10th Conference of the European Ornithologist's Union
24-28 August 2015, Badajoz

Programme and Abstracts

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PROGRAMME and ABSTRACTS

Edited by Graham Martin & Alfonso Marzal

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10th CONFERENCE of the EUROPEAN ORNITHOLOGISTS' UNION

BADAJOZ, 24-28 AUGUST 2015

Conference Organizers: University of Extremadura

Local Organizing Committee

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Sergej Soloviev, Omsk State University after F.M. Dostoevsky
Jan O.Engler, University of Göttingen

Welcome from the President

A cordial welcome to delegates from Europe and far beyond to the 10th Conference of the European Ornithologists' Union in Badajoz, Spain.

This exciting meeting promises to become another milestone in the development of the EOU. The EOU was founded in Bologna in 1997, when the Cold War had ended, in hopes to bring together ornithologists from across Europe for advancing the scientific study of birds. At its 10th meeting, the EOU has grown to be a vibrant community, where people from former "east" and "west" mingle effortlessly and work together in dynamic networks. Young ornithologists have self-organised and will meet and encourage each other in specific, dedicated "Fledgeling" events. The British Ornithologists' Union is generously supporting our Early Career Researchers. The Migratory Landbird Study Group, founded during the 9th EOU meeting in Norwich, is organising a Satellite meeting to discuss migration research, and many excellent Symposia and Round Tables will highlight and forge a broad range of research initiatives. It is a real pleasure to watch, and shelter from the winds, the sparks of new collaborative efforts that spring from the platform of EOU conferences.

It is our hope that the EOU conference in Badajoz will initialize many further synergisms. Several people have dedicated a major portion of their time and energy to generate this opportunity. Having observed these efforts, I cannot overstate how grateful I am to Alfonso Marzal and his Local Organising Committee, as well as to Graham Martin and his Scientific Programme Committee. Thank you also to the generous support of many Spanish organisations in these times of difficult funding.

On behalf of Council and Officers of the EOU, I wish you all an inspiring, invigorating and joyful meeting. Let us make the most of the great efforts that have gone into preparing for it.

Glasgow, August 2015

Barbara Helm
EOU President

Welcome to Badajoz for the EOU 2015 Conference

On behalf of the Local Organizing Committee I am pleased to welcome all delegates to the 10th Conference of the European Ornithologist's Union.

We are delighted to be your host during the conference in Badajoz, the biggest city in Extremadura. Our region is recognized nowadays in Europe as an ecological territory with unique nature spaces in Europe, and a real treasure for birdwatchers. Extremadura offers the possibility of birdwatching in natural habitats of great beauty and also of enjoying its interesting cultural and historical heritage.

We thank to EOU Council and Scientific Programme Committee for having displayed their confidence in the Spanish delegation for the organization of the Conference. We also would like to acknowledge to Gobierno de Extremadura, Ayuntamiento de Badajoz, University of Extremadura, Diputación de Badajoz and many other Spanish organizations for their invaluable support. We are also grateful to many companies for their sponsorship.

We sincerely hope that your attendance to the conference and the sharing of your knowledge will contribute to the advancement of ornithology and the promotion of the scientific studies of birds.

Badajoz, August 2015

Alfonso Marzal

Chairman of the Local Organizing Committee

EOU2015

PROGRAMME

MONDAY, 24th AUGUST 2015

08:30 – 17:00	**Migratory Landbird Study Group (MLSG) Satellite meeting**	SALA1
14:30 – 16:30	**EOU Council meeting**	SALA 2
17:00 – 19:15	**Registration**	OFICINA TÉCNICA
19:15 – 19:30	**Opening Ceremony**	AUDITORIO
19:30 – 20:30	**Plenary 1: Pérez-Tris**	AUDITORIO
20:30 – 21:30	**Welcome reception**	PATIO

TUESDAY, 25th AUGUST 2015

9:00 – 9:50 **Plenary 2: Bonadonna** AUDITORIO

9:50 – 10:30 **Break / Posters** PATIO / SALA EXPOSICIONES

10:30 – 12:30 **Parallel Symposia 1**

Symposium 4 (SALA AZUL): *Alone or in groups: different strategies of juvenile migrants*

Symposium 6 (AUDITORIO): *Coping with the stress of city life: mechanistic studies in urban ecology*

Symposium 9 (SALA 1): *Light, colours and perfumes: bird sensory ecology*

Symposium 10 (SALA 2): *Ecophysiological adaptations to the environment in birds*

Symposium 11 (SALA 3): *Mediators of individual quality in birds*

12:30 – 14:00 **Lunch / Posters / Exhibition** PATIO / S. EXPOSICIONES / CAFETERÍA

14:00 – 14:50 **Plenary 3: Laiolo** AUDITORIO

14:50 – 15:30 **Break / Posters** PATIO / SALA EXPOSICIONES

15:30 – 16:50 **Parallel Oral Sessions 1 – 5**

Oral Session 1 (AUDITORIO): *Ecology*

Oral Session 2 (SALA 1): *Physiology and Parasitology*

Oral Session 3 (SALA AZUL): *Migration*

Oral Session 4 (SALA 3): *Reproduction*

Oral Session 5 (SALA 2): *Distribution, Taxonomy, Evolution, Behaviour*

16:50 – 18:00 **Parallel Round Tables 1**

Round Table 1 (SALA AZUL): *Crossing borders: collaborative and integrative research for migrant landbirds across the flyway*

Round Table 3 (SALA 3): *Drivers of spatial and phenological change in migratory systems*

Round Table 6 (SALA 1): *The European Turtle Dove as a case study: how to conserve a declining species of hunting interest?*

Round Table 7 (SALA 2): *Creation of multiple genome alignments and clade-based tools to facilitate the study of speciation and adaptation in birds*

18:00 – 18:30 **SPECIAL TALK: DEL HOYO HBW** AUDITORIO

18:30 – 19:20 **BOU / ECR EVENT** SALA AZUL

19:00 - 20:30 **POSTERS** SALA EXPOSICIONES

20:30 – 23:00 **FLEDGELING EVENT** (PUB Mercantil)

WEDNESDAY, 26th AUGUST 2015

BIRD - TOURS

THURSDAY, 27th AUGUST 2015

9:00 – 9:50 **Plenary 4: Piersma** AUDITORIO

9:50 – 10:30 **Break / Posters** PATIO / SALA EXPOSICIONES

10:30 – 12:30 **Parallel Symposia 2**

Symposium 1 (SALA AZUL): *The scale of migratory connectivity and population dynamics in Palearctic-African migrant landbirds*

Symposium 5 (SALA 2): *Phylogenetics of Passerine birds: unraveling their evolution at the macro- and micro-scales*

Symposium 12 (SALA 3): *Early life experiences: merging mechanistic and functional approaches to reveal their meaning*

Symposium 13 (AUDITORIO): *Studies on bird, vector, and blood parasite interactions in a changing world*

Symposium 15 (SALA 1): *Internal and external drivers of variation in landbird migration*

12:30 – 14:00 **Lunch / Posters / Exhibition** PATIO / S. EXPOSICIONES / CAFETERÍA

14:00 – 14:50 **Plenary 5: Shamoun - Baranes** AUDITORIO

14:50 – 15:30 **Break / Posters** PATIO / SALA EXPOSICIONES

15:30 – 16:50 **Parallel Oral Sessions 6 – 10**

Oral Session 6 (AUDITORIO): *Ecology*

Oral Session 7 (SALA 1): *Behaviour*

Oral Session 8 (SALA 3): *Conservation*

Oral Session 9 (SALA 2): *Parasitology, Morphology, Genetics*

Oral Session 10 (SALA AZUL): *Migration*

16:50 – 18:00 **Parallel Round Tables 1**

Round Table 2 (SALA AZUL): *The role of social media in ornithology*

Round Table 4 (SALA 3): *Radar aeroecology: unravelling population scale patterns of avian movement*

Round Table 5 (SALA 1): *Macroecology, global change, and the state of modelling avian distributions*

18:00 – 19:00 **The EOU: Future Direction & General meeting** AUDITORIO

19:00 – 20:00 **FLEDGLINGS. Meet the editor** SALA AZUL

20:30 – 23:30 **Conference dinner** MEIAC

FRIDAY 28th AUGUST 2015

9:00 – 11:00 **Parallel Symposia 3**

Symposium 2 (SALA 3: *From analysis to action: mitigating the impacts of environmental change on alpine birds*

Symposium 3 (SALA 1): *Female ornaments and armaments*

Symposium 7 (AUDITORIO): *Current Research on animal personality in birds*

Symposium 8 (SALA 2): *Significance of intraspecific variation in avian sperm traits: plasticity, microevolution, speciation*

Symposium 14 (SALA AZUL): *Causes and Consequences of Partial Migration*

11:00 – 11:40 **Break / Posters** PATIO / SALA EXPOSICIONES

11:40 – 12:30 **Plenary 6: Liker** AUDITORIO

12:30 – 13:00 **Closing Ceremony** AUDITORIO

13:00 – 14:00 **Lunch** SALA EXPOSICIONES / CAFETERÍA

14:00 **EOU Council meeting** SALA 2

EOU2015

Plenary Lectures

Plenary 1 MONDAY 24th AUGUST 19:30h AUDITORIO

Javier Pérez-Tris

Department of Zoology, Complutense University, 28040 Madrid, Spain.
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Disease threats to bird diversity: where are they now, where are they going to be, and how can we recognize them

Abstract

Disease is an important driving force in the evolution of every life form, and birds are not the exception. Ornithologists are interested in knowing where and when birds face the strongest impacts of pathogens, as these may determine individual fitness, and sometimes may put bird populations at risk. Therefore, knowing the ecological and evolutionary processes that shaped the current distribution and impact of bird parasites is central to avian biology, and also to our ability to prevent disease outbreaks that may threaten bird diversity. However, by no means this is an easy task. Parasite diversity is huge, as it is the diversity of parasitic life styles. Parasites may differ in the geography of their transmission, their ability to hitchhike migrant birds to spread over the planet, or their success in establishing upon colonization of new areas. Worryingly, these processes are being altered by human influence, and they will probably change in the near future due to global warming. We need to be ready for new conservation challenges associated with the spread of parasites. Learning how to recognize those that are most likely to develop into emerging diseases may be a critical first step to prevent them from spreading.

Biography

Javier Pérez-Tris teaches Zoology at Complutense University of Madrid. He is broadly interested in evolutionary biology, biogeography, behavioural ecology and conservation biology. He has investigated variation in avian migration, and how this has driven phenotypic divergence and ecological interactions of birds. His recent research has focused on the biogeography of bird-symbiont interactions (from within-host symbiont coexistence to global diversity patterns) and the evolution of host exploitation strategies among symbiont species. He belongs to the Evolution and Conservation Biology Research Group and is member of the editorial boards of Journal of Avian Biology and Ibis

Home page: www.ucm.es/perez-tris

Plenary 2 TUESDAY 25th AUGUST 9:00h AUDITORIO

Francesco Bonadonna

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The three flavours trilogy: from orientation to communication in petrel seabirds

Abstract

Chemical cues have been probably the first cues ever used by organisms to assess their environment, and to communicate among them. Chemical cues are broadly used by invertebrates and vertebrates, but in birds have rarely been investigated: birds rarely display obvious olfactory-driven behaviours. However, in the last 40 years, researchers showed that odours are used by birds for orientation, foraging, and that they contribute to communication among individuals. Procellariiform seabirds, have been, and still are, a privileged model because of their developed olfactory neuroanatomy. Evidence, which relate to many aspects of petrels' ecology (homing, foraging, recognition, mate choice), provide a comprehensive case study of avian chemical communication. I will present a typical trilogy in Hollywood style, where three chapters lead step by step to the first evidence ever of individual olfactory recognition in a bird species. Odours over the sea guide petrels during navigation. Odours at the colony allow recognition and nest finding. Personal odours, reflecting species, sex, identity, and kin, may be used for communication. These results, more than 50 years after the seminal work on avian olfaction by Betsy Bang, indicate that chemical signals can contribute, as well as colours, calls and songs, to avian social behaviours

Biography

Francesco Bonadonna interests are around the olfactory world in birds. Coming from studies about olfactory navigation in homing pigeons, he explored thenavigation abilities in petrels and discovered, by chance, that these seabirds not only use olfaction for orientation, but also in communication among individuals. He claimed thus first that olfactory communication actually exists in birds. Obtaining a position in CNRS research institution in France he animates a small team working mainly in sensory ecology of birds and mammals, without obviously neglecting orientation and navigation topics in birds.

Plenary 3 TUESDAY 25th AUGUST 14:00h AUDITORIO

Paola Laiolo

Research Unit of Biodiversty (UO, CSIC, PA), Oviedo University, Campus de Mieres, 33600 Mieres, Spain.
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Patterns and processes in bird communities from alpine environments

Abstract

The spatial heterogeneity in habitat and climate conditions is a major agent of functional, taxonomic and phenotypic diversification of populations and species. Elevational gradients represent an excellent study system to observe the course of these ecological processes and to test predictions of life-history theory, niche theory, and island biogeography theory. I will provide evidence of the interrelation of individual, population and community processes along these gradients. Although birds have evolved few unique adaptations to alpine conditions, the guild of species typical of these environments shares functional characteristics that permit persistence in habitats characterized by low and fluctuating environmental productivity: high allocation to parental care and self-maintenance and low reproductive output. This trade-off, or cost of reproduction, may predict the distribution of phenotypes and species along elevation gradients. Consequently, bird communities are not randomly assembled, but tend to be organized by environmental filters more markedly than by limiting similarity and species competition as we move towards mountaintops. The position of richness peaks, and community dynamics along elevation, are differentially controlled by area-heterogeneity trade-offs and stochasticity.

Biography

Paola Laiolo's research integrates community with individual-level approaches to study passerine distribution and behaviour. Her recent research focuses on alpine organisms, and their adaptations, population dynamics and diversity patterns. She is associate professor of the Spanish National Research Council (CSIC) at the Research Unit of Biodiversity, member of the editorial team of Ardeola and of SEO BirdLife Scientific Committee.

Home page: http://www.unioviedo.es/UMIB/laiolo.html

Plenary 4 THURSDAY 27th AUGUST 9:00h AUDITORIO

Theunis Piersma

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Flyway flexibility: inter- and intra-generational degrees of freedom for seasonal migrants

Biologists have become wide awake to the fact that environments, as a rule, show change, often rapid change. Ornithological observations have now been carried out long enough to establish that temporal and spatial changes in the occurrence of birds are indeed the norm. In the current epoch of man-induced environmental upheaval more change is expected. Migration biologists need to reconcile 'old' ideas about genetic 'control' of migration with new cases of very rapid adjustment of the timing and pattern of seasonal migration. Is the established model of genetic control sufficient for a believable evolutionary account of such changes, or is there more that needs consideration? Should we be open to processes as varied as epigenetic priming and social learning enabling migrants to track changing patterns of resource availability across the globe? I will try to develop arguments for a greater (but certainly still limited) potential for flyway flexibility than has hitherto been acknowledged, using examples from the worldwide shorebird studies I am involved in.

Biography

Since 2012 Theunis Piersma has occupied the newly established Chair in Global Flyway Ecology at the University of Groningen at the instigation of the Dutch chapters of the World Wildlife Fund and BirdLife International. From 2003 to 2102 he occupied the Chair in Animal Ecology at the University of Groningen (RUG). Since 1996 he additionally leads a research team on intertidal mudflat ecology at the NIOZ Royal Netherlands Institute for Sea Reserarch on the Wadden Sea island of Texel. In 2004 he was awarded the Nature Conservation Prize of the Prins Bernhard Culture Fund and the first Luc Hoffmann Medal for Excellence in wetland science and conservation of Wetlands International. In 2009 he was elected member of the KNAW, the Dutch Royal Academy of Arts and Sciences. In 2014 he received the prestigious Spinoza Premie, the highest accolade for working scientists in The Netherlands. A contributor to over 400 scientific publications, together with his research teams at NIOZ and RUG and within strong international collaborations, Piersma tries to shape the best possible ecological research on migrant birds in wetland habitats. The research is strongly focused on the individual animal, with much consideration for the environmental context in which they have to make their foraging and

movement decisions. He has always tried to share the results of the research with as broad a societal audience as possible, something that has lead to increasing collaboration with the musician Sytze Pruiksma. Piersma was a coauthor of 'Shorebirds. An illustrated behavioural ecology' (KNNV Publishing, 2004), and together with Jan van Gils he wrote 'The flexible phenotype. A body-centred integration of ecology, physiology, and behaviour' (Oxford University Press, 2011). Home page: www.rug.nl/staff/t.piersma/

Plenary 5 THURSDAY 27th AUGUST 14:00h AUDITORIO

Judy Shamoun-Baranes

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Why are there so many individual strategies for coping with dynamic environments?

Abstract

Birds utilize dynamic environments, at the earth surface and in the air, which change at different scales in space and time. This environmental heterogeneity can have a strong influence on how, why, where and when birds move. The following presentation is an exploration of ongoing research which began with a focus on the influence of atmospheric dynamics on the migratory movements of birds. Studies combining models and measurements of different migratory systems show diverse strategies for dealing with atmospheric dynamics, especially changes in horizontal and vertical flow. However, migration is just a part of an individual's movement strategy. Thus I also present a transition towards studying movement throughout the entire annual routine of a migratory species, the lesser black backed gull *Larus fuscus*. Individuals of this seemingly generalist seabird show a broad range of migration and foraging strategies. Tracking these birds over multiple years at the fine scale has provided examples of individual specialization, strong site fidelity, consistency in migration strategies and flexibility. Ongoing work has raised questions, ideas, and new plans for understanding the long term ecological and evolutionary consequences of this diversity.

Biography

Judy Shamoun-Baranes is fascinated by avian flight behaviour and her research focuses on understanding how different intrinsic and environmental factors influence bird movement at different scales in space and time. Where possible she combines measurements of bird movement, models and environmental data to study immediate responses of birds to their environment, resulting movement patterns, and longer term consequences of different behavioural strategies. High resolution GPS tracking (www.uva-bits.nl) and radar measurements are often used in her research resulting in new challenges and opportunities for studying movement. Systems being studied include soaring bird, passerine, wader and seabird migration, and individual foraging strategies. She is currently the vice-chair of the e-COST Action "The European Network for the Radar Surveillance of Animal Movement" (ENRAM, www.enram.eu). Home page: http://tinyurl.com/ly66ptz

Plenary 6 FRIDAY 28th AUGUST 11:40h AUDITORIO

András Liker

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Mortality, adult sex ratio and reproductive sex roles in birds

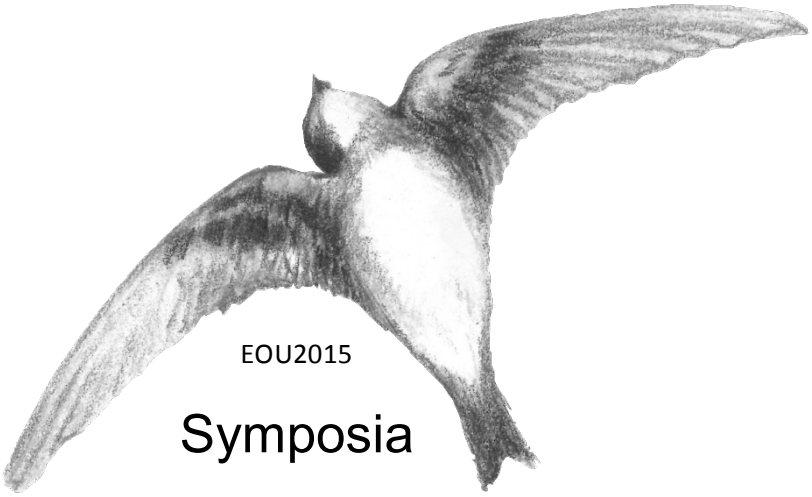
Abstract

Adult Sex Ratio (ASR) is an important demographic parameter that can influence reproductive sex roles including parental care and mating behaviour. In this talk I review the diversity of ASR in birds, and show that ASR is often unbalanced in natural populations. There are several processes that can generate skewed ASR: sex ratio may be already biased at hatching, or becomes unbalanced later due to differential mortality of the sexes. We tested these hypotheses using phylogenetic comparative methods, and results suggest that ASR is more strongly predicted by sex differences in adult mortality than by either hatching or fledgling sex ratios. Finally, we explored how interspecific variation in ASR is related to variation in sex roles in birds. Recent theories predict that the rarer sex, which has better mating opportunities than the more common sex, should invest more in mating and at the same time should reduce parental care. According to these predictions, our analyses show that skewed ASRs are often associated with polygamy and high divorce rates, and also with sex differences in parental roles.

Biography

András Liker's research focuses on behavioural ecology and evolutionary topics, using birds as model systems. In a series of recent comparative studies he investigates the association between skewed adult sex ratios and variation in avian parental sex roles and mating behavior. He is also interested in the mechanisms generating skewed sex ratios in birds, like the causes of sex-biased mortalities. In another line of research, he combines field studies and lab experiments to investigate the effects of habitat urbanization on behaviour and reproduction of house sparrows, one of his favourite urban species. Currently his team also studies great tits to compare climatic effects on reproduction between urban and woodland populations. He is currently a professor at the University of Pannonia, and was the president of the Hungarian Ethological Society between 2010-2011.

Homepage: http://ornithology.limnologia.hu/people/andras-liker



EOU2015

Symposia

THURSDAY 27th AUGUST **10:30h – 12:30h** **SALA AZUL**

S1. The scale of migratory connectivity and population dynamics in Palearctic-African migrant landbirds

Organisers:

Will Cresswell (St Andrews, UK) & Anders Tøttrup School of Biology, University of St Andrews & AP Leventis Ornithological Research Institute, Jos, Nigeria. wrlc@st-and.ac.uk

Anders P. Tøttrup (Copenhagen, DK) Center for Macroecology, Evolution and Climate, Natural History Museum of Denmark, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen O, Denmark, aptottrup@snm.ku.dk

Summary The scale of migratory connectivity between breeding grounds in Europe and wintering grounds in Africa determines population resilience in the face of habitat and climate change. Furthermore, identifying the species specific mechanisms by which migratory connectivity arises initially for juveniles and its flexibility when established by adults allow us to predict many aspects of migrant ecology and conservation. For example, migrants which have largely stochastic initial location of wintering grounds, and so only large scale connectivity, are likely to be generalists, with small body size, low migratory capability, have many stopovers and be nocturnal migrants, that require land sharing and sustainable development conservation solutions. In contrast migrants which have largely deterministic initial location of wintering grounds will have much smaller scale connectivity, and so are likely to be habitat specialists, short distant migrants and use social learning and have diurnal group migration to locate wintering areas, that require land sparing and governance conservation solutions. Despite the clear importance of the scale of connectivity in understanding the ongoing declines of many Palearctic migrant species, connectivity is poorly known for almost all landbird species. Recent tracking studies have now begun to address this knowledge gap. This symposium aims to bring together such recent studies to begin to identify generalities of scale in migratory connectivity that can feed into general conservation solutions.

Keynote address #1. **THURSDAY 27th AUGUST** **10:30h** **SALA AZUL**

S1.1

Bengt Hansson
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Uncovering the long-distance migration of Great Reed Warblers *Acrocephalus arundinaceus*

Abstract
We have studied the breeding ecology of great reed warblers (*Acrocephalus arundinaceus*) at Lake Kvismaren, Sweden, for 30 years and since 2008 also the species' migration with geolocators. Our results show a main migration corridor east of the Alps over Italy and Tunisia, and a rapid flight over the Mediterranean Sea and the Sahara Desert. Once in sub-Saharan Africa, the birds settled in an extensive region – from Senegal in west to SW Sudan in east – indicating weak migratory connectivity. The individuals' choice of wintering site was highly consistent between years, as shown by data from individuals tracked more than one year. On their northward journey back to Sweden the birds kept high migration speeds independently of when they departed from Africa, which indicates that they used a time-minimisation strategy to arrive as early as possible at the Swedish breeding site. This strategy pays off, because early arrival to the breeding grounds is tightly associated with mating opportunities and reproductive success in great reed warblers. Only by studying the whole annual life-cycle of long-distance migrants, we will be able to reach detailed understanding of these species' unique life-history ecology and conservation concerns.

Joint authors

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Keynote address #2. **THURSDAY 27th AUGUST** **11:00h** **SALA AZUL**

S1.2

Will Cresswell

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The population and conservation predictions arising from variation in connectivity in the African-Palearctic migration system

Abstract
Migratory connectivity is important in understanding migrant declines. If a migrant has large scale connectivity (a wintering area with longitudinal spread of thousands of kilometers) then overwinter survival for any European population will be similar and reflect the average conditions in Africa or during migration. Any degradation of habitat, anywhere in the wintering or migration area will therefore lower survival rates for all European breeding populations, so variation in population dynamics between these populations must be driven by differences in productivity, or survival post-fledging or during first migration. Migrants with large scale connectivity because of stochasticity in first winter site location will tend to be generalists and have resilience to local habitat or climate change at the individual and population level. Migrants which have much smaller scale connectivity because of geographical or temporal constraints during migration, or social learning will however be more vulnerable. First winter movement post-migration to locate optimal wintering habitat may also decrease scale of connectivity but should increase resilience unless sampling costs are high: this crucial aspect of connectivity remains unexplored. Conservation for species with large scale connectivity will require land sharing and sustainable development whereas small scale connectivity species require land sparing and governance solutions.

S1.3 **THURSDAY 27th AUGUST** **11:30h** **SALA AZUL**

Flavio Monti

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Scale-dependent migration and connectivity in Western Palearctic Ospreys *Pandion haliaetus*.

Abstract

We studied plasticity in migratory behaviour between populations of a large migratory raptor, the Osprey *Pandion haliaetus*, in the Western Palearctic. Fifty-four ospreys from Scandinavian and Mediterranean populations were GPS-tracked across 70 migratory trips to investigate variation in migratory traits across a latitudinal divide. Scandinavian ospreys performed homogeneous long-distance migrations, reaching sub-Saharan wintering grounds in West Africa. In contrast, Mediterranean ospreys showed a heterogeneous migratory behaviour, with resident (46% of cases), long-distance (39%) and short-distances (15%) migratory individuals. To infer wintering ecology of Mediterranean ospreys we relied on a complementary method, using multi stable isotope tracer approaches. δ13C, δ15N and δ34S from other 18 Mediterranean adults were examined to infer wintering ground locations and habitat types used during the inter-breeding period. Mediterranean ospreys spent the winter at temperate latitudes and made use of marine bays, coastal lagoons/marshland and inland freshwater sites. Such behavioural plasticity in the choice of migratory routes and habitat type suggests the implementing of broad-scale approaches for the protection of important areas. Overall, our study demonstrates that detailed knowledge of migratory patterns at multiple spatio-temporal scales is of fundamental importance for the design of conservation and management plans of migratory bird populations.

Joint authors

David Grémillet, Andrea Sforzi, Jean-Marie Dominici, Rafel Triay Bagur, Antoni Muñoz Navarro, Leonida Fusani, Aloïs Robert, Ilham Bentaleb, Raymond H.G. Klaassen, Thomas Alerstam and Olivier Duriez.

S1.4 **THURSDAY 27th AUGUST** **11:50h** **SALA AZUL**

Janne Ouwehand

Animal Ecology Group, Groningen Institute for Evolutionary Life Sciences, University of Groningen, P.O. Box 11103, 9700 CC Groningen, The Netherlands

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Is geographical variation in breeding phenology and migration driving migratory connectivity in Pied Flycatchers *Fidecula hypoleuca*?

Abstract

Understanding what drives long-distance migrants' responses to environmental change requires basic knowledge about the wintering and breeding grounds, and the timing of movements between them. We investigated whether pied flycatchers Ficedula hypoleuca from different breeding populations also differ in wintering locations in West-Africa. Light-level geolocator data revealed that flycatchers from different breeding populations travelled to different wintering sites, despite prolonged autumn route convergence. We found support for strong migratory connectivity showing an unexpected pattern: individuals breeding in Fennoscandia (S-Finland, S-Norway) wintered further west compared to individuals breeding at more southern latitudes in the Netherlands and SW-United Kingdom. The same pattern was found in ring recovery data from sub-Saharan Africa of individuals with confirmed breeding origin. Furthermore, birds from populations which breed and migrate earlier wintered further east than birds from 'late' populations. High repeatability and consistency in stable isotope ratios of winter-grown feathers of individuals with and without a geolocator suggested that wintering locations were unaffected by geolocation deployment. We discuss potential ecological factors causing such an unexpected pattern of migratory connectivity. We speculate that population differences in wintering longitudes result from geographical variation in breeding phenology and the timing of fuelling for spring migration at the wintering grounds.

Joint authors

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S1.5 **THURSDAY 27th AUGUST** **12:10h** **SALA AZUL**

Chris Hewson

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Methodological and sampling issues in use of tracking technology in connectivity studies

Abstract

Understanding the causes of patterns of connectivity depends critically on our ability to describe them accurately. For several species of small birds, current knowledge comes primarily from recent geolocator studies, because of the small number of ringing recoveries in Africa and potential biases in these. We present two sets of geolocator data from Common Nightingales, designed to test whether previously published longitudinally-segregated patterns of connectivity held for additional tagging localities in the breeding and wintering range, namely England and Ghana. Predicted patterns of connectivity were met in data from the breeding population but only partially fulfilled in data from the wintering location. Reasons for this are discussed, including limitations in tracking using light-level geolocators. Recommendations include conducting studies at both breeding and wintering locations if a complete picture of connectivity is required and the use of GPS technology where possible. Ideally, studies using non-archival tracking technologies are required so that fitness implications of different migration routes and wintering locations can be assessed to help identify causes of connectivity and the factors limiting migration routes and winter grounds of different populations. The implications of this for connectivity studies are illustrated using data from Common Cuckoos satellite tracked from the UK.

Joint authors

Chas Holt, Phil Atkinson - both BTO (address as above)

John Black - Natural England, Kent

FRIDAY 28th AUGUST **9:00h – 11:00h** **SALA 3**

S2: From analysis to action: mitigating the impacts of environmental change on alpine birds

Organisers:
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Summary
High altitude and high latitude ecosystems are particularly vulnerable to environmental change. There is evidence that alpine bird communities are being negatively affected by land abandonment, by disturbance generated by outdoor recreation and by habitat alteration induced by climate change, and that these threats interact. Projection models further suggest that climate change and related vegetation shifts will cause severe range reductions in grassland bird species in the European Alps. Having identified the main threats, the priority now is to develop pragmatic action to avoid and mitigate them. In this symposium, we shall consider strategies to preserve and restore alpine bird populations, which we define broadly to include both upland and boreal ecosystems. A first focus will be on providing tools for mitigating negative effects and solutions for active conservation and restoration interventions. A second focus will be the broader landscape-scale approach necessary to identify vulnerable species and habitats where action should be prioritized. Overall, the symposium will provide the next logical step from identifying and quantifying threats to managing habitats and landscapes for the conservation of alpine birds.

Keynote address #1 **FRIDAY 28th AUGUST** **9:00h** **SALA 3**

S2.1

Veronika Braunisch

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Where to combat shrub encroachment in Alpine timberline ecosystems: combining remotely-sensed vegetation information with species habitat-suitability modelling

Abstract

Where to combat shrub encroachment in Alpine timberline ecosystems: combining remotely-sensed vegetation information with species habitat-suitability modelling The abandonment of traditional grazing practices, followed by shrub encroachment, progressively reduces habitat heterogeneity and biodiversity in Alpine treeline ecosystems. We developed a method to localize sites where shrub encroachment affects the key reproduction habitats of black grouse *Tetrao tetrix,* a declining indicator species for habitat heterogeneity in the Swiss Alps. Combining different sources of remotely sensed information with spatial modelling we (1) identified the six predominant vegetation types, (2) assessed breeding-habitat suitability as a function thereof and (3) crossed the two models in order to identify priority areas for restoration action, i.e. large aggregations of homogeneous shrub encroaching into otherwise suitable breeding habitat. The six vegetation types (coniferous forest, *Alnus viridis* succession, *Rhododendron ferrugineum*-dominated, *Juniperus communis*-dominated and mixed heathland as well as Alpine meadow) were predicted with high accuracy. Breeding black grouse showed a unimodal response towards all vegetation types, with optimal cover varying between 10% (Juniper-dominated heathland) and 50% (mixed heathland). We recommend focusing management on larger (>1 ha) patches of homogeneous shrub-vegetation, which made up 10% of the potentially suitable breeding area (5.2% heathland and 4.8% green alder stands). Our approach can be applied to any geographic area where shrub encroachment represents a major biodiversity conservation issue.

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Keynote address #2 **FRIDAY 28th AUGUST** **9:30h** **SALA 3**

S2.2

Mattia Brambilla

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Climate change will exacerbate the impact of skiing on high-elevation bird species in the Alps

Abstract
How humans adapt their activities to future climate change may increase negative impacts on biodiversity. Skiing is known to have negative impacts on mountain biodiversity, and it is closely linked to climate. Similarly, species living at high altitudes are likely to shift their distributions towards mountain summits in response to climate change. We assessed the extent of the possible future conflict between skiing and biodiversity by predicting locations likely to be suitable for both skiing and for high-elevation passerine birds in the Italian Alps by modelling ski-piste and species presence in relation to climate, topography and habitat. Potential conflict was assessed by comparing the overlap of areas suitable for skiing and those suitable for five grassland bird species under different scenarios of climate change for the year 2050. Areas suitable for both ski-pistes and grassland birds were projected to increase in elevation and to overlap to a greater extent increase, with the consequence that most of the area suitable for species will be potentially subject to ski-induced conflicts. Given the alarming range contractions forecast for high-elevation species, and the increasing potential impact of ski-pistes, it is essential to consider prevention of ski-piste construction in sites characterized by high conservation value.

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S2.3 **FRIDAY 28th AUGUST** **10:00h** **SALA 3**

Thomas Sattler

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Climate warming and population changes of Alpine rock ptarmigan *Lagopus muta Helvetica*

Abstract
Models based on climate and land-use scenarios predict serious declines for the Alpine rock ptarmigan, a subspecies restricted to the Alps. We analysed counts of territorial males from 40 sites in the Swiss Alps since 1995 with state-space models including various environmental variables. Over the 18 study years population growth rate was negative overall (-13%), but varied greatly between different regions of the Swiss Alps (from -50% to +6%) and between sites. We did not find an overall factor which explained variation in population growth rates, except for a bell-shaped effect of July temperature. It thus seems that various factors act locally to different degrees, such as potentially unsustainable hunting, generally unfavourable weather, and upward shift of the ptarmigan due to increasing temperatures. Depending on regions, the ptarmigan observations have moved upwards by up to 11.0 m per year (Southern Alps). The first results from the new distribution atlas of Switzerland indicate shrinkage of the distribution area in the lower elevations of the Alps, which makes the Alpine rock ptarmigan a species of conservation concern. A better understanding of the different causes and possibly different management strategies will be essential for the conservation of Alpine rock ptarmigans in the Alps.

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S2.4 **FRIDAY 28th AUGUST** **10:20h** **SALA 3**

Jaime Resano Mayor

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Population structure of the Snowfinch *Montifringilla nivalis* in Western Europe

Abstract

Alpine ecosystems count among the most threatened by climate change. Species occurring in high mountains now face high risk of habitat loss, range contractions and local extinction. The Snowfinch (*Montifringilla nivalis*) is a characteristic passerine of alpine habitats in Europe. Despite its breeding nuclei are relatively well-defined, we still know little about the species' population structure in Western Europe. By analysing two mitochondrial genes (cyt b and CR) and the stable isotopes of hydrogen (δ2H), here we assess to which extent breeding populations of Snowfinches in the Cantabrian Mountains, Pyrenees and Alps and a wintering population in the Eastern Pyrenees function as a metapopulation. Most haplotypes were present in all breeding populations, but one was only found in the Cantabrian Mountains and predominant there. The most widespread haplotypes at the breeding grounds were found in the majority of the wintering individuals, but none of them showed the haplotype specific at the Cantabrian Mountains. Our results suggest connectivity between all populations, although the one at the Cantabrian Mountains seem to be more isolated. No differences in δ2H were found between breeding populations so we could not assign the breeding grounds of wintering individuals by isotopic analysis.

Joint authors

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S2.5 **FRIDAY 28th AUGUST** **10:40h** **SALA 3**

John Calladine

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Whinchats *Saxicola rubetra* in upland Scotland: Multi-scale associations with habitat and land use change

Abstract

Whinchats persist in restricted upland zones, with lower altitude limits constrained by intensive agriculture and upper limits by environmental conditions. The responses of breeding Whinchats to land-use change within that restricted zone provide an example of how grassland birds may respond to vegetation shifts in alpine and other upland areas. Where grazing ceased on former upland pasture, Whinchat territories tended to shift upwards by a mean 30 m over 4 years to more exposed areas where slower rates of vegetation development will have retained some short swards. Sites where young fledged successfully tended to be at higher altitudes which contrasted with a nearby site where grazing was retained and successful territories tended to be at lower altitudes. An upward redistribution to potentially less favourable environments in response to vegetation development is inferred. Limitations appeared to be a response to growth of more homogenous tall swards (avoided by foraging Whinchats) in advance of replacement by shrub woodland. Changes in the upland margins can be relatively rapid and therefore observed changes in Whinchat distribution could offer an insight into mechanisms that may operate in, and management options that maybe applied to, more exposed environments.

FRIDAY 28th AUGUST **9:00h – 11:00h** **SALA 1**

S3. Female ornaments and armaments

Organisers

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Alexandre Roulin

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Summary
In 1871, Darwin proposed the then highly controversial idea that male sexual ornaments could evolve through female choice, an idea that is now well established. Indeed, males from many different taxa, and in birds there are many examples, exhibit traits that attract females and thereby increase male reproductive success. However, the females of many species have similar traits. In particular, over 50% of bird species are monomorphic in appearance and female birds have frequently exaggerated traits, such as colour patches or elongated feathers. The historical explanation for exaggerated traits in females has been that they exist as the by-product of genetic correlation from sexual selection on male traits. Contrary to this explanation, an increasing number of studies in the recent years have suggested that female traits play a role in female-female competition (intrasexual selection, these traits are also called "armament") or are sexually selected by males (intersexual selection, these traits are also called "ornament"). It should be noticed that many of these studies are based on bird species. So, this symposium wants to offer an opportunity to show the last results in this field, to sum up the new ideas, and to offer new perspectives for future studies.

Keynote address #1 **FRIDAY 28th AUGUST** **9:00h** **SALA 1**

S3.1

Jesús Martínez-Padilla

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Female ornamentation in red grouse

Abstract

Despite males and females display conspicuous sexual traits, theoretical and empirical studies of sexual selection have been focused on male ornaments perhaps due to their higher conspicuousness. However, females also show sexual behaviour and express sexual traits, but the reasons why female ornaments have evolved, their behavioural function and the mechanisms that cause the variation of their expression are questions still unresolved. Here I present a series of experimental studies replicated in different populations of red grouse (*Lagopus lagopus scoticus*). We focused our studies on the carotenoid-pigmented red comb displayed by females. The results of these experiments show that 1) nematode parasites constraint the colouration of this sexual trait by reducing blood carotenoids; 2) the size of this ornament is condition-dependent and is related to female levels of parasitation by nematodes; 3) condition-dependence is mediated by environmental conditions; 4) redness of the comb is associated with reproductive output in females; 5) parasites mediates the trade-off between reproduction and ornamentation; and 6) that selection operates on the expression of female ornaments. Overall, I defend that female ornamentation is not just a evolutionary by-product of male ornamentation and rather play key role on intra- and inter-sexual contexts being a reliable signal of individual quality.

Keynote address #2 **FRIDAY 28th AUGUST** **9:30h** **SALA 1**

S3.2

Alexandre Roulin

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Melanin-specific female life history strategies

Abstract
In the field of sexual selection, males are commonly considered as the chosen sex and females the choosy sex. Although this concept has not been debated, evolutionary biologists now consider that males do not mate indiscriminately. Indeed, in many species females strongly differ in quality which strongly affect reproductive success implying that males should mate or pair with the best or compatible females. To this end, males assess the degree of female ornamentation to select a mate. Because females often differ in the degree of melanin-based coloration, this category of trait has the potential to reveal female quality. In this conference, I will present a review of the current knowledge of the role played by melanin-based coloration as a signal of quality directed to males.

S3.3 **FRIDAY 28th AUGUST** **10:00h** **SALA 1**

Alejandro Cantarero Carmona

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A plumage signal covaries with testosterone levels in female Pied Flycatchers *Ficedula hypoleuca*

Abstract

In females, levels of testosterone (T) are generally lower than in males, but T may still affect morphology and behaviour in this sex. Females may signal competitiveness to acquire resources necessary for survival and reproduction like food, territories or breeding cavities. It is not clear at present if variation in physiological T levels is associated with variation in signal expression of female birds. In Iberian populations some females pied flycatchers *Ficedula hypoleuca* exhibit a distinctive white forehead patch. Both sexes also exhibit conspicuous white patches on wings that vary greatly in size and shape. These patches are exhibited by birds of both sexes in social interactions by repeatedly flicking the folded wings. We have aimed at detecting if naturally occurring variation in T circulation is linked to the expression of forehead patch presence and folded wing white patch area in female pied flycatchers in three separated populations of the pied flycatcher. Female pied flycatchers showed during the incubation phase markedly lower values of circulating T than during the nestling phase. The area of the folded wing white patch but not the presence of a forehead patch in females was associated with higher circulating T levels during the incubation phase.

Joint authors

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S3.4 **FRIDAY 28th AUGUST** **10:20h** **SALA 1**

David López Idiáquez

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The role of melanin-based coloration in female-female competition *Falco tinnunculus*

Abstract
Sexual selection has produced an enormous variability on sexual ornaments that evolve mainly because they are reliable proxies of individual quality. This reliability is sustained by the high relative costs of producing or maintaining them for low quality individuals. However, our knowledge of sexual selection is male-biased despite females can show bright and coloured ornaments. Their evolution can be explained by shared genetic architecture with males or by female-female competition for breeding opportunities or ecological resources. In this study we simulated intraspecific territorial intrusions before breeding using natural decoys of females of two "phenotypes" of common kestrels (*Falco tinnunculus*) associated with different quality. We used rump colouration as previously proven proxy of individual quality: grey (high quality) and brown (low quality). High-quality phenotypes received significantly less attacks than brown ones. In addition, we found that more aggressive females had smaller clutches. We suggest that aggressiveness is a costly activity and that rump coloration may be an index of quality as grey rumped individuals were less attacked than brown ones. Our results suggest that intra-sexual competition in females might be cost paid in terms of breeding outcome.

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S3.5 **FRIDAY 28th AUGUST** **10:40h** **SALA 1**

Bekir Kabasakal

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Mutual sexual selection in the Yellow-vented Bulbuls *Pycnonotus xanthopygos*?

Abstract

There is growing evidence for active male choice of ornamented females, as well as for ornamental traits associated with condition and/or fighting ability and dominance. In bird species in which both the males and females are ornamented, could operate mutual mate choice on the same trait. We test this mechanism of mate choice in the Yellow-vented Bulbuls (*Pycnonotus xanthopygos*), in which both sexes are ornamented with yellow undertail-coverts,a yellow patch that they display during aggressive and sexual displays. Another factor that might influence mate choice of both sexes is social familiarity. Preference for social familiarity might be important mechanism in evolution of local adaptation.We experimentally test in captivity whether males and females prefer more colored partners, so if mutual mate preference is playing a role in this species. At the same time we investigated whether social familiarity brings attraction when a bird chooses a mate. We discuss our preliminary results.

Joint authors

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TUESDAY 25th AUGUST **10:30h – 12:30h** **SALA AZUL**

S4. Alone or in groups: different strategies of juvenile migrants

Organisers

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Summary

Recent advances and miniaturization of tracking technology has led to a remarkable increase in movement studies. One fascinating, still largely unknown aspect of a migrant's life is the behaviour of immature birds. During the first years, young birds often have higher mortality and lower site fidelity compelling scientists to focus their tracking efforts on adults. Only recently, first attempts of following the movements of first year migrants have been made in a number of large migratory species. The results reveal that juveniles have less efficient migration routes and lower foraging efficiencies than adults, leaving them more vulnerable to predation and drastic changes in habitat and climate. Certain migratory strategies, such as flying in groups, can give rise to social learning opportunities, reduced risks due to safety in numbers or aerodynamic advantages. Yet, how do juveniles of solitary migrants handle their apparent disadvantages? This symposium is meant to summarise recent advances in juvenile tracking. Our goal is to unite researchers that have experience in following immature birds to enhance our understanding of the different migration strategies. A direct comparison between social and solitary migrants will help us to disentangle the relative contributions of innate and learned components on the migratory behaviour.

Keynote address #1 **TUESDAY 25th AUGUST** **10:30h** **SALA AZUL**

S4.1

Andrea Kölzsch

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Juvenile migrants travelling in groups – white storks and white-fronted geese

Abstract
Contrary to most small song birds, many large, long-distance migrants travel in big flocks between their wintering and breeding sites. Depending on the species, these groups can vary greatly in size, structure and composition. Group flights may decrease predation risk due to safety in numbers, increase the detection of favourable flight conditions or provide social learning opportunities. Here we will present two studies examining the mechanisms behind and implications of collective migration. First, we examine high-resolution GPS tracks of juvenile white storks (*Ciconia ciconia*) during their first autumn migration. We reveal the interaction rules that keep the flock together and explore how these rules vary during the different flight phases (i.e. thermalling vs. gliding). Second, we present the migratory behaviour of complete family groups of white-fronted geese (*Anser albifrons*) during their migration cycle. We examine how individual geese movements relate to each other, whether and how their behaviours synchronise and how the stability of family units influences migratory success. The outcomes of our studies improve our understanding of drivers of group behaviour and social migration.

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Keynote address #2 **TUESDAY 25th AUGUST** **11:00h** **SALA AZUL**

S4.2

Wouter M G Vansteelant

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There and back again: factors driving ontogeny of individual migration routes in Honey Buzzards *Pernis apivorus*

Abstract
Mechanisms that drive the ontogeny of individual migration routes can have important implications for migratory connectivity between populations. However, it is currently not known to what extent environmental factors influence route choice and establishment of wintering and breeding sites in unexperienced migrants. Here, we present satellite tracking data of six juvenile Honey Buzzards *Pernis apivorus* from southern Finland. All birds survived the first outbound migration and established wintering sites over a broad longitudinal range in Africa. Wind drift accumulated during the outbound migration determined the longitudinal position of wintering sites. Two birds which spent their first two years in western Africa were tracked well into adulthood. Both birds returned to their natal sites via migration bottlenecks that are heavily used by adult Honey Buzzards in spring (Gibraltar and Italy), indicating these unexperienced individuals encountered adult birds from western European populations on the wintering grounds, and followed those during return migration. In subsequent years, both birds repeated the same seasonal routes which they learned as a juveniles, indicating that individuality of migration is determined by early life experiences. However, natal dispersal was not mediated by migration, indicating endogenous orientation strategies constrain breeding site selection and migratory connectivity for Honey Buzzards.

Joint authors

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S4.3 **TUESDAY 25th AUGUST** **11:30h** **SALA AZUL**

Marta L Vega

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Unraveling the migration program in young and adult Common Cuckoos *Cuculus canorus*

The mechanism of avian migration and the factors that influence it have been studied under different angles but several fundamental questions on migratory behaviour remains to be answered. We studied the migration program in inexperienced and adult birds to separate the internal and external factors influencing migratory behaviour in a model species, the common cuckoo *Cuculus canorus*. The cuckoo is a nocturnal long-distance migrant that carries out its first solo-migration without any learning experience or guidance by other birds. Satellite-tracking of young and adult cuckoos during fall migration enabled us to compare their migration programs for the first time. We also studied how some individuals track the seasonality in food resources. We find that the migration programs in young and adults differ and propose that the young use an inherited migration program whereas the adults respond also to other factors as seasonal changes in vegetation greenness. Surprisingly the inherited migration program seems to be sensitive to environmental factors as compensation of crosswinds. We recommend the integration of the different approaches used for a better understanding of bird migration.

Joint authors

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S4.4 **TUESDAY 25th AUGUST** **11:50h** **SALA AZUL**

Cecilia Nilsson

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Juvenile passerines more likely to perform reverse migration

Abstract

That birds migrate in the reverse direction of the expected is a phenomenon of regular occurrence which has been observed at many sites. We have used three different methods; tracking radar, radiotelemetry and ringing, to characterize the flights of these reverse migrants and investigate possible causes of reverse migration of nocturnally migrating passerines during autumn migration at Falsterbo peninsula, Sweden. Using these different methods we investigated both internal factors, such as age and fuel load, and external factors such as weather variables, competition and predation risk. Juveniles and lean birds were more likely to fly reverse directions. Juvenile birds have been shown to be less efficient foragers, and less able to cope with competition, possibly making them more likely to perform reverse movements. They could also be more likely to hesitate at the sea crossing, not having passed it before. Reverse migration on the whole was also more common with overcast skies and winds with north and east components. We did not find any effect of temperature, visibility, number of migrating sparrowhawks, or the total number of ringed birds at the site on the day of departure. We found that reverse migration is characterized by slower flight speeds (airspeed) at high altitudes and that it takes place later in the night than forward migration.

Joint author

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S4.5 **TUESDAY 25th AUGUST** **12:10h** **SALA AZUL**

Charles André Bost

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At-sea distribution and diving activity of juveniles *Aptenodytes* penguins in the South Indian Ocean

Abstract
During the first year of their life, fledged penguins at-sea disperse during several months to one year without any return at their colony. Information on their at-sea activity and survival during this period of their life cycle is essential because their mortality controls recruitment to reproductive stages and thus the future of populations. In addition, it is young individuals that disperse most and have the potential to emigrate and colonize new environments. During the last years we instrumented with data archiving tags transmitting to the Argos system a total of 20 and 21 juveniles of the 2 Aptenodytes penguins, the king penguin *Aptenodytes patagonicus* (from Crozet islands) and the emperor penguin *Aptenodytes forsteri* (from Adélie Land). First analysis indicate juveniles emperors disperse away from Antarctica toward the north of the pack-ice edge, in the polar frontal zone. The number of daily dives they performed strongly increased as well as dive depth and duration. Their diving efficiency was lower than those of adults. During austral fall and winter the individuals generally moved south-westward, precisely close to the extending pack-ice. Preliminary analysis confirm that the northward exodus exclude them of potential area of overlap with the adults. Juveniles king penguins performed very distant trips, up to 4000 km far off their colony. In autumn they gradually travelled toward the south, off the polar frontal zone. Some juveniles travelled as south as -62°8, i.e. right across dense sea ice. Juveniles behave in a very distinct way of the breeding adults, exhibiting much more exploratory looping trips. The juvenile behaviour of the 2 species is discussed in relation to the life history strategies of the Aptenodytes genus according to the marine habitat used (Antarctic vs Sub-Antarctic).

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THURSDAY 27th AUGUST **10:30h – 12:30h** **SALA 2**

S5. Phylogenetics of Passerine birds: unravelling their evolution at the macro- and micro- scales

Organisers
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Summary
Passerine birds compose over half of avian species diversity and they have been the focus of many ecological, behavioral, anatomical and evolutionary studies due to their ubiquity and enormous diversity. Recent estimates of the passerine phylogeny and evolutionary time-scale have shed light on the macro-evolution of this group, although the timing of their early divergence remains controversial in comparison with the fossil record. The ubiquity of passerine birds on many parts of the world, especially on islands, makes them also a particular group of interest for the study of micro-evolution and speciation, in relation to selection and/or gene flow. We propose in this symposium to discuss the most recent perspectives on these two aspects of passerine birds' phylogeny and biogeography conducted by European teams.

Keynote address #1 **THURSDAY 27th AUGUST** **10:30h** **SALA 2**

S5.1

Per Ericson

Swedish Museum of Natural History

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The largest radiation of birds: when, where and how?

Abstract
Almost 30 years of molecular systematics have completely changed our view of the evolution and biogeography of the largest adaptive radiation of birds, Passeriformes (songbirds). Passerines are uniform in their anatomy and thus their higher-level systematics and classification was long based on characters related to foraging and locomotion, i.e. bill, feet and flight feathers. Molecular data show that many of the traditional groups (such as 'flycatchers', 'thrushes' and 'warblers') are artificially grouped based on convergently evolved characters. DNA-based phylogenies suggest that Passeriforms are not as young as was long believed. Instead it is assumed that many higher-level biogeographic patterns observed today can be explained by vicariance events following the break-up of the southern supercontinent Gondwana around the K/Pg boundary around 66 mya. However, a paucity of suitable fossils to calibrate the phylogenies makes a solid dating of the major passerine groups difficult. Several instances of long-distance dispersal must be invoked to explain present-day biogeography. An interesting example is how large radiations in dynamic archipelagos (like in Australo-Papua) have led to colonization of nearby mainland regions, i.e. an opposite situation to the traditional theory of island biogeography. In this talk, based on a forthcoming, multi-authored book, we also discuss different hypotheses about what makes passerines such a successful radiation, speciation mechanisms, and geographical patterns of species-richness.

Joint author

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Keynote address #2 **THURSDAY 27th AUGUST** **11:00h** **SALA 2**

S5.2

Glenn-Peter Saetre

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Hybrid speciation in Passer sparrows

Abstract
Phylogenetics usually assumes that speciation is a bifurcating process. However, new species can also arise through hybridisation between two genetically divergent parent species. The Italian sparrow *Passer italiae* originated through hybridisation between the house sparrow *P. domesticus* and the Spanish sparrow *P. hispaniolensis*. I present evidence on how the hybrid genome is composed of blocks of single parent origin as well as blocks in which alleles from both parent species segregates. I discuss the processes that have shaped the intra-fertile hybrid lineage as well as the reproductive barriers that isolates it from its parent species.

S5. 3 **THURSDAY 27th AUGUST** **11:30h** **SALA 2**

Darius Stiels

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Conservative or divergent? - Evolution of seasonal niches in migratory *Oreothlypis* warblers

Abstract

In recent years, ecological niche models and phylogenetic analyses have greatly enhanced our understanding of environmental niche evolution. However, for species inhabiting different geographical ranges within their life span, analyses based on correlative models might be more complex. Among such species, migratory birds are a typical example as they are confronted with at least two potentially different environmental conditions in the respective breeding and wintering ranges. Over evolutionary time scales, these seasonal niches might evolve into different directions. To assess whether seasonal niche evolution shifts into more conservative or divergent directions, we study a monophyletic group of six North American wood-warblers within the genus *Oreothlypis* (Parulidae) including breeding birds of high boreal latitudes as well as species which breed in the south-western USA and Mexico. In order to get insight into the evolution of seasonal environmental niches, we apply a procedure based on a dated multigene phylogeny in combination with species-specific environmental niche models based on predictors representing (1) seasonal and (2) year-round climate data.

Joint authors

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S5.4 **THURSDAY 27th AUGUST** **11:50h** **SALA 2**

Matthias Helfried Weissensteiner

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Crow speciation genomics: Phenotypic integrity despite extremely low differentiation and gene flow

Abstract

Fundamental questions in evolutionary biology are how new species arise and how they can maintain their integrity despite interbreeding. One way to study the mechanisms behind this is to look at species with overlapping distributions and admixture occurring between them. A famous avian hybrid zone is that between carrion crows *Corvus [corone] corone* and hooded crows *Corvus [corone] cornix*. Previous work has shown that despite a clear separation of phenotypes and strong assortative mating, hybridization occurs and standard neutral genetic markers show no differentiation whatsoever, suggesting an early stage in the speciation process. Using whole-genome and transcriptome sequencing, we characterized genetic differentiation between carrion and hooded crows to elucidate the evolutionary forces acting. Across the entire genome we strikingly find only 82 single-nucleotide polymorphisms (SNPs) which are fixed between the species and only a small number of regions in the genome with elevated differentiation compared to the genome-wide mean. One prominent genomic region (<2 million base pairs) harboured 81 of all 82 SNPs (out of 8.4 million) and links genes involved in pigmentation and in visual perception reflecting colour-mediated pre-zygotic isolation. Our results suggest that phenotypic integrity can be maintained despite virtually no genetic differentiation and substantial admixture.

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S5.5 **THURSDAY 27th AUGUST** **12:10h** **SALA 2**

Anika Immer

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Climatic constraints on the evolution of leaf-warbler songs

Abstract

Songbirds use complex vocalisations to communicate, particularly in the breeding season, in order to defend their territories and to advertise for mates. Many parameters are involved in the transmission of information through song. Beside morphological and physiological constraints of the bird itself, environmental constraints play a large role. In a previous study, song traits from 80 leaf-warbler taxa were correlated with 15 potentially explanatory variables. Measures of latitudinal and longitudinal extension of the breeding range turned out as the variables with the most correlations with song traits. We hypothesised that climatic differences across the ranges are responsible for these findings, since climatic conditions influence directly the habitat and the environment of birds. We expected one or the other syntactical or frequency song feature to be the result of a trade-off between dealing with (extreme) temperature or precipitation and song sexiness. We extracted various temperature and precipitation measures from well-chosen occurrence points. We reconstructed a dated multi-gene phylogeny in order to utilise modern phylogenetic comparative methods to correct for phylogeny and to deal with phylogenetic uncertainty.

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TUESDAY 25th AUGUST **10:30h – 12:30h** **AUDITORIO**

S6. Coping with the stress of city life: mechanistic studies in urban ecology

Organisers
Hannah Watson

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Davide Dominoni

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Summary
Urbanisation and associated human activities dramatically alter the environment, subsequently inducing marked changes in behaviour, physiology and life histories of avian inhabitants. The consequences of urbanisation for behaviour, reproductive phenology, species diversity and species interactions have been widely studied, but little is understood about the mechanisms underlying responses at the individual and population level. While there may be benefits associated with living in urban areas, birds are also exposed to novel stressors, such as light, noise and air pollution. Some birds are able to thrive in urban environments, yet others are less tolerant and may be displaced. A greater understanding of the causes and consequences of exposure to urban stressors is necessary to understand the sensitivities of wild birds, and their capacity to adapt, to environmental stress and change. This symposium will draw on the recent surge in experimental studies focusing on the mechanisms underpinning individual responses to urban stressors. Participants will present research from diverse fields including endocrinology, chronobiology, molecular ecology, and genetics. We aim to integrate approaches at different levels of biological organisation, from genes to physiology and behaviour, and we are particularly keen to welcome speakers whose current research adopts state-of-the-art methodologies, such as genomics and transcriptomics.

Keynote address #1 **TUESDAY 25th AUGUST** **10:30h** **AUDITORIO**

S6.1

Veronika Bókony

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Measuring urbanization and its effects on avian physiology: pitfalls and approaches

Abstract

As urbanized areas expand and develop throughout the world, the importance of understanding their effects on wildlife increases. Living in cities may be stressful for animals but may also provide benefits, so the net effect on individual condition and health is not trivial. This presentation highlights examples from our research on House Sparrows *(Passer domesticus*), a passerine species undergoing population declines in urban habitats, to illustrate some of the challenges associated with studying variation in physiological state along the urbanization gradient. First, by tallying urban-rural comparisons of a dozen different biomarkers of stress including corticosterone levels and various haematological measurements, we show that evaluating only one or few indices of body condition can yield misleading results. Second, we emphasize the value of an integrative approach to physiological systems by investigating components of the antioxidant system and their covariation with a marker of oxidative damage to reveal habitat-related differences in redox balance. Finally, we provide an easy yet robust method for quantifying the intensity of urbanization, based on free image analysis of landscape-cover metrics, which facilitates the objective categorization of study sites and the detection of non-linear relationships along the urbanization gradient.

Joint author

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Keynote address #2 **TUESDAY 25th AUGUST** **11:00h** **AUDITORIO**

S6.2

Karl Evans

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Urban selection pressures – the blackbird's contribution to an emerging synthesis

Abstract

Many characteristic features of urban environments act as stressors for urban bird populations, but others may actually provide opportunities for those species whose traits enable them to exploit urban environments. This talk provides an overview of how some of these pressures influence avian populations and their constituent individuals. It draws upon a range of urban bird studies but primarily focuses on my research on blackbirds. The talk first provides a brief overview of urban selection pressures, and then focuses on how urbanisation alters biotic interactions between birds and their competitors, predators and pathogens. In so doing it highlights a range of behavioural and genetic responses to the novel features of urban environments.

S6.3 **TUESDAY 25th AUGUST** **11:30h** **AUDITORIO**

Pablo Salmón

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The impact of urban environment on oxidative stress and telomere length: A cross-fostering experiment

Abstract

Urbanisation of rural habitats is a rapidly expanding process and a potential global threat to many species and populations. Nonetheless, many forest-dwelling species have extended their distribution into urban environments where parks and gardens provide alternative habitats. Despite this, cities may impose new challenges to urban wildlife. Artificial night light and air pollution are two common stressors that have been shown to increase oxidative stress (a surplus of oxidants to antioxidants in tissues). This can increase oxidative damage, which has been linked to premature ageing and susceptibility to disease. Therefore, understanding how urban environments affect oxidative stress can give important insights into the influence of the environmental stressors that urban birds are facing. In this study, we did a reciprocal cross-fostering experiment with great tit nestlings between an urban area and a native forest population in southernmost Sweden. We measured different antioxidant- and oxidative damage biomarkers as well as telomere length (an important molecular marker of physiological age). This experiment allowed us to disentangle the direct environmental effects on physiology and telomere shortening from non-genetic and genetic inheritance. Our results provide useful information about the physiological consequences for birds breeding in urban environments.

Joint authors

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S6.4 **TUESDAY 25th AUGUST** **11:50h** **AUDITORIO**

Amparo Herrera-Dueñas

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The relationship between house sparrow and the city: why urban populations are on decline?

Abstract

House Sparrows *Passer domesticus* are distributed worldwide and closely associated with urban environments. These characteristics make them one of the most suitable candidates for biomonitoring ecological processes in cities. In the last decades a significant decline of its population in urban areas has been reported. Causes that have promoted this decline are not well known; but air pollution or low quality food resources, could be some of the reasons. We try to deepen this question from an ecophysiological perspective. In that respect, oxidative stress status is considered as a reliable biomarker against environmental stressors as pollutants exposure or unhealthy diet. Blood sample was collected from house sparrows in urban and rural localities, during the non-breeding and breeding season. And some parameters related with nutritional status and oxidative stress balance have been measured. Decline of house sparrows in cities could reflect a lack of adaptation to the urban environment, maybe due to pro-oxidant conditions that this ecosystem impose and it is aggravated by behavioural changes in foraging, inbreeding process, interspecific competition, etc. Obtained results could provide useful information not only for the conservation of this species but also for the monitoring of the urban ecosystem's health.

