

7th Conference of the

European Ornithologists' Union

Abstracts

21–26 August 2009, Zurich



7th Conference of the European Ornithologists' Union
21–26 August 2009, University of Zurich, Switzerland

Abstracts

Edited by Verena Keller & John O'Halloran

Swiss Ornithological Institute, Sempach

2009

7th Conference of the European Ornithologists' Union Zurich, 21–26 August 2009

Conference Organisers

Ala, Swiss Society for the Study and Conservation of Birds
Swiss Ornithological Institute, Sempach
University of Zurich, Institute of Zoology
SVS/BirdLife Switzerland

Local Organising Committee

Verena Keller, Ala and Swiss Ornithological Institute (Chair)
Gilberto Pasinelli, Ala and Swiss Ornithological Institute (Organisation Zurich)
Christa Glauser, Ala and SVS/BirdLife Switzerland (Excursions)
Barbara Schaller, Ala (Conference office)
Johann Hegelbach, Ala and University of Zurich
Lukas Jenni, Ala and Swiss Ornithological Institute
Werner Suter, Ala

Scientific Programme Committee

John O'Halloran, University College Cork, Ireland (Chair)
Andrew Gosler
Verena Keller
Marcel Lambrechts
Esa Lehtikainen
Erik Matthysen
Liz Pasztor
Simon Verhulst
Tomasz Wesolowski

Main Sponsors

Swiss National Science Foundation SNF
Federal Office for the Environment FOEN
Zürcher Kantonalbank

Sponsors and Exhibitors

Biotrack*
Bird Uganda Safaris*
Deutsche Ornithologen-Gesellschaft DO-G*
Ecotone*
Ficedula*
Haupt Verlag*
Heiniger
Leica*
Naturforschende Gesellschaft Zürich

Nos Oiseaux
Ornithologische Gesellschaft Zürich
Schwegler Vogel- und Naturschutzprodukte*
Stiftung für Suchende
Taylor & Francis Group (Bird Study)*
Telenax*
Wiley-Blackwell (Journal of Avian Biology, Journal of Field Ornithology, Ibis)

* present with stand

Conference website: Swiss Ornithological Institute, Stefan Weingartner, Reguel Wermelinger
Programme website: University College Cork, Sandra Irwin

Cover layout: Marcel Burkhardt, Swiss Ornithological Institute, photograph: Verena Keller
Printed by: Studentendruckerei, Universität Zürich
Printed on 100 % recycled paper

Contents

Welcome	4
Programme.....	5
Overview.....	5
Symposia.....	6
Abstracts	11
Plenaries.....	11
Symposia and Contributed orals	13
Workshops.....	95
Posters	97
Author index	149

Welcome to the EOU's 2009 conference

Birds have wings and they use them, so their lives are often lived at an international scale. Ornithologists must be equally international in their outlook, not only being aware of the work of their colleagues in other countries but actively discussing and collaborating with them. The promotion of such interactions in Europe is the role of the EOU and conferences are the most important means by which it achieves its objectives. The abstracts in this book show that the formal side of the Zurich conference will certainly fulfill that purpose, with a rich and varied set of talks and posters. For that we have to thank not only the speakers and the authors of the posters but the symposium organizers and the Scientific Programme Committee (under the chairmanship of John O'Halloran), who have solicited contributions from across Europe and drawn them together into an exciting programme.

We also have to thank our Swiss hosts (under the leadership of Verena Keller) for the excellent arrangements that they have made to ensure that the conference runs smoothly and effectively. This will allow us to get the most out of both the formal programme and the informal part of the conference, the discussions and making of new contacts that are so important a part of our meetings.

A significant part of the organization of this conference has been to provide modest financial support for young ornithologists and for those from lower income countries, to help them to participate in the meeting. EOU will continue to develop such support in future and to expand the ways in which it is supporting ornithological interactions and collaborations in Europe more generally. It will do so under a new team of officers and Council members to be elected at this conference. The elections will take place at the General Meeting on Sunday, to which all conference participants are invited. Please give the EOU and their officers your support, so that European ornithology continues to flourish and to grow in strength and effectiveness.

Enjoy the conference!

Jeremy Greenwood
EOU President

Welcome to Zurich

On behalf of the local organisers we warmly welcome you to the 7th EOU Conference in Zurich. 2009 is a special year for Swiss ornithologists. The Ala, the Swiss Society for the Study and Conservation of Birds, can look back on 100 years of active engagement in ornithology. The society has always promoted scientific research as well as practical conservation. Its journal *Der Ornithologische Beobachter* is one of the leading ornithological journals still published in German and an important channel to disseminate scientific knowledge to the scientific community and beyond.

The two pillars of Ala are reflected in its connections to the two main ornithological institutions in Switzerland. The Ala founded the *Schweizerische Vogelwarte Sempach* in 1924, which grew to become an independent private research institute, the Swiss Ornithological Institute as we know it today. The Ala also promoted the collaboration between the local and regional conservation societies and has become a member of *SVS/BirdLife Switzerland*.

Ala, Vogelwarte and SVS/BirdLife Switzerland have always had strong connections with other ornithological institutions in Europe. The Ala supported the EOU in its first years, as ornithologists in Switzerland, living in a small country in the heart of Europe, were particularly aware of the necessity to promote contacts across the continent. The 100th anniversary is therefore an ideal time to invite the EOU to hold its conference in Switzerland, to enable ornithologists from across the continent to meet and exchange their ideas. The Irchel campus at the University of Zurich with its park provides excellent facilities for formal presentations as well as an environment that we hope will stimulate the contact between sessions.

This conference would not have been possible without the help of many people, from the main organisers Ala and Vogelwarte as well as SVS/BirdLife Switzerland and the University of Zurich. We are also grateful to our sponsors, who enabled us to put together a programme which we hope you will enjoy.

Verena Keller
President Ala 2001–2009

Gilberto Pasinelli
President Ala since 2009

Programme

Overview

Friday 21 August 2009

14:30–21:00	Registration
15:00	R course
18:00	Welcome evening

Saturday 22 August 2009

07:30	Registration
08:30	Opening ceremony Jeremy Greenwood, EOU president Michael Hengartner, University of Zurich, Dean Faculty of Science Verena Keller, Chair of the Local Organising Committee
09:00	Plenary: Michael Schaub
10:30	Parallel sessions: Symposia S1–S5
13:45	Plenary: Barbara Helm
14:45	Poster session
16:30	Parallel sessions: Contributed orals C1–C5
20:00	Swiss evening: Lukas Jenni & Verena Keller

Sunday 23 August 2009

08:30	Plenary: Anne Charmentier
09:30	Poster session
10:30	Parallel sessions: Symposia S6–S9
13:40	EOU General Meeting
14:45	Parallel sessions: Contributed orals C6–C10
16:55	Parallel sessions: Symposia S10–S13
20:15	Workshops

Monday 24 August 2009

From 07:00	Excursions
17:45	Social evening

Tuesday 25 August 2009

08:30	Plenary: Juliet Vickery
09:30	Poster session
10:30	Parallel sessions: Symposia S14–S17
13:40	Parallel sessions: Contributed orals C11–C15
15:45	Plenary: Kees van Oers
16:45	Closing ceremony
17:00	End of conference

Symposia

Symposium S1: Birds and climate change: can current research reveal the future?

- Key note 1 Willis, S.G.: Observed recent changes and modelled future changes in European bird ranges and populations as a result of climatic change
- Key note 2 Newson, S.E.: A review of climate change effects on migratory birds
- Robert-Coudert, Y., Kato, A. & Chiaradia, A.: Do not think only globally: the impact of small-scale environmental perturbations on marine predators
- Matthysen, E., Adriaensen, F. & Dhondt, A.A.: Multiple changes in breeding phenology of Great and Blue Tits in relation to climate change
- Zalakevicius, M. & Stanevicius, V.: Can recent strategies of bird diversity conservation be effective in future in the face of increasing impact of climate change?

Symposium S2: Birds and urbanisation

- Opening speaker: Evans, K.: Processes and consequences of urban colonisation: the Blackbird *Turdus merula* as a case study
- Key note 1 Slabbekoorn, H.: Songs and the city: ecology and evolution in the urban soundscape
- Key note 2 Partecke, J.: Evolutionary consequences of an urbanizing world
- Arroyo-Solís, A., Castillo, J.M. & Figueroa, M.E.: Effects of habitat structure, landscape matrix and human disturbance on the distribution and abundance of breeding birds in urban parks in a Mediterranean city: Seville (Spain).
- Isaksson, C.: The effect of urbanization on avian oxidative stress status

Symposium S3: Evolution and ecology of bird-parasite interactions

- Key note 1 Boulinier, T.: The seabird-tick system as a model to address evolutionary ecology questions of epidemiological relevance
- Key note 2 Richner, H.: Maternal effects in bird-ectoparasite interactions
- Bensch, S., Marzal, A., et al.: Diversity, loss and gain of malaria parasites in a globally invasive species
- Heylen, D. & Matthysen, E.: Host-specificity and transmission in the nidicolous tick *Ixodes arboricola*
- Hochachka, W.M., States, S.L. & Dhondt, A.A.: Host community composition affects prevalence of a bacterial parasite

Symposium S4: How important are chemical cues to birds?

- Key note 1 Mäntylä, E.: Methods to study avian olfaction
- Key note 2 Gwinner, H. & Mennerat, A.: Odorous nests: olfaction and nest construction in Starlings and Blue Tits
- Gsell, A.C., Brunton, D., Ji, W., Hagelin, J., Goodwin, T., Robertson, J., Moorhouse, R., Fidler, A., Wild, M., Kubke, F.: Chemical communication in parrots with a specific emphasis on the Kakapo (*Strigops habroptilus*).
- Steiger, S., Fidler, A.E., and Kempenaers, B.: Evidence for increased olfactory receptor gene repertoire size in two nocturnal bird species
- Nordt, A.: The transgenerational transfer of plastic particles in a small seabird

Symposium S5: Avian hybridisation

- Key note 1 Randler, C.: Avian hybrids – a macroecological perspective
- Key note 2 Secondi, J., Bensch, S. & Faivre, B.: Moving hybrid zones – interests and limits
- Rubtsov, A.S., Panov, E.N. & Irwin, D.E.: Causes, dynamics and evolutionary role of natural hybridization: the case of interrelationship of *Emberiza citrinella* and *E. leucocephala*.
- Vabishchevich, A.P.: Variability of the Pied Flycatcher's (*Ficedula hypoleuca*) song in an eastern zone of sympatry with the Collared Flycatcher (*F. albicollis*)
- Väli, Ü., Dombrovski, V., Treinys, R., Bergmanis, U., Daróczy, S.J., Dravecky, M., Ivanovski, V., Lontkowski, J., Maciorowski, G., Meyburg, B.-U., Mizera, T., Zeitz, R. & Ellegren, H.: Widespread hybridisation with the Lesser Spotted Eagle threatens the Greater Spotted Eagle in Europe

Symposium S6: Habitat selection and use – variation in space and time

- Key note 1 Wesolowski, T. & Fuller, R.J.: Spatial variation in habitat use by birds at the European scale
- Key note 2 Martin, J.-L., Fahrig, L., Kirk, D., Lindsay, K., Smith, A.C. & Villard, M.A.: Selection of cultural landscapes by birds: do things look different across continents and, if so, why?
- Bollmann, K., Schaublin, S. & Imhof, S.: Conservation of two syntopic species with contrasting habitat preferences: Capercaillie and Hazel Grouse
- Mukhin, A. & Ktitorov, P.: Habitat recognition by nocturnally migrating passerines during landfall: the use of acoustic information and consequences of a right and wrong choice
- Robles, H., Ciudad, C., Matthysen, E. & Baglione, V.: Postfledging habitat selection and movements of juvenile Middle Spotted Woodpeckers

Symposium S7: Using GPS tracking in studies of wild birds: recent developments and current challenges

- Key note 1 Grémillet D.: GPS tracking in birds and its implications for conservation
- Key note 2 Dell'Omo, G.: Tracking the history and future use of GPS in ornithology
- Wilson, M. W., O'Mahony, B., Dell'Omo, G., Irwin, S., Kelly, T. C. & O'Halloran, J.: GPS tracking of Hen Harriers (*Circus cyaneus*) using a novel system combining VHF and GPS
- Klaassen, R.H.G.: Daily time budgets of migrating birds as revealed by GPS-based satellite telemetry
- Shamoun-Baranes, J., Bouten, W.1, Baaij, E., Camphuysen, K & van Loon, E.E.: Quantifying movements and inferring gull behaviour from high resolution GPS telemetry

Symposium S8: The conservation benefits of estimating turnover in birds

- Key note Atkinson, P.W.: The future of survival and turnover?
- Pradel, R., Atkinson, P., Choquet, R., Drewitt, A., Frederiksen, M. & Rehfisch, M.: Methodological overview
- Paris Le Clerc, N., Clark, J.A. & Rehfisch, M.M.: What existing turnover studies tell us
- Bauer, S., Ens, B., & Klaassen, M.: Many routes leading to Rome: potential causes for the multi-route migration system of Red Knots *Calidris canutus islandica*
- Vögeli, M., Laiolo, P., Serrano, D. & Tella, J.L.: Who are we sampling? Apparent survival differs between methods in a secretive species

Symposium S9: Field endocrinology: scientific and practical advances to address old questions

- Key note 1 Hau, M.: Hormones, trade-offs and life history
- Key note 2 Jenni, L.: Causes and effects of stress in birds: an introduction
 Chastel, O.: Reproduction and modulation of the stress response: testing the brood value hypothesis
 Almasi, B., Roulin, A., Jenni-Eiermann, S. & Jenni, L.: Stress hormones elicit behavioural changes but not brood abandonment during reproduction
 Riechert, J., Chastel, O. & Becker, P.H.: Is the reproductive success of breeding Common Terns influenced by prolactin or corticosterone plasma levels?

Symposium S10: Practical solutions for the impact of agriculture and predation on the success of ground-nesting farmland birds

- Key note 1 Smart, J., Bolton, M., MacDonald, M. & Eglington, S.M.: Here today, gone tomorrow...Predation – the issues and practical solutions.
- Key note 2 Schifferli, L., Spaar, R., Gruebler, M. & Rickenbach, O.: Ground-nesting farmland birds in conflict with intensive agriculture and heavy predation
 Junker, S., Ramme, S., Ehrnsberger, R. & Düttmann, H.: Changes in Lapwing productivity in Stollhammer Wisch (Lower Saxony, Germany) in the years 2001–2008
 Gruebler, M., Schuler, H., Müller, M., Spaar, R., Horch, P. & Naef-Daenzer, B.: Female-biased mortality and intra-seasonal breeding dispersal caused by anthropogenic nest loss in a meadow bird
 Pehlak, H. & Mägi, E.: The decline of Ruff *Philomachus pugnax* breeding population in Estonia and action planned for the species

Symposium S11: What are the non-breeding causes of Palearctic-African migrant declines? Ecological studies of migrants in Africa

- Key note 1 Cresswell, W.: What are the non-breeding causes of Palearctic-African migrant declines? Ecological studies of migrants in Africa
- Key note 2 Salewski, V., Tegetmeyer, C., Bargain, B. & Flade, M.: Factors effecting population dynamics of Palearctic-African migrants in the non-breeding season – a case study of the Aquatic Warbler
 Bayly, N.J., Atkinson, P.W., Clark, J.A., Rumsey, S.R.: Crossing the Sahara desert – could fuelling constraints in west Africa limit populations?
 Strazds, M. & Grinblate, S.: Preliminary report about the impact of DDT and other pesticides on breeding success of Black Stork in Latvia
 Remisiewicz, M., Underhill, L.G., Tree, A.J., Gustowska A. and Taylor P.B.: Extended moult as an adaptation of waders to the use of ephemeral freshwater habitats at their wintering grounds

Symposium S12: Large-scale monitoring programs: issues and opportunities

- Key note 1 Kéry, M.: Hierarchical estimation and modelling of distribution and abundance in metapopulation designs
- Key note 2 Jiguet, F. & CRBPO: Using large scale bird monitoring data in the study of global change impacts
- Besnard, A. & Lyet, A.: Large-scale monitoring of rare and elusive species combining capture-recapture with presence/absence data
- Sillett, T.S., Royle, J.A., Kéry, M. & Morrison, S.A.: Rangewide population size and habitat-specific abundance of the Island Scrub-Jay (*Aphelocoma insularis*)
- Voříšek, P., Škorpilová, J., Klvaňová, A., Van Strien, A. & Gregory, R.D.: Pan-European Common Bird Monitoring Scheme: using bird monitoring and science at European scale

Symposium S13: High-tension power lines and bird conservation: possibilities to mitigate the collision risk

- Key note 1 Kreuziger, J., Bernshausen, F. & Richarz, K.: Birds and high tension power lines: problems and solutions from a Central European perspective
- Key note 2 Jenkins, A.R., Shaw, J.M., Smallie, J.J. & Diamond, M.: Mitigation and conservation implications of avian collisions with power lines: a global review with South African perspectives
- Prinsen, H.A.M. & Smits, R.R.: Assessing collision risk for Bewick's Swan (*Cygnus columbianus*) and Eurasian Wigeon (*Anas penelope*) with a 150 kV power line in the Netherlands
- Martin, G.R.: Bird collisions: a visual or a perceptual problem?
- Bellebaum, J., Wendeln, H. & Korner-Nievergelt, F.: Identifying limits to wind farm-related mortality in migratory bird populations

Symposium S14: The future for farmland birds: future impacts of land-use change and potential policy opportunities

- Key note Siriwardena, G.M. & Diaz, M.: Future threats and opportunities for farmland birds
- Arlettaz, R., Ioset, A., Maurer, M., Menz, M., Reichlin, T., Weisshaupt, N., Abadi, F. & Schaub, M.: Bare soil as a staple commodity for declining ground-foraging insectivorous farmland birds
- Brambilla, M., Negri, I., Bergero, V., Bogliani, G., Crovetto, G.M., Falco, R., Siccardi, P. & Casale, F.: Red-backed Shrike conservation at regional scale
- Silva, J. P., Palmeirim, J. M. & Moreira, F.: Higher densities of the threatened Little Bustard *Tetrax tetrax* occur in larger grassland fields: management implications
- Denac, D. & Tome, D.: Recognition of ecological traps for Whinchat (*Saxicola rubetra*) in a mosaic of lowland habitat types

Symposium S15: Satellite telemetry in ornithology

- Key note 1 Howey, P. W.: Satellite Bio-Telemetry, just the beginning?
- Key note 2 Meyburg, B.-U. & Meyburg, C.: Satellite tracking of raptors in 1992–2009: an overview and some highlights of our results
- Cappelle, J., Gaidet, N., Newman, S., Takekawa, J., Prosser, D., Iverson, S. & Dodman, T.: Potential dispersal range and rate of H5N1 HPAI virus by wild waterfowl: estimation from satellite-tracked bird movements
- Trierweiler, C., Drent, R.H.(†), Exo, K.-M., Komdeur, J., Bairlein, F. and Koks, B.J.: Autumn migration routes and migratory connectivity of European Montagu's Harrier (*Circus pygargus*) populations – results from satellite tracking
- Nygård, T.: The use of satellite transmitters in eagle research in Norway

Symposium S16: Physiology of birds during migration and stop-over

- Key note 1 Fusani, L. & Goymann, W.: Physiological conditions predict nocturnal restlessness at a stopover site in wild migratory passerines
- Key note 2 Bauchinger, U. & McWilliams, S.: Tissue turnover rate determines extent of phenotypic flexibility in organ size of migrating birds
- Jenni-Eiermann, S. & Falsone, K.: Role of the glucocorticoid hormone corticosterone during migratory flight and fuelling
- Carere, C., Cardinale, M. & Costantini, D.: Physiological trade-offs in lean individual birds at stopover sites: interplay between glucocorticoids, oxidative stress, melatonin and body temperature in coping with emergency
- Coppack, T.: Rhythm is it! – Consistent flight schedules among wild-caught passerine migrants

Symposium S17: Advances in ornithological knowledge through species distribution modelling

- Key note 1 Osborne, P.E., Leitão, P.J. & Moreira, F.: Multiscale species distribution modelling and the benefits and pitfalls of very high resolution environmental data
- Key note 2 Brotons, L.: Predicting bird distribution in Mediterranean dynamic landscapes in a context of global change: challenges and the way forward
- Miranda, A.C., Santos, C.D., Granadeiro, J.P., Palmeirim, J.M., Cadima, J.F.: Modelling shorebird distribution during low-tide in the Tejo estuary
- Strubbe, D., Graham, C.H. & Matthysen, E.: Assessing the potential impact of invasive species on native biota: a case study on the invasion of Ring-necked Parakeets in Belgium
- van Horssen, P. & Poot, M.: Large-scale mapping of seabird densities on the North Sea

Abstracts

Plenaries

Charmantier, Anne

CEFE-CNRS, UMR 5175, 1919, route de Mende, F34293 Montpellier Cedex 5, France, anne.charmantier@cefe.cnrs.fr

Senescence in birds: from a phenotypic to a quantitative genetic perspective

Senescence is the decline of reproductive success and/or survival with old age. Since this mechanism of deterioration induces a decline in the reproductive output of individuals, natural selection should act against it. Yet several adaptive explanations have been proposed to explain the evolution of senescence. After many decades of ignoring senescence in birds, we now have accumulating evidence that this process affects many avian species, even in natural conditions where extrinsic mortality is so high that very few individuals live long enough to suffer from ageing. Using examples in short-lived as well as long-lived species, I will illustrate how long-term studies of birds can contribute to our understanding of the process of senescence and its evolution. I will describe important losses of reproductive performance with old age, which can be attributed to declining performance for specific stages in the breeding cycle (from egg laying to chick recruitment), and show how senescence is shaped by trade-offs between early and late reproductive effort. I will finally reveal how we can test predictions from the theories of senescence evolution, namely antagonistic pleiotropy and mutation accumulation, using quantitative genetic approaches applied to natural bird populations with inferred pedigrees. These recent findings demonstrate that senescence can no longer be considered as negligible in birds, and will advocate the use of long-term monitored bird populations for the study of senescence from an evolutionary perspective.

Helm, Barbara

Max Planck Institute for Ornithology (Andechs, Seewiesen & Radolfzell), Von der Tann Str. 24, 82346 Andechs, Germany, helm@orn.mpg.de

Programs, cues, and flexibility: seasonal timing in birds

Most habitats change with the seasons. Coping with seasonal change often entails not simply accommodation to fluctuations, but also their anticipation well in advance. A correct match of activities to environmental change is essential, and accordingly, birds have evolved diverse strategies for being "on time". Their superb mobility can buffer them from severe conditions, but in turn is associated with extensive seasonal modifications in physiology, morphology, and behaviour, and with high demands on time-keeping. Migrants often need to predict seasonal conditions not only at their current location but also in other, sometimes remote, areas. Therefore, avian timing has been extensively studied. Investigations in the field and lab have revealed major contributions of inherited, endogenous programs that, in combination with predictive cues, tell "time". However, there is no single solution that fits all birds. Inherited timing programs need to be fitted to the particular environment in which populations live, and in some environments, birds may fare better with flexible schedules than rigid programming. Accordingly, both inherited schedules and the impact of environmental and social factors on timing, differ between species. I illustrate avian calendars by a selective review of classical and new findings, and by detailed, comparative data from a passerine species, the Stonechat (*Saxicola torquata*).

Schaub, Michael

Swiss Ornithological Institute, 6204 Sempach, Switzerland, and Conservation Biology – Institute of Ecology & Evolution, University Bern, Baltzerstrasse 6a, 3012 Bern, Switzerland, michael.schaub@vogelwarte.ch

Integrated population models: A novel tool to get deeper insights into population dynamics

Understanding demographic mechanisms of population growth and decline is important in conservation and ecology alike. The variation of the size of a local population is determined by the variation of survival, recruitment, immigration and emigration. Thus, population counts across time contain information about all

demographic processes in the population. However, this information can only be extracted, if additional information about part of the demographic processes (e.g. survival, recruitment) is available. Moreover, population counts are typically prone to measurement errors. Integrated population models simultaneously analyse population counts and demographic data (e.g. capture-recapture data) in a coherent way allowing to extract demographic information while accounting for measurement errors. In this talk I will introduce this novel analytical technique and illustrate its use with case studies. I will show that the main benefits of integrated population models are the ability to estimate demographic rates that are impossible to estimate otherwise and the increased precision of the estimates. Integrated population models seem particularly valuable for declining and endangered species for which demographic data is typically limited.

van Oers, Kees

*Netherlands Institute of Ecology (NIOO-KNAW), PO Box 40, 6666 ZG Heteren, The Netherlands,
k.vanoers@nioo.knaw.nl*

Past, present and future of avian personality research: why we should take behavioural consistency into account

Birds exhibit behaviour and social organizations equal in complexity to mammals, they are widely distributed, highly diversified, yet they are generally more conspicuous and approachable in natural environments compared to many other vertebrates. Thanks to the work of a diverse group of ornithologists that range from professional field biologists to hobby birders, the knowledge of behaviour of birds under natural conditions and in captivity is much more extensive than in many other vertebrate taxa. The same reasoning is valid when we look at how many studies on animal personality have been conducted on birds. Behaviour of the same individuals can be measured both under standardised conditions in captive situations and in their natural environment, enabling us to take into account mechanistic, ecological and evolutionary aspects of animal personality. In this plenary I have two main aims. The first is to give insight in the broadness of avian personality studies at present. Birds are used to study many aspects of personality, which ranges from the search for the actual genetic variation in the genome to the fitness consequences in natural populations. The second aim is to put the current studies in perspective and to step back into the history of behavioural research. Long before the current hype of animal personality started, people were already pointing to the importance of taking the uniqueness of individuals into account, and most studies were thereby using birds as model species. Only, these studies came from an unexpected corner of ornithology.

Vickery, Juliet

British Trust Ornithol, Thetford IP24 2PU, Norfolk England. Current address: Royal Society for the Protection of Birds, Sandy SG19 2DL, Beds, England, Juliet.Vickery@rspb.org.uk

Farmland bird declines: from diagnosing declines to testing solutions

In the last 30 years farmland bird populations throughout Europe have suffered severe and continuing declines. A wealth of evidence exists to link these declines to changes in land use association with agricultural intensification. In Britain, the scientific focus of the 'farmland bird issue' has progressed through four distinct phases. First, identifying and quantifying the magnitude of the problem, then diagnosing the causes of the decline for individual species or suites of species, trialling land management 'solutions' to those problems and, finally, monitoring and evaluating the success of those solutions once adopted at a national scale. This talk will consider each of these phases in turn and describe some of the key examples of the research undertaken within them. This research ranges from intensive field studies of single species such as Turtle Dove *Streptopelia turtur*, Skylark *Alauda arvensis* and Lapwing *Vanellus vanellus*, to analyses of large-scale data sets on the distribution, population trends and demographics of birds in relation to temporal and spatial changes in their habitats. There are many 'lessons to be learned' from the way which these results have been used to inform and underpin agri-environmental policy at the national scale. The value of these will be considered in relation to addressing the potential impact of future changes in agriculture on farmland birds, such as the loss of set-aside and increased pressure on land for bio-fuels and, more broadly, the effective translation of science into conservation action.

Symposia and Contributed orals

C1

Adamik, P.¹, Husek, J.² & Cepak, J.³

¹Museum of Natural History, nam Republiky 5, 771 73 Olomouc and Dept. of Zoology, Palacky University, tr. Svobody 26, 771 46, Olomouc, Czech Republic, ²Dept. of Biology, CEES, University of Oslo, PO Box 1066 Blindern, N-0316, Oslo, Norway, ³Bird Ringing Centre, National Museum, Hornomecholupska 34, CZ-102 00, Praha, Czech Republic, peter.adamik@upol.cz

Bird ringing records as an overlooked source of long-term phenological data

Long-term phenological data on avian taxa are usually restricted to either a few national monitoring schemes or to specialized research groups working on a few model species. One largely overlooked source of such data is represented by national bird ringing schemes. For example, data on birds ringed as nestlings contain valuable information on timing of breeding period in a particular year. Similarly data on birds ringed on passage enable us to separate age- and sex-specific migration patterns. Here we use data from the Czech bird ringing scheme to document the value of ringing records for phenological studies. Examples are given on long-term changes in timing of breeding for three thrushes *Turdus* spp., the Red-backed Shrike *Lanius collurio* and even for long-living species, the White Stork *Ciconia ciconia*. For eight wader species we document changes in timing of both spring and autumn passage through their inland staging sites. Despite the fact that ringing records contain considerable amount of noise, we show that the signal of changing phenology (e.g. due to recent abrupt changes in climate) is obvious and we encourage their further use from other national schemes to document long-term changes and their geographical variability in birds' breeding phenology.

S9

Almasi, B., Roulin, A., Jenni-Eiermann, S. & Jenni, L.

Swiss Ornithological Institute, 6204 Sempach, Switzerland, bettina.almasi@vogelwarte.ch

Stress hormones elicit behavioural changes but not brood abandonment during reproduction

Hormones are a crucial link between environmental condition and behaviour. Variation in environmental quality (e.g. food scarcity, population density, inclement weather) has the potential to elicit a physiological stress response via the hypothalamo-pituitary-adrenal (HPA) axis, resulting in elevated levels of glucocorticoids, the main stress hormones (corticosterone in birds). During reproduction the conflict between self-maintenance and reproductive investment is also mediated through hormones. It was long hypothesised that stressful conditions during reproduction with a resulting increase in corticosterone redirect investment away from reproduction towards self-maintenance with the result of reproductive abandonment. In the present study we investigated in male Barn Owls (*Tyto alba*) whether a hormonal stress signal during reproduction results in a lower investment into the brood and a higher investment into self-maintenance. We mimicked a hormonal stress signal through implantation of corticosterone-releasing pellets. Male feeding rate during the four days when corticosterone was increased was significantly reduced compared to control males, but broods were not abandoned. This suggests that corticosterone reduces investment into the current brood. To investigate whether corticosterone redirects energy towards self-maintenance or whether it rather elicits sickness behaviour (e.g. apathy) we followed the males during the four nights of increased corticosterone levels with radio transmitters. Home-range size of corticosterone-treated males was significantly reduced to control males, but there was no difference in the distance the males covered per hour. This suggests that males with elevated corticosterone levels, despite of using a smaller area for hunting, were still foraging and consequently invested more into self-maintenance than control males. Survival of corticosterone-treated males until the next breeding season was not impaired compared to control-males. We conclude that corticosterone is a mechanistic link between the environment and behaviour and involved in the regulation of reproductive investment.

C12

Álvarez Keller, M.¹, Álvarez Xusto, E.¹, Gálvez Martínez, M.², Sánchez, X.M.², Millet Sargatal, A.³, Sanmartí Blanch, R.³ & Saavedra Bendito, D.³

¹GREFA, 2. Departament de Medi Ambient i Habitatge-Generalitat de Catalunya, 3, Obra Social Caixa, Catalunya, Spain, grefa@grefa.org

Connecting vultures through European skies

During 2008 a reintroduction project of Black Vulture (*Aegypius monachus*) with 14 individuals released was launched on the Catalan Pyrenees: RNC Boumort (Generalitat de Catalunya) and Espai Natural d'Alinyà (Obra Social Caixa Catalunya).

The main aim of this initiative, aside from the recovery of the species lost from natural areas in which the other three European vultures occur, is to provide the ecological link that may connect the on-going reintroduction projects in France (Grands Causses, Baronnies and Verdon) with the stronghold population of southwestern Spain, in order to increase the distribution range around Europe.

To check the movements of birds, they were equipped with terrestrial radiotracking emitters (12 individuals) and satellite-GPS devices (the last two). For the next 12 Black Vultures programmed to be released in February 2009, 6 individuals have been equipped with satellite-GPS, and 6 with conventional terrestrial items.

We aim to show:

1. The progressive reduction of the foraging area as the new-released birds become attached to the reintroduction area;
2. The role of the food supply in reducing the range of dispersive movements;
3. The importance of the NE direction for the dispersal behaviour of non-fixed individuals

As shown from the GPS maps, the two Black Vultures equipped with satellite devices chose the NE direction for their broader-range movements.

There was also a remarkable variation pattern between the more erratic dispersive movements of the non-fixed birds and the radial image of flights offered by the individuals attached to the reintroduction area. Also related to this, there was a slight reduction on the daily distances covered by the last.

And finally, we identify the crucial role that play feeding stations to minimize long-scale dispersive movements and, hence, decrease mortality rates of recently released vultures.

C3

Amezian, M.¹, Qninba, A.², Rguibi Idrissi, H.³, Cortes, J.⁴, Perez, C.⁴, Louah, A.¹, El Agbani, M.A.², & Bensusan, K.⁴

¹Université Abdelmalek Essaâdi, Faculté des Sciences, Département de Biologie, B.P. 2121, Tétouan, Morocco,

²Université Mohammed V – Agdal, Institut Scientifique, Département de Zoologie et Ecologie Animale, B.P. 703 Agdal,

Rabat, Morocco, ³Université Chouaib Doukkali, Faculté des Sciences, Département de Biologie, B.P. 20, El Jadida,

Morocco, ⁴Gibraltar Ornithological & Natural History Society (GONHS), Jews Gate, Upper Rock Nature Reserve, PO Box 843, Gibraltar, amezian2000@yahoo.fr

Complete moult of adult and juvenile Reed Warbler *Acrocephalus scirpaceus* in Smir marshes (northern Morocco).

In long-distance migrants *Acrocephalus* warblers, both adults and juveniles undergo a complete moult in their African winter quarters. However, recently some studies have shown that a few Great Reed Warbler *Acrocephalus arundinaceus* initiate and some finish their complete moult in Europe before leaving to sub-Saharan Africa. This has been shown in both adults and juveniles.

In Reed Warbler *Acrocephalus scirpaceus*, the complete moult north of the Sahara has never previously been reported apart from some cases recorded in Spain, which have been thought to be inconclusive and may concern moult interruption.

During a ringing program conducted in Smir marshes (northern Morocco) 140 adults and 292 juveniles *Acrocephalus scirpaceus* were caught during four autumns in the period 2004–2008. Of these birds, 8.9 % of juveniles were either in active moult (n=18) or completely moulted (n=8) and 40.7 % of adults were either in active moult (n=35) or completely moulted (n=22).

Capture history of some birds indicate that they over-winter locally or at least winter somewhere else in Morocco (i.e. north of the Sahara). It should be stressed also that all individuals that were completely moulted were caught in the month of November. An important part of the moulting birds are of local origin

because some of those birds were captured in autumn and later recaptured in spring showing breeding activity and *vice versa* (captured in spring and recaptured moulting in autumn).

Questions that arise from these data include: are the moulting birds of local origin only or also of European origin (e.g. from the neighbouring Iberian Peninsula)? What proportion of the local population that moult completely and (possibly) winter locally?

The above questions are discussed and more complete studies are required to gain a better understanding of the phenology of this moult, to study the origin of the moulting birds and to investigate the possible shift of migratory behaviour (i.e. sedentarism) of this species in this part of its range.

C10

Angelier, F., Holberton, R.L. & Marra, P.P.

Smithsonian Migratory Bird Center, Smithsonian Institution, 3001 Connecticut Avenue NW, Washington, DC 20010, USA, frederic_angelier@yahoo.fr

Does the stress response predict annual survival in a migratory bird? Importance of the non-breeding habitat

In vertebrates, the glucocorticoid stress response activates an emergency life-history stage, which is thought to promote survival by helping individuals escape life-threatening situations. Although the glucocorticoid stress response promotes many behavioral and physiological changes, it remains unclear whether this stress response actually translates into higher survival in wild vertebrates. Here, we show that the intensity of the glucocorticoid stress response is positively correlated with annual survival in a wild population of migratory birds (American Redstarts, *Setophaga ruticilla*). Because this hormonal stress response appears to be consistent within individuals across time, we believe that the intrinsic ability of an individual to physiologically react to stress can determine its ability to survive environmental perturbations. Importantly, our study also demonstrates that this hormonal stress response predicts survival in a context-dependent manner. The intensity of the glucocorticoid stress response predicts annual survival for birds wintering in low-quality habitats, but not for birds wintering in high-quality habitats. For an individual, the benefits of mounting an important glucocorticoid stress response probably depends on its environment and its intrinsic quality because these two variables are likely to affect the probability of an individual to be confronted to numerous life-threatening stressors during its annual life-cycle.

C2

Anselin, A., Vermeersch, G. & Van Landuyt, W.

Research Institute for Nature and Forest (INBO), Kliniekstraat 25, B-1070 Brussels, Belgium, anny.anselin@inbo.be

Favourable Reference Values for Annex I breeding species of the Birds Directive in Flanders (Belgium): methods and goals.

To successfully apply Natura 2000 conservation objectives to habitats and species of the Habitats Directive as well as to birds of the Birds' Directive, often choices have to be made in habitat management and restoration of sites. Global conservation objectives on regional or national scale can provide guidelines for a better weighting of these choices. In Flanders (Belgium) global scientific conservation objectives have been proposed for the three mentioned groups. For 25 regularly breeding bird species of Annex I of the Birds Directive, we defined conservation status and proposed objectives for a Favourable Reference Value, habitat requirements and species priorities in Special Protected Areas (SPAs) based on present occurrence. For each species we calculated their relative importance in each SPA as a percentage of the total population inside all Flemish SPAs and for the total Flemish population. This provides a guideline for targeting the important sites for each species. We assessed the Favourable Conservation State of each species taking into account the changes in range and population numbers since a historical reference period determined as the 1970's. The assessment of the population goals (Favourable Reference Values) was based on the same reference period. For some species (*Botaurus stellaris*, *Ixobrychus minutus*, *Crex crex*, and *Circus pygargus*) the historical reference population could not be considered as favourable, because at that moment, populations had already been declining substantially. For these species we used the population numbers before the decline, mostly the decade of the 1960s or the 1950s. We distinguished two main groups: species with a favourable status and species with an unfavourable status. The method is explained and an overview is given of the 'distance to target' for various species together with the most important management actions that will lead to habitat improvement within and outside the SPA's.

S14

Arlettaz, R., Ioset, A., Maurer, M., Menz, M., Reichlin, T., Weisshaupt, N., Abadi, F. & Schaub, M.
Institute of Ecology and Evolution – Conservation Biology, University of Bern, Baltzerstrasse 6, CH-3012 Bern, Switzerland and Swiss Ornithological Institute, 6204 Sempach,, Switzerland, Raphael.arlettaz@iee.unibe.ch

Bare soil as a staple commodity for declining ground-foraging insectivorous farmland birds

Changes in cultivated habitats and intensification of agricultural practices are the main factors responsible for the widespread decline of farmland birds across Europe. The goal of agri-environment schemes is to restore farmland biodiversity. Yet, these schemes have so far only had moderate effects upon farmland avian biodiversity, especially as regards ground-feeding insectivorous birds. Using radio-tracking, we investigated micro-habitat selection in four farmland birds of Switzerland (Wryneck, Hoopoe, Wood Lark and Ortolan Bunting) that occur in fruit plantations and/or vineyards. Habitat characteristics were recorded around foraging locations and compared with non-visited habitat within individual home ranges. The data were analysed for each species separately with a hierarchical logistic regression model implemented in the Bayesian framework using Markov chain Monte Carlo (MCMC). In all species, and irrespective of habitat type, the availability of bare ground (with cover optima ranging from 30 % and 70 %, depending on species) appeared to be the principal determinant of foraging occurrence. These results suggest that the conservation and restoration of populations of endangered ground-feeding insectivorous birds require the creation of patches of bare soil among arthropod-rich grassland. Extensification of grass management and/or targeted removal of the grass-cover locally may represent adequate management solutions. We recommend these measures to be integrated into future agri-environment policies.

C13

Arriero, E.^{1,2}, Majewska, A.², Martin, T.E.³

¹Centre d'Ecologie Fonctionnelle et Evolutive CEFE-CNRS, France, ²Max Planck Institute for Ornithology/ Radolfzell, Germany, Max-Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2 – 78315 Radolfzell, Germany,

³US Geological Survey, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula MT59812, USA, Elena.arriero@cefe.cnrs.fr, earriero@orn.mpg.de

Nestling immunity and life history traits in tropical and temperate birds

Immune defense is an essential physiological trait in all animals that is shaped by life history and ecology. In pre-reproductive individuals, parasite-induced mortality has a clear impact on fitness, and therefore the ability to resist infection is expected to be under intense selection. However, the factors that explain species-level variation in nestling immunity and their relationship to the life history strategies are still unclear and deserve further study. Long development times (characteristic of slow pace of life) are associated with higher adaptive immune defenses in adults, although the mechanisms underlying this correlation are still unclear. To address these relationships we conducted a comparative field study in nestlings of tropical and temperate passerine species from North and South America over four years. We measured three types of immune defense: natural antibodies, complement activity, and inflammatory response to a standard injection of phytohemagglutinin. We collected field data on the duration of incubation and nestling period in addition to nestling growth rate. Our study provides novel data on a taxonomically broad group of bird species and offers new insights into the study of life history strategies and development of immune function.

S2

Arroyo-Solís, A., Castillo, J.M. & Figueroa, M.E.

Department of Vegetal Biology and Ecology, University of Seville, Av. Reina Mercedes s/n 41012, Sevilla, Spain, aidaarroyo@us.es

Effects of habitat structure, landscape matrix and human disturbance on the distribution and abundance of breeding birds in urban parks in a Mediterranean city: Seville (Spain)

We characterized the influence of environmental factors, namely habitat structure, landscape composition and human disturbance, on the ecological diversity and spatial distribution of urban bird communities in the parks of Seville city (SW Spain). We also tested whether these factors could generate nested distribution

patterns. The ultimate aim was to identify determinants for local conservation that could be considered by future urban management plans.

With this aim, we studied the spatial distribution of birds associated with urban parks in the city of Seville during the reproductive season in 2007. A total of twenty-four environmental variables were considered: sixteen factors were related to habitat structure and floristic composition (vegetation cover, density and height, plant species richness, pavement cover, tree abundance according to classes of trunk-diameter, abundance of trees with cavities suitable for nesting), six factors related to landscape structure and the spatial distribution of green areas (area ratio and perimeter / area of parks and distances to different elements of the urban matrix) and two related to human disturbance (noise and pedestrian visiting rate).

Bird species richness and diversity were positively affected by park size and the abundance of trees with cavities, and negatively influenced by environmental noise and distance from water bodies. The pattern of species accumulation was not random, but nested (parks with few species were subsets of parks that were progressively richer in species). This accumulation of species was positively affected by park area and to a lesser extent by the abundance of trees with cavities. Nestedness decreased with the degree of park exposure to the urban matrix. We also found that the distribution of single species was mainly affected by park size, park edge distance, tree, shrub and pavement cover, abundance of large trees and noise level.

C3

Atiénzar, F., Visser, M.E, Greño, J.L., Holleman, L.J.M., Belda, E.J. & Barba, E.

"Cavanilles" Institute of Biodiversity and Evolutionary Biology, University of Valencia., PO Box 22085, E-46071 Valencia, Spain, Francisco.Atiénzar@uv.es

Lack of assortative mating in Mediterranean Great Tits: the effect of vegetation structure and predation risk

Colourful males are usually assumed to signal good individual quality. Hence, colourful dominant females preferentially mate with colourful males (i.e. assortative mating) to enhance their breeding success. However, in some scenarios (e.g. high predation risk), territory quality, independently of male characteristics, affects female breeding success. Therefore, there is a trade-off between male and habitat traits in female choice. Hereby, we were interested in female choice using as a model two Mediterranean Great Tit *Parus major* populations where nest predation level was high. Male characteristics used were brightness, chroma, tarsus length, weight and age. We characterized the habitat structure around each nest considering the number of trunks 5–10 cm and >30 cm, mean diameter of the five thickest trees, shrub and tree cover (%). Combining them into a principal component analysis we got an index of territory maturity. Nest predation was higher, and female breeding success decreased, as the maturity of the vegetation around a nest increased. On the other hand, colourful females bred preferentially in immature areas, where they got more food. Instead, colourful males were associated neither to territory maturity nor to breeding success. Considering colour parameters, there was no assortative mating. We suggest that colourful females chose preferentially those territories where predation risk was probably lower (i.e. immature areas), therefore having higher probability of success. The lack of relationship between male characteristics and breeding success probably caused a lack of assortative mating.

S8

Atkinson, P.W.

British Trust for Ornithology, The Nunnery, Thetford, IP24 2PU, Great Britain, phil.atkinson@bto.org

The future of survival and turnover?

The observed increase in the number of schemes individually marking birds will lead to a better understanding of species survival and turnover. A better knowledge of turnover and the potential pitfalls in calculating rates should make it possible to estimate more accurately the total number of birds using a site and identify more sites worthy of conservation protection in a rapidly changing world. Increasingly, studies on migrating species are addressing the issue of turnover using a variety of methods based around different assumptions and more development work is needed to fully understand the implications of these. The next step is to incorporate other ecological information to give new insights to important questions in the field of stop-over ecology such as the demographic consequences of different stopover strategies and the relationship with an individual's condition.

C7**Atkinson, P.W, Bayly, N.J., Clark, J.A. & Rumsey, S.R.***British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK, The Wetland Trust, Elms Farm, Pett Lane, Icklesham, Winchelsea, East Sussex, TN36 4AH, UK, phil.atkinson@bto.org***Fuelling for the Sahara crossing – Site use by 39 Afro-palaeartic migrants in the western Sahel**

To many Afro-palaeartic migrants the Sahara desert is a large ecological barrier providing few feeding opportunities. To cross the Sahara most species therefore accumulate large fuel reserves at suitable stopover sites away from the desert. South of the Sahara, these preparations coincide with the West African dry season and therefore at a time when resources are potentially limiting. Despite the recognised importance of stopover regions south of the Sahara and the likely deleterious impact of habitat degradation within them, site/regional use is not well documented during migration. To address this information gap, we present information on 39 species of Afro-palaeartic migrants in Djoudj National Park during the non-breeding season (located in the Sahel region), with particular emphasis on stopover/fuelling behaviour during spring migration. A variety of strategies emerged with respect to use of Djoudj/Sahel and they can be divided into three main categories: 1 - to both winter and fuel for the Sahara in regions south of Djoudj/Sahel (33 % of species); 2 - to winter largely in regions to the south of Djoudj and to use both Djoudj and other regions to prepare for the Sahara (23 %); 3 - to both winter and fuel at Djoudj/Sahel (44 %). Our findings demonstrate that Djoudj (and by extrapolation the Sahel) was used to prepare for the Sahara crossing by a wide range of migrants (67% of species examined) and conditions in the Sahel may therefore have an important role in regulating the success of migration and potentially the populations of many Afro-palaeartic migrants. For a smaller number of species, regions south of the Sahel are used and whilst these species may benefit from lower environmental variability, they face a longer a journey requiring larger fuel reserves and may therefore be more susceptible to smaller changes in resource availability.

S16**Bauchinger, U. & McWilliams, S.***University of Rhode Island, Dept. Natural Resources Science, 105 Coastal Institute in Kingston, URI, Kingston, RI 02881, USA, ulf@etal.uri.edu***Tissue turnover rate determines extent of phenotypic flexibility in organ size of migrating birds**

Many internal organs of migratory birds increase in mass during pre-migratory preparation and stopover periods, and decrease in mass during migratory flights. The quickest and most substantial organ mass changes in birds are the reductions observed after long-distance migratory flights. Typically, mass changes of small intestine and liver are most pronounced, skeletal muscles are reduced the least, and other organs including kidney and gizzard range intermediate. The magnitude of organ mass changes is relatively consistent across bird taxa which suggests a common underlying mechanism. Functional hypotheses that have been proposed include (1) the use:disuse hypothesis that predicts a decrease in digestive system and increase in heart and flight muscle during flight, and (2) the protein catabolism hypothesis that predicts decreases in organs in proportion to their protein stores. Recent data on carbon turnover rate of many organs suggest an alternative hypothesis to explain the magnitude of organ mass changes during flight: degree of organ-specific mass loss during flight is a simple consequence of the continuous process of tissue turnover. We discuss several ecological implications of this hypothesis that especially pertain to migratory birds.

S8**Bauer, S.^{1,2}, Ens, B.³, & Klaassen, M.¹**¹Centre for Limnology, Netherlands Institute of Ecology (NIOO-KNAW), P.O. Box 1299, NL-3600 BG Maarssen, The Netherlands, ²Swiss Ornithological Institute, CH-6204 Sempach, Switzerland, ³SOVON Dutch Centre for Field Ornithology, SOVON-Texel, P.O. Box 59, NL-1790 AB Den Burg (Texel), The Netherlands, s.bauer@nioo.knaw.nl**Many routes leading to Rome: potential causes for the multi-route migration system of Red Knots *Calidris canutus islandica***

Long-distance migrants usually make use of several stop-over sites. Potentially, multiple routes exist but often little is known about the causes and consequences of alternative migration routes. Apart from their geographical distribution, the suitability of potential sites might play an important role in the birds' decisions for a particular itinerary.