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S6.5 **TUESDAY 25th AUGUST** **12:10h** **AUDITORIO**

Davide Dominoni

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Integrating gene expression and metabolomics to understand avian responses to light at night

Abstract

Light at night can affect a wide range of behavioural and physiological responses of birds. In particular, it has been shown to shift activity into the night. We aimed at investigating the physiological mechanisms underlying this temporal shift in behaviour. We exposed four different groups of wild-caught, adult male great tits (*Parus major*) to four increasing levels of light at night, from 0 to 5 lux. We recorded locomotor activity for three weeks and then obtained plasma samples at midday and midnight, which were analysed using a metabolomics platform (LC/MS). Then birds were sacrificed and organs collected. We performed real time RT-qPCR on tissue obtained from two different brain regions (hypothalamus and hippocampus), liver and testes. Preliminary results show strong increases in the testes' expression of genes involved in the reproductive response. In addition, a first screening of the metabolomics dataset has found > 50 metabolites that are differentially concentrated at day and night. We are currently finalizing the analyses of the brain and liver tissues, as well as of the full metabolomics dataset. During our contribution we will present for the first time the full set of results of this experiment.

Joint authors

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FRIDAY 28th AUGUST **9:00h – 11:00h** **AUDITORIO**

S7. Current research on animal personality in birds

Organisers

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John L. Quinn

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Summary
Interest in consistent individual differences in behaviour – so called personality, coping styles or behavioural syndromes - has increased greatly over the last two decades. These individual differences have been suggested to reflect alternative strategies for dealing with environmental variation, and to have important implications for large-scale processes. Research on birds has played a central role in formulating and testing hypotheses about the causes and consequences of personality variation and several bird species have become well known models in the field. Indeed much of the current interest has been started by work on the great tit Parus major. The field of animal personality has expanded rapidly over the last 10 years in particular to include a broad range of topics, from studies on developmental and causal factors, to links with functional behaviour, effects on fitness and population level consequences. In this symposium we aim to bring together ornithologists interested in taking an individual based approach to dealing with how animals cope with social and non-social challenges. We aim to highlight the potential that studies on birds have to advance the field of animal personality with a program that will present exciting new finds, covering a broad range of approaches and topics.

Keynote address #1 **FRIDAY 28th AUGUST** **9:00h** **AUDITORIO**

S7.1

Kees van Oers

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The use but not the ability to solve a foraging task varies with personality

Abstract

The ability of an individual to solve foraging tasks is related to its reproductive success and fitness. Since many animals forage in groups, the use of this ability is likely to be affected by the social context. Though variation in problem solving behaviour is found to be unrelated to variation in personality traits, behaviour in a group context has been shown to differ for personality types. We investigated the influence of personality on learning of a foraging task, and the use of this acquired skill over time in a group context. For this we formed groups of great tits (*Parus major*) consisting of three naive individuals with distinct personality types, and one knowledgeable tutor. We presented them with multiple foraging tasks containing a highly preferred food item. In these experiments, performance of the learned foraging skill over time was significantly correlated with personality. However, personality did not affect the speed of learning to solve the foraging task, neither in a social nor a non-social context. With these results we show that even though individuals might be equally able to solve a problem task, they can differ in the tactic with which they use this newly acquired skill.

Joint authors

Kees van Oers1, Lies Zandberg1,2, John L. Quinn3, Thomas van Hemert1 & Marc Naguib2

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3. School of Biological, Earth and Environmental Science (BEES), UCC, North Mall, Cork, Ireland

Keynote address #2 **FRIDAY 28th AUGUST** **9:30h** **AUDITORIO**

S7.2

John L Quinn

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Avian personalities and syndromes: when and why do behavioural correlations occur?

Abstract
Natural selection rarely acts on behavioural traits in isolation because genetic correlations among such traits are pervasive in nature. But how commonly have behavioural correlations been reported and what are the consequences of these correlations for our understanding of ecological processes in bird populations? Despite the surging interest in the field, there has been limited progress in answering these questions at least in part because predicting which combinations of traits one should study in any given system is not clear. In this overview we discuss correlations involving combinations of different kinds of behavioural traits, including i) personality axes of variation, ii) trade-offs, iii) linkage between apparently unrelated traits, and iv) correlations between all of the above across species within communities, especially in the context of predator prey interactions. Our aims are to review the prevalence of the different kinds of correlations, and to consider the pros and cons of investigating each type. We also ask when different types of correlations are likely to occur, offering suggestions of the kinds of systems and questions that could lead to novel insights into large scale processes in bird populations.

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S7.3 **FRIDAY 28th AUGUST** **10:00h** **AUDITORIO**

Maria Moiron

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The role of state-behavior feedbacks in explaining adaptive personality differences

Abstract
In recent years it has become widely accepted that individuals within single populations often exhibit consistent differences in behaviour across contexts and over time (called 'animal personality'). However, it is much less evident how behavioural consistency can be explained from an adaptive viewpoint. State-behaviour feedback loops have been proposed as an evolutionary explanation for personality-related differences. The feedback mechanism between state and behaviour exists because an individual's state affects its optimal behaviour, which in turn affects its state. This feedback dynamics has been theoretically well-developed but never empirically tested. Here we first provide a statistical framework based on repeated measures and multi-level random regression modelling that enables one to capture variation in state-behaviour feedbacks. Next, we experimentally explore feedback loops between sampling (information acquisition) and body condition that may explain why individuals differ in sampling behaviour using wild great tits (*Parus major)* as a model species. We present data on the occurrence of between- and within- individual variation in sampling; and we provide an empirical test of how positive feedback loops lead to within individual state-behaviour covariance and between individual positive intercept-slope correlations of temporal reaction norms, while negative feedback loops lead to the opposite outcome.

Joint authors

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S7.4 **FRIDAY 28th AUGUST** **10:20h** **AUDITORIO**

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Context dependence of risk-taking in wild Collared Flycatcher males: do personality domains exist?

Abstract
The concept of animal personality assumes that different and independent ecological contexts (e.g. predator approach) elicit particular behavioural responses (e.g. fear behaviour), and the measured behavioural traits (e.g. latency to resume activity) are displayed for the same biological purpose (e.g. avoid predators). Accordingly, most studies categorize behaviours into 5 major domains that are independent and cover the most important biological functions (e.g. risk-taking). However, treating behaviours along distinct domains may be misleading due to, for example, the heterogeneous correlation structure between measured behavioural traits within the same domain that is caused by the varying degree of contextual overlap among the underlying assay conditions. In male Collared Flycatchers (*Ficedula albicollis*), we investigated the relationship between the strength of correlation and contextual overlap for pairs of 18 behavioural traits that could be included in the 'risk-taking' domain. We found that the correlation between different traits reflecting fear response was generally weak and varied considerably across comparisons. Further investigation of this heterogeneity revealed a positive relationship between the strength of correlations and contextual overlap. Therefore, the measured behavioural traits may have partially different functions depending on the underlying ecological context, which implies that assigning behaviours into domains may be a deceptive simplification.
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S7.5 **FRIDAY 28th AUGUST** **10:40h** **AUDITORIO**

Balint Preiszner

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Urbanization, problem-solving and reproductive success in Great Tits *Parus major*

Abstract

Problem-solving success, an aspect of behavioural flexibility, is suggested to positively affect breeding success in some birds. Problem solving may be especially important in urban environments, where birds may frequently encounter novel situations and reproductive success is often reduced due to limited availability of high-quality food for food nestlings. We tested this hypothesis in two urban and two woodland Great Tit populations, conducting three field experiments in which we measured breeding birds' performance in a novel object test, an obstacle-removal task, and a food-acquisition task. According to our preliminary results, urban birds were less neophobic compared to their woodland conspecifics, and the proportion of successfully problem-solving pairs was higher in urban habitats in both problem-solving tasks. Additionally, urban pairs that solved the obstacle-removal test tended to have higher breeding success (more fledglings), whereas we found no such difference in the food-acquisition task, nor between solver and non-solver pairs in woodlands in either of the problem-solving tasks. These results support that birds in urban habitats have better problem-solving skills which may increase their reproductive success.

Joint authors

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FRIDAY 28th AUGUST **9:00h – 11:00h** **SALA 2**

S8. Significance of intraspecific variation in avian sperm traits: plasticity, microevolution, speciation

Organisers
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Summary
In the majority of socially monogamous bird species, females copulate with males other than their social mates. This frequently results in extra-pair fertilizations. Comparative evidence suggests that postcopulatory sexual selection resulting from extra-pair fertilizations was a major force in shaping avian sperm trait diversity in the evolutionary past. However, due to a lack of studies performed in a within-species context, we have a very limited understanding of how contemporary postcopulatory sexual selection shapes sperm form and function within and between populations of the same species. Understanding the link between sperm traits and paternity in a within-species context is of crucial importance, because it allows i) evaluating the role of adaptive phenotypic plasticity, ii) quantifying the strength of postcopulatory sexual selection and heritabilities, iii) assessing the role of sperm traits in the evolution of reproductive barriers and iv) experimentation to infer causality. Linking sperm traits to extra-pair success will also shed light on the much-debated question which traits make a male bird a successful extra-pair sire. The goal of this symposium is to review and highlight recent advances in the study of sperm traits in a within-species context and to discuss and define knowledge gaps and research priorities for future work.

Keynote address #1

S8.1 **FRIDAY 28th AUGUST** **9:00h** **SALA 2**

Jan T Lifjeld

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Sperm traits and the evolution of reproductive barriers

Abstract
Passerine birds are extremely diversified in secondary sexual traits like male plumage coloration and song. Such traits function in mate attraction and mate choice and evolve primarily in response to sexual selection. In recent years, it has become increasingly evident that passerines, especially within the Passerida oscines, are also highly diversified in sperm morphology and frequency of extra-pair paternity. It is therefore timely to ask whether sperm competition acts as a force of post-copulatory sexual selection driving the evolutionary diversification of sperm traits, and whether sperm trait divergences represent reproductive barriers to gene flow or hybridization in species with strong sperm competition. In this talk I will present a theoretical background for how sperm competition can drive sperm evolution. Further, I will review some recent evidence showing that sperm competition indeed accelerates the evolution of sperm traits and is associated with rapid divergences. I will argue that such divergences might indicate reproductive barriers in promiscuous passerines, with the same implications for taxonomy and species delimitation as currently acknowledged for plumage and song traits. Finally, I will try to identify important gaps in our knowledge about the functional properties of sperm and their performance in their selective environment, the female oviduct.

Keynote address #2 **FRIDAY 28th AUGUST** **9:30h** **SALA 2**

S8.2

Simone Immler

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The potential role of phenotypic plasticity of sperm traits in the evolution of mating behaviour

Abstract
Sperm competition is a powerful force driving the evolution of both male and female sexual traits. Males invest into sperm production according to the risk and intensity of sperm competition they face, both across species and within species. Males have been shown to change ejaculate traits such as sperm numbers, sperm density, sperm swimming velocity and sperm morphometry when facing varying levels of sperm competition. Such changes are usually achieved over very short periods of time. While the functional significance of such short-term adjustments for male reproductive success is appears to be intuitive, the evolutionary consequences of these are less well understood. I discuss the causes and consequences of such phenotypic plasticity in sperm traits and their role in the evolution of avian mating behaviour.

S8.3 **FRIDAY 28th AUGUST** **10:00h** **SALA 2**

Alfonso Rojas Mora

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Within and between male variation in sperm morphology and ejaculate quality across social ranks

Abstract

Sperm competition could lead to stabilizing selection towards an optimal spermatozoa design that maximizes the fertilization ability of an ejaculate. However, large within individual variation in spermatozoa morphology have been reported, and it was suggested that individuals produce ejaculates with diverse strategies to maximize the fertilization success. Theoretical models predict that as costs to acquire a mate increase, males should enhance their ejaculate quality. Thus, when dominance determines access to fertile females, we hypothesize that subordinate males produce ejaculates with larger sperm morphology variation than dominant males. We experimentally tested such hypothesis on wild house sparrows (*Passer domesticus*) maintaining 60 males and 60 females in 15 outdoor aviaries. After a four-week acclimation period, we shuffled males across aviaries to change their hierarchical position. We monitored antagonistic interactions and sexual behaviours to establish the hierarchical positions before and after manipulating males' social environment. We collected sperm one day before and three weeks after shuffling groups, from which we estimate the variation on sperm morphology within and between males, as well as its relationship with sperm quality, e.g. swimming speed and percentage of live sperm. Our results highlight the importance of within male sperm morphological variation in male reproductive tactics.

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S8.4 **FRIDAY 28th AUGUST** **10:20h** **SALA 2**

Oldřich Tomášek

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Effects of oxidative stress and carotenoid intake on sperm morphology and function in zebra finches

Abstract

Several sperm traits are considered important for male's fertility and success in sperm competition. Functional sperm traits, such as velocity, and even the more heritable morphological traits were shown to be phenotypically plastic, being affected by environmental stressors or immune activation. Since sperm cells are highly vulnerable to free radicals, it has been proposed that such plasticity could be underlain by oxidative stress. It has been further proposed that carotenoid-based sexual ornaments could signal individual's resistance to oxidative stress, and thus sperm quality. Here, we support the former hypothesis, by showing reduced sperm velocity and midpiece length following experimental exposure of zebra finch (*Taeniopygia guttata*) males to increased oxidative load (diquat dibromide). Free-radical effect on sperm velocity, but not midpiece length, was indeed dependent on carotenoid-based beak colouration; but contrary to our expectations, the more colourful males were the more affected ones. Despite the traditional view of carotenoids as antioxidants, adverse effects of free radicals were not inhibited by experimentally increased carotenoid intake. On the other hand, high carotenoid intake reduced the abnormal sperm proportion, suggesting carotenoid importance for proper spermatogenesis. In summary, our results indicate a potential trade-off between ornament expression and sperm quality in zebra finches.

Joint authors

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S8.5 **FRIDAY 28th AUGUST** **10:40h** **SALA 2**

Anais EDME

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Relative importance of ornaments, and sperm quality on paternity in collared flycatchers

Abstract

In monogamous species, females often obtain extra-pair copulations from other males that their social partners. Consequently, sperms from different males compete to fertilize the eggs. According to the phenotype linked fertility hypothesis, the quality of the sperm may be assessed by phenotypic clues like sexual ornaments. Males with larger ornaments may also provide more viable sperm. Females may engage in extra-pair copulations to adjust their mate choice and obtain more fertile sperm to fertilize their eggs. In collared flycatchers (*Ficedula albicollis*), extra-pair paternity is common and males possess two white sexual ornaments. Females preferred males with larger ornaments. Sperm samples were taken at male arrival to breeding sites and about a month later, during the period of nestling provisioning. We investigated the correlation between sperm's traits and ornaments to test the phenotype linked fertility hypothesis. We also compared sperm's traits of social males and extra-pair males. In addition, we tested if sperm traits change during the life of an individual. Seasonal effects were assessed by a comparison of sperm taken in the two sampling periods, i.e. arrival and nestling provisioning. As many birds were caught in several years, we were also able to test how sperm traits change during aging.

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TUESDAY 25th AUGUST **10:30h – 12:30h** **SALA 1**

S9. Light colours and perfumes: bird sensory ecology

Organisers
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Summary

Sensory information guides and strongly influences most animal behaviour. Birds use vision to control flight, find food and recognize conspecifics. Data on the relevance of plumage and egg colours for bird behaviour have accumulated, and our understanding of bird visual systems is improving. Still, we see a gap between field studies on a wide range of species and laboratory studies of visual capacities in selected model species such as chicken, pigeon or budgerigar. We propose to present an overview on our current knowledge on spatial vision and colour vision and their relevance for bird behaviour. Avian chemical communication has long been overlooked because birds were historically considered having little or no smell. Several findings over the last 50 years have, however, progressively led biologists to reconsider the question. Research birds' olfaction, previously restricted to the responses of a few species to environmental cues only (essentially olfactory foraging and olfactory navigation), at the beginning of 2000 received a new input by discovering individual olfactory recognition in seabirds. We hope that bringing together both fields may encourage more interaction between ecologists and sensory biologists, and allow both groups to find ways to (1) to bring lab methods to the field and (2) ask ecologically relevant questions in the lab. This would allow for new studies of visual capacities and the use of olfactory cues of birds, in an ecological meaningful context.

Keynote address #1 **TUESDAY 25th AUGUST** **10:30h** **SALA 1**

S9.1

Luisa Amo

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The role of olfaction in foraging: insectivorous birds exploit herbivore-induced plant volatiles to locate their prey

Abstract

Arthropod herbivory induces plant volatiles that can be used by natural enemies of the herbivores to find their prey. This has been studied mainly for arthropods that prey upon or parasitize herbivorous arthropods but rarely for insectivorous birds, one of the main groups of predators of herbivorous insects such as lepidopteran larvae. Here, we show that great tits (*Parus major*) discriminate between caterpillar-infested and uninfested trees. Birds were attracted to infested trees, even when they could not see the larvae or their feeding damage. We furthermore show that infested and uninfested trees differ in volatile emissions and visual characteristics. Finally, we show, for the first time, that birds smell which tree is infested with their prey based on differences in volatile profiles emitted by infested and uninfested trees. Volatiles emitted by plants in response to herbivory by lepidopteran larvae thus not only attract predatory insects but also vertebrate predators

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Keynote address #2 **TUESDAY 25th AUGUST** **11:00h** **SALA 1**

S9.2

Olle Lind

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A nuanced view on colour vision and ultraviolet sensitivity in birds

Abstract

Birds have sophisticated colour vision that is used to guide vital behaviour. Today, we have good knowledge about the functional physiology of bird colour vision, its variation across species, and how this information can be combined in mathematical models to make colour discrimination predictions. There has been less information of how colour vision changes over different viewing conditions and how this may affect visually guided behaviour. This issue is of particular interest for ultraviolet vision, which often is described as a special mode of colour vision used for specialized purposes. However, the many hypotheses about the ecological function of colour vision have been poorly matched by few investigations of the fundamental mechanisms of ultraviolet sensitivity. In a series of recent behavioural, physiological, and theoretical studies, we have explored the function of bird colour vision and ultraviolet sensitivity in changing light conditions. I will discuss how these new data alter our view of bird visual ecology and the evolution of bird colour vision and plumage colouration. Furthermore, I will argue that the physiological and environmental constraints on ultraviolet sensitivity are extraordinary, but ultraviolet signals are not. Present data do not support a special status for ultraviolet vision in bird colour vision.

S9.3 **TUESDAY 25th AUGUST** **11:30h** **SALA 1**

Barbara A Caspers

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Hatchlings of an altricial songbird recognize their parents based on olfactory cues!

Abstract
Zebra finches *Taeniopygia guttata* are known to be able to distinguish their natal nest from a foreign nest based on olfactory cues and it has been demonstrated that the smell of the nest is learned around hatching. Based on this knowledge, we conducted a series of experiments to test whether day old hatchlings may also be able to detect the smell of their parents. Day-old chicks beg in a stereotypical posture, which can be induced by directing gentle puffs of air from a plastic wash bottle near the face. We used this method to experimentally test whether begging duration of chicks was indicative of odour recognition/detection. Zebra finch hatchlings begged significantly longer when exposed to a parent's odour, indicating that hatchlings are able to recognise their parents from the first day on. In a second experiment we transferred one egg into another nest and tested whether the fostered hatchling shows a preference for the foster parents or the biological parents. The results as well as potential implications will be discussed. Our simple testing procedure can be used to efficiently quantify odour recognition and/or preference in altricial songbirds.

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S9.4 **TUESDAY 25th AUGUST** **11:50h** **SALA 1**

Mindaugas Mitkus

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There are no double cones in the raptor fovea

Abstract
The bird retina contains five types of cone photoreceptors, four types of single cones (sensitive to UV, blue, green and red light) and a double cone with broader spectral sensitivity. Single cones are responsible for colour vision, and it has been proposed that double cones are responsible for high acuity achromatic vision in birds. Only few raptor species are known to have higher visual acuity than humans. The fovea is the region in the retina, which has the highest photoreceptor and neuronal cell density, therefore provides highest spatial resolution. As the achromatic vision is more acute than the colour vision, one would assume that the raptor fovea is packed with double cones. We used immunohistochemistry and transmission electron microscopy to investigate foveal and parafoveal regions in four species of raptors. We found no double cones in the foveal and parafoveal regions. In the central retina double cones were few and narrow, but in the peripheral retina they were more abundant and wide. Our findings indicate that double cones are not the only cones contributing to the high acuity achromatic channel in birds, and that the high visual acuity in the fovea is mediated only by the single cones.

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S9.5 **TUESDAY 25th AUGUST** **12:10h** **SALA 1**

Jannika E Boström

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Temporal resolution in small birds

Abstract
While outstanding colour vision and spatial resolution of birds are studied in many species, very little is known about the temporal aspects of bird vision. Flying animals need to accurately detect, identify and track fast-moving objects and these behavioural requirements are likely to select for eyes with extreme abilities to resolve visual detail in time. However, evidence of highly elevated temporal visual acuity has so far been confined to insects and missing in birds. Recently, we demonstrated extremely high temporal resolution in three species of passerines: blue tit, pied flycatcher and collared flycatcher. These birds can resolve alternating light-dark cycles at up to 145 Hz, which is 150% of the highest frequency shown in any other vertebrate and 240% of that in humans. It is unknown whether high temporal resolution is specific to passerines, to small and actively flying birds, to insectivores or to diurnal birds living in bright habitats. To investigate this further we did a study on budgerigars and found that high temporal resolution is not common for all small and active birds living in bright light habitats. Whether it is typical for passerines, or for insectivorous birds remains to be tested.

Joint authors

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TUESDAY 25th AUGUST **10:30h – 12:30h** **SALA 2**

S10. Ecophysiological adaptations to the environment in birds

Organisers
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Summary
Birds are endotherms and so must rely on endogenous heat production to maintain a stable body temperature regardless of variation in environmental temperature. This is a remarkable feature, not the least during temperate zone winters where the gradient between the body core and the environment may exceed 70-80 °C, and during the breeding season when birds on the nest must regulate not only their own body temperature but also maintain the nest environment at levels compatible with egg development or nestling growth. At the other end of the spectrum, birds in hot environments may face difficulties in avoiding heat stress, especially during hard work and/or in dry climes where water for evaporative cooling is scarce. To deal with such circumstances, birds have developed a range of ecophysiological adaptations, including temporal and regional heterothermy, metabolic adjustments and reorganization, and the construction and use of well-insulated nests or roosts. Such strategies are widespread across the avian phylogeny, but much remains to be learned about their evolutionary causes and consequences. Nor do we know much about how energy-allocation to systems for dealing with adaptations to the environment affects the function of other parts of physiological regulation. To this end, this symposium seeks to bring together those broadly interested in seasonal adaptations to the environment in birds, and aims to cover a range of topics from the avian energetics, seasonal variation in thermoregulation, and behavioural strategies for energy conservation.

Keynote address #1

S10.1 **TUESDAY 25th AUGUST** **10:30h** **SALA 2**

Andreas Nord

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Is workload and performance in birds constrained by the risk of overheating?

Abstract

Limits to sustained energy expenditure is crucial for understanding animal form, function and performance in different ecological contexts, and so has been a tenet in ecology and evolution for decades. Research in this trajectory has traditionally been much influenced by the concepts of environmental and intrinsic (i.e. tissue capacity and efficiency) limits to energy expenditure. A more recent idea posits that maximum workload instead may be ultimately determined by an animal's capacity to shed metabolic heat, because there are high somatic costs associated with sustained hyperthermic body temperatures. While there is empirical support for this notion from small mammals, overheating risk in the context of physiological and ecological performance remains largely unexplored in birds. However, birds might be as constrained by the capacity for heat dissipation as are mammals, not the least considering their comparatively higher, and substantially more variable, body temperatures. This talk discusses the concept of heat dissipation limits to workload in birds, and its applicability to avian ecophysiological research. In addition, recent empirical evidence for heat dissipation as a constraint on both parental effort during breeding and other parts physiological regulation (with special emphasis on fever ecophysiology) is outlined and discussed.

Keynote address #2

S10.2 **TUESDAY 25th AUGUST** **11:00h** **SALA 2**

Esa Hohtola

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Avian endothermy: theme and variations

Abstract
Birds, as endothermic animals, have a high body temperature (ca. 41 °C), high resting, sustained and maximal metabolic rates and a high aerobic capacity. These traits result in a high energy need. It is conceivable that selective forces allowing either a relaxation of strict homeothermy, or producing mechanisms enhancing heat gain or loss have influenced the evolution of avian homeothermy. Several new lines of research have increased our knowledge on such flexibility of avian thermoregulation. These include 1) regulated hypothermia/hypometabolism in the form of deep or shallow torpor, 2) tolerance to very high body temperatures (up to 45 °C), 3) cooling by transcutaneous evaporation and 4) regulation of basal metabolic rate (BMR). While the energetic benefits of hypometabolism are clear, much less is known about the incurred costs. Flexibility of body temperature is adaptive energetically or for reducing water need, but may disturb vital physiological functions. Enhanced evaporation stabilizes body temperatures, but increases water loss. Increased BMR is usually coupled to increased maximal metabolic rate. i.e. work capacity. But if an absolute metabolic ceiling exists, increased BMR will actually restrict the work capacity of a bird. Clearly, more information on the costs and benefits of these mechanisms is needed.

S10.3 **TUESDAY 25th AUGUST** **11:30h** **SALA 2**

Juli Broggi

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Reserves or expenditure. What are small boreal passerines regulating in winter?

Abstract

Wintering small passerines in the boreal conditions are faced with a serious energetic challenge. Research has focused on the regulation of body mass (BM) within a framework of starvation-predation trade-off. Small birds increase their BM during winter, presumably increasing their level of internal reserves. On the other hand metabolic capacity, represented by the basal rate of metabolism (BMR) is highly and positively correlated with BM, and birds increase it to cope with thermogenetic demands, similarly to BM. We hypothesize that seasonal BM change may partly reflect variation in BMR rather than solely internal reserves. We studied co-variation between these variables in three different species of titmice originating from two wild boreal populations. We measured BM at capture, BMR and night-time mass loss under standard conditions. Seasonal variation in BMR and BM differed importantly among species and populations. Seasonal change in BM was largely reduced once variation in BMR was accounted for. Night-time mass loss exhibited a similar degree of variation, implying that species and populations use different energetic substrates for a given metabolic rate. Co-variation among the different traits studied suggests that energy management is a multifaceted strategy that cannot be fully understood without considering the diverse characters involved.

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S10.4 **TUESDAY 25th AUGUST** **11:50h** **SALA 2**

Sergey S Simonov

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Thermal insulation of passerine nests in North-West Russia: preliminary results and ideas

Abstract

Thermal insulation is one of the most significant quality of bird nests equally with hygroscopicity and mechanical strength of nest materials. Within the aim to estimate and to compare thermal insulation efficiency in nests of passerine birds of different ecological groups we analyzed the basic measurements of nests, compositions of nest materials, and reproductive success. These parameters had been studied for 11 breeding seasons (2003 – 2014) under the conditions of North-West Russia. On the example of *Sylvia* and *Phylloscopus* warblers we defined connections between nest shapes and plant-substrates, identified all natural and artificial nest materials. Preliminary results had heightened the interest in the mechanisms of thermal insulation of nests and now we are planning the series of experiments in field. In order to check the working hypotheses, we are going to get thermal pictures of nests in field conditions at different stages of the reproductive season of 2015 with a thermographic camera (NETD down to 50 mK), analyze these pictures and relate these data to the nest quality and reproductive success of controlled pairs. Details of the research and results will be discussed in our presentation. This work is supported by the Russian Federation President Grant for young scientists MK-3599.2015.4.

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S10.5 **TUESDAY 25th AUGUST** **12:10h** **SALA 2**

Götz Eichhorn

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Going south going slow? Metabolic rate in arctic and temperate breeding barnacle geese

Abstract
In the last few decades, the barnacle goose Branta leucopsis population wintering on the European mainland has increased and extended its breeding grounds. It has even found a means to reproduce successfully also outside its traditional Arctic breeding grounds through colonisation of new (temperate) breeding areas in the Baltic and the Netherlands. We study the potential changes of the physiological phenotype when occupying new environments. From the short productive season in the Arctic and the associated migratory episodes, we expect arctic breeders to be more time-stressed than temperate-breeders, which can afford a slower 'pace-of-life'. Higher growth rates of goslings and a strong lay date effect on gosling survival in the Arctic seem to support this prediction. However, the rate of re-growing wings in moulting adult geese appears similar in Arctic and temperate sites. Because of the vulnerability to predation during this flightless period pressure to complete wing moult as fast as possible may be equally high in these environments. The primary variable reflecting differences in 'pace-of-life' is metabolic rate. We will test the aforementioned prediction by analysing patterns of resting metabolic rates measured in growing goslings and moulting adult barnacle geese from Arctic (Russian) and temperate (Dutch) breeding sites.

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TUESDAY 25th AUGUST **10:30h – 12:30h** **SALA 3**

S11. Mediators of individual quality in birds

Organisers

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Summary

For a trait to evolve via natural selection, it must show variability, be heritable and confer some benefits. Thus, "individual quality" is usually described by among-individual differences in traits associated with survival and reproduction (Wilson & Nussey 2010). Yet, there is no clear consensus at which traits we should be looking at when trying to assess individual quality. One can argue that linking cellular genetic variants to survival and reproduction is the best descriptor of "individual quality". However cells form living organisms that interact together in mating or social group units, providing multiple levels of complexity for selection to occur (Piersma & van Gils 2010). Correlational natural selection on these different traits across different life-history stages has been proposed to lead to their functional integration (Ghalambor et al. 2003). Thus, because most traits characterising an individual at the whole organism level are polygenic, describing individual quality requires functional and evolutionary investigations of multiple traits (e.g. physiology, morphology, behaviour) over various life-history stages. This symposium aims to address the question of individual quality and performance from an integrative stand, considering the fitness of, and selection on, specific individual phenotypes in birds

Keynote address #1 **TUESDAY 25th AUGUST** **10:30h** **SALA 3**

S11.1

Barbara Tschirren

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Maternal effects as mediators of individual quality in birds

Abstract
Conditions encountered before birth can modify developmental processes and can have long-term effects on the morphology, physiology and behaviour of organisms. In birds, mothers can considerably influence the environment encountered by the offspring during early development by differentially transferring resources and developmental cues to the egg. Using examples from different bird systems I will show how environmental conditions encountered by females during egg laying affect offspring phenotype, and how selection is acting on such prenatal maternal effects in the wild

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Keynote address #2 **TUESDAY 25th AUGUST** **11:00h** **SALA 3**

S11.2

Neeltje Boogert

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Sing me something smart

Abstract
Researchers of avian communication have long wondered why in many songbird species, females tend to prefer males with more complex songs or larger song repertoires. The hypothesis that song complexity signals developmental quality has received empirical support. But why should females care about the developmental history of candidate mates? The cognitive capacity hypothesis suggests that better singers might be smarter overall, as a stable development facilitates both song learning and later cognitive performance. But what is the evidence for developmental stress affecting both song and cognition, and can females really use male song to assess how "smart" these candidate mates are? The aim of my talk is to address these questions while outlining both limitations and opportunities in the fields of avian cognition and communication.

S11.3 **TUESDAY 25th AUGUST** **11:30h** **SALA 3**

Robert Gwiazda

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Foraging behaviour of the Whiskered Tern *Chlidonias hybrida* in the breeding season – effect of sex

Abstract
Sexual size dimorphism is common in many bird species. It can lead to sex-specific differences in foraging behaviour and diet. The Whiskered Tern (*Chlidonias hybrida*) exhibits sexual size dimorphism: males are significantly larger than females. Differences in the foraging behaviour of the individually marked Whiskered Terns were investigated in carp ponds (S Poland) during the breeding season. Foraging behaviour was different between the sexes. Males foraged mainly by shallow plunge diving into the water, while females foraged mainly by picking prey from plants and water surface. Measurements of some females and males overlap so we hypothesised that foraging techniques could be attributed to individual size within sex also. Differences of plunge diving rate between smaller and greater females and males were not found. However, picking of prey from the water surface was more frequent in lighter individuals both in females and males. Picking rate from leaves was higher in females of lower body mass. Differences in catching prey in air between greater and smaller individuals were not found in both sexes. Plunge diving rate is probably more related to sex and picking of prey from the water surface is more related to individual body size. Lighter individuals of the Whiskered Tern are more predisposed to catch invertebrates from the water surface.

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S11.4 **TUESDAY 25th AUGUST** **11:50h** **SALA 3**

Vincent A Viblanc

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Advertising quality: condition-dependent signals in monomorphic King Penguins *Aptenodytes patagonicus*

Abstract

Because of its multi-factorial nature, individual quality is a concept which is hard to define. It is classically viewed as the among-individual differences in traits somehow associated with fitness, notably survival and reproduction. Thus, to better our understanding of what exactly makes a 'high' or 'low' quality phenotype compared to others, a wide array of studies have investigated physiological, behavioural and life-history traits in relation to individual fitness. An alternative to this approach consists in letting the animals under study ask the question. The framework of sexual selection and mutual mate choice provides just this opportunity. Mutual mate choice has been proposed to explain why in some species, both males and females share similar ornaments, even though baring those ornaments often comes at a cost (e.g. conspicuousness, production cost). In species, such as seabirds, where both parents depend on each other to raise the offspring, selection is expected to favor mutual mate choice for high quality partners. Quality may then be signaled to sexual and social mates by means of the ornaments males and females conspicuously share. Here, I will present the investigations we have conducted on king penguins (*Aptenodytes patagonicus*) over the past 3 years revealing associations between colour ornaments and physiological traits of individual quality (body condition, stress levels, immune defences). Specifically, mixing correlative and experimental approaches, and focusing on structural coloration (UV), I will document short- and long-term dynamics in beak spot coloration, and the condition dependency of this signal in those monomorphic seabirds.

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S11.5 **TUESDAY 25th AUGUST** **12:10h** **SALA 3**

Frédéric Angelier

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Are stress hormones linked to individual quality in birds?

Abstract

In the wild, measuring individual quality in birds is challenging because following individuals through their life to measure their performances (survival, reproduction) is difficult. In that context, stress related mechanisms may be useful because they are functionally involved in the ability of an individual to survive and reproduce in its environment. Indeed, changes in stress hormones levels occur when an organism has to cope with challenging environmental conditions, and these hormonal modifications are thought to help individuals restoring homeostasis (i.e. surviving the challenge, reproducing despite environmental constraints). Here, I will specifically focus on corticosterone (the main avian "stress hormone") and prolactin (the avian "parental hormone") and I will review evidence that these two hormones may help ecologists assessing individual quality in wild birds. Because of the functional link between environmental conditions, stress hormones and performances, I will show that elevated corticosterone levels and low prolactin levels are often found in individuals of poor quality that have difficulty coping with their environment. Second, I will highlight that the ability of individuals to cope with a challenge can theoretically be assessed by monitoring their hormonal responses to stress. Finally, I will also emphasize the complex context-dependent relationship between these hormones and performances.

THURSDAY 27th AUGUST **10:30h – 12:30h** **SALA 3**

S12. Early life experiences: merging mechanistic and functional approaches to reveal their meaning

Organisers:

Valeria Marasco

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Summary
It is increasingly recognised that early life experiences, those that occur before sexual maturity, can dramatically influence adult lifestyle and fitness. Although there is general agreement on the role of early life in shaping the adult phenotype, two main questions are still open to intense debate. First, the potential adaptive benefits of what we generally refer to as "developmental programming" or "priming" remains unclear. Second, our appreciation of the mechanisms mediating phenotypic development is still elusive. The understanding of these mechanisms is very important if appropriate trade-offs are to be postulated and constraints are to be identified. Recent work has suggested that telomere erosion, oxidative stress, sexual and stress hormones, and gene expression changes are relevant markers to help tracking the effects of early life experiences across the individual's lifespan and across generations. In this symposium, we aim to integrate studies on proximate mechanisms with studies focused on organismal fitness outcomes, an approach that is emerging as one of the most integrative areas of modern biology. This symposium will provide a multi-disciplinary platform to discuss current advances, as well as to pin point gaps and directions for future research.

Keynote address #1 **THURSDAY 27th AUGUST** **10:30h** **SALA 3**

S12.1

Valeria Marasco

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Does maternal stress influence growth and biological ageing of offspring? A study on a songbird

Abstract

Growing lines of evidence across a variety of vertebrate species clearly indicate that animal responses to stressful environmental circumstances experienced in early life can produce a long-lasting molecular signature that may persist even into adulthood. However, the extent to which such phenotypic changes maximise fitness outcomes and contribute to variation in the following generations remains unclear. Furthermore, the consequences of maternal stress may depend on environment-maternal state interactions, and could also be age-dependent. Interactions between telomeres and glucocorticoid hormones have been suggested as a key mechanistic process underlying the long term consequences of early life stress exposure. We have been manipulating maternal stress exposure in the zebra finch and examining offspring phenotypic responses to environment-maternal state interactions in offspring produced over distinct reproductive episodes. We will discuss our data on growth, acute stress responses, maternal age and telomere dynamics in the context of fitness and parent-offspring perspectives.

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Keynote Address #2 **THURSDAY 27th AUGUST** **11:00h** **SALA 3**

S12. 2

David Costantini

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Digging at oxidative stress' roots: how early life experiences fine-tune the oxidative phenotype

Abstract

The early environment in which an individual grows up and develops has profound, long lasting, and often irreversible consequences throughout the individual lifetime. Much work has provided evidence in favour of a role of early life experiences in shaping the individual oxidative status and resistance to oxidative stress. This is particularly important because it is increasingly recognised that the need to manage oxidative stress in an optimal way may be a mechanism driving the outcome of many life-history trade-offs. In this talk, studies on how early life experiences fine-tune the oxidative balance will be presented. In particular, the talk will focus on the role of environmental stressors (heat stress and food availability) and stress hormones in shaping the individual resistance to oxidative stress.

S12.3 **THURSDAY 27th AUGUST** **11:30h** **SALA 3**

Lukas Jenni

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Maternal programming of nestling phenotype: the role of corticosterone

Abstract
Maternal programming has been proposed to prepare offspring phenotype for prevailing environmental conditions. Numerous stressors can affect maternal glucocorticoids (stress-hormones) and glucocorticoids have the potential to play a key role in programming offspring phenotype. In birds maternal programming can already start with the deposition of glucocorticoids into the eggs. We investigated how pre-natal exposure to maternal corticosterone (main glucocorticoid in birds) or corticosterone-altered maternal behaviour affects offspring performance. Breeding female barn owls received a dead laboratory mice spiked with either a small amount of corticosterone or with sesame oil as control during three consecutive nights after the females had laid their first egg. Eggs were then cross-fostered between nests of cort-mothers and control mothers. Pre-natal exposure to corticosterone (high level of corticosterone in eggs) reduced hatching mass (but not fledging mass) and maternal antibody concentration of nestlings significantly compared to the control group. Corticosterone-altered behaviour of the mother altered body mass of young nestlings and baseline corticosterone at fledging depending on the phenotype of the mother. These results suggest that corticosterone (directly through exposure of the embryo and indirectly through altered maternal behaviour) influences the phenotype of nestlings and that some of these effects are transient and disappear at fledging.

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S12.4 **THURSDAY 27th AUGUST** **11:50h** **SALA 3**

Rie Henriksen

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Matching the pre and post-hatching environment eliminate effects of mild maternal heat stress in Japanese Quail *Coturnix japonica*

Abstract

Changes in the prenatal milieu caused by alterations in the maternal environment can have profound and long-lasting effects on an animal's phenotype. Whether such effects are fixed or if their expression is dependent on the offspring's postnatal environment remains largely unexplored. Temperature variation provides a good framework for testing phenotypic plasticity, as many traits are highly sensitive to changes in thermal conditions. Using Japanese quails in a fully factorial split brood design we investigated whether effects of mild maternal heat stress during egg formation are modified by mild heat stress in the offspring's post-hatching environment. We found that maternal effects on offspring traits (HPA-axis sensitivity and respiratory quotient), that were evident in offspring mismatched to their mothers' environment, were eliminated when the offspring's environment was matched to their mothers' environment. Other traits were only affected by maternal heat stress (early life growth) or post-hatching heat stress (adolescence growth rate and immunocompetence). The fact that some maternal effects are expressed when the offspring's environment is mis-matched to the mothers' environment and not when it is matched suggest that previous studies might have overestimated maternal effects by not taking the post-hatching environment into consideration and adds support to anticipatory maternal effect hypotheses.

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S12.5 **THURSDAY 27th AUGUST** **12:10h** **SALA 3**

Claudia Mueller

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Effect of elevated corticosterone during postnatal development on post-fledging behaviour & survival

Abstract

In life-threatening situations, the hypothalamo-pituitary-adrenal axis, leading to a rise in glucocorticoids, helps an animal to redirect the available energy and the behaviour from normal activities into a survival mode. During postnatal development, chronically elevated corticosterone levels can have negative impacts on growth and development, affecting morphology and cognitive performance for the entire life. We investigated whether some days of elevated corticosterone levels during postnatal development in an altricial species prolonged nestling- and post-fledging time, impeded or slowed down learning of hunting and affected survival until independence. Corticosterone levels of Common kestrel *Falco tinnunculus* nestlings were artificially elevated to stress-induced levels by implants in the middle of the nestling stage, while sibling nestlings served as controls by implanting placebo pellets. Before fledging, nestlings were equipped with a radio transmitter. Cort-nestlings stayed longer in the nest and left their parents later than placebo-nestlings, while there was no difference in time between fledging and independence between the two groups. Cort-nestlings showed a less developed hunting performance and a trend to lower survival from fledging to independence than placebo-nestlings. It seems that a short period of elevated corticosterone during postnatal development has the potential to affect fitness-related parameters like hunting performance and survival.

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THURSDAY 27th AUGUST **10:30h – 12:30h** **AUDITORIO**

S13. Studies of bird and blood parasite interactions in a changing world

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Summary. It is becoming increasingly clear that diseases play a fundamental role in shaping life history adaptations, migration patterns and regulating population dynamics. Moreover, the spread of diseases have been suggested as one of the main drivers behind the anticipated negative effects on bird populations in the face of global change. Blood parasites of birds (e.g. species of the genera *Plasmodium, Haemoproteus, Leucocytozoon, Trypanosoma, Isospora/Atoxoplasma*) are particularly suitable models for studies of disease in wild populations as both infection status and infection intensity can be accurately estimated from small blood samples. In this symposium we wish to highlight the most recent findings and methodological developments in this rapidly developing field to stimulate the spread of blood parasite research into other fields of ornithology.

Keynote address #1 **THURSDAY 27th AUGUST** **10:30h** **AUDITORIO**

S13.1

Staffan Bensch

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The conundrum of variation in parasite host specificity – examples from avian haemosporidians

Abstract

Avian haemosporidians of the genera *Plasmodium, Haemoproteus and Leucocytozoon* count a few hundred described species and perhaps more than ten times as many cryptic or undescribed species. Over the past 15 years, a region of the parasites' cytochrome b (cyt b) gene has become the standard for barcoding and since 2009, this information is compiled and made available in the database MalAvi (http://mbio-serv2.mbioekol.lu.se/Malavi/). Thanks to joint efforts from many laboratories world-wide screening haemosporidians, the database contains host- and geographic data for >1900 unique cyt b lineages. Most of these are either host specific or rare, as they so far have been found in single host species. A smaller proportion, however, are broad generalists with the two Plasmodium lineages GRW4 and SGS1 in 60 and 93 hosts, as the most extreme examples. Patterns of host range, host switches and host sharing appear mostly to be idiosyncratic but the data accumulating in the MalAvi database now makes it possible to search for more general patterns that will help to understand the processes behind shaping the variation in host-specificity. I will address these issues with examples from MalAvi and suggest subsets of parasite-host combinations that will be useful for further exploring these questions.

Keynote address #2 **THURSDAY 27th AUGUST** **11:00h** **AUDITORIO**

S13.2

Vaidas Palinauskas

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Avian malaria parasites: recent studies combining traditional, molecular and experimental data

Abstract

Plasmodium parasites are important agents of malaria in domestic and wild birds. Over 50 avian *Plasmodium* species have been described based on the similarity (morphology) species concept. Molecular studies revealed that based on mitochondrial cytochrome b gene there are more than 600 unique *Plasmodium* lineages. However, recent studies combining molecular and microscopy analyses revealed that this new method underestimates multiple infections and abortive development. Thus the recommended methods for avian blood analysis is combination of both microscopy and sequence analysis including single cell dissection methods.

Although accumulated huge data about diversity of avian *Plasmodium* parasites, their impact on vectors and vertebrate hosts especially during primary infections is insufficiently investigated. The analysis of blood samples obtained from mist-netted birds underestimate the impact of malaria parasites. I will present some experimental studies that reveal differences in susceptibility of some common bird species that co-evolved together with parasites and will talk about the virulence of parasites for different bird species.

Taken together, diverse group of avian malaria parasites have huge impact on birds' fitness, particularly during energy consuming periods such as seasonal migration, breeding and unfavourable environmental conditions. That should be taken in consideration in avian conservation, migration and orientation studies together with more detailed investigation of their natural pathogens.

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S13.3 **THURSDAY 27th AUGUST** **11:30h** **AUDITORIO**

Strahil Georgiev Peev

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Diversity and transmission areas of avian haemosporidians among three species of migratory birds

Abstract

In 1936 the veterinary Dryanovski had published first study of blood parasite diversity in Bulgarian birds. This study pointed at important scientific questions: haemosporidian diversity and distribution, host specificity and pathogenicity which are still essential nowadays. In the present study we demonstrate how a combination of various methods can be applied in order to move further our knowledge in the defined by Dryanovski 80 years ago questions. We apply methods (molecular and morphological) for diagnostic of avian malaria infections and recently developed geolocation approach for tracking small passerine birds. We evaluated the patterns of transmission of haemosporidian infections (*Plasmodium and Haemoproteus*) in the breeding and non-breeding grounds of the Common Nightingales (*Luscinia megarynchos*) (captured in France, Italy and Bulgaria), the Collared Flycatchers (*Ficedula albicollis*) and the Semi-collared Flycatchers (*Ficedula semitoruata*) captured in Czech Republic and Bulgaria, respectively. Using geolocation we identified non-breeding areas of our populations and thus we can propose regional-specific transmission areas of recorded parasites. These results contribute to better understanding the distribution and exchange of parasites in Palearctic - African bird migration system.

Joint authors

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S13.4 **THURSDAY 27th AUGUST** **11:50h** **AUDITORIO**

Swen Renner

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Disentangling the interactions between forests, parasites, and immune responses

Abstract

On the one hand, habitat characteristics determine the presence of individual birds through resource availability, but on the other hand habitat characteristics should also indirectly influence the occurrence of blood parasites. We tested if birds are more affected by land use changes (i.e., changes in resources through changes in forest interior structures) or through haemosporidian infections. Results from two widespread European passerines showed that the forest habitat structure of hosts also had positive outcome on the presence of parasites. We found three times higher parasite prevalence for the Blackcap *Sylvia atricapilla* compared with the Chaffinch *Fringilla coelebs*. Parasite prevalence varied within host species depending on forest type, being highest in beech forests (Chaffinch) and in mixed-deciduous forests (Blackcaps). Host body condition was more affected by parasites in structurally complex habitats, indicating that host-parasite interaction may be affected considerable through forest utilization.

S13.5 **THURSDAY 27th AUGUST** **12:10h** **AUDITORIO**

Josué Martínez-de la Puente

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Tasty birds: mosquito feeding patterns and implications for avian malaria transmission

Abstract
Avian malaria parasites affect the health status and fitness of their hosts. For the transmission between an infected bird to a new host, parasites require the intervention of an mosquito vector. The recent establishment of invasive mosquito species in new areas may provide novel epidemiological scenarios potentially affecting the circulation of these parasites. Therefore, identify those factors affecting the host selection by mosquitoes and the development of the parasites in different insect species is crucial on the study of avian malaria transmission. Molecular approaches allow the identification of the host species of mosquitoes, by the amplification and sequencing of the host DNA contained in mosquito blood meals. Furthermore, it is possible to identify the avian malaria parasites harboured by mosquitos using these methods, in order to reveal the potential vectors of avian malaria parasites. Here, we captured mosquitos in Barcelona (Catalonia, Spain) where native mosquitoes cohabit with the invasive mosquito *Ae. albopictus*, in order to identify: i) the host species of mosquitoes and ii) the avian malaria parasites potentially transmitted by these species. Our results support that the native ornithophilic *Cx. pipiens* may play a central role in the transmission of avian malaria parasites in the area.

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FRIDAY 28th AUGUST **9:00h – 11:00h** **SALA AZUL**

S14. Causes and Consequences of Partial Migration

Organisers

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Ines Catry,

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Summary. Partial migration defines the phenomenon where within a single population both migratory and resident individuals coexist. Partial migration occurs in many species and has even been suggested to be an early evolutionary form of full migration. In recent years, decreased migratory distances and increased frequencies of resident individuals in previously completely migratory species have occurred throughout Europe. These changes have been associated with climate change and with increased winter food availability resulting from human activities and environment changes. Studying species that exhibit partial migration offers the unique opportunity to investigate the causes and consequences of migration. Therefore, studies on partial migration have the potential to provide insight into evolutionary origins and mechanisms of migration. However, so far most studies investigating causes and consequences of avian migration have focused on species exhibiting obligate long-distance migration. One reason is the difficulties associated with tracking individuals over large spatial and temporal scales. Hence, sound knowledge of individual movement decisions and their consequences on individual fitness is lacking. With recent advances in tracking technologies it now becomes increasingly possible to study cause and consequences of partial migration. In this symposium we want to synthesis the current knowledge on partial migration and stimulate research on this fascinating topic. The symposium will review causes and consequences, aspects of fitness, the role of environmental change (including climate change), physiological mechanisms and environmental drivers of partial migration.

Keynote address #1

S14.1 **FRIDAY 28th AUGUST** **9:00h** **SALA AZUL**

Jan-Åke Nilsson

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The ecology and evolution of partial migration

Abstract

In a number of populations, some individuals remain resident in an area all year round whereas others migrate between areas, a phenomenon known as partial migration. Several hypotheses about the causes promoting such a migratory system exist, including competition for resources, predation risk and intra-specific niche diversity, as well as predictions of which individuals should be engaged in one or the other strategy depending on intrinsic as well as extrinsic states. The consequences of partial migration at the population level or consequences for individuals adopting the two different strategies are much less studied due to limitations in our possibility to follow individuals over a full year. This is understandable but is still very unfortunate as it makes it hard to evaluate hypotheses about how the system is maintained over evolutionary timescales. Predominantly this has been explained either as a frequency-dependent evolutionary stable strategy, implying equal fitness outcomes of the two strategies, or as a conditional strategy implying that individuals choose strategies from a best-of-a-bad-job point of view with resulting differences in fitness. I will summarize the causes and consequences of partial migration trying to infer examples not only from birds but also from other animal groups.

Keynote address #2 **FRIDAY 28th AUGUST** **9:30h** **SALA AZUL**

S14.2

Francisco Pulido

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Genetics and adaptive evolution of partial migration

Abstract

The environmental threshold model of migration predicts that populations close to the migration threshold, i.e. partially migratory populations, should show particularly high levels of phenotypic variation because these population are expected to possess high sensitivity of migratory traits to environmental conditions, like food availability, and high levels of genetic variation in the amount of migratory activity and on the propensity to migrate. According to this model partial migration is a central state of a population in the process of adaptive evolution of migratory behaviour. It is predicted that partial migrants should more rapidly adapt to rapid environmental changes, like those caused by current climate change, than populations of complete migrants or residents. Here, I review the evidence supporting these predictions and discuss the importance of different environmental variables that have been identified as possible triggers or modifiers of migratory behaviour. Studies elucidating the interplay of genetic and environmental factors in the expression of migratory behaviour are much needed for making better predictions on the rate and direction of adaptive changes in migratory behaviour in response to future environmental changes.

S14.3 **FRIDAY 28th AUGUST** **10:00h** **SALA AZUL**

Jesko Partecke

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Control of partial migration: Testing textbook knowledge in the wild

Abstract

Across the planet, migratory animals are currently encountering rapid changes to their breeding and non-breeding habitat as a result of global environmental change. Despite progress in identifying the underlying mechanisms responsible for migratory behaviour and developing evolutionary models explaining the existence of various migratory strategies, our knowledge how animals and their phenotypic and genetic make-up interact with their environment in the wild is very limited. Disentangling plastic, genetic and/or epigenetic attributes of individual migratory strategies and the phenotypic response to the environment, however, will be pivotal to understand how migratory species or populations can and will adjust to and cope with these rapid environmental changes. Using state of the art tracking techniques we first study a partially migratory population of Eurasian blackbirds (*Turdus merula*) to elucidate the degree of flexibility of their migratory strategies and their phenotypic responses to the environmental conditions in the wild. Second, in a combined common garden breeding and translocation experiment using Eurasian blackbird populations across Europe, which exhibit different overwintering strategies ranging from year-round residency, partial migration to complete migratoriness, we test by means of reaction norms to what extent these different strategies are hard-wired or soft coded.

S14.4 **FRIDAY 28th AUGUST** **10:20h** **SALA AZUL**

James J Gilroy

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Migratory diversity and population declines in European birds

Abstract

Migratory species are particularly vulnerable to environmental change, for reasons that are not fully understood. An important question is whether within-species flexibility in migratory behaviour plays a role in determining resilience to anthropogenic change. We evaluate the diversity of migratory strategies within species using metrics derived from distribution maps, focusing on partial migration and the relative dispersion of species distributions in the non-breeding season. We evaluate the power of these metrics in predicting Europe-wide population trends for 318 bird species using 1970-2000 EBCC Atlas data. We use a multi-model inferential approach, accounting for the effects of phylogeny, body mass, feeding guild, habitat specialism and climate niche tolerance. We suggest three hypotheses to explain the link between migratory diversity and population trends: 1) diversity might act to buffer populations against region-specific threats; 2) diversity might predispose species to advance their migratory timing in response to shifting resource phenology; 3) diversity might be correlated with other traits, for example dispersal ability, that determine resilience to environmental change. Our results provide a deeper understanding of what determines species vulnerability to environmental change. Our metrics are also likely to have significant value for conservation assessment

Joint authors

Aldina M. Franco

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S14.5 **FRIDAY 28th AUGUST** **10:40h** **SALA AZUL**

Marleen M P Cobben

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Stable partial migration? Bridging theory and practice

Abstract
We present an individual-based model investigating the evolution of partial migration, trying to reconcile theoretical and empirical views on its stability. The model featured a grid of populations with a cline of winter survival for non-migrants. Each individual had an inherited threshold value that determined the migration decision: it would migrate when the expected winter survival was lower than the threshold. The composition of each population changed through selection, dispersal and mutation. We observed a spatial gradient from fully migratory to fully resident populations with a substantial, temporally stable zone of partial migration. This is in line with the evolutionary stable state paradigm in theoretical studies. Diversifying selection on the migration threshold value occurred at the borders of the partial migration zone, explaining its stability. The strength of this selection increased with decreasing correlation between the expected and actual winter survival. Despite such increased selection however, the inclusion of variation in the actual winter survival, simulating good and bad years, resulted in yearly changes in the size and position of the partial migration zone. This could explain the differences between theoretical and empirical views on its stability, and shows that a threshold model underlying migration decisions allows for realistic patterns.

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THURSDAY 27th AUGUST **10:30h – 12:30h** **SALA 1**

S 15. Internal and external drivers of variation in landbird migration

Organisers.

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Summary

Despite many studies aiming to solve the mysteries of bird migration to date, the underlying factors that drive the variation in migration patterns throughout life-cycles are poorly understood. How do young migrants find their way to the winter grounds and how does this change during their life-cycle? Evidence for the kind of programme that drives these journeys over life-time is still mixed with different suggested mechanisms (clock-and-compass vs. goal-navigation). And to what extent do external conditions explain variation in the migration patterns that we see? External conditions can shape migration patterns, if these conditions alter costs and benefits that migrants face. Costs of bad conditions might be direct, i.e. affecting mortality, but costs might also carry-over to affect performance in later seasons or life-stages. Long-distance migrants can also specifically exploit variation in external conditions, in example by tracking vegetation greenness. Unravelling both endogenous and external drivers may also be crucial to understand how flexible migrants are to adapt to a changing environment. We are particularly interested in how recent advances in tracking individual birds have reinforced our understanding on the internal and external drivers that underlie variation in landbird migration.

Keynote address #1 **THURSDAY 27th AUGUST** **10:30h** **SALA 1**

S15.1

Raymond Klaassen

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A review of seasonal interactions (carry-over effects)

Abstract
Migration is a fabulous solution for the problem of exploiting seasonal resources. However, migration is a rather complex task as it is difficult to constantly be at the right place at the right time throughout the annual cycle, especially as conditions (food abundance, weather) might vary between years. Events during one stage of the annual cycle (e.g. deteriorated conditions at the wintering site) might have an effect during subsequent stages of the annual cycle (e.g. timing of spring migration, breeding success), and these processes are known as 'seasonal interactions' or 'carry-over effects'. In this talk, I will provide a synthesis about our current understanding of seasonal interactions. What types of interactions can we identify? When and where do they occur? What do we not know about seasonal interactions? In addition, using my own study system, the Montagu's Harrier, I will provide a new perspective on the strength of carry-over effects throughout the annual cycle. This analysis is based on long-term tracking of individual harriers using satellite transmitters and GPS-logger devices.

Keynote address #2 **THURSDAY 27th AUGUST** **11:00h** **SALA 1**

S15.2

Richard Holland

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Olfactory cues: a surprising candidate for navigation in migratory birds

Abstract
Bird navigation has a long and controversial history and no aspect has caused more controversy than the hypothesis that olfactory cues provide the information that is used in so called "true" navigation: the ability to navigate from unfamiliar areas. Whilst a large body of evidence has been gathered to support this in homing pigeons, the possibility that olfactory cues might also be used by migratory birds for navigation was thought unlikely. Nevertheless, here I present evidence for precisely this, from two separate studies. In the first, migratory passerines from the USA (Gray catbird *Dumetella carolinensis*), was follow using aerial radio tracking of the migration path. A second study from migrating gulls in Europe (Lesser black backed gull, *Larus fuscus fuscus*) used more than 100 GPS/ARGOS satellite transmitters to track the complete migration routes of experimentally manipulated birds and in some cases the return to breeding areas. If these data are borne out and olfaction is a crucial component of the navigation map of migrants, given the variability of such cues, it raises significant implications for the variation in migratory routes and strategies of migrating land birds.

S15.3 **THURSDAY 27th AUGUST** **11:30h** **SALA 1**

Sara Lupi

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Stopover decision during migration: the role of hormones controlling food intake

Abstract
During migration, birds undergo continuous changes in body condition: sustained migratory flights over ecological barriers, such as deserts and seas, lead to a rapid fat consumption, thus birds spend a considerable amount of time at stopover sites to refuel. Furthermore, migrants are subjected to dramatic changes in their life pattern: most passerines are diurnal but migrate at night. Because body condition is a strong predictor of migratory tendency in European passerines, we started investigating the role of orexic and anorexic hormones. Ghrelin, a recently discovered peptide hormone secreted by the gastrointestinal tract, acts as an anorexic hormone in domestic galliforms, reflecting nutritional state and food availability. We conducted a series of studies on a nocturnal migrant, the garden warbler *(Sylvia borin*), during spring migration on Ponza Island in the Tyrrhenian Sea. We compared circulating ghrelin levels between birds differing in nutritional state and food availability, and recorded the effects of ghrelin administration on food intake and nocturnal restlessness (*Zugunruhe*), an indicator of migratory disposition and stopover duration in captivity. Our results indicate a role for ghrelin in determining stopover behaviour, suggesting that this hormone acts as a signal regulating behavioural and metabolic switches between migratory and non-migratory states.

Joint authors

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S15.4 **THURSDAY 27th AUGUST** **11:50h** **SALA 1**

Martins Briedis

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Breeding latitude leads to persistent differences in annual schedule of a trans-Equatorial migrant

Abstract
Optimal temporal and spatial organization of the annual cycle is of crucial importance for individuals' survival and reproductive success. This especially applies for long-distance migratory birds which move large distances between their temperate breeding grounds and tropical non-breeding sites. Here, we provide the first complete information of the annual cycle of trans-Equatorial passerine Passeriforme migrants – Collared Flycatchers *Ficedula albicollis*. Individuals from two spatially separated breeding populations with similar geographic longitude, but different latitude were tracked year-round using geolocation by light. Due to climatic constraints, the onset of breeding in the northern population is approximately two weeks later than that of the southern population. We demonstrate that this temporal between-populations offset caused by different breeding latitudes carries-over to the entire annual cycle. The northern population was consistently later in timing of all subsequent annual events – autumn migration, non-breeding residence period, spring migration and the following breeding. Migration routes and non-breeding residency areas of the two populations largely overlapped suggesting that annual schedules are endogenously controlled with breeding latitude as the decisive element shaping the timing of annual events.

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S15.5 **THURSDAY 27th AUGUST** **12:10h** **SALA 1**

Rien E van Wijk

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The timing of migration in a Palaearctic-African migrant and its consequences on reproductive success

Abstract
Most studies on timing of migration in birds have focused on single events, i.e. arrival or departure from the breeding or non-breeding grounds, rather than the timing of multiple events embedded within the annual cycle. Usually, this single event has been the timing of 'spring' migration towards the breeding grounds, which is vitally important for reproductive success. It might however be influenced by earlier events, e.g. on the non-breeding grounds or 'autumn' migration timing. We therefore investigated the migration timing of individual Hoopoes, *Upupa epops*, and used a structural equation model to identify carry-over effects of each migration event on reproductive success. We found that the timing of each migration event within the annual cycle depended only on the timing of the previous event, but to varying degrees. Furthermore, only spring migration timing had carry-over effects on reproductive success. Our findings show periods within the annual cycle during which long-distance migrants can compensate for and thus flexibly respond to varying environmental conditions *en route*, but also that particularly spring migration timing is least flexible, since any change in timing carries over on reproductive success.

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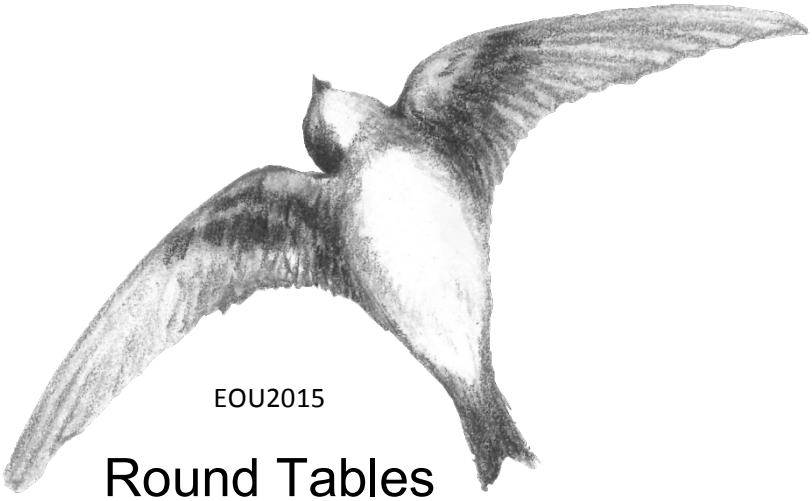

EOU2015

Round Tables

RT1: Crossing borders: collaborative and integrative research for migrant landbirds across the flyway

TUESDAY 25th AUGUST 16:50h SALA AZUL

Organisers:

Wouter M.G. Vansteelant Migrant Landbird Study Group;RSPB UK Headquarters The Lodge Sandy, Bedfordshire SG19 2DL, United Kingdom // IBED (CGE), University of Amsterdam, Science Park 904 Room C4.163, 1098 XH Amsterdam, the Netherlands
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Summary

The conservation of Palearctic migrant birds requires concerted research and monitoring efforts across the flyway range. Multilateral Environmental Agreements identify collaboration with and intervention by local people as essential for successful international conservation action. Academic researchers thus need to integrate with conservation managers, land owners and communities in delivering on the question of a flyway-scale understanding of migration connectivity, population dynamics, drivers of population threats, and evaluation of conservation action.