We parameterized an optimal migration model to test three non-mutually exclusive hypotheses leading to variations in the spring migration routes of a subspecies of Red Knot *Calidris canutus islandica*, which migrates from wintering grounds in Western Europe to breeding grounds in Greenland and the Canadian Arctic: the breeding location hypothesis, the energy budget hypothesis, and the predation risk hypothesis. Varying only breeding location, the model predicted that birds breeding in the Canadian Arctic and on West Greenland stop over on Iceland, whereas birds breeding on East and North-East Greenland migrate via northern Norway – a prediction that is supported by empirical findings. Energy budgets on stop-over sites had a strong influence on the choice of route and staging times on the sites. Varying foraging-intensity and mass-dependent predation risk prompted the birds to use less risky sites if possible. The effect of simultaneous changes in the energy budget and predation risk strongly depended on the site where these occurred.

Our findings provide potential explanations for the observations that *C.c. islandica* uses a diverse array of migration routes. According to our results all three hypotheses may be involved in the choice of migration routes, however, to different degrees. Scrutinizing the alternative driving forces for the choice of migratory routes awaits further, specific data collection in rapidly developing fields of research (e.g. predation risk assessment, GPS tracking).

S11**Bayly, N.J., Atkinson, P.W., Clark, J.A., Rumsey, S.R.**

The Wetland Trust, Elms Farm, Pett Lane, Icklesham, Winchelsea, East Sussex, TN36 4AH, UK, British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK, nick_bayly@hotmail.com

Crossing the Sahara desert – could fuelling constraints in west Africa limit populations?

The populations of several Afro-palaearctic migrants have been shown to be limited by environmental conditions on their west African non-breeding grounds. However, when, where and how conditions impact on populations is unclear. To successfully return to breeding areas, Afro-palaearctic migrants must cross the Sahara desert twice. The success of the return journey, which coincides with the west African dry season, could be strongly influenced by variability in environmental conditions. To understand how migrants prepare for the Sahara crossing and identify factors affecting these preparations, we compare and contrast the fuelling strategies of *Locustella naevia* and *Acrocephalus scirpaceus* at an autumn stopover site in Portugal and at a spring stopover/wintering site in the Senegal delta, south of the Sahara. In both species, fuelling rates were significantly slower and stopover/fuelling durations significantly longer in Senegal relative to Portugal, suggesting that the ability to fuel was constrained in Senegal. In a strategy that presumably minimises this constraint, *L. naevia* departed from Senegal over one month before *A. scirpaceus*, thereby avoiding the height of the dry season. Mean body mass of the spring fuelling population differed significantly between years when controlling for date in both species, indicating that fuel loads could be affected by constraints on fuelling. Significant between year differences were found in nine further Afro-palaearctic migrants and correlations to both regional rainfall levels and local conditions were apparent. Between year differences in mean mass of the fuelling population varied from 3 % to 24 % of lean body mass and suggest that fuelling shortfalls in years with unfavourable conditions could result in high mortality during the Sahara crossing.

C10**Beaulieu, M., Spée, M., Lazin, D., Le Maho, Y., Ancel, A. & Raclot, T.***Institut Pluridisciplinaire Hubert Curien, Département Ecologie, Physiologie et Ethologie, 23 Rue Becquerel, 67087 Strasbourg, France, michael.beaulieu@c-strasbourg.fr***Ecophysiological response of Adélie Penguins facing an experimental increase of breeding constraints**

Foraging strategies play a key role in parental investment and particularly when breeding constraints vary. Little is known however about their connections with hormonal / nutritional states and survival, especially when breeding constraints vary. In this study, we experimentally increased foraging cost by handicapping electronically-identified male or female Adélie Penguins (*Pygoscelis adeliae*) with external, large, dummy devices known to decrease the bird's foraging efficiency. Concurrently we measured plasma levels of corticosterone, a stress hormone affecting foraging behavior, and metabolites (triglycerides, uric acid) characterizing the animal nutritional state. In parallel, we investigated the use of ecological niches by birds by analyzing their erythrocyte isotopic signature which indicates their trophic position ($\delta^{15}\text{N}$) and their spatial distribution ($\delta^{13}\text{C}$). Handicapped birds performed ~ 70 % longer foraging trips and lost ~ 60 % more body mass than controls and their partners. However, corticosterone levels, their nutritional state and their survival (during the subsequent breeding season) were unchanged, whatever their sex. The isotopic signature revealed that males and females differed in their foraging behavior: males fed on upper trophic levels, in more pelagic areas. Moreover, surprisingly, handicapped and partner birds adopted the same strategy at sea: a shift towards higher $\delta^{13}\text{C}$ values suggested that they both foraged in more coastal areas than controls. These changes in foraging decisions may optimize feeding time by decreasing traveling time between the colony and feeding grounds. This may partly compensate for the presumed lower foraging efficiency of handicapped birds and for the energetic debt of partner birds who had to fast ~ 70 % longer on the nest because of the prolonged foraging trips of their handicapped mates. Finally, this flexible use of ecological niches may allow parents facing increased breeding constraints, to avoid a chronic stress situation and to minimize the impact on their nutritional state and survival.

S13**Bellebaum, J.¹, Wendeln, H.¹ & Korner-Nievergelt, F.²**¹*Institut für Angewandte Ökologie GmbH, D-18184 Neu Broderstorf present address: Puschkinallee 4a, D-16278 Angermünde, Germany,* ²*Oikostat, Ettiswil, Switzerland, jochen.bellebaum@t-online.de***Identifying limits to wind-farm related mortality in migratory bird populations**

Lighted offshore constructions cause mortality by collisions especially in nocturnally migrating birds. Plans for large numbers of offshore wind farms in the Baltic and North Sea where millions of birds migrate to and from Scandinavia each spring and autumn have raised concern about cumulative effects on migratory birds at a population level. Current EIA procedures have only considered effects of single wind farms.

Here we present an application of a method developed to estimate thresholds for additional mortality in marine mammals and seabirds, i.e. long-lived organisms, to estimate mortality limits for populations of migratory birds with strongly different life histories. Using basic data for 43 bird populations (mainly passerines) from Northern Europe migrating across the southern Baltic Sea we show that this method is suitable to set thresholds for collisions with offshore wind farms at a population level.

Results indicate that for the different species studied, an additional annual mortality ranging between < 1 %–6.9 % of the autumn population size could be sustainable. This finding was supported by matrix models. Species-specific thresholds could be used to guide approval of future wind farm projects and can easily be updated when better demographic data become available.

S3**Bensch, S., Marzal, A., et al***Lund University, Department of Ecology, Ecology Building, S-223 62 Lund, Sweden, Staffan.bensch@zooekol.lu.se***Diversity, loss and gain of malaria parasites in a globally invasive species**

What makes a species a successful invader to new continents and ecosystems is an urgent question for predicting biodiversity loss and protecting biodiversity. Parasites and diseases have been proposed as key

factors explaining colonization success of invading species. The Enemy Release Hypothesis suggests that successful colonizers are successful because they have left behind their naturally controlling pathogens. In contrast, successful colonizers may out-compete local native species because they bring with them parasites to which the native species are not adapted to, the Novel Weapon Hypothesis. House Sparrows *Passer domesticus* have colonized all continents except Antarctica from southern Eurasia within the last few hundred years. Here we analyse the distribution of avian malaria parasites and related haematozoans in >1500 House Sparrows covering most of its present global range. The obtained lineages have been matched to a database compiled from 70 publications, containing the distribution of >850 unique lineages in 550 species of birds. Our results reject the Novel Weapon Hypothesis because the House Sparrow parasites in the species' original range have been replaced by a local parasite in each of the newly colonized continents. These new parasites appear to be host generalists. In support to the Enemy Release Hypothesis, the diversity of parasites is lower in recently colonized regions.

S12

Besnard, A. & Lyet, A.

UMR 5175 - CEFE CNRS, 1919 route de Mende, 34293 Montpellier cedex 5, France, Aurelien.besnard@cefe.cnrs.fr

Large-scale monitoring of rare and elusive species combining capture-recapture with presence/absence data

In the context of global species decline, the set up of large scale monitoring is a central matter for any conservation or management purpose. Over the last decades, there has been an increasing interest in this approach for the monitoring of bird and mammal populations. However, although flexible and powerful statistical methods have recently been proposed for common and/or easily detectable species, they are of limited use when facing rare species with low detection probability and heterogeneous detection probability among sites. Here we introduce a double sampling strategy to estimate local abundance, which requires two types of information, repeated presence/absence data on a site, and the individual detection probability which has to be estimated elsewhere. To that aim, we first estimated the detection probability on a particular site representative of the species (calibration site) and then explored how this estimate performed in predicting animal abundance on other sites where abundance was known (evaluation sites). We evaluate the relevance of our approach using a monitoring of the Orsini's viper at a regional scale. We currently lack an available dataset on birds, but we will sketch two examples of field protocols which could easily be applied to that group.

C9

Bogdea, L., Cojan, C. & Munteanu, A.

Institute of Zoology, Academy of Sciences Moldova, Academy' Street, 3, MD – 2028, Chisinau, R. Moldova, condrea_p@yahoo.com

Spatial distribution of the ecological territory in the case of *Sylvia* sp. in R. Moldova

The present study is focused on the ecological relevance of the horizontal and vertical distribution of genus *Sylvia* in different woodlands (regarding the structure and the flora composition of the ecosystem). Our fieldwork was undertaken in two seasons (2007–2008), using transect method, visual and species song recording, in two parks from Chisinau city (transects about 1 km length) and in some natural deciduous forests (*Quercus* sp. and *Fraxinus* sp., *Quercus* sp., with *Carpinus* sp. and *Tilia* sp., respectively, *Quercus* sp. and *Prunus avium*), on transects about 10 km length. The analyses used the variance report and aggregation index. We found five breeding species of the genus *Sylvia*: *S. atricapilla*, *S. borin*, *S. communis*, *S. curruca* and *S. nisoria*. In the heterogeneous forests, *S. atricapilla* and *S. communis* are the dominant breeding species, with agglomerate distribution (the aggregation index present values between 12 and 13.3) and high densities (92.4, respectively, 51.7 pairs/km²), while in the parks, that present a high homogenous flora, *S. atricapilla* and *S. borin* present uniform distribution ($\chi^2 = 0.94$). For *S. curruca*, we recorded a random distribution ($\chi^2 = 1.99$) and not high density (16.5 pairs/km²), this species preferring the coniferous plantations and the deciduous forest's edge. The species *S. communis* and *S. nisoria* are present, especially, on the southern slopes of the hills, in bushy vegetation. The latter species has a low density (maximum 7 pairs/km²) and prefers the bushes which are not so dense, nearest the arable lands

and the margins of forests. The mosaic habitat, the flora's composition, the trees' diversity, the presence of herbaceous and bushes stratum have an influence on the dispersion and density of these bird species.

S6

Bollmann, K.¹, Schaublin, S.^{1,2} & Imhof, S.^{1,3}

¹Swiss Federal Research Institute WSL, Research Unit "Biodiversity and Conservation Biology", Zürcherstrasse 111, CH-8903 Birmensdorf, Switzerland, ²Zoological Institute, University of Zürich, ³Geographical Institute, University of Zürich, kurt.bollmann@wsl.ch

Conservation of two syntopic species with contrasting habitat preferences: Capercaillie and Hazel Grouse

The under-representation of pioneer and old-growth stands and the loss of structural richness through changes in forest practices are major problems for the conservation of forest biodiversity throughout Europe. Today, mountain forests are the only stronghold for several bird species that prefer open stands with structural richness. This applies also to Capercaillie *Tetrao urogallus* and Hazel Grouse *Bonasa bonasia*, two endangered forest grouse with contrasting habitat preferences. We systematically assessed the distribution and habitat characteristics of both species in a special forest reserve in the Swiss Alps. In a grid system, we investigated abiotic, structural and vegetation parameters and compared presence and absence cells of both grouse species by applying logistic regressions. In general, Capercaillie preferred semi-open forest stands with well developed ground vegetation whereas Hazel Grouse was restricted to stands with an understorey providing a minimal amount of softwood trees. Thus, forest management for the coexistence of both species has to define a process how semi-open stands with low and high understorey cover can be combined within a single reserve. We will present a simple spatial concept to show how forest stands of both types can be triggered by considering topographic characteristics of mountain forests and differences in home range size of both species.

S3

Boulinier, T.

CEFE-CNRS, UMR 5175, Montpellier, France, thierry.boulinier@cefe.cnrs.fr

The seabird-tick system as a model to address evolutionary ecology questions of epidemiological relevance

Most seabirds are long-lived and breed in dense colonies where large quantities of ectoparasites can accumulate. We will illustrate how these characteristics make them interesting models to address modern evolutionary and ecology questions about host-parasite interactions. A first set of questions relates to the immuno-ecology of host-parasite interactions. A second set of questions relates to the evolution of host specialization and its potential consequences for the dynamics of vector born pathogens. We have been working on these issues with the system involving (1) seabirds, (2) the tick *Ixodes uriae* and (3) the bacteria *Borrelia burgdoferi* sensu lato, the agent of Lyme disease. In this talk, we will particularly illustrate our recent findings on the evolutionary ecology of the maternal transfer of antibodies. We found that female Black-legged Kittiwakes *Rissa tridactyla* could transfer antibodies to *B. burgdoferi* via the egg yolk and that the proportion of nest containing antibodies was higher in tick infested areas. Using an experimental design involving the controlled exposure of breeding individuals to an antigen (vaccination) and the study of the dynamics of immunity of their chick exposed to the same antigen the year after, we were able to show that such antibodies are functional in an ecological setting. We further found that the level of anti-*Borrelia* antibodies in breeding Kittiwakes was highly persistent between years, but that it was also affected by the previous year exposure to ticks. Investigations of antibody profiles of various species were also used to explore differences in the circulation of a bacteria like *Borrelia burgdoferi* within and among populations of hosts. Overall, the findings are relevant for the epidemiology of vector born diseases, but also for the basic understanding of host-parasite interactions.

S14

Brambilla, M.¹, Negri, I.², Bergero, V.¹, Bogliani, G.², Crovetto, G.M.¹, Falco, R.¹, Siccardi, P. & Casale, F.¹

¹Fondazione Lombardia per l'Ambiente, Piazza Diaz 7, I-20123 Milano, Italy, ²Università degli Studi di Pavia, Italy, brambilla.mattia@gmail.com

Red-backed Shrike conservation at regional scale

We developed a multi-level conservation strategy for *Lanius collurio* in Lombardy, N Italy, starting from a region-wide assessment of habitat preferences, whose results were translated into conservation priorities over different spatial scales.

L. collurio appeared to be dependent on mown or grazed grassland at landscape level, to partial shrub cover and higher hedge length (at both landscape and territory levels), and to intermediate cover of untilled grasslands at territory scale.

After defining habitat associations, we i) described conservation priorities (at landscape scale) over the whole region, by identifying the most important populations of the species, main areas of potential occurrence and main threats and conservation needs in terms of macroscopic habitat change, ii) derived territory-level guidelines for management of different habitats occupied by the species.

We assessed the relative importance of different land-use changes on habitat suitability for the species in Lombardy, considering land abandonment, conversion of lowland grasslands into other land-uses, unmanaged evolution of scrub habitats.

Guidelines included a description of the habitat mosaic virtually representing most suitable option for the species in different environmental contexts (mown grasslands, pastures, fields with hedges, shrublands, heathlands, vineyards) inhabited by *L. collurio* in Lombardy, best practices favourable for the species and possible benefits for other animal species. Such knowledge could be helpful to implement habitat management for species' conservation within agri-environment solutions. Local experience of habitat management consistent with our indications proved to induce sudden increase of *L. collurio* populations, indirectly confirming validity of some of the proposed schemes.

S17

Brotons, L.

Centre Tecnològic Forestal de Catalunya, Centre Tecnològic Forestal de Catalunya CTFC, Pujada del Seminari s/n, 25280 Solsona, Spain, & Institut Català d'Ornitologia, Museu de Zoologia, passeig Picasso s/n 08003 - Barcelona, Catalonia, Spain, lluis.brotons@ctfc.cat

Predicting bird distribution in Mediterranean dynamic landscapes in a context of global change: challenges and the way forward

The current challenge in a context of major environmental changes that will be exacerbated in the future is to allow a meaningful projection of species distribution to future landscape and climate scenarios. Species distribution modelling may play a fundamental role in this challenge but we need to integrate more ecology in model building and develop more coherent model validation before species distribution modelling may be of use in a dynamic ecological context.

Mediterranean landscapes are highly dynamic systems. Fire is one of the most powerful driving forces of these dynamics and in the Mediterranean basin its frequency and impact have markedly increased in recent years. The description and analysis of landscape patterns associated to fire dynamics have received some attention but knowledge as to how the temporal and spatial arrangement of habitats arising from wild fires affects wild animals is astonishingly poor with the exception of within habitat succession related recovery of communities after the disturbance event.

In this paper, we present recent advancements on bird species responses to fire in Catalonia (North-east Iberian peninsula) in which species distribution modelling applications have played a major role. Our study model in dynamic Mediterranean landscapes has stressed the importance of landscape dynamics, population connectivity and model building in the accurate prediction of distribution changes of bird species in response to fire dynamics during the last 20 years in the region. We argue that a deep insight on the temporal and spatial factors that interact in a complex way to determine current landscape patterns and species responses will be essential if we aim at understanding and managing Mediterranean systems. The generality of these constraints suggests that successful application of species distribution modelling to the prediction of species distribution dynamics in other systems should be developed under a similar integrative, ecologically sound framework.

C2**Burfield, I.J.***BirdLife International, Wellbrook Court, Girton Road, Cambridge, CB3 0NA, United Kingdom, ian.burfield@birdlife.org***Identifying national responsibilities for conserving breeding bird species in Europe**

Legal instruments like the Convention on Biological Diversity and the EU Birds and Habitats Directives oblige their signatories to identify, monitor and protect biodiversity. Unfortunately, the resources available for this work are scarce, forcing countries to prioritise their spending. At species level, national Red Lists are commonly used for this purpose, even though extinction risk (which is what Red Lists measure) is not the only factor to consider when setting conservation priorities. If other factors are not taken into account, there is therefore a risk that precious resources may be misdirected. One such factor is national responsibility. When setting priorities, it is logical that countries should consider the international significance of their national populations. If done correctly, with countries agreeing to share the overall cost burden, this should lead to more efficient resource allocation and more effective conservation. Some countries have tried to take this approach, but they have adopted various methods that are not comparable and may even conflict. Using BirdLife's unrivalled data sets, this presentation will build on recent developments in the field to identify national responsibilities for breeding bird species in Europe, taking into account their global and regional populations and threat status.

C15**Buschmann, A.***Chair of Forest Inventory and Remote Sensing, Faculty of Forest Sciences and Forest Ecology, University of Goettingen, Buesgenweg 5, 37077 Goettingen, Germany, ABuschm@gwdg.de***Remote sensing based habitat suitability modelling – a case study for the Red Kite (*Milvus milvus*)**

Models to estimate species distribution and to support evaluation of the habitat potential of landscapes are important elements of biodiversity management and protection. The paper examines an empirical multivariate approach to evaluate breeding habitat suitability for Red Kite (*Milvus milvus*), a raptor with large home range size. Environmental variables at locations where Red Kites were present (nesting sites) in EU SPA V19 (Lower Saxony, Germany) are compared with the mean values of these variables for the entire study area. The hypothesis being tested is that the species' demands regarding these variables will differ significantly from the means. Multi-source environmental data for extraction of predictor variables include remote sensing imagery of high spatial resolution (1 m) supplemented by detailed database information from agricultural and forestry administrations and further geo-datasets (DEM, road maps etc.). Environmental variables of different categories including landscape *composition*, i.e. cover percentages of existing land use classes, forest stand attributes, topography and competition enter as predictor variables into the habitat model. Also landscape *configuration*, describing the spatial structure of the study area, is hypothesised to influence habitat suitability for Red Kite. *Landscape metrics* are used to integrate this information on habitat configuration into the model on *multiple scales*. Individual patch spatial attributes as well as measures aggregated over patches of selected land use classes are derived as sets of predictor variables. The variables that affect the choice of the breeding habitat of Red Kite most significantly are identified; it is this set of variables that eventually defines the ecological niche of the focal species regarding the breeding habitat. With the multivariate statistical model, measures of marginality and specialisation quantify this niche and allow to generate rasterised habitat quality maps that depict and predict breeding habitat suitability for each landscape cell of the study area.

C12

Cameron, A., Alerstam, T., Barber, D., Bechard, M., Bildstein, K., Douglas, D., Ferrer, M., Fuller, M., Gschwend, M., Kays, R., Katzner, T., Klaassen, R., Kochert, M., Maisonneuve, C., Mandel, J., Martell, M., McIntyre, C., McGrady, M., Meyburg, B., Miller, T., Nathan, R., Nye, P., Koks, B., Safi, K., Seegar, W., Smith, J., Steenhof, K., Thorup, K., Trierweiler, C., Weinzierl, R., Wikelski, M.

Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schloß Möggingen, Schloßallee 2, 78315 Radolfzell, Germany, acameron@orn.mpg.de

Movebank - mapping global migration flyways with great accuracy across many species

Thousands of biologists collect animal movement data but there are no tools to save or compare these. Most data are used once and then disappear into a filing cabinet. In January 2009 Movebank (www.movebank.org) launched an animal tracking data-base and web-portal. The first test of this system was to support a three day global raptor migration workshop at Hawk Mountain, Pennsylvania, in February 2009. Prior to the workshop participants identified Argos tracking studies from 38 species of raptor, for which data on start of migration, end of migration, annual migration distances, daily migration distances, and flight speeds were compared. This meta-analysis is supplemented with results from direct analysis of Argos tracking data for 20 species, which allows detailed intra and inter-species comparisons such as between continents, and between migration seasons. The applicability of the migration flyway concept is examined, migration diversity indices are presented, and migration bottle-necks are identified. Overviews of additional questions that are being addressed using this data-base, and potential uses of the system for other groups of ornithologists are provided.

S15

Cappelle, J.¹, Gaidet, N.¹, Newman, S.², Takekawa, J.³, Prosser, D.³, Iverson, S.³ & Dodman, T.⁴

¹CIRAD, UR Animal et Gestion intégrée des risques (Agirs), CIRAD ES, Campus international de Baillarguet, 34398 Montpellier France, ²FAO, Infectious Disease Group / EMPRES, Animal Health Service, Food & Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy 00153, ³USGS, Western Ecological Research Center, SFB Estuary Field Station 505 Azuar Drive, Vallejo, CA 94592, USA, and Patuxent Wildlife Research Center, c/o BARC-East BLDG 308 RM 224, 10300 Baltimore Avenue, Beltsville, MD 20705, USA, ⁴Wetlands International, P.O. Box 471, 6700 AL Wageningen, The Netherlands, nicolas.gaidet-drapier@cirad.fr, julien.cappelle@cirad.fr, Scott.Newman@fao.org, john_takekawa@usgs.gov; diann_prosser@usgs.gov, saiverson@usgs.gov, tim@timdodman.co.uk

Potential dispersal range and rate of H5N1 HPAI virus by wild waterfowl: estimation from satellite-tracked bird movements

The rapid spread of highly pathogenic avian influenza (H5N1) viruses over Asia, Europe and Africa, contemporary to outbreaks in migratory waterfowl, has questioned the potential for wild waterfowl to spread H5N1 viruses. While these viruses are still circulating over these regions, a number of recent experimental infection surveys have revealed that some wild waterfowl can excrete H5N1 virus for several days before or without exhibiting clinical signs.

We here present the application of a large-scale satellite telemetry program to epidemiology. We evaluated the dispersive potential of H5N1 viruses by wild waterfowl through the analysis of the movement range and rate of satellite-tracked birds, in relation to the duration of potential asymptomatic viral shedding (DPAVS). Our review of all available inoculation surveys (120 birds from 15 wild waterfowl species) indicates that almost all infected birds show a period of asymptomatic viral shedding, ranging from 1 to 8 days. We compiled location data of more than 100 birds from more than 10 species of Anatidae we had equipped with PTTs in Africa and Asia. We then measured the magnitude, speed and frequency of bird movements during time frames corresponding to values of DPAVS.