However, education and capacity-building may appear incompatible with scientific research and an increasing emphasis on individual-based grants in research funding complicates the development of integrative and collaborative research approaches. During this round table session, we will identify key challenges and opportunities for successful collaboration and integration of stakeholders in the EU and Africa to help achieve flyway-scale research and conservation of migrant birds. This round-table serves as a follow-up to the Migrant Landbird Study Group (MLSG) symposium that will take place in Badajoz on August 24th, and the outcomes of this meeting will help identify priority themes for future MLSG events.

RT2: The role of social media in ornithology

THURSDAY 27th AUGUST 16:50h SALA AZUL

Organisers

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Summary

Social media is a fast-moving technology and now plays an increasing role in research, including ornithology. Researchers who have embraced social media have discovered that it is much more than a social networking opportunity, but it can be an important tool for their research needs at the research, publishing and networking levels. Social media is now an important tool to disseminate research results. The arrival of individual article metrics now means there are developing metrics which will allow researchers, institutes, funders and others to measure the outreach and public impact of individual pieces of research. Ornithology, more than many other research areas, requires the input of the wider ornithological and birding communities. These communities are social and many exist as clubs or societies. Social media has seen these groups, as well as many more individuals traditionally outside of these groups, move online en-masse, embracing social media and web-based technology for information exchange, bird recording and data collection. Social media enables ornithologists to engage with, and mobilise, this online community for research projects. This symposium aims to look at: • the use of different social media and network platforms by researchers • how to maximise the outreach of a project via social media • how social media can be used for collaborative research • how social media can be integrated into citizen science projects • how social media is being used to promote published research and how it is driving individual article metrics in scientific publications

RT3: Drivers of spatial and phenological change in migratory systems

TUESDAY 25th AUGUST 16:50h SALA 3

Organisers

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José A. Alves

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Summary

Among the most urgent of challenges for ecologists and conservationists are the rapid population declines in many migratory species throughout the world. Understanding the causes of these declines is complex because individuals can depend on large numbers of locations throughout the migratory range, and environmental changes can occur at differing rates across these locations. Given this spatial variation in rates of environmental change, the impact on species will depend on the factors influencing individual site choice, and on the capacity of individuals to change site use and timings of movement. The use of novel tracking technologies is increasingly suggesting high levels of site- and time-fidelity in adult migrants. Consequently, juvenile site choice and the associated capacity to develop new habits in space and time may be key drivers of migratory species responses to environmental change. In this symposium, we aim to go beyond patterns of change in migratory systems to address the mechanistic processes that can facilitate or constrain these changes. Through a range of conceptual and empirical approaches to addressing this issue, we aim to synthesise current understanding of mechanisms driving changes in avian species with varying life history strategies, and to identify key areas for future research.

RT4: Radar aeroecology: unravelling population scale patterns of avian movement.

THURSDAY 27th AUGUST 16:50h SALA 3

Organisers

José A. Alves

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Judy Shamoun-Baranes

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Summary

Each year millions of birds use the aerosphere for migration, dispersive movements or foraging. The dynamic movement of these individuals has profound implications for the health of the environment (e.g. the provision of essential ecosystem services), and for human societies (e.g. risks to air traffic). It is thus imperative that population wide spatio-temporal patterns of bird movement be accurately measured, understood and ultimately predicted. These mass movements are detected by radar but monitoring and studying them is extremely challenging and it is often a neglected aspect of biological study. At the same time, biologging can provide wonderfully detailed movements of tagged birds, but typically provide tracks for few individuals and set strict limits to the birds' size. In contrast, remote sensing technologies such as radar provide detailed information on the intensity, timing, altitude and spatial scale of mass movements for a broad range of species and it is the best way to monitor bird migration at the population level. In this symposium we will discuss cutting edge approaches in radar aeroecology to monitor bird movement at the population level and across continental scales and how to use this information for a range of applications and stakeholders interested in monitoring.

RT5: Macroecology, global change, and the state of modelling avian distributions

THURSDAY 27th AUGUST 16:50h SALA 1

Organisers:
Jan Engler & Darius Stiels

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Summary

In recent years, a plethora of macroecological studies are based on birds as model organisms. They have not only described biogeographical patterns but greatly improved our understanding of underlying processes and mechanisms leading to the observed avian diversity. Species distribution models have become a common tool in studies on avian distribution patterns on regional to global scales but are in some respects still in their infancy. Recent topics cover conceptual and methodological challenges as well as solutions to basic and applied questions. Current research highlights extraordinary chances of SDMs when they are used for studies in avian conservation or even combined with ecological field studies. Conceptual questions e.g. on seasonal niche dualities will be raised in order to discuss possible peculiarities of the applications of SDMs in ornithological studies. Furthermore, recent methodological advances allow new approaches to questions on the evolution of environmental niches, when SDMs rest upon on phylogenetic studies.

RT6: European Turtle Doves as a case study: how to conserve a declining species of hunting interest?

TUESDAY 25th AUGUST 16:50h SALA 1

Organisers:
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Summary

European Turtle Doves *Streptopelia turtur* is one of Europe's fastest declining birds, with factors on the breeding grounds, migration routes, stopover sites and wintering grounds all potentially contributing to the decline. Research into Turtle Dove conservation and ecology on breeding grounds is being carried out in multiple European countries, with research into migration routes, stopover sites and wintering ground ecology also in early stages. This symposium provides the opportunity to bring together research groups working on this species to summarise current knowledge and prioritise areas for future research and collaboration. The proposal also provides the opportunity to exchange protocols, field experience and establish novel collaborations with groups interested in initiating research on this species, with the aim of establishing a working group to determine the extent and drivers of the decline, and conservation solutions for Turtle Doves across its range.

RT7: Creation of multiple genome alignments and clade-based tools to facilitate the study of speciation and adaptation in birds

TUESDAY 25th AUGUST 16:50h SALA 2

Organiser:
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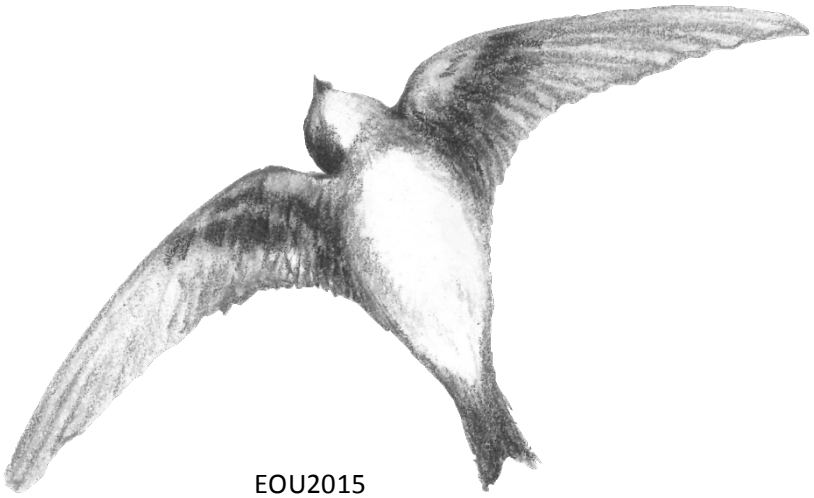
Summary

The avian phylogenomics project (http://avian.genomics.cn/en) recently sequenced 45 bird genomes. Highlights included a highly resolved phylogeny for members of 32 of the 35 proposed avian orders, evidence of convergent evolution in the development of vocal learning, the deciphering of complex sex chromosome evolution, the inference of a draft genome for the common ancestor of birds, crocodilians and dinosaurs, and more. In short, the project stands as a triumph of clade-based comparative genomics. Recent sequencing efforts have increased the number of available avian genomes to an estimated ~250. This expansion opens the possibility of understanding the natural history of birds in unprecedented detail. The goal is to sequence all 10,000 living species of birds as part of the B10K Consortium. As the number of species grows the average branch length between species declines, allowing the fine-grained isolation of genetic traits, and the more nuanced study of the relationship between genotype and phenotype. In many regards birds are an ideal model for this clade-wide investigation, primarily due to the nature of their genomes, which for vertebrates are compact, possess a stable karyotype and have a relatively low repeat content, all of which makes genome assembly and comparison more straightforward. However, analyses that were difficult and time consuming at the scale of 50 genomes will be near impossible with an order of magnitude more genomes. For example, a number of aggressive and undesirable heuristics were used in the genetic analyses that were largely aimed at avoiding limitations in assembly and alignment technologies. These prevented comprehensive analyses of genome rearrangements and gene duplications, likely critical players in the evolution of clade diversity, and forced analysis around a subset of "reference" genomes, creating unnecessary bias. In addition, many of these vertebrate genomes have low N50 contig lengths and the ability to annotate the increasing number of genomes is limited, where conventional methods require months to complete for each genome. Clearly, the situation is no longer sustainable.

In this Roundtable discussion I want to outline a proposal in which we will develop the next generation of comparative genomic analysis tools, based upon new methodologies that will make reference-free, clade based assembly, alignment, annotation and inference routine. This badly needed effort, which will use the avian clade as its test bed and driver, will make possible the informatics for community projects, such as Genome 10K, and in the process support B10K, the next generation of the avian phylogenomics project.

During EOU2105 I hope to reach out to other ornithologists to integrate avian genomes with avian biology.



EOU2015

Oral Sessions

Oral 1: Ecology

O.01 Daniela Campobello TUESDAY 25th August 15:30h AUDITORIO

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Interactive effects of micro- and macro-habitat features on reproductive success of lesser kestrels *Falco naumanni*

Abstract
Global warming effects and their interactions with other stressors have been examined at a macro- but not at a micro-scale. Across 2004-2013, we examined the potential interactive effect of ambient and nest temperatures on the reproductive performances of 1,157 nests of a cavity nester, the lesser kestrel *Falco naumanni*, breeding colonially in the Gela Plain (Sicily). By modeling temperatures on local (i.e. by weather stations) and micro (i.e. inside the nest) scales together with another set of biotic and abiotic variables, we found that local temperatures alone were the worst predictors of nest conditions whereas, together with the type of nest and brood days to a daily mean ≥ 38.9° C) suffered decreased hatching and fledging success. The most successful breeders were those that prevented such an overheating by both occupying under-tile nests and laying small clutches. We discuss the role of these two abiotic (i.e. nest type) and biotic (i.e. brood size) variables representing selective pressure potentially able to shape behavioural and life history traits such as nest site preferences and clutch size, respectively.

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O.02 Tomasz Wesołowski TUESDAY 25th August 15:50h AUDITORIO

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Species richness of a primeval forest breeding bird community – a 40 years' perspective

Abstract

Studies of the long-term changes in community structure, though necessary for assessing the impact of environmental changes, are only rarely conducted. Moreover, differentiation between the effects of the anthropogenic and natural drivers of change is hardly possible without information on the natural rates of change in the communities free of direct human influence. Our study meets both these requirements; we present results of a 40-year (1975-2014) census work carried out in the strictly protected part (no direct human intervention) of Białowieża National Park (Poland), where fragments of a primeval lowland European forest have survived. We use this dataset to assess the long-term variation in the species richness and species turnover in the breeding bird assemblages of the forest. The diversity of this community is very high, probably one of the greatest number of breeding species in any temperate forest. Its composition is very stable as well, no colonisations or extinctions were recorded in 40 years, though changes of habitat structure affected species richness locally. Most species breeding there are rather ubiquitous, they utilize all types of old growth habitats. Such flexibility in the habitat usage seem to be one of the reasons of a high resilience of this community.

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O.03 Alexander Grendelmeier TUESDAY 25th August 16:10h AUDITORIO

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The importance of conspecific cues for settlement: an experimental approach

Abstract
Decision-making concerning many aspects of an animal's life history requires information obtainable for instance through inadvertent social information which requires less effort than self-acquired information and is available from multiple sources. During the pre-breeding period of 2013 and 2014, settling behaviour of wood warblers (*Phylloscopus sibilatrix*) on plots with song playbacks was compared to control plots and subsequent nests monitored to evaluated reproductive performance. We recorded 1.2 territories on song plots compared to 0.39 territories on control plots (p-value = 0.0002). Occupation of song plots occurred as rapidly as 64% of all playback plots occupied after 1 week. Pairing rates on song plots (0.5 in 2013; 0.3 in 2014) appeared to be lower than on control plots (0.8 in 2013; 0.6 in 2014), but differed significantly only in 2014 (p = 0.03). Reproductive performance did not significantly differ between playback and control plots. The presence of conspecifics appears to be a key component in the settlement decision of wood warblers. In general we believe artificial attraction to be a feasible method to be used in conjunction with habitat management if the aim is to promote occurrence probability on breeding grounds for this species.

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O.04 Jakub Szymkowiak TUESDAY 25th August 16:30h AUDITORIO

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Selective social information use in habitat selection of Wood Warblers *Phylloscopus sibilatrix*

Abstract
Intraspecific social information use in songbirds commonly involves conspecific attraction strategy, when individuals use the presence of conspecifics as a cue to make their settlement decisions. Social information use is expected to be adaptive only when it is selective. Especially, good quality individuals are expected to be a more valuable source of information, thus should be preferred as social cues (so-called copy-successful-individuals strategy). It is poorly known, however, whether songbirds rely on intraspecific location cues discriminatively. We experimentally tested whether Wood Warblers *Phylloscopus sibilatrix* selectively relied on conspecific location cues in relation to the quality of observed individuals. We found that Wood Warblers selectively used intraspecific social information for breeding-site selection, but in a pattern opposite to that expected based on copy-successful-individuals strategy. Wood Warblers were attracted near poor quality conspecifics, but did not settle near good quality individuals. Moreover, the breeding-site choices of good quality demonstrators were rather actively rejected, instead of simply ignored. We suggest that observed pattern of selective social information use in Wood Warblers may result from a trade-off between the value of information and cost of intraspecific competition.

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Oral 2: Physiology and Parasitology

O.05 Martina Ferraguti TUESDAY 25th August 15:30h SALA 1

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Effects of landscape and mosquito community on malaria prevalence in wild House Sparrows *Passer domesticus*

Abstract

The incidence of vector-borne diseases has increased in the last decades, having anthropogenic landscape transformation an important effect on pathogen transmission. We evaluated how landscape characteristics and mosquito communities affect the transmission dynamic of avian blood parasites *Plasmodium, Haemoproteus and Leucocytozoon*. We sampled 2,587 house sparrows (*Passer domesticus*) and 335,877 mosquitoes in 45 localities grouped in trios (15 urban, 15 rural and 15 natural areas) from Spain. Overall, 58.2% of the birds were infected by at least one parasite genus. Bird age, landscape use and availability and the abundance of mosquitoes significantly affected the prevalence of blood parasites in birds, although their effects varied with respect to the parasite genus tested. Birds from both natural (62.5%) and rural (59.9%) areas had higher prevalence of infection than birds from urban areas (53.1%). For each of the three parasites, older birds presented a significantly higher prevalence than juveniles. For Plasmodium, the only of the three parasites transmitted by mosquitoes, the abundance of mosquitoes positively affected the prevalence of infection (p=0.007); for *Haemoproteus*, female birds had a lower prevalence than males (p=0.018).These results suggest that human changes in landscape and their subsequent effects on vector community may strongly influence the transmission dynamics of avian malaria parasites.

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O.06 Jorge S Gutiérrez TUESDAY 25th August 15:50h SALA 1

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Ecological context and physiological constraints determine the choice between prey of different salinity

Abstract

Food choice has profound implications for the relative intakes of water and salts, and thus for an animal's physiological performance. Discrimination behaviours with respect salt intake have been documented in number of bird species, but few studies have considered the ecological context in which they occur. Here, we report on the results of a two-choice experiment designed to examine the influence of dietary salt content and freshwater availability in food discrimination behaviours using red knots *Calidris canutus* that feed on mud snails *Peringia ulvae* manipulated to have either low (5‰) or high (42‰) salinity. Birds ate more and spent longer time foraging on low-salinity mud snails when they were deprived of freshwater and when their salt glands were relatively small. However, as they enlarged salt glands and regained access to freshwater, their preference for low-salinity prey disappeared. Such a change of preference represents a case of context-dependent discrimination. As birds were able to maintain salt-water balance under all conditions, changes in salinity preferences may occur without physiological sings of osmotic stress. Our results highlight the importance of ecological context for understanding foraging responses. We argue that areas with high salinities could act as refuges for euryhaline invertebrates from their avian predators.

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O.07 Antón Pérez-Rodríguez TUESDAY 25th August 16:10h SALA 1

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Do feather mites (Acari: *Astigmata*) keep feather microbiota under control?

Abstract
All species engage on symbiotic relationships, yet we know very little about the precise nature of many of them. Feather mites (Acari: *Astigmata*), which can be found in nearly all bird species, were for long thought to be commensals of birds, or even parasites; but recent research suggests that they could help birds keeping their plumage fit. We present the results of a correlational study linking feather mite distribution and abundance on blackcap *Sylvia atricapilla* wing feathers, and diversity of feather microbiota. We isolated several fungi, yeast, and bacteria species growing on blackcap wings, and we identified keratinolythic activity on many of them (i. e. a capacity to damage feather integrity). There was a clear negative correlation between microbial and mite loads in the feather sectors where mites were more abundant, indicating that birds could benefit from the presence of feather mites. To our best knowledge, this is the first time that a link between feather microbiota and feather mites is reported, enlightening our understanding of the ecosystem interactions of birds

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O.08 Ana Cláudia do Souto Gonçalves Norte TUESDAY 25th August 16:30h SALA 1

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Birds as hosts for ticks and reservoirs for *Borrelia burgdorferi s.l.* in Portugal

Abstract

Wild birds are often infested by ticks and considered reservoirs of the tick-transmitted bacteria *Borrelia burgdorferi s.l. (sensu lato*), the etiologic agent of Lyme borreliosis. In 2010-2014 we collected 2820 ticks from 690 infested birds of 40 species in Portugal, and assessed their *B. burgdorferi s.l.* infection by nested PCR. Eight tick species were identified, and, *Ixodes frontalis* (37%) and *I. ricinus* (34%) were the most common. *Turdus merula* and *Erithacus rubecula* were the most infested species, possibly due to their ground foraging behaviour. Infected *Ixodes* sp. were collected from *Fringilla coelebs, Parus major, Sylvia melanocephala, Troglodytes troglodytes, T. iliacus, T. merula and T. philomelos,* with higher prevalence in ticks from *T. philomelos* (26%). We detected *B. turdi* (4.4%), *B. valaisiana* (3.7%), *B. garinii* (3.3%), *B. miyamotoi* (0.06%) and one *Borrelia sp.* (0.06%) in *Ixodes sp*. collected from birds. The genetic characterization of *B. turdi* strains suggests their phylogenetic divergence from the strain originally detected in Japan. *A xenodiagnostic* experiment proved the reservoir competency of *T. merula* for *B. valaisiana* and *B. turdi*. These results strengthen the role of birds as key agents for the maintenance of different genospecies of the *B. burgdorferi* complex. This work was financially supported by the Portuguese Foundation for Science and Technology (UID/MULTI/04046/2013 and SFRH/BPD/62898/2009).

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Oral 3: Migration

O.09 Alexander Pakhomov TUESDAY 25th August 15:30h SALA AZUL

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Magnetic declination provides east-west coordinate in the navigational map of a migratory songbird

Abstract
Migrating songbirds are able to navigate across the surface of the Earth. Experienced migrants use a map based on long-range environmental cues because they can correct for displacements to unknown areas. However, it has remained a mystery how migrants determine their longitude (i.e. east-west) position. Latitude (i.e. north-south position) can be inferred from magnetic inclination, total magnetic intensity and, theoretically, also from the angle of the celestial point of rotation above the horizon. Detection of magnetic declination, the angular difference between magnetic and geographic north, would require very accurate celestial and magnetic compasses, but could provide the missing east-west cue making the bird's map usable on a continental scale. Here we used virtual magnetic displacements to test whether adult and first-autumn Eurasian reed warblers (*Acrocephalus scirpaceus*) and first-autumn European robins (*Erithacus rubecula*) can detect magnetic declination. Our results suggest that experienced migrants can detect changes in magnetic declination and respond in a manner consistent with compensation for the virtual magnetic displacement. Naive migrants either did not respond to the changed magnetic declination at all or increased scatter in their orientation. Thus, a migrating songbird can detect magnetic declination, and it provides the missing east-west map coordinate that enables experienced migrants to navigate in virtually all areas of the globe regularly frequented by migratory songbirds.

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O.10 Arne Hegemann TUESDAY 25th August 15:50h SALA AZUL

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Sick birds delay migration – Immune function influences migration phenology

Abstract

Most migrating birds make a number of stopovers during migration with a huge variation in the duration of such stopovers among individuals. Some of this variation can be explained by weather conditions or fat stores. However, a considerable part of the variation remains unexplained. We explore whether the health status of a bird influences stopover duration. We caught long-distance migrants (LDM) and short-distance migrants (SDM) during autumn migration in Falsterbo, Sweden. We applied radio-transmitters to quantify individual stopover durations and experimentally immune-challenged half of the birds. We compared stopover duration between control and experimental birds and within and among SDM and LDM. We show that immune challenged birds prolong their stopover duration and that this effect differed between long- and short distance migrants. We also related baseline immune function to stopover duration and individual timing of migration. Among LDM, early migrating individuals had higher levels of baseline immune function than late migrating individuals, while this pattern was reversed in SDM. Our data support the hypothesis that LDM are more time constrained than SDM. Moreover, our data suggest that in LDM high quality individuals leave first, while in SDM high quality individuals migrate later.

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O.11 Pedro Miguel Mendes Araújo TUESDAY 25th August 16:10h SALA AZUL

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Reed warblers migrating through Portugal: a climatic influence on stopover ecology over the last decade

Abstract
The arrival and breeding dates of small migrant birds have advanced throughout Europe. This study evaluates the hypothesis of a faster migration along the migratory route, which should lead to a decrease in stopover duration in staging areas over the last decades. Several climatic predictors were analysed as proxies to understand the stopover ecology of reed warbler *Acrocephalus scirpaceus* migrating through central Portugal. The minimum stopover duration of migratory reed warblers decreased significantly over the last decade during both the autumn and the spring migrations. During spring such reduction paralleled a higher gain in body mass in spring as compared to autumn. Such change in stopover patterns is likely to be related with the general improvement of environmental conditions along the migratory route, particularly a general increase in temperature. Warmer conditions *en route* during spring and in Northern Europe in summer should increase food availability, increasing the body condition of departing birds and the quality of stopover sites *en route* to Portugal, such that migrants will reduce the stopover duration at Portuguese reed beds.

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O.12 Frank A La Sorte TUESDAY 25th August 16:30h SALA AZUL

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The use of looped migration strategies by terrestrial birds in the Western Hemisphere

Abstract
Looped migration strategies have been documented for a broad spectrum of migratory bird species worldwide. Under this strategy, migration routes follow different seasonal paths, forming clockwise or counter clockwise looped trajectories when examined across the annual cycle. However, the prevalence and variation of looped migration strategies has not been systematically examined for any assemblage of bird species. Here, using occurrence information from the eBird citizen-science database, we estimate population-level migration trajectories for 207 long-distance migratory species within the Western Hemisphere. We generated daily occurrence centroids for each species using methods that accounted for spatial and temporal variation in sampling effort. The majority of migratory species presented evidence for looped trajectories (66%) with clockwise trajectories being the most prevent (49% of all species). Clockwise looped trajectories were more prominent at lower latitudes and counter clockwise looped trajectories at higher latitudes in the Northern Hemisphere. Straight trajectories were most prominent at the mid-latitudes in the Southern Hemisphere. Our findings suggest the geography of terrestrial and marine features in combination with seasonal atmospheric conditions likely determine the form and distribution of looped migration strategies in the Western Hemisphere.

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Oral 4: Reproduction

O.13 Elena Álvarez TUESDAY 25th August 15:30h SALA 3

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Keep moving to stay in place: responses of Mediterranean Great Tits *Parus major* to global warming.

Abstract
Global temperatures have increased over the past decades, and this change has affected the breeding ecology of birds. Many studies have shown a significant trend towards earlier laying, but fitness consequences of this advancement are still not clear. In our study area (orange plantations, eastern Spain), temperatures have significantly increased (e.g. by about 3 ºC in April) over the past 3 decades. We examined the effect of this increase on the breeding performance of a Great Tit *Parus major* population during this period. Mean laying date has advanced a mean of 0.4 days per year since 1986 (about 9 days during the study period) and it was negatively related to March temperatures. Several breeding parameters have shown significant long-term changes: clutch size has increased, mean egg volume has decreased, and the number of hatchlings per breeding attempt has increased. However, the number of fledglings per pair and their size and mass at fledging has not changed. It seems therefore that Great Tits have adjusted some breeding parameters to keep pace with probable environmental changes triggered by the increase in temperatures, so that the final output has virtually not changed.

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O.14 Cristina Ruiz Castellano TUESDAY 25th August 15:50h SALA 3

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Interspecific differences in eggshell susceptibility to bacterial colonization and penetration

Abstract
Avian eggshell has been traditionally assumed to have evolved at least partially as a response of selection pressures due to bacterial infection of embryos. We explored the possible interspecific variation of antibacterial properties of avian eggshells which would support this assumption. Probability of trans-shell bacterial infection largely depends on bacterial density over the eggshell, which varies interspecifically, but has been only explored in relation with nest characteristics and incubation behaviour. Trying to disentangle the effect of eggshell characteristics on bacterial colonization of eggshells and egg contents, we collected eggs (N = 184) from abandoned nests of 9 species (average-per-species=20, min=5, max=37) of birds that, after disinfection, were placed in 22 nest-boxes under identical environmental conditions. Four and 18 days later, we quantified eggshell bacterial loads, and density and prevalence of bacteria inside the experimental eggs. We detected interspecific differences in eggshell bacterial loads, and in density and prevalence of trans-shell bacterial infection after four and 18 days. We discuss possible role of eggshell characteristics (e.g. thickness, pore density and size) and of species-specific nest environments (e.g. nest material and nesting habit), explaining the evolution of detected interspecific differences in eggshell antibacterial properties.

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O.15 Martin U Grüebler TUESDAY 25th August 16:10h SALA 3

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Food provisioning in little owls *Athene noctua*: experimentally disentangling the effects of habitat quality

Abstract

Food provisioning of parent birds to their young depends on both, habitat quality and the nutritional state of their young. Since habitat quality and the brood's nutritional state often are correlated, the underlying mechanisms of adjustments in feeding behaviour remain uncertain. By supplementary feeding little owl (*Athene noctua*) broods, we experimentally changed the nutritional state of juveniles raised in two habitat categories, thereby disentangling the effect of habitat quality from the effect of the nutritional state on parental feeding behaviour. Camera traps recording a sequence of 10 pictures for each parental visit allowed identifying prey items brought to nestlings. The biomass supplied to broods did not differ between supplemented and control broods, suggesting that parents did not adjust their supply to the nutritional state of their young. However, the composition of prey differed between supplemented and control broods. Parents in low quality habitats fed nearly half the biomass compared to those in high quality habitats, resulting in higher nestling survival of food supplemented broods in low, but not in high quality habitats. Our results suggest that habitat quality affects the biomass of prey brought to the brood, whereas the nutritional state of the brood affects prey selection of parents.

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O.16 Vanja T Michel TUESDAY 25th August 16:30h SALA 3

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Reproductive success of little owls *Athene noctua* in relation to food supply and home-range size

Abstract

The abundance of resources in avian home-ranges affects fitness-related traits both directly and indirectly. Variation in resource availability may directly affect the number of offspring produced or survival of adults and chicks. Inhabitants of high quality habitats may indirectly benefit from reduced travelling effort and higher efficiency during brood provisioning linked to the use of smaller home-ranges. To disentangle potential direct and indirect fitness benefits of habitat quality in breeding little owls (*Athene noctua*), we used a food supplementation experiment manipulating the nutritional state of the brood, assessed the habitat composition, and recorded the reproductive success of 176 broods. 27'666 telemetry locations collected by radio-tracking of 154 individuals were used to estimate 236 summer- and 127 winter-home-ranges. Food supplementation and habitat composition strongly improved the survival of fledglings. While different components of the habitat affected the size of summer and winter home-ranges of adults, food supplementation did not reduce home-range size and reproductive success was not related to the size of summer or winter home-ranges. Thus, food supplementation affected reproductive output within equally sized home-ranges, but home-range size showed no additional effect on reproduction. Our results show that little owls profit from high habitat quality mainly through direct effects.

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Oral 5: Distributions, Taxonomy, Evolution, Behaviour

O.17 Stephen Baillie TUESDAY 25th August 15:30h SALA 2

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EuroBirdPortal – modelling the year round distributions and phenology of European birds

Abstract
EuroBirdPortal (EBP) is a new initiative that will combine data from on-line recording schemes to model the distributions, abundances and phenology of European birds throughout the year. The project currently collates data from over 100,000 observers in 21 European countries, with an initial data set covering 55 species from 2010 to 2013. The EBP website, launched in June 2015, provides dynamic distribution maps that demonstrate the potential value of this new resource. We outline the types of data being gathered by EPB and initial modelling approaches to describe seasonal variation in distributions, delimit migratory flyways and quantify phenological patterns. Limitations of the current data set include a high proportion of presence only records together with heterogeneity in sampling and reporting effort. We plan to improve data quality by encouraging observers to quantify effort. Applied issues where observations and modelled results from EBP can contribute significantly to conservation and management include site networks, the wise use of hunted populations, strategic management of collision hazards, the spread of non-native species and the transmission of avian diseases. The work will also provide opportunities to address ways in which birds contribute to cultural ecosystem services, including health benefits, recreation, tourism and education.

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O.18 Rene E. van Dijk TUESDAY 25th August 15:50h SALA 2

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Cooperative investment in public goods is kin directed

Abstract
The tragedy of the commons predicts social collapse when public goods are jointly exploited by individuals attempting to maximise their fitness at the expense of other social group members. However, animal societies have evolved many times despite this vulnerability to exploitation by selfish individuals. Kin selection offers a solution to this social dilemma, but in large social groups mean relatedness is often low. Sociable weavers *Philetairus socius* live in large colonies that share the benefits of a massive communal nest, which requires individual investment for construction and maintenance. Here, we show that despite low mean kinship within colonies, relatives are spatially and socially clustered and that nest-building males have higher local relatedness to other colony members than do non-building males. Accordingly, nest building took place above the nest-builder's own and its relatives' nest chambers. Alternative hypotheses received little support, so we conclude that the benefits of the public good are shared with kin and that cooperative investment is, despite the large size and low relatedness of these communities, kin-directed.

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O.19 Antonio Arnaiz-Villena TUESDAY 25th August 16:10h SALA 2

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Carduelini new systematics: new groups and splits showed by mitochondrial DNA and Bayesian phylogeny

Abstract
Rhodopechys sangineus phylogeny together with a group of Carduelini finches has been analyzed. Mitochondrial cyt b molecule has been used for species comparison and maximum likelihood and Bayesian methods have been employed in order to obtain a solid phylogeny. Compared Carduelini finches groups include: Greenfinches, "Arid-Zone" finches and Genera Rhodopechys and Pyrrhula species. Our results lead to conclude: 1) Genus *Rhodopechys* included species should need a new taxonomic classification; 2) Genus *Pyrrhula* shares a common ancestor with "Arid-Zone" finches group; the latter is phylogenetically a separate clade, including species from *Carpodacus, Rhodopechys and Leucosticte* Genera, and 3) *Pinicola enucleator* belongs to Genus *Pyrrhula* and seems to be ancestral. Results show that a systematics revision of *Carduelini* tribe bird species is required. Ref.: The Open Ornitholology Journal (2014) vol 7, pp 55-62.

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O.20 Alexey Druzyaka TUESDAY 25th August 16:30h SALA 2

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Social interactions independently affect chick growth in Black Terns *Chlidonias niger*

Abstract

Intraspecific interactions in colonial birds are the factor that reduces the reproductive output in conditions of high nest density. However, the effect of intra-brood contacts on their growth usually confounded by the deteriorating conditions and parental quality in the course of season. We investigated the effect of the number of neighbours and their behaviour on the linear growth (1-8 day) chicks of Black Terns (*Chlidonias niger*). Enclosing of 7-33, average of 15 neighbouring broods together, we manipulated the number and age of the neighbours contacted with each chick. The number of such "contacters" and the period of exposing negatively affected growth rate of chicks independently of their birth date or hatching order. Attacks from neighbours or losses of the conflicts for the food increased with the number of neighbours and had a negative effect on the growth rate of chicks. Feeding by parents was less possible if the number of neighbours increased, whereas feeding frequency had a positive effect on the growth rate of chicks. Our data indicate that in Black Terns intra-brood interactions affect chick growth independently of sibling competition or timing effects. Supported by RSF 14-14-0603.

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Oral 6: Ecology

O.21 Jan Jedlikowski THURSDAY 27th August 15:30h AUDITORIO

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Multi-scale habitat selection in Little Crakes *Porzana parva* and Water Rails *Rallus aquaticus*

Abstract

Habitat selection is the process determining the choice of a particular habitat amongst others available, and is often regarded as a hierarchical process from coarser (landscape level) to finer (territory and nest site level) scales, affected by multiple pressures (predation risk, food availability, etc.). We investigated at which scale birds take the most important decision about breeding site choice, and whether habitat features at the same scales mostly affect nest survival. During three years study (2012-2014) at Mazurian Lake District (NE Poland) we collected data about habitat selection and nest fate for Little Crakes *Porzana parva* (n = 53 nests) and Water Rails *Rallus aquaticus* (n = 57 nests). We analyzed the effect of multi-scale habitat variables on site selection and nest fate (logistic regression models and variation partitioning). Territory (especially for Water Rails) and landscape levels were particularly important in driving species settlement, but nest-stand still matters, especially in Little Crakes. Nest success (clutch survival) was mostly driven by variables belonging to the territory level, and subsequently to nest site and landscape levels. Decisions about site selection involve variables belonging to different levels; habitat selection is partly adaptive in both species, mostly in terms of reduction of predation risk.

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O.22 Hannah Watson THURSDAY 27th August 15:50h AUDITORIO

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Surviving in the city: transcriptomics offers insight

Abstract
Urbanisation and the associated high levels of environmental stress (from e.g. light, noise and air pollution) can impose physiological stress on wild animals. It has previously been demonstrated that urban birds exhibit higher levels of oxidative stress, but also show upregulation of antioxidant defences. Given the increasing impact of urbanisation worldwide, understanding the mechanisms underlying phenotypic effects associated with exposure to anthropogenic pollution is of increasing importance. The development of next-generation sequencing offers the opportunity to examine responses to environmental cues at the gene level. Using RNA sequencing, we sequenced the transcriptomes, from blood and liver tissues, of urban- and rural-dwelling male Great Tits *Parus major*. This enabled us to examine gene expression profiles of individuals living in the two environments characterised by different levels of environmental stressors. Over 100 genes were differentially expressed between urban and rural birds. Urban birds showed upregulation of several genes relating to immune function and protection against oxidative stress and metal toxicity. I will discuss the significance of these differences in gene expression and the use of transcriptomics to further our understanding of environmental adaptation.

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O.23 Letizia Campioni THURSDAY 27th August 16:10h AUDITORIO

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Niche segregation between immature and adult seabirds: does progressive maturation play a role?

Abstract
In long-lived species with slow maturation the ecology of pre-breeders, which often represent a large percentage of the individuals, is still understudied. Recent works have found pre-breeding seabirds to differ in their isotopic (and trophic) niche from adult breeders. These have been hypothesized to be linked to the less developed foraging performance of younger and less experienced immatures, or perhaps to their inferior competitive abilities. Such differences from adults would wane as individuals mature ("the progressive ontogenetic shift hypothesis") and could underpin the prolonged breeding deferral until adulthood displayed by those species. This study documents a marked difference in the isotopic signatures measured in the blood of immatures and breeders in two pelagic species, Cory's Shearwaters *Calonectris diomedea* and Black-browed Albatrosses *Thalassarche melanophris*. However, blood isotopic values did not present a relationship with pre-breeder age, suggesting no gradual ontogenetic shift from an immature towards an adult isotopic niche. Furthermore, isotopic signature of sabbatical adults could not be separated from those of immatures attending the same colonies, but were clearly segregated from adult breeders. Our results support the "the reproductive constrain hypothesis" suggesting that isotopic differentiation between breeders and non-breeders is mainly related to the severity of central-place-foraging and reproduction requirements.

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O.24 Ricardo Rafael dos Santos Ceia THURSDAY 27th August 16:30h AUDITORIO

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Numerical and functional responses of passerines to defoliator outbreaks in cork oak woodlands

Abstract
Insect-caused defoliation is implicated in the current decline of cork oak (*Quercus suber)* woodlands. In order to determine how the bird community of cork oak woodlands responded to larval irruptions of defoliators, we determined bird abundance and foraging time per tree in areas with localized outbreaks of two insect species (*Lymantria dispar* and *Periclista andrei*), and in a non-infested control area. Numerical and functional responses of tree-foraging passerines were compared among areas and we detected significant individual responses of foliage-gleaning species: Eurasian Blue Tits (*Cyanistes caeruleus*) spent a larger amount of time foraging on trees infested with *L. dispar*, and Common Chaffinches (*Fringilla coelebs*) density was higher in the outbreak area of *P. andrei.* Our results are consistent with the predictions of the generalist predator hypothesis, because moderate outbreaks of defoliators in cork oak woodlands were associated with positive numerical and functional responses of two key generalist passerines in spring. Our study shows, for the first time, that common resident passerine species of cork oak woodlands may play an important role in the control of pest populations, and calls on forest managers to find ways to enhance bird populations in order to reduce the severity of infestations.

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Oral 7: Behaviour

O.25 Alfredo Sánchez Tójar THURSDAY 27th August 15:30h SALA 1

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Winter prospecting behaviour changes in relation to age but not personality in House Sparrows *Passer domesticus*

Abstract

Finding a good nest site is essential for birds. However, the process of nest prospecting is not well described in wild populations. Here, we use a long-term dataset to test two hypotheses regarding winter nest-prospecting behaviour: (1) juveniles show higher winter nest-prospecting behaviour than adults, who most likely already hold a nest, and (2) personality differences predict prospecting behaviour: specifically, winter prospecting behaviour will correlate positively with nestling and post-fledgling activity. In the Lundy Island population, more than 99% of House Sparrows (*Passer domesticus*) are individually PIT-tagged. Over four years, we continuously recorded winter nest box prospecting behaviour by 188 individuals. We additionally tested nestling and post-fledgling activity in 156 of those individuals. Our results show that, independently of sex, juveniles prospect more than older individuals. However, neither nestling nor post-fledgling activity predicts winter prospecting behaviour. This study highlights the importance of exploring whether commonly used personality tests predict behaviours relevant to fitness in the wild.

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O.26 Elina Mäntylä THURSDAY 27th August 15:50h SALA 1

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Can insectivorous birds anticipate the future? Attraction of birds to pines induced by insect eggs

Abstract

Insectivorous birds can eat sawfly eggs, but a tree with insect eggs could also indicate "future food" (i.e. hatching larvae). Earlier studies have shown attraction of insectivorous birds to herbivore-damaged trees without the birds actually seeing or smelling the larvae. For the first time we show with great tits *(Parus major*), blue tits (*Cyanistes caeruleus*), pine sawflies (*Diprion pini*) and Scots pines (*Pinus sylvestris*) a similar attraction to egg-induced trees. Adult sawflies were placed on the lower part of a branch for egg-deposition. After three days the lower egg-laden part of the branch was cut off, and the upper, systemically egg-induced branch (without eggs) was transferred to a bird experiment booth together with an egg-free control branch. Each bird's behaviour was followed for 10 minutes. The birds of both species were more attracted to the branch induced by egg-deposition than to the control branch (46 vs. 22: $\chi 2 = 8.47$, $p = 0.0036$). Birds could have recognized the egg-induced branches by olfaction. The pine branches emitted numerous terpenoid volatile organic compounds, of which (E)-β-farnesene was released in higher quantities from the egg-induced branches. Also visual cues might be relevant since control branches reflected light significantly more than egg-induced ones

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O.27 Ben Hatchwell THURSDAY 27th August 16:10h SALA 1

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Cooperative breeding in long-tailed tits: kin selection and a test of Hamilton's Rule

Abstract
Inclusive fitness theory provides the conceptual framework for our understanding of social evolution, and empirical studies suggest that kin selection is a critical process in the evolution of animal sociality. A key prediction of inclusive fitness theory is that altruistic behaviour evolves when the costs incurred by an altruist (c) are outweighed by the benefit to a recipient (b), weighted by the relatedness of altruist to recipient (r), i.e. Hamilton's rule rb > c. Despite its central importance in social evolution theory, there have been few empirical tests of Hamilton's rule, and hardly any among cooperatively breeding vertebrates, leading some authors to question its utility. Here, we use data from a long-term study of cooperatively breeding long-tailed tits *Aegithalos caudatus* to examine whether helping behaviour satisfies Hamilton's condition for the evolution of altruism. We show that helpers are altruistic because they incur survival costs through the provision of alloparental care for offspring. However, they also accrue substantial benefits through increased survival of related breeders and offspring, and despite the low average relatedness of helpers to recipients, these benefits of helping outweigh the costs incurred. We conclude that Hamilton's rule for the evolution of altruistic helping behaviour is satisfied in this species.

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O.28 Erik Matthysen THURSDAY 27th August 16:30h SALA 1

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Information use and dispersal: the role of early experience

Abstract

One of the main challenges for dispersing birds is to gather and process information on available options outside the natal area. Costs of dispersal can be reduced by exploring or prospecting prior to the final departure decision. In some birds including Great Tits *Parus major*, parents escort their dependent offspring to foraging areas often at large distances outside the territory. We showed earlier that these post-fledging family movements (PFM) are a significant predictor of dispersal direction after independence, and that PFM are related to parental characteristics. Here we use a novel statistical approach and an extended dispersal dataset from a patchy study area to formally test whether early experience with a patch through PFM increases the probability of settling there. Preliminary results confirm this hypothesis. In addition we will test whether birds with particular phenotypes, condition or status (personality, fledging date, body mass at fledging) rely to a greater or smaller extent on the use of this early information. Finally we will update previous results on factors explaining variation in PFM (Van Overveld & Matthysen, Behav. Ecol. 2011) using a considerably larger dataset of radiotracked families.

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Oral 8: Conservation

O.29 Tamer Albayrak THURSDAY 27th August 15:30h SALA 3

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Phylogeographic structure and key areas for the conservation of Krueper's Nuthatches *Sitta krueperi*

Abstract
The phylogeographic structure and atlas projects provide detailed information of great value of key species are the primary input for conservation genetics and management plans. Krueper's Nuthach (Sittidae, *Sitta krueperi*) is endemic to Anatolia, Lesvos Island and Caucasus region. It is listed "Near Threatened" by IUCN due to habitat loss and declining the population. I conducted bird survey in more than 1400 point counts in Turkey and Greece, covering most of its distribution. Phylogeographic structure of Krueper's Nuthatch was analyzed partial sequences of the mitochondrial cytochrome oxidase subunit I gene (COI; 605 bp) from birds sampled across seven localities. A total of fourteen COI haplotypes were found revealing three distinct haplotype groups; one each in northwestern, northeastern, and southern Turkey. However, there was evidence for secondary gene flow between the northwestern and the other two regions. Geographical Information System (GIS) was used for preparing the distribution maps and depicting the hotspots for Krueper's Nuthatch. In conclusion, I highlight four key areas for the conservation of this species, which were located one in southern and two in northern Turkey and Caucasus region. The areas should be considered as an Important Bird Area for Krueper's Nuthatch.

O.30 Reto Spaar THURSDAY 27th August 15:50h SALA 3

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A citizen science census of House Martins *Delichon urbicum* in Switzerland lead to rethinking conservation strategy

Abstract
House Martins *Delichon urbicum* are in decline in many western European countries. The reason for the decline is poorly understood. One cause is a diminishing acceptance of homeowners and inhabitants for house martin nests on buildings and a lack of material to build own natural nests around buildings. In 2013, the Swiss ornithological institute started a two-year web based citizen science project to collect information on exact addresses of house martin colonies (to protect larger colonies from disappearance) and to collect information on the occupation rates of natural and artificial nests, on the types of buildings the nests were located on and the availability of material for nest construction. The results of the census show that more than half of the registered occupied nests were artificial, and thus, the species depend to a big part on human made breeding sites. The proportion of House martins breeding in artificial nests and the availability of open ground to find nest material differed strongly between regions. Another important result was that about half of the artificial nests remained unoccupied, and many natural nest were reported as damaged or destroyed. Current conservation strategies should be adapted to these findings.

Joint authors

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O.31 Hugo Robles THURSDAY 27th August 16:10h SALA 3

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Floaters buffer the extinction risk of bird populations in fragmented habitats

Abstract
In a world subjected to increasing human impacts on biodiversity, understanding how populations persist under severe fragmentation conditions is a hot research theme in ecology and conservation biology. Simulation studies suggest that floaters (non-breeding but sexually mature individuals) may buffer avian populations from extinction by replacing the lost breeders, but there are no empirical studies that assess this hypothesis in fragmented habitats. We addressed this issue in a fragmented landscape occupied by middle spotted woodpeckers (*Dendrocopos medius*) in NW Spain (2000-2014). The number of occupied patches was relatively stable (15-24 of 101 patches annually) because extinction was balanced by recolonization. After controlling for population size and habitat quality, local populations in patches with floaters were 8 times less likely to become extinct in subsequent years than populations in patches without floaters. Some floaters replaced the lost breeders, suggesting than floaters may constitute pools of non-territorial individuals that enhance population persistence by promoting population turnover. In addition to a preference for large and high quality patches, floaters were more likely to occupy high-populated patches, which may suggest that a lack of conspecific cues necessary for floater settlement and population turnover is behind the decline of small populations in fragmented habitats.

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O.32 Liviu G Pârâu THURSDAY 27th August 16:30h SALA 3

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Demographic patterns of invasive parrots in Europe

Abstract
Non-native species are currently considered by some nature conservationists as one of the great threats for biodiversity. A number of alien species have become widespread and their impact ranges from displacing local fauna to decreasing agricultural production. Among several established alien species of parrots in Europe, Rose-ringed Parakeets *Psittacula krameri* are the most abundant. However, increasing empirical evidence suggest this species has a negligible impact on local avifauna. Since 1970's Rose-ringed Parakeets have established in more than 100 urban centres across the continent. In Western Europe, a number of long-term census programs have monitored population trends: the species has grown considerably in numbers, yet some subpopulations failed. Valuable demographic data exists, but independent from one another. During our study, we collated these data and updated the status for 113 populations of Rose-ringed Parakeets in 9 countries. Furthermore, we obtained information regarding the species presence in 24 European countries, for which no data was previously available. Information was extracted from published papers, regional bird-atlases, grey literature or experts from the region were contacted. Our data synthesis reveals a positive demographic trend across the continent, with Rose-ringed Parakeets in Southern countries spreading more rapidly than populations in West and Central Europe.

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Oral 9: Parasitology, Morphology, Genetics

O.33 Michaël Moens THURSDAY 27th August 15:30h SALA 2

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Haemoproteus communities in hummingbirds: specialist parasites in a singular habitat?

Abstract
Hummingbirds are a unique environment for symbionts due to their high metabolic rates and small size. As hummingbirds have the highest metabolic demands in the vertebrate world and this is associated with erythrocyte adaptations, we hypothesize that their blood parasites will be specialists with exceptional host exploitation strategies. Here we explored the diversity and host specificity of Haemoproteus parasites of hummingbirds in the cloud forests of Southern Ecuador. We tested if these parasites are the outcome of an adaptive radiation and if they are specialized in hummingbirds by sampling a wide diversity of hummingbirds and passerines. From a general survey of 940 birds belonging to 134 bird species we sampled 172 individuals of 19 hummingbird species. We show that hummingbirds have been colonized by Haemoproteus parasites with a diverse phylogenetic ancestry and that they consist of generalist lineages shared with passerine species. Furthermore we detected a lineage known as of Haemoproteus witti which is highly transmitted to hummingbirds and passerine species and which shows extremely high levels of infection in hummingbirds, suggesting this lineage poses a significant threat to this unique radiation of birds in the Northern Andes.

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O.34 Lucie Kropáčková THURSDAY 27th August 15:50h SALA 2

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Interspecific variation of gut microbiota in passerine birds based on high throughput sequencing

Abstract

Significant attention has been devoted to the research on the composition of the gastrointestinal microbiota in humans or laboratory mammals. Nevertheless, factors determining composition of microbiota colonizing wild populations of vertebrates are still insufficiently understood, despite their potential ecological and evolutionary importance. In this contribution, we performed large scale analysis of the interspecific variation in taxonomic and functional composition of gut microbiota in 57 passerine species (485 samples analysed in total) using metabarcoding of bacterial V3-V4 16s rRNA on Illumina MiSeq. We tested if ecological traits such as diet composition, migration, preferred habitat and population densities affect inter- and intra-specific variation in gut microbiota and if there is any evidence for the co-phylogeny between host and its gut microbiome.

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035 Peter Laszlo Pap THURSDAY 27th August 16:10h SALA 2

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Interspecific variation in the structural properties of flight feathers in birds

Abstract

The functional significance of intra- and inter-specific structural variations in the flight feathers of birds is poorly understood. Here, a phylogenetic comparative analysis of four structural features of proximal and distal primary feathers of 137 European bird species was conducted. Flight type, habitat, and moult strategy were all found to affect feather structure to some extent. Species characterized by low wing-beat frequency flight have broader feather rachises and feather vanes with lower barb density than birds associated with more active flapping modes of flight. Rachis width and feather vane density are likely related to differences in force distribution across the wingspan during different flight modes. An increase in shaft diameter, barb density and porosity from the proximal to distal wing feathers was found, and was highest in species with flapping flight indicating that aerodynamic forces are more biased toward the distal feathers in flapping flyers than soarers, and gliders. Habitat affected barb and barbule density, which was greatest in aquatic species, and within this group, barb density was greater in divers than non-divers, suggesting that the need for water repellency and resistance to water penetration may influence feather structure. We also found that barb density was affected by moult pattern.

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Genetic diversity and differentiation in Middle and Great Spotted Woodpeckers

Abstract
Many species persist in fragmented habitats as a consequence of ongoing habitat loss. However, connectivity among the fragmented populations is often unknown. The Middle Spotted Woodpecker *Dendrocopos medius* is bound to old deciduous forests with rough-barked trees and standing dead wood and shows a strongly fragmented distribution. Due to the presumed limited dispersal capacities of woodpeckers in general, it has long been speculated that the remaining populations of the species are at best weakly connected, possibly giving rise to genetic problems. To address this, blood samples from Middle Spotted Woodpeckers were collected in Switzerland and Germany from 2009 to 2011. For comparative purposes, we also collected in the same forests samples from Great Spotted Woodpeckers D. major, an abundant and widely distributed habitat generalist. Genetic diversity and differentiation were examined with microsatellite markers. Overall, genetic diversity in Middle Spotted Woodpeckers was lower than in Great Spotted Woodpeckers. Local populations were more strongly differentiated in Middle Spotted Woodpeckers than in Great Spotted Woodpeckers. The local populations were assigned to three genetic groups in Middle Spotted Woodpeckers and to two groups in Great Spotted Woodpeckers. A significant isolation-by-distance pattern was found in Middle Spotted Woodpeckers, but not in Great Spotted Woodpeckers.

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Oral 10: Migration

O.37 Willem Bouten THURSDAY 27th August 15:30h SALA AZUL

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Dawn ascents to astonishing altitudes during migration of Eleonora's Falcons *Falco eleonorae*

Abstract
Eleonora's Falcons, breeding on the Canary Islands and wintering on Madagascar revealed astonishing dawn ascents (short-lasting vertical spikes, occasionally up to 5500 m above ground level) at about half of the migration days. These steep vertical movements in the atmosphere or sea have been reported for some species but were never described for raptors. In general, these movements are thought to be related to foraging, probing the atmosphere for following winds or acquiring orientation cues. We evaluated these options for Eleonora's Falcons using high resolution GPS tracking (on average 22000 measurements per bird per season) while flight modes were monitored using a tri-axial accelerometer. Birds used flapping flight to climb with vertical speeds of 0.8-1.2 m/s, starting at 0.5-1 hour before sunrise although these ascents require two to three times as much power as horizontal flapping flight. Dawn ascents mainly occurred along the magnetic equator (where inclination is zero) but not with high cloud cover nor in mountainous areas where landmarks are clearly visible above the landscape. We therefore concluded that this mainly diurnal migrant seeks a wide overview of the landscape and acquires polarized light cues during dawn to orient or recalibrate its compass, especially along the magnetic equator.

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Yearly movement patterns of the Little Bustard *Tetra tetrax* in South-western Iberia

Abstract
We studied the annual movement patterns of Little Bustards captured and tracked in Alentejo (Portugal) and Extremadura (Spain), analysing individual variability, seasonal site fidelity and main habitat usage during the different seasons of the year. Using satellite tags, 17 birds were tracked for over one year between 2001 and 2015, resulting in 30 years of complete yearly cycles of moments (five birds were tracked for three years; four during two years and another seven birds during one year). We analysed individual migration patterns using Net Square Displacement (NSD) and describe the main different yearly movement patterns using GAM models. We found the population to be partially migratory: 23% of the cases showed a sedentary pattern; 63% performed migratory round trips and 14% corresponded to dispersal episodes. All nine birds that were tracked for over one year showed high levels of breeding and post breeding site fidelity. Habitat use shifted between seasons: while depending exclusively on dry cereal agriculture and pastures during the breeding season a considerable proportion of irrigated land uses were found in the post-breeding ranges. We hypothesise that movements are mostly related to resource availability.

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O.39 Mikkel Willemoes THURSDAY 27th August 16:10h SALA AZUL

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Migratory connectivity in common cuckoo *Cuculus canorus* populations across Northern Europe

Abstract

Population specific patterns of migration routes and phenology is the result of colonization history and of adaptive changes in relation to environmental conditions and competition effects within and between populations. It can therefore help to identify which traits are conserved and which are modified, and hence provide information about the plasticity and adaptability of migratory behavior. In this study we compare individual annual migratory cycles between three populations of common cuckoos *Cuculus canorus* in northern Europe (populations in Great Britain, South and North Scandinavia, respectively). Previous research has shown that one population of common cuckoos migrates over a narrow front. This would predict some degree of migratory connectivity, unless all populations use the same corridor. We find a high degree of migratory connectivity in the routes followed through Europe, but no or low connectivity within Africa. Temporal connectivity was likewise non-existing in the winter area, but grew stronger the closer the birds were to their breeding grounds. This suggests that winter area is a well-preserved trait, whereas route and timing are more easily modified mainly to fit breeding site location and phenology. Such results are important, if we are to predict the effects of climate change on migrating birds.

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O.40 Jenny Sturgeon THURSDAY 27th August 16:30h SALA AZUL

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High early-life winter site fidelity in partially-migratory European shags *Phalacrocorax aristotelis*

Abstract
One critical step towards understanding the causes and consequences of partial migration is to pinpoint the age at which individuals fix their strategy of residence versus migration and select a winter location. This is because the winter location and environment that individuals experience can profoundly affect their subsequent fitness and survival, especially if individuals use the same winter location across years. However, due to the difficulty of tracking movements of numerous juveniles over large spatio-temporal scales, very little is known about the development of residence versus migration, or the age at which individuals fix their winter location. We used field resightings of colour-ringed adult European shags to show that Scottish breeding populations are partially migratory. We then used >6000 resightings of ~2500 juveniles colour-ringed at four colonies across five years to quantify the timing and location of settlement. Juveniles from all colonies were repeatedly resighted at the diverse locations where they were first sighted in winter. Juvenile shags therefore show high winter philopatry, suggesting that they acquired their lifelong wintering strategy soon after fledging. These data imply that, within a partially-migratory population, individuals' wintering strategies become canalized early in life, potentially inhibiting individual and population responses to future environmental change.

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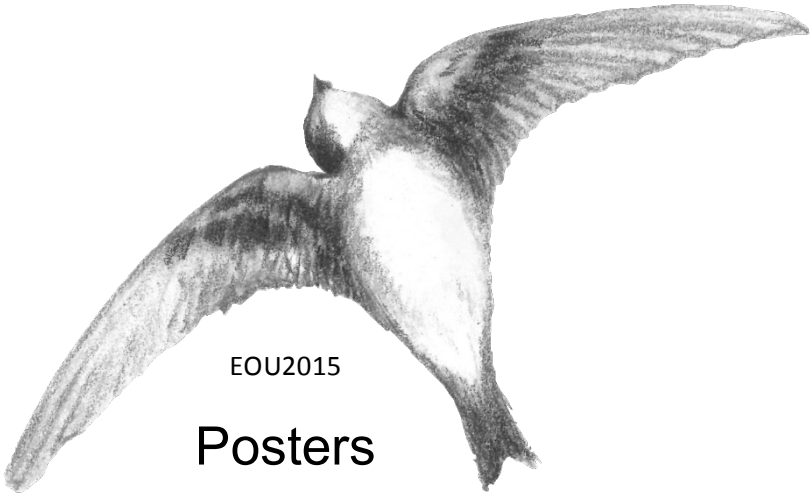

EOU2015

Posters

Group 1: Reproduction

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Monogamous versus polygamous males: Siring extra-pair young does not increase male fitness

Abstract

A basic assumption underlying evolutionary theory is that males who mate with multiple females gain a quantitative reproductive advantage over monogamous males. Conversely, females are limited by their number of eggs and are thus expected to prefer quality over quantity. While the latter has been tested often, empirical data assessing whether polygamous males sire more offspring compared to monogamous males is sparse. Here, we tested this hypothesis in a long-term dataset from a wild population of house sparrows, *Passer domesticus*. We found no difference in life-time fitness between monogamous males and those who sired extra-pair offspring (EPO), when accounting for individual lifespan. This was independent of the chosen fitness measure (life-time number offspring, life-time number recruits). That male polygamy not necessarily translates into higher life-time fitness could be because EP sires may face a greater risk of being cuckolded. Indeed, males that sired EPO sired on average 2.9 (95% CI 2.5 – 10.3) fewer within-pair offspring than monogamous males. Our results challenge the basic assumption of a quantitative fitness advantage for males who seek extra-pair paternity. We call for more empirical tests assessing the fitness consequences of extra-pair paternity quantitatively to better understand sexual selection.

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Linking form to function: How morphology predicts velocity of coal, great and blue tit spermatozoa

Abstract
Despite their common task, avian spermatozoa come in endless forms and it is a challenge to understand the evolution and maintenance of diversity in sperm morphology between and within species. Assessing how sperm form relates to sperm function may be key to discovering the selective pressures that have shaped such variation in birds, in particular when variance in male fitness is strongly determined during postcopulatory processes. Empirical data relating avian sperm form to function are scarce, however, and the results obtained so far appear inconsistent across lineages. To better understand the differential functional morphology of spermatozoa in different groups of birds, we here used computer-assisted sperm analysis (CASA) to examine how sperm velocity is influenced by sperm morphology in a large sample of blue tits *Cyanistes caeruleus*, great tits *Parus major* and coal tits *Periparus ater*, three socially monogamous passerine birds with frequent extra-pair mating.

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Competitive fertilisation success in relation to sperm trait variation in three passerines

Abstract
Females of most socially monogamous bird species routinely copulate with males other than their social mates resulting in broods with mixed paternity. To understand how fitness gains through extra-pair fertilisations affect sexual selection on males it is crucial to know which traits make a male successful as an extra-pair sire. However, with the notable exception of male age no consistent predictors of fertilisation success have been identified which is particularly evident for secondary sexual characters that females might assess during precopulatory mate choice (e.g. plumage or song). In this contribution we focus on traits and mechanisms effective post copula and analyse competitive fertilisation success in relation to sperm traits in a large sample of blue tits *Cyanistes caeruleus*, great tits *Parus major* and coal tits *Periparus ater* to better understand postcopulatory sexual selection and the microevolution of sperm traits under sperm competition in passerine birds.

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Individual consistency in provisioning and nest defence in House Sparrows *Passer domesticus*

Abstract

Many avian species show biparental care. Nestling provisioning and nest defence are important traits for fitness, but these traits are rarely studied together and it is not well known how they may trade-off or covary. We used a comprehensively surveyed population of nest box breeding House sparrows to test the following hypotheses: (1) males and females show temporal consistency in parental care, (2) males show a positive association between both parental care behaviours and (3) females adjust their nestling provisioning effort according to the male's provisioning effort. Overall, we analyzed 55 males and 58 females, caring for 85 broods. We assessed provisioning by counting the number and duration of the visits, and nest defence in males by their reaction to a caged stuffed sparrow (two males, one female, and one empty cage). First, we confirmed that the stuffed males evoked an aggressive response. Second, we found that nest defence and provisioning behaviour showed within individual consistency. Third, we found that males that provision more invest more in nest defence. Our results also suggest that females do not adjust their level of provisioning effort to their partner's effort. Our study suggests that different aspects of parental care may be positively associated.

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The effect of urbanization on the breeding ecology of the Rallidea family in Northeastern of Algeria.

Abstract
A wetland is characterized by the permanent or temporary presence of water. It controls the evolution of the characteristics of the environment and development of fauna and flora. Sensitive to gradual or sudden changes in their environment, birds are good bio-indicators. They occupy large territories and provide information on the quality of many areas (forests, wetlands, rivers, etc.). In North East Algeria and during the breeding season of 2012, the reproductive biology of three species of Rallidae: purple swamphen (*Porphyrio Porphyrio*) which is a protected species listed in Annex I of the Birds Directive and Appendix II of the Bern Convention, the Coot (Fulica atra) and the Common moorhen (*Gallinula chloropus*); nesting at TONGA lake "natural environment at the El Kala National Park" and pond of Boussedra "urban environment that is at the city of Annaba", was studied. This helped to understand, firstly, the timing of reproduction and the course of these three nesting bird species, that is to say, the demographic parameters (The laying date, installation and characterization of nests, clutch qize, egg biometrics). And it has, on the other hand, highlight the lack of differences between the results collected in the urban and natural environments and those in the literature.

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Facultative and non-facultative shifts in sex ratio of Glossy Ibis *Plegadis falcinellus*

Abstract
The sex ratio is an important parameter affecting population demographics. We studied the causes and mechanisms of changes over time in the sex ratio of the glossy ibis in the main breeding colony in Doñana. As colony size increased from seven pairs in 1996 to 4000 in 2011, a worsening of conditions seems to have increased mortality of female chicks (smaller than males), increasing the proportion of males at fledging. At the same time, the proportion of females increased at hatching, as expected under Fisher's hypothesis related to the costs and benefits incurred by the parents by growing offspring of different sexes. The excess of males among fledglings was compensated by a greater dispersal to other populations. Changes in sex ratio are shown to be a complex process involving both facultative and non-facultative mechanisms.

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How does the parental investment affect the malaria infection status of the collared flycatcher?

Abstract
The life-history theory states that there is a trade-off between the current and the future reproduction. This trade-off is often caused by a negative correlation between the reproductive effort and the immune function because both are energetically costly for the individual. If an individual allocates more energy into the current reproduction then less energy will be available for the immune defence. Thus the individual's resistance to infections decreases and this negatively affects its future survival. Several scientific studies have investigated the effect of parental effort on parasitism but many of them have failed to find any correlations perhaps because the majority of these studies have examined only short-term effects of the reproductive effort. The aim of our research was to investigate the short and long-term effects of parental investment on malaria infection in the collared flycatcher (*Ficedula albicollis*). Therefore we experimentally manipulated the parental investment by increasing or decreasing the brood size of the parents and then we determined the prevalence of malaria blood parasites (*Haemoproteus and Plasmodium* genus). According to our results the manipulation did not affect significantly the infection status of the individuals in the experimental year and the next year.

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Clutch size and breeding productivity of Long-eared Owls *Asio otus* and the factors determining them

Abstract
The research was conducted in the north of Moscow Region (Russia) in 2001–2014. Mean clutch size of Long-eared Owls annually varied from 4.0 to 6.5 eggs, averaged 5.0±0.2 eggs over all years. The number of eggs in successful (5.2±0.3) and unsuccessful (4.3±0.3) nests differed significantly ($Z=2.04$; $p\leq0.05$). The clutch size negatively correlated with the nesting start date ($rs= -0.58$; $p\leq0.05$) and positively – with the rodent abundance in spring ($rs=0.55$; $p=0.08$). The annual fecundity of owls reached 1.1-4.7 chicks per nest, averaged 2.9±0.4 chicks per nest over all years. Analysing only successful nests, i.e. with at least one nestling leaving the nest, the fecundity was higher (3.3±0.3) with interannual variation from 2.3 to 5.4 chicks per nest. The average number of chicks from successful nests positively correlated with the average temperature in May, when most fledglings leave their nests. The average survival rate of fledglings (69±4%) negatively correlated with the amount of precipitation in June ($rs=-0.79$; $p\leq0.05$). The owls breeding success varied from 0 to 77% (averaged 42±8%) and negatively correlated with the temperature of the second half of April ($rs=-0.56$; $p\leq0.05$). It could be explained by more intensive incubation which among other things reduced nests predation.

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Reproductive success affects apparent survival in birds breeding in abandoned fields

Abstract
We present the results of a ten year study (2005-2014) investigating demographic parameters of Yellow Wagtails *Motacilla flava*, Whinchats *Saxicola rubetra* and Booted Warblers *Iduna caligata* in abandoned fields at the central part of Vologda region, Russia. We explored the relationship between reproductive success and adult apparent survival. To calculate apparent survival rates we constructed a multistate model where the states reflect different classes of reproductive success. Predation was the main cause of nest mortality for all three species. Reproductive success had a strong impact on their apparent survival. Apparent survival after successful breeding was higher than after unsuccessful breeding, because unsuccessful breeders probably moved to new breeding sites the following year. Apparent survival rate for males was slightly higher than for females for both classes of reproductive success. Differences in apparent survival rates of three species were negligible. Thus predation was the main factor limiting apparent survival of passerine birds breeding in abandoned fields. Our investigations have received financial support from the Russian Foundation for Basic Research (13-04-00745-a).

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The role of concealment by vegetation in nest survival in Arctic-breeding waders

Abstract
The effect of nest concealment on nest survival was studied in 2011–2014 on southeastern Taimyr (72°51'N, 106°04'E) by monitoring the fate of nests of the pectoral sandpiper (Calidris melanotos) [PSN], red phalarope (Phalaropus fulicarius) [RPN] and two types of artificial nests with quail eggs (in random points [ARP] and in the previous-year nests of pectoral sandpipers [ANS]). Quantitative assessment of overhead nest concealment was made by taking photos of white paper circles placed in the nests and further processing of images using ImageJ 1.48 software in accordance with original protocol. A degree of nest concealment significantly increased in the series "ARP (11.6±1.5%) – ANS (17.9±1.3%) – PSN (23.5±1.9%) – RPN (28.1±2.2%)". Daily survival rate (DSR) differed significantly between years, but was higher in wader nests than in artificial nests of both types. Analysis of the model of DSR dependence on the nest type, concealment, and interaction of these factors showed significant effect of all these factors, so DSR increased in the abovementioned series regardless of the degree of nest concealment. Thus, overhead nest concealment is an important, particularly in years with high activity of avian predators, but not exclusive factor affecting nest survival in tundra-nesting waders.

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Extra-pair paternity, monogamy and polygamy in Pied Flycatchers *Ficedula hypoleuca*

Abstract
We considered monogamy, polygamy and extra-pair paternity in the Pied Flycatcher as different reproductive strategies and analysed the effect of their interaction in the population breeding near Moscow. The proportion of broods with extra-pair chicks reached 28.6%. The proportion of extra-pair chicks was 12.6% among all chicks. Both values were close to the maximal representative values reported for other European populations of this species. The number of genetic fathers per brood varied from one to three. The proportion of broods with extra-pair chicks was not influenced by breeding dates. We tested the hypothesis according to which bigamous males had more chances to be cuckolded, especially in their first broods. Monitoring of local population revealed about 5% of potentially bigamous males which were observed as social parents of two broods per breeding season. On average, these birds were older and had more conspicuous plumage than other males. The proportion of broods with extra-pair chicks tended to be higher in broods of bigamous males in comparison with monogamous ones. Among broods of bigamous males, the proportion of extra-pair chicks was higher in first broods than in second broods. These results, although preliminary, support the idea that cuckoldry can be the cost of polygamous strategy in Pied Flycatcher males.

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Extra-pair parents and chicks in Pied Flycatchers: do they have any peculiarities?

Abstract
Understanding the function of extra-pair paternity (EPP) should be based on three sets of comparisons between features of: 1) cuckolded and extra-pair males; 2) females with and without extra-pair chicks; 3) within-pair and extra-pair chicks. We analysed EPP in Pied Flycatcher *(Ficedula hypoleuca*) population in Moscow region. Pied Flycatcher males have two peculiarities, which are of a great interest for revealing the adaptive role of EPP, - polymorphism of breeding plumage and combination of monogamy and polygamy. The chicks in 74% of broods were genetic offspring of their social parents. Old females (but not old social males) more often reared extra-pair chicks than the young ones. The colouration of males was not related with the presence of extra-pair chicks in their nests, but the number of extra-pair chicks tended to be higher in broods of pale males. Extra-pair males and cuckolded ones did not differ by age and colouration. Asymptotic body weight of extra-pair chicks was higher than that of within-pair chicks. The latter relation and inclination of experienced females to extra-pair copulations give additional arguments in favour of adaptive role of EPP.

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Extra pair paternity and parental behaviour in Pied Flycatcher (*Ficedula hypoleuca*) population in Moscow

Abstract
Extra-pair paternity in the Pied Flycatcher is a common phenomenon in the Moscow region and other parts of species' range. We investigated the relation between EPP and parental care. We estimated feeding rate of parents, which reared 9-13-days chicks, and the number and the size of preys in each delivered food portion. The proportion of broods reared by single females was 8%. Beside single females and paired social parents, regular helpers and few of occasional visitors also took part in the rearing of young. These helpers and visitors had no genetic offspring in nest-boxes, where they were observed. The proportion of broods with extra-pair chicks was higher in the nestboxes of single females in comparison with other nests. The reasons of this phenomenon as well as the peculiarities of parental behaviour of pairs with extra-pair chicks are discussed.

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The importance of replacement clutches and helpers in the reproductive success in Iberian Magpies *Cyanopica cooki*

Abstract
In birds, the failure in the first reproduction can be high. Many species, when failing in their first attempt, realize an additional attempt (replacement clutch). There are few studies analyzing these new attempts: it is necessary to have the population marked and, sometimes, to locate the new nest. Nevertheless, this information is indispensable to determine the individual and population fitness. We have realized a long-term study about replacement clutches in a marked population of Iberian Magpies (*Cyanopica cooki*), a cooperative breeding species. The failure in first clutches is high (70 %), and the renestings are numerous (89 % of the first unsuccessful clutches) and they suppose 34 % of the total of the successful clutches and 30 % of the fledglings. One pair can do until 3 replacement clutches in the same season. Helpers are present in 15-17 % of the nests, being more frequent and in major number in the first replacement clutches. The mean of fledglings decreases with the date, but it increases with the number of helpers at nest. This increase is more remarkable in first clutches than in renestings, probably because every type of clutches has different types of helpers and each one assume different parental load.

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Activity in cage and breeding territory quality in Great Tits *Parus major*

Abstract
Choosing a suitable breeding territory is vital for many organisms, and high quality individuals tend to occupy high quality territories. However, it is unclear whether behavioural traits can act as a proxy for estimating the quality of breeding territories. We conducted a simple cage trial in Great Tits (Parus major) during the brood rearing period. Behaviour was monitored for three minutes, and all hops and calls were recorded. Breeding territory quality was estimated using historical breeding data from previous seasons. The behavioural traits of males were related to nest box choice: more mobile males bred in nest boxes with higher historical occupancy rates and higher proportions of successful broods. Vocally more active males used nest boxes with historically later laying dates. Female behaviour was unrelated to territory choice. However, more active pairs tended to use territories and pre-breeding nest boxes with earlier laying dates and higher occupancy rates. These results indicate that easily measured behavioural traits can be used as an indication of territory quality. However, caution should be exercised since these results are correlative and should be verified using experimental manipulation.

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Assortative mating by brain volume in Red-backed Shrike *Lanius collurio*

Abstract
In assortative mating, individuals mate with respect to particular phenotypic character. Assortative mating may indicate an active mate choice. It is one of the most commonly observed mating patterns in animals. Till now, such mating pattern was observed in relation to body size, wing length, plumage colour, size colour size, age, body condition and other traits. The aim of present preliminary study was to test assortative mating in Red-backed Shrike *Lanius collurio.* Data were collected in 2011 - 2013 in Poland. We have found out significant positive assortative mating with respect to body mass, tail length and brain volume of individuals. As a predictor of brain volume, we have used head volume, calculated sa an ellipsoid (4/3πabc). Assortative mating by a variety of traits is well documented in birds, however, there is no evidence about assortative mating by brain volume. Our results have confirmed that Red-backed Shrikes formed pairs at nonrandom with respect to brain volume. Our preliminary findings suggest that brain volume or its correlates could affect mate choice and could play an important role in sexual selection of shrikes and animals in general. Acknowledgements: The work was financially supported by grant OPV ITMS: 26110230119.

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Effects of inbreeding on sperm quality in Zebra Finches *Taeniopygia guttata*

Abstract
Inbreeding and inbreeding depression - the resulting reduction of fitness due to mating between close relatives - is one of the most studied issues in biology. Inbreeding usually rebounds in fitness-related traits, such as body mass, testis weight and sperm production in various animal species. Quality of sperm is one of the most important traits because it is expected to be linked to fertilization success of males. Here, we provide comprehensive evidence for the negative effect of inbreeding on sperm traits in a passerine bird. This study was carried out with two independent captive Zebra Finch populations, one domesticated and one recently wild-derived. Morphologically normal spermatozoa did not differ in their morphological traits (the total length of sperm cell, midpiece and tail lengths) between inbred and outbred birds. However, inbreeding resulted in both lower sperm motility and a higher percentage of sperm abnormalities in sperm samples from inbred males. These effects were remarkably consistent between the domesticated and wild-derived populations. Our results show that inbreeding can have a strong negative effect on sperm phenotype and ejaculate quality in passerine birds. Future studies should examine the fitness consequences of inbreeding effects on sperm quality.

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Breeding phenology and trophic mismatches: the role of altitudinal gradients in a warmer world

Abstract
Climate change is currently one of the most important challenges for biodiversity. Migratory birds are advancing their arrival dates to their breeding grounds to keep in pace with their seasonal trophic resources. However, in some populations this advance is not enough and their reproductive schedule is becoming too late for a successful reproduction. Topography may help birds to overcome trophic mismatching by providing different phenological scenarios in a small spatial scale. I studied during four years the reproductive cycle of a population of Pied Flycatchers (*Ficedula hypoleuca*) breeding along an altitudinal gradient between 1,280 and 1,600 m of altitude in Central Spain. I also monitored the phenology of Lepidoptera caterpillar by quantifying its seasonal abundance. The peak of caterpillar abundance was delayed one week from low to high altitudes, while Pied Flycatchers bred at similar dates along this elevation gradient. As consequence, pairs breeding at lowest altitude hatched their chicks late in relation to caterpillar phenology, while hatching dates at highest altitude matched the caterpillar peak. Cold springs alleviated phenological mismatching at low altitudes, but warm springs exacerbated it because caterpillars were more responsive to temperature than birds. Therefore, the role of altitude varied in different climate scenarios.

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Which Barred Warbler *Sylvia nisoria nisoria* males are more successful during nesting?

Abstract
Males of birds can display their genetic and parental quality in different forms, e.g. male song, quality and size of territory, body proportions and feather coloration and ornaments. The using of these different quality indicators differs among birds taxa. These different traits can attract females and simultaneously are tools of competition among males. In many papers authors found, that qualities observed in these traits have strong positive influence on offspring's survival and female's investments into progeny (e.g. biased investments into clutch as bigger eggs volume or skewed sex-ratio). For each male, we measured different body characteristics (weight, length of tarsus, wing, tail and bill), diverse song parameters (song frequency, length of song and number of syllables with harmonics frequencies, which are demanding for presentation in song) and recorded features of males territory (territory size and quality territory given by among years occupations of particular territory). Furthermore, we observed nesting process (measuring egg volumes and sex-ratio in the clutch) and clutch survival. We investigated relationship among these factors and their interaction with clutch traits and clutch survival for males of barred warblers (*Sylvia nisoria nisoria)*. The study was conducted at the south – east part of the Czech Republic during three years.

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Coping with shifting nest predation refuges by European reed warblers *Acrocephalus scirpaceus*

Abstract
A common assumption in nest predation studies is that nest sites vary in their vulnerability to predation and that these differences remain stable in time. We tested this prediction by analysing patterns of nest predation in a population of European Reed Warblers studied in 2006-11. Our study revealed that safe nest sites (predation refuges) do not exist in the studied population: nest site characteristics correlated with nest fate, but a nest with the same nest-site attributes could be relatively safe in one season and vulnerable to predation in another. Reed warbler females that lost their first nests in a season did not disperse farther for the subsequent reproductive attempt, compared to successful individuals, but they introduced more changes to their second nest sites. In subsequent nests, predation risk remained constant for birds that changed nest-site characteristics, while increased for those that did not. At the between-season temporal scale, individual birds did not perform better with age in terms of reducing nest predation risk. We conclude that the experience acquired in previous years may not be useful for an individual, given that nest predation refuges are shifting in time.

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Sexual selection and individual quality: do parental colour ornaments predict chick growth in monogamous King Penguins *Aptenodytes patagonicus*?

Abstract

In seabirds, raising the chick is a tricky business: parents feed far at sea a long way off their breeding grounds. The king penguin (*Aptenodytes patagonicus*) is no exception. During the reproductive season, parents feed at the polar front, several hundreds of kilometers from their breeding colony. Cooperation between sexes is crucial, as neither parent is able to raise the chick alone. Under such circumstances, selection can be expected to favor mutual mate choice for high quality partners and traits of individual quality (i.e. behavioral/physiological traits linked to fitness) could then be signaled to tentative partners by means of honest ornaments. Of particular interest are the recent findings that sexual ornaments in king penguins (yellow-orange auricular feather patches, yellow-orange bill spots that also reflect UV) appear to signal various physiological traits relating to body condition, stress levels, and immunity. However we lack knowledge on whether those ornaments ultimately shape fitness, given a set of environmental conditions. In this study, we use an experimental cross-fostering design to examine how parental coloration in interaction with social environment conditions (chicks raised under high vs. low colony density conditions) predict offspring phenotype during growth. We present results that link the ornamentation of genetic and adoptive parents to chick phenotype at different stages of growth, revealing the influence of gene x environment in establishing offspring phenotype. Our results provide new supports on how ornamental traits appear crucial in assessing partner quality and fitness in seabirds.

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Nest-Site Fidelity and Long-Term Monogamy in the Yellow-vented Bulbul *Pycnonotus xanthopygos*

Abstract
Pair bond duration and nest-site fidelity are suggested to be important determinants for reproductive success in social monogamous species. To investigate the role of pair-bond duration in Yellow-vented Bulbul, *Pycnonotus xanthopygos*, we studied the breeding biology for three years between March and August in Akdeniz University Campus, Antalya, Turkey. Adults and chicks were captured and ringed with aliminum and colored rings for individual identification. We found that the species started to occupy territory at the begining of March and lasted breeding period at the end of August for each years. We found that both male and female selected territory and built the nest together. About 20% of the pairs were long-term monogamous pairs (they breed together for 2 or more years together) and they bred in the same nest site of the year before. We observed that only one pair had a successfull second clutch in the same breeding season and it was a monogamous pair. We found that breeding success was higher for monogamous pairs in comparison to birds that changed partners. Thus, our preliminary results seem to support the hypothesis that the duration of the pair bond may improve coordination within a pair and this enhanced reproductive success.

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Breeding Biology of House Crow *Corvus splendens* at Hazara University, Garden Campus, Mansehra

Abstract
Study on the nesting biology of the House Crow *Corvus splendens* was conducted at Hazara University, Garden Campus (125 acre), Mansehra during the 2013 breeding season (June to September). Details about nest locations, tree characteristics, nest and egg characteristics were recorded. Mean nest density of House Crow was 2.4 nests/ acre. Mean tree and nest height was 14.8±6.30 and 11.8±5.42m. Mean tree canopy spread 9.5±2.48m. Mean maximum and minimum nest diameters were 42.3±2.08 and 39.0±1.73cm respectively while maximum and minimum diameters of nest cup were 15.6±1.52 and 13.3±1.15cm respectively. Nest depth and nest cup depth were measured 19.3±2.08 and 8.3±1.15cm respectively. Mean nest weight was 1.4±0.24 kg. Mean clutch size was 4.0 (ranged 1–6). Mean egg length was 38.6±0.69mm, breadth 26.0±0.69mm, egg volume 13.3±0.83cm3 and egg shape index 1.42±0.83. Mean egg weight was 12.3±0.70g. Egg and nest success was calculated 55.1% and 69.0%. Hatchlings and fledglings produced per nest was 2.20 and 1.44 respectively. Main reasons for reproductive failures were unhatched eggs, poor nest construction, bad weather conditions and observer's disturbance.

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Breeding Biology of Spur-winged Lapwing *Vanellus spinosus* and its parasites

Abstract
The breeding biology of Spur-winged lapwing *Vanellus spinosus* was studied in Boğazkent/Antalya (Southwest Turkey) between 2009-2011 and also 2014-2015 Population density, nest number, clutch size, hatchling number and habitat selection was determined. Besides birds were trapped and banded with metal and color rings and some morphological parameters as wing-, bill- and spur length were collected. Population consisted of 52 individuals in 2009, 60 in 2010, 72 in 2011, 83 in 2014 and 57 in 2015 (for middle March). Nest numbers were 17 in 2009, 27 in 2010, 38 in 2011, 32 in 2014. Because of breeding season just beginning, we have no data about nest number from 2015. Our research is also following now. According to our data Spur-winged lapwing's incubation period was 23 days and the mean of clutch size was 3.6. Total hatchling number was 23 juveniles in 2010, 27 juveniles in 2011, 31 juveniles in 2014. Their nest preferences were mostly fields, grasslands and sand areas. 13 adults were banded in 2010 and 25 adults also in 2011. The predators of eggs and juveniles were mainly Hooded crow, dogs and fox.

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The cuckoo coming: Behavioural, reproductive and physiological effects of risk of cuckoo parasitism

Abstract
Brood parasitism occurs when cuckoos *Clamator glandarius* lay their eggs in other species' nests and the resulting offspring is then raised by the host parents. Cuckoos can drastically deplete the host's reproductive success and, thus, it is a powerful selective force acting on host defences. Possible inducible effects of cuckoo parasitism risk on host distribution, morphology, behaviour and physiology have not been studied yet despite they could carry costs selecting against their expression at low risk of cuckoo parasitism, and evidence showing that they are widespread in relation to predation risk. Here, we conducted a large-scale manipulation of brood parasitism risk during Eurasian Magpie (*Pica pica*) territories' choice resulting in a gradient of risk of cuckoo parasitism at the population level. We found that proximity to areas with high induced risk of cuckoo parasitism explained territories' choice, volume of the nest, clutch size, egg rejection behaviour and nestlings' physiology of Eurasian Magpies. Furthermore, the effect was different for early and late breeding hosts. Our results constitute the first evidence of inducible defences in a cuckoo host when challenged by cuckoo parasitism risk. This study urges for future consideration of indirect effects of fear to cuckoos in order to understand cuckoo-host coevolution.

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Parental investment and brood size predict offspring desertion by females in the Whiskered Terns *Chlidonias hybridus*

Abstract
In the majority of birds both partners take care for the young. In these species a conflict of interests may occur because each mate tries to increase their own fitness. Brood desertion by one of mates and leaving parental care for the individual which stays with brood represents the strategy allowing an increase in own reproductive success. This study documents common offspring desertion in the Terns (Sternidae) family for the first time. Whiskered Terns are semi-precocial, socially monogamous waterbirds. Between 2010 and 2014, 114 nests were monitored in the Upper Vistula River Valley (S Poland). Among 62 deserters, 60 were females and only 2 males. Desertion rate during chicks period was 56%. Females supported much less food than their partners. Daily probabilities of desertion were lower in nests with more chicks and when females supported more food, while male's feeding rate affected desertion probability to a lesser degree. After female's desertion, males increased feeding rates to reach approximately the same feeding rate as the total feeding rate of both pair members before desertion. This study showed that brood size and females provisioning rate predicted the probability of desertion by females in socially monogamous species with high parental investment.

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The impact of match-mismatch on geographic variation in Blue Tit *Cyanistes caeruleus* productivity

Abstract
The match-mismatch hypothesis (MMH) is often applied to explain variation in the productivity of insectivorous woodland passerines such as tits (Paridae) and flycatchers (Muscicapidae). Consistent with the MMH, coincidence between the timing of the peak breeding energy requirement and the peak of local caterpillar abundance is often found to correspond with higher productivity. However, most insights stem from single site studies in oak-dominated habitat. The extent to which the MMH applies in different habitats or operates similarly in different locations is relatively unexplored, yet key to developing models that predict the impact of mismatch across larger geographic areas. Here we present the first results from our study system comprised of 40 field sites distributed along a 300km transect of Scotland, covering a wide range of elevations, habitats and latitudes. This system allows us to identify the timing and variance of the caterpillar peak at each site and the impact that coincidence of nestlings with this peak has on productivity, allowing a greater understanding of the geographic variation of mismatch

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The warmer springs, the more mice and the fewer fledglings in the forest. Twenty-six year perspective on the reproduction of Collared Flycatcher *Ficedula albicollis*

Abstract

Rodents are known as an important bird nests robbers. Seasonal reproduction of small mammals in the temperate forest zone usually is related to fluctuations of tree seed crop. We examined effects of rodent food availability on reproduction of the Collared Flycatcher *Ficedula albicollis* which is very numerous breeding secondary-cavity-nester, within twenty six years in lime-hornbeam-oak stands of the Bialowieza National Park. The investigated ecosystem is protected for centuries. The stand composition is very primeval with important very old oak and hornbeam trees. It seems that, recently warming spring and summer accelerated seed crop fluctuations. Then, this triggered an acceleration of mice (*Apodemus flavicollis*) fluctuations. Density indices of mice also increased much. As a result the Collared Flycatcher suffered higher breeding losses in last years. In some years even more than one/fifth of broods of this bird were lost due to nest predation.

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Is a head start always beneficial? Recruitment of Mediterranean Great Tits *Parus major*

Abstract
The timing of breeding is a major determinant of juvenile survival, with implications that have an effect far beyond the nestling period. It is commonly accepted that early breeding is most beneficial, although breeding too early may entail high costs due to low resource availability. We therefore predicted the existence of an optimum breeding date maximizing juvenile survival, so that both positive and negative deviations from this period would have a negative effect on reproductive output. We used mark-recapture models to analyse the effect of hatching date on post-fledging survival probability of a Mediterranean Great Tit (*Parus major*) population. We also included nest temperatures, fledging size and body weight. Results show a selection for an optimum hatching date on April 28, while juveniles hatching before or after this date have reduced recruitment probabilities. Additionally, post-fledging survival increased with fledging size. We suggest food scarcity could limit survival of too-early fledglings, whereas late fledglings suffer from detrimental environmental conditions and increased predation and parasite pressure.

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Nocturnal migratory songbirds adjust their travelling direction aloft

Abstract
Migratory songbirds are known to use multiple cues to select and maintain appropriate directions during migration. Departure directions of songbirds leaving stopover sites are often assumed to reflect the birds' intended travel directions, but this assumption has not been critically tested. We used data from an automated radio telemetry system and a tracking radar at Falsterbo peninsula, Sweden, to compare the initial orientation of departing songbirds (recorded by radiotelemetry) with the orientation of songbird migrants in climbing and level flight (recorded by radar). Thus we could investigate if the migrants make adjustments in their travel direction after takeoff. We found that the expected migratory directions of birds at high altitudes and in level flight were more concentrated than departing birds and birds in climbing flight, which indicates that the birds adjust their travelling direction once aloft. This was further supported by a wide scatter of vanishing bearings in a subsample of radio tracked birds that later passed an offshore radio receiver station 50 km southeast of Falsterbo. Track directions seemed to be more affected by winds in climbing compared to level flights which may be explained by birds not starting to partially compensate for wind drift until they have reached cruising altitudes.

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Trophic asynchrony and offspring ontogeny affect parental prey choice in a passerine

Abstract
Parental effort must be matched with the nutritional demands of offspring to maximize fitness in many animals. Previous research has largely encompassed the seasonal components of this parental matching, often focusing on one particular superabundant prey item that parents must synchronize with the period of maximum offspring demand. A mismatch with this seasonal food peak may force prey switching with cascading effects on fitness. However, no research has experimentally studied the effect of mismatch on nestling diets. Moreover, the role of offspring ontogeny on parental prey choice is often neglected in this context. In this study, we use descriptive and experimental data collected over two field seasons to study the effects of nestling age and reproductive timing on prey choice in pied flycatchers (*Ficedula hypoleuca*). We compared prey choice in early and late experimental groups using nest box cameras at four offspring ages. We found that parents adjust their qualitative choice in prey partly to match the ontogeny of their offspring. Moreover, we found that mismatch with the caterpillar peak decreases the contribution of caterpillars to the nestling diet. We conclude that both mismatch with a key food item and offspring ontogeny are important determinants of variation in parental provisioning.

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Tracking males and females: investigating protandry in a songbird throughout the migration cycle

Abstract

Protandry, the phenomenon of males arriving earlier at the breeding grounds than females, has been demonstrated in several migratory bird species. The pattern is linked to reproductive success and often ascribed to selection for securing the highest quality territories or mates. Protandry can be achieved by males wintering closer to the breeding area or migrating earlier or faster than females; none of these options being mutually exclusive. Constraints in following the birds throughout the annual cycle have so far limited our understanding of the proximate causes of protandry. Furthermore, protandry may not occur exclusively at the breeding grounds, but could potentially act at all stages during the annual cycle. Recent technological advances are currently enabling us to track yet smaller songbirds throughout their migration, giving us the opportunity to study the causes of protandry in further detail. Here, we use data derived from geolocator tracking of red-backed shrikes, *Lanius collurio*, from a Scandinavian breeding population over a five year period (2009-2014) to assess whether males precede females throughout the annual cycle by comparing differences in the migration speed and timing at each of the migration stages.

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White storks and "junk food"

Abstract
In the mid-twentieth century, White storks (*Ciconia ciconia*) suffered a marked decline along entire Europe due to the destruction of their natural habitat by human activities. Since several decades ago, its populations have been recovered impressively due to the occurrence of a new food source, rubbish dumps. It is well established that the use of these sites as food resource facilitates chick raising, thus making it easier to raise high numbers of chicks. However the quality of these resources is very questionable. Food availability at rubbish dumps is unlimited throughout the year, but consists of mostly manufactured products mixed with a wide variety of rubbish that may contain dangerous substances as shown in different studies. In order to study adaptation of storks the use of this food resource we sampled chicks of four colonies with confirmed different food sources exploited by their parents during 3 consecutive years. We compared blood chemistry and oxidant/antioxidant balance between colonies with chicks fed natural or completely rubbish dump based diets and between years. The results suggest and adaptive physiological upregulation of antioxidant systems in storks exploiting junk food as food source.

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Natal and breeding dispersal in Spanish populations of two *Acrocephalus* warblers

Abstract
Information about dispersal movements of birds is crucial to understand their population dynamic and consequently for conservation. For birds breeding in fragmented habitats, dispersal capability is especially important to maintain gene flow between populations. Wetlands are naturally patchy habitats, and loss and fragmentation of these areas due to human activities have been severe in the Mediterranean area. In this study, we use ringing data from the Spanish marking scheme to investigate the distribution of natal and breeding dispersal distances in Eurasian Reed Warblers *Acrocephalus scirpaceus* and Moustached Warblers *A. melanopogon*. Finally, we compare the results obtained for each of the two species, taking into account their differences in migration strategy and population size.

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Ageing and reproduction: antioxidant supplementation alleviates telomere loss in wild birds

Abstract
Reproduction is inherently costly. Environmental stressors, such as infection and limited food resources, can compromise investment at each breeding attempt. Recent data on captive birds showed that increased reproductive effort accelerates ageing. However, the effects of nutritional status and infection on ageing remain unknown. Telomeres function as protective caps at the ends of eukaryotic chromosomes, and changes in telomere length is a commonly used proxy for ageing. In 2012 we supplemented, medicated or administered a combined treatment to wild blue tits (*Cyanistes caeruleus*) breeding in central Spain, and we evaluated the effect of these manipulations on changes in telomere length between two consecutive breeding seasons. The nutritional supplement consisted of two different antioxidants, while the medication was an antimalarial treatment against blood parasites. The antimalarial drugs reduced infections in 2012. On the contrary, supplemented birds showed no reduction in blood parasite infections, although they exhibited higher body mass and fledging success. In the following season, telomeres from supplemented birds had shortened less. Altogether, we found that supplementation with antioxidants provided fitness benefits in the short term and reduced telomere loss a year following treatment. Our results provide indirect empirical support for accelerated telomere loss as a cost of reproduction.

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Group 2: Migration

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Bird migration across the Bay of Biscay observed by wind profiler and thermal-imaging camera

Abstract
Migratory flyways of birds are strongly determined by geographical barriers such as mountain ranges, deserts or large water bodies. The Bay of Biscay, situated in the East-Atlantic flyway, one of the main migration routes worldwide, is considered a geographical barrier. However, its role during bird migration remains poorly studied. Along the Bay of Biscay a network of meteorological radars has been established monitoring the respective area continuously. The wind profiler radar in Bilbao, North Spain, has been regularly exhibiting contamination by birds occurring seasonally between sunset and sunrise. To explore these patterns and the suitability of this radar type as a potential bird-monitoring tool, we analysed three years (2010-2012) of radar data and extracted preliminary parameters on the migration phenology. The origin of the signals was verified by a thermal-imaging camera. Radar data showed two peaks of migration with greater activity in spring than in autumn, height distribution, direction and intensity of migration, while the camera confirmed and complemented the radar findings providing additional information on migration direction and intensity. Migratory activity was positively correlated with absence of rain, but independent of tailwind conditions. The findings encourage a more detailed evaluation of wind profiler data in the ornithological context.

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Spring migration of European teals *Anas crecca* wintering in Italy

Abstract
Tracking data on migratory movements of European ducks are relatively scarce and available information mainly belong to largest species. In 2013 we started a project aimed at collecting data on the ecology of migration of some species of dabbling ducks wintering in Italy by means of satellite tracking (AnaSat Project). Up to now we tagged 25 female European teals *Anas crecca,* the smallest duck in Europe and one of the most abundant. Teals were caught in three different sites in Central and Northern Italy and then equipped with solar powered PTTs. Most tracked birds left their wintering areas by the end of February-beginning of March and then followed eastward routes, While some females ended their migration in central Europe, several teals flew thousands of kilometers, sometimes reaching the arctic circle in Russia, thus confirming previous evidences collected by means of ringing recoveries and stable isotopes analyses. At the very beginning of migration, these long-distance migrating individuals used staging areas mainly located in south-eastern Europe. On the whole, this is the first analysis at individual level regarding the timing of migration and routes of teals and thus represent an important contribution for the management of the species at European scale.

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Causes and Characteristics of Reverse Bird Migration

Abstract
That birds migrate in the reverse direction from the expected is a phenomenon of regular occurrence which has been observed at many sites. Here we use three different methods, tracking radar, radio telemetry and ringing, to characterize the flights of these reverse migrants and investigate possible causes of reverse migration of nocturnally migrating passerines during autumn migration at Falsterbo peninsula, Sweden. Using these different methods we investigated both internal factors, such as age and fuel load, and external factors such as weather variables, competition and predation risk. Birds flying in the reverse direction were more likely to be lean and to be juveniles. Reverse migration was also more common with overcast skies and winds with south and east components. We did not find any effect of temperature, barometric pressure, visibility, number of migrating Sparrowhawks, or the number of ringed birds at the site on the day of departure. We found that reverse migration is characterized by slower flight speed (airspeed), lower altitude, and that it takes place later in the night than forward migration.

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Does age influence dispersal of Great cormorants *Phalacrocorax carbo* wintering in rivers?

Abstract
The usage of different niches dependent on age is common in birds, adults often showing dominance over juveniles and subadults. Great cormorants (*Phalacrocorax carbo*) are aquatic birds which use night roosts during the winter season. Reducing costs in movements and daily activity budgets could be determining age-related spatial distribution. Based on winter transects covering 619.6 km of rivers in Galicia (NW Spain), we modelled occurrence and abundance of adults and subadults by using easily measurable predictors: river width and distance from river to the nearest night roost and nearest road. We compared alternative a priori models with Akaike's second order AIC corrected for small sample sizes using GAM models for occurrence and Hurdle models for abundance data. The predictor with the largest weight was estimated to be the most important. Akaike's multimodel inference supported the prominent role of the width of the river on adult occurrence and abundance. The distance to the night roost was the most important predictor on subadults occurrence (the greater the distance, the greater the likelihood of presence), while abundance was better explained by river width.

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Arriving to Europe extremely lean - spring migration of some passerines at three small Greek islands

Abstract
In spring, within the European–African bird migration system, most birds make a fast return trip to their breeding sites and a lot of species have to pass both the Sahara desert and the Mediterranean Sea with few or any possibilities to refuel. The mean body mass of 10 species of passerines, mist-netted in three Greek islands, with a fat score of 0 (no visible subcutaneous fat stores) and a muscle score of 0 (emaciated flight muscle) were used to estimate the mean potential flight range of birds that have just arrived to Europe. The percentage of birds that were not able to continue their trip to more northern stopover sites varied from 3.8% to 54.3% depending on species and site. In some cases, minimum body mass measurements were among or the lowest ever reported in the literature. The high percentage of birds that are not able to continue their migration and the low minimum and mean body mass of birds having just crossed the Mediterranean Sea, further indicates the high conservational value of small Mediterranean islands for migratory birds.

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Changes in the timing of autumn migration of songbirds in the SW end of Europe

Abstract
Long-term phenological shifts in autumn migration remain almost unknown in the Mediterranean region; despite of the key role of this area for both long- (LDM) and short- (SDM) distance migrants in Europe. Over 70,000 songbirds were trapped in a constant effort ringing location in Doñana (Spain) between 1994 and 2004. We selected 8 LDM and 10 SDM species and estimated temporal trends in passage dates for each fraction of their populations by dividing them into 5th percentile steps. LDM advanced their passage dates in all fractions of their populations, while SDM delayed most of them. In LDM, individuals between the 25th and 70th percentiles advanced their passage by -0.30 d/yr, while the earliest and latest individuals advanced at a slower rate. For SDM, there was no significant trend in passage dates for the percentiles earlier than 40th, while later fractions delayed their arrival dates by +0.18d/yr. As a consequence of these opposite temporal trends, the seasonal overlapping of LDM and SDM in the study area has markedly decreased. Heterogeneous phenological responses may have important implications for the stopover ecology of these species by altering community composition and consequently, interspecific competition for trophic resources.

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Relaxed selection for early arrivals in a migratory bird

Abstract
The timing of bird migration has shifted in response to climate change. However, few studies have linked the potential consequences of any phenological shift on individual fitness. About 3,500 male and 2,500 female arrival dates to their nests along with 3,000 breeding attempts for the Slovakian population of White Storks were studied between 1977 and 2007. Males tended towards a slight delay for most fractions of arrival distribution, while females did not change their arrival schedule. As consequence, protandry was reduced by 30% (1.44 days). The annual average number of fledglings per nest (2.49±0.42SD) has not changed since 1977. However, fecundity selection for arrival date reduced over the years: at the end of 1970s and 1980s, early breeders had more success than late breeders, but this seasonal trend disappeared towards the end of the study period. An early arrival and territory acquisition may have become less of an advantage due to the enhancement of feeding opportunities during the breeding season in recent decades. Therefore, it is hard to imagine any change in the migratory calendar of White Storks in future generations by natural selection because variability in arrival dates is not related to a differential reproductive success of individuals.

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Migratory strategy and spatial ecology of greylag geese in Europe.

Abstract
Greylag Geese *(Anser anser*) populations strongly increased over the last decades in Europe. To meet the challenge of bird and habitat conservation, it became urgent to understand how geese use their stopover and wintering areas. The study of minimum convex polygons (MCPs) from daily monitoring of 30 GPS/GSM tagged geese (2012-2014) shows that the start of hunting in late summer was immediately followed by the increase of the geese home ranges ($p<0.05$). However learning and experience may influence this behaviour. Home ranges varied significantly between October and February ($p<0.01$). Values were highest in October (47.1±13.5 km²) during the active fall migration. Home range areas were lowest in December and January (<8.9±2.5 km²), which is the strict wintering period, and no difference was found between Spanish and Dutch wintering sites ($p>0.40$). Those results show that each goose used a very small area in early winter when thermoregulatory energy constraints become highest. Conversely, living areas extended in February reached similar values than in November. Since prenuptial migration was clearly observed after February 11th in Spain and the Netherlands, the extent of staging areas prospected before the start of migration (October and February) would correspond to important physiological needs to prepare migratory journeys.

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Is the Bearded Reedling *Panurus biarmicus* a partial migrant?

Abstract
Bird ringing data contain information on the key factors defining movement; the distance, direction, and timing. By observing the underlying patterns of movement from ringing recoveries, we can infer the ecological drivers of movement. The Bearded Reedling, *Panurus biarmicus*, is a reedbed specialist Passerine. Little is known about the wide scale movement processes of this species, being traditionally considered a resident. Using over 4,000 movement records provided by EURING, I take a detailed look at ringing recoveries of Bearded Reedlings from selected regions within Europe. I find a suite of migratory movement tendencies throughout these regions. Birds from southern Europe were sedentary, while birds from central Europe showed seasonality in their movements but little directionally. Individuals from the UK and northern Europe showed seasonal and directional movements resembling short range migration. Contrasting with many other species, I find no evidence that a single age or sex is more predisposed to movement, suggesting that movements cannot be explained by traditional age or sex biased dispersal mechanisms. I suggest that wide scale movements of this species relate to changes in resources or climate, and that differences in the predictability and magnitude of these changes have generated a gradient of migratory movement types.

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Do migratory birds time their spring arrival?

Abstract
The timing of reproduction and survival in relation to migration are generally believed to be crucial in determining fitness of migrants. Several studies have investigated how timing of breeding is related to reproduction but the consequences on survival of migration and arrival timing have not received much attention. The proximate control of timing of individuals is presumably a result of a combination of genetic, phenotypic and environmental factors as well as some degree of randomness. Here, we investigate the effect of timing on individual survival, by modelling survival rates as a function of ringing date. In all cases, we incorporated species, season and migration distance effects. In spring, long distance migrants tended to show low survival for early and late birds whereas for short distance migrants, survival generally decreased during the season. In autumn, the pattern of survival was much less clear with apparent differences between species. Overall, migration in spring passed was before the maximum survival. For the species showing protandry, the migration peak of females coincided with maximum survival whereas males arrived before that. This supports the prediction that competition for territories can lead to arrival preceeding survival optimum in migrants.

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Studying birds flight-ways by ringing and stable isotope (d2h): a contribution for the conservation of European birds

Abstract
During post-breeding migration, for many European intra-Palearctic and trans-Saharan migratory species, Alps may represent an important flight-corridor, followed at different altitude, crossing mountain passes or flying over uplands and valleys. Moreover, the alpine chain has been demonstrated to be set along a migratory divide that separates eastern and western populations of the central and northern population of the Western Palearctic during post-breeding migration. In order to better understand geographic origin and direction of migrators, and to underline the importance of Alps for the conservation of European birds during migration, we analyzed a recovery data set including observations until 2008, referred to 15 species, of which individuals were ringed or recaptured within the alpine region; the aim was to identify their hypothetical breeding origin and wintering destination belts. Then, we analyzed deuterium (d2H) stable isotope ratios in feathers of individuals of the same species, sampled during post-breeding migration in the years 2010-2013 on an alpine pass in central Italian Alps. We used the presumed areal of provenance obtained by recoveries of each species and calibrated deuterium isotopic maps (isoscapes) as suggested by several authors. The aim was to model probability surfaces to determine geographic origin of the sampled individuals.

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Assessing large-scale distribution of Eurasian reed warblers *Acrocephalus scirpaceus* across the annual cycle

Abstract
Assessing the extent of migratory connectivity is crucial for our understanding of the evolution of migratory systems and for effective species conservation. Quantification of range-wide distribution of migratory populations across the annual cycle has been, however, hampered by the inherent bias present in the ring re-encounter data. Here we use the Eurasian reed warbler (*Acrocephalus scirpaceus*) as one of the most frequently ringed passerines in Europe to demonstrate the use of ring re-encounter data for elucidating the annual whereabouts of different breeding populations. To this end, we employed stochastic multistate models which quantify range-wide distribution of different populations while accounting for the spatial heterogeneity in the re-encounter probabilities and different survival of young and adult birds during migratory and non-migratory periods. The modelling approach confirmed the importance of the southwestern flyway for the majority of populations and the use of the southeastern flyway by the populations from southeast Europe. Moreover, southeast European populations performed loop migration: they passed through northeast Africa in autumn but mainly through the Middle East in spring.

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Does island stop-overs effect survival in long distance migrants?

Abstract

Spring and autumn migrations are the poorest understood life-history event in many thousands of birds. Environmental barriers such as ocean or desert crossings are believed to key factors in survivorship during long distance migrants. In order to better understand the importance of route selection over large water bodies on survivorship we present the meta-analysis of long-term ringing data sets from island and mainland ringing stations in Europe. Here we investigated solitary, nocturnal passerines and compared the behaviours and fitness of adult (experienced) birds with those embarking on their first migration.

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A new monitoring tool for bird migration: small scale automated radar surveillance with a wing-beat

Abstract
Radar has been used for monitoring bird migration since more than 60 years. Mass movements can be easily detected with various radar systems, and put into context with environmental conditions. In many radar studies, flight speed and target size has been used to differentiate between birds and insects, although moths and passerines may show similar flight speeds during migration. Thus, a small proportion of insects flying with similar ground speed as birds can blur the movement of birds considerably. The radar system BirdScanMR1 identifies radar targets based on the echo signature, which allows separating birds from insects according to the wing-beat pattern. However, wing beat patterns can only be detected if a bird is continuously tracked by the radar or flying through a static beam. Tracking single targets does not allow a proper quantification of migration, while with a static beam no information on speed and direction is available. This problem has been solved with the BirdScanMR1 by a slight nutation of the beam. Now, we can monitor the temporal pattern of bird migration, the height distribution, direction and speed in real-time. In addition, the analysed wing-beat frequencies and wing-beat patterns allow a classification of the migratory birds in subgroups.

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Early morning flights of migrating birds at Cape May, USA are a response to nocturnal wind drift

Abstract
For nocturnal migrant songbirds, flights just after sunrise may be crucial for selecting stopover habitat and successfully navigating to a migratory goal. This behavior occurs in diverse geographic locations, but few studies have examined its functions. Annual autumn visual counts of migrants in Cape May, New Jersey, USA represent the most comprehensive documentation of this phenomenon worldwide. Here, we examine the hypothesis that coastal morning flights are a direct response to nocturnal wind drift. We used Doppler weather surveillance radar (WSR-88D) and observational data from autumn 2014 to investigate whether nocturnally migrating birds experienced wind drift over New Jersey, and whether larger morning flights followed nights with greater wind drift. WSR-88Ds with new dual-polarization capabilities now allow us to determine migrants' orientations, from which we can estimate wind drift more accurately than previous wind-based calculations. We found that, on average, nocturnal migrants did experience significant wind drift over the region. Further, morning flights were larger when winds exerted a greater influence over nocturnal flight directions; wind influence and nocturnal migration magnitude together explained the majority of variation in morning flight size. These results are consistent with morning flight representing displacement compensation by nocturnal migrants.

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Effect of geolocators on flight performance of Barn Swallows *Hirundo rustica*

Abstract
Miniaturized geolocators are very popular in studies of avian migration. However, the effects of these devices on birds' flight behavior are poorly known. We investigated the influence of geolocators on flight behavior of Barn Swallows (*Hirundo rustica*), small aerial insectivorous passerines and long-distance migrants. We investigated whether miniaturized geolocators (ca. 3.5% of body mass) affect short-term flight performance traits of breeding male Barn Swallows by comparing flight maneuverability, velocity and acceleration of geolocator-equipped vs. control (handled only) birds in flight tunnels. We used a robust experimental design where the within-individual change in flight performance was compared between birds that were equipped with a geolocator (after allowing for a period of acclimation) and control birds (that were also tested twice) without geolocators. We found no statistically significant effects of geolocator deployment on the three flight performance traits. Our results suggest that geolocator deployment does not markedly impair flight performance traits of male Barn Swallows in the short-term. We suggest that negative effects of geolocators on fitness (as reflected by lower return rates of Barn Swallows equipped with geolocators reported in other studies) are related to processes mainly acting outside the breeding season.

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Melatonin and nocturnal migration: recent findings and new perspectives

Abstract
Nocturnal migrants show extreme, peculiar behavioural and physiological adaptations related to a substantial shift of their circadian activity pattern. A series of studies had suggested that the hormone melatonin is functionally involved in the switch from diurnal to quasi-nocturnal activity in Passerine birds during migration. However, an experimental study involving melatonin manipulation in spring migratory garden warblers (*Sylvia borin*) showed no effects of increased circulating melatonin on a strong proxy of migratory disposition in captivity, i.e. nocturnal restlessness. Previous work indicated that the role of melatonin might be stronger during autumn than spring migration. Recently, we repeated melatonin manipulation in autumn on migratory garden warblers and blackcaps (*Sylvia atricapilla*) and found clear-cut and significant effects on migratory restlessness. Melatonin treatment, which resulted in the elevation of circulating melatonin concentrations within the physiological range, reduced migratory restlessness in both species. These results helped us to reframe our hypothesis on the involvement of melatonin on nocturnal migration.

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Stopover duration of Garden Warbler *Sylvia borin* in Kızılırmak delta, in northern Turkey during autumn

Abstract
During migration birds spend most of their time at the stopover sites to refuel. The stopover duration differs before and after crossing an ecological barrier. We studied the stopover duration of Garden warblers *Sylvia borin* in north of Turkey at the Cernek Ringing Station during autumn migration season after they have crossed the Black Sea. We determined stopover duration in using light weight radio telemetry and capture-recapture data. 14 radio transmitters were attached and followed during stopover at Kızılırmak delta. Minimum stopover duration according to capture-recapture data from 150 recaptured birds has been used. Minimum stopover duration is calculated according the assumption that all recaptured birds were present in the study area from their first capture until their last capture. The stopover duration according to radio transmitter was calculated as 8,43 days and for the capture-recapture stopover duration it was calculated as 6,32 days. The stopover duration of recaptured birds was shorter than in radio tracked birds.

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Does migration strategy act as an isolation barrier between Greater and Lesser Spotted Eagles

Abstract
Different migration strategies may be isolation barrier keeping apart closely related sympatric species. Greater Spotted Eagles *Clanga clanga* and Lesser Spotted Eagles *C. pomarina* probably diverged ca 1 million years ago but isolation barriers are not complete, or have recently broken down, as the species hybridise extensively across the vast area in Eastern Europe. In the current study we compare migration patterns of the two species, and hybrids between them, by means of satellite telemetry and data loggers in an hybridising population in Estonia. The two species had strikingly distinct migration pattern. Lesser Spotted Eagles are long-distance migrants with short departure period and narrow southbound migration corridor to southern Africa. Greater Spotted Eagles are short-distance migrants flying to various directions to winter in Southern Europe and Anatolia, the timing of migration is scattered over long period. Studied hybrids have had intermediate migration timing and wintering locations (e.g. in South Sudan), or followed the pattern similar to that of the Greater Spotted Eagle. Hence migration differences are an important isolation barrier for the two species but probably not sufficient to keep species apart.

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Increasing protandry in the spring migration of the Pied Flycatcher *Ficedula hypoleuca* in Hungary

Abstract

Sexual selection theory suggests that the degree of protandry in spring migration should increase when earlier males benefit from better mating opportunities. Western European studies failed to show differences in sex-specific arrival dates for the Pied Flycatcher. However, different climatic conditions and other constraints may affect its phenology in continental Europe. In this work, we used linear mixed effect models to analyse the sex-related spring migration trends of Pied Flycatchers during 25 years (1989–2013) and show their temperature dependence at a stopover site in Hungary (Ócsa Bird Ringing Station). The spring arrival of male flycatchers shifted to 11.3 days earlier dates whereas female arrival showed no change, implying an increasing degree of protandry. The arrival time depended significantly on the mean and maximum local temperatures in April, but only for males. We lack evidence suggesting sex-specific wintering ranges or differences in the onset of migration. However, faster flight of males due to longer wings should be considered, as well as the idea that males are more likely to be loop migrants than females are, so they shorten their spring route back to the breeding area. It can be the most likely explanation for sex-related phenological changes in Central Europe.

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Migration Ecology of Lesser – Spotted Eagle (Clanga pomarina) Over Hatay – Belen Pass Between 2008 – 2014

Abstract
Hatay – Belen Pass is the one of the most important migration route over Western – Palearctic. The route is frequently using by Storks (*Ciconia sp.*) and diurnal raptors every migration periods. We have carried out a monitoring project since 2008 in Belen Pass. Though monitoring studies covers all soaring migrant species, our study has focused on diurnal migrant raptors, especially lesser - spotted Eagle's (LSE). We have used four different monitoring points to observing bird migrations between the time 07.00 am and 06.00 pm during autumn migration period since 2008. According to study results, the LSE's have frequently migrated over pass between the time 08.25 and 12.10 am. Though the LSE's have not preferred to migrate after 13.00 pm, it has rarely passed between 15.00 and 18.00 pm as small flocks. The timing of LSE's migration is significantly correlated to weather condition over the area. Number of observed LSE individuals are 18.650 in 2008; 19.322 in 2009; 17.398 in 2010; 18.212 in 2011; 18.346 in 2012; 18.774 in 2013 and 18.880 individuals in 2014. These numbers are belonging to autumn migration periods of each years. LSE flocks have frequently flown between 1.000 – 1.300m altitudes over region. The significant LSE's migration has not been occur in spring over our observing points during whole monitoring studies. According to our field observations results Belen Pass is the one of the most important passing point of lesser – spotted Eagle over Western – Palearctic in view of total population.

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Flying further: differences in shifts of wintering and breeding ranges lead to longer migrations

Abstract
Studies on the impact of climate change on the distributions of bird species in Europe have largely focused on summer breeding ranges. While some studies have investigating potential range shifts during the winter season, until now these have not focused on actual migration distances of individuals or populations. We used long-term datasets from the Finnish ringing centre to investigate whether migratory bird species show consistent range shifts in both breeding and wintering areas or if these shifts are independent. Our data reveal species-specific differences in these patterns. We show that some species that have shifted their breeding ranges northward in the past 50 years have not shifted their wintering grounds, leading to increased migration distances. Potential variables that contribute towards these patterns include body size, habitat preference and phylogeny. This research fills an important gap in the current climate change biology literature, focusing on individuals' entire life histories and revealing new complexities in range shift patterns.

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Studying group specific autumn migration across northern France with automated radar monitoring

Abstract

For environmental impact assessments investigations of bird movements by radar are meanwhile widespread. Most systems use target size and flight speed with respect to ground to distinguish between birds and all other kind of targets. The system used in this study allows identifying targets based on their echo signature. In many cases wing beat patterns are easily identified and are used to further subdivide birds into so-called wing beat classes (e.g. passerine-type, wader-type). The static beam of the radar facilitates a proper estimate of the surveyed volume and thus allows a proper quantification of the movements. We recorded bird movements continuously during autumn 2013 in Lorraine region and 2014 in northern France. There was a clear difference in the composition of migration between the sites and within the phenology of the two years based on the automatic subgroup classification, whereas height distributions were more related to atmospheric conditions than to subgroups. Some remarkable events presented in this talk, underline the potential for a further progress towards species specific investigations. With larger collection of reference data from visually identified birds a more detailed classification based on echo signatures is possible, and together with ground based monitoring schemes migration patterns of single species are within the reach.

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Feather isoscapes predict wintering areas and laying dates of House Martins *Delichon urbicum*

Abstract

For a Palearctic-African bird as the House Martin (*Delichon urbicum*), migratory connectivity implies that what occurs in their wintering area, south of the Sahara Desert, and during the migratory journey may have important carry-over effects on the breeding areas in Europe. However, research and conservation efforts have generally focused on the breeding areas. Analysis of multi-isotopes (δ13C, δ15N, δ2H) proportions locked in feathers have proved to be a powerful tool to address questions about migratory origins of passerine birds and their life history traits. We determined the wintering area of South Western Spanish House Martins using previously described African isoscapes. First, we identified the African isoscapes matching the isotopic signs of the feathers, and we identified the most probably wintering area using a previously described regression analysis among the longitudes of breeding and wintering areas for this species. Second, we investigated if wintering areas predict fitness in this species. We found that individuals wintering northerly in more xeric habitats lay their eggs earlier than individuals wintering in the southernmost area (a wet tropical habitat). Further studies are needed to understand the cost and benefits to spend the winter in either of the two wintering areas we described for our study population.

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A model for analysing annual wintering proportions of partial migrants

Abstract
Partial migrants – species for which part of the population migrates – are excellent for studying the causes and consequences of migratory behaviour. The migrating proportion can evolve rapidly and often shows large annual variation in response to weather or food availability. We here present a statistical model for studying annual variation in the proportion of migrating (wintering) birds. The model borrows ideas from logistic regression and multivariate linear models, and combines three complementary sources of information: breeding and wintering population indices, and autumn migration numbers. Using Swedish national monitoring data and migration data from Falsterbo bird observatory, we apply the model for European Robins (*Erithacus rubecula*) and Common Blackbirds (*Turdus merula)*. The two species' migrating proportions show opposing temporal trends, but consistent negative relationships with late autumn temperature. Unfortunately, the average migratory proportion (intercept) has identifiability issues, but its estimate clearly affects the remaining results of the model. This calls for inclusion of a priori information about the intercept in the model. This is possible using Bayesian analysis, as well as various frequentist approaches. We believe that the proposed modelling framework can help to recognize drivers and patterns of variation in the wintering proportion of partial migrants.

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A hidden Markov model for reconstructing animal paths from solar geolocation loggers using templates

Abstract

Solar archival tags (henceforth called geolocators) are tracking devices deployed on animals to reconstruct their long-distance movements. The increased use of geolocators on small birds has created a need for analytical tools to produce accurate and objective estimates of migration routes that are explicit in their uncertainty about the position estimates. We present a hidden Markov chain model for the analysis of geolocator data. This model estimates tracks for animals with complex migratory behaviour by combining: (1) a shading-insensitive, template-fit physical model that includes migratory and sedentary behavioural states, (2) an uncorrelated random walk movement model, and (3) spatially explicit behavioural masks. We use the particle filter (PF) algorithm to provide relatively fast model posterior computation. We illustrate our modelling approach with analysis of simulated data for stationary tags and for real tracks of both a Tree Swallow *Tachycineta bicolor* migrating along the east and a Golden-Crowned Sparrow *Zonotrichia atricapilla* migrating along the west coast of North America. Our model increases accuracy in analyses of noisy data and movements of animals with complicated migration behaviour. It also provides posterior distributions for the positions of animals, their behavioural states (e.g., migrating or sedentary), and distance and direction of movement.

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Ecological behaviour of birds in post-breeding migration through the alps using a multi isotope ratio technique

Abstract
Stable isotopes ratios have been increasingly applied in the last years in ornithological studies in order to infer animal movements or ecological animal behaviour in general. In the present study an extensive sampling effort of individuals of different European Passerine species (more than 700 individuals of 21 species) has been realized since 2010. Juvenile feathers were collected from yearlings captured during post-breeding migration on Italian Alps. For the first time all together, the analyses of the stable isotope ratios of carbon, nitrogen, oxygen, hydrogen and sulphur (d13C, d15N, d18O, d2H, d34S) by Isotope Ratio Mass Spectrometry (IRMS) were carried out on the collected feathers. The aim of the study was to deepen into ecological habits of different European Passerine species, focusing on mean trophic level for each species. We tried to clarify if it could be possible to group different species on an ecological basis, considering inter and intra-specific isotopic variability, breeding seasonality and feeding habits of the different species. Results suggest how important is understanding ecological behaviour of specimens within the species, especially in studies aiming to track animal movements by stable isotope ratios analysis. This work essays to lay the groundwork to build a purposeful discussion about the opportunity to develop isotopic maps related to Passerines feathers, useful to better figure out western Palearctic migration flyways

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Are long-distance migrants limited by climate on breeding or wintering grounds?

Abstract
Currently there are two most discussed hypotheses explaining impact of climate on bird populations. First, conditions in wintering sites in sub-Saharan Africa, particularly droughts, negatively affect survival of long-distance migrants. Second, increasing spring temperatures negatively affect breeding productivity of long-distance migrants due to mismatch of the peak of seasonal food supply with the arrival of long-distance migrants to the breeding grounds (mismatch hypothesis). Both of these hypotheses have been proven by many studies, however, a complex, multiple-species study comparing the strength of both of these effects is still lacking. Here we correlate survival and productivity from Constant Effort Sites data in Czech Republic with spring temperature on breeding grounds and precipitation and moisture on wintering grounds. This way we are able to compare the strength of both hypotheses across wide species spectrum. Our study will hopefully increase our understanding of the mechanisms how climate change affects bird populations. The project is supported by Czech Science Foundation (project no. 13-06451S) and the Grant Agency of Charles University in Prague (project no. 633212).

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Can the migratory status of Lesser Kestrels *Falco naumanni* be determined from stable isotopes?

Abstract

Many previously wholly migratory species recently established resident populations in Europe. To understand the consequences of changing migratory behaviour, distinguishing migrants from non-migrants within partially migratory populations is essential. This study compares the performance of stable isotopes (Carbon, Nitrogen, Hydrogen) to determine migratory status in Lesser Kestrels (*Falco naumanni*), a partially migratory species in Iberia. The African Sahel wintering locations of 6 individuals were known from geolocators. Breeding and winter grown feathers were collected from 67 birds with unknown migratory status. Adult males are easily recognised, juvenile and adult females have indistinguishable plumage. Moult sequence was investigated by sampling every primary feather from 8 individuals. Carbon clearly distinguished Iberia from the Sahel. Unexpectedly 4 tagged birds that wintered in Africa displayed an Iberian isotopic signal. This indicated flexibility in timing of moult. Carbon could therefore only distinguish migrants who completed moult in Africa (68.8%). Nitrogen and Hydrogen were not useful in determining migratory status. Adult breeding season feathers were highly enriched in Hydrogen, possibly due to breeding effort. This was important for excluding juvenile females (9.7%), a novel use for Hydrogen. It could not be determined if the remaining confirmed adults (21.5%) were residents or migrants who moulted in Iberia.

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Migration strategies in French White Storks *Ciconia ciconia* populations: causes and consequences

Abstract

The existence of different migration strategies (migrant and non-migrant) within a population is classically referred as partial migration. As this strategies can occurred in coexisting individuals, recent studies focused on determinants implied in this behavioral plasticity. The aim of our study is to analyze migration strategies in White Storks by using a 25 years ringing/resighting dataset on the entire French territory, and testing the effects of age, populations, climate or previous migration strategy on the decision to migrate or not. By using a multistate mark-recapture approach, we were able to design two matrixes for survival and transitions probabilities, thus allowing us to test impacts of factors separately on this two parts of the analysis. We expect an evolution of strategies occurring between juvenile and mature states, the latter the more sedentary. Influence of the previous strategy is also expected, highlighting an individually dependent migratory history. Moreover, population in the southern part of the country are expected to be composed by a larger number of sedentary individuals than the northern ones, because of the milder winters. Our study will provide a better understanding on the determinants of migration strategies and their consequences in term of survival.

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"The same procedure as last year?" – Indications of winter site fidelity in Common Swifts *Apus apus*

Abstract

Repeated tracking of migrating individuals is essential to investigate site fidelity and the strength of linkage between the breeding and nonbreeding sites of migratory bird populations, i.e. migratory connectivity. Swifts are highly aerial long-distance migrants, only intermitting their airborne life for breeding. From 2012 to 2014, we equipped ten Common Swifts *Apus apus,* breeding in a colony in Western Germany, with light-level geolocators each year. Four individuals were re-fitted with geolocators in 2013 and 2014. So far, we know migration routes of nine different individuals, among them two that were tracked twice. These nine individuals chose not only one but several different wintering areas between mid-October and early April. These wintering areas were distributed over Central and South-East Africa and even located in South Africa. Both at the beginning and the end of the wintering period, eight swifts headed for the Congo Basin. The two repeatedly tracked individuals, however, used the same individual-specific wintering areas in subsequent years. These findings provide first indications of individual winter site fidelity. The choice of wintering areas seem to vary between individual swifts. With upcoming logger recoveries we hope to further evaluate whether the migration strategy is indeed the "same procedure as every year".