Our analysis confirms that wild waterfowl have the potential of being long-distance vectors of H5N1 viruses. Satellite-tracked birds were able to perform long-distance movements (up to 3000 km) during short periods compatible with DPAVS. However, their general dispersive potential was low. Long-distance dispersals (>100 km) were only occasional, with magnitudes no more than 1000 km for most ranging or migration movements, extensive distances being covered only when birds crossed large natural barriers. In addition, time between separate long-distance dispersals was generally longer than DPAVS, preventing birds from spreading viruses through successive long-distance flights.

S16**Carere, C., Cardinale, M. & Costantini, D.***Section of Behavioural Neurosciences, Department of Cell Biology and Neuroscience, Istituto Superiore di Sanità, Viale Regina Elena, 299, I-00161 Rome, Italy, Claudio.Carere@iss.it***Physiological trade-offs in lean individual birds at stopover sites: interplay between glucocorticoids, oxidative stress, melatonin and body temperature in coping with emergency**

Migrants are often forced to make crucial decisions. After prolonged flight and fasting, they massively take breaks at stopover sites for resting and/or feeding. They could leave after a few hours or stay longer, depending on several external and internal factors. Recent work confirmed that (good) condition at arrival is a strong predictor of migratory restlessness and, supposedly, quick departure. However, many individuals have depleted fat resources, their metabolism shifts to protein catabolism and must cope with energetic stress rapidly and efficiently. Here, we focus on these individuals that may decide not to leave readily. We combine empirical data on the physiological status of small passerines at stopover sites during spring migration to build a possible scenario about the internal factors controlling such a decision. We focus on oxidative profiles, melatonin and glucocorticoids in relation to strategies of energy saving and suggest that lean birds may become hypothermic. Hypothermic states might be facilitated by suppression of the adrenocortical response. Such strategy, being associated with a reduction in metabolic rate, could reduce oxidative stress produced by the strenuous flight and, at the same time, provide a substantial energy saving allowing to buffer protein breakdown. Also, the suppression of the corticosterone secretion could help recovering from the flight-related oxidative stress, since high levels of stress hormones may increase oxidative damage. A concomitant increase in melatonin, having both antioxidant and thermoregulatory properties, may play a pivotal role in this system by down regulating body temperature and, thereby, reducing the otherwise programmed nocturnal migratory restlessness. In summary, we predict that a lean individual after arrival at a stopover site should incur in an emergency physiological syndrome including: a rise in melatonin; a suppression of adrenocortical reactivity; a reduction in oxidative stress; a suppression of nocturnal restlessness; a hypothermic state and a lowered metabolic rate.

S9**Chastel, O.***CEBC/CNRS, CNRS-Centre d'Etudes Biologiques de Chizé, 79360 Villiers en Bois, France, chastel@cebc.cnrs.fr***Reproduction and modulation of the stress response: testing the brood value hypothesis**

In vertebrates, stressors such as starvation or predator attacks stimulate the rapid elevation of circulating glucocorticoid hormones, triggering physiological and behavioural responses that aid immediate survival but simultaneously inhibit reproduction. Accordingly, this stress response has been proposed to serve as a physiological mediator of life-history trade-offs: when the value of current reproduction is high relative to the value of future reproduction and survival, a mitigated stress response is expected to enable successful breeding and maximize fitness ("the brood value hypothesis"). In this talk, we will present correlative, experimental as well as comparative evidences in short-lived and long-lived birds strongly supporting the hypothesis that individuals actively modulate their stress response with respect to the value of current reproduction. We will also show that the modulation of the stress response involves other hormones such as prolactin, a pituitary hormone widely involved in regulating parental care. Recent studies have shown that plasma levels of prolactin decrease in response to stressors in birds and we suggest that prolactin response to stress shows potential for mediating some life-history trade-offs as do the extensively studied glucocorticoids. The stress response has also been predicted to be positively correlated with immediate survival. In the latter part of this talk we will present an experimental study testing this prediction and we will discuss the complex relationships between the magnitude of the stress response and survival probabilities.

C1**Cholewa, M. & Wesołowski, T.***Department of Avian Ecology, Wrocław University, ul. Sienkiewicza 21, 50-335 Wrocław, Poland, mcholewa@biol.uni.wroc.pl***Climate variation and Great Tits' breeding season in the temperate forest**

We investigated evidence for climate warming in the primeval forest of Białowieża National Park (E Poland) over the past 33 years (1975–2007). We asked whether the local population of Great Tit (*Parus major*) advanced its breeding phenology during that time, and how breeding phenology was affected by temperature during the period preceding egg-laying. Mean yearly temperatures varied strongly across years, with a significant warming trend. Spring temperatures increased significantly solely in the second half of April. *P. major* showed a significant advance of breeding and the onset of breeding was very variable across years (up to 30 days), as birds started breeding earlier in springs with higher temperatures in the prelaying period. Such a wide range of phenological plasticity indicates that the birds already possess mechanisms, enabling them to accelerate breeding in response to climate warming, provided that warming occurs in the prelaying period.

C3**Chylarecki, P.***Museum & Institute of Zoology, Polish Academy of Sciences, Wilcza 64, 00-679 Warszawa, Poland, pch@miiz.waw.pl***Opposite effects of feather mites on fitness-related traits in Ringed Plovers *Charadrius hiaticula***

Feather mites (Acariformes: Astigmata) are ubiquitous symbionts of birds, inhabiting different, often species-specific plumage parts of their hosts. Controversy exists however regarding whether the relationship between feather mites and their avian hosts is parasitic, commensalistic or mutualistic. I studied ecology of infestation of Ringed Plovers *Charadrius hiaticula* by feather mites *Bychovskiata charadrii*. *Bychovskiata* is a common (prevalence over 90%) inhabitant of primaries of adult plovers. During three breeding seasons I experimentally removed feather mites (by spraying pyrethrin) from half of plovers incubating early-season clutches in my study population. Performance of experimental birds was compared with controls (unsprayed birds) during the subsequent clutches in the same breeding season and in the year following the experiment.

Unexpectedly, experimental birds of both sexes showed significantly lower body mass during the incubation of second/replacement clutches and tended to lay smaller eggs than controls. This was suggestive of lowered fitness of hosts following removal of symbionts.

Annual survival decreased with parasite load in control female plovers. In experimental females, survival until next year increased following parasite removal in birds with initially high *Bychovskiata* load, but remains unaffected for those with low number of feather mites. Annual survival of males did not change with pyrethrin application, but individuals with naturally high *Bychovskiata* load had higher survival. Birds of both sexes developed larger ornaments in the year following removal of feather mites, as compared to controls. These were extent of orange bill at base and breadth of black diadem on the forehead. Generally, feather mites seemingly decrease some fitness-related traits in female Ringed Plovers. They may also influence development of ornamental traits revealing individual quality of plovers. On the other hand, decreased condition and lowered reproductive investment in late clutches, following removal of feather mites, remain enigmatic, suggesting mutualistic relationships at other stages of the life cycle.

S16**Coppack, T.***Zoological Museum, University of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland, coppack@access.uzh.ch***Rhythm is it! – Consistent flight schedules among wild-caught passerine migrants**

Circadian clocks are believed to play a central role in the physiological control of flight and stop-over decisions in night-migrating songbirds. Yet, this assumption is largely based on experiments with individuals entrained over extended periods to laboratory conditions. At the same time, capture-recapture

data from the wild do not give us reliable information on the timing of migration, due to potential bias through individuals in poor physical condition. Using a motion-controlled videographic system, I determine the precise timing of flight and stopover behaviour in 17 redstarts (*Phoenicurus phoenicurus*) captured during spring migration at a northern European stopover site. Birds were held captive for three days in the absence of photoperiodic cues (constant dim light) and under permanent food availability. Despite the absence of external temporal cues, most birds retained clear-cut bimodal activity patterns: intense nocturnal activity alternating with diurnal foraging and resting periods. The onset of migratory activity coincided with the time of projected sunset and was individually repeatable. The study indicates that circadian rhythms and photoperiodic cues are the key factors positively controlling stop-over duration in the wild. Day-to-day fluctuations in food availability, weather, and physical condition are more likely to be the ultimate reasons why songbirds have evolved such a robust, anticipatory time-keeping system.

S11

Cresswell, W.

School of Biology, University of St Andrews, St Andrews, Fife, KY16 9TS, Scotland, UK, wrlc@st-and.ac.uk

What are the non-breeding causes of Palearctic-African migrant declines? Ecological studies of migrants in Africa

Recent evidence shows substantial declines of Palearctic migrants relative to non-migrants, with distance of migration being a key predictor. This strongly suggests that factors acting during the migration period or during the non-breeding period in Africa are driving migrant declines. This review seeks to identify specific mechanisms that might affect populations of trans-Saharan passerine migrants as the first step to actually doing something about the declines, either by spurring work to fill in the gaps, or moving from assessment towards management or at least damage limitation. The evidence for habitat degradation, climate and direct anthropogenic mortality having changed coincident with migrant declines, or being directly linked to migrant population change is presented. The relatively weak evidence for indirect effects such as habitat degradation or climate change altering the competitive relationships of migrants and residents, or their predation risk is also considered. An overall framework to understanding the mechanisms of migrant declines is proposed: migrants have a number of flexible and inflexible patches, in terms of both time and space, that they use in the non-breeding season. This flexibility is a function of time because, for example, post breeding staging to the wintering areas may less time constrained than the return to the breeding grounds because late arrival at the wintering quarters may have much less cost than late arrival at the breeding grounds. The flexibility is also a function of space because migrants are likely to be much more mobile during the non-breeding season and particularly on the wintering grounds. Understanding which points are less flexible for migrants during the non-breeding season is crucial to identifying where and when any conservation action might be targeted. Field studies in Africa are therefore particularly needed to identify residency, inter-African migration and staging patterns during the non-breeding season.

C14

David, M. & Cézilly, F.

Université de Bourgogne, UMR CNRS 5561 Biogéosciences, Equipe Ecologie Evolutive, 6, boulevard Gabriel, 21000 Dijon, France, Morgan.David@u-bourgogne.fr

Personality influences mate choice in female zebra finches

Mate choice studies often reveal substantial variation in both female preferences and sampling strategies. The recent concept of personality is based on the characterization of consistent inter-individual differences in behaviour across contexts. However, so far, its influence on sexual selection processes has been poorly considered. We investigated the influence of female personality on various components of mate choice in the Zebra finch (*Taeniopygia guttata*). Exploratory tendencies, previously shown as a major component of a behavioural syndrome in this species, were first assessed in a standardized cage. Female choice for three stimuli males was then tested in a classic four-chamber choice apparatus. Choosiness, preference strength and their consistencies across trials were found to be related to personality. Indeed, more active females were less choosy and less repeatable than less active ones. We discuss our results in relation to the relevance of the concept of personality to studies of mate choice.

C7**De Graaf, M., Hegemann, A. & Tieleman, B.I.***University of Groningen, Animal Ecology Group, 30 Kerklaan, P.O. Box 14, 9750 AA Haren, The Netherlands, m.de.graaf.9@student.rug.nl***Wintering strategy of Skylarks *Alauda arvensis* – local wintering and migration occur within the same population**

For many years, the Skylark was one of the most common birds in Europe, but populations declined rapidly during the past three decades. Changes in agricultural practice are thought to have caused a reduced reproductive success. However, information about behaviour and performance outside the breeding season is lacking. Even simple questions like the wintering strategy of populations from northwestern Europe have remained hitherto unanswered and both local wintering and migration to France and Spain have been hypothesized. We analysed the ring recoveries from the Dutch ringing centre covering the past 100 years and showed that both strategies occur in the Dutch population, but wintering decisions at the individual level remained unclear. Therefore we fitted Skylarks of a study population in the Netherlands with a radio-transmitter at the end of the breeding season to follow their winter movements at a local scale. While some of these birds wintered in the surroundings of their breeding area, others disappeared in winter. Nevertheless some of the birds that could not be found during winter returned to the breeding grounds in spring suggesting a migratory strategy. Moreover migration to southwestern Europe was confirmed by recoveries of birds ringed during migration in Belgium and breeding in the same Dutch population. Thus the occurrence of both strategies, local wintering as well as migration towards France and Spain, have been shown to occur within the same population. Analyses of stable isotopes in the continuously growing claw may allow us to determine the wintering location on an individual basis. If successful, this knowledge will be combined with causes and consequences of different wintering strategies for reproductive success and probability of survival. This knowledge will be helpful to establish a powerful conservation strategy for the species.

S7**Dell'Omo, G.***Technosmart, Viale dei Quattro Venti 253, 00152 Rome, Italy, giacomo.dellomo@iss.it***Tracking the history and future use of GPS in ornithology**

It is now a decade since a GPS logger was first fitted to the back of a bird. Since then, most GPS studies have been conducted either on albatrosses or on pigeons, birds at opposite extremes of the range of sizes of birds on which GPS units have been deployed. The number of studies conducted on medium-sized species, and particularly marine birds, is slowly increasing, but there are constraints on the use of GPS which have so far limited its use in many other species. However, the potential of this technology to contribute to our understanding of birds is enormous. Because of the high spatial resolution of GPS data, it can be used at smaller geographical scales than satellite telemetry, opening up new possibilities for the study of bird movements at high resolution across a variety of habitats. Recent technological advances have allowed the integration of GPS units with sensors and other miniature instruments, providing a variety of GPS-based tools for scientific investigation. Increased accuracy of GPS has allowed flight dynamics to be described with more precision than was previously possible, and this technology has recently been used to study the movement of individual birds in relation to others individuals within flocks. Use of GPS loggers in conjunction with micro-sensor technology has also allowed various physiological parameters, including EEG activity, to be related to flight behaviour and to landscape features. Examples of these new approaches and of GPS data collected from various bird species on land and sea are presented.

S14**Denac, D. & Tome, D.***National Institute of Biology, Vecna pot 111, SI-1000 Ljubljana, Slovenia, damijan.denac@nib.si, davorin.tome@nib.si***Recognition of ecological traps for Whinchat (*Saxicola rubetra*) in a mosaic of lowland habitat types**

Whinchat is an indicator species of extensive unimproved grasslands – one of the most threatened ecosystems in Central Europe. In Slovenia its population declined by half during the last decade. We investigated fecundity, nest survival and annual survival of Whinchats in a mosaic of lowland habitat types. Our aim was to recognize factors driving population decline in Whinchat. The study was carried out between 2002–2006 on 120 ha large area in central Slovenia on six habitat types with different vegetation and mowing regime and on pastures with different grazing intensity. Fieldwork methods involved searching and controlling of nests, capturing individuals and marking them, and recapture of birds and registering mowing and grazing activities. A total of 139 nests were found, 243 adult and 397 young birds in nests were marked. We analysed nest survival following basic Mayfield method, and apparent annual survival using classical Cormack-Jolly-Seber Model for open population. The most supported were models where nest survival was a function of the mowing date. The later the mowing, the higher the nest survival. If meadows were mowed before 13th June, less than 10 % of nests survived. If mowed on 6th July 50 % of nests survived. Grazing density was the factor explaining nest survival on pastures. The higher the grazing density, the lower the nest survival. Nests did not survive a constant grazing density of 1.9 cows/ha during the breeding cycle (32 days). Under constant grazing density of 1.1 cow/ha 50 % of nests survived. Early mowed meadows were ecological traps for Whinchat because they did not avoid them but nests on them failed as a result of early mowing. Pastures were ecological traps, too, but only when grazing started after the onset of breeding. If grazing started before breeding started, Whinchats did not select them for breeding at all.

C11**Diebold, M., Suter, M. & Roth, T.***ETH Zurich – Institute of Integrative Biology, CHN G35.2, Universitätstrasse 16, 8092 Zürich, marianne.diebold@env.ethz.ch***Landscape-level patterns and species richness of farmland birds: the associations with a Swiss agri-environmental scheme**

In many parts of Europe, the populations of farmland birds have largely declined during the last decades. The decline is mainly attributed to the agricultural intensification at a field or landscape level. Aiming at increasing the farmland biodiversity also on a landscape level, in 1994 the canton of Aargau, Switzerland, started to implement an agri-environment scheme (AES) that seems to be unique in its focus on entire farms instead of single fields. Evidence suggests that the Aargau AES is effective in protecting and promoting species richness of plants and snails, but no direct effect of the AES on total bird species richness has been found so far. Here, we investigated the relationship between species richness of farmland birds and the AES of the canton Aargau at a landscape level. Landscape metrics, such as a shape index or the number of patches of ecological compensation areas, were defined following standard methods and were analysed for their relation to birds using generalised linear models. The species richness of farmland birds was positively correlated with several landscape metrics which suggests that the specific focus on farms is effective when AES are established. Our results may also explain, why - in contrast to other regions of Europe - we found an increased species richness of farmland birds per study plot from 1999 to 2008 in the investigated landscape.

C4**Dietz, M.¹, Spaans, B.², Dekinga, A.², Klaassen, M.³, Korthals, H.³, van Leeuwen, C.³ & Piersma, T.^{1,2}**¹Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, PO Box 14, 9750 AA Haren, The Netherlands, ²Department of Marine Ecology, Royal Netherlands Institute for Sea Research (NIOZ), PO Box 59, 1790 AB Den Burg, Texel, The Netherlands, ³Department of Plant-Animal Interactions, Centre for Limnology, Netherlands Institute of Ecology (NIOO-KNAW), PO Box 1299, 3600 BG Maarssen, The Netherlands, M.W.Dietz@rug.nl**New insights from stable isotopes: do Red Knots (*Calidris canutus islandica*) pass Iceland by during southward migration?**

The Red Knot subspecies *Canutus calidris islandica* breeds on the Arctic tundras in North-East Canada and North-Greenland and winters along the coasts in North-West Europe. *Islandica* Knots stopover during northward migration in Iceland or Northern Norway and during southward migration in Iceland, though some birds (mainly juveniles) are found in Norway and Denmark. This migration route is the shortest of all six Knot subspecies, namely ca. 4800 km, and Knots may be able to fly this distance in one non-stop flight as migration flights of the other subspecies can be as long as 6900 km. We investigated using stable carbon isotopes ratios ($\delta^{13}\text{C}$) in blood (cells) and plasma if *islandica* Knots pass Iceland by en route to the Dutch Wadden Sea. Based on the expected duration of stopover at Iceland (17 d) and the turnover rates of blood (cells; 15.07 d) and plasma (6.03 d), Red Knots should arrive after a stopover in Iceland with $\delta^{13}\text{C}$ ratios in plasma approaching the marine diet and blood (cells) ratios midway between the tundra and marine signal. Many adults had $\delta^{13}\text{C}$ ratios in blood (cells) and plasma below this expectation and some Knots even had tundra signals in their blood (cells); a strong indication that adults pass Iceland by. Remarkably, also juveniles arrived with tundra signals in blood (cells), indicating that they also pass Iceland by en route to the wintering grounds. This contradicts the general idea that juvenile shorebirds have more stopovers than adults. The $\delta^{13}\text{C}$ signature of second-year birds confirmed that they had overwintered in the Wadden Sea. Because *islandica* Knots arrive with tundra $\delta^{13}\text{C}$ signatures in the Wadden Sea, $\delta^{13}\text{C}$ ratios can be used to estimate of time since arrival, enabling for the first time a detailed timing aspect in the research on Knots at wintering areas. We can now look at e.g. the variation in body and gizzard mass, and body mass change with time since arrival.

C4**Dokter, A.¹, Liechti, F.², van Gasteren, H.³, Holleman, I.¹, Shamoun, J.⁴ & Sorbi, S.⁵**¹KNMI Meteorological Institute of the Netherlands, Wilhelminalaan 10, De Bilt, The Netherlands, ²Swiss Ornithological Institute, Luzernerstrasse 6, 6204 Sempach, Switzerland, ³Dutch Royal Air force, ⁴University of Amsterdam, ⁵Belgium Royal Air Force, adriaan.dokter@knmi.nl, felix.liechti@vogelwarte.ch**Quantification of bird migration – a bird filter for weather radar enables automated monitoring**

To reduce collisions between aircraft and birds an international project has been launched by the European Space agency (ESA), aiming 1) for a compilation of information on current bird movements by various sensors, 2) to combine them in a single model, and to finally 3) predict bird strike risks for different spatial and temporal scales.

The established European network of weather radars is one of the the most potential sensors to achieve such aims, but measurement accuracy has to be validated first. We compared data on bird migration measured with different weather radar systems and with a specialized bird radar operating simultaneously within the range of these systems. We could verify that weather radars are well suited for monitoring bird migration continuously over an area of about to 3000 km². The radars provided reliable migration traffic rates, height distributions, ground speeds and flight directions. Apart from the quantification of migration, an important improvement is the fact that a compiled algorithm extracts these information automatically from weather radar scans. Our results suggest that near real-time information on bird movements can be provided by implementing such a 'bird filter' to the existing weather radar systems. With the established continent-wide network of weather radars almost all flyways across Europe could be monitored simultaneously all year round. Apart from highly improved bird strike warnings, this network would yield invaluable information for scientific research on bird migration with respect to the influence of the spatial distribution of stopover sites, the weather regime and their variation in time. The study also demonstrates that there is an existing sensor monitoring bird migration, and there seems to be relatively little investment needed to get access to the data.

C7**Duriez, O.¹, Ens, B.J.², Pradel, R.³, Choquet, R.³ & Klaassen, M.⁴**

¹Muséum National d'Histoire naturelle, UMR 5173 MNHN-CNRS-UPMC, Conservation des Espèces, Restauration et Suivi des Populations, 61 rue Buffon, 1er étage, 75005 Paris, France, ²SOVON Dutch Centre for Field Ornithology, SOVON-Texel, P.O. Box 59, 1790 AB Den Burg, the Netherlands, ³CEFE-UMR 5175, Biometry and population dynamic team, 1919 Route de Mende - 34293 Montpellier cedex 5, France, ⁴Netherlands Institute of Ecology (NIOO), Centre for Limnology, Rijksstraatweg 6, 3631AC Nieuwersluis, the Netherlands, duriez@mnhn.fr, Bruno.Ens@sovon.nl, remi.choquet@cefe.cnrs.fr, roger.pradel@cefe.cnrs.fr, m.klaassen@nioo.knaw.nl

Winter and summer survival of Oystercatchers in continental Europe: a comparison between resident and migrant populations

In most animal populations, survival rates vary across the year and periods of higher mortality rates are often associated with high energy expenditure. In partially migratory species, a geographical disjunction between breeding and wintering grounds for some populations adds complexity to the understanding of the species' demography. The factors affecting survival may differ between wintering sites and breeding sites. Moreover, individual survival rates may also differ between wintering areas.

We tackled these questions with the Eurasian Oystercatcher (*Haematopus ostralegus*), a long-lived wader with a large breeding and wintering range. In winter, all populations are mixed in the coastal habitats of the Wadden Sea islands, North Sea and Atlantic coast. In summer, part of the population stays at these shores (residents) while the other part migrates inland in agricultural habitats or further north along the Baltic Sea and Norwegian coasts. Although still abundant, populations are declining and suffer from habitat change (reduction of tidal area, decline in shellfish food stock), climatic hazards, and hunting.

We address the following questions:

1. Do migrants, as opposed to residents, have a reduced survival because they have an additional migratory flight to perform and suffer increased competition on the wintering grounds with residents, which probably have better knowledge of and priority of access to the best wintering sites?
2. Is survival lowest in summer, since breeding is often considered as the most demanding period in the life cycle, or lowest in winter, given high energy requirements for thermoregulation and poorer access to food, with massive mortality occurring in severe winters?

We compared the survival of resident and migrant populations in both summer and winter. To this end, we pooled all ringing-recovery datasets from 1975 to 2000 from all continental European countries along the Baltic, the North Sea and the Channel south coasts. Using both live recaptures and dead recoveries (further distinguishing between mortality due to natural causes and hunting), we used a multi-event capture-recapture model to estimate winter and summer survival rates of migrant and resident populations. We particularly investigated the effects of important habitat changes such as the closure of the Oosterschelde in the Dutch Delta and the collapse of mussel beds in the Dutch Wadden Sea, as well as the effects of severe winters.

C13**Eichhorn, G.¹, Le Glaunec, G.¹, Pierre, A.¹, Parisel, C.², Arnold, L.², Handrich, Y.¹ & Groscolas, R.¹**

¹Dept. of Ecology, Physiology and Ethology, IPHC, ²Dept. of Subatomic Research, IPHC, DEPE/IPHC, 23 rue Becquerel, 67087 Strasbourg, France, goetz.eichhorn@c-strasbourg.fr

Energetics of growing King Penguin chicks: insights from heart rate and body temperature recordings

Among birds, King Penguin chicks exhibit an extraordinary long growth period of about one year when they depend entirely on food provisioning by their parents. After a first growing and fattening phase of 3-4 months, feeding is reduced dramatically for the next 4 months during the austral winter, and chicks lose weight and suspend or reduce structural growth. A second phase of intense feeding follows, ending by moult and fledging. Thus, King Penguin chicks face marked changes in food provisioning, from intense feeding to complete fasting. To determine how they energetically adjust to these changes, while growing and moulting, heart rate (HR, an index of energy expenditure) and various body temperatures (from the deep tissues to the periphery) of free-living chicks in their colony on Possession Island (Crozet Archipelago) were recorded for up to 7 months. Weather parameters and behavioural observations were recorded in parallel. We show that large-scale metabolic and thermoregulatory changes occurred and attempt to quantify various effects on HR related to behavioural activities, weather circumstances, food processing, and moult. For instance, a three-fold increase in resting HR was observed during peak moult compared to

the winter fast, suggesting a high energy cost of moult and/or efficient energy saving during food shortage. Such savings may be achieved through hypothermia, with a decrease in deep tissue temperature of up to 10 °C being observed. Feeding and food processing induced a marked and prolonged increase in HR. Thus, several nutritional, developmental, environmental and behavioural parameters simultaneously affect the energetics and thermoregulation in growing King Penguin chicks.

S2

Evans, K.

University of Sheffield, UK, Department of Animal and Plant Sciences, Western Bank, Sheffield, S10 2TN, United Kingdom, karl.evans@sheffield.ac.uk

Processes and consequences of urban colonisation: the Blackbird *Turdus merula* as a case study

Globally, urbanisation is one of the fastest growing land uses, with over half of the world's human population now located in urban areas. Indeed, towns and cities have already consumed large amounts of land in some regions. It is thus timely that there has been an explosion of interest in urban ecology during recent years. Much of this interest focusses on assessing spatial patterns in assemblage structure and composition along rural-urban gradients. The colonisation of towns and cities by native species and its consequences have received much less attention. This talk assesses how species colonise urban areas and the nature of trait divergence between the resultant urban populations and ancestral rural ones. I use the Blackbird *Turdus merula* as a case study. This former forest specialist is now one of the most abundant birds in many European towns and cities. Moreover, the timing of urbanisation has been particularly well documented in the Blackbird, although much of the relevant literature has been rather obscure. This talk first synthesises the available data on the history of Blackbird urbanisation and discusses the marked spatial pattern in timing of urbanisation. I then use genetic data from 13 paired urban and rural Blackbird populations located across the Western Palearctic to assess the processes through which urban colonisation events have arisen. I assess how these urban and rural populations have diverged in a number of traits focusing on their morphology and risk of disease. Finally, I discuss future research requirements for assessing trait divergence between conspecific urban and rural populations.

C11

Fehérvári, P., Harnos, A., Lang, Zs., Solt, Sz., Szövényi, G. & Palatitz, P.

Szent István University, Faculty of Veterinary Sciences, Department of Biomathematics and Informatics, Budapest, MME/BirdLife Hungary, Költő utca 21, H-1121, Budapest, Hungary, fehervari.peter@mme.hu

The effects of grassland mowing on the density of prey species and hunting efficiency of Red-footed Falcons

The Red-footed Falcon (*Falco vespertinus*), a small long-range migrant raptor species of international conservation concern, predominantly breeds in steppe type habitats in central eastern Hungary. A key element in the conservation management of this species is improving feeding grounds around the breeding sites of this colonial falcon. Grasslands are one of the most important hunting habitat types of Red-footed Falcons, where the most abundant prey taxa of this species are orthopteras and small mammals. Nature friendly grassland management can be categorized in two large types in Hungary, mowing and livestock grazing.

In our study we examined the short term effects of grassland mowing on orthoptera density. We monitored the change in the density of 14 orthoptera species for 4 days after experimental mowing at 2 sites, and applied a Bayesian regression approach to identify the time of near 0 density equilibrium of these taxa after mowing. Assessing hunting efficiency of Red-footed Falcons at grassland type habitat patches where the time of mowing was known was carried out with the aid of radio-tracking 29 specimens in 2007 and 2008.

Our results show that, although orthoptera densities decreased to a near 0 state in a time span of approximately 20–40 days after mowing, the hunting efficiency of Red-footed Falcons during the chick rearing period does not decrease in relation to time after mowing. The underlying reason may be that the lack of vegetation cover increases detectability of the prey enough to enable Red-footed Falcons' successful hunting, despite the very low prey abundance.

The results of our study have been incorporated in a species-specific agro-environmental subsidy system proposal.

S16

Fusani, L.¹ & Goymann, W.²

¹Department of Biology and Evolution, University of Ferrara, Italy, Via L. Borsari 46, 44100 Ferrara, Italy, ²Max-Planck-Institut für Ornithologie, Eberhard-Gwinner-Str. Haus 6a, D-82319 Seewiesen, Germany, leofusani@gmail.com, goymann@orn.mpg.de

Physiological conditions predict nocturnal restlessness at a stopover site in wild migratory passerines

During migration a number of bird species rely on stopover sites for recovering and replacing their energy reserves before and after crossing ecological barriers such as desert regions or seas. The duration of the stopover depends on a series of factors including environmental and physiological ones. Previous studies indicated that lean birds prolong their refuelling stopover compared to fat birds, however the quantitative relationship between physiological conditions and stopover behaviour had not been studied yet. We studied whether the amount of migratory restlessness (*Zugunruhe*) shown at a stopover site depends on physiological conditions in three passerine species, the Whinchat *Saxicola rubetra*, the Garden Warbler *Sylvia borin*, and the Whitethroat *Sylvia communis*. A large sample of migrating birds of these three species was caught at a ringing station on the island of Ponza, Italy. After recording a series of morphological and physiological variables, the birds were set in custom-made individual cages with water and food. The cages were equipped with infra-red locomotor activity recorders. The birds were released the following morning. An integrated measure of condition based on body mass, amount of subcutaneous fat, and thickness of pectoral muscles, strongly predicted the intensity of *Zugunruhe* shown in the recording cages in the night following capture. These results provide novel and robust quantitative evidence in support of the hypothesis that the amount of energy reserves determines the stopover duration in migratory birds.

C2

Geiger, S., Knez, K., Le Maho, Y., Lignot, J.H. & Robin, J.P.

Département d'Ecologie, de Physiologie et d'Ethologie - Institut Pluridisciplinaire Hubert Curien - Centre National de la Recherche Scientifique. 23, rue Becquerel, 67087 Strasbourg Cedex 2, France, sylvie.geiger@c-strasbourg.fr

Digestive tract atrophy of oil-covered birds: a possible cause for rehabilitation failures?

During oil spills thousands of seabirds may arrive in care centres. Besides its toxicological effects, oil damages feather isolation. Birds can feed no more, become hypothermic and suffer from cachexia. Such animals continue to lose weight even if refed in care centres. The hypothesis of an irreversible atrophy of the digestive tract has been proposed. We checked the validity of this hypothesis in Common Guillemot (*Uria aalge*) oil covered after the Napoli oil spill in January 2007. We used birds considered as non viable because their body mass was below a threshold level. Birds were euthanatized either fasted at the arrival in the care centre or after being refed with sprats. The digestive tract and indicators of body condition such as the pectoral muscle and skin were sampled and analysed. Even in these birds considered as non viable the digestive tract presented signs of a functional restoration after only one day of refeeding: the circumference and villi length of the jejunum was 1.3 times increased over values in fasted birds (9.6 ± 0.3 to 12.4 ± 0.4 mm and 820 ± 15 to 1060 ± 40 μ m, respectively). Such reactivation of the digestive tract corresponds to the values obtained in non-oiled birds in the same metabolic conditions (prolonged fasted birds refed for 24 h). Moreover, within some days of refeeding Guillemots may be able to regain weight (+15-20%) and to restore partially the lost body reserves (muscular proteins and lipids). As a conclusion, the initial hypothesis of an irreversible atrophy of the digestive tract does not seem to be verified and other possible causes of rehabilitation failures are discussed.

C14**Gladbach, A., Gladbach, D.J. & Quillfeldt, P.***Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, 78315 Radolfzell, Germany, Anja.Gladbach@gmx.de***Tarsus colouration as a signal of individual quality in Upland Geese (*Chloephaga picta leucoptera*)**

In the open nesting Upland Geese (*Chloephaga picta leucoptera*) females lack the possibility to indicate their quality via colourful plumage colouration as incubation requires a dull plumage to avoid predator attraction. But female Upland Geese show a conspicuous orange foot colouration in contrast to their rather dull plumage, which we hypothesize to indicate individual quality. The development of carotenoid-based colouration is assumed to be costly to produce, because birds, being unable to synthesize carotenoids, rely on obtaining them in their diet. As carotenoids play an important role in many immunological pathways the intense orange foot colour of female Upland Geese may be a signal of a good supply of carotenoids and serve as an indicator of a good health state.

The study was carried out in the New Island Nature Reserve, Falkland Islands from October to December in 2007 and 2008. Breeding individuals were caught using a mist net. Tarsus colour of females was measured in two different ways: Spectrophotometric colour measurements were carried out using a portable spectrometer. Reflectance was measured relative to a white standard, at a wavelength range of 300–700 nm and dark references were performed before each sample. Five sample points were taken and a mean value used for further analyses. Additionally a digital photo was taken together with a colour reference card.

We show that the intensity of female tarsus colouration allows a statement about the reproductive quality of females. Females with paler yellow legs started to lay later in the season. Total clutch volume and mean egg volume were negatively related to tarsus hue. We also found that tarsus hue reflects individual plasma carotenoid concentrations and could therefore indicate the level of immunocompetence in female Upland Geese.

C13**Gosler, A.G. & Wilkin, T.A.***Edward Grey Institute of Field Ornithology, Dept. of Zoology, South Parks Rd., Oxford OX1 3PS, UK, andrew.gosler@zoo.ox.ac.uk***Eggshell-thinning revealed by changing shell-speckling in Great Tits *Parus major***

Recent studies of eggshell pigmentation in the Great Tit have shown that pigment 'spread' is strongly related to eggshell thickness; itself influenced by local soil calcium availability. At Wytham Woods UK, situated on a limestone ridge, systematic soil surveys conducted in 1974 and 1991 revealed a significant decline in available soil calcium. We examined whether that decline had continued to the present, and tested whether declining soil calcium availability at Wytham was associated with a change in eggshell pigmentation patterns over time, which would indicate a concomitant reduction in eggshell thickness. A repeat soil survey conducted in 2008 revealed a further significant reduction in soil calcium. Examination of 20 years' of eggshell pigmentation data from the Wytham Great Tit population revealed that, as predicted, a systematic decline in eggshell-pigment spread had occurred, equivalent to about a 6.5 % reduction in eggshell thickness. We also found a positive correlation between the degree of change over time in calcium at a location and the degree of change in pigment spread over time at that location (i.e. changes in pigment and calcium were spatially, as well as temporally, correlated). Calcium leaching due to acid deposition is suggested as the most likely cause of the long-term decline in soil calcium. The study demonstrates the sensitivity of eggshell pigmentation, and by implication of eggshell thickness, to changes in local calcium availability, and provides the first evidence that declining soil calcium can affect birds breeding in calcium rich (e.g. limestone) landscapes. It also suggests a potential for the use of eggshell pigmentation as a non-destructive method to assay shell thickness, and to detect environmental change.

C10**Goutte, A., Antoine, E., Weimerskirch, H. & Chastel, O.***Centre d'Etude Biologique de Chizé (CNRS-CEBC) France, Villiers en Bois, 79360 Beauvoir sur Niort, goutte@cebc.cnrs.fr***Age-specific timing of breeding in a long-lived bird: are young birds more sensitive to stress?**

In bird species, early breeding is usually associated with a high breeding success. Interestingly, young females lay classically later in the season than older ones, suggesting that timing of breeding plays a crucial role in the well-known improvement of reproductive performances with advancing age. However, it remains unclear, at the proximate level, how this life history trait is affected by age. In that respect, the stress-hormone corticosterone deserves attention because it is thought to adjust reproductive investment in response to environmental and energetic conditions. Thus, corticosterone release due to pre-breeding constraints could mediate this age-specific timing of breeding. Because elevated corticosterone levels may disrupt the hormonal pathway that initiates reproduction, strong sensitivity to stress might delay or even stop the onset of breeding in young birds. In this study, we tested the following hypothesis: do young birds lay later than older ones because of a higher secretion of corticosterone in case of perturbation? To do so, we measured the corticosterone stress response of 66 known-age (7 to 44 years old) pre-breeding Snow Petrels, *Pagadroma nivea*. Then, we tested whether baseline corticosterone levels and the corticosterone stress response (1) are affected by age; (2) can predict timing of breeding. As predicted, young individuals laid their egg later than older ones, highlighting an improvement of reproductive ability with advancing age. In parallel, young birds were more sensitive to stress than older ones. Moreover, individuals with low baseline corticosterone levels lay earlier than birds with high baseline corticosterone levels. These findings support that environmental and energetic constraints affect the release of corticosterone, which in turn influences timing of breeding. We suggest that this stress hormone is involved in the adjustment of breeding schedule and performance with age. In addition, we report the first evidence of physiological senescence in relation with timing of breeding.

S7**Grémillet D.***CNRS - Centre d'Ecologie Fonctionnelle et Evolutive, 1919 route de Mende, F-34293 Montpellier Cedex 5, France, david.gremillet@cefe.cnrs.fr***GPS tracking in birds and its implications for conservation**

Bird biodiversity is threatened on a world-wide scale, calling for urgent improvement of management schemes. Protection of breeding sites is successful in many instances, but the conservation of bird feeding areas and migration routes is a far more challenging task. This is often due to a lack of basic knowledge regarding bird home ranges, and bird tracking via biotelemetry is therefore an essential conservation tool. Across the twentieth century, direct observations, ring recoveries, geo-location, radio-tracking and satellite-tracking allowed vast advances in our understanding of local and global bird movements. However, during the last decade, GPS-tracking of birds triggered a quantum leap in our knowledge of their spatial ecology. Indeed, this system allows unprecedented temporal (up to 10 Hz) and spatial (better than 5m) resolution. Due to ongoing miniaturisation, GPS devices have mainly been used in large seabirds. Using case studies in Cape Gannets, African Penguins and Cape Cormorants endemic to the Benguela upwelling zone off Southern Africa, I demonstrate the tremendous potential of GPS-tracking for the conservation of these vulnerable species. When used in combination with a range of biotic and abiotic parameters, seabird GPS-tracking drastically improved our understanding of this marine ecosystem challenged by climate change and fisheries. Crucially, this approach also allowed the design of marine protected areas which were established in 2008.

Further miniaturisation of GPS devices permitting the study of smaller bird species will provide the data necessary to the establishment, or the refinement of a wide range of Important Bird Areas and Marine Protected Areas.

C14**Griggio, M. & Hoi, H.***Konrad Lorenz Institute for Ethology, Vienna, Austria, m.griggio@klivv.oeaw.ac.at; h.hoi@klivv.oeaw.ac.at***Variation in preference for a male ornament is associated with female condition**

Female phenotypes may influence the final result of the mate choice because the direct costs and benefits of mating with certain males vary among females. Condition-dependent variation in mate choice may have important evolutionary implications, not only within the same population, but also among populations. There are few experiments, however, of how condition and/or genotype influences female mate choice decisions. The black throat patch of male house sparrow, *Passer domesticus*, is an intensively studied plumage trait. It is often referred to as a “badge of status” and seems to be involved in female mate choice, but differences among populations have been shown. Between-population variation in mate preference may occur for condition-dependent mate preferences. Here we experimentally investigated in captivity the hypothesis that females preferences may vary with females quality (body condition). We compared the mate preference among different groups of females: low, medium and high quality females. We measured females' preference for black bib size using an aviary two-choice test in which females were presented with two males whose black bib was experimentally enlarged or maintained at the average size. At the population level we did not find a female preference for enlarged nor medium black bib, but low quality females spent more time near medium badge males. Collectively, these results indicate that female preference varies with female quality. Differences observed among populations could be partly explained by differences in the condition of females.

C7**Grinkov, V.G.¹, Udilova, E.I.¹, Bukvareva, A.A.¹ & Sternberg, H.²**

¹*Evolutionary Biology Dept., Faculty of Biology, M.V.Lomonosov Moscow State University, Leninskie Gory 1/12, Moscow 119992, Russian Federation,* ²*OAG für Populationsforschung Braunschweig, Im Schapenkamp 11, D-38104 Braunschweig, Germany, v.grinkov@gmail.com*

Fitness consequences in overlap between breeding and moulting in Western Siberian population of the Pied Flycatcher (*Ficedula hypoleuca*)

The study of the *F. hypoleuca* population in Tomsk (56°20' N 84°56' E) region started in 2001 and is going on. The most important feature of this population is the exceptionally long migration distance, *i.e.* over 10,000 km from the wintering quarters in Africa to the breeding grounds. This is two times longer than the migration route of any European population of this species. Our study examines how birds overcome the shortage of time allocated to breeding and moulting due to long migration distance.

The proportion of females which combine moult and breeding varied from 8 to 46 % during the study period (mean 24 %). Moult overlaps with breeding occurred in males more often. The proportion of moulting males while rearing nestlings varied between 27 and 65 % (mean 47 %). Moulting birds returned to their breeding grounds the following year with the same rate as non-moulting ones. In pairs with one partner moulting, there was no difference in the return probability of the other partner the following breeding season. The recruitment rate was slightly higher in pairs with a moulting female and a non-moulting male, but not significant. Moulting and non-moulting birds did not differ in longevity and in number of offspring recruited to the breeding population. In view of breeding and moult overlap, each individual in the population uses a strategy allowing to maximise survival and number of their recruits to the local population. On the other hand, time constraints in the Tomsk population of *F. hypoleuca* are not strong enough to prevent distribution of the species far to the east.

S10**Grüebler, M., Schuler, H., Müller, M., Spaar, R., Horsch, P. & Naef-Daenzer, B.***Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, Switzerland, martin.gruebler@vogelwarte.ch***Female-biased mortality and intra-seasonal breeding dispersal caused by anthropogenic nest loss in a meadow bird**

Birds breeding in meadows such as the Whinchat *Saxicola rubetra* have been declining due to increased farming intensity. In modern grassland management, the first mowing and the breeding cycle of the birds coincide, causing high nest destruction rates and low productivity of grassland bird populations. It is virtually unknown whether the mowing process directly affects adult survival by accidentally killing incubating females. Moreover, nest destruction by mowing might change the spatial distribution of individuals through altering home-ranges and intra-seasonal dispersal to alternative breeding sites. In our study using radio-telemetry of adult Whinchats in a subalpine valley in Switzerland, mowing undoubtedly killed two of 20 radio-tagged females when they were laying or incubating. During the 20-year period of assessing Whinchat territories and mowing phenology, an increasing proportion of nests were destroyed before the chicks hatched and this change was associated with an increased distortion of the adult sex ratio. Modelling the population growth rate showed that including the additional effect of mowing on female mortality resulted in a 1.7 times faster local population decline. Furthermore, nest destruction often caused 'divorce' and disturbance of the social structure of breeding birds. A considerable part of the individuals experiencing nest destruction dispersed to other habitat patches in order to start a replacement brood or to spend the rest of the breeding season unmated. These results are consistent with the hypothesis that the extinction of Whinchat populations in the lowlands of central Europe was caused not only by habitat degradation and low productivity, but also by increased man-made female mortality.

S4**Gsell, A.C., Brunton, D., Ji, W., Hagelin, J., Goodwin, T., Robertson, J., Moorhouse, R., Fidler, A., Wild, M. & Kubke, F.***Ecology and Conservation Group, Institute for Natural Sciences, Massey University, Building 5, Gate 4, Oteha Rohe Albany Campus, Albany Highway, Private Bag 102-904, North Shore Mail Centre, Auckland, New Zealand, a.c.gsell@massey.ac.nz***Chemical communication in parrots with a specific emphasis on the Kakapo (*Strigops habroptilus*)**

New Zealand's isolation and the absence of mammalian predators and in particular the lack of mammals that rely on scent to find their prey have New Zealand enabled to evolve a unique bird fauna, characterized by many flightless and nocturnal species. Having adopted features more common for mammals than birds, it is therefore plausible that olfaction may be an important aspect of the ecology of this unusual avian assemblage as the use of scent would not have increased their vulnerability to predation over evolutionary time. For New Zealand birds, olfaction might indeed play an important role in social communication and mate choice. Moreover, New Zealand is home to one of the world's most unusual parrots, the critical endangered Kakapo, which is known for its strong smell. The aim of this project is to investigate the role that chemical communication may play in the ecology of parrots and specifically in the social and mating interactions of Kakapo. This study has three lines of investigation: 1) An anatomical approach - the histology of the olfactory bulb in parrots; 2) a biochemical approach using GC-MS technology to identify the chemical compounds of the body-scent parrots emit; and 3) a behavioural approach using scent presentations to parrots to evaluate the ability of olfactory cues to influence behaviour. In this talk we present our findings on the chemical composition of Kakapo scent and give our initial findings on the histological distinctiveness of the Kakapo brain.

S4**Gwinner, H.¹ & Mennerat, A.²**¹Max Planck Institute for Ornithology, Postfach 1564, D-82305 Starnberg/Seewiesen, Germany, ²University of Bergen, Department of Biology, Allégaten 41, NO-5020 Bergen, Norway, adele.mennerat@bio.uib.no**Odorous nests: olfaction and nest construction in Starlings and Blue Tits**

Nest construction is a key element of avian reproductive fitness, with the nest providing the developmental environment for the embryo and nestling thereby affecting their survival and quality. However, so far surprisingly little attention was paid in behavioural studies on the effect of nest quality on the condition and behaviour of parents and nestlings. One interesting nesting-behaviour shown by various bird species is the addition of fresh, green, aromatic plant material into the nest. Three hypotheses explaining this behaviour have been investigated in the last years mainly in two greenery using species, the European Starling (*Sturnus vulgaris*) and the Blue Tit (*Cyanistes caeruleus*). The “courtship hypothesis” suggests that birds use fresh plants as a way of signalling their attractiveness as a mate: lining the nest with particular kinds of plants may indicate territorial or individual quality. The “nest protection hypothesis” proposes that volatile secondary plant compounds protect nestlings by reducing the number of ectoparasites in the nest. The “drug hypothesis” argues that the nest plants have direct positive effects on the growth rate and body condition of chicks, regardless of any effect on ectoparasites. Because both species prefer aromatic plants as green nest material it was suggested that the birds employ olfaction to select their nest material. Several studies showed that indeed olfaction is used, to an extent and with an accuracy that were previously unknown in small passerine birds. In this talk, we will review the main conclusions from these studies and propose directions for further research.

C4**Hahn, S., Guélat, J. & Liechti, F.**Swiss Ornithological Institute, Luzernerstrasse 6, CH – 6204 Sempach, Switzerland, steffen.hahn@vogelwarte.ch**Linking resource availability and food requirement for barrier crossing in Palaearctic long-distance migrants**

Most Palaearctic songbirds migrating to sub-Saharan wintering sites have to cross two ecological barriers, the Mediterranean Sea and the Sahara desert. During barrier crossing feeding *en route* is almost impossible; and consequently most species accumulate considerable fuel stores at staging sites before. We quantified spatial food availability patterns around the Mediterranean in autumn and the energy demand of 55 passerine species for fuelling their flight across the barriers.

Food availability in August/September, estimated by long-term means of NDVI values, differs largely between the northern European coastal areas inclusively the Mediterranean islands and the southern coastal regions of northern Africa. In Europe, food availability is lower on the Iberian Peninsula and Turkey compared to a belt from France, the Apennine Peninsula to Greece. At the North African coast, the western part with the Atlas Mountains offers feeding conditions comparable to that on the Iberian Peninsula; whereas the regions eastwards to the Sinai Peninsula did not offer adequate feeding conditions (except the Nile delta).