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A pan-European assessment of migratory connectivity in the near-threatened European Roller *Coracias garrulus*

Abstract

The extent to which individuals from different breeding populations mix during the non-breeding season ('migratory connectivity') has important consequences for population dynamics and conservation. Given recent declines of long-distance migrant birds, multi-population tracking studies are crucial in order to assess the strength of connectivity and identify key bottlenecks en route. Here, we present the first such study for globally near-threatened European Rollers *Coracias garrulus*. Our study synthesises new geolocator data with existing geolocator, satellite tag and ringing data from eight countries across the Roller's European breeding range (32 individuals, one tracked twice). We analyse the spatial pattern of winter and passage sites with respect to breeding origin and quantify the strength of connectivity between breeding and winter sites. Rollers from across Europe used the northern savannah zone for autumn stopovers, and both loop and leap-frog migration by rollers from eastern populations were evident. Whilst individuals from different populations mixed to some extent over winter, their distribution was non-random, with positive correlations between breeding and winter longitude as well as between pairwise distance matrices of breeding and winter sites. Connectivity was stronger for eastern populations than western ones, although such regional comparisons are hampered by a 'scale-dependence' problem, which we discuss.

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Turkey as a crossroad for Greater flamingos Phoenicopterus roseus: evidence from population trends and ring-resightings

Abstract

We report the results of wintering (1999-2014) and breeding (1969-2014) surveys of the Greater Flamingo *Phoenicopterus roseus* in Turkey together with resightings information from 1180 flamingo chicks ringed in the Gediz Delta. The wintering population of Greater flamingos tends to increase with an average of 54947 ± 20794 birds, concentrating in Gediz, B. Menderes and Çukurova Deltas. The species used to breed in at least in seven different sites over Turkey. After 1999, most colonies of Central Anatolia were abandoned due to water derivation for agriculture. The species now breed regularly in Tuz Lake and Gediz Delta, and sporadically in Acıgöl and Akşehir Lakes. The Tuz Lake colony is of prime importance with 18418, 20274 and 20292 chicks in 2011, 2012 and 2013, respectively, a record in the Mediterranean and West African region. Resightings of ringed flamingos confirm that post-fledging, natal and breeding dispersal of Turkish flamingos reach Western Mediterranean and West Africa. Yet, flamingos from Turkey also disperse eastward to regions outside the known flyways of the Western Mediterranean flamingos, i.e. Israel and United Arab Emirates. Turkey is thus a crossroad between the Western Mediterranean and Southwest Asia.

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Changes in bird arrivals over two centuries: do cold and warm periods matter more than migratory strategies?

Abstract
Temperature is well recognized as the main driver associated with timing of bird migration. We reconstructed first arrival dates to breeding sites of 13 bird species (7 short- and 6 long-distance migrants) for the period 1828–2010. We found that across species the arrival-temperature relationship did not differ significantly between cold and warm climatic periods. However, the strength of the interaction between arrival and temperature has changed during the last two centuries for short- and long-distance migrants. Since the late 1970s long-distance migrants have strengthen their response much more than short-distance migrants. This is in contrast with previous studies and questions usually accepted opinion that long-distance migrants are not able to track the tempo of the changing climate as adequately as short- distance migrants. Despite the rapid recent advancement of first arrivals we show that some species are still behind with their arrivals when compared to the beginning of the 19th century.

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Diversity of avian haemosporidians of poorly studied regions and scarcely examined bird species

Abstract
Haemosporidians are widespread vector-transmitted parasites that infect a variety of animals. The most diverse assemblage of haemosporidians is found in birds, represented by more than 50% of the known species. The knowledge of this diversity is of great importance for understanding changes in geographical distribution and host range due to imminent climate change. Our study incorporates poorly studied regions worldwide and undersampled bird species living in contact with vectors. Focused on natural infections in wild hosts, we explore geographical sampling gaps in Malaysia, Madagascar and Vietnam regarding parasite species of three genera (*Plasmodium, Haemoproteus and Leucocytozoon*). This study also examines three European bird species of different orders and occupying diverse habitats, namely Black-headed Gulls (*Chroicocephalus ridibundus*), Little Bitterns (*Ixobrychus minutus*) and European Bee-eaters (*Merops apiaster*). Using complementary techniques of blood smear analysis and molecular methods, we provide results on prevalence, host range and lineage diversity of parasites. We also gain information about intensities of infection, potential for transmission and comparisons of methods. Our intention is, by applying a combination of methods, to molecularly characterize parasite species and to contribute to the traditional morphology-based taxonomy. The present results elucidate the distribution of widespread generalist parasites and processes of colonization of new hosts.

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Dietary regulation of lipid synthesis in Black-tailed Godwits *Limosa limosa* feeding on distinct diet

Abstract
The food conditions experienced during stopovers can deeply affect the performance of migratory birds, such as the Black-tailed godwit *Limosa limosa*. This species traditionally foraged on estuarine invertebrates but the intake of rice in stopover and wintering areas of Iberia and coastal Africa is now increasingly important. Understanding how these distinct diets (plant vs animal) and consequent metabolic adaptation, translates into lipid synthesis is important for the physiological ecology of this and other species using rice-fields. Stable isotope tracers, such as deuterium (2H), are incorporated into lipids during synthesis and have been used to measure lipid flux. This was successfully achieved with Black-tailed godwits subjected to two different diets (6 per diet) during 15 days: rice and pellets. The tracer was delivered by intraperitonial injection of a 100%-enriched dose of deuterated water (2H2O) and supplied with 5%-enriched drinking 2H2O. 24h after the injection the birds were sampled for lipid tissue and blood, with 2H-enrichments being quantified by 2H-NMR. Lipids were reconstituted in chloroform containing a pyrazine standard. This methodology provided reliable estimates for de novo lipogenesis and fatty acid elongation, and was also able to detect clear differences between the individuals from the two diets.

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Tracking the parasites: Inferring the transmission areas of haemosporidians by tracking their hosts

Abstract
The advance in tracking technologies gives us much more opportunities than revealing the migration routes and wintering regions of various bird species. Migratory birds often travel thousands of kilometres to distant areas on the globe where they encounter a great variety of parasites absent in their breeding grounds. Often the parasites are poorly studied in these areas and the tracking of birds' movements can give us hints where parasite transmission takes place. In this study we investigated the patterns of haemosporidian infections (*Plasmodium and Haemoproteus*) in two Great Reed Warbler (*Acrocephalus arundinaceus*) populations, from the Czech Republic and Bulgaria, wintering in two different parts of Sub-Saharan Africa. We obtained tracks of 12 birds using geolocators and checked them for presence of haemosporidian parasites, thus estimating the population-specific transmission areas. In addition, we analysed >100 individuals from each population and the available information for haemosporidian parasites in this host from the MalAvi database. A total of four cytochrome b lineages of Haemoproteus and nine lineages of Plasmodium were recorded, with the majority of the lineages transmitted in Sub-Saharan Africa. Several of these lineages can potentially serve as geographical markers when migrating birds with unknown breeding and wintering areas are sampled.

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Are nest materials the source for bacterial communities of hoopoes?

Abstract
Nesting Eurasian hoopoes (*Upupa epops*) harbor in their uropygial gland a complex community of symbiotic bacteria with considerable antimicrobial activity. Female hoopoes besmear their brood patch and eggshells with uropygial secretion and, thus, the bacterial community of the beak, brood patch and eggshells is determined by that of the uropygial gland. However, it remains unclear the origin of the symbiotic bacterial community of the uropygial gland. Here, we experimentally tested the hypothetical role of materials in the nest of hoopoes as a source of the mutualistic bacteria inhabiting the uropygial gland, the cloaca and eggshells. We manipulated the composition of bacterial communities of nest materials in nest-boxes by using material taken from hoopoe nests of the previous breeding season or commercial grinded olive stones (with reduced bacterial loads). Bacterial communities were characterized by means of ARISA fingerprinting technique. The results revealed no experimental effect on the bacterial communities of gland or cloaca, but influence of materials on those of the eggshells. Studies exploring the interactions between bacterial communities from the eggshells and from the nest materials would serve to understand how mutualistic bacteria from the uropygial gland act on the eggshells of hoopoes.

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Prevalence and genetic diversity of *Leucocytozoon spp*. in a migratory passerine specie, House Martins *Delichon urbica*

Abstract

Avian haemosporidian parasites (genera *Haemoproteus, Plasmodium and Leucocytozoon*) are one of the most well-known and well-studied groups of parasitic protist because they include the agents of malaria. The level of our knowledge of different groups of haemosporidians has been increasing over time. However, most of studies have been focused in the first two genera, but less attention has been paid on *Leucocytozoon* parasite species. Moreover, *Leucocytozoon* species have been widely investigated in some bird species such as raptors and poultry species, but comparatively fewer studies have addressed these blood parasites infections on passerines. Here we aim to analyse the prevalence and genetic diversity of *Leucocytozoon* parasites in house martins (*Delichon urbica*), an African-Paleartic migratory passerine species during their breeding season in South-western Spain. Our preliminary results showed a very low prevalence and genetic diversity of *Leucoytozoon* infections. These infections showed no negative effects on their bird hosts in terms of body condition. We also revealed that most of the infected house martins were also co-infected with other haemosporidian parasites, which may induce lower survival prospects. Future studies are desired to elucidate the pathogenicity of single and mixed *Leucocytozoon* infections on migratory passerines.

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Willow Warbler *Phylloscopus trochilus* parsasitism by blowflies in Sweden across latitude

Abstract
During breeding seasons of 2013 and 2014 we the studied breeding biology of willow warblers *(Phylloscopus trochilus*) in two study sites in Sweden: Tovetorp. (southern site) and Abisko research station (northern site). After chicks fledged nests were collected and inspected. Ectoparasitic hematophagus blowfly (Protocalliphora) larvae and pupae were quantified. Pre-imago blowfly specimens where reared artificially until imago hatched. Adult flies were identified to species level. Nests were filmed during chick feeding period. Videos where analysed and data of parental feeding rates and nest sanitation where extracted. In the southern study site 56.25% of fledged nests were infested in contrast In the northern study site located in subarctic Sweden 85.71% of all nests were infested. Average number of larvae per chick was 3.88(SD 5.02) in Abisko and 3.12(SD 3.02) in Tovetorp. A combination of severe infestation and harsh weather in Abisko caused the death of several chicks. No mortalities caused by blowflies were observed in Tovetorp. This study describes a parasite induced increase in parental feeding rates and time spent on nest sanitation.

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Parasite-poor breeders invest less on constitutive immunity

Abstract
Although benefits of increased reproductive investment can be off-set by a reduction in survival and/or future fecundity, the underlying mechanisms regulating these trade-offs are not fully understood, but current evidence indicates that immune function plays an important role. A strategic use of parasite-poor habitats could potentially reduce the necessary investments in immune function, and allow directing energy to parental care and/or chick growth. For species with different co-evolutionary migratory strategies and habitat use, some individuals may be able to invest less on immune defence. This could be the case for the two sub-species of Black-tailed Godwit occurring in W Europe: while Icelandic godwits (*Limosa limosa islandica*) breed in High Arctic and are restricted to parasite-poor areas in winter, Continental godwits (*Limosa limosa limosa*) breed at more southern latitudes and use parasite rich areas in winter. Indeed, we found that during the breeding season, Icelandic godwits exhibit lower constitutive immune responses than Continental godwits, having better body condition, lower lysis, hemagglutination activity and haptoglobin levels, and higher white-blood cells count with non-significant differences on the H/L index. Current data suggests that the lack of pathogen exposure might therefore, be one of the operating forces down-regulating investment in the immune system.

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Optimization of field sampling and wet lab procedures for analyses of gut microbiota in birds.

Abstract
Effects of gut microbiota on physiology and health in vertebrates are of significant interest in current biological research. Gut microbiota sampling, sample storage and their processing should be carefully planned before the data collection as these steps has large effect on quality and quantity of DNA template as well as on resulting microbial profiles. Commonly recommended procedures, such as immediate deep freezing of samples or immediate DNA extraction are often not feasible. This holds especially in the case of field studies conducted in remote areas with limited access to standard laboratory equipment. Using samples from captive Zebra finsches (Taeniopygia guttata), we conducted a controlled experiment in order to test the effect of two extraction methods and four previously described microbiota storage media, particularly [1] 96% etanol, [2] RNA later, [3] FTA cards and [4] the so called two step methods, i.e.ethanol dehydration followed by silikagel conservation,, on quantity of bacterial DNA template and on resulting community profiles. In addition, our experimental design allowed to evaluate differences between bacterial community profiles obtained using feacal samples and cloacal swabs.

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Microclimates within the plumage of mallard ducks can potentially facilitate long distance dispersal of microbes

Abstract
Birds as carriers of propagules are major agents in the dispersal of plants, animals, fungi and microbes. The microclimate found within the plumage likely plays a pivotal role in propagule survival. In this study, we have analysed the microclimatic conditions within the plumage of mallard ducks (*Anas platyrhynchos*). Under similar ambient conditions of humidity and temperature, a sample of mallards showed a consistent microclimatic regime with variation across the body surface. The highest (mean) temperature and specific humidity occurred between feathers of the postpatagium. The lowest humidity was found between feathers of the centre back and the lowest temperature in the crissum. Observed differences in plumage depth and density, and distance from the skin, are all likely to be determining factors of microclimate condition. Specific humidity found within the plumage was on average 1.8-3.5 times greater than ambient specific humidity. Thus, the plumage can supply a microclimate buffered from that of the exterior environment. Extrapolating desiccation survival data for aquatic *Lemna minuta* and *Lemna minor* at various temperature and humidity levels, to the measured plumage microclimatic conditions of living birds, survival for up to 6 hours can be anticipated -especially in crissum, crural and breast plumage.

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Long-term changes in the body condition of wintering Great Tits *Parus major*

Abstract
Climate change affects all parts of the yearly cycle in the life of birds. In some species, strong responses have been reported e.g. concerning the timing of migration and breeding as well as the reproductive success. Long-term changes occurring during winter, such as in condition and survival, have been studied less, probably due to lack of adequate trapping data. To fully understand the changes in the sizes of bird populations, data on the condition and survival is needed, since winter weather likely affects the breeding performance of birds in the following spring via the condition of the parent birds, and survival affects directly the size of the reproducing cohort. Wintering Great tits (*Parus major L.*) have been trapped and measured in Turku, SW Finland (60° N) already for three decades. In this study, I use those data to examine 1) possible long-term changes in the winter body condition and 2) the effects of the variation in winter weather to the body condition of the Great Tits.

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Long-term variation in body condition of female pied flycatchers *Ficedula hypoleuca* in the vicinity of a metal smelter

Abstract
Body condition is related to several life-history processes, such as individual fitness, survival and reproduction. Also anthropogenic factors, such as environmental pollution may affect body condition of animals. We used a long-term data set from pied flycatchers (*Ficedula hypoleuca*), collected from one of the most polluted sites in Finland during the past 23 years to study the long-term effects of metal pollution on female body condition. Metal emissions in this area have been decreased remarkably during this study period, which is why we examined the relationship between female body condition and reduced metal emissions. We also investigated the relationship of clutch size, breeding time temperature and breeding density of females to the long-term variation in body condition during incubation phase. Our results showed that body mass started to decline already three days before hatching, indicating a preparation of females to forthcoming chick feeding period. Females had higher body condition index in polluted than in unpolluted sites, but the body condition index decreased faster in polluted sites, which may be due to more drastic decrease in food abundance in polluted sites. Temperature and clutch size had positive association on body condition index, whereas breeding density affected negatively on body condition index.

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A preliminary overview on the influence of rehabilitation on blood parasite infections in wild owls Strigidae

Abstract
The haemosporidian parasites of birds have captured the interest of avian researchers in the last century. They usually infect wild birds in natural conditions, and the parasite presence (or absence) is often used as a general health index of the avian host. Nowadays, the rehabilitation centres have a remarkable role in avian conservation. Among others activities these centres heal a vast number of individuals suffering from different kinds of accidents/problems. More of them are released once they get recovered. This study is focused on the influence of rehabilitation period over the presence of haemosporidian infection in the recovered individuals. We carried out haemosporidian diagnosis on owl in a rehabilitation centre to measure if any parasitemia variation happens during the recovery of birds. We assessed the parasitemia at the beginning and at the end of the rehabilitation stint. Our preliminary results show that infection levels by these blood parasites decrease during the period spent in the rehabilitation centre. A non-specific treatment against haemosporidians would be enough to decrease the parasitemia further.

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Physiological adaptation to anthropogenic stress in breeding European storm petrels *Hydrobates pelagicus*

Abstract

Ground-nesting seabirds breed in remote places because they are highly vulnerable to predation, and anthropogenic stress could have fatal consequences for these species. Most studies on the impact of human disturbance on wild bird populations have relied on behavioural parameters. However, behavioural responses might not be appropriate measures of stress, since opposite behaviours can be observed in response to the identical stressors depending on the life history stage. The corticosteroid response is becoming an established indicator of stress in free-living populations, especially for conservation issues. However, simple determination of corticosteroid concentrations is often not sufficient to conclude whether an individual is chronically stressed or habituated to anthropogenic stress Here, we investigated the impact of anthropogenic stress on a breeding population of European storm petrels in Sicily. We compared two groups, one breeding in a cave exposed to boat traffic and tourism, the other one breeding in an inner, completely isolated cave. Beside, determining the stress-response to handling, we conducted further physiological tests - i.e. ACTH- and a DEX-challenge - to investigate how the hypothalamic-pituitary-adrenal axis responded to human disturbance. Our results indicate that birds breeding in the outer cave are habituated to, and not chronically stressed by, tourist visits. Nevertheless, we also show that although such a habituation can be beneficial in the short term, it can have serious consequences in a longer term.

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Variation in time of the amount of feather mites in urban bird species

Abstract
Feather mites are very common in the lives of birds, although relationships among them are not well understood yet. Considered as parasites until very recently, there are increasing researches suggesting that they hold a commensalistic relationship, despite of determining factors of its prevalence and abundance stills unclear. We analyze the amount of mites present in the feathers of 24 species of birds both resident and wintering species in an urban environment for three consecutive years. Our results suggest that the number of mites varies depending on the species and the time of year, increasing with the arrival of wintering individuals. Furthermore, while the resident species age and physical condition not to seem to influence, there is a positive correlation with variables indicating the physical condition of wintering individuals, as well as with age, having fewer mites in young individuals. Thus, these results may indicate the influence of certain environmental factors in a urban environment over the incidence of feather mites; although it seems that the birds do not obtain a great benefit from the presence of mites in their feathers, relationships among mites and birds remains unclear, so the decrease of the amount of feather mites could be negative for the birds ultimately.

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Different pace of life, but similar testosterone and behaviour in temperate and tropical stonechats *Saxicola torquata.*

Abstract
Avian life histories vary with latitude in a predictable way: tropical birds live a slower pace of life than temperate ones, i.e. they usually get older but produce fewer young during a single breeding season. The physiological mechanisms of a slow pace of life in the tropics are not very well understood, but it is thought that the sex steroid testosterone may play a central role. We investigated differences in testosterone levels and territorial behaviour in stonechats (*Saxicola torquata spp.*). Remarkably, they breed seasonally in temperate and in Afrotropical environments. Tropical stonechats followed a slower pace of life than temperate stonechats. However, this was not reflected in their reproductive physiology: in both tropical and temperate stonechats testosterone was elevated during breeding. Furthermore, tropical stonechats responded as vigorously to a simulated territorial intruder as temperate stonechats with the strongest response during nest building when testosterone levels were highest and females fertile. In addition, tropical males increased their peak song frequency during nest building. Although migratory temperate stonechats sang with a higher song rate than resident tropical stonechats during mating, they did not have higher testosterone levels during that period. Thus, in stonechats, the seasonal profile of testosterone does not seem to differ between tropical and temperate populations. We suggest that in seasonally breeding tropical species, testosterone activates territorial behaviour and facilitates mate guarding during the fertile period of females similar to temperate species. Therefore, testosterone does not hold as a general mediator of differences in pace of life between tropical and temperate species.

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The PHA test as useful method to measure T-cell mediated immunity in free-living birds

Abstract
The validity of using the phytohemagglutinin (PHA) test to measure acquired immunity, one of the most widely used methods, is currently being debated due to new knowledge on the complex physiology of the process. However, a greater secondary response to consecutive challenges, linked to increases of circulating lymphocytes levels, would be indicative of a T-cells mediated immune response. To date, only one study with captive birds has directly addressed this question, but the validity under wild conditions is still lacking. Breeding habits of Blue-footed Boobies (*Sula nebouxii*) facilitate their recapture over time, which allowed us to perform an under wild condition experiment in this way. We found significantly stronger secondary response to PHA injection independently of sex or age, while controlling for body condition, the second response being on average 90% larger than the first one. Likewise, relative lymphocyte counts were significantly higher in the second PHA challenge, whereas non-significant differences were found in untreated birds. Significant direct correlations between the PHA response and both lymphocytes counts and plasma protein levels were found, whereas non-significant differences were found in plasma protein levels between challenges. Our results pointed in the same direction that those shown for captive birds, supporting the use of the PHA skin-swelling test to measure the acquired T-cell mediated immunity in birds.

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Large-brained birds suffer less oxidative damage

Abstract

Relative brain size (i.e. degree of encephalization) is positively associated with fitness. Although, the putative costs of encephalization can constrain the majority of species to modest brain sizes, these costs are still poorly explored. On one hand, we predict that high encephalization could entail an oxidative stress cost given the energetic demand and composition of the neural tissue and its connection with physiological systems. On the other hand, large brains could favour an efficacious antioxidative defence machinery to diminish oxidative damage-induced neural (and organismal) dysfunctions and thereby secure the fitness advantages large brains provide. We address these contrasting hypotheses by means of phylogenetic comparative approach based on 86 European bird species. We report for the first time that large-brained birds suffer less oxidative damage to lipid constituents of cell membranes, while their blood antioxidant levels are similar to small-brained species. These results were not confounded by life history or breeding latitude, and did not depend on what measure of relative brain size was employed. Our findings therefore support the second hypothesis and contribute a proximate mechanism that can explain the connection between large brain size and slow pace-of-life syndrome (i.e. retarded ageing rate and longer lifespan).

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Maternal telomere length and experience are linked to hatching success and offspring quality

Abstract
Telomeres are increasingly recognized as markers of individual quality. Although telomeres shorten with every cell division, this process may be accelerated by stressors, such as those associated with reproductive effort. The link between telomere length (TL) and reproductive success nevertheless remains unclear. Here we investigated how TL is related to individual breeding success and offspring quality. We predicted that high quality individuals, with longer telomeres, will gain higher breeding success and their offspring will have higher survival chances. These predictions were tested using eider (*Somateria mollissima*) females breeding in Baltic Sea (Finland). We recorded female hatching success and measured TL of females and their newly-hatched ducklings using quantitative PCR assay. We found that TL is not correlated with age in adult individuals. We also found that hatching success is positively associated with female TL, but modulated by female breeding experience and breeding phenology. The steepest gain in hatching success with increasing TL was observed in young females and females with a late onset of breeding. Lastly, duckling TL and their weight were positively associated with maternal TL. Thus, our results demonstrate that irrespective of chronological age, TL is positively linked to hatching success and duckling quality, ultimately determining reproductive success.

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Detecting transmission areas of malaria parasites in a migratory bird species

Abstract
SGS1, one of the lineages of *Plasmodium relictum*, is known to have active transmission in tropical Africa and temperate regions of Europe. Nuclear sequence data from isolates infected with SGS1 (based on MSP1 allelic diversity) have provided new insights on the distribution and transmission areas of these allelic variants. For example, MSP1 alleles transmitted in Africa differ from those transmitted in Europe, suggesting the existence of two populations of SGS1 lineages. However, no study has analysed the distribution of African and European transmitted alleles in Afro-Palearctic migratory birds. With this aim, we investigated whether juvenile house martins become infected in Europe before their first migration to Africa. We explored the MSP1 allelic diversity of *P. relictum* in adult and juvenile house martins. We found that juvenile house martins were infected with SGS1 during their first weeks of life, confirming active transmission of SGS1 to house martins in Europe. Moreover, we found that all the juveniles and most of adult house martins were infected with one European transmitted MSP1 allele, whereas two adult birds were infected with two African transmitted MSP1 alleles. These findings suggest that house martins are exposed to different strains of *P. relictum* in their winter and breeding quarters.

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Uropygial gland size and antimicrobial activity secretion between rural and urban areas: a comparative study in House Sparrows *Passer domesticus.*

Abstract
The uropygial gland is an organ that produces an antimicrobial substance which is smeared on the plumage during preening. Because of the volume of the uropygial secretion is positively related to the gland size the correlation between these two variables may be used in order to determine changes either in the secretion volume or size of the gland. Moreover, both gland size and the antimicrobial activity of the gland secretion may vary as a consequence of the pathogens on their hosts. Thus, the concentration of bacteria may differ between rural and urban zones. Here, we analyzed the size of the uropygial gland and the efficiency of its secretion reducing bacterial activity in two areas (urban and rural) of house sparrows (*Passer domesticus*). Our results showed that the size of uropygial gland of sparrows from urban areas is bigger than the one showed by individuals from rural areas. Moreover, we detected that the antimicrobial activity secretion was more effective in the urban area than in the rural one. These outcomes suggest that the uropygial gland size and the antimicrobial activity secretion may play a specific role regulating the concentration of feather-degrading bacteria in the birds.

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Spectra of the Growth Bars of Blue Jays *Cyanocitta cristata* and Eurasian Jays *Garrulus glandarius*

Abstract
Transmittance and bidirectional reflectance measurements were performed on feathers obtained from blue jays and Eurasian jays. Single feathers were illuminated using a quartz-tungsten-halogen source and spectra obtained between 300 and 800 nm using a fiber optic spectrometer. The dominant wavelength and spectral purity were computed from the spectral measurements. The dominant wavelength in transmittance of both the blue jay and Eurasian jay was between 570 and 579 nm for both black and blue growth bars. The purity of the Eurasian jay growth bars was 0.70. The purity of the blue jay growth bars of was 0.70 for the blue and 0.62 for the black, respectively. In reflectance, the feathers of both species had dominant wavelengths near 475 nm and purities of 0.25. The blue jay purity values decreased towards the calmus while the individual blue growth bars of the Eurasian jay showed spatial variation of purity within individual bars. The feathers were then immersed in fluids of different refractive indices for 12 hours. An initial decrease in transmittance was observed due to the presence of the fluid. The transmittance increased as the fluid evaporated. A significant difference was observed in the blue region of the spectrum centred around 410 nm.

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Low prevalence of blood parasites in a long-distance migratory raptor: the importance of host habitat

Abstract

Haemosporidians are common blood parasites infecting birds, although their prevalence greatly differs between species and habitats. It has been hypothesized that birds inhabiting marine habitats present low parasite prevalence. This could be explained by the lack of suitable vectors, the inexistence of the right host-parasite assemblage or the immunological capacity of the host. Here, we assessed the parasite prevalence and diversity of blood parasites of the genera *Plasmodium, Haemoproteus and Leucocytozoon* in the Eleonora's falcon (*Falco eleonorae*), a medium-sized long-distance migratory raptor that breeds on small islets throughout the Mediterranean basin and overwinters in inland Madagascar. We sampled Eleonora's falcon nestlings from five colonies and adults from two of these colonies distributed throughout most of the species' breeding range. None of the 282 nestlings analysed were infected by blood parasites, while a prevalence of 16.7% was found in adults. Our results support the hypothesis of absence of vector-borne parasites in marine habitats. Eleonora's falcons may be thus infected during migration or in their wintering areas. In conclusion, the characteristics of marine environments with a lack of appropriate vectors may be the key factor determining the absence of local transmission of blood parasites in Eleonora´s falcon's breeding areas.

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Diversity and transmission areas of avian haemosporidians among three species of migratory birds

Abstract

In 1936 the veterinary Dryanovski had published first study of blood parasite diversity in Bulgarian birds. This study pointed at important scientific questions: haemosporidian diversity and distribution, host specificity and pathogenicity which are still essential nowadays. In the present study we demonstrate how a combination of various methods can be applied in order to move further our knowledge in the defined by Dryanovski 80 years ago questions. We apply methods (molecular and morphological) for diagnostic of avian malaria infections and recently developed geolocation approach for tracking small passerine birds. We evaluated the patterns of transmission of haemosporidian infections (*Plasmodium* and *Haemoproteus*) in the breeding and non-breeding grounds of the Common Nightingales (*Luscinia megarynchos*) (captured in France, Italy and Bulgaria), the Collared Flycatchers (*Ficedula albicollis*) and the Semi-collared Flycatchers (*Ficedula semitoruata*) captured in Czech Republic and Bulgaria, respectively. Using geolocation we identified non-breeding areas of our populations and thus we can propose regional-specific transmission areas of recorded parasites. These results contribute to better understanding the distribution and exchange of parasites in Palearctic - African bird migration system.

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Blackbird *Turdus merula* nestlings do not change their innate immune response under a chronic increase of nest predation

Abstract
Nest predation can affect several life-history traits in nestlings, however, little is still known about physiological costs induced by this selective pressure and how these costs interact with other traits. The immune system is a vital component of an organism, but two previous studies have found changes in adquired immunological parameters due to extreme and acute nest predation risk. Here, we experimentally investigated whether a chronic increase of nest predation risk (using sounds of common nest predators throughout nestling period) could affect different innate immunological components (haemolysis-haemagglutination, haptoglobin, nitric oxide and ovotransferrin) in Blackbird nestlings (*Turdus merula)*. We found that nestlings under a high risk situation did not differ from control ones for any of the parameters studied. These results suggest that chicks do not respond immunologically to sustained nest predation risk probably because of important costs associated to such potential changes (i.e. growth) or because of the immaturity of the innate immune system at nestling stage. In fact, lysis was undetectable for all chicks, indicating that this immunological function could still be undeveloped at this stage.

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Haemoproteus and *Plasmodium* spp. prevalence in a declining population of European Turtle Doves *Streptopelia turtur*

Abstract
Columbidae can be substantial reservoirs for diseases and are susceptible to co-infection by different parasite lineages or genera. We examined prevalence of infection with two different groups of blood parasites, *Haemoproteus* and *Plasmodium*, along with host immunological responses within UK Columbidae, with a particular focus on declining Turtle Doves, the UK's only migratory dove. We screened blood samples collected over three breeding seasons using microscopic examination of blood smears and nested PCR in parallel. We confirm the first reported cases in the UK of *Haemoproteus and Plasmodium spp*. infecting Turtle Doves, with prevalence at 71% and a wide diversity of strains sequenced. We also found a parasite prevalence of 57% in Turtle Dove nestlings sampled at 7 - 9 days old. To our knowledge, this is one of the youngest ages at which haemosporidian infection has been detected in wild birds. Parasite infection was associated with an increase in lymphocyte number, suggesting an immunological cost of infection. Results are concerning for Turtle Doves, as the costs of immune response to infection may interact with other limiting factors to influence survival and productivity. Further research should address impacts of co-infections on hosts, as well as age-specific impacts of infection.

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Infection with blood parasites and reproductive performance in Blue Tit *Cyanistes caeruleus* females

Abstract
Blood parasites infecting avian hosts form a large and very diverse group. Generally, these parasites are considered to negatively affect host fitness, although their effects have been shown to vary between host species as well as different host populations. Here, we studied the association between infection status with parasites from genera *Plasmodium* and *Haemoproteus* (avian malaria), *Leucocytozoon, Atoxoplasma and Trypanosoma* and reproductive performance at the early stage of the nesting cycle of Blue Tit females from a population inhabiting the island of Gotland (Sweden). The infection status was assessed based on molecular screening of blood samples collected at the end of the incubation period and hence considered to represent chronic infections. Infection with none of the studied parasite types was associated with the shift in the onset of egg laying or reduced investment in clutch or egg size. However, females infected with avian malaria were heavier than uninfected ones and body mass positively correlated with mean egg size in the clutch, which is an important predictor of nestling fitness.

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You are what you eat: a mechanistic study of fatty acids in urban and rural Great tits *Parus major*

Abstract
Cities are characterized by the provision of abundant supplementary food, but its nutritional features are different from what birds can find in nature, e.g. in the profile of fatty acids (FAs). FAs fulfil important functions in the body and take part in multitude of physiological processes during the whole life of animals, but probably they are even more crucial at early life stages, when cells and tissues are developing. Exploring the differences in the FA profile between urban and rural populations at these early stages is important for understanding how urbanization is affecting bird communities through differences in diet. The aims are 1) identify and quantify the FAs of yolk and nestlings' plasma of Great Tits (*Parus major*) to 2) compare the FA profiles between urban and rural populations. We 3) test for differences in nestling morphological development between these populations using condition index increment as proxy of growth, and 4) the potential influence of functional classes of FAs on this trait is investigated. Inter-population differences were found, most likely linked to food differences. Since polyunsaturated FAs affect inflammatory responses, these differences are intriguing to further explore in relation to how urban birds can handle environmental stressors that increase inflammation.

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Babesia spp. transmission by ticks to Antarctic penguins and their immune response

Abstract
Babesia spp. are apicomplexan piroplasmid parasites transmitted by ticks. In spite of their abundance presence in mammals there is little information about its presence in avian hosts. The likely presence of *Babesia* in Antarctic penguins has not been paid attention probably due to the idea that not suitable vectors as ticks were present in this continent, and then there is not any record on the presence of *Babesia sp.* in the literature. Recently, the distribution and relative abundance of ticks in the Antarctic Peninsula has been established showing a wide distribution. Considering this wide distribution and the transmission of *Babesia sp* by ticks is expected that this blood parasite is present in the Antarctic penguins. This study checks for the first time the presence of *Babesia spp*. in the chinstrap penguin (*Pygoscelis antarctica*), its relation to tick density and to the immune response of the hosts. Our results confirm by microscopy and molecular methods, the presence of *Babesia spp*. in the blood of the chinstrap penguin. We also find that prevalence was higher in places with higher densities of ticks. Finally, we did not find any difference in cellular or humoral immunity between infected and non-infected individuals.

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Infection with blood parasites in relation to host exposure to haematophagous ectoparasite

Abstract

Different parasites infecting the host species may interact with each other, either positively or negatively, and consequently influence the disease dynamics. Such associations between parasites have, however, been only rarely investigated and most data originates from observational studies. Avian hosts commonly harbour two types of organisms: nest-based, haematophagous ectoparasites such as fleas and endoparasites, which complete one of the life stages in the host blood such as Plasmodium. We investigated whether infestation of avian host with Hen Fleas (*Ceratophyllus gallinae*) affects the prevalence of infection with four genera of blood parasites: *Plasmodium, Haemoproteus, Leucocytozoon and Trypanosoma*. The co-occurrence of these ecto- and endoparasites was studied experimentally, in nests with reduced and increased infestation with Hen Fleas, in a box-breeding population of Blue Tits (*Cyanistes caeruleus*). The status of infection was assessed in females at the end of the incubation and the end of the nesting period. Exposure of Blue Tit females to Hen Fleas neither affected the prevalence of infection at the end of the nesting period nor affected the change in infection status between two sampling occasions.

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Islands, haemosporidian and birds, a biogeography approach

Abstract

Isolated oceanic island archipelagos are important model systems to study the evolution of host-parasite interactions and their biogeographic patterns. Additionally, in the present context of increasing environmental global changes and human interventions, our understanding of mechanisms that mediate the invasion of insular systems by novel vectors and pathogens is very important, especially due to their potential to cause conservation issues. Here we focus on the most abundant forest passerine host species and haemosporidian lineages sampled from all islands of the Azores archipelago (North Atlantic Ocean) and in southwest Europe and northwest Africa. We obtained comparative data on the parasite richness and intensity between continental and island parasite communities and phylogeographic data. The results support the island syndrome predictions that island parasite assemblages are a subset of source assemblages. Also, host-parasite interactions are reduced since most of the parasites are specialized in one host species, the blackbird, *Turdus merula*, which may explain why the prevalence in the other host species is so reduced. Ancestral informative loci show whether parasites and their hosts arrived in Azores in a single event or as a result of a stepping-stone process involving Madeira and Canary islands.

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Environmental and physiological relationships of bacterial infections by Campylobacter sp. in White Stork *Ciconia ciconia* chicks in Poland

Abstract

Environmental and physiological relationships of bacterial infections by Campylobacter sp. in White Stork *Ciconia ciconia* chicks in Poland We use an exceptionally high resolution data set of White Stork chicks (n=398, SW-Poland) that were screened for Campylobacter occurrences. Rectal-swabs were collected from chicks from Odra-meadows, suburbs, and polluted areas. We link our infection data with associated physiological and environmental data to ask the questions: (1) are infection frequencies linked to physiological health-status, age, and body-mass of storks, (2) does environmental pollution influence infection frequencies, (3) does proximity to urban environments affect infection frequency, (4) are infections spatially clustered around possible 'infection hotspots', (5) does proximity to urban environments affect antibiotic resistance? We expected to see a link in Campylobacter infections with physiological health-status and environmental conditions. Given that possible underestimation of infections rates is a random-variate in space we found weak support for hypothesis that polluted area had higher infection risk. Infection rates were neither spatially auto-correlated not linked to human proximity. This interpretation is equivalent to our rejection of 'infection hot-spot' hypotheses. Apparently, infections occur spatially random. This hypothesis is in accordance with random distribution of vectors in space that form an 'infection matrix' of roughly equal infection probability. Campylobacter may easily be transmitted to storks via its environmental sources and/or by immediate and close-contact.

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Prevalence of Plasmodium in Malagasy rainforest birds – Ecological correlates and individual traits

Abstract

In Malagasy rainforest birds, Plasmodium was found in over 50 % of individual birds (n = 379). After a Plasmodium-specific PCR and following nested PCR, a fragment from the 18S rRNA-gene was amplified. Capture sites were located between 1004 -1111 m altitude at Maromizaha (Andasibe, Perinet) and apparently healthy birds were sampled along a gradient of habitats that differed mainly in land use intensity. After identifying the species, birds were ringed and their sex, age and weight were determined before release. Data on site fidelity of the different bird taxa obtained by an ongoing capture-recapture study was also considered and food guild. Plasmodium prevalence did vary with some ecological factors, i.e. capture site and food guild but not with the recapture probability of a bird, its weight or breeding status. We will discuss possible explanations for the patterns observed.

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Blood-sucking parasites of Pied Flycatcher nestlings in El Escorial, Central Spain

Abstract

Nestlings in bird boxes represent an ideal opportunity for blood-sucking arthropod parasites to feast on captive hosts. The potential impact on nestlings is poorly known and little reported, though several Dipteran groups are vectors for avian pathogens, including Haematozoan parasite infection ("Avian Malaria"). The nest thus represents an ideal opportunity for parasite transmission.

We report the abundance of ectoparasites in nest boxes in El Escorial, Central Spain in the nest boxes of Pied Flycatchers (*Ficedula hypoleuca*, *N* = 54), in the 2013 breeding season. Ectoparasites were captured by placing a baited petri dish on the ceiling of the bird box biting midge from 10-13 days post hatching. Midge (Diptera: Ceratopogonidae) and box mites (Mesostigmata: Dermanyssidae) reached high abundances in some nest boxes. Blackfly (Diptera: Simuliidae) and Mosquito (Diptera: Culicidae) were infrequent. Ectoparasites were sorted to family and counted using binocular microscope.

The abundance of biting midges was positively associated with brood size and brood mass, supporting the hypothesis that a larger brood attracted biting midges. Box mite presence was negatively associated with brood size and mass, presumably because heavy infestations had a negative effect on growth and survival.

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Phylogeography of the Corsican Nuthatch *Sitta whiteheadi*

Abstract
Molecular studies support the hypothesis that Corsica Island was a glacial refugium for forest birds during the Pleistocene. We focused in this study on the Corsican Nuthatch (*Sitta whiteheadi*), an endemic passerine strongly associated with the Laricio Pine (*Pinus nigra laricio*), which range has been impacted by the Pleistocene glacial periods and also recently fragmented by cutting and fires. We used molecular (mitochondrial and nuclear) and morphological characters to evaluate the Quaternary history of the Corsican Nuthatch in the island. Our analyses showed that the Corsican Nuthatch, an old element of the island avifauna, perdured through the late Pleistocene and Holocene climatic variations and sustained the cycles of forests reduction/growth that followed. However, the recent anthropization of the landscape produced the isolation of a cluster of populations in the northern part of the island. This suggests that the fragmentation of its habitats is impacting the future of the nuthatch in creating subdivisions and reducing gene flow within the island.

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Songs of cryptic species. Comparative analysis of Large-billed and Blyth's Reed Warblers songs

Abstract

The enigmatic Large-billed Reed Warbler (*Acrocephalus orinus*) was recently rediscovered after more than 130 years of being treated extinct. In 2006 it was captivated alive, further studies of museum collections and searches for living individuals helped to elucidate breeding, moulting and wintering areas. Breeding area of Large-billed Reed Warblers is located in Middle Asia, in the southern parts of the range of a very close species the Blyth's reed warbler (*A. dumetorum*). Our previous studies showed that Blyth's Reed Warblers produce different songs in northern and southern parts of the range (Ivanitskii et al. 2012). The similarity of *A. orinus* and southern *A. dumetorum* songs very likely led to mistakes in species identification. In our study, we compared time-and-frequency parameters of southern and northern songs of *A. dumetorum* and the song of *A. orinus.* In each group we analyzed the recordings of 9 males. We found out that 1) southern and northern songs of *A. dumetorum* significantly differ from each other, 2) northern songs of *A. dumetorum* significantly differ from *A. orinus* songs, 3) the most similarity in analyzed parameters we found between southern *A. dumetorum* songs and *A. orinus* songs.

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The biogeographic history of European Shags, from the eastern Mediterranean to the North Atlantic

Abstract

The European Shag (*Phalacrocorax aristotelis*) is a very common and well-studied European seabird. Taxonomically, European populations have been assigned to two morphologically distinct subspecies, the Atlantic *P. a. aristotelis* and the Mediterranean *P. a. desmarestii.* Moreover, Atlantic Shags often show distinctive ecological preferences compared to Mediterranean ones, in several aspects of their reproductive behaviour and foraging habits. Here we present a range-wide phylogeographical study of the species based on mitochondrial and nuclear DNA markers, including for the first time populations from the eastern Mediterranean edge of its distribution. Three phylogroups were revealed. The major division separated northern Atlantic from southern populations, whilst within the southern clade two groups were apparent: western Mediterranean, including Corsica and Spain, and eastern Mediterranean. During the Pleistocene, dispersal has probably occurred repeatedly across the Mediterranean and through the Straits of Gibraltar, but in recent times gene flow between the three phylogroups appears to have been limited. Thus, the current subspecific division is not supported by the genetic data, but a new pattern of genetic differentiation has emerged. This will be discussed in an attempt to synthesise ecological and molecular data and highlight differences and similarities among the taxonomic and phylogenetic groups of the European Shag.

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The Ethno-ornithology World Archive (EWA): an open-science database for cultural knowledge of birds

Abstract
The EWA project seeks to engage a wide constituency, including ornithologists, ethno-biologists, conservationists, indigenous peoples and community leaders, and others, both academics and practitioners, by recording, researching, dissemination and applying ethno-ornithological knowledge world-wide. Currently undergoing alpha and beta testing prior to public release, we outline our framework of operation in four areas, to invite feedback from the ornithological community: 1) conservation priorities; 2) intellectual and cultural heritage issues including ethical considerations; 3) comparative research; 4) tools for teaching and learning. With an open-science compilation of culturally relevant knowledge of birds, we aim for a far wider integration of bio-cultural knowledge, particularly at local level, into both conservation research and practice, and a greater understanding of the culture of all relevant stakeholders. In so doing, we aim to explore and implement best practice for building reciprocal, respectful relationships between communities of knowledge-holders and outsider researchers in a digital environment. The potential for comparative, ethno-ornithological, and applied research using the EWA database is great, and it is envisioned as a rich resource for transformational teaching and active learning.

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Group 5: Genetics

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Global genetic pattern of the avian malaria parasite Plasmodium relictum based on microsatellites

Abstract
Avian malaria parasites are widespread, abundant and easy to sample, making them an ideal model for studying ecological and evolutionary patterns of host-parasite associations. Parasite can be roughly divided into two kinds, generalists and specialists. Generalist parasites can infect many different host species with little or no preference, while specialists can only infect one or a few closely related host species. Because of local adaption, a parasite may acquire novel hosts during evolution, but whether it stays as a generalist or split up into several specialists remains unknown. That depends on the existence of gene flow, which can be tested by genotyping parasites isolated from different host species and examining patterns of genetic differentiation. Based on data of parasite association and distribution compiled in the MalAvi database, a globally reported general parasite, Plasmodium relictum was chosen as the study object. P relictum includes the three closely related mitochondrial lineages, SGS1, GRW4 and GRW11. To detect the population genetic pattern, variation of a nuclear gene (MSP1) and several highly morphism microsatellite loci were genotyped.

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The Canary as a model for elucidating the genetic basis of songbird phenotypic variation

Abstract

A central goal in biology is to understand the evolution of phenotypic variation. Domesticated species show great phenotypic diversity that often exceeds the one in their wild ancestors. The Domestic Canary (*Serinus canaria*) is one of the most studied songbirds, and differs widely in song complexity, size, shape, feather ornaments and plumage color. All these traits are also interesting because they are of great relevance in avian evolution. We have been obtaining genome-wide polymorphism data using whole-genome resequencing of selected individual genomes of both wild and domesticated canaries, and provided a first generation map of directional selection in its genome. This allowed us to search for candidate causative mutations within selected regions, both SNPs and structural variants. We expect that our integrative approach will forward our understanding of the genomic basis and architecture of multiple traits in canaries. Since passerine birds encompass more than half of extant bird species, understanding the genetic underpinnings of vocalizations, colors, and ornaments, which also vary conspicuously among passerine species in the wild and are recognized to be sexually selected features, is informing us about the identity of genes involved in the evolution of phenotypic diversity and speciation in birds.

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Avianbase: to enable comparative genome analyses of birds

Abstract

The full genome sequences of 44 birds, recently released by the Avian Phylogenomics Consortium, have opened up the possibility to look for regions within these genomes which are of functional relevance. On the one hand, at the level of individual species, the sequences, coupled with the initial annotations can serve as a vehicle for basic research. On the other hand integrating the available data e.g. by generating multiple sequence alignment for these species, can enable comparative studies which benefits all the species included. Such studies in general can broaden our understanding of genome evolution and the evolution of phenotypic characteristics within birds or between birds and other taxa or can help to disentangle phylogenetic relationships. To enable the integration of bird specific resources we created Avianbase, an Ensembl-based online database, with sequence and annotation data for a total of 48 birds. Our main aim is to analyse the integrated data with a focus on creating a detailed functional map which is relevant to birds, by using methods which detect signatures of selection. Such a map is in turn to be used to drive the identification of novel protein-coding and non-coding genes, binding sites for miRNAs, transcription factors, enhancer, silencer and other regulatory sequences. This level of annotation can play an important role in identifying causative variants which affect putatively functional genomic locations and so can help to make the link between genotypes that underline certain phenotypic differences in individuals or species.

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Group 6: Morphology

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Comparative anatomy of the intertarsal joint and its bearing on the locomotion of *Hesperornis regalis* (Hesperornithiformes) and *Emeus crassus* (Dinornithiformes).

Abstract

Comparative anatomy of the intertarsal joint and its bearing on the locomotion of *Hesperornis regalis* (Hesperornithiformes) and *Emeus crassus* (Dinornithiformes) A reconstruction of the soft tissues (i.e., collateral ligaments, Lig. anticum, menisci, tendon of the M. fibularis brevis), involved in the mechanism of intertarsal joint stabilization, in two species of extinct birds, Hesperornis regalis and Emeus crassus, allowed insights into their locomotion. Despite an overall similarity of Hesperornis foot to that of a grebe and grebe-like movements of the toes, its "loose" intertarsal joint indicates loon-like movements of tarsometatarsus, thus making the Cretaceous toothed bird a diver of a special kind with a mixture of loon- and grebe-like features in underwater foot-propelled locomotion. The "tight" intertarsal joint of Emeus, in contrast, shows the restriction of the tarsometatarsal movements to flexion-extension, a feature that is characteristic for other Ratites and many specialized cursorial birds. The study shows how comparative anatomical data can be valuable in the reconstruction and interpretation of the morphology and locomotion of recent or extinct birds.

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Discover colour variation in Common buzzards *Buteo buteo*

Abstract
Buzzards have a very variable plumage: the extremes go from very dark to almost completely white individuals. Such colour polymorphism is common in raptor species. It is interesting that this variation has a genetic basis, and apparently has been maintained over evolutionary time. The question is why that is the case, and one of the possibilities is that the colour morphs differ in fitness. The individual performance of different morphs may depend on habitat characteristics and climate variables and could vary in space (at a small or large scale) and time. Potential long-term changes and spatial variation in morph frequencies are largely unexplored. In this project we are aiming to investigate the geographical and temporary differences in the distribution of the various morph-types in the Common buzzard. One way to try to answer this question is by the use of data that can be collected by citizens, called Citizen Science approach. In this case to collect information on the distribution of different morph-types across Europe we need your help. The "Buteo-morph" website allows anyone in the field watching buzzards to enter data about the different colour morphs that they encounter and to receive feedback on the project.

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Altitudinal and latitudinal effect on Chaffinch's morphometry and its characterization in Turkey

Abstract
We studied the altitudinal and latitudinal effect on morphometry of Chaffinch *Fringilla coelebs* by capturing 100 individuals using mist nets in nine different areas in Turkey during 2005–2014. Fifteen different morphometric characters were measured. Although we did not find any significant differentiation between male's and female's body mass, the others measurements of female were found smaller than male except bill height at nostril ($p<0.05$). In female, a positive correlation between altitude and the length of nostril to bill apex and between latitude and tarsus and also a negative correlation between latitude and tail were found ($p<0.05$). In male, we did not find any correlation between altitude and its morphometry but we found between latitude and bill width at nostril; length of nostril to bill apex; tarsus; alula ($p<0.05$). Morphometric measurements of male and female of Chaffinch was found different between northern; middle; southern populations (ANOVA; $p<0.05$) with lowest length of nostril to bill apex and length of bill apex to head back in southern populations and increase to the northern populations in both sex. These population differentiations should be checked genetically. This study was supported by TUBITAK.

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Getting the knack of woodpecker head knocks

Abstract
The question of why „woodpeckers do not get headache from pecking" has been studied by morphologists, physicists, and engineers. The morphological approaches contain analyses of static forces, at best, whereas other studies dearly miss important biological details. Thus, sometimes questionable conclusions have been drawn from those analyses. Basic features of the woodpeckers' head anatomy have not been described in sufficient detail. Especially the exact position of the brain with respect to the skeletal structures and the expected mechanical forces has not yet been described adequately. Moreover, more detailed mechanical studies of the impact forces missed one important aspect of avian anatomy, cranial kinesis. We investigated the skull anatomy of the Great Spotted Woodpecker (*Dendrocopos major*) using x-ray micro-computed tomography (Micro CT) with complete heads. By these means we could get an exact description of the relations of brain and skeletal elements. Based on these data we developed a Finite-element Model that included both the hard and soft tissue components of the woodpecker head to come up with more realistic and biological relevant results than earlier studies.

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How to make an egg shine: A nanostructural basis for gloss of avian eggshells

Abstract
Bird eggs are characterized by diverse colours that are thought to be produced by just two pigmentary compounds. Contrary to expectations, we discovered a structural mechanism of colour production in avian eggs. The eggs of tinamous (distant relatives of ostriches and kiwis) are famous for their vivid coloration and glossy appearance, but the underlying mechanism for these optical effects has remained unclear. Using mechanical manipulations in conjunction with angle-resolved spectrophotometry, scanning electron microscopy, and chemical analyses we show that the glossy appearance of tinamou eggs is produced by a smooth cuticle, composed of calcite, calcium phosphates and proteins. Furthermore, we demonstrate that this cuticle produces weak iridescence, an optical effect never previously documented for bird eggs. Gloss and iridescence are likely not solely the result of surface smoothness, but may also be influenced by the cuticle's unique chemical composition. Our discoveries provide a foundation for further exploration of structural coloration and its behavioural effects across avian eggshells.

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The effect of urbanization on the phenotype of the Collared Doves *Streptopelia decaocto* in north eastern Algeria

Abstract
Urbanization has led to a dramatic increase in the areas occupied by the cities and therefore the increase in human population in many parts of North America, Europe, Asia and even Africa, at the same time forcing the animals and plants to adapt to new conditions, including the proximity of humans or disappear, the Eurasian Collared Dove (*Streptopelia decaocto*) is one of those species. Its rapid expansion in Algeria has not been discussed outside of a few papers. On the other hand, no indicator is available to assess its abundance, evolution and phenotype in Algeria except Belabed 2012, 2013. This study aims to deepen the phenotypic knowledge on this species in urban and suburban areas, providing more information on biometric characters in the Northeastern Algeria. It was conducted in the city of Annaba in the extreme north-east of Algeria, between January 2011 and June 2012, adult doves were captured using static vertical nets, projected nets, traps and folding nets near the water. The recorded biometric parameters were: weight, height, width and length the beak, the length of culmen, collar, tarsus, stretched and folded wing, the wingspan and finally the fifth remix. We made our measurements on the 50 captured birds before releasing them. Of those 50 specimen, 02 were pre-adults (an urban and a suburban one), and 48 adults (25 in the urban area and 23 in the suburban site). Based on morphometric parameters, comparing averages shows significant differences between the two environments regarding the tarsus, the height and length of the beak in favour of the urban site and 5th remix, wingspan, collar, stretched and folded wing in favour of the suburban site. The PCA, gives us two distinct groups, representing the adult urban site on one side, supported by the characteristics of the beak, and, on the other side, the group of the suburban birds, grouped around the other characteristics, especially the wings' ones. So the differences between urban and suburban areas make that populations that colonize the two environments are different.

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Why the bill lengths of females is longer than those of males in Great Tits *Parus major* in Turkey: A preliminary study

Abstract

We studied the bill length of Great tits *Parus major* by capturing 58 individuals using mist nets in seven different areas in Turkey during the breeding season from 2005 to 2014. Eleven different morphometric characters were measured. Although bill length, wing length, 8th primaries and tail length of male and female were found significantly differentiation (*t*-test; $p<0.01$), morphometric characters were not significantly different among sites (ANOVA; $p<0.01$). Regression analysis was used to determine the relation between bill length and the other variables. Though bill height at nostril, length of nostril, alula, 8th primaries were negatively effected with the bill length of female, they were positively affected in male. Besides the wing of female and male were positively and negatively affected with the bill length, respectively. In addition, latitude, length of bill apex to head back, tarsus, tail length were positively and body mass were negatively affected with the bill length of both sex. This study was supported by TUBITAK.

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Group 7: Conservation

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Biodiversity of birds of prey in the tundra of Nenets autonomous district of Arkhangelskaya, Russia

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Abstract

Study on biodiversity and territorial distribution of order Falconiformes were conducted from 1973 to 2014 in East-European tundra of Russia (Malozemelskaya, Bolshezemelskaya tundra and Yugorskij peninsula). On the surveyed area collected information about type staying of genuses like: *Pernis* (1 species), *Milvus* (1 species), *Circus* (4 species), *Accipiter* (2 species), *Buteo* (2 species), *Aquila* (1 species), *Haliaeetus* (1 species), *Gyps* (1 species) and *Falco* (6 species). Determined authentic breeding of 9 species, hypothetically breed 3 species, other birds of prey fly into tundra zone regularly or occasionally. Birds of prey unevenly distributed throughout the study area. In Malozemelskaya tundra registered 17 birds of prey species, from which breed authentically: Northern Goshawk (meetings of young of first year), Rough-legged Buzzard, White-tailed Eagle, Gyrfalcon, Peregrine and Merlin. Hypothetically breed Hen Harrier, Buzzard and Golden Eagle. To the category of passage birds belongs: Honey Buzzard, Pallid Harrier, Monatgu's Harrier, Marsh harrier, Sparrow Hawk, Eurasian Hobby, Red-footed Falcon and Common Kestrel. Of the 17 species of birds of prey in Bolshezemelskaya tundra breed: Hen Harrier, Pallid Harrier, Northern Goshawk, Rough-legged Buzzard, Golden Eagle, White-tailed Eagle, Gyrfalcon, Peregrine, Merlin and Common Kestrel. Rare occasional species include Black kite, Monatgu's Harrier, Sparrow Hawk, Buzzard, Griffon Vulture, Eurasian Hobby and Red-footed Falcon. On the Yugorskij peninsula breed: Rough-legged Buzzard, Golden Eagle, White-tailed Eagle, Gyrfalcon, Peregrine, Merlin, and possibly, Hen Harrier. Were marked occasional flights of Pallid Harrier.

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Identifying potentially suitable nesting sites for Common Cranes *Grus grus* in the Upper Don River basin

Abstract

Identification of nesting sites is the essential part of the conservation strategy for common cranes (*Grus grus*) in the Upper Don River basin. Such identification has been conducted here using GIS and remote sensing data. The input of the developed GIS-model includes occurrence data of the species and predictor layers. The occurrence data are the coordinates of 29 known nesting sites in the region. The predictors are multispectral Landsat ETM+ coverage, SRTM-based elevation model, forestry and topographical maps. Using these data some statistically and ecologically significant characteristics of a potentially suitable nesting site location have been computed. Thus, the spectral reflectance of the sites has been identified on the base of Landsat coverage. The acceptable elevation (96-143 m) and slope (0-5 degree) ranges have been obtained from the DEM. Proximity analysis provided values of minimum distances to some nearest objects such as alder forests (0 km), wetlands (0,6 km), meadows (1,6 km), roads (0,2 km) and settlements (0,6 km). Given characteristics allow calculating the potentially suitable nesting sites of the common cranes. As the result the model has identified 59 such sites (the overall area is 30,9 km and individuals are 20-225 ha) across the study region.

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Anthropogenic influence on birds of steppe zonobiom (complex forest-steppe and steppe) south-western part of Western Siberia and Northern Kazakhstan

Abstract

Our research based on study of the avifauna and ornithocomplexes in the south-western part of forest-steppe and northern steppe of Western Siberia and Northern Kazakhstan from 1974 to the present time.. Species richness of bird decreased from forest-field and meadow-steppe landscapes to lakes, lowland bog, forest-steppe and steppe, meadow-field, ruderal parts and rivers. It connected with the simplification tiered structure phytocoenosis and decreased heterogeneous of habitats. It determined by the food value significance and the accumulation of important habitats or avoidance of one or other species, including those due to indirect human impact on the territory or direct persecution. On the one hand it enriched at the expense of new species, habitats which are located to the south (Dalmatian pelican, Cormorant). On the other hand there is a change the number of "native" species in two diametrical directions: increase in density synanthropic species and decrease waterfowl and birds of prey. Ornithocomplexes presented spatially organizational and structural complex with defining heterogeneity similar natural and anthropogenic factors and laws referred to zonobiom. Change of steppe birds community forest-steppe ornithocomplexes happens far to the North in analogy of change landscapes, that we see like the adaptation of birds for create huge agriculture territories.

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Conservation measures for Eleonora's Falcon *Falco eleonorae* in Greece, the LIFE project

Abstract

Eleonora's Falcons are one the most important bird species in Greece since the country and particularly the islands of the Aegean Sea host >80% of their global breeding population. Being a migratory raptor, their populations are highly dependent on the quality of the breeding and wintering habitats, as well as on food availability and quality (i.e., insects and passerines). Thus, the species has been the focus of various conservation schemes over the past 10 years, mainly in the framework of LIFE projects, which have introduced cost-effective, targeted methods in the species' management in Greece. Given the migratory nature of the species, and thus the implications of carry-over effects, as well as the likely impact of ongoing climate change directly to the species breeding performance and indirectly via its prey availability, a new LIFE project (LIFE ElClimA, LIFE13 NAT/GR/000909) began last summer to address these threats in the most important colonies of the species in the Aegean Sea exploiting the technical know-how and theoretical background gained through previous projects. Here, we present the outline of the LIFE ElClimA project and focus on the results furnished by the implementation of similar concrete conservation actions in previous projects.

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Heavy metals in the egg shells of Montagu's harriers *Circus pygargus* in industrial and agricultural habitats

Abstract
In the 1980s Montagu's harriers breeding in Poland started changing their nesting habitat from natural peat bogs or marshes to crop fields. The polish population of the Montagu's harrier was growing rapidly in this habitat. This was forced by changes in their traditional breeding habitat and a rapid increase of predation pressure in the breeding areas. One of the reason these changes was the difference in the breeding success. It is possible that low reproductive output is consequence of higher level of heavy metals in breeding harrier's areas. The environment polluted by heavy metals (Hg, Cr, Ni, As, Cod, Pb) can influence the number of addled eggs and hatching success of harriers. Our research was carried out in natural habitat of the Montagu's Harrier near cement plant in Chełm and the crop's population in South Podlasie in eastern Poland. The preliminary results indicate that mean level of heavy metals in eggs shells of Montagu's harrier from calcareous peat bogs near Chełm in eastern Poland (Hg=0,04 mg/kg, Cr=0,44 mg/kg, Ni=0,45mg/kg) was higher than at the crop fields in South Podlasie region (Hg= 0,008mg/kg, Cr=0,28mg/kg, Ni=0,13mg/kg). These differences were statistically significant (Hg: Mann Whitney test z=2,75, n=46, p=0,005; Cr: Mann Whitney test z=3,89, n=45, p=0009; Ni: z=4,75, n=45, p= 0,00002). The reason for these differences may be the proximity to the cement plant in Chełm. Only arsenic (As) was detected in the higher level at the crops (0,08mg/kg) in comparison with natural habitats near Chełm (0,03mg/kg). This difference was significant too (Mann-Whitney test z= -5,03, n=45, p=0,00001). The levels of cadmium and lead were similar in both habitats. The breeding success of Montagu's harrier was significantly higher in the crops of South Podlasie than in Chełm marshes (Krupiński et al 2012, Wiącek 2007, Wiacek 2015 in press). The higher level of heavy metals (Hg, Cr, Ni) in egg shells from Chełm can be a reason of higher number of addled eggs and lower hutched success in this population of the Montagu's harrier. The environmental pollution can be one of the reason of population decline and changing the nesting habitat by Montagu's harrier from calcareous peat bogs near Chełm. This study will be continued in next seasons.