Total energy requirement of all passerines for barrier crossing ranged between 246 and 480 TJ, i.e. an accumulation of 14,600 tons of fuel on average. Herein, 32 % of the total energy is demanded by birds on the western flyway and 68 % by birds migrating along the eastern flyway. Converted to three main food types, long-distance migrants would consume about 32,700 tons of insects, 34,160 tons of fruits and 1,800 tons of seeds, which should be provided by Mediterranean habitats each autumn.

The food requirement combined with spatially different food availability around the Mediterranean have important implications e.g. on fuelling strategies employed by birds using either the western or eastern flyway. This may allow for predictions about geographically different migration patterns and body mass dynamics between different populations of a species as well as across species.

C1**Halupka, L., Borowiec, M. & Dyrz, A.***Department of Avian Ecology, Wrocław University, Zoological Institute, Sienkiewicza 21, 50-335 Wrocław, Poland, lh@biol.uni.wroc.pl***The Reed Warbler *Acrocephalus scirpaceus* benefits from climate change**

Although some populations do suffer as a result of climate change we provide evidence that some species may benefit from this phenomenon. Since 1970 Reed Warblers (*Acrocephalus scirpaceus*) have started breeding more than two weeks earlier, but, in contrast to other studied populations, the end of their egg-laying remained unchanged. This resulted in the lengthening of the breeding season. We hypothesised that it should increase their reneesting opportunities, so we compared the breeding data of colour-ringed individuals collected in 1980-82 and 2006-08. In contrast to our expectations, we found that the annual number of breeding attempts has not changed; however, breeding pairs produce now more than twice as many nestlings throughout the whole breeding season as they did in the 1980s. This is largely a result of much lower nest losses of early broods and hence higher number of second broods in our population. The increased survival of early nests during recent years is associated with the accelerated reed growth affecting various nest characteristics.

S9**Hau, M.***Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, D-78315 Radolfzell, Germany, mhau@orn.mpg.de***Hormones, trade-offs and life history**

Hormones have pleiotropic effects on behaviour, physiology and morphology. Hormones also regulate major transitions between phases of the annual cycle in animals. These actions make hormones ideal candidates for mediating life history trade-offs, such as the one between investment in fecundity versus self-maintenance. I will review intraspecific studies that have supported such a role for both corticosterone and testosterone in avian species. I will also summarize results from a study on interspecific variation of corticosterone and testosterone concentrations of free-living males of various passerine species from a temperate and a tropical latitude that vary in life history strategies (annual adult survival rates; breeding season lengths) and body sizes. The data from the latter study support the hypothesis that these two hormones are part of the physiological system that underlies avian life history strategies. I will discuss these results in the context of recent models of hormone evolution.

C13**Hegemann, A., de Graaf, M., Versteegh, M.A., Matson, K.D. & Tieleman, B.I.***University of Groningen, Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, P.O. Box 14, 9750 AA Haren, The Netherlands, a.hegemann@rug.nl***Annual patterns of energetics and immune function in the Skylark (*Alauda arvensis*)**

Many birds experience seasonally dynamic environments, which are thought to shape their life history and annual cycle. Specifically, seasonal patterns of investments in self-maintenance and protection against disease could provide insights into the likelihood of mortality at different times of the year and therefore into the evolved balance between survival and reproduction of a species. We studied the interactions between energy balance and different indices of the immune function to shed light on how birds cope with seasonal environmental challenges. Our work focused on the Skylark, a widespread and typical temperate zone species. Seasonally challenges may include increased work loads during breeding and migration as well as food shortages and low temperatures during winter. During these times free-living birds may be forced to compromise particular immune functions because they cannot otherwise meet their total energetic requirements. Alternatively, overall immune function might shift towards a mix of components that is energetically less costly.

We studied the energy metabolism and several indices of immune function during the annual cycle of Skylarks. We caught birds in five distinct periods: spring migration, breeding, moulting, autumn migration and winter. To explore energetically more- and less-costly components of immune function, we included

indices of experimentally-induced acute phase responses and baseline indices of constitutive immunity. In experimental birds following an injection of lipopolysaccharide (LPS), we quantified the acute phase response through measurements of metabolic rate, body temperature, body mass loss, and blood sugar levels. We compared these to measurements of un-injected control birds. Within both control and experimental individuals, baseline immune parameters were measured using a sample collected at capture, and parameters were re-measured using blood samples taken after metabolic rate measurements (equivalent to 13 hours after LPS injection). These measures within and between experimental and control birds provide an overview of annual variation in metabolic rate, sickness response and constitutive immune function of free-living Skylarks.

C8

Herrmann, P., St Clair, J.J.H., Woods, R.W., Kuepper, C. & Szekely, T.

University of Bath, UK, Department of Biology and Biochemistry, Claverton Down, Bath, BA2 7AY, UK, philherrmann@gmx.de

Breeding ecology and sex-roles in the Rufous-chested Dotterel *Charadrius modestus*

The Rufous-chested Dotterel is a common shorebird in the Southern Neotropical region, although its breeding ecology is little studied. We undertook the first such study, and tested the hypothesis that, like the congeneric Eurasian dotterel *Charadrius morinellus*, this species might exhibit sex-role reversal.

Fieldwork was conducted on Sea Lion Island in the Falkland Islands, South Atlantic, from 2005 to 2009. We caught, measured, blood-sampled and colour-ringed ~120 adults, and conducted molecular sexing in order to determine differences in body size and plumage between the sexes. We also monitored breeding behaviour to determine sex-roles in incubation and territory maintenance.

Molecular sexing showed that individuals with brighter plumage were usually male, with plumage brightness predicting sex correctly in 82 % of cases. There were no significant differences between males and females in body size measurements. Video data showed incubation to be strongly biparental. Territories were maintained by the males. We conclude that the Rufous-chested Dotterel does not exhibit sex-role reversal.

S3

Heylen, D. & Matthysen, E.

Antwerp University, Evolutionary ecology group, Department of Biology, Building V - room 3.25, Groenenborgerlaan 171 - 2020 Antwerpen, Belgium, Dieter.Heylen@ua.ac.be

Host-specificity and transmission in the nidicolous tick *Ixodes arboricola*

Ixodid ticks are a common group of blood-sucking ectoparasites with a large variation in host specificity, and hence are an interesting model system to investigate the evolution of host specialisation. Here we will present the first results of a comparative study on the adaptations of two closely related tick species (*Ixodes arboricola* and *I. ricinus*) to the Great Tit (*Parus major*), an avian host shared by both ticks. The tree-hole tick (*Ixodes arboricola*) is a widely distributed nidicolous tick that particularly parasitizes birds breeding or roosting in tree holes. The sheep tick (*Ixodes ricinus*), is a generalist field tick that uses mammals, birds and even lizards as hosts. Data of a field experiment on the effects of tick parasitism on nestling health status shows that *Ixodes ricinus* have higher engorgement weights and feed more aggressively than *Ixodes arboricola*, as observed by the stronger decrease in the birds' haematocrit level with tick load. Furthermore, the proportion of ticks that attached to the nestlings was higher in *Ixodes arboricola* than *Ixodes ricinus*. Outcomes of a lab experiment that studied the timing of detachment from full-grown hosts show that all stages of *Ixodes arboricola* detached mainly during night, the moment when birds often sleep in natural holes. In contrast, the majority of *Ixodes ricinus* nymphs and larvae detached during day time. Duration of attachment was highly variable in larvae and nymphs of *Ixodes arboricola* and lasted up to three weeks, while immature *Ixodes ricinus* left their host within five days. These striking differences in the ecology of two closely related ectoparasites will be discussed with regard to theories on the transmission of free-living parasites among hosts and the evolution of host specificity.

C4**Hilgerloh, G.***Fulfsweg 20, 26386 Wilhelmshaven, Germany, gudrun.hilgerloh@t-online.de***How soaring birds react to a migration bottleneck, as studied near Zait Bay/Egypt**

Soaring birds are almost entirely dependant on updrafts to sustain their migration flight. The lack of updrafts over large bodies of water prevents them from crossing seas except at the narrowest of straits. Many of the birds migrating along the East African flyway avoid crossing the Gulf of Suez and detour overland via Suez instead. However, others migrating through southern Sinai concentrate at Zait Bay, the narrowest crossing point in the southern part of the Gulf of Suez.

Here, to improve our understanding of the behaviour of soaring birds in a migration bottleneck, we studied their migratory behaviour in autumn and spring migration. Vast numbers of them were observed – among them endangered and vulnerable species. The abundance of the species in spring and autumn migration gives us insight into which use the same route and which seem to perform a loop migration.

A sea crossing presents a great challenge to soaring birds. They have to start the sea crossing at a high altitude to offset their inevitable height loss over the water. Before the crossing, they often rest overnight in the hope of an improvement either in their own physical condition or in environmental conditions. This affects the height distribution of the birds. Whether the sea crossing is ahead of the birds or whether they have just negotiated it will have a bearing on the range of flight directions over the study area.

S3**Hochachka, W.M., States, S.L. & Dhondt, A.A.***Laboratory of Ornithology, Cornell University, 159 Sapsucker Woods Road, Ithaca, NY 14850, U.S.A., wmh6@cornell.edu***Host community composition affects prevalence of a bacterial parasite**

While some parasites are specific to only a single host species, many others have multiple hosts. If parasites can be transmitted between host species, then host community composition will affect parasite prevalence. We examine the extent to which variation in abundances of multiple host species affect the prevalence of a bacterial parasite, *Mycoplasma gallisepticum* in one host, *Carpodacus mexicanus* (House Finch), in eastern North America. *M. gallisepticum*, a common bacteria in poultry, is an emergent pathogen of *C. mexicanus*, having caused declines in *C. mexicanus* abundance of 50 % or more. In spite of its severe impact on its host, *M. gallisepticum* has persisted and appears to have prevented recovery of populations of *C. mexicanus* for more than a decade. We have recently proven that *M. gallisepticum* can be transmitted between *C. mexicanus* and other species of passerine birds under controlled, experimental conditions. However, the real-world importance of inter-specific transmission of the parasite needs to be demonstrated. We use data from winter-long surveys of disease prevalence in *C. mexicanus* across the northeastern United States, combined with information on abundances of multiple species of passerines, in order to identify effects of abundance of other potential hosts on prevalence of disease in *C. mexicanus*. Our results indicate that at least one alternate host, *Carduelis tristis* (American Goldfinch) affects disease prevalence in *C. mexicanus* and that the rate of transmission between host species depends on the frequency of encounters of the two host species and not the abundances of these two passerine species.

C6**Holt, C.A., Fuller, R.J. & Dolman, P.M.***British Trust for Ornithology / University of East Anglia, The Nunnery, Thetford, Norfolk IP24 3PA, UK, chas.holt@bto.org***Implications of intensified deer browsing for breeding Common Nightingale *Luscinia megarhynchos* in coppice woodland**

The impacts on young woodland of increasing populations of deer in Britain have led to growing concern among ecologists. We present the results of an experimental test of the effects of deer browsing on the distribution and habitat use of male *Luscinia megarhynchos* within a coppiced wood in eastern England.

Multi-visit territory mapping of 21 territories and radio telemetry of seven males were carried out to evaluate habitat use by the species within a deer exclusion experiment of replicated split-plot design. The radio-tracked birds were fitted with tail-mounted *Biotrack PIP31* transmitters and followed for a mean duration of 11 days. Estimates of radio telemetry home range were derived using 100 % minimum convex polygons, 95 % and 50 % kernel density estimators. Habitat preferences were identified through Compositional Analysis of available versus utilised habitat patches, both at whole site level and within individual home ranges.

In terms of both song territory distribution and use of derived home ranges, a strong selection of coppice coupes without deer over paired browsed coupes was recorded. Mean 95 % kernel home range was 15,921 m² and mean 50 % kernel home range was 2,856 m². The tracked birds spent 69 % of time in the 6 % of the study area protected from deer. Extra-territorial forays were suggested by movements into neighbouring territories, augmenting knowledge of *Luscinia megarhynchos* breeding biology.

We conclude that intensified browsing by deer can influence local settlement patterns of *Luscinia megarhynchos*, probably as a result of habitat quality. The last national survey of the species in Britain in 1999 noted a shift away from coppice; our results infer that changes to habitat quality brought about by deer may have been at least partly responsible for this abandonment of coppice and other young woodland.

S15

Howey, P. W.

Microwave Telemetry Inc., 8835 Columbia 100 Parkway, Columbia, Maryland, USA 21045,
Paul@microwavetelemetry.com

Satellite Bio-Telemetry, just the beginning?

We live in exciting times, over the last 50 years the use of technology in research has led to quantum leaps in our understanding of the world around us. Electron microscopes have allowed us to look into the microstructure of our surroundings while space probes have explored the world beyond our home planet. This is the story of the inception and development of small satellite tracked transmitters that are allowing us to peer into the lives and travels of the birds we study. The idea of tracking animals from a satellite looking down on Earth goes back to the dawn of the space age and was first demonstrated in the early 1970s. The first transmitters weighed in the region of 10 kg and were received by the polar orbiting Nimbus weather satellites. Such heavy devices could only be carried by large mammals such as caribou. Today, nearly 40 years later, satellite tracking using the Argos system is an accepted technique for long distance migration studies of birds. We now have available to us a range of transmitters designed specifically for the satellite tracking of birds, the smallest of these devices weighing less than 5 grams. Over the last few years GPS enhanced transmitters have been developed that now allow us to position birds in 3 dimensions to within a few metres, making satellite telemetry a new tool for various fine scale studies. It is generally accepted that any device we burden a bird with should weigh no more than 3 % of the bird's weight if we are not to affect its behavior. Of the nearly 10,000 species of birds alive today only about 1,500 are large enough to carry even the smallest 5 g units; we still have a long way to go to develop units light enough for use in the study of the majority of species.

C3

Hoye, B.J.¹, Munster, V.², Madsen, J.³, Fouchier, R.A.M.² & Klaassen, M.¹

¹Department Plant-Animal Interactions, Netherlands Institute of Ecology, Rijksstraatweg 6, 3631AC Nieuwersluis, Netherlands, ²Department Virology, Erasmus Medical Centre, Rotterdam, Netherlands, ³Department of Arctic Environment, National Environmental Research Institute, Roskilde, Denmark, b.hoye@nioo.knaw.nl

Infection of individual has ramifications for the population of infector as well as the infected

When a pathogen infects a host a chain-reaction of events, shaped past interactions in that individual (adaptation) and previous generations of that species (evolution), come into play. This sequence of reactions may appear to be of negligible consequence on the surface, and as such many empiricists have given little weight to the role of these interactions in structuring either host or pathogen populations. However, even small changes in individual hosts could have ramifications for the dynamics of both populations. Avian influenza virus in wild waterfowl represents an ideal endemic host-pathogen system in which to examine interactions at the individual and population level. We examine these interactions from two perspectives, host effect on virus and virus effect on host, in two different species of arctic breeding

waterfowl (*Anser brachyrhynchus* and *Cygnus columbianus bewickii*) infected with low pathogenic avian influenza (LPAI). We establish specifically when, where and in which individual(s) infection occurs using both experimental and observational techniques throughout the annual cycle. From this baseline we investigate the host's individual behavioural response, the population's immune response and the virus's evolution following infection in the wild. Our findings challenge current theories of both avian influenza ecology in the broader waterfowl population and the regulating role of host-virus interactions in general. Infection cycles suggested the virus is most likely acquired in the temperate zone, perhaps due to interactions between different host species at this time and location. We also find strong evidence for partial immunity to re-infection, suggesting the role an individual might play in transmission is highly dependent on its infection history. This unique finding also indicates a long-term interaction between the virus and these host species.

C14

Ilyina, T.A.¹, Ivankina, E.V.² & Kerimov, A.B.³

^{1,3}Dept. of Vertebrate Zoology, Biological Faculty, Moscow State University, 119991 Vorobjevy Gory, Moscow, Russia, ²Zvenigorod Biological Station of Moscow State University, P.O. Box Shihovo, Odintsovo District, 143036 Moscow Region, Russia, ¹t_ilyina@yahoo.com, ²Ficedula@yandex.ru, ³parus@soil.msu.ru

The role of social context in shaping exploration patterns of young Great Tits in heterogeneous novel environment

Previous studies have shown that in Great Tits, *Parus major*, fast and slow explorers differ in patterns of food searching behaviour and social competition. To address the question in more details, we compared the reaction of young Great Tits to novel environment in standard open field (OF) and aviary supplied by variable recourses including food. Using two experimental options (a bird was left in the aviary alone, n=24, or together with heterosexual conspecific partner, n=96), we took into account the social context of exploration behaviour. No relation between exploration score in OF tests and the level of locomotor activity in the aviary was found, probably, because of competition between time spent on movements and food consumption in the aviary. However, the higher the exploration score in OF, the shorter the latent period of access of a bird to variable recourses in the aviary. This advantage of fast explorers was obvious in the absence of a social partner and became negligible in its presence. Besides exploration score, the manner by which birds explored artificial trees in OF was related to latent period of access to resources in the aviary.

S2

Isaksson, C.

University of Oxford, Edward Grey Institute for Field Ornithology, South Parks Rd, Zoology Department, EGI, OX1 3PS, Oxford, UK, caroline.isaksson@zoo.ox.ac.uk

The effect of urbanization on avian oxidative stress status

A direct negative link between human health and urban pollution levels generated by increased internal levels of oxyradicals is well established. However, the impact of urbanization on the physiology of wild birds is poorly investigated. In the urban environment there are several factors that could influence the internal level of oxyradicals, for example, anthropogenic pollution, increased parasite prevalence, and higher population densities. Although birds are known to be more resistant to oxyradicals than mammals, the potentially synergistic effects and multiple sources of oxyradicals might drive even birds over the threshold and show signs of oxidative stress i.e., overrepresentation of oxyradicals in relation to the protecting antioxidants. The consequences of increased oxidative stress are accumulation of oxidative damage, which ultimately makes the target molecule (e.g., DNA, lipids or protein) dysfunctional, and thereby increases the probability to develop several diseases, along with increased cellular senescence.

In Swedish urban and rural populations of Great Tits, *Parus major*, we have measured different physiological and ecological factors to investigate the impacts of urbanization. Some of the main results found, over a 5-year period, was that urban birds have higher antioxidant activity, as indicated by a higher oxidative stress ratio (i.e., reduced/oxidized glutathione), and total antioxidant activity. This response is mainly due to differences in endogenous production of antioxidants rather than dietary differences in uptake of antioxidants, i.e. carotenoids. The good news is that, even though there are potential costs associated with an up-regulation of the stress response, the increased antioxidant activity does seem to protect the urban birds from accumulating oxidative damages, since there was no detectable difference between the

urban and rural birds in damaged lung lipids. Along with presenting a summary of the Swedish studies I will present an overview over the field and discuss future directions and challenges on the topic.

S13

Jenkins, A.R., Shaw, J.M., Smallie, J.J. & Diamond, M.

Wildlife & Energy Interaction Group, Endangered Wildlife Trust, Private Bag X11, Parkview 2122, Johannesburg, South Africa, andrewj@ewt.org.za

Mitigation and conservation implications of avian collisions with power lines: a global review with South African perspectives

We review the existing literature on the nature, scale and impact of avian collisions with overhead power lines worldwide. Cranes, bustards, flamingos, waterfowl, shorebirds, gamebirds and falcons are among the most severely affected avian groups, and collision frequency is a critical factor in ongoing population declines in several species of cranes, bustards and diurnal raptors. Very few comprehensive experimental studies have been done on ways to reduce avian collisions with power lines, although most of these have yielded quite clear results. Mitigation options considered have included removing the earth-wire which is usually the highest, thinnest and most problematic component in an overhead power line configuration, or else fitting this wire with markers – brightly coloured ‘aviation’ balls, thickened wire coils, luminescent, shiny or hinged flashing or flapping devices. All of these options reduce bird collision frequency overall by at least 50–60 %, although the efficacy of line marking may be much lower for certain species (e.g. bustards). There remains considerable uncertainty about the best performing marking device (perhaps because performance may vary with both local conditions and the species involved in each instance), and a durable, all-purpose device, that is effective both during the day and at night, has not yet been developed. We describe ongoing research in South Africa on the assessment and mitigation of Blue Crane and Ludwig’s Bustard collisions

S9

Jenni, L.

Swiss Ornithological Institute, 6204 Sempach, Switzerland, lukas.jenni@vogelwarte.ch

Causes and effects of stress in birds: an introduction

Birds have to cope with a wide variety of unpredictable environmental events, many of them are potentially detrimental and may act as a stressor. In order to overcome stressful conditions, in many cases animals resort to a physiological stress response, mediated through an elevation of circulating glucocorticoids. The aim of any stress response is to avoid or overcome stress or to mitigate the negative effects of a persisting stressful situation. Therefore, survival and reproductive success of animals depend on both the adaptations to the general qualities of their habitat and on efficient strategies of responding to stressors. Today, the main stress hormone in birds, corticosterone, can be measured in small samples of blood and its metabolites in droppings. Therefore, the level of physiological stress birds are exposed to can be assessed in free-living birds. This is an important aspect in conservation biology, particularly when it comes to an assessment of human disturbance. Examples are given of the physiological effect of human disturbance in passerines during the breeding season and in two grouse species during winter. Elevated corticosterone levels negatively affect development and growth in early life. Therefore, stressful events may not only have an immediate effect, but may also shape the phenotype on a longer term scale or even permanently. Examples will be given on the effect of corticosterone on growth and development in a raptor and an owl species. There is a large individual variation in the glucocorticoid response to stressors. Hence, some individuals may cope better or differently with stressful conditions than others. We show that the sensitivity to stressful conditions is correlated with other behavioural traits and with traits of plumage coloration that are heritable. Thus the sensitivity to stressful conditions may be an important trait in evolutionary ecology, correlated with many other traits.

S16**Jenni-Eiermann, S. & Falsone, K.***Swiss Ornithological Institute, Luzernerstrasse 6, 6204 Sempach, Switzerland, susi.jenni@vogelwarte.ch***Role of the glucocorticoid hormone corticosterone during migratory flight and fuelling**

Most migrant birds do not fly in one flight bout from their breeding to some wintering grounds, but they alternate between flight and stopovers. During stopover, birds generally try to build up fuel stores, while during flight fuel stores are partly or completely consumed. Little is known about the hormonal regulation of the energy metabolism during migration and findings so far were often conflicting. During the last years the glucocorticoid hormone corticosterone was discussed as a candidate which might orchestrate the energetic needs during migration. For the first time we measured plasma corticosterone levels in actively flying migratory birds: in Red Knots, *Calidris canutus*, flying up to 10 h in a wind tunnel and in free-ranging passerines caught out of migratory flight. We compared the plasma corticosterone concentrations of birds with different migration strategies, namely long-distance, short-distance and irruptive migrants. During migratory flight slightly elevated corticosterone concentrations seem to promote the mobilisation of the energy stores. A strong increase in corticosterone when fat reserves are near exhaustion triggers an increase in the catabolism of protein and probably a change in behaviour. During particular sensitive phases, such as landing in unfamiliar areas, corticosterone prepares birds to cope with these situations behaviourally and metabolically. During refuelling slightly elevated corticosterone concentrations seem to support fuel deposition. Experiments suggest that this may be triggered by the geomagnetic field, indicating the position in relation to desert and ocean crossings.

S12**Jiguet, F. & CRBPO***MNHN, CRBPO, CP 51, 55 rue buffon, 75005, Paris, France, fjiguet@mnhn.fr***Using large scale bird monitoring data in the study of global change impacts**

Standardized bird monitoring data are now available in many European countries as the development of monitoring programs is an ongoing process. Data are currently mainly used to produce trends and population indicators. Communication to the public via websites has also contributed to the success of such programs. Yet these data are of great potential to study broad scale ecological processes affecting birds such as global change although they remain relatively underexploited. Here we will show some examples of published studies originating from the French Common Bird Monitoring Program. We will first focus on the issue of data quality by addressing learning and weather effects on counts in the Breeding Bird Survey. We will then see that bird count or ringing data are a powerful tool to cast evidence on the way birds respond to climate change and habitat perturbation at the species but also to the communities' level. To show this we will use the following examples: effects of the 2003 heat wave in France on bird population trends and breeding success, effects of habitat perturbation and fragmentation on bird community specialisation and an estimation of how far bird communities lag behind climate change. These studies should encourage future international collaborations in order to highlight more global change effects and compare responses between countries.

S10**Junker, S.,^{1,2} Ramme, S.,¹ Ehrnsberger, R.¹ & Düttmann, H.¹***Institut für Didaktik der Naturwissenschaften, Abteilung Biologie, Hochschule Vechta, Driverstr. 22, 49377 Vechta/Germany, ²Fliederbusch 1a, 26605 Aurich/Germany, sven.junker@ewetel.net***Changes in Lapwing productivity in Stollhammer Wisch (Lower Saxony, Germany) in the years 2001–2008**

Since 2001 we investigated the effectiveness of protection measures designed to increase the reproductive success of the Lapwing *Vanellus vanellus* in the Stollhammer Wisch, a ca. 3000 ha grassland area in Northern Lower Saxony, Germany. In particular, we compared the hatching success and the survival of chicks in 3 adjacent grasslands of 25–46 ha which differed in management: Study site I was a conventionally managed grassland with nest protection measures only, whereas the study sites II and III

were managed with agri-environment schemes, which included restrictions concerning livestock density, the timing of first mowing and rewetting of the grasslands during the reproductive time in spring.

In most of the years the 3 study sites did not show significant differences in nesting success. However, we found marked differences in nesting failure between the years. In half of the years (2001, 2005–2007) nesting success averaged less than 40 %. The survival of radio-tagged chicks ($n = 401$) significantly increased with age. Like in nest survival we revealed significant differences in chick survival between years with the lowest rates in 2001 and 2005.

Predation was the most important factor causing nest failure and chick mortality. By datalogger records, we identified carnivorous mammals as the most prominent egg predators, especially in years with high predation rates. With regard to chick predation, we identified the Buzzard (*Buteo buteo*) as the most important predator. Losses of nests and chicks by agricultural impacts, e.g. trampling by livestock, remained low due to the implementation of protection measures.

A reproductive success of at least 0.8 fledglings per breeding pair, which would be sufficient for a stable Lapwing population, was only reached in a few years.

C5

Kania, W.¹ & Chylarecki, P.²

¹Ornithological Station of Museum and Institute of Zoology, Ul. Nadwiślańska, 80-680 Gdańsk, Poland, ²Polish Academy of Sciences and Museum and Institute of Zoology, PAS, Ul. Wilcza 64, 00-679 Warszawa, Poland, wkania@stornit.gda.pl, pch@miiz.waw.pl

Ringling records as the window into the history of population changes – pitfalls and prospects in analysis of 76 year data on Starlings *Sturnus vulgaris* breeding in Poland.

Ringling data are a rich, albeit largely underexplored, source of information on bird populations, which can be used for inferring temporal changes in population size.

For breeding birds ringling totals offer information on bird numbers extending much further into the past than data provided by the majority of currently operating monitoring schemes collecting observational data. However, raw ringling totals are a poor measure of population size. The main confounding factor is the probability of a bird (adult breeder or brood) being ringled conditional upon being present in the sampling frame. This probability, in turn, is a function of many variables, including ringlers' selectivity (e.g. special interest in a given species), skills in catching and availability for catching.

We analyzed a 76-year long (1931–2006) set of ringling data for Starlings *Sturnus vulgaris* breeding in Poland, trying to infer population changes from ringling schedules provided to the national ringling scheme. Starling seems a good candidate species for testing efficiency of such an approach. It was ringled by many ringlers, as it was a common and widespread breeder, and its broods in nest-boxes were easily accessible. In recent decades the species declined in most European countries, although the exact track of population changes is rarely available, and thus of some interest.

In the presentation we will explore some ways to identify and control the human factor behind observed changes in the numbers of birds ringled. We also will suggest certain extensions to the standard data set collected during ringling, which would enable efficient use of ringling records in population monitoring. With few additional information recorded, ringling schemes can provide a useful insight into long-term changes in bird numbers and breeding biology.

C4

Kemp, M.U., Shamoun-Baranes, J., van Gasteren, H., Bouten, W. & van Loon, E.

IBED – University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands, M.U.Kemp@uva.nl

A comparison of migration models for Belgium and the Netherlands

Predictive general additive models (GAMs) were developed to anticipate avian migratory intensity for the Netherlands and Belgian air forces to avoid bird strikes. Models were built for each combination of location, migration season, and diurnal period using variables from the European Centre for Medium Range Weather Forecast Deterministic model as predictors. Migration intensity data were collected using military surveillance radars in Belgium and the Netherlands. Multiple measurement locations provided an opportunity to better understand how weather variables influence the spatial and temporal dynamics of

migration (particularly regarding similarities and differences between the locations due to their respective geographic positions).

An automated procedure was developed to prepare these weather and bird data and subsequently develop and test models with different combinations of predictor variables. The modelling procedure returned the 50 best performing models for each location and time. An examination of the general seasonal and diurnal trends at the locations was performed first and was followed by an examination of the influence of individual weather variables. Some predictor variables, such as wind, pressure, and precipitation, tended to persist in most of the models, even among different locations and times. Other variables, such as specific and relative humidity, cloud cover, and temperature, tended only to be retained by models at particular times or locations. The most significant predictor variable, after time of year and day, was wind. Wind was particularly interesting, since it was available at multiple pressure levels. Our findings suggest that winds from lower altitudes were generally more influential. Also, the research indicates that the direction of 'preferred' winds was variable within a migration season. These results are useful in a purely biological context to help improve our understanding of weather's influence on migration as well as in aiding future model development in other locations.

C15

Kerus, V., Aunins, A. & Strazds, M.

Latvian Ornithological Society (LOB), Kalnciema iela 27-18, Riga, LV-1046, Latvia, viesturs@lob.lv

How to assess changes in bird distribution between successive atlas projects with different grids and survey coverage

Three nation-wide breeding bird atlas projects have been carried out in Latvia: the first Latvian Breeding Bird Atlas (1980–1984), Atlas of European Breeding Birds (1985–1989) and the second Latvian Breeding Bird Atlas. In the former, two 10x10 km squares in UTM system were used, but in the latter Atlas 5x5 km squares in LKS-92 system. In addition to the differences in grids, also the survey coverage of the territory of Latvia varied greatly among the studies.

For some of the species during the second Latvian Breeding Bird Atlas additional information, including precise coordinates of the observation was gathered. For these species adequate assessment of distribution can be carried out spatially, as the observations can easily be transferred to UTM grid. However, differences in survey coverage cannot be taken into account in this case.

If 5x5 km squares are merged into 10x10 km squares and only the number of squares is considered, the differences in the grids no longer play a role. In addition, survey coverage can be taken into account – instead of the number of squares in which the species is recorded, the ratios of the total number of squares with the species registered against the number of satisfactorily covered squares can be compared.

Additionally, it should be noted that the survey coverage can change for individual species regardless of the total changes in the coverage. In some cases it can be because of differences in survey coverage of specific habitats but in other cases the distribution might seem increased artificially due to the observers' better ability to identify and register species. There are species for which this can be clearly documented but for other species this improvement in registration might not be so obvious.

S12

Kéry, M.

Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, Switzerland, marc.kery@vogelwarte.ch

Hierarchical estimation and modelling of distribution and abundance in metapopulation designs

Every field ornithologist knows very well that some birds are often missed, hence, an observed "absence" is not necessarily equivalent to the genuine absence of a species and an observed count is not equivalent to true local population size. Ignoring these issues will lead to biased estimates of the distribution and abundance of animals and plants. Furthermore, it may render the resulting data ambiguous, especially when changes over time may affect not only bird populations, but also their detection. For instance, detectability is likely to change over time as the observer pool changes, with a changing climate, increase of traffic noise or directed habitat change. Hence, it is wise to collect and analyse information about the observation process in monitoring programs.

Methods to explicitly account for imperfect detection include distance sampling and capture-recapture. The former uses the distribution of detection distances to glean information about the observation process, while the latter use repeated observations of a system assumed to be static. Monitoring programs are typically based on a metapopulation design, i.e., the same field protocol is applied to an array of spatial replicates. Data collected in metapopulation designs lend themselves particularly well for hierarchical modelling, where the true biological state, e.g., local occurrence or abundance, is modelled separately from its observation. If the required extra-information on the observation process provided by distance sampling or capture-recapture-type of data is available, mechanistic hierarchical models for the true distribution or true abundance may be developed. These models directly deal with the biological state of interest (true occurrence or true abundance), while fully correcting for biases induced by possible non-detection. I will focus on hierarchical models of the capture-recapture type and present a brief overview of some of the latest methodological developments that are likely interesting for large-scale monitoring programs.

C9

Kingma, S.A., Hall, M.L., Rijpstra, J.J. & Peters, A.

Behavioural ecology of sexual signals group, Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, D78315, Radolfzell, Germany, kingma@orn.mpg.de

Helpers help: positive effects of subordinates on reproductive success as well as breeder workload and survival in cooperatively breeding fairy-wrens

How helpers, subordinate supernumeraries, affect reproduction and investment by dominant group members (usually the breeding pair) is important for understanding the adaptive nature and evolution of cooperative breeding. The most obvious form of help is nestling food provisioning, whereby effects of helpers can range from providing additional care to reduction in investment by breeders. In our study on Purple-crowned Fairy-wrens (*Malurus coronatus*), helpers contributed significantly to offspring care, increasing overall feeding rate, and increased the quality and number of fledglings produced. Additionally, the breeding pair could reduce their workload when helpers assisted with offspring provisioning. Consequently, as breeder provisioning rates were directly related to survival, breeder survival prospects were higher when helpers were present. Thus, helpers have multiple beneficial effects in *M. coronatus*. This pattern is different from other, closely related fairy-wren species. One possibility may be that the liberating effects of helpers on breeders' extra-pair mating behaviour restrict certain direct benefits of cooperative breeding in those and potentially also other unfaithful species, but not in the monogamous *M. coronatus*.

S7

Klaassen, R.H.G.

Lund University, Sweden, Department of Animal Ecology, The Ecology Building, 22362 Lund, Sweden, raymond.klaassen@zooekol.lu.se

Daily time budgets of migrating birds as revealed by GPS-based satellite telemetry

Satellite telemetry has been a revolution for the study of bird migration as it enabled to follow individual birds on their travels. Recently, satellite telemetry has been combined with Geographical Positioning System (GPS) technology, allowing to track birds at a previously unmatched spatial and temporal resolution. We have used GPS-based satellite transmitters to track the movements of adult Ospreys *Pandion haliaetus* between breeding grounds in Sweden and wintering areas in western Africa. Hourly GPS locations in combination with information about the instantaneous speed and altitude were used to reconstruct, for the first time, daily time budgets on travelling days. In Europe, where feeding habitat is abundant, Ospreys fed both before/after flights and during interruptions, thus combining migration with foraging. This resulted in a 2.7 hr shorter daily flight period in Europe than in the Sahara. A calculated energy budget indicated that such 'fly-and-forage migration strategy' is nevertheless favourable in Europe because associated benefits (energy intake) more than outweigh costs (reduced flight time). The much shorter flight time in Europe was the main explanation why Ospreys covered on average 78 km less distance on a travelling day in Europe than in the Sahara. In addition, there were regional differences in hourly flight speeds that are most probably the result of variation in thermal soaring conditions. We conclude that landscape properties have a profound effect on migration, through regional variation in daily travel routines. Being able to track animals in great detail is an important advancement in itself as it reveals many new aspects about migrating birds.

C1**Kluen, E.**

University of Helsinki, Department of Biological and Environmental Sciences, P.O. Box 65 (Viikinkaari 1), 00014 Finland, edward.kluen@helsinki.fi

Direct and indirect costs of delaying hatching under asymmetric climate warming

Seasonal asymmetric climate change (warming during the pre-laying period, but not during the laying period) is predicted to occur, especially in northern latitudes. This change may hamper the breeding processes in passerine birds. Higher spring temperatures advance egg laying, although, when during the laying phase temperatures drop to unfavorable values, the breeding female may suffer from limited energy availability. As a consequence, birds will delay the hatching of their brood. However, such a delay may be costly. Direct costs of this delay could be expressed through a reduced hatching success of the clutch and a reduced condition of the breeding female. Additionally, young hatched from clutches that had an unusually long incubation period may suffer negative indirect effects during development. In a population of *Cyanistes caeruleus* breeding in nest boxes in the Southwest of Finland, we show that such asymmetric warming can, in certain years, strongly delay hatching. Based on a large-scale cross-fostering experiment (2005–2007), we investigated the direct and indirect costs of such a delay of hatching.

C7**Koce, U. & Denac, D.**

National Institute of Biology, Večna pot 111, 1000 Ljubljana, Slovenia, ukoce@nib.si

Habitat use by Whinchat (*Saxicola rubetra*) on spring migration at the stopover site on the SE Adriatic coast

Whinchat (*Saxicola rubetra*) is a long distance passerine migrant with a poorly known migration strategy. Habitat use of Whinchats on spring migration was studied at the stopover site in mosaic cultural landscape on Montenegrin coast (SE Adriatic). The habitat use was viewed in two aspects: (a) probability of foraging behaviour with respect to flocking and (b) physiognomic characteristics of foraging patches.

The Whinchats were occurring as single birds, as pairs of birds, or as groups, here referred to as *Whinchat units*. 71 Whinchat units of 1 to 29 individuals were registered between 5th and 24th April 2007 at the stopover study site. Behaviour of each unit was observed for 5 minutes and the units classified as foraging or non-foraging. The proportion of foraging units increased with unit size. There were no differences in proportion of foraging and non-foraging units with respect to date, time of the day or habitat type. The probability that a patch within the habitat was used by Whinchats for foraging was modelled with logistic regression. Five independent physiognomic variables of patches were used in modelling: (a) natural outstanding structures (NOS), (b) artificial outstanding structures (AOS), (c) high herbal vegetation (HHV), (d) open shrubby vegetation (OSV) and (e) physiognomic heterogeneity (PH). All possible additive models and the null model were constructed. The models were ranked by information-theoretic approach, according to second-order information criterion AIC_C. The relative importance of each physiognomic variable was calculated. Two models had substantial support in the data, including variable(s) (a) NOS and (b) NOS + AOS. Five other had considerably less support and the rest essentially none support (nine models). The relative importance weights of physiognomic variables NOS, AOS, PH, HHV and OSV were 1, 0.38, 0.24, 0.13 and 0.13 respectively. We conclude that among these physiognomic variables the outstanding structures were the most important feature for foraging Whinchats, most likely influencing Whinchats' foraging patch selection.

C12**Kölzsch, A., Kruckenberg, H., Kaatz, M. & Blasius, B.**

ICBM, Carl von Ossietzky University of Oldenburg, 2503, 26111 Oldenburg, Germany, koelzsch@icbm.de

A network model of bird migration in time and space

Bird migration is widely intertwined with human life and activities, which emphasizes the importance to advance our knowledge about general issues of migration patterns and its driving factors. This may be done by examining theoretical models, however high quality temporal and spatial data are required. Such

data are available with Satellite telemetry and GPS technology, establishing the possibility to sensibly model bird migration in time and space.

The long-distance, annual migratory routes of several bird species can be described as a stepping stone model on a network of discrete breeding, resting and wintering sites. We have modelled such a process as an inhomogeneous Markov chain on a directed network of habitats. Each habitat is occupied by some density of birds during a certain time of the year and these nodes are connected by edges that represent the intensities of jumping between the habitats. The jumping rates are considered to be periodic, unimodal functions of time.

For parameterisation of the model we used satellite telemetry data (using Doppler location and GPS) of the White Stork (*Ciconia ciconia*) and the Greater White-fronted Goose (*Anser albifrons*). The individual bird trajectories showed two modes of movement, slow resting and fast migration. The network nodes were determined by clustering the positions of slow movement and jumping rates were fitted to calculated fluxes. Habitat features of the identified resting areas are extracted afterwards, evaluating model sensitivity. The model can further be extended, including higher order memory terms, environmental conditions and population dynamics.

With methods of network analysis we examined dynamical properties of the generated cumulative networks and time specific sub-networks. Results allow characterising migration routes, giving indications about the vulnerability to the loss of certain resting or breeding areas and changes in migration timing, and suggest the possibilities of epidemics spread by migratory birds.

C12

Kopp, M., Hahn S., Ritz, M., Lisovski, S. & Peter, H.-U.

Polar & Bird Ecology Group, Institute of Ecology, Friedrich Schiller University, Dornburger Str. 159, D- 07743 Jena, Germany, Matthias.Kopp@uni-jena.de

Spatial and temporal feeding pattern of two southern skua species

The development of miniaturized GPS-systems in recent years has allowed for the tracking of animals over very fine temporal and spatial scales. We employed GPS-loggers to two predatory seabird species during the breeding period. Our work took place at King-George Island, the biggest island of the South Shetland Islands in the maritime Antarctic during two austral summer seasons. In this area two skua species breed sympatrically and are therefore forced to divide their food sources. It is known that Brown Skuas *Catharacta antarctica lonnbergi* feed mainly on penguin while South Polar Skuas *C. maccormicki* feed mainly offshore on several fish species and crustaceans. However in most cases it is still unknown where they feed and if they have preferred feeding areas.

The recorded coordinate's from tracked South Polar Skuas show that they feed exclusively offshore and use bays as well as the open ocean for feeding. Brown Skuas breeding near penguin rookeries are territorial and feed exclusively at this place. Tracked Brown Skuas breeding away from penguin rookeries still show a preference for feeding on penguin and will visit penguin rookeries on inaccessible islands when possible but they have adapted to feed on other bird species away from penguin rookeries.

C5

Kormann, U.^{1,2}, Gugerli, F.¹, Jacob, G.¹, Excoffier, L.² & Bollmann, K.¹

¹Swiss Federal Research Institute WSL, Zürcherstrasse 111, CH-8903 Birmensdorf, Switzerland, ²Computational and Molecular Population Genetics Laboratory, Institute of Ecology and Evolution, University of Berne, Baltzersrasse 6, 3012 Berne, Switzerland, urs@students.unibe.ch

Capercaillie dispersal in a mountain environment revealed by a landscape genetic approach

Landscape genetic methods combine high resolution genetic markers with spatial data, and offer new insights on the impact of landscape configuration on genetic structure and gene flow among populations. In this study, we examined the effect of a mountain landscape on the genetic structure and connectivity of a regional population of the endangered Capercaillie *Tetrao urogallus*. In spring 2003 and 2008, we systematically collected non-invasive samples of this forest bird species in five lekking areas in the northeastern Swiss Alps. We recovered 88 unique genotypes over both sampling periods. Based on eleven nuclear microsatellites, we determined population sizes and genetic structure, and combined several genetic methods to assess dispersal rates among populations. Results indicate that only few individuals

contributed to the overall recruitment of young birds, therefore reducing effective population size. At single leks, closely related males were found more often than expected by chance, whereas no such pattern was found for females. However, we found no signs of a sex-biased dispersal. Presence of population differentiation, the absence of isolation by distance but concurrent evidence of recent, asymmetric dispersal let us conclude that the landscape configuration notably affects gene flow among populations. We will further investigate the relative impact of topography and landuse types on population connectivity with a recently published GIS-derived landscape genetics model based on electrical circuit theory.

C1

Kovács, Sz., Fehérvári, P., Harnos, A., Nagy, K. & Csörgő, T.

Eötvös Loránd University, Budapest, Pázmány P. sétány 1/C, H-1117, Budapest, Hungary, csorgo@elte.hu

The impact of climate change on the biometrics of passerine bird species during autumn migration

Climate change may alter the geographic distribution of species and the wintering grounds may shift. Climate can impact the timing of migration, breeding and moulting, and can affect demographic factors and biometric traits. The rate and even the direction of changes may differ on species or in some cases on population levels.

We used ringing data of 7 common passerine birds (approximately 100,000 specimen) ringed in Hungary, at the Ócsa Bird Ringing Station during 1984–2007 (Moustached Warbler *Acrocephalus melanopogon*, Marsh Warbler *A. palustris*, Reed Warbler *A. scirpaceus*, Wood Warbler *Phylloscopus sibilatrix*, Chiffchaff *P. collybita*, Blackcap *Sylvia atricapilla*, Garden Warbler *S. borin*). Age groups (i.e. 1st calendar year birds and adults) were treated separately. The populations of the Moustached Warbler, the Reed Warbler and the Chiffchaff are isolated in the Carpathian Basin, since either the breeding range does not protrude north of Hungary or birds from northern populations do not migrate through the region.

Although the timing of migration more or less changed for all the examined species, we found a marked change in biomass and wing length between species with isolated and trans-migrant populations. Decrease of autumn biomass and an increase in wing length was shown in case of trans-migrant species, while no such pattern was seen in the case of Carpathian-Basin isolates. These results indirectly indicate the effects of climate change on breeding range and/or reproductive success. The changes in biometrics of trans-migrant species may indicate changes in ratio of individuals originating from different populations. Individuals of the same species breeding in northern populations, due to the longer migration route, have longer wings compared to those breeding south, moreover birds arriving from larger distances use more body fat for flying. Our results possibly indicate that the ratio of individuals from northern populations has increased during autumn migration.

C5

Kremer, P., Gonzalez, J., Dietzen, C. & Wink, M.

Institute of Pharmacy and Molecular Biotechnology (IPMB) Department of Biology, Im Neuenheimer Feld 364, 69120 Heidelberg, Philipp.Kremer@urz.uni-hd.de

Molecular phylogeny and phylogeography of the Canary Islands Chiffchaff *Phylloscopus canariensis*

In order to complete the phylogenetic relationships within the genus *Phylloscopus* and reconstruct the phylogeography of *Phylloscopus canariensis* on the Canary Islands, we sequenced two mitochondrial genes, the NADH dehydrogenase subunit 2 and the cytochrome *b*. We analysed individuals representing all relevant islands of the Canarian Archipelago. We established the phylogenetic relationships among several species of the genus *Phylloscopus* using maximum likelihood, maximum parsimony and Bayesian inference methods. Two species of the Passeriformes, *Parus major* and *Regulus regulus*, were used as outgroups.

The phylogeographic analyses show two main distinct clades in *Phylloscopus canariensis*. One clade includes exclusively individuals from Gran Canaria while the other includes representatives of the remaining islands. However, the latter clade is supported by a low posterior probability value. On the Canary Islands, other species such as *Parus teneriffae* or *Erithacus rubecula* exhibit a similar phylogeographic structure.

S13**Kreuziger, J.¹, Bernshausen, F.¹ & Richarz, K.²***Planungsgruppe für Natur und Landschaft, Raiffeisenstraße 5, D-35410 Hungen, Germany, ²State Centre for Bird Protection in Hesse, Rhineland-Palatinate and Saarland, mail@pnl-hungen.de***Birds and high tension power lines: problems and solutions from a Central European perspective**

Based on studies conducted in the (near) coastal regions of Germany, bird losses resulting from collisions with high tension power lines have been estimated to total more than 30 million a year for the whole of Germany. Because of these results, RWE Transportnetz Strom started a research project in 1994 in co-operation with three State Centres for Bird Protection with the goal to evaluate and minimize this problem.

The results from the research project show significant regional differences in the collision risk. This depends on the number and flight movements of birds, but also on the trajectory of the power line in relation to the structure of the landscape. It is shown that in large parts of the Central European cultural landscape the collision risk averages approximately five to a maximum of ten losses a year per kilometre of power line, which is ten to hundred times lower than in coastal regions.

Based on these results, we have developed a rating system that takes into account the number of birds and species composition (Avifaunistic Potential AP) within functional areas, as well as the location and lay-out of the power line in the landscape (Endangerment Potential EA). The product $AP \times EA = AEP$ (Avifaunistic Endangerment Potential) is used as a relative measure to determine the collision risk for every individual line section (area between two pylons). Using this system, we have identified the most problematic areas in the power line network of RWE. The line sections with increased collision risk added up to about 400 km of power lines. Since 2005 all these sections have been fitted with specially developed markers to prevent birds from colliding.

The efficiency of the new markers has been tested at the Alfsee (Lower Saxony). In this study, an infrared camera was used during dawn and night. While without markers 20 collision victims were recorded, during a similar period with markers no victims were detected. Furthermore, the proportion of critical flight-reactions decreased to about 50 %. Based on these results, the reduction of the collision risk by marking the power lines is expected to be more than 90 %. Further investigations are currently taking place in the Lippeaue, North Rhine-Westphalia.