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The importance of Nanpu saltpans in the Yellow Sea for migratory waterbirds along the East Asian-Austral

Abstract
The natural coastal wetlands of East Asian-Australasian Flyway are disappearing at alarming rates, now leading to steep declines in this most species-rich water bird flyway in the world. The anthropogenic wetlands that sometimes replace the natural wetlands may buffer what otherwise would be more rapid losses. Among the largest (300 km2) saltpan complex in the world, the Nanpu saltpans on the northern shore of Bohai Bay, Yellow Sea, China, created from 1956, host many migrating water birds. To assess the importance and role of the Nanpu saltpans, we surveyed water birds in both the saltpans (from May 2013 to October 2014, 40-44 km2) and the remaining adjacent natural intertidal mudflats (from April to October 2014, 46-57 km2). Of the 85 waterbird species, in 22 maximum numbers exceeded the 1% threshold known flyway populations, including Curlew Sandpiper *Calidris ferruginea* (46%) and Red Knot *Calidris canutus piersmai* (42%). The maximum numbers of water birds in spring and autumn in saltpans were 96,000 and 105,000, respectively, while on mudflats the numbers were 73,000 and 20,000. Excluding the use of high-tide roosting ponds near the mudflats, water birds used the saltpans mainly for feeding (84%) and roosting (16%, average percentage of 15 dominant species in saltpans). There were no differences between the numbers and densities of water birds in the two habitats in spring; but the numbers and densities in the saltpans were higher in autumn. Species including Black-tailed Godwit *Limosa limosa,* Pied Avocet *Recurvirostra avosetta*, and Black-winged Stilt *Himantopus himantopus* almost only occurred in saltpans, whereas Red Knot and Great Knot Calidris tenuirostris preferred to feed on mudflats. The Nanpu saltpans is an important staging area for water birds in the East Asian-Australasian Flyway and warrants protected status.

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Using Unmanned Aerial Vehicles (UAV's) to evaluate the nesting status of a canopy breeding species

Abstract
Remotely controlled, unmanned aerial vehicles (UAVs) promise to be of high potential for a variety of applications in ecological and behavioural research. Off-the-shelf solutions have recently become available for civil use at steeply decreasing costs. In this study, we explored the utility of an UAV equipped with an on-board camera (14 Megapixel photo and 1920 ? 1080 pixel video resolution) in assessing the breeding status, offspring number and age of a canopy-breeding bird species, the hooded crow *Corvus [corone] cornix*. We further quantified performance and potential time savings using the UAV versus inspection with alternative approaches (optical instruments, camera on a telescopic rod, tree climbing). Nesting status, number and approximate age of nestlings could be assessed with good success in all 24 attempts using the UAV. Eighty-five percent of the time required for inspection by climbing could be saved. Disturbance was moderate and lower than caused by climbing or using a camera on a telescopic rod. Additionally, UAV usage avoided tree damage and circumvented health risks associated with tree-climbing.

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The limits of human disturbance on avian species diversity and abundance: could water depth and perceived risk explain the evidence?

Abstract

Over the last decade many studies have shown that, during nonbreeding season, birds respond to human activities according to the starvation-predation risk trade-off, thus balancing the effects of human disturbances on birds' spatial ecology. Here, we investigated species diversity and changes in bird abundance according to 3 habitat categories: disturbed (D), undisturbed (R) (leisure activities are at least 150m far from water pond border) and partially disturbed (PD) water ponds (leisure activities take place next to the pond but not on it). About 1.2 million birds of 80 species were exhaustively counted on 56 water ponds over 3 years throughout hunting (October-January) and non-hunting (February and March) periods. Accounting for the effects of water pond areas and maximal water depth (covariables), the abundance of quarry species changed with the disturbance level ($p<0.05$) during both periods, most birds being counted in PD areas with no difference between R and D sites. Conversely, abundance of protected species was not affected by disturbance level whatever the periods. Species diversity (Shannon index) was highest in the PD area ($p<0.05$). To conclude, protected and quarry species show a different perceived risk to disturbance. Water pond area and water depth have to be consider when investigating the effect of disturbance on wetland use.

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Are oil spills explaining background levels of PAHs in a coastal bird?

Abstract
Polycyclic aromatic hydrocarbons (PAHs) are one of the most important types of persistent pollutants. They are spread globally, from inland lakes and urban rivers to the open ocean, over a wide range of concentrations. Marine and coastal birds are especially sensitive to PAH pollution, mainly due to their exposure to marine oil spills. On 13 November 2002, the hull of the Prestige oil tanker wrecked near the A Coruña coastline (NW Iberia) and about 63 000 t of heavy oil were released into the marine environment. Here we examine PAH levels in eggs of Kentish plover (*Charadrius alexandrinus*) collected in beaches of Galicia and North Portugal from 2004 to 2010. The objective was to track temporal variation and elucidate main contamination sources. The occurrence of PAHs in eggs was extensive. Levels decreased from 2004 to 2006 but strongly increase and showed a different pattern of PAH accumulation in 2007, probably related with tetra- and pentacyclic compounds from forest fires that occurred during summer 2006. Between 2007-2010 a new decreased was observed until values under the ones registered in 2004. More work on this subject is planned for the future, in order to expand this temporal series.

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Assessing predation rates of alpine grassland birds using an artificial nest experiment

Abstract
Ground nesting birds of alpine grasslands are threatened by climate change in many ways. One is the advancement of treelines, resulting in a loss of suitable nesting habitats. Several alpine grassland birds avoid the proximity of the treeline, which could be related to predation pressure if forests are reservoirs for predators. We tried to estimate nest predation rates in relation to the distance from the treeline and other habitat variables through a field experiment using artificial nests, which included both quail eggs and plasticine eggs (for predator identification). Our results showed no relationship between predation and treeline distance nor altitude. However, there was evidence to suggest that nest micro-habitat influenced predation rate. Importantly, there was a difference between 'real' and plasticine eggs, the latter having significantly higher predation rates early in the season. These results show that micro-habitat structure may be important for predation of ground nesting birds. The experiment also highlights potential seasonal biases in using plasticine eggs to identify predators.

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Important wintering habitats and areas for Iberian and European Rollers *Coracias garrulus* in southern Africa

Abstract
European Rollers *Coracias garrulus* are near-threatened long-distance migrants experiencing a global decline, which has been attributed to the degradation of open agricultural habitats in which rollers breed. However, conservation threats in non-breeding areas remain largely unstudied. Here we used ecological niche models to characterise suitable wintering areas for European rollers in Southern Africa and identify potential threats there. Location data from open-access databases and bird atlases allowed a characterization of wintering areas for the overall breeding population, while data from satellite-tracked birds breeding in Spain allowed the characterization of wintering areas of the westernmost Iberian population. Spanish Rollers occupied a relatively narrow wintering area in the north western part of the global wintering range. The most important habitat variables determining wintering areas were distance to roads and tree cover for Iberian birds, and tree and herbaceous cover for the overall population. Wintering habitats used by Iberian rollers differed from those characterizing the overall wintering range, suggesting that birds from different breeding populations may winter in separate areas. Suitable areas for Iberian rollers were reasonably included within current protected areas in southern Africa, more than for the global population. However, suitable wintering areas overlapped with degraded areas more than expected by chance.

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Tracking Marsh Harriers *Circus aeruginosus* in a highly agricultural landscape

Abstract

In 2013 and 2014 we tracked two male Marsh Harriers *Circus aeruginosus* in order to study home ranges and habitat use in time and space at a daily scale during the breeding season. The study area is located in the north eastern part of Eastern Flanders province, Flanders, Belgium (lat 51.28, lon3.59). Habitat types in this flat and open polder landscape are crop fields (e.g. cereals, potatoes, beetroots, maize, onions), grassland, grassy ditch edges and dykes. We fitted the birds with Uva-Bits GPS loggers, small solar-powered tracking devices which store accurate positions at pre-programmed time intervals; first every 5 minutes, followed by a period of higher resolution data every 3 minutes during the young and fledging phase, and an even higher resolution in periods of favourable, sunny weather. We analyse the hunting habitat selection in relation to the different stages in the breeding cycle (e.g. female on eggs, small, larger and fledged young) and the availability of the crops in relation to harvesting. Various methods for assessing the home-range will be tested and compared. Our study is part of a larger project on the ecology of the species which results could provide important guidelines for conservation management.

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Can quarries provide novel habitat conditions for a rocky bird species?

Abstract
Quarries are accounted as ecologically degraded sites as consequence of industrial mineral extraction. However, quarry landform can provide suitable artificial conditions for rocky species. This study aims to evaluate if the existence of quarries is potentiating Black redstarts (*Phoenicurus ochruros*) occurrence. Our results intend to explore other facets of quarry restoration that can complement classic practices. The study took place in central-west Portugal on two cement plants and adjacent areas. We carried out 21 transects between January and June 2012. Territory mapping was made upon the location of male Black redstart's observations. We tested territory placement accounting for five variables: mean slope, forest and quarry percentage cover, number of habitats and built-up area. Data was analysed with Generalized Linear Models following the Information Theoretic Approach. A total of 25 Black redstarts' territories were identified in quarries (n=13), urban (n=11) and forest areas (n=1). Results show that Black redstarts select quarries to place their territories especially when their presence is constrained by unsuitable surrounding forest habitats. Quarries can endow landscape of novel elements, e.g. steep slopes, which benefit Black redstarts' occurrence. Thus, these novel elements should be accounted for when planning restoration practices either for specific conservation goals or to enhance local biodiversity.

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International importance of Extremadura for global endangered bird populations

Abstract
Most of the recent assessment of the status and trends of the European bird species confirm that many of them are in an unfavorable conservation status. Part of them are considered to be of global conservation concern and are listed as Threatened or Near-Threatened on the IUCN Red List. Extremadura, Spain, is a biodiversity hotspot inside Europe and it is an international important area for breeding and wintering bird populations, including 8 globally threatened or near threatened species: Cinereus Vulture (*Aegypius monachus*), Spanish Imperial Eagle (*Aquila adalberti*), European Roller (*Coracias garrulus*), Black-Tailed Godwit (*Limosa limosa*), Red Kite (*Milvus milvus*), Egyptian vulture (*Neophron percnopterus*), Great Bustard (*Otis tarda*) and Little Bustard (*Tetrax tetrax*). Here we showed a status update on these species in Extremadura. Today Extremadura is an Area of International Importance for most of this global endangered species. Thus, Extremadura holds more than 10% of the global breeding population of Cinereus vulture and Spanish Imperial Eagle, 14% of the Western European population of Black-tailed Godwit and a stable population of the declining Egyptian vulture (almost 5% of the European breeding population).

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Conservation Tools in Spain: Red Natura 2000 against power lines effects on birds

Abstract
Red Natura 2000 is an ecological network which involves the main biodiversity conservation areas in Europe. The target of this net is the long-term survival of the different species and habitats around Europe, stopping the biodiversity destruction. At the same time power lines are used by birds for nesting or as perches, but most of the time this relationship is negative because birds usually crash against power lines or they get electrocuted. For these reasons birds' mortality by power lines is one of the main issues of the species conservation. Therefore it is worth to be sure that the conservation tools are being successfully used against these kind of problems. According to this and using the OEM ringing data base we compared the number of ringed dead birds which have been found inside and outside the protecting areas since the first ZEPA started to work in Spain in 1987 until 2007. The purpose was to observe the efficiency of Red Natura 2000 as a conservation tool. In conclusion, we have checked there have been more deaths outside the protecting areas than inside.

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Birdsong and anthropogenic noise: robins choose high song posts by roadsides

Abstract

The ubiquity of man-made noise nowadays is one of the most serious problems that animals living in close contact with humans have to contend with, as it interferes with the transmission of information encoded in sound signals sent from emitter to receiver. The complex acoustic communication systems of birds expose them in particular to such negative interactions. This research analyses the selectivity of song posts of the European robin *Erithacus rubecula* with respect to a number of habitat parameters and the amplitudinal intensity of traffic noise. The study was carried out in ten forest complexes directly adjacent to different national roads in eastern Poland. The analysis showed that the only parameters significantly correlated with the song perch height were the level of traffic noise and tree height. In breeding territories subject to high amplitudes of noise males sang from posts located higher above the ground. Very likely, the choice of song posts situated higher up in the vegetation improves the robins' auditory perception of neighbouring rivals in an environment polluted by excessive noise levels. The differences in selectivity of song post location between areas with high and low intensities of noise may have serious adaptive consequences for the individuals concerned.

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Local topography drives woodland bird richness and abundance responses to increasing aridity in southern Europe

Abstract
The increasing frequency of drought spells in southern Europe has been associated with reduced growth and increased defoliation and mortality of several tree species. However, topographic variation and associated microclimates may buffer against negative effects of drought at a local level. We aimed to evaluate the influence of topographic variation on woodland structure and bird assemblages and their preferred food resources along an aridity gradient. We quantified cork oak woodland structure, bird species richness and abundance and caterpillar biomass on north- and south-facing slopes along an aridity gradient across the Iberian Peninsula. Drier microclimates on south-facing slopes had lower tree cover and bird richness and abundance than north-facing slopes, and the magnitude of these differences increased markedly from wetter (~5-15% lower on south-facing slopes) to drier regions (~50-60% lower). This reduction is likely a response to lower tree cover and resource availability, as caterpillar abundance was also ~50% lower on south-facing slopes. The topographic complexity of the Mediterranean Basin seems to be shaping community-level and trophic chain responses to increasing aridity in Southern Europe, and suggests that topographic and microclimatic conditions on north-facing slopes can potentially act as refugia for the high biodiversity characteristic of cork oak woodlands.

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Reversing population declines in Afro-Palaearctic migratory birds

Abstract
Across Europe, many Afro-Palaearctic migratory bird populations are declining severely. As declines are particularly apparent in species travelling to the humid tropics of Africa, attention has focused on identifying threats operating during the non-breeding season. However, substantial within-species variation in population trends across breeding ranges suggests that breeding ground processes could also be involved. In order to develop appropriate conservation actions there is therefore an urgent need to quantify (a) the contribution of key demographic processes to these population trends and (b) the magnitude and type of demographic change needed to reverse the declines. To address this issue, we construct integrated population models (IPM) for a long-distance migrant, the Willow Warbler, *Phylloscopus trochilus*, that is currently declining severely in the south-east of the UK but stable or increasing in the north-west. We use these models to identify the demographic drivers of population trends in both regions and to quantify the magnitude of change in survival and productivity needed to drive population recovery in the north-west. We then explore regional variation in demographic rates exist across other migrant species and quantify the degree to which each demographic rate would have to be improved to reverse current population declines in these species.

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Long-term declines of alpine birds in a central European mountain range

Abstract
Montane birds are recently exposed to strong environmental changes, which are predicted to cause extinctions of many species confined to mountain tops during forthcoming decades. However, the data enabling to test actual population consequences of these changes are scarce. Here we calculated population trends of 50 montane bird species between 1984 and 2011 using data from a central European mountain range, the Krkonoše Mountains National Park. The steepest declines were observed in species breeding in alpine habitats, while the populations of forest species increased. The other traits of the focal species such as life history or migration strategy were not related to their population trends. Moreover, many species shifted their altitudinal distribution upwards with the largest shifts observed in the declining species breeding in open habitats. These patterns can be explained by two processes: forest recovery since 1990s due to the cease of acidification and long-term climatic changes accompanied with increasing temperatures. Although these two processes may have synergistic impacts, they require different strategies for bird conservation. Whereas forest recovery is beneficial for montane ecosystem and supported by local conservationists, climate change cannot be effectively mitigated locally, but other threats for alpine species (such as tourism) can be managed.

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A multi-scale approach to linking land use changes and population trends in threatened bird species

Abstract
European bird species associated with low-intensity farmland habitats are in decline. One such species is the globally threatened European roller *Coracias garrulus*. The Mediterranean island of Cyprus supports one of the largest remaining, stable, European populations. Nevertheless, road transects undertaken between 2003 and 2011 indicated a recent sharp population decline. It is important to understand which factors drive the distribution of the species on the island and to provide conservation practitioners with robust tools to monitor and safeguard this important population. We provide roller population estimates at district and national scales, identify key habitat types, and investigate the rate of historic habitat loss and occupancy using a national-scale habitat suitability map (HSM). Roller population densities were calculated using road transect data and the Corine Land Cover (CLC) 2006 dataset, before being extrapolated across the entire island. Key habitat types were identified and their loss across Cyprus between 2000 and 2006 quantified. These habitats were incorporated within a habitat suitability model for the species, using road transect presence/absence data. The resulting HSM allows the loss of 'high potential' habitat to be quantified and overlaid upon the Important Bird Areas designated for the species, providing guidance on additional areas to target for roller conservation.

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Evaluating the performance of the Special Protection Areas within the European Union and identifying key sites for expansion

Abstract
Protected areas represent one of the main tools for tackling the current biodiversity crisis. Among all continents, Europe enjoys one of the most extensive networks of protected areas, whereby traditional parks and reserves have been complemented by the Natura 2000 sites. Natura 2000 is a network of sites in the European Union (EU) designated for protecting selected habitats and species listed in the 1992 Habitats Directive and the 1979 Birds Directive. The Birds Directive is enforced through the institution of Special Protected Areas (SPAs). In many cases, Important Bird and Biodiversity Areas (IBAs) identified by BirdLife International have been used as a base for selecting SPAs. Here we use an ad hoc spatial conservation planning tool in order to evaluate the performance of IBAs and SPAs in covering birds and other vertebrate ranges within EU. Further, we identify important areas for the expansion of IBAs and SPAs that are still unprotected within the EU. Preliminary results suggest that IBAs and SPAs provide a good coverage to birds in particular, but also to all vertebrates, and that several areas with high potential for expanding the SPA network exist within the EU.

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Changes in occurrence and distribution of diurnal raptors associated to land use changes in North West Spain

Abstract
Land use and land cover changes (LULCC) are one of the main drivers affecting landscapes and biodiversity in Europe. This study addresses the LULCC in Ourense province (Galicia, NW Spain) and their effects on occurrence and distribution of diurnal raptors over the last 13-year period. We combined a LULCC analysis from remotely sensed data-derived maps with raptor data from road censuses from 2001 and 2014 at 10-km square scale through a coinertia analysis. High-resolution species distribution models were performed from all the contacts obtained within each 10-km square to analyse the spatio-temporal dynamics of raptor community at finer scale. Our results suggest an increase in occurrence and distribution of forest raptors species coupled with a strong decrease of species associated to open habitats. The forest management policies recently implemented in Galicia, together with the abandonment of the traditional land management practices, could be behind the declining trend observed for some species. Monitoring of endangered species has been proved to be an essential tool to address the evolution of such species and to control further environmental degradation. Forest management practices should be explicitly included into conservation plans to effectively protect threatened species and accomplish with the current environmental legislation.

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Past, present and future: how land-use change affects the common bird

Abstract
Land-use change is the main driver of habitat loss, one of the greatest threats against biodiversity. To understand what determines biodiversity patterns in the landscape is to accurately describe the best indicator of species richness, the common species. In northern Europe, the most common bird species are willow warblers (*Phylloscopus trochilus*) and chaffinches (*Fringilla coelebs*). In this study we have utilized the uniquely old and detailed national maps in Sweden to show how land-use change has altered the commonness of these two birds through time. The occurrence of the birds was first measured in 7 different habitats. Then the coverage of the habitats within in a 165200ha transect of middle Sweden was derived from maps in 1901 and 2012. The results show that the landscape is less heterogenic ($p=<0.001$) today than 110 years ago and that this, in addition with transition from grazed woodlands to high-stem coniferous forest, has greatly disfavoured the willow warbler but affected the chaffinch little. The present status of the species corroborates these findings. Common species are more easily monitored, thus good indicators in schemes to improve biodiversity, but their commonness can also hide extreme declines, and the case of the willow warbler highlights these contrasts.

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Avian-wildlife conflict: a modelling approach

Abstract

Avian-human conflict is an issue of growing concern globally, yet little is known about how humans influence the patterns of movement, space-use, and behaviour of wild, free-ranging birds. These changes in movement behaviour often lead to persistent conflicts with humans causing population decline. Keas (*Nestor notabilis*) are an endangered parrot who are suffering ongoing population decline due, in large part, to conflicts with humans. We used precision GPS telemetry to track the movements of kea near Arthur's Pass Village, New Zealand. We then applied a switching Hidden Markov Monte Carlo model and spatial point-pattern analyses to assess how patterns of kea behaviour varied in relation to the proximity of anthropogenic landscape features. Preliminary findings show that the kea's rate of behavioural change was lower in human areas, likely signifying the higher concentration of food resources and play objects. Keas were attracted to these resources which greatly increase their chances of human-induced mortality, particularly by being hit by cars. Our study provides an unprecedented look at the movement and space-use patterns of free-ranging birds in areas of high human activity, and provides information that may be critical for informing management of avian species in human-dominated habitats.

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The role of habitat, surroundings and connectivity of urban green spaces for birds

Abstract
Urbanization is one of the fastest growing types of land use and is expected to continue rising even in developed countries. As cities become denser, urban green spaces remain as sole refuges for many species. However, little is known about the relative importance of local habitat characteristics and surrounding landscape especially for small green spaces and whether these spaces facilitate species movement. We evaluated the influence of local and landscape characteristics of urban green spaces on bird communities and assessed whether these spaces constitute a network that would enable songbirds to move between remaining habitats. Fixed-radius point counts were performed at 85 sites in small and large parks and residential yards across the city of Vienna, Austria. Foliage-height profiles at 20 m-radius buffer and landscape structure at 300 m-radius buffer were determined. We found 54 bird species in which the most common were *Parus major*, *Corvus corone*, *Turdus merula* and *Sylvia atricapilla*. Both local and landscape characteristic were significant predictors of species diversity and there was low connectivity when considering a threshold distance of 1500 m, suggesting that management efforts should consider complex vegetation structure, maintain or increase amount of vegetation around green spaces and increase connectivity levels.

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Possibilities of using thermal imaging in detection of nests of ground-nesting birds on farmland

Abstract
The decline of European farmland birds is primarily attributed to deterioration of foraging and breeding habitat through agricultural intensification. Hence, the most effective proven conservation measures in intensively farmed areas aim to improve a birds' reproductive performance. Recent shifts towards precision agriculture, heavily based on novel technologies, also presents possibilities to integrate detection systems into farming that allow avoidance of wildlife collisions on farmland. Unfortunately there is a lack of studies that test the effectiveness of technologies, such as thermal imaging that could detect wildlife on farmland, which can benefit the environment and farmers alike. In the presented study we investigate the effectiveness of thermal imaging in detecting nests of ground-breeding birds on agricultural substrates in Southern Finland. We run multiple trials with a thermal camera recording images of plots with artificially created nests, closely mimicking the thermal profile of real nests. The trials take place under varying weather conditions, varying field substrates and use nests with eggs of two different sizes. The main aim is to quantify detection probability of ground nests using thermal imaging and to identify the range of conditions and factors affecting detection. Finally we discuss implications of the results and possible future directions for study.

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Contrasting trends in the bird populations of North European peatlands

Abstract

Climate change is posing a threat to biodiversity, forcing it to adapt through shifts in species' distributions and thus altering their abundances. As a further complication, degradation, destruction and fragmentation of natural habitats are clearly increasing the vulnerability of species worldwide. In this work we investigate the status of NE peatland birds using geometric means of common species' population indices. We analyse the state of the NE peatland bird populations in three different areas: Finland, Scandinavia (Sweden and Norway) and the Baltic region (Estonia and Latvia). While the Finnish populations have declined ca 30% over three decades, the Scandinavian ones have remained stable during the last 20 years. On the other hand, the Baltic populations show moderate increases, providing a contrast with the Finnish populations. We relate these results with the country-specific historical management of these particular ecosystems, therefore gaining insight into the target habitats that are more conductive to biodiversity. Additionally, we explore the effects of climate change by means of community climatic indices. Our findings call for more effective conservation actions in NE peatland habitats and a deep reconsideration of the current management schemes, particularly in Finland, where the studied populations show the poorest conservation status.

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Long-term distribution dynamics in Swiss birds

Abstract
A good knowledge of species distribution dynamics is fundamental in order to study many ecological processes and also to evaluate the conservation status of bird species. In our study we combine different datasets (two breeding bird atlases and common breeding bird surveys) using a single modelling framework to study the distribution dynamics of Swiss breeding birds during the last 30 years in the whole country. We use dynamic site occupancy models (MacKenzie et al., Ecology, 2003) which allow us to explicitly model occurrence as a function of colonization and persistence, while accounting for presence/absence measurement error (i.e., imperfect detection). We use climatic covariates to model the colonization and persistence probabilities to investigate possible effects of climate change. For example, we expect a positive relationship between colonization and temperature for species which are currently increasing the elevation range in which they occur. Site occupancy models also provide an explicit way of modelling the observation process. This allows us to account for the differences in the sampling protocols and in the observation intensity during the whole study period.

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Breeding success and timing of breeding of upland ground-nesting birds in Dartmoor National Park, UK

Abstract
Upland birds are threatened by many factors and species such as Meadow pipits (*Anthus pratensis)* and Whinchats (*Saxicola rubetra*) have shown population declines in recent decades. In order to implement appropriate conservation interventions and prevent future losses, a thorough understanding of key demographic rates and factors affecting breeding success is required. In a long-term study we focus on the timing of breeding and breeding success in Meadow pipits, Stonechats (*Saxicola rubicola*) and Whinchats at an 2km2 upland moorland study site in Dartmoor National Park, England. Nest data for a total of 705 nests were collected over seven breeding seasons. We studied differences in timing of breeding and breeding success between species and between years. Onset of breeding, the peak of the breeding season and length of breeding seasons were found to show small variability in all three species. Breeding success was relatively stable between years. Additionally, we explored the effect of weather variables during breeding on breeding outcome. Results were variable, but our findings seem to suggest weather conditions during the nesting period had only minor or no effect on breeding outcome.

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Mapping the Conflict between Raptor Conservation and Recreational Shooting in the Batumi Bottleneck

Abstract

Every autumn more than one million birds of prey funnel between the eastern coast of the Black Sea and the foothills of the Lesser Caucasus in the Republic of Georgia. This spectacle attracts not only bird watchers and ornithologists from all around the world, but also local people with shotguns. The tradition of autumn hunting of raptors—which is illegal according to the relevant international and national legislation, but enforcement is practically non-existent—has long been a widespread practice in the region. Despite its prevalence, there have been few studies on the scale, impacts and drivers of the shooting, and our understanding of its role as a social activity is still limited. According to previous studies, the range of estimated casualties is very large (from 1,500 up to 18,000 individuals per year), and an increase in the number of shots recorded at the migration count stations likely indicates a growing hunting pressure. Local and international NGOs monitoring migration and hunting activities have recently become increasingly present in the region, and a growing number of foreign people are visiting these villages every autumn to enjoy the phenomena of the migration, which forecasts a potential conflict between conservationists, governmental bodies, and local people. As a first step towards a mutually acceptable resolution, the present paper explores this emerging conflict through the identification of the affected stakeholders and the mapping of their values, positions and goals associated with the raptor migration in the bottleneck.

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Factors responsible of birds' sensitivity to plant invasions: a case study from the city of Prague

Abstract

Urban habitats are often dominated by non-native trees, but our understanding of their impacts on birds remains limited. We investigated such impacts by comparing the stands of non-native *Robinia pseudoacacia* and *Pinus nigra*, with the stands of native *Quercus sp.* and *Pinus sylvestris*. No reduction of bird species richness in the stands of invasive trees was found. Instead, the stands of the invasive *R. pseudoacacia* were dominated by habitat generalist birds, while habitat specialists were confined to the stands of native *Quercus sp.* Habitat generalists probably benefited from a dense shrub layer in the stands of invasive trees, which was much reduced in the stands of native trees. By contrast, native tree stands most likely provided richer food supply for birds via higher insect biomass and diversity than that found in the invasive tree stands. We suggest that habitat specialists might thus lack some key food resources in the stands of invasive trees. Plant invasions thus may not always reduce bird species richness, but can significantly alter species composition of bird communities at the expense of ecological specialists. To prevent such adverse impacts, we urge to plant only native tree species in European cities wherever possible.

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Potential Threats to the Barn Owl (*Tyto alba*) in Yogyakarta Province, Indonesia

Abstract
In Indonesia, especially in Yogyakarta Province, it has become difficult to find the Barn Owl (*Tyto alba*) living among humans. The species play an important role in ecosystems by controlling populations of rats, which are an agricultural pest and vectors of leptospirosis epidemic. In urban areas, the Barn Owl occupies cavities in buildings. But unfortunately, its ecological roles are not well understood. Consequently, people hunt the birds and renovate existing buildings regardless of their presence in the building. This research focused on the characteristic of the species, behaviour, and the impact of the renovation on their lifecycle. Method used during this research were direct observation, literature search and interviews. I found that: 1) Barn Owls build their nests in broken ceiling, 2) the birds choose strategic places to choose nest, 3) renovation negatively impacts the species and could potentially affect its population, and 4) from our interviews, most people (60%) are not aware of the importance of their ecological roles. Nest-boxes can be a solution to this problem. Hence, we conducted a workshop for farmers in Yogyakarta Province to demonstrate how to prepare and set up nest-boxes.

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The effects of vineyard organic farming on birds: a population and community ecology study

Abstract

Farming systems and management regimes of vineyards may affect local biodiversity of plants, invertebrates and vertebrates through the use of chemicals and a reduction of habitat and landscape diversification. With this contribution, we present the results of a five-year study (2008-2012) conducted in an area of north-western Italy where viticulture is the dominant agricultural practice. The study, aimed at comparing conventional and organic farming systems, was conducted both at the population (nest boxes equipped with cameras and radio tracking of great tits *Parus major*) and at the community (censuses through linear transects) levels. Feeding behaviour and habitat use by breeding great tits showed that, regardless of the farming system, birds did not commonly use vineyards to search for food, spending most of the time in the surrounding wooded areas. Plots in and close to organic vineyards housed larger numbers of SPEC species and had higher diversity indices than those around conventional vineyards. The results suggest that organic farming systems, along with the associated landscape heterogeneity induced by the management regime, provide key criteria for hosting a well-structured bird community and benefitting species such as woodlark (*Lullula arborea*), wryneck (*Jynx torqilla*) and redstart (*Phoenicurus phoenicurus*).

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Habitat fragmentation influences nestling growth in Mediterranean Blue Tits and Great Tits

Abstract
In patchy forestry areas, the size of the forest patch where birds breed is a main issue that influences their breeding success. However, the proximate effects underlying the failure in breeding success in small patches remains unclear, and a shortage of food in those patches has been hypothesized to be a main cause. With the aim to test this hypothesis, we have recorded the nestling diet and monitored the breeding cycle of two populations of Blue Tits and Great Tits (Cyanistes caeruleus and Parus major respectively) in fifteen oak patches in central Spain, during three years. The study area was constituted by three 'large' patches (26.5-29.5 ha) and twelve 'small' patches (1.12-2.06 ha). Blue tit nestlings had a significant better body condition in large patches, and Great tit nestlings were significantly bigger in large patches. Furthermore, the probability for yearlings to breed was significantly higher if they were born in large patches. Blue tit diet did not differ between patch sizes, but Great tit diet significantly did, with a significant higher proportion of caterpillars delivered in large patches. General results suggest that nestling growing conditions in small patches are worse, and this has negative consequences in the future reproduction of birds.

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Higher-Tier Agri-Environment scheme enhances breeding densities of most priority farmland birds

Abstract
Agri-environment schemes (AES) are the main policy mechanism available for reversing the widespread declines of European farmland birds. We test whether higher-tier AES management affects the abundance of priority farmland birds in three English regions with contrasting agricultural landscapes. We compare changes in relative abundance for 15 species of priority farmland birds on 68 Higher Level Stewardship (HLS) farms and the wider farmed countryside, as measured on 291 Breeding Birds Survey (BBS) 1km squares. Between 2008 and 2014, changes in abundance were more positive on HLS farms for 10 out of 15 priority species (in at least one region). Positive effects of HLS management on two further species were restricted to the period 2008-11. Based on the observed growth rate of the Farmland Bird Index on HLS farms, we estimate 31-40% of English farmland would need to be under HLS-style management to halt the current FBI decline. This study highlights the potential for evidence-based higher level AES to halt and reverse population declines of widespread farmland birds. It also suggests that impacts of AES on target species may exhibit temporal variation linked to unfavourable weather condition, highlighting the need for AES options to be resilient to detrimental weather impacts.

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Flexible estimation and modelling of seasonal detectability peaks

Abstract
Monitoring studies usually aim at finding most birds breeding within the area of interest by detecting them acoustically or visually. Acoustic detection plays an important role, and observation success often depends on singing activity. Thus the time period for surveys should contain the peak singing activity of one or more target species. Within the last decades, bird species advanced spring phenology, what might lead to a mismatch between survey period and the period of highest detectability leading to an underestimation of abundance or occurrence. The method presented here estimates the date of peak detectability in spring by combining site-occupancy with semi-parametric (spline) regression modelling. This approach was applied to opportunistic observations of 27 bird species (mostly passerines) in the Swiss lowlands. Detectability for sedentary and short-distance migratory species peaks between late February and mid-April, for trans-Sahara migrants between mid-April and late May. By using the date of peak detectability in spring as a phenological measure, we tracked changes in phenology for 10 species with data available for >9 years. The mean advance over all species was more than 3 days per 10 years. Our approach is widely applicable to species with seasonal variation in detectability. It might help to adjust monitoring schemes to changes in phenology and to unravel how species and communities respond to global warming.

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Prey abundance or biomass availability? The case of Bonelli's eagle *Aquila fasciata* in Aragón (NE Spain)

Abstract

Seven breeding individuals of a Bonelli´s eagle population located in Aragón (Northeast Spain) were equipped with GPS devices and tracked over 8 years. Home ranges were estimated using available locations. In order to determine if food resources conditions the maintenance of home ranges, we conducted prey censuses inside actual home ranges and outside them but within potentially occupied buffers around the home ranges' centroids. Four potential preys as rabbit, partridge, pigeon and different species of corvids were surveyed. Prey availability was analysed at two levels, one following traditional Index of Kilometric Abundance (IKA) and another following a new approach of biomass, IKB, (accounting for total prey biomass rather than number of individuals). All census were performed three times a year during two consecutive years according to prey cycles and breeding status of the eagles (breeding, non-breeding and fledglings dependence periods). According to our results, pigeon is the most abundant prey and rabbit is much scarcer than in other study areas of this species. Bonelli´s eagle in Aragón establishes its home ranges seeking continuous and predicted availability of prey biomass throughout the year rather than fluctuating and unexpected abundances of them.

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Changing the guard in birds: thresholds of community change in a Mediterranean landscape.

Abstract
Ecological thresholds are regions in which the rate of change is accelerated. Their identification may improve biodiversity conservation effectiveness by defining species sensitivity to threatening processes such as habitat loss or fragmentation. In our study we aim to define the turnover thresholds of bird communities inhabiting a canopy-density gradient of the South-western Iberian oak-forests. In order to understand how landscape change can alter biodiversity patterns we provide a new insight on how species perceive and distribute along the landscape. We used Huisman-Olff-Fresco models to identify species-specific responses to the gradient, which enabled us to identify species richness and turnover patterns of the community. Twenty-seven of 28 bird species showed a clear response to the gradient. Maximum species richness is reached at 10% canopy cover, suggesting a unimodal skewed response. Total turnover rate shows a distinct peak around 1% canopy cover and a smaller one at 20%. Canopy-density gradient is responsible for major changes in bird community acknowledging the loss of vegetation vertical strata and canopy enclosure. Typical Mediterranean savannah-like oak-forests promote higher regional levels of bird richness. However, different cover densities that may provide uniqueness and function (connectivity) should not be neglected at a landscape scale.

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Reversing population declines in Afro-Palaearctic migratory birds

Abstract

Across Europe, many Afro-Palaearctic migratory bird populations are declining severely. As declines are particularly apparent in species travelling to the humid tropics of Africa, attention has focused on identifying threats operating during the non-breeding season. However, substantial within-species variation in population trends across breeding ranges suggests that breeding ground processes could also be involved. In order to develop appropriate conservation actions there is therefore an urgent need to quantify (a) the contribution of key demographic processes to these population trends and (b) the magnitude and type of demographic change needed to reverse the declines. To address this issue, we construct integrated population models (IPM) for a long-distance migrant, the Willow Warbler, *Phylloscopus trochilus*, that is currently declining severely in the south-east of the UK but stable or increasing in the north-west. We use these models to identify the demographic drivers of population trends in both regions and to quantify the magnitude of change in survival and productivity needed to drive population recovery in the north-west. We then explore regional variation in demographic rates exist across other migrant species and quantify the degree to which each demographic rate would have to be improved to reverse current population declines in these species.

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Montados vs pinewoods vs eucalyptus plantations: who wins in forest birds' diversity?

Abstract

During the Spring of 2009 we surveyed the bird communities of the three main forest types in Portugal - cork-oak montado, pinewoods and eucalyptus plantations - which are responsible for 72% of the Portuguese forested area. Our main goals were to know: (1) if forest species select primarily native forest stands, (2) if vegetation complexity in non-native forest improves the bird community, and (3) how management in forest areas can influence biodiversity. For each forest type we delimited an area of 500ha and conducted 10min birds counts in 15 sites. Since all areas are within the same geographical region and under the same landowner, the potential pool of species is the same. The species accumulation curves presented the same pattern for all forests. Although the number of species in montados and pinewoods were similar, they were almost the double than in eucalyptus. Using GLM, we compared forest types for several bird assemblages (e.g. total richness, forest specialists, forest generalists) and the results showed that montados and pinewood hold more species and are more important for forest birds. Eucalyptus plantations with shrubs had more bird diversity than the ones without, indicating that simple management measures can contribute to locally increase biodiversity.

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Bird collision on power lines: estimating biases associated with carcass detection and persistence

Abstract

Bird mortality by collision along power lines is an international conservation issue. Quantification of this mortality is complicated by the heterogeneity of the survey methods used and the biases associated with carcass persistence and observer search efficiency. To estimate these biases we conducted three persistence experiments, lasting 30-days each, by placing carcasses of red-legged partridges (*Alectoris rufa*) and common pheasants (*Phasianus colchicus*) under power lines in 14 sites, and two search efficiency experiments, testing the detection of carcasses by 19 observers. We used survival analysis and generalized linear mixed models to estimate daily carcass persistence and detection probabilities. The daily average carcass persistence probability was highly variable between sites up to an 8-fold variation. Observers detected a common pheasant with a 0.48 mean probability while smaller partridge chicks were detected with a 0.003 mean probability. These results suggest that carcass persistence varies strongly at a small landscape scale and that a 7-days search interval may not be sufficient to estimate mortality of large birds. Unbiased estimation of bird collision mortality along power lines might thus require a substantial field effort.

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Understanding the effects of haymaking practices in Mediterranean dry grasslands on bird conservation

Abstract

We evaluated the impact of haymaking practices on a Mediterranean grassland bird community of south Portugal. Our goals were: (1) to investigate the exposure of different species to mowing; (2) to investigate potential biases on detectability of nests and dead birds; (3) to produce models linking clutch destruction, bird mortality and mowing management practices. Mowed fields were surveyed for signs of breeding and birds censused prior to mowing. Linear and mixed models were computed to inspect for biases on the detectability of breeding signs. GLMs and model averaging were used to link clutch destruction, bird mortality and mowing management variables. Only 4% of records evidenced successful nesting attempts. The corn bunting was the species with the largest number of records identified. Montagu's harrier mortality is also noteworthy since these species is quite rare. Important bias on detectability was found in fields with lower vegetation biomass prior to cutting, presenting stubbles shorter than 8 cm, and where sickle bar mowers were used. Higher probabilities of mortality events were found in fields mown earlier (but not in all years) and raked with one-rotor rotary rakes. Delayed haying and silage using temporary crops are discussed as grassland management alternatives to reduce nest destruction and bird mortality.

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From landscape sparing to landscape sharing by predators and men: Changing macrohabitat use by the Lesser Spotted Eagle in Estonia, 1990–2010

Abstract

Survival of large predators depends on their ability to cope with increasing anthropogenic pressure. In the current study we explored temporal changes in habitat use by the Lesser Spotted Eagle in Estonia in 1990–2010 by analysing variables, which describe nesting and foraging habitats, as well as anthropogenic disturbance. Although the total area of forests in Estonia did not change, eagles bred after twenty years in areas with less forest cover, whereas the area of foraging habitats in home range significantly increased. Also the distance from nest to foraging grounds significantly decreased during the two decades. Apparently such changes reflect the long-term habitat (re-)colonisation process due to stopped persecution and switched habitat use. This also indicates the potential of some large raptors to cope with the anthropogenic landscape changes, if these are not too dramatic, and gives hope that the future wildlife conservation may be based on habitat sharing, instead of habitat sparing, with humans.

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Operation Turtle Dove - flyway scale conservation

Abstract
Many of our migrant birds are in trouble. Breeding populations of long-distance, trans-Saharan migrant birds have declined sharply since the 1970s. Birds Without Borders is an RSPB programme linking up conservation actions along the flyway of declining migrant birds. This involves integrating conservation for long-distance migrants by developing initiatives that will protect, conserve, improve, restore and create habitats across the range of migratory birds. Operation Turtle Dove (http://operationturtledove.org/) is an important component of Birds Without Borders. Operation Turtle Dove is a partnership project committed to reversing the declines of European turtle dove (*Streptopelia turtur)*, a species which has suffered a 74% decline across Europe since 1980 (PECMS). Together, we are developing and facilitating delivery of conservation actions for turtle doves to significantly improve the chances of species recovery.

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Advertising song age differentiation of Whinchat *Saxicola rubetra*

Abstract
Most passerines have a repertoire of different song patterns, and a repertoire size is thought to signal aspects of male quality. We investigated the relationship between advertising song features (including their time and frequency characteristics), male age (yearlings or older) and reproductive success (successful or unsuccessful) in Whinchat *Saxicola rubetra* population in abandoned fields of Vologda region, Russia. We estimated minimum and maximum song frequencies, song length and pauses between them and the repertoire size of Whinchat males with the identified age and type of reproductive success. No significant differences in the time and frequency characteristics of vocalization of yearlings and older males as well as the successful and unsuccessful males were discovered. We concluded that Whinchat is a species with rather a rich song repertoire. A total of 218 song types were singled out in the song repertoires of thirty-five males and about 22 song types were found in their individual repertoires. The repertoire size of adult males significantly exceeds the repertoire size of the yearlings. There are no significant differences in the repertoire size among Whinchats with different reproductive success. Our scientific research was sponsored by the Russian Foundation for Basic Research (RFBR) (13-04-00745-a).

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Individual and geographical variations in vocalization of Tawny Owls *Strix aluco* and European Pygmy Owls *Glaucidium passerinum*

Abstract

This study was conducted in Central and Western Europe in 2006-2014. We analysed recordings from 67 Tawny Owl (*S. a. sylvatica, S. a. aluco, S. a. willkonskii*) and 20 Pygmy Owl (*G. p. passerinum*) males. The Kruskal–Wallis test (H) and discriminant analysis were used for revealing individual and geographic variation. Based on literary and our own data we segregated 22 signals (five types) for adult and seven signals (two types) for young Tawny Owls. Acoustical repertoire of Pygmy Owls includes 18 signals (five types) of adult and three signals (two types) of young owls. Five of 14 measures of the territorial call allow discriminating Tawny Owl males with 98% accuracy. Four of six measures of Pygmy Owl territorial call allow discriminating them with 84,8% accuracy. No microgeographical (between close subpopulations) variation was revealed for both species. Unlike Pygmy Owls, macrogeographical variation was found for Tawny Owls. For example, S. a. willkonskii and S. a. aluco males could be discriminant by their territorial vocalization with 96% accuracy.

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Preliminary investigation of the geographic variability of vocalizations by Stone-curlews *Burhinus oedicnemus*

Abstract

The Stone-curlews are a species of conservation concern in Europe but its population structure is poorly investigated. Recent genetic data supported a significant differentiation of the Canarian populations from Mediterranean ones, but the available data were not enough to fully assess the taxonomic status of Canarian birds. In order to collect further evidences in this regard, we compared the vocalizations by adult Stone-curlews belonging to Gran Canaria and Italy. In spite of the relatively small sample size, the vocal repertoire seemed comparable. However, some frequently used calls clearly showed quantitative differences. For example, the harmonic components of the gallop call and of the bitonal whistle were more intense in the Canarian samples. Furthermore the final element of the kurlee call showed a significantly higher peak frequency in Canarian vocalizations. In the end, some call subtypes, which are relatively rare in Italian recordings, seemed more widespread in the Canarian repertoire. The analysis of further recordings combined with playback experiments and other sources of information (e.g. genetic, morphological data) would be helpful to understand whether observed differences have a significant biological meaning and are strong enough to support a revision of the taxonomic status of Canarian subspecies from an integrative taxonomy approach.

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Exploratory behaviour and sociality: the role of familiarity in House Sparrows

Abstract

"Novel environment" tests have long been used to investigate bird personalities by analyzing individual reactions and how they cope with novel and hence stressful situations. In the last few years, there has been growing interest in the influences of social behavior on exploratory behaviour. Under natural conditions individuals of gregarious species usually explore together, as this could improve their chance of avoiding predators and finding food faster. Among others, it was discovered that social rank and personality of companions have a distinct influence on their exploratory behaviour. Our goal here is to determine if familiarity and strength of previous associations (e.g. degree of synchronization between individuals) could play a role in exploring novel environments. Interactions between flock members have been shown to be non-random, and to develop a relationship to a new companion could be also stressful. Our study focuses on House Sparrows (*Passer domesticus*), a social and flexible species, that is able to exploit different and novel food sources. To test familiarity and strength of bonds on exploratory efficiency birds were faced with a novel large semi-natural enclosure. Here we present results on the effect of familiarity on exploratory behaviour.

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The sense of smell in House sparrows: is it used to find a house?

Abstract

In the last decade increasingly attention has been paid to the importance of smell in birds. However, we are still far to fully understand the role of smell in birds. In particular, there are a variety of context dependent capabilities and areas of application, which may also have a seasonal dimension. In this study we would like to answer whether smell could be important in nest site selection, e.g. to gather information and evaluate different aspects of nest site quality. Furthermore we want to know how important olfactory stimuli might be for everyday life or whether it is restricted to specific periods. To answer these questions we performed a series of choice experiments with House sparrows (*Passer domesticus*), using different odours. Individuals were put in experimental cages, provided with odours treated nest boxes (each containing different odours of potential predators or conspecifics) and given the possibility to explore them. One year males and females were tested in different experimental set-ups in order to clarify the use of olfactory stimuli for nest site selection and whether the use or olfactory ability changes during the year or with hormonal status.

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Effects of social information and competition differ for competitors and prey of the informant

Abstract
Social information use is a widespread fitness-enhancing strategy to assess environmental quality and might theoretically promote species coexistence in animal communities. However, the value of social information might be affected by many factors such as whether information is provided by con- or hetero-specifics, if it tells on resources or threats, if it is used in only one or two directions, the amount of information providers and the type of receivers. Here, in a crossed design we manipulated social information on a threat and hole availability at the patch scale, aiming to identify the relative importance of social information and competition in determining the structure of a cavity-nesting bird community. We distinguished between effects on prey species of the informant species and on potential competitors of the informer. Social information was disregarded by prey species in the community, but influenced the organization of competitor species. In contrast, hole availability affected habitat selection of prey species but was irrelevant for competitors. Our results suggest that the positive effects of social information may surpass the negative effects of competition for a hole for competitors but not for prey species, highlighting the relevance of social information use for understanding species coexistence.

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Foraging activity of Sedge Warblers *Acrocephalus schoenobaenus* depends on the availability of food

Abstract
Activity age-sex groups of Sedge Warbler population in Biebrza valley (NE Poland) assessing the relationship between 11 seasons, age, sex of birds, time of day and weather was analyzed. The activity was expressed as dynamic birds capture in the next two-hour periods of day, from sunrise to dusk. Observations of foraging zones of individually marked males and females within the breeding pairs was made. 6483 information about the food places of males and 2744 of females were noted. Recorded weather conditions and measured activity of insects in reeds using the barrier trap. Conversely binomial distribution of birds daily activity was noted. Significant relationships between breeding season, birds age and sex and time of day in log-linear analysis models was found. Earliest began to feed the young birds, then females, then males, while in the evening longest activity characterized by males. The activity correlated with the level of birds fat reserves and significantly differs between breeding seasons. Male and female selectivity differed feeding sites and activity of the food outlets throughout the day. This activity was modified by weather conditions and correlated with the insects activity. Males in search of food penetrated farther from the nest area compared to females.

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Testing mechanisms of visual discrimination in a nocturnal owl *Otus scops*

Abstract

Recent evidence demonstrates that owls respond to coloured cues of owlets in the night, which is intriguing given that colour discrimination in dim conditions is unlikely. Here, trying to disentangle the mechanisms behind these patterns, we investigated parental preference in nocturnal Scops owls (*Otus scops*). We studied food allocation in relation to UV and visible reflectance of the cere. Parents were faced with owlets displaying a pronounced UV peak (controls), reduced UV reflectance but normal visible reflectance (UV reduced), and reduced UV and visible reflectance (UV-visible reduced). We predicted that if birds rely on color contrast they would respond similarly to UV reduced and UV-visible reduced owlets and to both differently from the control. If brightness is important, they would also response to both UV reduced and UV-visible differently from the control, however, they should also distinguish between UV reduced and UV-visible. We found that parents treated differently owlets with intermediate bright cere (UV reduced nestlings), and that preferences changed over the season. Therefore, our results would suggest that UV-peak contributes strongly to brightness-based discrimination in scops owls. We discuss the possible mechanisms involved in these findings based on current knowledge about avian photoreceptor sensitivity in owls.

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Conditioned learning for the prevention of electrocution in rehabilitated juvenile Spanish Imperial Eagles *Aquila adalberti*

Abstract
Electrocution is a major problem for large raptors in open areas. The construction of safe electrical pole and wire configurations is the primary way of reducing this mortality and has been applied successfully in many regions of the Iberian Peninsula. However, electrocution is still the main cause of mortality for the Spanish Imperial Eagle. We employed an electric fence equipped power pole in a flight cage to train rehabilitated eagles ready for release to not use these poles as perches. To date three eagles were trained and released. Despite being the highest and most attractive perch in the cage avoidance of the power pole was effective after two low power electric shock experiences. Post- release satellite transmitter data is available only for one of the three individuals. This two-year-old eagle has establishes a small home range in an open area, and five months after release is still avoiding power poles as perches. These preliminary results show that similarly to other species such as the Californian Condor (*Gymnogyps californianus*) or the Philippine eagle (*Pithecophaga jefferyi*) conditioned learning is effective in the mid-term, as an additional tool to the correction of dangerous power poles.

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Spreading information in populations of dispersed individuals

Abstract

Dispersed individuals can coordinate the onset of life history events, like reproduction or migration, on a large (population) spatial scale. However, the mechanism of this synchronisation has not yet been identified. In many species signals produced by one individual stimulate signalling activity of its immediate neighbours. I propose that such local focuses of signalling could transform into waves propagating in space. Computer simulations and preliminary empirical data from a grid of sound recorders distributed in space, suggest that populations of dispersed signallers-receivers can self-organize into a critical complex system. I propose that networks of interacting neighbours may integrate populations synchronising life cycles of dispersed individuals.

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Individual quality and morph specific recruitment in an urban raptor

Abstract
Recruitment into the breeding population is a key driver for population viability. To successfully recruit into the population, offspring must survive to sexual maturity, secure a territory and find a mate. All of which may depend on individual quality. We explore factors influencing juvenile survival and subsequent recruitment in urban Black Sparrowhawks (*Accipiter melanoleucus*). The species shows discrete colour polymorphism (dark and light morph adults) and within South Africa, morph ratios are linked to climate conditions. Although dark morph adults are numerically dominant, with 76% occurrence in our population, we found evidence for offspring of pairs with contrasting morphs having a higher survival probability than offspring of identical/pure pairs. Additionally we found birds hatching early are more likely to survive and breed. However, this pattern varies between the morphs: dark morph males produce more recruits when breeding early, whereas light morph males produce more recruits later in the season. Males provide most food during the nestling period, and dark morph males might be more successful hunters in the early wetter breeding period, whereas lighter males might be favoured later on, when conditions become warmer and drier. Male hunting success may therefore be crucial for productivity, post-fledging survival and consequently recruitment.

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Using Flight Initiation Distance to measure habituation to anthropogenic disturbance in birds

Abstract

The characteristics of a personality type can act as drivers of ecological and evolutionary processes such as invasion and colonisation. With rapid human population growth, wild habitats are being transformed, forcing native wildlife to either adapt to the new environmental challenges or face the threat of extinction. Here, findings will be presented following a study measuring the distance at which wild bird populations in both urban and rural locations make an escape attempt. Known as Flight Initiation Distance (FID), this can be used to measure risk responsiveness, a component of personality. Predictions can then be made about an individual based on the known correlation of behaviours consistent with a personality type. Therefore, FID can be used to infer the level of human habituation experienced within a population. FID was measured in three bird species at 20 different locations around Cornwall, UK (10 urban, 10 rural). Consistent with preliminary predictions, birds in urban areas were found to make an escape attempt at a significantly shorter distance than their rural counterparts. This difference in FID suggests that birds in urban areas may have bolder personalities than rural birds as a result of greater habituation to human disturbance.

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Nesting close together can be a flexible strategy against constant predation pressure in Azure-winged Magpies *Cyanopica cyanus cyanus*

Abstract
The breeding colony of the Azure-winged Magpie in the Khonin Nuga valley in Mongolia began experiencing nest predation from a pair of Carrion Crow who have bred regularly near the breeding site of the Azure-winged Magpies since 2008. Since that time the distance between the Azure-winged Magpie's nests became closer throughout the 8-year study. Nest predation usually occurs on a large scale that most of the nests in a colony are preyed upon by predators, mostly Carrion Crows, in a relatively short time. After losing their first nests, Azure-winged Magpies are often divided into subgroups and nest separately in subgroups usually within the breeding site. The second nests of the failed Azure-winged Magpies and nests in subgroups formed after the intense nest predation were close to each other than nests built before the predation. These results suggest that the Azure-winged Magpies are able to adjust in such a way to avoid nest predation in a short time by nesting close to each other. This maximizes the nest defense by responding much faster with a large number of individuals and is also more flexible that less energy costly by responding in subgroups instead of whole colony.

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Why are some birds more susceptible to roadkills than others?

Abstract
Millions of birds are killed by car collisions worldwide. However, information is still scarce on why some species are more susceptible to vehicle mortality than others. We aimed to test if the proportion of road-killed species is related to nearby abundance, and, if not, which species traits makes them more vulnerable to roadkills. Data was collected in a 50 km-road network and adjacent areas (up to 5 km; years 2009-2011), in a Mediterranean landscape (Portugal). We compared roadkill data with availability data (bird abundances) using Manly's standardized selectivity index to assess if roads act as a selective "predator". In general, more abundant species suffered higher roadkill rates (mostly passerines). However, nine species (30%) were selected by roads as preferred "prey" or avoided "prey". The Blue tit *Cyanistes caeruleus*, the Blackcap *Sylvia atricapilla* and the Goldfinch *Carduelis carduelis* roadkills were positively selected, while Cetti's warbler *Cettia cetti*, Spotless starling *Sturnus unicolor*, Short-toed tree-creeper *Certhia brachydactyla*, Lesser striated swallow *Cecropis daurica*, Zitting cisticola *Cisticola jundicis*, and wren *Troglodytes troglodytes* were negatively selected. There are specific features associated with roadkills beyond simple presence or abundance nearby. Foraging guild, body weight, wing loading and length, and sociality classes showed significant selectivity indexes in roadkills.

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Evidence of olfactory ability in raptors: Do turkey vulture and Crested Caracara *Polyborus plancus* find their food by smell?

Abstract
Raptors are usually considered to be highly visually dependent, with no olfactory abilities. Yet turkey vultures (*Cathartes aura*) are reported to potentially use their sense of smell to forage. However in South America, where vegetation can be dense, turkey vultures are sympatric to several other scavenging raptors, like crested caracaras (*Polyborus plancus*) which are considered to be anosmic. We conducted an experiment to confirm the use of olfaction for finding food in turkey vultures and then applied the same methodology to investigate olfactory ability in crested caracaras. We used captive raptors (5 vultures and 5 caracaras). In a closed aviary, for six sessions of ten minutes each, we presented the birds with two rice cooking balls: one containing dried meat while the other contained a piece of plastic. Both species made more contact and spent more time in contact with the ball emitting food odours, supporting the use of olfaction to find the food. Our results confirm that turkey vultures can find their food using olfactory cues and show for the first time the existence of a functional olfactory sense in a caracara, belonging to the Falconidae family.

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How raptors see their worlds: Investigations of visual acuity and visual fields

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Abstract
Although raptors are often considered to be highly visually dependent, their visual abilities remain unclear. The general assumption that they have extraordinary visual capabilities are debated since they frequently collide with human devices like wind turbines or power lines. We estimated visual acuity and the visual fields in a wide range of raptor species. By behavioural two-choice tests, we show that Harris' hawks (*Parabuteo unicinctus*), chimango caracaras (*Milvago chimango*) and black kites (*Milvus migrans*) have a lower visual acuity than human (*Homo sapiens*). A proxy of the visual acuity can be the shape of the two foveas (temporal and central). In over 20 species from accipitridae and falconidae families, we estimated the anatomy of the foveas with the recent technique of tomography. Finally, using the ophthalmoscopic reflex, we estimated visual fields in the same species used in the tomography experiment. For both analyses (foveas and visual field), we interpreted the results in relation to their ecology and phylogeny. Studying the visual ecology of raptors is a key challenge to understanding how they acquire and use the information that they extract from their environments, especially in regard to the increase of human-produced objects which intrude into the open air space.

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Reducing cuckoo *Cuculus canorus* parasitism risk via informed habitat choices

Abstract

Brood parasitism incurs severe fitness costs for hosts. A suite of host adaptations to avoid parasitism exist at various stages of the host breeding cycle, particularly well-known being the egg-stage defences. Fitness costs of parasitism would be especially minimized if hosts avoided parasitism prior to the egg-laying stage. However, whether hosts are able to reduce parasitism risk via informed habitat choices has been poorly studied. We conducted a playback experiment to examine the capability of forest passerine birds to perceive vocal cues of the common cuckoo to estimate local parasitism risk and adjust their breeding habitat choices accordingly. Density of open-nesting host species was considerably lower in sites of high perceived parasitism risk than in control sites. Cavity-nesting hosts did not respond to the simulated increase in parasitism risk, nor did bird species that are not known as regular cuckoo hosts. Hosts thus seem to be able to reduce parasitism risk through informed breeding habitat choices, but this behaviour is restricted to open-nesting hosts. Informed habitat selection as an adaptation against parasitism may have important implications for the parasite-host co-evolutionary arms races via reducing the selection pressure for or completely blocking the development of later-stage host adaptations.

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Do all birds stress in the same way? Determinants of bird stress responses

Abstract
The increase in outdoor activities and the changes in land use are leading to an ever-increasing number of human-bird encounters. These encounters often elicit physiological and behavioural responses from birds, which in turn may have consequences for their body condition, breeding activity or survival. Therefore, concern has been raised among researchers and conservationist about the impact of human disturbance on bird populations. Little is known however, about variation in susceptibility among species, habitats, or periods of the year. Thus, the objective of this study was to investigate which factors determine bird stress responses. We performed meta-analyses of published data on stress responses (i.e. adrenocortical responses and flight initiation distances) of birds from different species, genders, habitats, and seasons. Although the results are still preliminary, there seems to be substantial differences in physiological and behavioural responses of birds depending on sex, species characteristics, and life history traits. Habitat and time of the year also seem to play an important role determining how much birds will stress in the face of an encounter with people. These findings could have important implications for interpreting and predicting real impacts of human disturbance on wild populations and species.

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Anti-predator responses of Great Tits *Parus major* in urban and rural habitats

Abstract
Urbanization affects ecological systems on multiple trophic levels. While cities might serve as refuges from predators, some predators may be equally good at exploiting urban habitats as their prey. We studied the effects of urbanization on behavioural responses by Great Tits (*Parus major*) to their principal predators, Sparrowhawks (*Accipiter nisus*). In two urban and two rural populations, we placed a mounted Collared Dove control (*Streptopelia decaocto)* and a mounted Sparrowhawk near the nest of breeding birds, and measured the latency of arrival and chick-feeding rate in the presence and after the removal of each stimulus. Our preliminary results suggest that compared to the dove test, feeding rate was significantly lower and latency was significantly higher both in the presence and following the removal of the Sparrowhawk. The difference in latency and feeding rate between the predator and the control treatments was similar in urban and forest habitats, suggesting that the predation risk perceived by the birds does not differ between the two habitats. Urban pairs had higher absolute feeding rate and lower return latency than rural pairs, which may be explained by either compensation for lower prey quality or less sensitivity to human disturbance in urban birds.

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Foraging movements of Scopoli's Shearwaters *Calonectris diomedea* during early chick-rearing phase

Abstract
Pelagic seabirds that breed colonially are constrained in their foraging trips by habitat heterogeneity and intraspecific competition. As central-place foragers their spatial distribution is restricted in marine areas around their colonies. This is especially so during the egg-hatching season when attendance and food provision to their chicks has to be intense. In the present study we analyzed 23 foraging trips of Scopoli's Shearwaters breeders that were tagged with GPS data loggers during 2009-2014 in the Ionian Sea (western Greece) and assessed the range and oceanographic parameters of their foraging habitat. By applying the Adaptive Kernel method the 50% and 95% foraging range of breeding shearwaters was estimated at 4,170 km2 and 18,850 km2 respectively. In addition, Generalized Additive Models showed that Chlorophyll-a (0.05-0.10 mg/m-3), Sea Surface Temperature (<25.7 oC), spatial distribution of purse seiners (high values of fishing effort), fishing pressure index from small scale fisheries (high values), minimum distance from the coastline (1.8-13.5 km) and from Strofades colony (<7.5 km) were the most significant environmental and fishing effort parameters that explained the foraging pattern of this marine top predator during the early chick rearing period (i.e. 53.7% of the final model deviance).

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Individual consistency in the use of social foraging tactics in a free living passerine bird species

Abstract
During social foraging individuals use two alternative foraging tactics: producing or scrounging. Producers, by definition, actively search for food, while scroungers search for joining opportunities to exploit others' food discoveries. The use of foraging tactics is characterized by high within-individual flexibility and is determined by numerous factors (e.g., sex, body condition, dominance rank, flock density, energy reserves). Animals, however, often exhibit a high degree of within-individual behavioural consistency, defined recently also as „animal personality". In the present study we investigated the individual use of foraging tactics in free living Tree sparrows (*Passer montanus*), during multiple sessions of social foraging, under natural conditions. Considering the potential confounding role of several variables (see above), we tested the within-individual consistency in the use of social foraging tactics. We found a slight, but significant repeatability in the use of scrounging tactics. Also, we found a positive relationship between flock density and the proportion of scrounging, and a negative relationship between body condition and proportion of scrounging in females. We conclude that the use of social foraging tactics shows an individual-level consistency and is influenced by both internal and external factors in free living Tree Sparrows.

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Redder finches are better escapers

Abstract
Carotenoid coloration is considered in many species a sexually selected signal that reflects the condition and general health state of its bearer. Carotenoid supplementation has been also shown to improve aspects of flight performance in birds. More agile birds in good condition should be better suited to avoid predators, so we could expect that individuals showing brighter carotenoid-based colorations would be able to better escape predation attempts. We tested this prediction by measuring the escape ability of male House Finches (*Haemorhous mexicanus*) and relating this ability to their carotenoid-based plumage. Redder males showed a higher escape ability than duller individuals, probably due to a greater ability to sustain continuous flight. These results agree with a recent hypothesis that proposes that carotenoid coloration reflects a more efficient cellular respiration. Ultimately, a better flight performance can confer important advantages when foraging, maintaining a territory and, as observed, when suffering a predator attack, which, in the case of the House Finches, can help to explain why redder individuals show higher overwinter survival rates.

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Sleep and vigilance linked to melanism in wild barn owls *Tyto alba*

Abstract

Understanding the function of variation in sleep requires studies in natural ecological conditions in which sleep evolved. Sleep has an impact on individual performance and hence may integrate the costs and benefits of investing in processes that are sensitive to sleep such as immunity or coping with stress. Because dark and pale melanic animals differentially regulate energy homeostasis, immunity and stress, the organization of sleep may covary with melanin-based colour. We recorded the electroencephalogram of cross-fostered barn owl nestlings (66) in nature using a minimally-invasive method. Additionally, we measured melanin-based colouration as well as vigilance during family interactions. Heavily spotted male nestlings and offspring of heavily spotted biological mothers switched sleep-wakefulness states more frequently. They had shorter non-rapid eye movement (non-REM) sleep bouts, a shorter REM sleep latency and more wakefulness bouts. Also, nestlings from mothers displaying many black spots looked more often towards the nest entrance where their parents bring food and towards their sibling against whom they compete. Owlets from heavily spotted mothers might invest more in vigilance thereby possibly increasing associated costs due to sleep fragmentation. Different strategies of the regulation of brain activity have evolved and are correlated with melanin-based colouration.

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Egg rejection: a by-product of conspecific parasitism or resistance against interspecific parasitism?

Abstract

Usually, it is assumed that recognition and rejection abilities arise as a response against interspecific brood parasitism (IBP). However, recent evidences suggested that these abilities evolved as a response to conspecific brood parasitism (CBP). To test these two alternative hypotheses we performed an experimental study by parasitizing nests of the common blackbird (*Turdus merula*) with conspecifics or interspecific eggs under different conditions of risk of parasitism (presence of interspecific or conspecific parasites). This species is a potential host of the common cuckoo (*Cuculus canorus*) but suffer low levels of CBP too. Ejection rates of conspecific eggs did not exceed 13%, even when a blackbird female was placed near the nest, which contradict the main prediction derived from the CBP hypothesis. Conversely, ejection rates of experimental eggs simulating IBP were much higher (80-100%). Furthermore, female blackbirds were more aggressive towards cuckoos than towards blackbird females. Both results considered together support the IBP hypothesis, indicating that egg recognition and rejection in blackbirds has probably evolved due to previous cuckoo parasitism. Successful resistance is a frequent long-term outcome of brood parasite-host coevolution and it may results in the maintenance of recognition abilities in species not currently impacted by IBP.

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The effects of nest-trapping and video-recording on breeding birds' behaviour

Abstract

In behavioural studies catching and marking birds and using video cameras in the proximity of the nests are common methods to study several aspects of birds' behaviour. However, the possibility that these procedures may potentially affect individuals' behaviour (e.g. by increased wariness, neophobia or reduced activity) thereby causing bias in the collected data is often neglected. In order to test these hypotheses we used Great Tits (*Parus major*) during brood rearing in urbanized and woodland habitats. In a field experiment, applying a 2x2 block study design, we compared the behaviour of (1) parents that were and were not familiarized with the presence of a camera, and (2) parents that were or were not nest-trapped and ringed before the observation. While our preliminary results indicate no robust effects of habituation to the video camera, nest-trapping in males (but not in females) induced increased alertness, longer latency to enter their nest and decreased chick feeding rate. We found similar patterns in urban and woodland birds. Our results thus reveal subtle and sex-dependent effects of catching and marking parent birds that may often influence the results of behavioural studies.

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Little bustard's *Tetrax tetrax* behavioural responses to elevated temperature: Probable effects of climate warming

Abstract

High temperatures pose a thermoregulatory challenge to Mediterranean grassland birds, which have limited protection from direct sun radiation during the hottest hours of the day. This makes them particularly vulnerable to climate warming. Using the Little Bustard as a model species, our study aimed to understand behavioural responses of grassland birds to elevated temperatures. For this purpose we tracked nine birds in South-western Iberia during the post-breeding season of 2014 using GPS/GSM loggers equipped with a 3D accelerometer. These devices collected bursts of data at a rate of 1Hz every 10 minutes to determine different behavioural modes throughout the day. We classified over 10,500 behavioural readings into resting, walking, flying, foraging and alert modes based on accelerometer readings and verified with video footage. We found foraging activity strongly restricted to the lower temperatures of the day that were registered within the daylight period, during early morning and dusk. The rest of the day with higher temperatures or night time was dominated by resting behaviour. First results suggest that heat waves are likely to strongly constrain its foraging behaviour.

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Behaviour of the European starling *Sturnus vulgaris* in its wintering area in Algeria

Abstract

Tracking daily movement of starlings since autumn 2004 to spring 2014 highlights the arrival and departure of starlings. Indeed, in late August to late October *Sturnus vulgaris* happens. The biggest clouds of starlings correspond to a peak at the end of November to early January. The number of starlings seen before dusk declines sharply toward the second decade of February to become only a few dozen in March. The earliest departures of starlings to their breeding sites is noted at the end of February, but massive departures are seen in March.

Few stragglers individuals can be observed in April and even in May. It is probably low quality or sick bird who do not have enough energy to take part in the migration. Observations made earlier in the day report of starlings groups well before dusk to their takeoffs in waves and close to potential dormitories as Garden of Hamma, Bainem's forest and the People's palace. Indeed, many starlings gather in fields left fallow or the treetops from 16h10' and others keep coming and forming large swarms in the visible sky before sunset.

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Who is who? Acoustic monitoring of migratory passerines with complex and simple song as a tool for individual recognition

Abstract

In field studies, it is often necessary to identify specific individuals. Colour rings frequently used to mark birds are often difficult to observe, especially in small passerines and dense habitats. Acoustic-based monitoring detecting individuals by their characteristic vocalization is a potentially suitable alternative, but this approach is challenging in species with complex songs. Here we present its application on two species of pipits (*Anthus* spp.). From a three year study on Tree Pipits (*A. trivialis)*, which often sing in flight or from perches, we conclude that acoustic monitoring based on the syllable repertoire can be substantially more efficient for individual recognition than colour ringing. Repertoire of each banded male was distinct and stable within as well as between seasons; and males with similar syllable repertoires differed in syntax. Thus, we were able to unambiguously identify singing males in the studied population from analyzing a recording containing 20–30 songs, and use the data to track territory changes and detect returning individuals. We will contrast these results with those from terrestrial Tawny Pipit (*A. campestris*) with much simpler song. For this species, we will present first data about song stability of individually banded males recorded repeatedly during one breeding season.

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Poster: Behaviour

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Oral or written history? Yellowhammers sing a different story about colonization of New Zealand

Abstract
Yellowhammers (*Emberiza citrinella*), widely distributed Eurasian passerines, were in the 19th century introduced by the British to New Zealand as a biological control against overpopulated insect pests. From the same period we have the first notion about geographical variation of their song. As subsequent research has shown, yellowhammer dialects can persist on a site for decades and thus potentially hold some information about the past. As New Zealand acclimatisation societies kept records about liberations of these birds, it is possible to compare the "written" and "oral" history and see to what extent they match. The project presented in this contribution had two important steps: 1) Reconstruction of the history of yellowhammer colonization of New Zealand using documents of acclimatisation societies and newspapers, 2) Mapping the distribution of yellowhammer dialects in New Zealand and Britain, with the help of citizen-science. These two approaches seem to give conflicting results. Although old documents confirmed solely a British origin of New Zealand yellowhammers, the dialect composition of both countries is strikingly different and some New Zealand dialects is more similar to rather match those from countries from continental Europe. Several phenomena will be discussed that could explain the observed patterns, including population decline, independent cultural evolution, and sampling bias.

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Vision and the Foraging of Auks

Abstract

In birds the width of the binocular portion of the total visual field differs with taxonomic order and foraging mode. In non-passerine species binocular fields are typically have a maximum width of 20 ° - 30 ° whereas in passerines they are typically 50 ° - 60 °. An enlarged binocular field facilitates accurate bill placement and/or delicate manipulation of small items during foraging. Superimposed on this visual dichotomy are more subtle variations in visual field configuration indicative of fine tuning to different perceptual challenges associated with exploiting different prey types. Using an ophthalmoscopic reflex technique we have found a marked difference in the visual fields of two species of Auks, Alcidae. Common Guillemots (Murres) *Uria aalge* have relatively narrow binocular fields (25 °) typical of those found in non-passerine predatory birds. Atlantic Puffins *Fratercula arctica,* have much broader binocular fields (49 °) similar to those that have hitherto been recorded in only passerines that feed on small items taken at close range, or in owls. We argue that although perceptual challenges associated with foraging are similar in these two species during the breeding season when they are piscivorous, Puffins (but not Guillemots face) face more exacting perceptual challenges when foraging outside of the breeding season. Puffins broaden their diet in the winter and take a high proportion of small invertebrate prey. Capturing this prey probably requires more accurate, visually-guided bill-placement and we argue that this is met by Puffins' broader binocular field.

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Prey composition of the Southern Grey Shrike *Lanius meridionalis* elegans in an arid zone (Algeria)

Abstract
The palm of the National Institute of Agricultural Research (INRAA) in Adrar (Algeria) is on the edge of the city of Adrar. This area is part of the arid bioclimatic stage. The analysis of 20 pellets of rejection of Southern Grey Shrikes collected in the palm of the institute for two seasons revealed that the diet of this species consists mainly on prey belonging to the class Insecta with (Ni = 95.97%), followed by 2 species of plants with (Ni = 2.42%) and Aranea (1.61%). The order coleoptera is the most important with 39.52% followed by the hymenoptera (Ni%=31.45%). Two species most represented with were *Lithoborus* sp. and *Componotus* sp. with (15.32 and 12.90%) respectively.

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Cattle Egret *Bubulcus ibis* adults selecting prey species for their chicks in the lower Soummam valley

Abstract

The diet of Cattle Egret chicks in the lower Soummam valley, Algeria, was investigated in 1998 and 2006, when 145 and 23 regurgitates were collected, respectively. In 1998, 1 698 individual prey items were identified. Insects formed the bulk of the diet of chicks: 94% in terms of frequency, 71% in terms of mass. Orthopterans were dominant, especially in terms of biomass (22% by frequency, 58% by mass), whilst Dipterans were well represented in numbers (59% by frequency). Vertebrates, despite their lesser frequency (3%), contributed 23% by mass of the diet. In 2006, 441 prey items were identified. The contribution of insects decreased to 79% by frequency and 15% by mass (mostly Orthopterans) but vertebrates made up a higher frequency: 20% of prey items and 85% by mass of the diet. The availability of prey items was not correlated to their occurrence in the diet, suggesting that the Cattle Egret is a selective predator, with adults selecting prey species for their chicks. A drought in the spring of 2006 increased the availability of fish and lizards to the Cattle Egrets.

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Birds of artificial islands of the eastern part of the Gulf of Finland

Abstract

Investigations were carried out in 2013-2014 during the breeding season on 4 artificial islands (Smin = 0,5 km2; Smax = 1,6 km2) of the eastern part of the Gulf of Finland. Islands were constructed about 150 years ago from boulders and sands as a fortresses and fortifications. 5 bird habitats were determined: plots with trees and scrub, manmade sandy banks, grasslands, boulder ridges, old buildings and fortresses. In total 28 species were found out there (130 birds species breed on the islands of the gulf in whole). 4 species are included in Helcom Red List of Baltic Sea species in danger of becoming extinct, 2 species - into Red Data Book of Leningrad region. The most preferable nesting habitats are boulder ridges (41%, 11 species), 7 (26%) breed in grasslands, 6 (22%) - in "park"areas, 2 (7%) - in fortresses, the only ones – Sand Martins (*Riparia riparia*) - inhabit manmade sandy banks, but their abundance comes up to 100 pairs (fort Totleben). The commonest species are Black-headed gulls *Larus ridibundus*, Common Terns *Sterna hirundo*, Arctic Terns *S.paradisaea*, Tufted Ducks *Aythya fuligula*, Goosanders *Mergus merganser*. This study was conducted under financial support from SPbSC RAS and TOPCONS international project (№ 2011-022-SE511).

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The habitat preferences of the European Rollers *Coracias garrulus* in Corum, Northern Anatolia

Abstract

In this study, breeding and foraging habitat preferences of the European Rollers (*Coracias garrulus*) were investigated in Çorum, the Northern Anatolia, in 2014 breeding season. The breeding habitat preferences were determined within a radius of 300 m around the each 8 nest sites. The foraging habitat preferences were determined within a buffer of 1000 m around the transects constituted by unifying the perch points mostly utilized by the rollers for 4 certain roller areas with 31 breeding pairs. Both colonial and solitary breeding pairs were recorded. The pairs nested on sand quarries, concrete buildings, and abandoned magpie nests on electrical poles. Within 75% of breeding habitats, at least 80% of the area were agricultural areas. Within 63 km2 foraging habitats, the extended places were occupied by the agricultural areas (at least 67.5%) in three study plots. In the other study plot, the foraging habitat consisted of bushland (40.5%) and agricultural area (23.8%). Additionally, meadow was relatively important habitat type in one of the study plots. According to the results of this preliminary study and our personal observations, it could be said that in addition to habitat types, nest site availabilities effect the existence of the European rollers in an area.

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Nest hole selection of European Rollers *Coracias garrulus* in a colony

Abstract

This study was carried out in a 500 ha area during 2014 breeding season of the European Rollers (*Coracias garrulus*) in Corum Province-Turkey. This species is non-excavator and frequently solitary. In this area, a breeding colony with 7 pairs was detected. The colony was located within a scarp carved out by removing earth. This scarp was about 13 m height and 450 m length. 40 potential nest holes were recorded on the slope of scarp and utilized holes were determined. We took photos of the potential holes with a scale. The peripheries of nest holes and heights from the ground of them were computed with IMG Tool Software. Average periphery and height were 43.76 cm and 11 m respectively. The values didn't vary significantly between utilized and non-utilized holes. The nest hole selection could be depend on the other factors such as depth. Moreover, the individuals exhibited pre-breeding behavior even in the late summer and it wasn't encountered any breeding cues such as fledglings during the study period. Although there wasn't a shortage of potential nest holes, the holes could not be satisfactory for this species. Nest boxes installation in a conservation plan can be necessary in this area.

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Habitat use of Cuckoos *Cuculus canorus*: An analysis of satellite-tagged birds in a key stopover area

Abstract

Cuckoos (*Cuculus canorus*) are inter-African migrants which are showing population declines in many areas. Satellite-tagging of British male Cuckoos has shown that the Po Valley in northern Italy is a key stopover area for many individuals, often for durations of up to a month. We analysed the detailed habitat use of tagged Cuckoos stopping-over in this area between June and August. Analysis of daily movement patterns showed that individual Cuckoos when first arriving moved over a large area which became progressively smaller over the duration of the stopover, the Cuckoos focussing on relatively restricted areas, although they made occasional longer-distance movements. A kernel analysis in conjunction with land cover data found that the Cuckoos' presence was related to the heterogeneity of the landscape. The results suggest that the Cuckoos used quite small areas which could potentially be a conservation focus for the species. Given that the stopovers were often long, that several host species were still breeding and that the presence of singing Cuckoos was positively related to host presence, we cannot discount the possibility that migrant Cuckoos attempt to breed in the study area.

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Bio-ecology of birds in the Bejaia region of north eastern Algeria

Abstract

The study of birds took place in olive region. This region is nestled among the hills of the Massif Djurdjuran and the first chains of Bibans. The methods used to identify birds in the area are the method of punctual abundance index (IPA), the quadrat method and progressive frequency Sample Rate. We have identified 50 bird species belonging to 27 families in Sidi Aich station and 39 bird species belonging to 20 families in the Tazmalt.Prmi station we identified these species of migratory species in summer as *Coturnix coturnix, Streptopelia turtur, Hippolais pallida , Muscicapa striata* and migratory species in winter as *Motacilla alba, Motacilla flava, Turdus philomelos* and *Sturnus vulgaris*. These results are processed by environmental cues such as centesimal frequency, diversity and density and statistical methods such as correspondence analysis.

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On the duality of seasonal niches in migratory birds: The case of the Citril Finches *Carduelis citronella*

Abstract

The realized distribution of animals is often delimited by climatic factors which define, next to the specific habitat and food availability, their species-specific potential distribution. We studied the environmental limitations affecting the realized breeding and wintering distributions of the Citril Finch (*Carduelis citrinella*). To assess these limits, we used species distribution models (SDMs) derived from macroclimate in combination with land cover information. Our data suggest a high congruence between the modelled potential breeding distribution of the Citril Finch and the currently known breeding sites indicating a high level of niche filling. The unusual absence in several suitable breeding habitats at the eastern and northern range limit is likely linked to a combination of both missing resources and restricted physiological migration capacities from the available wintering grounds. Since the accomplished migratory distances hardly exceed more than 500 km it seems likely that the distance to the main wintering areas is too large for exceeding eastern and northern range limits. We discuss the differences in SDM outcomes when including distal predictor variables instead of using proximal predictors alone and highlight the importance of considering a seasonal niche duality to gain more insights into complex range effects in species with seasonal ranges.

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A study on site and habitat fidelity of Western Marsh Harriers *Circus aeruginosus* using wingtags.

Abstract

Western Marsh Harriers occur in a range of open habitats, mainly wetlands. Locally, they have shifted to crop fields as a nesting habitat. In 2011 we started a long time research project on the ecology of the species, including populations from Belgium and SW-Netherlands. One of the objectives is to study dispersal and site/habitat fidelity: (1) how is the interchange between populations, (2) does young birds show site/habitat fidelity to their fledging site, (3) does adults show site/habitat fidelity to their breeding site. This knowledge is important to evaluate the overall population status and to provide conservation policy advice, in particular for breeding sites in agricultural crops. Since 2011 we fitted wingtags with unique colour and code combinations on 431 young birds from 158 different nests, in crops as well as in reed beds. Until now, about 15% of the tagged young have been resighted as breeding/attempted breeding adults, in or outside our study area. There is no prevailing direction for dispersal and distances reach up to 200 km. Numbers are still low but apparently there is no clear site nor habitat fidelity between young and adult stage, although adults tend to show a higher site fidelity once established.

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Offshore wind: The importance of bird density and breeding season definitions

Abstract

In the case of UK offshore wind developments, avian collision risk at a site is usually derived via a mean density figure following two years of baseline survey, which may not reflect the importance of that site in years when seabird use is high. Estimates of collision impacts on Special Protection Area (SPA) breeding populations are influenced by definitions of the breeding season, some of which have been arguably too narrowly-defined.

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Winter roost place selection of Long-eared Owls *Asio otus* in European Russia

Abstract

In an urban setting in southwestern Russia we investigated roost site use by Long-eared Owls (*Asio otus*) during winter. Number of Long-eared Owls at the study site ranged from 80 to 150 individuals in the 4 winters, 2010-2013 (mean = 107.3). Long-eared Owls preferred to roost in conifers (93.7%, N=429), particularly in spruces (*Picea* spp.) (65.0%) and pines (*Pinus* spp.) (21.0%). Cedars (*Thuja* spp) (7.7%) and deciduous trees (*Populus* spp., *Fraxinus* excelsior) (6.3%) were infrequently used by owls. Results of model analysis showed that among roosting trees, excepting spruces, number of owls at a particular roosting place was significantly affected by the year, tree type, level and zone of the crown. Middle level and first zone from the trunk were chosen by higher numbers of owls than other levels and zones. Roost locations within spruces were close to the middle of the tree and close to the trunk. Thus, Long-eared Owls at the winter roost site frequently used trees and particular places with the best concealing qualities likely to protect themselves from the environmental factors such as weather and human disturbance.

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Habitat preference of wintering Wrynecks, *Jynx torquila*, in the North of Extremadura, Spain

Abstract

Despite an increase in efforts to study the annual cycle of migrant birds, still a lot is unknown about their habitat preferences and behaviour during the non-breeding season. Not only for long distance migrants that eg migrate from Europe to Africa, but also for short-distance migrants that spend the winter in southern Europe, only few studies exist that have investigated the whereabouts of such migrants during winter. Recently, using geolocators, it was shown that Wrynecks from central European populations actually migrate to sites north of the Sahara, instead of presumed sub-Saharan non-breeding sites. In an effort to better understand its wintering ecology, we investigated the habitat preferences of Wrynecks in the North of Extremadura in January 2014 and 2015. We found that Wrynecks occur in a range of habitats close to water sources within a landscape mosaic usually typical for extensive agriculture on deep sandy soils characteristic for rivers and streams. These findings not only highlight habitat preferences in a conservation context, but also show the importance of studying migrant bird species during the non-breeding season.

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The distance between a nest and a residential building as a measure of the degree of synanthropization of magpies *Pica pica*

Abstract

An increasing number of species throughout the world is involved in the phenomenon of synantropization. Nowadays there is a need not only to explain and determine this process, but also to measure how advanced the level of synantropization is. The author proposes to determine European Magpie's degree of synantropization using measurements of the distance between residential buildings and magpie nests. To assess the degree of this process, the average distance of the nests from buildings and characteristics of the distance distribution have been considered. The material includes mapped nests from five cities in central Poland as well as non-urban areas. In these areas magpies were also counted in the previous years i. e.1977-79 and 2005-2007. Density and other indicators based on the quotient of the center and the outskirts solely do not account for the level of synantropization). Additionally, the fact that the degree of synantropization increases with the distance from the river valleys with wet meadows has to be taken into consideration. In some cases, the degree of synantropization in non-urban areas may be higher than in urban areas.

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Demographic and phenological aspects of ecology of Common Kestrels in Moscow region (Russia)

Abstract

The research was conducted in the north of Moscow Region (Russia) at the 48 km2 study plot. The aim was to determine demographic and phenological parameters of Common Kestrels and analyze their variability under meteorological factors. Monitoring of the local population was started in 1994. After hanging nest boxes for Kestrels in 2000 their average density increased from 2.8±0.8 pairs per 48 km2 (1994-1999) to 8.7±2.1 pairs per 48 km2 (2000-2014). Number of pairs peaked in 2003 (21) and 2010 (26). On average the first observed arrival was on 2 April±3 days (n = 14). Estimated laying date of the first egg was 2 May±4 days. Earlier laying date and the interval between the arrival date and egg-laying were positively correlated with the transition of average daily temperatures over 0C°. Departure dates varied from 8 August to 25 November (on average 18 September±9 days). Date of the last meet correlated with the autumn abundance of small mammals. The annual average clutch size varied from 4.5±0.3 to 6.0±0.2 eggs, the number of hatchlings – from 3.1±0.7 to 4.7±0.5. The overall breeding success in 2009-2014 (n = 50) was 74.0±0.3%. The survival rate for feeding stage was 100%.

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Incubating in the city: a comparative study between urban and rural birds

Abstract
A wide range of avian biological processes are affected by urbanization, including differences in daily and seasonal activity between rural and urban bird populations. Understanding how urbanization impacts on timing-related traits is essential to comprehend the ecological and evolutionary constraints regulating adaptation to city life. Incubation is a crucial life-history stage but it has received very little attention in a urban-rural framework. Using individual-based data of incubating female blue tits (*Cyanistes caeruleus*) along a gradient of urbanization in Glasgow, UK, we aim at understanding whether incubation patterns differ along the gradient, and what the potential fitness correlates are. We found differences in the time incubating females terminated their activities outside the nest-box along the urban-rural gradient. Females in urban locations were active one hour longer than the rural birds before settling on their eggs for the night. This difference was also reflected in the length of the "working-day", which was longer in cities. This result suggests that rural females need to spend less time outside the nest to secure resources for incubation. These data will be discussed in relation to reproductive success, food availability and environmental characteristics (light, noise and temperature) along the urban-rural gradient.

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Selection of feeding sites of Lapwing, Redshank and Black-tailed Godwit in floodplain of river valleys

Abstract
The aim of this study was to determine the foraging sites of waders in relation to shoreline and evaluation of soil thickness in the sites, which may limit the food availability. The study was conducted during breeding seasons on the two waders colonies in Narew and Biebrza valley (NE Poland). Feeding sites were classified into 5 categories distinguished in relation to land/water border: zone 1) land over 1 m, 2) land to 1 m, 3) at the boundary of water, 4) water to the tarsus height, 5) water above the tarsus height. The soil thickness evaluated based on the depth of penetration of the metal pins, with a marked scale, which bled from a height of 1 m above the ground. Measurements were made in feeding birds sites and sites out of this randomly selected. Waders preyed mostly on land area: Lapwing preferred the zone 2 (60%), Redshank zone 3 (61.5%) and Black-tailed Godwit in zone 1-3 (total 72.2%). The soil thickness decrease as it moves away from the flood zone. In feeding sites was statistically higher than in randomly selected points. It can be assumed that availability of foraging sites varies with decline of floodplains and river valley drainage.

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Using species distribution models to extrapolate farmland bird species richness to another region

Abstract
Species distribution models (SDMs) are numerical tools based on the ecological niche concept, which combine observations of species occurrence or species richness with environmental variables. Generally, these models are used to predict the species' distribution or species richness on large geographical scale, but the most important is that they show environmental suitability for species or target groups. In this study, we test a hypothesis that data on focal farmland bird species richness (FFSR) collected in one region can be extrapolated in another region in the same biogeographical zone. Based on data from Poland, we have developed prediction model of FFSR for Slovakia. As a modeling procedure we have used General Additive models and tree regression. The goodness of fit on the best model was tested using data from atlas Birds distribution in Slovakia. Our model of FFSR is yet another step in predicting species distribution according to different environmental and spatial scenarios. Key words: farmland, niche modelling, species distribution models, Slovakia, Poland. Acknowledgements The work was financially supported by grant OPV ITMS: 26110230119 and National Scholarship Programme of the Slovak Republic (NSP) to JZK.

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Habitat and landscape preferences of a short toed eagle population breeding in the Italian Alps

Abstract
Short-toed eagles *Circaetus gallicus* are summer resident in Europe, wintering in tropical Africa. In Italy, a breeding population of about 400 pairs has been estimated, mostly distributed in the Alps, pre-Alps, Ligurian Apennines and along the western slope of central Italy. To our knowledge no studies describe so far habitat and landscape preferences of short toed eagle nest site in the Alps. With this contribution we analyze 40 nests located mainly in intra alpine valleys of Aosta Valley and Piedmont. Nests were found on trees with a diameter at breast height ranging from 22 to 117 cm, at an altitude ranging from 430m and 1700m asl. Observations of first flight in the morning showed that the birds started hunting on average 2-3 hours after sunrise. In intra alpine valleys the average distance between nests and hunting territories was 2200m (1400-4000m, n=14). At the habitat level nests were placed on the third superior of prominent evergreen coniferous trees (*Pinus sp.*). In few instances deciduous species were selected *(Castanea sativa, Fagus sylvatica, Larix decidua*). Landscape analysis showed a clear preference of the species to build nests far from human infrastructure, facing North-Eastern exposition with increasing slopes.

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The diet of Little Bitterns *Ixobrychus minutus* on extensively managed fish ponds in central Europe

Abstract

Little Bittern is probably the least studied species of the European herons. Although in a large part of its continental range the species is thought to breed mainly on fish ponds, knowledge on its ecology in such habitats is still lacking. I collected data on prey delivered to flightless young of Little Bitterns nesting on extensively managed Common Carp (*Cyprinus carpio*) ponds in eastern Poland in 2014. The analysis of prey composition was based on 48 regurgitates collected from 19 nests. A total of 202 items were retrieved and most of them identified to a species level. Fish formed a substantial part of prey taken by chicks (58,4% in terms of numbers). The diet was also composed of invertebrates (23,8%) amphibians (17,3%), and mammals (0,5%). At least six fish species were recorded in the food remains. Cultured fish (young-of-the-year carp) constituted only 21,2% while two alien invasive species *Carassius auratus gibelio* and *Psedorasbora parva* (wild grown in ponds) formed 44,9% of fish prey. The largest fish ingested by young was ca 10 cm of total length. The most frequent invertebrate prey were Odonata, Coleoptera, and Heteroptera, both larvae and imagines. All amphibian prey were anurans, mainly late pre-metamorphic stages.

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Ecological correlates of the distribution of alpine birds in polish part of Carpathian Mountains

Abstract

High-mountain habitats are currently at risk because of combined effects of land use modifications and climate change. This makes group of alpine bird species especially vulnerable and in need of protection. But our understanding of factors shaping communities of alpine birds is still far from satisfying and this may hamper proper planning of their conservation. Ecological studies focusing on birds of the high-altitude habitats are still scarce, and only few studies have been carried out in the second largest mountain chain in central Europe – Carpathian mountains. The aim of the study was to analyse the habitat characteristics influencing the presence of alpine birds in polish part of Carpathians. The research has been carried out in the years 2012-2014 in the highest mountain ridges of polish Carpathian mountains, where on 36 plots more than 500 point counts has been performed. We present results of habitat requirements analysis for the whole assemblage of the alpine birds and for individual species of conservation concern in Poland – Water Pipit *Anthus spinoletta*, Common Redpoll *Carduelis flammea*, Alpine Accentor *Prunella collaris*. Based on those results, proposal of conservation measures is provided.

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Diet of globally threatened Aquatic Warblers *Acrocephalus paludicola* at breeding sites in South Easteen Poland

Abstract

Aquatic Warblers (*Acrocephalus paludicola*) have garnered attention from scientists and conservationists due to their unique mating system (promiscuity) and endangered-species statues. The population trend is decreasing due to habitat loss and degradation. Aquatic Warblers' females are involved in all parental duties: nest building, incubation of eggs, feeding nestlings. From May to August 2014 I collected data about breeding success and prey delivery rates, composition and size of food brought by females to chicks in Chełm Marshes in Southeastern Poland. In this area Aquatic Warblers breed in calcareous fen mires dominated by sawgrass and in similarly structured wet meadows. Repeatedly I employed small digital cameras hidden next to the nests to study 18 broods at different age of chicks (from 1 do 13 day old). I documented 154 hours from 65 camera footages. Results show that in terms of numbers, the diet of Aquatic Warblers appears to be dominated by Orthoptera (60,2%), Araneae (18,4%), Lepidoptera (14,3%), Odonata (2,9%), Neoroptera (2,6%) and other insects' orders (1,6%): Coleoptera, Hymenoptera, Diptera. Provisioning females apparently preferred larger prey size (the largest insect was ca 50 mm of length). The average frequency of feeding during recording was every 5,2 minutes.

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Woodpeckers as focal species for an ecological network design in the Po Plain (Northern Italy)

Abstract

Habitat fragmentation is a major threat to biodiversity. Thus the improvement of connectivity in highly fragmented landscape is a crucial issue for animal conservation. In this study we designed an ecological network for woodland birds in the agricultural landscape of the Po Plain (Northern Italy) using woodpeckers (great spotted woodpeckers *Dendrocopos major*, lesser spotted woodpeckers *Dendrocopos minor* and green woodpeckers *Picus viridis*) as focal species. Habitat suitability for woodpeckers was evaluated by generalized linear models and multimodel inference handling data on land use, landscape metrics and surrounding context. Circuit theory was used to define the best corridors network, subsequently compared with the distribution of other woodland birds. Wooded riversides, extended agro-forestry plantations and scattered natural forest stands appeared as the best components of a corridor design for woodland birds. The fact that other species threatened by forest fragmentation (e.g. Eurasian nuthatches *Sitta europaea* and marsh tits *Poecile palustris*) mainly occurred in the corridors network defined in the present study emphasized these results.

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How to survive in the urban jungle: Yellow-headed Amazon *Amazona oratrix* parrots in Germany

Abstract

The city of Stuttgart, Germany has been home to a population of naturalized Yellow-headed Amazon parrots (*Amazona oratrix*) since 1984. Due to habitat loss and pet trade, this species is threatened in its native range in Mexico. It is surprising that these neotropical parrots survive in the novel habitat where they are exposed to dangers like cold temperatures, seasonal fluctuations in food availability and man-made threats like traffic. For parrot conservation it is important to understand their reproductive behaviour and productivity. Therefore, breeding cavities were described and measured and a pilot study on breeding behavior was carried out, including observations on feeding behavior at the nest, territorial behavior towards other species and the fledging process itself. Counts at the roost site were conducted on a regular basis to analyze population growth. Furthermore, information on foraging behavior and diet throughout the year was expanded. The urban Amazon parrot population can provide important new insights into the behavior of this endangered species while these parrots are more easily accessible than in their native range in Mexico. It can also help us to understand how species adapt to a novel environment.

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Are aquaculture areas complementary or alternative to natural wetlands for waterbirds?

Abstract
Are aquaculture areas complementary or alternative to natural wetlands for waterbirds? The case of Veta la Palma in Doñana Natural Area. For many waterbirds, artificial wetlands, including aquaculture facilities, provide either complementary or even alternative to natural habitats at some stages of the annual cycle. Here we analyze the role of Veta la Palma (an originally ca. 11.000 Ha. of natural marshes areas included in Doñana Natural Area that were transformed into extensive aquiculture in the 1990's), for maintaining waterbirds populations during winter and migratory periods between 2004 and 2013. The results show that Veta la Palma maintains an average of 62.0% (SD=13.7) of waterbirds wintering in Doñana, with 104 species recorded (81 of them regularly). The relevance of this site is even higher during migration, with 79.1% (SD=7.5 DE) 80% of birds counted in Doñana Natural Area staying in Veta la Palma during this period. These percentages have remained fairly stable over the study period. Our results suggest that the aquaculture facilities of Veta la Palma, as an example of extensive sustainable aquaculture, provide alternative (preferred) habitats to natural marshland and play an essential role for maintenance of wintering and migrating waterbirds populations in Doñana Natural Area.

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Habitat requirements of Boreal Owls *Aegolius funereus* and Pygmy Owls *Glaucidium passerinum* in mountainous populations on the Balkan Peninsula

Abstract
The Balkan Peninsula holds some of the European relic montane populations of Boreal Owl (*Aegolius funereus*) and Pygmy Owl (*Glaucidium passerinum*) and little is known about their habitat requirements in these apparently isolated refugia. The occurrence of both species was studied in the Western Rhodopes (South Bulgaria) in relation to various forest parameters and forest management practices. We fitted logistic regression model to presence/absence data using backward stepwise analysis. Principal component analysis was performed to select the variables that best represented the stand structure. The presence of Boreal Owl was best explained by the proportion of plots with canopy closure ≤ 0.3 (inversely correlated) and with trees with DBH > 50cm, and the total amount of fallen dead wood in the penultimate stage of decay. The presence of Pygmy Owl was best accounted for by the total amount of rotting logs only. Results suggest preference of both species to forests with elements/ zones of old-growth forests, the Pygmy Owl being less prone to inhabit managed forests. Boreal and Pygmy Owls are of high conservation value and current findings can be used for adjusting the forest management practices in order to ensure both sustainable profit from timber and continuous species survival.

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A review of the impacts of corvids on bird productivity and abundance

Abstract
Corvids are often viewed as efficient predators capable of limiting prey populations. Despite this widely held belief, a comprehensive review quantifying the effect of corvids is lacking. We examine the impacts of crows, ravens and magpies on other bird species. We summarise results from 42 studies which included 321 explicit evaluations. We examined "abundance" and "productivity" parameters from both experimental and correlative studies. Negative impacts were more likely for productivity than for abundance (46% vs 10%). Experimental studies removing only corvids were less likely to show a negative impact on productivity than those removing corvids alongside other predators (16% vs 60%). This suggests that the impact of corvids is smaller than that of other predators, or that compensatory predation occurs. Crows were more likely to have a negative impact on target species productivity than Magpies (62% vs 12%). We conclude that whilst corvids can have a negative impact on bird species, their impact was nearly 6 times more frequent for productivity than for abundance. These results suggest that in the vast majority of cases bird species are unlikely to be limited by corvid predation pressure and therefore that conservation measures may generally be better targeted at other limiting factors.

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Spatial characteristics of Ortolan Bunting *Emberiza hortulana* habitat selection

Abstract
Ortolan Buntings have undergone one of the most severe population declines of any European farmland bird over the last thirty years. The aim of this study was to find out which habitat features, including crop characteristics, ortolan bunting prefer in Estonia, and how selection patterns differ at territorial scales. This study compared currently occupied and unoccupied ortolan bunting territories. Occupied areas contained significantly more tall broadleaf trees, crop types, structural elements (trees, bushes, roads, overhead power lines and buildings) and spring wheat, but had lower crop drilling densities. Ortolan bunting territories were best described by a logistic regression model containing six variables: amount of structural point elements, length of power lines, amount of tall broadleaf trees and number of different crops had a positive effect, whereas crop density and area of autumn-sown crops had a negative effect. Based on the findings of this study, the following conservation measures can be recommended: lower crop densities; spring rather than autumn-sown crops; small-field systems containing a variety of crops; scattered scrub preserved or planted; habitat patches of permanent grasslands, hedges and tall broadleaf trees retained within the agricultural landscape.

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Habitat displacement effect between Ural Owls *Strix uralensis* and Tawny Owls *S. aluco* in fragmented habitats

Abstract
In owl communities, interspecific interaction driven by competition for food and nesting places usually lead to spatio-temporal niche segregation between co-distributed species. We addressed this phenomenon between sympatric and allopatric populations of Tawny Owls (*Strix aluco*) and Ural Owls (*Strix uralensis*) in areas of forests deficiency and fragmentation (southern Poland). Tawny Owls (compared to sympatric Ural Owls) occupied forests with higher canopy compactness, sites located closer to forest border and to built-up areas, stands with a higher share of fir and spruce and a lower share of beech. Allopatric Tawny Owls (compared to sympatric Tawny Owls) occupied sites with lower canopy compactness, located further from forest borders and in stands with lower share of fir and spruce and a higher share of deciduous. As Ural owls are dominant in relation to Tawny Owls, this indicates that the presence of Ural Owls prevents Tawny Owls from occupying deciduous-dominated and old stands located in forest interior areas, far from buildings and forest edges. The results support habitat displacement between the two species when breeding in sympatry. We also show that protection of large forest patches is crucial for the Ural Owl, a species still rare in central Europe.

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Causes of breeding failures in the Black Storks *Ciconia nigra* as revealed by remote cameras

Abstract
Black Storks *Ciconia nigra* are threatened bird species with distinct geographical trends across Europe – range expansion and adaptation to human tolerance in the western and, in contrast, marked population declines and avoidance of humans in the eastern part of the continent. In the current study we investigated declining Black Stork population with low breeding success in Estonia. In order to identify reasons behind breeding failures, 13–20 automatic motion-triggered photocameras and 1–2 web-cameras, annually, were set up at nests in 2010–2013. We monitored activity of birds on the nest during breeding season and obtained information about the phenology and breeding performance. We found that many nests are occupied by a single territorial Black Stork. Only less than half of the population started breeding and from less than half of the laid eggs offspring fledged. The impact of predation was lower than expected. Instead, main reasons behind breeding failures were breaking of eggs due to the fights initiated by visiting other Black Storks and death of the juveniles on the nest due to unknown reasons.

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Ecological responses to extreme flooding events in Common Cranes *Grus grus* wintering in SW England

Abstract

Climate change is causing an escalation of extreme weather events. However, responses from individuals facing these situations are still unclear. We aim to understand how severe flooding events shape survival, distribution, behaviour and energy expenditure in Eurasian Cranes (*Grus grus*), rare and iconic birds wintering in the Somerset Levels (UK), a lowland wetland that experiences regular winter flooding. Winter 2013/2014 was the wettest in over 200 years, resulting in record flooding extent and duration. To monitor birds' responses to such events, we fitted 22 reintroduced cranes with GPS and accelerometer devices and used remote sensing data to model the floods during three consecutive winters (2012-2015), encompassing a range of water levels. Our results show that during the acute phase of the floods, potential feeding areas decreased dramatically and cranes restricted their activity to a very small unflooded area. During the winter 2013/2014 cranes increased their foraging effort by 5-20% compared to winters 2012/2013 and 2014/2015, with a consequent increase in energy expenditure and a reduction in resting time. Survival was steady for the three winters, showing that behavioural flexibility can withstand the effects of extreme weather events. However, long-term consequences of these situations should not be neglected.

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Nest-site selection by Great Tits in primeval conditions (Białowieża National Park, Poland)

Abstract

Studies of European cavity-nesters breeding in natural nest-sites are scant, even for an otherwise well-studied species, such as the Great Tit *Parus major*. This provides an incomplete picture of nest-site preferences, limited information on the causes of nest losses and factors affecting the nest placement decisions of adults. To fully understand adaptations of birds, including those related to nest-site selection by cavity-nesters, the observations are needed from conditions similar to those in which the organisms have evolved. These primeval conditions have survived in a few places in Europe, among them in the Białowieża forest strictly protected within Białowieża National Park (Poland). Here, diverse tree cavities are superabundant, enabling cavity-nesters to choose their preferred nest-sites which would favour successful reproduction. We describe the features of the tree cavities used by breeding Great Tits in the primeval Białowieża forest and present some of the drivers of nest-site selection by the tits. We consider the role of predation, light conditions, microclimate and risk of flooding as selective factors that are important for birds nesting in tree cavities.

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Why do vertebrate top predators engage in complex predatory and competitive interactions

Abstract

Several studies have investigated the consequences to the victims of complex predatory interactions among vertebrate top predators, which includes super-predation and intra-guild predation. On the other hand, the determinants of super-predation have received little attention from researchers. We considered three main hypotheses – a) food stress; b) opportunistic super-predation; c) competitor/predator removal – and combinations of these as possible causes of interactions among vertebrate top predators. We used data from 65 eagle owls territories in south-western Iberian Peninsula to discuss the most probable drivers behind the killing and consumption of top and meso-predators, such as owls, diurnal raptors and mammalian carnivores. We considered competing additive models to explain super-predation by eagle owls taking into account main prey and meso-predator abundance. Super-predation showed non-linear relationships with both main prey and mesopredator abundance, indicating an interaction of these effects, with a greater consumption of mesopredators where main prey is scarcer and mesopredators are more abundant. The most frequently preyed mesopredators were the smallest and most common species, which are not strong direct competitors or serious threats. Our results support the hypothesis that super-predation by eagle-owls in the study area is determined mostly by food stress and opportunism.

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Wintering and stopover ecology of Wood Warblers *Phylloscopus sibilatrix* in sub-Saharan Africa

Abstract
Wood Warblers *Phylloscopus sibilatrix* are a fast declining breeding species in Europe. Intensive work on their breeding grounds in the UK has failed to identify the causes of this decline. Therefore, the focus of our research has switched to their ecology on the wintering grounds in sub-Saharan Africa, at both a stopover site in Burkina Faso (Koubri, where birds spend 1-2 months), and in southern Ghana (Pepease), where birds overwinter for up to 4+ months. Birds were radio-tracked for up to three weeks, 23 birds at Koubri (2012-14) and 20 at Pepease (2011-13). As may be expected for a species familiar from European forests, variables describing the 'woodiness' of the landscape were key predictors of areas used by radio-tagged birds at both sites. Certain tree species were also favoured: *Anogeissus leiocarpus* at Koubri (where birds also often travelled up to 1km to roost in favoured trees, often the non-native Eucalyptus), and *Albizia zygia* at Pepease. In addition to promoting the maintenance of wooded landscapes and the retention of trees within farmland to enhance the conservation of Afro-Palearctic migrants, our work suggests that the species composition of such areas may be important in their suitability to wintering Wood Warblers.

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Effects of nuclear radiation on the vulnerability of feathers to bacterial degradation

Abstract

The exposure to high levels of nuclear radiation has profound effects on organisms, causing severe health problems or even death. In birds, exposure to radiation increases mutation rates and consequently impedes the proper development of feathers, increasing the frequency of abnormalities in their colour patterns, morphology and shape. Even, some birds have abnormal barbs that prevent them from fusing normally, which may affect feathers' functionality and susceptibility to attack by keratinolytic bacteria. We tested this hypothesis in a population of barn swallows (*Hirundo rustica*) from Chernobyl, where a nuclear accident took place almost thirty years ago. We studied the degradability of tail feathers by means of a laboratory experiment in which feathers were incubated with a feather-degrading bacterium, *Bacillus licheniformis*, followed by measurement of the amount of keratin that was digested. The same experiment was performed with swallows from a control population free of radiation but with similar ecological characteristics in Denmark. We found that feathers of individuals from Chernobyl degraded at a higher rate than those from Denmark. This result implies that long-term effects of nuclear radiation not only affect individual's performance, but also interactions with other organisms such as bacteria, which may have sever implication in survival prospects.

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How do long-distance migrating shorebirds keep pace with the environment?

Abstract
Migratory birds have tightly packed life history cycles in which all events such as the accumulation of nutrient stores, moult, migration flights and reproduction should be in pace with the environments used and with each other. The known basic mechanism of time-keeping in animals is an endogenous annual clock, synchronized with the environment through exogenous cues. The entraining cues differ among species, but long-distance migrants are predicted to rely on photoperiod. To test this prediction we followed annual cycles of body mass and moult in 45 Red Knots *Calidris canutus islandica* throughout their 20 years in captivity in the northern Netherlands, experiencing the natural photoperiodic cycle of their wintering area. Fourteen birds additionally were exposed to 8 years of constant photoperiodic (12:12 LD) and temperature conditions. Under constant conditions, the annual cycle in the Red Knots started to free run with a period longer than 12 months, and different traits became desynchronized. However, upon return to outside aviaries the birds recovered their annual schedules and expressed cycles of body mass change and moult with extraordinary consistency, and with a timing similar to that in nature. As predicted, in organizing their year, Red Knots greatly relied on photoperiodic cues.

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The relevance of the food peak's architecture in trophic interactions

Abstract

Phenological shifts and changes in the temporal match with the food peak are ecological consequences of the climate change. We suggest that food peak's architecture – phenologies and abundances of individual prey species and the level of synchrony between them – determine the timing and shape (height, width, peakedness) of the food peak. We demonstrate this with data from three prey species (Willow Tits *Poecile montanus*, Eurasian Blue Tits *Cyanistes caeruleus*, Great Tits *Parus major*) and their avian predators, Eurasian Sparrowhawks *Accipiter nisus*. We found a good temporal match between the predator's breeding schedule and food availability. Temporal trends in the timing of the food peak or synchrony between prey species were not found. However, the food peak has become wider and more peaked over time, which expectedly makes the trophic match/mismatch more relevant for the breeding success of the predator, hence affecting its timing of breeding. Interestingly, the timing of the highest food availability may become later although prey species would advance their phenologies. High annual fluctuation in the timing of the food peak resulted from alternating abundances of early and late breeding prey species. Arduously predictable timing of the food peak could explain insufficient phenological adaptations at higher trophic levels.

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Different strategies to breed in an environment with seasonal food availability

Abstract
Different species are often specialized in different environmental conditions to decrease the strength of interspecific competition. In addition, different phenotypes within species have been suggested to be adapted to different environmental conditions. In temperate climate insect food availability tends to peak within a short period of time and for insectivorous birds it is important to match the timing of breeding to the greatest food availability. The importance of breeding in synchrony and in food-rich habitat may however differ between species and phenotypes. We studied European Pied Flycatchers *(Ficedula hypoleuca*) and Collared Flycatchers (*Ficedula albicollis)* in rich and poor habitats on the island of Öland, Sweden in 2013–2014. We conducted cross-fostering experiments and measured growth and corticosterone stress responses of the nestlings. Additionally we measured food availability in different habitats throughout the breeding season. We analysed if growth rates, stress-sensitivity and reproductive success differ between the two species in relation to environmental conditions. We also studied if different phenotypes within species differ in their success between rich and poor environments. The results provide new information about mechanisms of adaptations to different environmental conditions. The study will help to understand how different species and phenotypes will respond to rapidly changing food-webs.

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Life history and behavioural traits in blue tits: differences between two Mediterranean habitats.

Abstract

Habitat-specific selection pressures on phenotypic traits have been widely studied, but whether selection favours different personality types in different habitats has rarely been evaluated. We videotaped the exploratory and the parental provisioning behaviour, and linked variation in this personality trait with the reproductive success in natural populations of blue tits (*Cyanistes caeruleus)* inhabiting two different habitats (oakwood and pinewood). We used a path analytical approach to establish links between these behavioural traits and reproductive success. Blue tits had lower exploratory behaviour rates in the pinewood. In contrast, feeding rates were higher in the pinewood than in the oakwood, due to the smaller size of the caterpillars available in the first one. Nevertheless, breeding success was lower in the pinewood, implying that it is a low quality habitat for this species. Our results suggest that the establishment of blue tits in a habitat is conditioned on their behaviour, allowing a better adaptation to its particular characteristics, as abundance of resources or temperature regimes. This study also emphasizes the importance of using multivariate statistical analyses to the study of behavioural evolution.

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Where are you from or how old are you? Both immigrant and local young females prefer adult mates

Abstract

Immigration and emigration through natal dispersal have the largest impact on population structure. This exchange of individuals could lead to differences in reproductive success, depending on the origin and sex of the recruits. When looking for differences between immigrant and locally born individuals, mate characteristics should be included into the analyses, since reproductive success depends on both pair members. In a Great Tit *Parus major* population breeding in extensive and homogeneous orange plantations, we investigated the differences in reproductive success between immigrant and local young, considering the mate's age and origin. Results showed that 65% of young females, while only 45% of young males, were immigrants. Biometrics and reproductive success were similar between immigrants and locals of both sexes. After adding mate traits, bigger young females (immigrants or locals) mated more frequently with adult males (immigrants or locals), and these pairs started laying earlier and produced heavier and bigger fledglings. We highlight the importance of social dominance by size in young females over differences given by birthplace in homogeneous habitats. Nevertheless we cannot underestimate the demographic aspect, where immigrant females outnumber local ones, raising therefore more fledglings into the population.

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Environmental dependency of Antarctic breeding birds in the Fildes Peninsula region, South Shetland

Abstract

Through recent, as well as long-term changes in polar ecosystems, potential impacts on breeding species of the Antarctic are inevitable. This study aims to distinguish environmental factors that drive temporal changes in the breeding pair numbers of bird species in the maritime Antarctic. Long term monitoring of breeding pair numbers yielded time series of seven different species of seabirds, which include penguin species (Adelie Penguin (*Pygoscelis adeliae*), Gentoo Penguin (*P. papua*) and Chinstrap Penguin (*P. anatarcticus*)), skua species (South Polar Skua (*Stercorarius maccormicki*) and Brown Skua (*S. a. lonnbergi*)) as well as other bird species nesting in the region (Antarctic Shag (*Leucocarbo bransfieldensis*) and Southern Giant Petrel (*Macronectes giganteus*). In this on-going study, different environmental variables, derived from station based as well as remote sensing measurements, were included in univariate as well as multivariate approaches to determine potential impacts on the formation of breeding pair numbers over several years. Preliminary results show, that potential impacts are mainly connected to the breeding period of the species, few influences derive during times of non-breeding. Summarizing, the study seeks to contribute to a broader understanding of environmental drivers in Antarctic ecosystems and gives further insight into changes of breeding communities and species distribution.

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Drivers of bird diversity in Italian vineyards: both landscape and management matter

Abstract

Winegrape is a typical Mediterranean crop which will likely expand to meet increasing wine demand and in response to climate change. Spreading of viticulture may pose serious threats to biodiversity; therefore, decreasing its environmental impact is critical for conservation. We studied vineyard avian communities in Trentino (South-eastern Alps, Italy) both in breeding and wintering season to understand the effect of habitat traits and management on birds. We calculated 5 community indexes and modelled how they change according to 18 variables belonging to three different levels (landscape, management and topography-climate). Landscape models performed better than others except in the case of Shannon diversity index, for which the management model proved to be higher-ranked. Landscape complexity, semi-natural and marginal habitat extension, traditional elements (such as hedges, three rows, stone walls) in the landscape proved to have positive effects on bird communities, whereas the cover of vineyard and intensive orchards generally have negative effects. On the basis of our results, we recommend some potential measures for bird conservation both at the landscape and the farm scale. Such measures are particularly important for e.g. Rural Development Programs given that vineyards have been left out from the 'greening' obligations at the EU level.

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The role of Mediterranean islands in the evolutionary diversification of the Spotted Flycatchers *Muscicapa striata*

Abstract
Our study highlights the major role played by the western Mediterranean islands (Balearic Islands, Corsica, Sardinia) in the evolutionary history of a long-distance migratory passerine species, spotted flycatchers. We show that present-day genetic structure of the spotted flycatcher comprises two primary mitochondrial lineages. One lineage is endemic to the mainland and has a widespread geographical distribution including North Africa and Eurasia whereas the second lineage is restricted to the Balearic islands, Corsica, Sardinia and possibly some coastal regions of Italy. Within the mainland lineage, North African and Spanish birds form a well-supported monophyletic group with respect to other Eurasian populations (mitochondrial genetic distance, 1.3%). The insular lineage is genetically well differentiated from its mainland counterpart (3.5%). Balearic birds (*M. s. balaerica*) do not share any haplotypes with Corsican and Sardinian birds (*M. s. tyrrhenica*). This result suggests the absence of matrilineal gene flow between these two insular subspecies. This study provides an interesting case-study illustrating the crucial role of Mediterranean islands in the evolution of a passerine showing high dispersal capabilities. We hypothesize that differences in migratory behaviour and breeding phenology may prevent any gene flow between insular and mainland populations of the Spotted flycatcher.

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Is supplementary feeding in gardens a driver of evolutionary change in a migratory bird species?

Abstract
Urbanisation is responsible for some of the most extreme human-altered habitats and is a known driver of evolutionary change, but evidence and understanding of these processes is limited. For birds, a fundamental feature of the urban landscapes is the high abundance of anthropogenic food resources. However, whilst it is perceptible that supplementary feeding might elicit evolutionary responses within wild bird populations, this possibility has largely been overlooked by previous studies. Here, we examine whether supplementary feeding in British gardens during winter has contributed to the contemporary evolution of migratory behaviour in Eurasian blackcaps *Sylvia atricapilla*. Blackcaps from central Europe have been wintering in urban areas of Britain with increasing frequency over the past 60 years, rather than migrating south to the Mediterranean. Using a long-term national-scale dataset, the British Trust for Ornithology's Garden BirdWatch, we examine the potential drivers of blackcap wintering behaviour in Britain. Our new findings suggest that both human supplementary feeding activities and changes to the British winter climate have been important in facilitating the establishment of a wintering population of blackcaps in Britain. This study presents new and timely evidence that some species may be more resilient to rapid environmental change than previously assumed.

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Songbirds conserved sites of MHC Class 1 molecules reveal a unique evolution in vertebrates

Abstract

Birds are considered dinosaurs that passed the 65 mya ago bottleneck. Songbirds (Passeriformes) include about half extant bird species (about 5000) and are generally the most air-thriving bird species, concordantly with their small size. MHC molecules have seven conserved residues in all vertebrates from jawed-fishes, 300 million years ago, to humans, including chickens. All wild songbird species tested by us (n=18) and others (n= 2) differ in α1 domain residue 10 and α2 residue 96 from all other vertebrates. Amplification, cloning and sequencing were performed by standard methods. Sequences alignment were done by using PAUP and MEGA programs software. Crystallographic studies were performed by using mammal and bird MHC molecules from MPID database and other sources and showed that these changes did not significantly vary the MHC class I molecule stability in songbirds. Further α1 and α2 domain comparisons by simple Composition Distances and Bayesian Inference showed that songbirds overall MHC class I molecules are phylogenetically more separated from mammal than other birds molecules. These small birds have undergone a different evolutionary pathway, than all other tested vertebrates and more terrestrial birds and specific changes observed in songbirds have an entropic, testable solution similar to that reached by other vertebrates.

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Does diet overlap influence spatio-temporal patterns of breeding in two sympatric passerines?

Abstract

Interspecific competition may induce a different use of space and time among ecologically similar species. The degree of overlap in resource use and information about resource demand and availability may provide indirect evidence for the occurrence of interspecific competition. At a marshland in Spain (Pego-Oliva Natural Park) we studied breeding phenology, diet and spatial overlap of two sympatric reedbed-nesting passerines, the Moustached Warbler *Acrocephalus melanopogon* and the Eurasian Reed Warbler *Acrocephalus scirpaceus*. Diet and prey selection were similar among species, while spatial overlap was relatively reduced (< 50%). Food availability increased throughout the breeding season, as well as the overall abundance of the two species. Moustached Warblers start breeding earlier than Eurasian Reed Warblers, and according to our breeding phenology data the periods of higher food demand (nestlings rearing) of the two species were clearly segregated in time. Given the high diet overlap, we suggest interspecific competition for food as an explanation of the reduced spatial and temporal overlap observed among the two species. In fact, breeding early Moustached Warblers have to deal with a reduced number of competitors, while those Eurasian Reed Warblers avoiding the areas previously occupied by Moustached Warblers would suffer lower competition for food.

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Drivers of song adaptation along urbanisation gradients into two Central European cities

Abstract
Among the most conspicuous changes induced by urbanisation are adjustments of territorial songs to the environment. Type of adjustment partially varies among species and study regions. Song adaptations in Oscine birds are certainly not innate, could be not even permanent within an individual, but rather instantaneous. Anthropogenic noise is favoured as the cause for changes in song frequency and other characteristics. Nevertheless, other potential stressors for birds in cities have not been ruled out. Most studies focussed on a single steep gradient from urban to "natural" environment. We studied songs of three common songbird species in Central Europe around two major cities from city centre via suburbs to forests. Besides recording spontaneous territorial songs of Eurasian Blackbird (*Turdus merula)*, Eurasian Blue Tit (*Cyanistes caeruleus*) and Great Tit (*Parus major*), a variety of environmental features were registered in the field or taken from published sources. They have been used to compile a continuous urbanisation gradient that is correlated with several compositional and frequency traits of the songs. We ask which environmental traits contribute most to the variation of the vocal traits, if the three species adjust songs in different ways and if adaptation differs between the two cities.

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Allochronic and geographic reproductive isolation in an African songbird

Abstract

Ecological speciation - the divergence by local adaptation to different environments – is being studied extensively with focus on the role of geographic isolation for population divergence. In contrast, allochronic isolation - the separation of populations by timing - remains mostly unconsidered when studying speciation. Populations might exhibit temporal barriers to gene flow because seasonal activities must be accurately fitted to local conditions to avoid mismatches with the environment. African stonechats, Saxicola torquata axillaris, are a well-studied species with robust reproductive rhythms. We studied genetic, song, and morphological divergence between synchronic and allochronic breeding populations, and populations separated by geographic barriers. We found that allochronic and spatially isolated populations are genetically differentiated as judged from microsatellite loci and mitochondrial DNA. Allochronic, genetically distinct populations are spatially connected with no geographic or environmental barriers to gene flow, which strongly indicates population divergence as the result of allochronic isolation. The genetic structure is strongly concordant with patterns of song and morphology divergence. Females preferred phenotypic traits associated with synchronously breeding males, thus promoting reproductive barriers by behavioral isolation. Our results indicate that the evolutionary dynamics of allochronic isolation maybe key drivers for population divergence and ultimately speciation.

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Drivers of recent urban colonization by a reed-nesting waterbird, the Eurasian Coot *Fulica atra*

Abstract
Selective forces responsible for urban colonization in waterbirds remain largely unrecognized. In this study a process of adaptation to urban environment was studied in a reed-nesting waterbird, the Eurasian Coot *Fulica atra*, in central Poland. Coot pairs nesting in a recently colonized city centre had significantly higher hatching success and annual reproductive output in comparison to pairs nesting in suburban natural-like habitats. Urban-dwelling birds were also in better condition measured with body mass and blood haemoglobin concentrations. City colonization yielded no survival costs for adult coots and urban individuals showed higher site fidelity than suburban conspecifics. The results suggest that the recent urban colonization by Eurasian Coots was primary driven by considerable reproductive benefits which can be primarily attributed to: (1) reduced predation resulting from an exclusion of most native predators from highly urbanized zones; (2) increased condition of urban-dwelling birds resulting from enhanced food availability.

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Unforeseen biogeographical patterns in a multiple parasite system in Macaronesia

Abstract

Understanding the reasons explaining why hosts lose, maintain or swap their parasite burden after colonizing new areas has long intrigued island biogeographers. We evaluate parasite biogeography using molecular markers in the spectacled warbler (Sylvia conspicillata), in Macaronesia, by studying a multiple parasite system of Apicomplexa protozoans (haemosporidian and coccidian parasites). We amplified and sequenced two mitochondrial genes (cytb and COI) to determine prevalence, diversity and associations between groups of pathogens from the continental sources to the macaronesian islands. We did not find a significant reduction in the parasite diversity in the macaronesian islands compared to mainland. The prevalence was higher in Macaronesia than in the mainland although it was only significant in the haemosporidian parasites. We found an unforeseen strong differentiation in the coccidia with a similar structure to the haplotype topology found in the host. This study has revealed that the colonisation and diversification in a multiple parasite system is more complex and partially counter-intuitive to that expected from island syndromes where an impoverishment of parasite assemblage and lower prevalence were expected. Intriguingly, such oceanic systems provide the opportunity to illuminate co-speciation processes in bird-coccidian interactions since coccidian closely track the evolutionary history of their hosts.

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Mergus populations in Lapland reserve (Kola Peninsula) in 1969-2014.

Abstract

In Lapland nature reserve are three species of *Mergus*. Until the 1970s, the most common were *Mergus serrator*, comparatively less frequently met *Mergus merganser* and *Mergus albellus* were rare. Later it was discovered that since the 1970s, the ratio of change and more common Goosander all *Mergus* species. In 1969-2014 in August was determined by the linear density of waterfowl on routes 110 km. Average density: Smew – 0.68 ind/10 km of coastline (lim = 0-2.1, σ = 0.58), Red-breasted Merganser – 2.35 (lim = 0.4-6.8, σ = 1.53), Goosander – 4.8 (lim = 1.4-13.9, σ = 2.33) (for all n = 46). The Smew is not registered in the 11 years from 46 years of observations. The smallest density Smew marked in the 1983-1988; density of Red-breasted Merganser – increase during this period after decrease since the early 1970s. In the 1990 - 2014s the density of this species decreased, and the Smew and Goosander during this period increase. In general, the density of a Goosander compared to 1970s period increased almost twice, the Red-breasted Merganser has decreased fourfold, Smew stayed the same, but it is increasing since the late 1980s. The reason of density changes of Goosander and Red-breasted Merganser remains unclear.

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Birds of the western macroslope of the Northern Urals

Abstract

The study area is situated at the interface of two big geographical units, Europe and Asia, and is characterized by both latitudinal and altitudinal division into zones which, in turn, affects local bird fauna. Now, the territory counts 241 bird species of 16 orders, among which 186 are nesting species. The most distinguishing feature of local bird fauna is the absence of alpine bird species which normally inhabit mountain countries of the Palearctic. Only one nesting endemic species, black-throated accentor (*Prunella atrogularis atrogularis*), was found in the under-goltsy altitudinal belt in the zone of dwarf birch vegetation. In Ural it was represented by one group of species being isolated from its principle occupation place in Altai and Tien Shan. The majority of bird fauna (90%) is formed of plain species which inhabit mountain areas of the Subpolar and Northern Ural Mountains. Bird fauna of mountain-forest belt includes Siberian species as black grouse, capercaillie, hazel grouse, Tengmalm's owl, hawk Owl, three-toed woodpecker, Siberian jay, Siberian accentor, yellow-browed warbler, red-flanked bluetail, black-throated thrush, willow tit, Siberian tit, nuthatch, brambling, two-barred crossbill, and little bunting. Generally, bird fauna is represented by typically taiga species. But as the territory lies at the interface of the eastern-European and the western-Siberian plains, bird fauna includes both European and Siberian fauna representatives and numerous arctic mountain tundra species. The work was financially supported by the 12-P-4-1018 project 'Species, cenotic, and ecosystemic diversity of landscapes at the UNESCO World Heritage object 'Virgin forests of Komi''

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Birds of Natural Reserve "Birds harbour" in the centre of city Omsk

Abstract

Natural Reserve «Birds harbour" has an area of 1 km2 and is situated in the centre of city Omsk, which has population more than 1 million people, in Western Siberia. Counts was made by methods of U. Ravkin (1967) labour zoological monitoring Institute Systematic and Ecology Animals SB RAS (Novosibirsk). The total abundance was counted in May and July 2014 (1337 and 1366 individuals/ km2), it tells us, that birds prefer the most saved water territories of Priirtishja in migration and increasing number of birds in July after appearance chicks of ducks and Black Coot. The most species richness was observed in May (30 species), which is explained by the preference of migratory birds to use the natural park in this time. In spring migration was counted Great Crested Grebes (62 ind/km2) Common Pochards (76 ind/km2), Gadwalls and Northern Shovelers (15 ind/km2). The dominant species is Black Coot in April and in nesting period (May-June, on the average 50 ind/km2). In post-nesting period Black Coots and Shovelers (abundance increased by 12 fold), Great Crested Grebes (X 4), Gadwalls (x 2), Common Pochards (x 1.5).

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Numbers and ecology of Woodpigeons *Columba palumbus* in European Russia

Abstract
Studies were conducted 2011-2014 in different regions within the forest, steppe and mountain zones of Russia, during implementation of the project sponsored by Federación de Caza de Euskadi, Spain. Woodpigeons are 'wild' birds in Russia, avoiding urban habitats, so the data were collected in farmland and woodland areas. The main objects of studies were obtaining new data on numbers and distribution in breeding period, determination of breeding success via assessment of ratio of adult and juvenile birds in post-breeding flocks and monitoring of wintering Woodpigeons in the North Caucasus. Main important factors influencing on nesting densities are described. Modern peculiarities of post-breeding distribution of Woodpigeon in the forest zone, depending from the changes in agriculture and abandonment of large farming areas, are discussed. Foothills of the North Caucasus near Black Sea coast are very important areas, supporting significant part of all-Russian population of wintering Woodpigeons. The maximal number of birds was assessed as 430,000-450,000 individuals in winter 2013/2014 with favourable weather conditions. Trends of wintering population, their driving factors and characteristics of Woodpigeon winter movements are shown and analysed. The phenomenon of sea water's drinking by Woodpigeons, depending from types of winter food, is discussed.

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Four years' changes of a summer bird population after a forest fire in the centre of the East Europe

Abstract
In summers 2011–2014 bird populations were surveyed in the center of the East European Plain, which suffered from forest fires of 2010, using line transect counts with a total length of 1300 km. A part of a UNESCO biosphere reserve, Nizhegorodskoye Zavolzhye, were investigated. These wetlands are of international importance. During the research seven main types of habitats, as well as similar undamaged areas, were investigated. The investigation covered different vegetation types and degrees of damage. The trees that had fallen after the fires made the whole habitat more of a mosaic. This contributed to the gradual increase in the number of species and cumulative abundance of bird populations in the forests damaged by the ground fire. In the first year after the crown fires, the characteristics of the bird populations decreased. However, during the second year the number of bird species here doubled. The local species acting as indicators of these areas were identified. The abundance of periperhal species increased in the damaged areas in the third year and the forest species still formed major components of the bird populations in the post-nesting season. The abundance of birds increased gradually during the nesting season. The characteristics of the bird populations of undamaged areas were lower.

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A Bibliographic Database on Birds of Turkey

Abstract

This research describes a national bibliographic database on bird studies of Turkey. As a total there are 1.342 papers including Ms-PhD thesis, articles, guides, books and field work reports dating between 1836 and 2014. This database includes all available information about researches on ecology, avifauna, migration, breeding and wintering area, bird atlas, conservation, genetic and molecular, parasitology, toxicology, microbiology and anatomy. The database is listed in an excel sheet. Most of the literature in Turkey on birds (83%) describes work done after 1980. Ecology-based researches were started in 1950s. The number of ornithologists, birdwatchers and research methods in studies is increasing in Turkey. The database is intended to provide easy access to this important background information; Turkey's literature on birds is composed of avifauna (43%), atlas, distribution and breeding (18%), ecology (17%), migration (13%) and conservation (11%). Over the last 30 years there has been a great increase in the number of papers documenting Important Bird Area (IBA), mid-winter waterfowl census, biodiversity and conservation in Turkey. This increase also provides a useful framework in examining some historical trends of conservation priorities within Turkey. Parasitological, virological and bacteriological studies have increased since the early 2000. Crimean-Congo hemorrhagic fever and avian influenza disease has been a major factor in this increase.

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Influence of trophic and meteorological factors on the population dynamics of the Long-eared *Asio otus* and Short-eared Owls *A. flammeus*

Abstract
The research was carried out in the north of Moscow Region (Russia) in 2001–2014. The dependence of the population dynamics of both species on the environment parameters was analysed using generalized linear models (GLM). There were four peaks in population dynamics of predators and voles. Years with high number of voles coincided with an increase of breeding number of Short-eared Owls within the study area. Results of modeling showed that the trophic and meteorological parameters significantly affected the number of Long-eared Owls. Highest number of Long-eared Owls was related to the vole abundance (β±SE=0.23±0.03). Weather factors affected the number twice weaker (β=0.12±0.02). Long-eared Owls number was found to be positively related to average temperature of spring months and negatively - to the snow depth in March-April and precipitation in spring. Both parameters were significantly correlated with the number of Short-eared Owls. Factor associated with meteorological parameters affected owls weaker than the trophic factor: β = 0.05 ± 0.02 and β = 0.24 ± 0.0, respectively. Thereby, the population dynamics of owls simultaneously affected by the abundance of prey and various meteorological factors. Meteorological factors influenced the population dynamics of Long-eared Owls much stronger than of Short-eared Owls.

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The Swiss Breeding Bird Atlas 2013–2016

Abstract

In Switzerland, two breeding bird atlases have been published, covering the periods 1972–1976 and 1993–1996, respectively. Because many species had suffered massive declines already before the 1970s, a Historic Breeding Bird Atlas additionally documents the distribution of the breeding birds in the 1950s. Fieldwork for the new atlas started in 2013 and will last up to 2016. After two seasons already some interesting first results are revealing. The online portal www.ornitho.ch plays a key role in data transmission and as an online-atlas. Comparisons with the former atlas periods 1972–1976 and 1993–1996 show dramatic changes in both the distribution and density of several species. While many species in the agricultural zone or long-distance migrants experienced serious declines, other species have increased, especially water birds. With simplified territory mapping in 2319 1 × 1 km squares (5.4 % of the area of the entire atlas perimeter), preliminary abundance maps based on 1726 1 × 1 km squares mapped in 2013–2014 were calculated. Differences in the altitudinal distribution since 1993–1996 allow the estimation of the effects of climate and habitat change.

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Causes of long–term population changes of high-bog avifauna in Latvia

Abstract

High bogs as habitat for birds have experienced dramatic changes due to peat extraction in Northern Europe. The methods of peat extraction have changed since 19th century. We classified bogs in three categories: (1) intact by peat extraction; (2) old (re-naturalized) peat extraction bogs; (3) bogs with active peat extraction. Old peat extraction sites have succeeded the succession and naturalized, but the modern ones have little space for biodiversity. We studied bird population changes in Latvian bogs by analysing data on three national bird atlases: 1980–1984; 1985–1989 and 2000–2004, as well as transect counts on 13 plots to assess quantitative changes over the last ten years (2003–2014). One species – Red Grouse *Lagopus lagopus* has not been observed in Latvia since beginning of 2000. Steep declines in bog habitats in Latvia were observed in two species – Curlew *Numenius arquata* (bogs are the primary habitats for Curlew in Latvia) and European Cuckoo *Cuculus canorus*. Several bird species show moderate declines in bogs over the study period e.g. Wood Sandpiper *Tringa glareola*, Common Crane *Grus grus* and Chaffinch *Fringilla coelebs*. One species – Skylark *Alauda arvensis* showed strong increase.There are considerable differences of avifauna due to peat extraction history.

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A graph-theory approach for analyzing metapopulation dynamics: the case of White Storks *Ciconia ciconia* in France

Abstract

To know how the individual and genetic flows works between populations within a metapopulation, it's important to understand population dynamic of species. The aim of this study is to analyze a metapopulation dynamic in White Storks by using a 25 years ringing/resighting dataset on the entire French territory. A graph-theory usually used to describe the social network is applied in an ecological context in this species by determining nodes (five populations: North-East/North-West/Centre/West/South) and edges (dispersing events). We highlighted the clusterization of our populations (North-East/Centre and North-West/West), indicating preferential interactions. We also have shown that the mean migration direction (32°) largely influenced the number of dispersing events, independently from the distances between the populations. Links were asymmetrical, North-East and North-West populations giving more individuals than they received. Finally, the centrality of the population varied through time, and a switch occurred from West to North-East for the most central population. In conclusion, the graph-theory approach gives a complete vision of individual movements within a metapopulation. Our study shows a temporal evolution, the importance of the migration direction or even a source/sink structure. The recent use of this approach should promote future studies.

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First insights in the wintering population of Egyptian vultures *Neopron percnocterus* in Extremadura

Abstract
The globally endangered Egyptian vulture (*Neophron pernocterus pernocterus)* is assumed to be a migratory species with few overwintering individuals in the Iberian Peninsula, mainly in Extremadura (SW Spain) and Doñana National Park (SW Spain). To date, there are no estimates of the population size using these areas as wintering sites. We performed a survey during winter 2014-2015 to quantify the wintering population at Extremadura, and counted simultaneously all know roosting sites. We have also tagged with GPS/GSM transmitters two individuals, an adult and juvenile, to get some insights on the origin, breeding areas and the behaviour of overwintering individuals in Extremadura. We estimated the population to 58 individuals (45 adults and 13 subadults). A new roosting side was discovered (not included in the census), with 26 individuals located thanks to the tagged immature. According to this, the population is estimated to 90-100 individuals. While the juvenile stayed in the area, the adult bird moved to a breeding territory only 60 kilometres of distance from the core of the wintering area. Accordingly to GPS data and visual observations both individuals seem to be dependent of extensive sheep farming and intensively farmed poultry and pigs during the winter.

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Where the two cultures meet: Estimating absolute abundances using N-mixture models and Random Forest models

Abstract

Several European countries uphold significant strongholds for numerous common bird species. Unfortunately many of these remain poorly documented in lack of human and financial resources. In a great number of countries the best available coverage is obtained through different monitoring programs. The methods used for modern data evaluation are generally developed for long term and good quality data, with very specific requirements, hard to meet by such countries. Here we present an approach combining two modelling techniques to estimate absolute abundance distributions, and thus the possibility to calculate population sizes on a national scale. Romanian Common Bird Monitoring data from 2010-2014 were used in a two-step process: 1. detection probabilities and absolute abundances for survey points were estimated using an N-mixture model; 2. the distribution of absolute abundances were estimated by tree-based models. In our case we used the program JAGS for the former, and the R package TRIMmaps for the latter.

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Numbers of Black Stork *Ciconia nigra* in Ukrainian Forest Zone

Abstract

Black stork *Ciconia nigra* is a rare bird in Ukraine, which is Red Data Book species. It is under Bonn, Bern and Washington conventions protection. The species is widespread in the Forest zone (on the North) and in the Carpathian region (on the West) of Ukraine. Investigations on Black Stork numbers were conducted 2009-2012 on the territory of Zhitomir region during the All-Ukranian census, organized by Chair of Zoology at Shevchenko National University and Bird Conservation and Study Society of Ukraine. Data were collected due to own studies and with questionnaires distributed among forestry worker and local population. During the census it was found 108 Black stork nests. Besides this 59-62 possible breeding sites were recorded, where birds were observed in a breeding season but their nests are still not known. So, Black stork is breeding in Zhitomir region in amount not less than 167-170 pairs. The average density of the nests in this area is 1,73 pairs per 100 km2 of the forests. The most negative factor which influence on the numbers of the species is an intensive timber cutting. Among positive factors there are bird adaptation to human activities.

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Drones for estimating abundance of Antarctic penguins and Giant Petrels

Abstract

The penguin colonies of the Antarctic undergo considerable changes, mainly caused by climate change. As penguins are visible to remote sensing systems they are suitable for the use as an indicator for the Antarctic and Southern Ocean ecosystems. To derive quantitative information from satellite images, reliable ground-truthing data are necessary. The use of small drones (UAVs) represents a new technique to acquire such information efficiently, cost effective and with low disturbance to the birds. The study shows the results of the UAV-based mapping of penguin colonies and additionally Giant petrels on King George island, South Shetland Islands, Antarctic. The airborne mapping outcomes colonies were compared with the results of traditional GPS-based ground mapping. The results reveal that the obtained breeding pair numbers only have minor differences the two methods. These differences are mainly caused by misclassifications of incubating and not incubating individuals.

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Climatic, landscape and habitat factors determining the spread and spatial distribution of Mute Swan *Cygnus olor*

Abstract

Climate warming and ecological plasticity allowed the Mute Swan significantly expand its living area northward in the 20th century. However, its distribution does not go further East part of the Gulf of Finland during last 20 years. Mute Swan is the largest of the palaearctic swans. It has the longest breeding season - about 6.5-7 months. The analysis shows that the mass distribution of the species in inland waters, mainly lakes, limited in Pskov region and on the extreme South-West of Leningrad region, where the duration of the ice-free period is at least 7 months (average, from mid-April until the mid-November). The shorter ice-free period on lakes of the Leningrad region does not allow the successful breeding. However, the ice-free period in the Gulf of Finland is significantly longer - around 9 months. The distribution of birds is determined by the insular landscape - moraine and rocky skerries. The bulk of birds (more than 90%) nests in moraine landscape, where a boulder shallow waters with filamentous algae plantations occupy a significantly larger area than in the rocky archipelago (more than 10 times). The high density of swans in the moraine Islands is caused by ability to the formation of colonies.

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Origin of re-colonized White-tailed Eagle (*Haliaeetus albicilla*) populations in Central Europe

Abstract

The European White-tailed Eagle populations suffered drastic decrease during the 20th century, but recovered by now. We studied the structure of several recovered populations (e.g. Carpathian Basin countries, Czech Republic, Germany, Poland, Finland) using 11 microsatellite loci and a 499bp mitochondrial DNA fragment. We found a subdivision with three major populations (Northern, Central and Southern), confirming the basically philopatric behaviour of the species. However, our results suggest that considerable amount of wintering birds could stay and start breeding at their wintering places. This behaviour could explain the high number of birds with northern genotypes in the Carpathian Basin population. Furthermore, our findings indicate that the genetic composition in the Czech Republic was highly influenced by the eagles released between 1978 and 1989 in this area.

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Population dynamics and breeding dispersal of Eastern Imperial Eagles in the Carpathian Basin

Abstract

Individual-level monitoring of survival rate and breeding dispersal is an important part of conservation programmes as it helps to estimate both the effect of potential or real threats and the efficiency of particular conservation measures. After a severe bottleneck and habitat loss in the second half of the 20th century, population census of Eastern Imperial Eagles in the Carpathian Basin began to grow. This was accompanied with an expanding breeding area, increasing breeding density and changes in breeding territory use (from mountains toward lowland). Recently still only a fraction of suitable habitats are occupied by the species. However, increasing level of direct poisoning emerged as a novel threat. We investigated the annual turnovers of adult breeding birds in 150 territories in a 18-year period. Individual genotypes were identified via multi-locus genotyping, using non-invasively collected shed feathers as DNA source. We identified 320 breeding birds (100 males, 220 females). Mortality rate was estimated around 10 %, breeding dispersal (when a breeder moved to another breeding territory) was estimated 4%. Despite the recent changes in population size and density, high level of breeding site fidelity (with a large number of long-term stable breeding territories) is present in the population.

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Variation in the distributional changes of Finnish land birds

Abstract
Several studies have shown that species are shifting their distributions towards poles and higher altitudes as has been predicted by climate change forecasts. The variation between species in the speed of range shifts is large and still poorly understood. As capability to response to climate change can be critical for the extinction risk of the species, we need to understand the reasons for why some species are shifting their ranges and some are not. In my presentation I will show results of studies that have utilized data from several long–term monitoring schemes in Finland to study shifts in both range edges and mean latitude of density of land birds. I will discuss how different weather variables and functional groups influence the velocity of distributional changes.

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Long-term trends of Great Bustard *Otis tarda* in Alentejo (Portugal) and Extremadura (Spain)

Abstract
Of the global Great Bustard (*Otis tarda*, IUCN Vulnerable) population, 70% breed in Iberia. Extremadura and Alentejo hold 11% of the total Iberian population. They depend mostly on extensive open agricultural habitats to breed, and remain vulnerable to agricultural intensification. However there have been some notable conservation successes for some sub-populations. Using breeding season census data collected since 1980, we analysed temporal population change across Alentejo and Extremadura, bringing together data-sets from both countries in an integrated trans-boundary analysis. We defined local nuclei, sub-populations and regional populations based on demographic parameters, across multiple spatial scales. This definition accounts for potential connectivity and movements among adjacent sub-populations that in practice form a metapopulation structure. This long-term, multi-scale, cross-border analysis offers a unique assessment of population trends that captures the metapopulation structure in Alentejo and Extremadura, and provides important tools for better cross-border conservation. In SW Iberia a few large sub-populations utilising high-quality habitats have increased but many smaller sub-populations had decreased or become extinct, a similar pattern to other parts of Iberia. We discuss implications for conservation of Great Bustards across SW Iberia.

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Detecting spatial structure in bird populations from mark-resighting data

Abstract

When individual birds consistently use different areas over long periods, this will lead to the structuring within populations, with different sub-populations being subject to different selection pressures. Thus, spatial structuring patterns might underlie fitness variation within populations. Here we explored spatial structuring in three migratory shorebird species at a wintering site, Roebuck Bay, Northwest Australia. Resighting data of marked individuals were collected at 10 roosts in 2009-2014. First, by expanding the concept of site fidelity, we developed a novel metric which did not require a priori assumptions on the home ranges of different sub-populations, and corrected for imperfect detection and variable roost availabilities caused by environmental factors (e.g. tidal ranges and disturbances). We detected between-individual differences in preferences for certain sets of roosts that persisted between years. Our method is applicable to sites of any spatial distribution, spatial scales and different availabilities, and enables comparisons of spatial structuring patterns between species in the same area, and between areas, as a descriptive step towards analyses of ecological shaping factors as well as the fitness consequences of spatial structuring.

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Dynamic N-mixture models with density-dependence in vital rates: an application to passerines

Abstract
A better knowledge of population dynamics at large spatio-temporal scales is fundamental to understand how demography is affected by environmental and anthropogenic changes. However, estimating survival and recruitment over large areas is difficult because it usually requires detailed demographic data from marked animals. The recently developed dynamic N-mixture model of Dail & Madsen (2011) is very promising in this respect because it yields estimates of abundance, survival, recruitment and detection probability from simple counts replicated in space and time. Such data are often collected in monitoring programs all over the world. Here, we apply a newly developed, dynamic N-mixture model that includes density dependence and environmental stochasticity in vital rates to spatially and temporally replicated count data of passerines obtained from the breeding bird monitoring in Switzerland. We investigate how the relationships between demographic rates and temporal and/or spatial covariates can improve the estimation of vital rates. We use an allometric model between body mass and survival as criteria of goodness-of-fit of our dynamic N-mixture models. References Dail, D. and Madsen, L. (2011) Models for estimating abundance from repeated counts of an open metapopulation Biometrics, 67:577-587.

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Influence of breeding and wintering weather conditions on population trends of Finnish waterbirds.

Abstract
According to most climate change scenarios, climate on Earth is anticipated to change dramatically in the next decades, increasing weather variability and stochasticity. Hence, population dynamics of many species will be profoundly affected. Anticipated changes in weather conditions and patterns will most likely have severe impact on population dynamics of avian species, including waterbirds. Studies showing the effect of temperature on population dynamics of birds have become increasingly common in the literature, especially those studying the effects of climate change on breeding populations. However, evidence is accumulating that winter temperature may be also an important factor driving population dynamics of migratory waterbirds and such studies are clearly under-represented in the literature. Furthermore, the effects of winter and summer temperature have rarely been assessed jointly in the same study for several species. Here we used an improved state-space model to assess the long-term (29 years) effect of both, the temperature in the wintering grounds and the temperature in the breeding sites, on population trends of 14 species of waterbirds breeding in Finland.. Results may shed new light into how waterbirds are responding to climate changes and the consequences for their population dynamics.

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Climate change and directions of density shifts in birds

Abstract
There is increasing evidence that climate change shifts species distributions. However, most studies are based on presence-absence data, and either abundance or the observation effort have rarely been measured. In addition, hardly any studies have investigated direction of shifts and factors affecting them. Here we show using count data on a 1000 km south-north gradient in Finland, that between 1970–1989 to 2000–2012, 128 bird species shifted their densities, on average, 37 kilometres towards north northeast. The species-specific directions of the shifts in density were significantly explained by migration behaviour and habitat type. Although the temperatures have also moved on average towards north northeast (186 kilometres), the species-specific directions of the shifts in density and temperature did not correlate due to high variation in density shifts. Findings highlight that climate change is unlikely the only driver of the direction of species density shifts, but species-specific characteristics and human land use practices are also influencing the direction. Furthermore, the alarming results show that former climatic conditions in the northwest corner of Finland have already moved out of the country. This highlights the need for an international approach in research and conservation actions to mitigate the impacts of climate change.

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Does wintering on different continents affects breeding and adult survival of Black-tailed Godwits *Limosa limosa*

Abstract
Migration connectivity and population dynamics in migratory species can be ideally studied by comparing the costs and benefits of individuals that breed in the same population but winter in different areas more than 3.000 km apart. The majority of Continental European Black-tailed Godwits (*Limosa limosa limosa*) breeds in agricultural grasslands in The Netherlands, and most spend the winter in West-Africa. Recently, despite a decline of 80% of the breeding population in the last 50 years, godwit numbers that winter in south western Spain in Doñana have increased. The increase in numbers in Doñana corresponds with an expansion of anthropogenic habitats. In West-Africa, godwits also mainly forage in man-made landscapes, such as rice-fields, but numbers have decreased. Does it still payoff for godwits to winter in West Africa instead Europe? By using >10.000 resightings of colour-ringed godwits we analyzed whether godwits that winter in Doñana differ in arrival time, breeding success, and adult survival rate from those that go to West-Africa to spend the winter.

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The effect of climate and river dynamics on a Sand Martin *Riparia riparia* population in Northern Italy

Abstract
The sand martin *Riparia riparia* is a transaharian migrant species, whose populations are declining throughout Europe. We present the results of a multi-year study on a breeding population of sand martins along the Po River through monitoring breeding sites (1970-2014) and ringing breeding birds at colonies (2002-2014). There was a shift in breeding sites over the study period, from traditional sites along the Po river to the more anthropic sites in the surrounding sand quarries. This might be caused by a limited river dynamic which reduces the suitable nesting habitats along the river banks. Ringing recapture data were analyzed with the software MARK v 6.1 to obtain survival estimates. Yearly survival rate was related to meteoclimatic indices (NAO, Sahel rainfall and Chad Lake rainfall). The analysis of ringing data (2543 adults) showed a different survival between sexes (39% for males and 24% for females). Survival was mainly related to rainfall in the Sahel area, and in particular in the Lake Chad area. Our study main consequences are: - sand quarries are increasingly important for sand martins and should be targeted for management; - the Lake Chad area needs further investigation as a key wintering site for this and other species.

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Surviving at high elevations: an inter- and intra-specific analysis with a sympatric association of open-habitat passerines

Abstract
Survival rate is a key demographic parameter for population dynamics and it plays an important role in life history evolution. Several intrinsic and extrinsic factors affect this vital rate but few studies have examined its variation by using simultaneously an interspecific and intraspecific data collected in the same environmental settings. We analysed clines of annual survival in a sympatric association of open habitat passerines along an elevation gradient in NW Spain. We tested whether the average adult survival of 20 passerine species was affected by the average elevation of their ranges, and whether the survival of populations of the Water pipits (*Anthus spinoletta*) and Northern wheatears (*Oenanthe oenanthe*), two species of this community, changed in the same direction, by using a capture-recapture approach. We found that high elevation species had higher survival than low elevation ones. Instead, at intraspecific level, we encountered that Water pipit survival decreased along elevation while Northern wheatear survival did not vary. This study shows that the same environmental pressures may not act in a consistent manner among and within species and we attribute this finding to the different influence of local conditions and environmental (non-genetic) variation at intra and interspecific levels.

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Effect of warm springs on Great Tits' *Parus major* population dynamics

Abstract

We analysed the time variation in survival, recruitment and population growth in a great tit (*Parus major*) population in eastern Spain. The analyses were based on capture-recapture data collected from 2004-2014 from a population breeding in nest boxes in Mediterranean forest. . Time variation in demographic parameters was analysed in relation to variation in temperature and rainfall. On average, survival probability of breeding birds was high 0.6, while local recruitment was low (0.1). The population show a stable trend throughout the study, though it was declining by the end of the study period. Neither adult nor juvenile survival were related to winter temperatures. The factor that affected most juvenile survival was temperatures during the breeding season. High temperatures during the breeding season, and during summer were associated with low juvenile survival, which resulted in lower growth rates. An experimental study consisting in heating nest boxes during the nestling period was conducted. The results showed that fledglings from heated nests had lower survival probability than fledglings from control nests. The differences in survival were present during the first days after fledging and resulted in higher number of fledglings from controls nests being recruited at the population.

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Immigration enhances fast growth of a newly-established source population

Abstract
Settlement of new population is unequivocally due to immigration from source populations. However, from thereon the population dynamics is also affected by local demographic processes (fecundity, survival and recruitment). We used capture-recapture and matrix population models to investigate the causal process beyond local dynamics and assess the contribution of these as opposed to immigration on a Glossy ibis (*Plegadis falcinellus*) population growth since its settlement at Doñana (SW Spain) in 1996. We found that the sharp increase of this population was accompanied by favorable local parameters (e.g. early age at first reproduction and high productivity) but it would not have been possible without the huge contribution of immigrants (ca. 58 pairs per year). Our findings have relevant implications for the understanding of the ecological processes driving population dynamics and (re)distribution of species. In particular, we highlight that new populations may quickly become crucial for spreading to other areas while immigration is still playing the main role for its growth. In a metapopulation context, we outline the importance immigration may play to switch the role of a population from sink to source in a very short time lapse.

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Territorial behaviour of Sylvia warblers in habitats occupied with different population densities

Abstract
We studied the territorial behaviour of typical warblers, namely Blackcaps *Sylvia atricapilla,* Garden Warblers *S. borin*, Whitethroats *S. communis*, and Lesser Whitethroats *S. curruca,* in the habitats occupied by them with the high local population density (to 67 pairs/sq.km at the Courish spit of the Baltic Sea, Russia) and low population density (1 pair/sq.km and even lower at the Republic of Karelia, Russia). We supposed that specifics of the territorial behaviour may be one of the adaptation mechanisms to the different social conditions, first of all, related to population density, and we aimed at investigation of this hypothesis. We found that Sylvia warblers' territorial behaviour have a high degree of plasticity and depends on population density. Particularly, sizes of conspecific males' territories and distances between them were getting lesser with increasing of population density. Also under the high population densities, we observed the most variety of behavioural patterns, including ones nonspecific for these birds. At very high and very low population densities, bird territoriality was partially reduced. The differences in the territorial behaviour presumably direct to the maximum realization of the reproductive potential in different environmental conditions. This study was supported by RFBR, research project NN. 12-04-31872 and 15-05-03493_a.

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Current condition of the most northern populations Dalmatian Pelican and Cormorant in Siberia

Abstract
Current condition of the most northern populations Dalmatian Pelican and Cormorant in Siberia Dalmatian pelican (included Red Book of Omsk Oblast) and cormorant firstly appeared in Omsk Oblast (northern forest-steppe) in 1980-s on lake Tenis (S=118 km2; 56º07' N., 71°45' E.). Numbers of nesting colony of Dalmatian pelicans increased in thirteen times, and total number of adult composed more than 400 and cormorant more than 600 in August 2013. These species are nesting in mixed colonies on the quagmire 6 islands. Cormorants are supplanting Dalmatian pelicans in front of islands. It leads to the fact that pelicans have latest clutch with difference in one month from the first. These species should nesting on coasts of lake because they have limiting nesting habitats. Here species meet new introduced species American mink (*Mustela vison*), who hunting on these species, but can kill cormorant, which are not so aggressive. Chicks of cormorant hit their heads in the reeds. Their behavior was passive. Chicks of dalmatian pelican were aggressive. Thus, we marked June 30, 2013 – 38 dead cormorant chicks on the shoreline of Lake Tenis. The Government of Omsk Oblast founded natural reserve "Pelican's island" on water area lake Tenis (2,5 km2) 26 June 2013. Nowadays problem staying between cormorant and owners of fish farms.

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Socio-spatial structuration of alternative breeding strategies in a colour polymorphic raptor

Abstract
It has been proposed that niche and behavioural processes may promote the coexistence of alternative colour morphs in discrete areas. In this study, we tested the hypothesis that alternative melanin-based phenotypes perform differently when co-occurring in breeding areas. We assessed the influence of microhabitat and social drivers on both the resulting nest-site distribution and the variation in reproductive success of interacting phenotypes of the colonial, colour polymorphic Eleonora's falcon (*Falco eleonorae*). We combined measures of social, behavioural and breeding performance, as well as environmental variables under a spatially explicit approach. We found that alternative morphs were segregated over suitable habitats by forming permanent same-colour clusters. This pattern was mainly due to social dominance relationships; the pale morph, which was less dominant but more aggressive than the dark morph, settled close to pale conspecifics but far from dark ones. This segregation was also influenced by the settling of dark morph males in less dense areas and at higher altitudes than pale ones. Although the timing of reproduction did not differ between morphs, the dark morph attained higher reproductive output during the study years. The evidence suggests that pale and dark falcons adopt different breeding strategies, with pale morphs behaving highly colonially and dark morphs being more territorial, yet their relative advantages depend on the environmental conditions. We suggest that balancing selection may act on such competitive asymmetries, likely contributing to the evolutionary stability and long-term maintenance of colour polymorphism in wild populations.

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Woodpecker survey in the Republic of Moldova

Abstract

The Republic of Moldova is a small Eastern European country with a mosaic of artificial and natural habitats distributed in a hilly region with the highest point reaching 429 m (Bălănești). Being a low land country, most of the forests suffered a great human impact, with only few exceptions, which are now protected areas. Most of the forests are fragmented due to poor forestry management. During 2013 – 2014 we set up a woodpecker survey programme in order to study their distribution and density in the forests from the Republic of Moldova.

Seven woodpecker species were recorded in our study area: Grey-headed Woodpecker (*Picus canus*), European Green Woodpecker (*Picus viridis*), Great Spotted Woodpecker (*Dendrocopos major*), Middle Spotted Woodpecker (*Dendrocopos medius*), Lesser Spotted Woodpecker (*Dendrocopos minor*), Syrian Woodpecker (*Dendrocopos syriacus*), Black Woodpecker (*Dryocopus martius*). Due to the survey period (March – May), we did not consider data on Wryneck (*Jynx torquilla*) for this analysis.

During the surveys, the most common species was Great Spotted Woodpecker (17 – 20 individuals/km^2), Middle Spotted Woodpecker (3.3 – 3.6 individuals/km^2), and Grey-headed Woodpecker (1.7 – 2.2 individuals/km^2) with almost 80% of the observed individuals. The rarest species recorded during our survey was the European Green Woodpecker with only few observations (3.7%).

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EOU2015

SPECIAL GUEST TALK

EOU2015

Josep del Hoyo

Lynx Edicions, Barcelona, Spain

Special Talk: 18:00 Tuesday August 25th AUDITORIO

A detailed explanation of the rationale and methodology behind the taxonomy of the new HBW and BirdLife International Illustrated Checklist of the Birds of the World.

Abstract

This if the first completely illustrated Checklist of the Birds of the World and the first to follow a consistent taxonomic methodology.

Josep del Hoyo is one of the authors of the checklist. He will discuss the species-level quantitative criteria that have been applied, and the results and implications for threat status and the conservation of birds.

MID-CONFERENCE TOURS

Local Organizing Committee (with the sponsorship of Gobierno de Extremadura, Diputación de Badajoz and Ayuntamiento de Badajoz) has organized seven different birdwatching and sightseeing tours for delegated attending to EOU 2015 Badajoz. All these tours will be held on Wednesday, 25 Aug.

Please make your choice and reservation no later than 12th of July by sending an email to the indicated email address (specific to each bird-tour)

Bird- tour 1: MONFRAGÜE NATIONAL PARK.

Sponsored by Gobierno de Extremadura

The Monfragüe National Park is a wonderful place to visit for both ornithology and Mediterranean flora; it was declared a Biosphere Reserve by UNESCO in 2003. It is the largest and best preserved stretch of Mediterranean mountain landscape in the world. The wild mountains delimiting the Tagus and Tiétar valleys are home to oak forests and Mediterranean trees and shrubs, boulders, reservoirs and streams; it is a typically Iberian landscape that provides a home for the Park's incredibly diverse flora and fauna. Tagus and Tiétar rivers surround Monfragüe, and their waters carve in the quartzite rocky outcrops where tawny vulture colonies settle. On the riverside and watercourses live kingfishers, cormorants, or nightingales, as well as animals that live in the water such as the otter. Among birds, you will find about 400 pairs of Eurasian Black Vulture, Spanish Imperial eagle, Black Stork, Egyptian Vulture, 600 pairs of Griffon Vulture, Golden Eagle, Peregrine Falcon, and Bonelli's Eagle. Apart from these bird species, you can find other species such as the Common Buzzard, Red Kite, Short-toed Eagle, Booted Eagle, Black Kite, Black-winged Kite and the Northern Goshawk.

6:00h. Departure from Badajoz.
09.00h – 13.00h: Birdwatching
13.30h: Lunch
15.30h: Return to Badajoz

If you wish to participate in this bird-tour, please send an email to eou2015monfrague@gmail.com
Maximum: 150 people

Bird- tour 2: TAGUS INTERNATIONAL NATURE RESERVE.

Sponsored by Gobierno de Extremadura

The Tagus International Nature Reserve is one of the last refuges for various threatened species native to Mediterranean woodlands. This Nature Reserve in the north west of Caceres province follows the Tagus river and its tributaries, the Erjas and the Sever, which act as a natural 60 kilometer border. The Spanish part covers 25,088 hectares and is home to many species, some of which are threatened with extinction, such as the black stork, the Iberian imperial eagle and the indigenous freshwater crayfish. The indigenous fauna also includes otters, water lizards, the short-toed eagle, the golden eagle, the Egyptian vulture, Griffon vultures, Black vultures and Bonelli's eagles, and an almost endless list of other mammals and fish.

Schedule:

06:30h. Departure from Badajoz. On the way through ZEPA Sierra de San Pedro (one of the most representative habitats of this protected natural area) there will be some stops to observe some of the most representative bird species (Spanish Imperial Eagle, Eurasian Black Vulture, Black Stork, Golden Eagle and Egyptian Vulture nest).

09.00h. Arrival to Cedillo (P.N. del Tajo-Tejo Internacional). Coffee-break sponsored by the Town Hill of Cedillo

10:00 h – 13.30. Boat trip through P.N. del Tajo-Tejo Internacional. Birdwatching

13:30 h. Lunch at “Casa Manolo” (Cedillo)

15:30 h. Return to Badajoz

If you wish to participate in this bird-tour, please send an email to eou2015tajoint@gmail.com

Maximum: 50 people

Bird- tour 3: LA ROCA DE LA SIERRA.

Sponsored by Diputación de Badajoz

Schedule:

8:00h. Departure from Badajoz.

8:35h. Stop at dam of Peña del Águila. Here you can see different species of Mediterranean forest from ZEPA-ZIR Sierra de San Pedro.

9:35h. Stop at Portilla de Alpotreque, a wonderful place to see raptors such as *Aquila fasciata*, *Aquila adalberti* and *Neophron percnopterus*, among others.

10:30h. Coffee-break

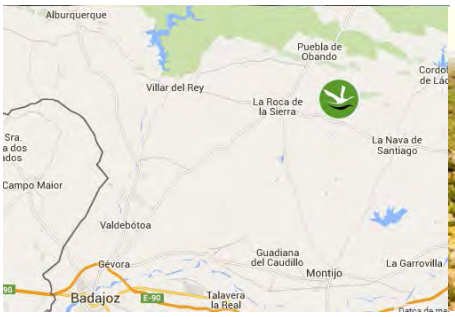
11:30h. Stop at Laguna de Morantes. Very interesting aquatic habitat in a well-preserved dehesa with numerous species of herons, egrets, Anatidae and waders

12:30h. Walking tour through Dehesa Boyal de la Roca and visit to "Province of Badajoz Bird Interpretation Centre".

13:30h. Lunch at La Roca de la Sierra and return to Badajoz.

If you wish to participate in this bird-tour, please send an email to eou2015laroca@gmail.com

Maximum: 25 people



Bird- tour 4: LA SIBERIA.

Sponsored by Diputación de Badajoz

Schedule:

8:00h. Departure from Badajoz.

09:30h. Visit "The Moheda Alta" peri-urban park's interpretation centre in Navalvillar de Pela, providing visitors with an insight into the life of the crane, pastureland and the surrounding area. Here you can observe different bird species of the Dehesa, and rice culture lands with numerous waders.

10:30h. Coffee-break

11:30h. Stop at Puerto Peña. With its beautiful landscape, consisting of dense pine and eucalyptus woods and large rock formations, it is a very valuable home for wildlife. Don't miss the opportunity to see the natural habitat of Griffon vultures, black vultures, black storks, golden eagles, Bonelli's eagles, booted eagles, peregrine falcons, goshawks and kestrels.

13:30h. Lunch and return to Badajoz.

If you wish to participate in this bird-tour, please send an email to eou2015siberia@gmail.com
Maximum: 25 people

Bird- tour 5: GREAT LAKE ALQUEVA.

Sponsored by Diputación de Badajoz

Schedule:

8:00h. Departure from Badajoz.

08:20h. Visit the Azud of Badajoz (An interesting urban ZEPA with herons and egrets)

09:30h. Visit Llanos de Olivenza (ZEPA-LIC) with important grassland or steppe bird species like great bustard, little bustard and Montagu's Harrier.

10:30. Coffee-break

11:30h. Boat trip in Great Lake Alqueva. On its sides and islands there are many bird species like spoonbills, herons and *Nycticorax nycticorax*.

13:30h. Lunch and return to Badajoz.

If you wish to participate in this bird-tour, please send an email to eou2015alqueva@gmail.com
Maximum: 25 people

Bird- tour 6: TAGUS ESTUARY (Portugal)

7:00 - Badajoz departure (Spanish time: 8:00)

9:00 -11:00 – "Sitio das Hortas". It is one of the best spots in Tagus estuary to see shorebirds in the interdital area during tide rise. The group will walk (about 2 km) to Alcochete through the edge of the estuary (Map 1).

11:00 - 13:45 – "Samouco saltpans". Here we could see Kentish plovers, Black-winged stilts and Little terns in breeding plumage and juveniles. "Canto salina"; in this artisanal saltpans we could see the flocks of shorebirds coming from the estuary; other bird species: stone curlews, marsh harriers, hoopoes, etc. (Map 2)

14:00 - 15:30 - Lunch in Alcochete (during the hottest part of the day).

16:20 - 18:00 - EVOA lagoons. We will pass through the rice fields, and could see Purple herons, Collared pratincoles, Glossy ibis, etc. Here the group can buy a snack (Map 3).

18:00-18:40 – "Ponta da Erva". This is the second best spot in intertidal area (Map4).

21:00 - Badajoz arriving (Spanish time: 22:00).

If you wish to participate in this bird-tour, please send an email to eou2015estuario@gmail.com
Maximum: 50 people

Bird- tour 7: AZUD DE BADAJOZ

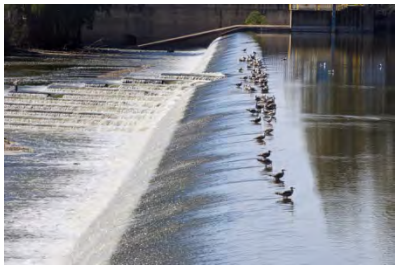
Sponsored by Ayuntamiento de Badajoz

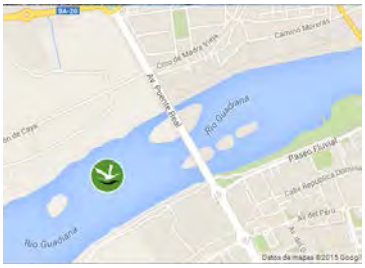
The weir that makes up El Azud de Badajoz slows the Guadiana river almost to a standstill, creating a unique ecosystem that is an ideal habitat for many endemic Spanish birds. This has led to the area being designated a Special Protection Area for Birds (SPA) and is included in the network known as Red Natura 2000.

So, if you are a bird lover, be sure to visit the permanent bird-watching site where you can see all the different species that live here. These include cattle egrets, lesser black-backed gulls, black-headed gulls, white storks and cormorants.

8:00h – 12.30h Walking tour through SPA El Azud de Badajoz

If you wish to participate in this bird-tour, please send an email to eou2015zepabadajoz@gmail.com
Maximum: 35 people





Palacio de Congresos de Badajoz

PLANTA 1

11 - SALA 5
12 - SALA 6

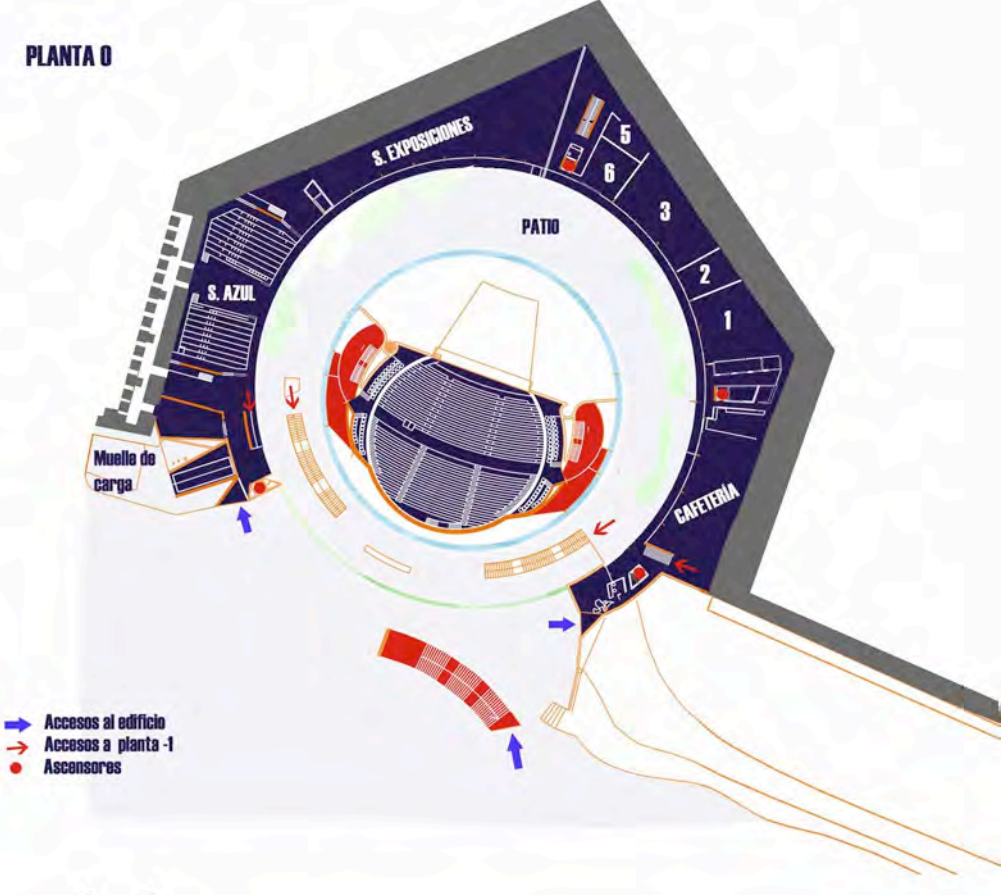
PLANTA 0

5 - SALA AZUL
6 - S. EXPOSICIONES
7 - SALA 3
8 - SALA 2
9 - SALA 1
10 - CAFETERÍA

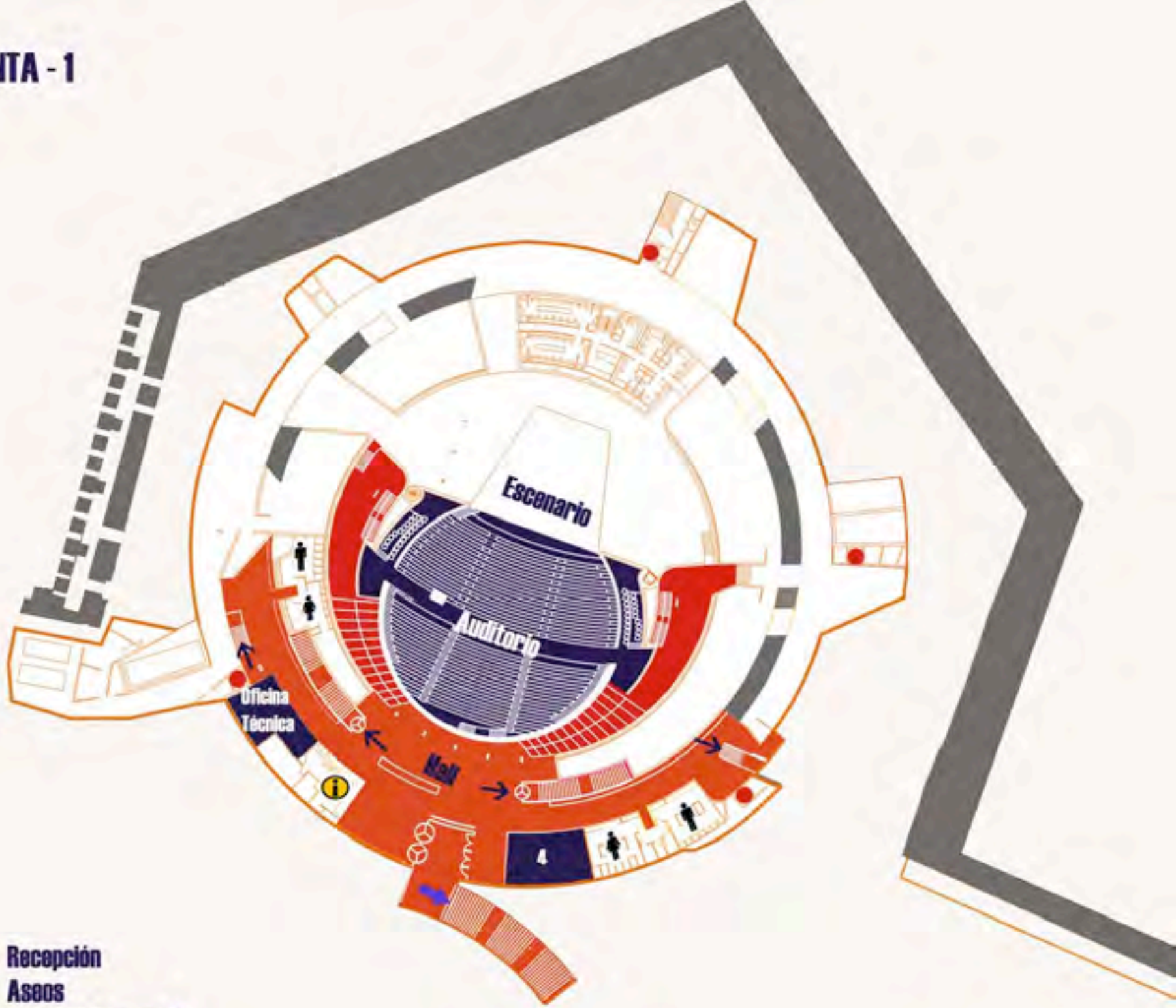
PLANTA -1

1 - HALL
2 - AUDITORIO
3 - SALA 4
4 - OFICINA TÉCNICA

PLANTA 0


S. EXPOSICIONES
PATIO
S. AZUL
Muelle de carga
CAFETERÍA
1
2
3
5
6
Accesos al edificio
Accesos a planta -1
Ascensores
0
10

PLANTA - 1



- Recepción
- Aseos
- Accesos a planta 0
- Accesos a exterior
- Ascensores

0 10

Extremadura
BIRDING

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- Festival of the Cranes
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INTRODUCTION

Extremadura and birds

Spanish Imperial Eagles, Black Vultures, Griffon Vultures, Egyptian Vultures, Black Storks… These are among the many species that soar above Monfragüe National Park –and just a sampling of the ornithological wealth of Extremadura (Spain), which has become a favourite region for nature lovers from all over the world. British, German, French, American and, of course, Spanish tourists –to name just a few nationalities– visit us with their cameras, binoculars and telescopes.

Extremadura can boast some magnificent nature resources and a wide range of products and services for this kind of tourist. In addition, we are specialists in organising events like the Extremadura Birdwatching Fair (FIO), the leading such event in Spain and the second most important in Europe after the one that is held in England each summer. This year we have celebrated its tenth birthday with a record number of exhibitors (94) and the best programme of conferences and activities since it began.

Extremadura is considered one of the most important regions in Europe for birds and thus it is among the most prized destinations for birdwatching enthusiasts and nature lovers from all over the world, drawn by the possibility of observing birds in natural habitats of great beauty and also of enjoying the interesting cultural and historical heritage of Extremadura.

It is without a doubt an authentic birdwatching paradise due to the excellent state of conservation of its natural habitats, in which Mediterranean vegetation finds one of its best expressions. Wood pasture (*dehesa*) is the most emblematic landscape of the region and plays a crucial role in the great diversity of birds, as many species are closely associated with this valuable habitat. But this territory also brings together a great variety of habitats that make up a complex mosaic, from high mountain landscapes of the Sierra de Gredos mountain range, passing through the extensive pasture lands of the peneplains, the dense Mediterranean forest formations that still cover the sides of many mountains and riverbanks, to the intricate network of waterways, tributaries of the Tagus and Guadiana rivers distinguished by large reservoirs. The agricultural landscape completes and enriches this diverse mosaic, integrating itself harmoniously with the natural habitats and highlighting the importance for the birds of the grain fields and irrigated crops, mainly rice and corn.

In recognition of its ornithological importance, 75% of its extensive territory has been included in the Important Bird Areas of Spain (SEO/BirdLife, 1995), an exceptional situation at both the national and European level.

BIRDING IN EXTREMADURA CLUB

How local services will help you

Owing to its ornithological richness, the region of Extremadura has been promoting birding as a form of tourism and today a large number of businesses are offering services related to birdwatching, so do also specialist travel agencies and a good accommodation infrastructure, specialized and experienced to meet the needs of birders.

Likewise, many entities and local development agents have also invested in this sector, to enhance this type of tourism in a sustainable way. All the actors directly or indirectly linked to ornithological tourism are welcome to the Birding in Extremadura Club.

The Birding in Extremadura Club is a voluntary group bringing together private and public sectors, with the purpose of coordinating and developing the supply of services related to birding in Extremadura, and to encourage growth in the number of tourists coming to Extremadura for birding guaranteeing to tourists high quality services and at the same time watching over the conservation of birds and their habitats as a tourism resource.

Promoted by the regional Government of Extremadura and supported by other institutions and business associations, the Club aims to develop further birdwatching tourism throughout Extremadura in a structured way and to meet the expectations of the demand.

Any entity, company or service related to ornithological tourism can join the Birding in Extremadura Club.

The Club is run according to the following principles:

Voluntary. The partners of the Club participate freely and voluntarily, aware of the benefits of working together.

Compliance. All partners in the Club have to meet the prerequisites of the Club to ensure that the product they offer will satisfy the expectations of the clients.

Cooperation. The partners of the Club form a network that develops joint and cooperative activities, to which all partners contribute, for the benefit of birding tourism in Extremadura.

Distinctiveness. The partners of the club are differentiated from other businesses which are not part of the initiative. The name and logo of the Club is for the exclusive use of partners only.

Commitment. All partners provide financial support to support the objectives of the Club and participate in the different activities to promote the Club and its projects.

Benefits. The partners of the Club receive derived from the promotional activities and marketing support.

Distinctive partners logo:

Number of partners

2012: 53
2013: 59
2014: 69
2015: 77 (July)

Type of partners (July 2015)

Accommodation: 26
Specialized guides and other birding services: 18
Tourist offices: 18
Local institutions: 9
Interpretation centres: 5
Incoming travel agency: 1

Contact details are the following:

Telephone number: +34 924 33 25 01
E-mail: vpalacios@gpex.es
Website: www.birdinginextremadura.com

BIRDING IN EXTREMADURA WEBSITE

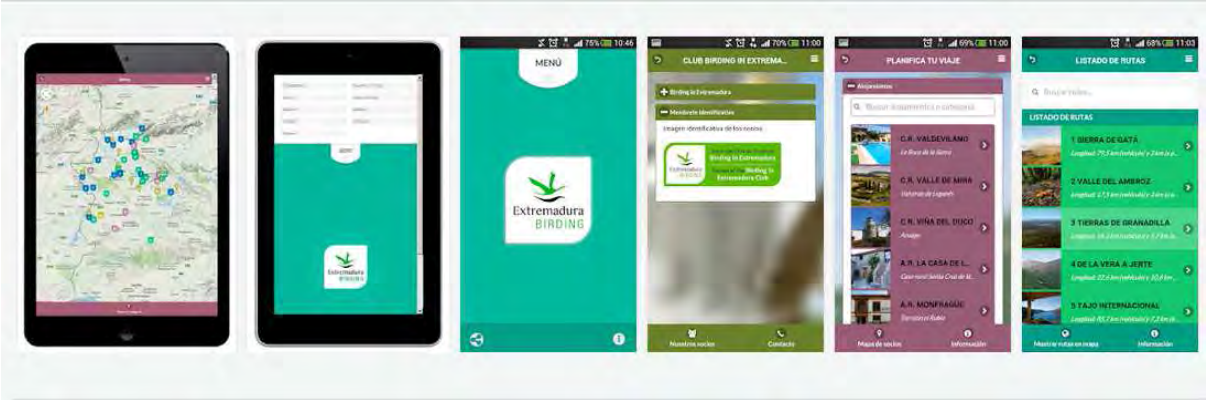
The website http://www.birdinginextremadura.com/ is a portal belonging to the Government of Extremadura that aims to promote ornithological tourism in this region. In its different sections, you can find all of the necessary information on the different species of birds, their habitats, the routes and itineraries that are available in the places of greatest interest for birdwatching and the times of year recommended for it, tourist services and, ultimately, everything we need to plan our ornithological trip and make the most of our stay in Extremadura.

The contents are available in Spanish, English, French, German, Italian and Portuguese.

BIRDING IN EXTREMADURA APP

If you are a birder and want to visit our region, then this is the app for you.

- Spanish and English versions
- 60+ geo-referenced partners including accommodation, guides, tourist information offices and interpretation centres
- 23 detailed routes, ideal to do by car combined with walks
- 120 + birding sites
- 10 habitats described
- 150 bird species included
- Vocalisations provided of each species
- Available on Google Play and App Store.



EVENTS

EXTREMADURA BIRDWATCHING FAIR (FIO)

Monfragüe National Park | Winter

The Extremadura Birdwatching Fair (FIO) celebrated a very special edition in 2015: their 10th anniversary. The past ten years of this event have put Extremadura on the European map of birdwatching and it has become the largest fair of its kind in southern Europe. Almost a hundred exhibitors and 13,500 visitors (35% more than last year) travelled to the heart of Monfragüe National Park from February 27th to March 1st.

The fair brings together the very best of nature tourism and ornithology in an open forum format: a broad presence of specialized companies, public institutions and conservationist associations, meetings among professionals from the sector, a programme which combines business and recreational aspects and, above all, the participation of experts and the general public in activities: technical seminars, professional workshops, a photography contest, guided tours and sessions for children.

All of the above takes place in Monfragüe National Park, one of the world meccas for birdwatching and an area declared to be a Biosphere Reserve by UNESCO.

Among the different scheduled activities, mention should be made of the 2,000 people who took part in the photographic workshops and conferences run by FOTOFIO. There was also a great response to the technical conferences about different subjects related to nature: 1,000 people listened to experts like Juan Varela, Killian Mullarney David Lindo, Stephen Moss, Joaquín Araújo, Carlos de Hita, José Luis Gallego and Antoni Margalida.

All the conferences of this year edition are available in video on www.fioextremadura.es

Workshop: Fifteen countries in 469 business meetings

The workshop of the 2015 edition was held on 27 February with the participation of 56 sellers and 26 buyers from 15 countries: Spain, the United Kingdom, China, India, Italy, Holland, France, Portugal, Belgium, Ireland, Denmark, the Czech Republic, Serbia, Norway and the United States.

In total, there were 469 professional contacts in just a few hours.

The workshop is an event organised during FIO for professionals from the tourism sector in order to promote business opportunities to companies that provide specialised services related to bird and nature tourism.

Entry to this workshop is limited to representatives of the companies of the Birding in Extremadura Club, inbound travel agencies from Extremadura and exhibitors participating in the fair.

Bird Photography Contest

Another attraction of the fair is a photography contest on the birds, regarded as one of the most prestigious on the national scene. In 2015, the contest reached its record number of 1,169 photograph submissions.

These were the winning photos in the five categories:

Birds of Spain
Images of wild birds made in any part of Spain.
Author: Mario Cea Sánchez
Title: *When Night Falls*

Birds of Extremadura
Images of wild birds made in the Extremadura autonomous region.
Author: Valentín Fernández Jiménez
Title: *Athene noctua. Textures*

Birds of the World
Images of wild birds made outside Spain.
Author: Arturo de Frías Márquez
Title: *Gentoo Penguins, Antarctic*

Habitat and Behaviour
Images of wild birds in their habitat, where the landscape takes on a special importance in the composition, or where the images demonstrate an interesting, curious or attractive aspect of the species being photographed.
Author: José-Elías Rodríguez Vázquez
Title: *Wings in the Heart*

Young Photographers
For photographers under the age of 18 at the end of the presentation time (17 February 2015).
Author: Carlos Pérez Naval
Title: *Enduring the Storm*

Martín Iglesias Prize
Author: José Luis Ojeda Navío
Title: *Silhoutte at dawn*

Canon Prize
Author: José Pesquero Gómez
Title: *Taking off together*

WEEK OF THE STORK

Malpartida de Cáceres, Cáceres | Spring

Since 1990, Malpartida de Cáceres, the only Spanish town to form part of the International Network of European Towns of the Stork, holds an annual week dedicated to this kind of bird. The Week of the Stork is an event that started with the aim of building awareness on the conservation of nature and providing education on the importance of these birds and on the environment.

An event that is an ornithological reference point as a tribute to the stork, a bird that decided not to emigrate and to become a real symbol of Extremadura and Malpartida. Dozens of these birds fly through the skies of this town, settle on the roofs of the town's iconic buildings and nest in exceptional natural surroundings such as the National Monument of Los Barruecos.

A week with a wide programme of activities, furthermore, such as an international photography contest, conferences, exhibitions, making and placing nests, workshops, and also ecological and ornithological trails.

BIRDS FESTIVAL

Cáceres | Spring

The ornithological and environmental wealth of Cáceres, a World Heritage Site and the third Monumental Site in Europe, is the theme for this festival which takes place each year in May and which enables visitors to enjoy and discover the capital city of Cáceres from a different perspective.

Visitors who come to Cáceres in the spring will be surprised by the number of birds which live in the city, whose spectacular towers are all adorned with storks nests. You will also see dozens of Lesser Kestrels in the old town or hear noisy flocks of Swifts flying over the streets and squares of the monumental city of Cáceres.

The aim of the festival is to promote Extremadura's natural resources, in particular those of the city of Cáceres, where three areas of special protection for birds meet (Llanos de Cáceres and Sierra de Fuentes, Sierra de San Pedro and the Lesser Kestrel colony of the Monumental Site of Cáceres). An unimaginable variety of birds populate the skies of this city, including, among others, Azure-Winged Magpies, Storks, Great Spotted Woodpeckers, Kestrels, Spotted Flycatchers, Robins, etc.

Species that can be seen close up on some of the birdwatching tours which can be taken in the city. So, don't let this opportunity pass you by. Come to Cáceres and enjoy the Bird Festival, which has a programme of activities to make your visit an unforgettable experience.

A perfect idea if you are travelling with your family, as many of the events are suitable for all ages, such as guided and birdwatching tours through the Monumental Site of the city,

workshops for the younger ones, dramatized shows and walks, and even the chance to take part in a photographic marathon.

For more details on this date with the birds, go to www.festivaldelasavescaceres.com

FESTIVAL OF THE CRANES

Navalvillar de Pela, Badajoz | Winter

Each season, almost at the end of the year, the Common European Crane migrates following the western route in search of food and warmth to spend the winter. And it is precisely in Extremadura where more than 80,000 of these birds find the ideal wintering place. This is why the Festival of the Cranes is held in Moheda Alta Peri-Urban Park in Navalvillar de Pela (Badajoz), one of its favourite places, to celebrate their arrival and to observe them in a habitat where they feel at home. If you get the chance to come, it will be an unforgettable experience, especially if you come with your family.

There is a special programme of activities related to the event during these days. So get ready to take part in the guided birdwatching tours, take a bike ride through the park, have fun in the workshops, attend the technical seminars or enjoy the storytelling and bird shows which are organised within the framework of this festival.

Please check all the information at Festival's website: www.festivaldelasgrullas.com

OTHER EVENTS IN EXTREMADURA

May - Month of Birds (Mérida, Badajoz) | Spring

Common Swift Festival (Alange, Badajoz) | Spring

Lesser Krestel Festival (Trujillo, Cáceres) | Spring

Birds and Nature Festival (La Roca de la Sierra, Badajoz) | Spring

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