C2**Kunc, H.P.¹, Gross, K.² & Pasinelli, G.^{2,3}***¹Queen's University Belfast, School of Biological Sciences, 97 Lisburn Road, Belfast BT9 7BL, UK, ²University of Zurich, ³Swiss Ornithological Institute, h.kunc@qub.ac.uk***The effect of man-made noise on singing behaviour in Reed Buntings**

The negative impact of humans on biodiversity is well known, and habitat destruction is a well studied driving force causing a massive loss of species diversity. However, other factors such as elevated levels of man-made noises might also contribute to the decline of species. Especially, species relying on acoustic communication to defend resources and to attract mates must either avoid noisy habitats or adapt their signals to increasing noise levels. Individuals can either flexibly adjust their signals to immediate noise levels on a short-term or evolutionarily modify signals in response to long-term noise exposure. Using behavioural observations and playback experiments, we show that male Reed Buntings (*Emberiza schoeniclus*), a species historically inhabiting areas with naturally low levels of man-made noise, were strikingly flexible in their response to noise. During both observations and experiments, males sang songs at a higher minimum frequency and lower rates when noise levels were high. This suggests that behavioural plasticity allows individuals to immediately adjust their signals to noise and thus can play an important role in the ability of a species to adapt to novel selection pressures. Understanding the limits that underlie vocal plasticity and the fitness consequences of such plasticity is crucial for assessing the vulnerability of particular species to elevated noise levels.

C6

Leivits, A.¹, Leivits, M.², Leivits, A.¹, Tammekänd, J.¹, Tammekänd, I.¹ & Vilbaste, E.¹

¹Environmental Board, Pärnu-Viljandi Region, Vana-Järve, 86107 Tali, Estonia, ²Department of Geography, Institute of Ecology and Earth Sciences, University of Tartu, agu.leivits@nigula.ee

Long-term changes in bird community of the breeding birds in Nigula Bog: a 40-year study in south-western Estonia

Bogs are a very specific habitat for birds. In general, due to the acidic and nutrient-poor environment the densities are relatively low and many species spend only a short time in this extreme habitat. The breeding bird communities of bogs are heterogeneous in hemiboreal biogeographical zone. Both, species distributed more abundantly in north and species of more southern origin colonize bogs in Baltic region. Also species from open landscape and forest habitats exploit bog habitats. Since 1968 in Estonia, the community of the breeding birds has been monitored in Nigula Bog (2342 ha) every year. The most important changes that have taken place during last 40 years in bird community of the Nigula Bog are the invasion of species of eutrophic habitats (meadows, fens) to oligotrophic bog habitats and the increase of the proportion of dendrofilous species. During the study period the number of breeding bird species has significantly increased in Nigula Bog. The species (10) belonging to the southern type of distribution have increased during study period. From 12 species typical to the northern avifaunal regions. 7 species have significantly decreased and only one species from this group has significantly increased. The most important local factor affecting bird abundance has been the change of vegetation structure in the bog. The abundance of species preferring open habitats has decreased due to pine invasion into once open bog areas. The sequence of large-scale aerial photographs (from 1950 to 2007) has made it possible for us to conduct a retrospective analysis to detect changes in elements of mire landscape. The results of this analysis indicate change on the level of fine grained habitat structure as well as change on the landscape scale, which both contribute significantly in explaining change of bird community.

C5

Liu, Y.¹, Keller, I.² & Heckel, G.¹

¹Computational and Molecular Population Genetics (CMPG), Institute of Ecology and Evolutionary Biology, University of Bern, Baltzerstrasse 6, 3012 Bern, Switzerland, ²Eawag, Department of Aquatic Ecology, Ueberlandstrasse 133, 8600 Dübendorf, Switzerland, yang.liu@jee.unibe.ch

Population genetic characteristics and probable breeding origin of Tufted Duck (*Aythya fuligula*) wintering in Western Europe

The large-scale migration patterns of birds have been extensively studied through ringing and satellite telemetry. However, these approaches have several technical limitations, especially with respect to sample size and low and biased recovery rates, which make meaningful predictions difficult. Population genetic approaches avoid these issues, because it is possible to estimate the long-term average rate of gene flow and document actual dispersal events. The Tufted Duck, *Aythya fuligula* is a long distance migrant with a large number of individuals wintering in Europe and is regarded as a particularly likely vector of highly pathogenic avian influenza virus (HPAI). We use mitochondrial and nuclear DNA markers to assess the extent of genetic differentiation between European, Central Asian and East Asian breeding populations. Further, we investigate the genetic structure and potential origin of ducks sampled on different European wintering grounds. Our molecular data complement previous results from the analysis of ring recovery data to provide a detailed picture of the population structure and movements of these ducks across Eurasia.

C12

López-López, P., Limiñana, R., Mellone, U. & Urios, V.

Estación Biológica Terra Natura (CIBIO) - University of Alicante, Apdo. 99 E – 03080, Alicante, Spain, lopez.pascual@gmail.com

Migration strategies of Eleonora's Falcons (*Falco eleonora*) breeding in the Western Mediterranean: individual variation based on an inherited program?

Falco eleonora is one of the less known European raptors. In particular, its migration strategy has been largely a mystery. Here we provide data on autumn and spring migrations, winter movements in

Madagascar and summer movements of non-breeding birds in mainland Spain. The recent development of satellite transmitters lighter than 10 g allowed us to fit in 2007 and 2008 11 birds from the colonies of Columbretes and Balearic islands (Spain) with solar-powered PTT accounting for less than 3 % of the animal body mass.. The birds left their breeding grounds in late October and arrived into Madagascar in late November-early December migrating across the Sahara desert, equatorial Africa and then crossing the Mozambique Channel, performing at least 600 km of sea crossing. They spent the winter in Northern Madagascar. Juvenile birds reached the same wintering grounds as their parents but they arrived later, migrating independently, probably thanks to an inherited program. Despite the high individual variation, we suggest that orientation is based on vector navigation. The observed migration pathways could be the result of historic and genetic factors reflecting the speciation of their clade within the *Falco* genus, which originated in Eastern tropical Africa, and its colonization towards the Mediterranean basin. This group is made up of *Falco eleonora* and its closest relatives, *F. concolor*, *F. subbuteo*, *F. cuvieri*, *F. vespertinus* and *F. amurensis*, with all of them sharing the same ancestry and the same wintering areas in southeast Africa. Further data from the birds breeding in the other colonies scattered in the Mediterranean basin and Macaronesian region are needed to shed light on the roots that led to the evolution of the migratory behaviour of this species.

S4

Mäntylä, E.

University of Turku, Section of Ecology, Department of Biology, FIN-20014 University of Turku, Turku, Finland, elkuma@utu.fi

Methods to study avian olfaction

Avian olfaction, especially in passerines, is a relatively new research topic. Recent studies have shown that also passerines, not only carrion birds, albatrosses and shearwaters, can use their olfaction in many situations. There is little common knowledge about what methods work best in different situations to study the avian olfaction. There are several aspects that affect the choice of methods, e.g. bird species, source of chemicals (natural or artificial) and environment (nature or aviary). This talk will give a review of studies about avian olfaction and the methods used in those studies, together with a discussion of their suitability in different types of experiments.

S13

Martin, G.R.

University of Birmingham, Centre for Ornithology, School of Biosciences, Edgbaston, Birmingham, B15 2TT, UK, g.r.martin@bham.ac.uk

Bird collisions: a visual or a perceptual problem?

Birds rarely seem to collide with objects in natural environments, yet collisions with human artefacts are well documented. Birds collide with power wires, light houses, large windows, aerial arrays, wind turbines. Are birds failing to detect these objects because of some aspects of their visual capacity, especially low acuity? Acuity in birds is high; in some species it exceeds that of the human fovea. Most collisions occur with large objects whose detection is likely to be well within the visual capacity of birds. Such collisions are likely to be of the kind referred to in humans as “looked but failed to see”. These result from perceptual errors rather than visual limitations. They stem from a lack of attention to or misinterpretation of available information. Often there is no prior expectation to see anything ahead and the observer fails to see the object with which they collide even though they are apparently looking. In most birds visual fields are very extensive; some species have total panoramic vision of the celestial hemisphere. In most birds only a very small proportion of the total visual field (<2%) is devoted to forward vision. Thus the majority of birds, even when in flight, may be attending to visual information received from all around them with only minimal attention to what lies ahead. Birds flying in naturally open airspaces may in fact be attending only intermittently or not at all to what lies ahead. These birds may have no prior expectation to see anything ahead; their attention may be devoted to the search for objects (conspecifics, feeding sites?) on the ground below. Thus reducing collisions may require more than making potential collision objects more conspicuous. It is also necessary to acknowledge the perceptual limitation of birds. In particular it might be necessary to develop strategies that ensure flying birds attend to what lies ahead rather than attending to what lies below them. Some solutions are proposed.

S6**Martin, J.-L.¹, Fahrig, L.², Kirk, D.³, Lindsay, K.⁴, Smith, A.C.² & Villard, M.A.⁵**

¹CEFE/CNRS UMR 5175, 1919 route de Mende, 34293 Montpellier, France, ²Geomatics and Landscape Ecology Research Laboratory, Carleton University, 1125 Colonel By Drive, Ottawa, Canada, ³Aquila Conservation & Environment Consulting, 85 Albert Street, Suite 900, Ottawa, ON K1P 6A4, Canada, ⁴Habitat & Ecosystem Conservation Division, Canadian Wildlife Service, Environment Canada, 351 St. Joseph Blvd, Gatineau (Hull), QC K1A 0H3, Canada, ⁵Département de biologie, Faculté des sciences, Université de Moncton, Moncton, NB, E1A 3E9, Canada

Selection of cultural landscapes by birds: do things look different across continents and, if so, why?

Over the past centuries, forestry (managed forests), agriculture (farmed land and remnant native habitats in a matrix of farmed land) and urbanization have been major forces that shaped landscapes of North America and Western Europe. This talk will look at the selection of these cultural landscapes by birds and how research on bird-habitat relationships was addressed and perceived on both continents. The most striking contrast was found in farmland birds both from the birds' and researchers' perspective. While European farmlands seem to have developed a well identified avifauna, this does not appear to be the case in North America. Part of the difference however, stems from differences in approach. While north-American research has mainly considered farmland as a land-use coming in the way of birds from natural grasslands and open habitats, European research has treated farmland and the semi-natural land associated with it as a well identified habitat for birds. As a result, Europeans intensively studied patterns and mechanisms of farmland selection by birds with major effects on public perception and land management policies. This was only marginally the case in North America. Studies of habitat selection by birds in urban landscapes and in managed forests show less contrast in results and approach across continents. North American urban bird communities distinguish themselves by the prevalence of a suite of urban core species that are species introduced from Europe, while European cities have avifaunas which are, besides a few exceptions, exclusively made up of native birds. It is in the study of birds in managed forests that similarities in questions and findings are the most striking and where across-continent collaboration has been most prevalent. This analysis showed that the understanding of the selection of cultural landscapes by birds is the result of a subtle interplay between the reality on the ground and the perception of this reality by those who take on the challenge of understanding patterns and processes of habitat selection by birds.

C3**Marzal, A., Bensch, S. et al**

Universidad de Extremadura, Department of Zoology, Fac. Ciencias, Avda. Elvas s/n, 06071 Spain, amarzal@unex.es

Effects of malaria double infection in birds: one plus one is not two

Avian malaria parasites are supposed to exert negative effects on host fitness because these intracellular parasites affect host metabolism. Recent advances in molecular genotyping and microscopy have revealed that coinfections with multiple parasites are frequent in bird-malaria parasite systems. However, studies of the fitness consequences of such double infections are scarce and inconclusive. We tested if the infection with two malaria parasite lineages has more negative effects than single infection using 6 years of data from a natural population of *Delichon urbica*. Survival was negatively affected by both types of infections. We found an additive cost from single to double infection in body condition, but not in reproductive parameters (double-infected had higher reproductive success). These results demonstrate that malaria infections decrease survival, but also have different consequences on the breeding performance of single- and double-infected wild birds.

S1**Matthysen, E.¹, Adriaensen, F.¹ & Dhondt, A.A.^{1,2}**¹University of Antwerp, Department of Biology, University of Antwerp, B-2020 Antwerp, Belgium, ²Cornell Lab of Ornithology, Cornell University, NY 14850 Ithaca, USA, erik.matthysen@ua.ac.be**Multiple changes in breeding phenology of Great and Blue Tits in relation to climate change**

Previous work in different European countries has shown that some populations of Great and Blue Tits (*Parus major*, *Cyanistes caeruleus*) have strongly advanced their laying date in response to changes in food supply due to warmer spring temperatures and the advanced timing of tree budburst. In a Belgian oak-beech forest both Great and Blue tits have advanced their first-egg dates by more than 11 days over the past 30 years, considering only first broods. In addition we found significant changes in several other components of the breeding phenology, including a decrease in laying interruptions, a decrease in nestling development time (as estimated by plumage development), and a lower incidence of second broods. Because of these effects the average fledging date of all nestlings has advanced by an additional 4 days in Blue Tits and 7 days in Great Tits after accounting for the earlier onset of laying. Analyses of selection differentials showed no change in selection on any component of breeding phenology, indicating that both species are well able to track changes in their food supply. This is confirmed by indirect estimates of annual food peak dates based on temperature profiles and variation in nestling weight. Our results are similar to recent work on Great Tits in Wytham Woods (UK) but in striking contrast to the well-studied and geographically much closer Hoge Veluwe (NL) population. We will discuss possible explanations for these markedly different responses between populations experiencing a similar climate shift.

C9**Mazgajski, T.D.**

Museum & Institute of Zoology, Polish Academy of Sciences, Wilcza 64, 00-679, Warszawa, Poland, mazgaj@miiz.waw.pl

Effect of forest patch size on survival of the Great Spotted Woodpecker *Dendrocopos major*

Forest fragmentation may affect several aspects of animal biology. So far studies concerned with this problem mostly deal with breeding biology, and few present survival rates in relation to size of the forest. A population of the Great Spotted Woodpecker *Dendrocopos major* was studied in a plot ca 145 km² located in very fragmented landscape in Central Poland. Birds were individually, colour ringed, and their nests were searched in 2001-2004. Based on finding of ringed birds it was possible to estimate survival of adult woodpeckers between two consecutive seasons. It was found that in large forest (190 ha), ca 60 % of birds that bred in one year survived to the next breeding season. In small woodlots (mostly < 35 ha) only 33 % of birds were observed between two successive seasons. Such differences were mostly connected with disappearance of females that bred in small forests. It is possible that observed pattern in small wood plots could be connected not only with lower survival but also with long-distance breeding dispersal, however no such movements of Woodpeckers were observed in the boundaries of the study area. Birds used the same forest patches for breeding, and breeding dispersal distances were rather small, both in large and small forests, except one male that bred in archipelago of 4 small woodlots.

So far only one study carried out in Vienna Wood present estimations of Great Spotted Woodpecker survival. Therefore data gathered in fragmented landscape will be compared with those from another Polish population that live in 1000 ha forest near Warsaw.

C9**Maziarz, M., Wesołowski, T. & Rowiński, P.**

Institute of Zoology, Department of Avian Ecology, Wrocław University, ul. Sienkiewicza 21, 50-335 Wrocław, Poland, martamaz@biol.uni.wroc.pl, tomwes@biol.uni.wroc.pl, nuthatch@wp.pl

Do Wood Warblers count rodents?

Wood Warbler *Phylloscopus sibilatrix* numbers fluctuate violently from year to year in Białowieża National Park (Poland), which cannot be accounted for by variation in local production and survival. That is exceptional for an insectivore, but typical for irruptive species tracking variable food supplies.

Using 30 years of census data (1975-2005) we found that Wood Warbler declines were unrelated to variation in food (leaf-eating caterpillars number), but they coincided with the rodent outbreaks (U test, $p < 0.0001$). Additionally, during 12 years of intensive study we observed that Wood Warblers laid significantly smaller clutches in seasons with the outbreaks (mean 6.2 eggs vs. 6.5 eggs in other years) and experienced much higher nest losses than in the neighboring, non-outbreak years.

These results indicate that breeding during rodent outbreaks is costly for Wood Warblers which apparently assess the rodent number and refuse to settle in areas infested by them.

S15

Meyburg, B.-U. & Meyburg, C.

World Working Group on Birds of Prey (WWGBP), Wangenheimstr. 32, 14193 Berlin, Germany, BUMeyburg@aol.com

Satellite tracking of raptors in 1992–2009: an overview and some highlights of our results

Satellite telemetry has revolutionized the study of birds and will continue to do so even more in the future. This is because tracking systems based on Ultra High Frequency (UHF) technologies such as the Argos system can regularly estimate and record an individual's location worldwide for several years. Individual birds must be able to carry transmitters (PTTs), weighing about 5 g or more which should not exceed 3 % of their body weight. More recently, transmitters and Global Positioning Systems (GPS) receivers have become small enough to use on birds. In many cases GPS satellite telemetry has or will soon supersede land-based VHF tracking. The GPS provides location accuracy to within a few meters, enabling computing of position (in three dimensions), velocity, flight direction and time. GPS units can be programmed to collect data at pre-set intervals. Data can be logged in memory and be coded in PTT messages and relayed to users via the Argos system. We shall mainly report on some highlights of our own telemetry results, based on the monitoring of over 180 individuals of 15 different raptor species. While in the beginning, studies had to concentrate on migration because of the less precise Doppler fixes of the Argos system, thanks to the precise GPS locations these now also include other aspects like home range sizes, habitat utilisation, daily activity patterns, altitude and speed of flight etc. This presentation will include project planning tips for those putting this technical equipment to use. In addition, there will be an overview of the questions for which the use of this technique can provide answers or has already done so.

S17

Miranda, A.C.^{1,4}, Santos, C.D.¹, Granadeiro, J.P.², Palmeirim, J.M.¹, Cadima, J.F.³

¹*Centro de Biologia Ambiental, Departamento de Biologia Animal, Faculdade de Ciências, Universidade de Lisboa, 1749-016 Lisboa, Portugal,* ²*Centro de Biologia Ambiental, Museu Nacional de História Natural, Universidade de Lisboa, Rua da Escola Politécnica 58, 1269-102 Lisboa, Portugal,* ³*Departamento de Matemática, Instituto Superior de Agronomia, Tapada da Ajuda, Lisboa 1349-017, Portugal,* ⁴*Current Address: Max-Planck-Institute für Ornithologie, Vogelwarte Radolfzell, Schlossallee 2, 78315 Radolfzell, Germany, miranda@orn.mpg.de*

Modelling shorebird distribution during low-tide in the Tejo estuary

We modelled the large-scale distribution of foraging shorebirds during low-tide in the Tejo estuary, Portugal. This analysis was based on density values (number of birds per hectare) obtained from counting sectors with different dimensions, using a set of physical and biological characteristics of the counting areas as explanatory variables.

Typically, bird density has a characteristic that makes it difficult to model using usual distributions: the inflation of zeros. In fact, bird density is better described as a mixed random variable, in which the discrete component is associated with zeros, and the continuous component associated to positive densities.

We addressed this problem by exploring several alternatives in the context of Generalized Linear Models: (1) logistic regression for modelling occurrences, (2) gamma models for positive densities modelling, (3) hurdle models, which combine the two previous, allowing the modelling of both absences and positive densities, and (4) Poisson-gamma models, which model both absences and positive densities with a single distribution.

Generally used in other subjects, the Poisson-gamma models performed better than the others when modelling shorebird distribution in intertidal habitats. These models presented the additional advantage of being an integrated approach for zero inflated distributions.

C8**Monceau, K., Moreau, J., Motreuil, S., Dechaume-Moncharmont, F.-X. & Cézilly, F.***UMR CNRS 5561 Biogéosciences Equipe Ecologie Evolutive, Université de Bourgogne, 6 bd Gabriel 21 000 Dijon, France, Karine.monceau@u-bourgogne.fr***Resource use segregation in Zenaida Doves from Barbados: true resource polymorphism or ontogenetic shifts?**

Resource use segregation is quite common in the animal kingdom. Two main processes can explain this phenomenon. First, resource polymorphism is defined as the occurrence in the same population of different morphs specialised in the exploitation of distinct resources. The observed variation between morphs is in this case supposed to be independent of the age of individuals. In contrast, the hypothesis of ontogenetic shifts regards resource partitioning as an age-dependent process. One way to distinguish between the two phenomena is to compare groups across several developmental steps. Unfortunately, studies on resource polymorphism have mainly been interested in comparing data concerning one single stage (generally adults), often because of difficulties in sexing immature individuals. In Barbados, Zenaida Doves (*Zenaida aurita*, Columbidae), exhibit two foraging strategies, with some birds defending aggressively all-purpose territories, while others feed in groups where food is locally abundant. The existence of two distinct foraging strategies has been previously considered by Sol et al. (2005, *Ecology* 86: 2397-2407) as a clear case of resource polymorphism. However, this study only considered morphological variation among adults, as juveniles could not be reliably sexed. Here we use a much larger data set and molecular tools to revisit the evidence of resource polymorphism in Zenaida doves, controlling for the age (juveniles and adults) and sex of individuals. Our results strongly suggest that the existence of distinct foraging strategies by Zenaida doves in Barbados does not correspond to a case of resource polymorphism but is better explained by ontogenetic shifts in foraging strategy.

S6**Mukhin, A. & Ktitorov, P.***Zoological Institute RAS, Biological Station "Rybachy", Pobedy str.32, Rybachy, Kaliningrad reg., Russia, a.i.mukhin@gmail.com***Habitat recognition by nocturnally migrating passerines during landfall: the use of acoustic information and consequences of a right and wrong choice**

During migration, birds must fly over suboptimal habitats differing from those selected during breeding and wintering. Nocturnally migrating passerines need to assess the suitability of potential stopover habitats during landfall. Before actual landfall, proximate cues may play a significant role in habitat selection. After landing they find themselves in an unfamiliar place and have to explore their surroundings for direct assessment of stopover habitat quality. We studied the possibility that migrant songbirds use acoustic information as distant cues for habitat selection when ceasing flight. We checked the differences between habitat generalists and specialists in their use of acoustic cues by comparing the proportion of species killed at lighthouses with those captured in mist nets using song playback in both suitable habitats and suboptimal stopover habitats during spring and fall migratory seasons. Our observations showed that during twilight landfall, when visual cues are reduced or absent, habitat specialists (*Acrocephalus scirpaceus* and *A. shoenobaenus*) respond to acoustic cues. Their songs were more attractive to conspecifics and other birds of wetland habitats than to habitat generalists (*Ficedula hypoleuca* and *Turdus iliacus*). Additionally, we studied the distance of exploratory movements and stopover durations of *A. scirpaceus* in suitable (reedbeds) and suboptimal (sand dunes) habitats by radio-telemetry. Even the leanest birds tape-lured in the dunes did not perform exploratory movements longer than 300 m, and moved even less in reeds (max 200 m). 'Fat' individuals at both sites remained stationary. Birds spent just 1 day in the dunes and up to 13 days in the reeds. These results emphasize the importance of correct habitat recognition by migrants with restricted diurnal movements, when they cease nocturnal flight.

C10**Müller, C., Jenni-Eiermann, S. & Jenni, L.***Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, claudia.mueller@vogelwarte.ch***Strategies of the last-hatched nestling under varying food availability in asynchronous broods of the Eurasian Kestrel: corticosterone, condition and growth**

Hatching asynchrony is widespread in altricial birds and often explained with the brood reduction hypothesis, which postulates that brood size is adaptively reduced under conditions of food scarcity through starvation death of the last-hatched, least competitive nestling for the benefit of a higher fledging success of its older siblings. In this study we investigate the strategies adopted by the last-hatched nestlings. We postulate that last-hatched nestlings should try to catch up in growth with older siblings under good conditions, but would be the first to have to switch to a survival mode under bad conditions. Glucocorticoids are candidate hormones to mediate such strategies. In free-living Eurasian Kestrel *Falco tinnunculus* nestlings we measured growth, baseline corticosterone levels, the adrenocortical response to handling and body energy stores under varying food conditions (yearly fluctuations in prey abundance and short-term impairment of hunting success of adults by rain). We showed that last-hatched nestlings under good conditions (no rain, large furcular fat stores) had lower baseline corticosterone levels and a higher wing feather growth rate than older siblings, indicating catch-up growth, enabled by very low corticosterone levels. Short-term food restriction (rain) resulted in higher baseline corticosterone levels in last-hatched nestlings than in older siblings. Furcular fat stores were lower in last-hatched nestlings compared with older siblings. Growth of wing feathers and body mass was reduced and mortality increased in last-hatched nestlings with high corticosterone levels. We conclude that last-hatched nestlings modulate baseline corticosterone levels and growth allocation compared with older siblings. This modulation is condition-dependent and varied with food conditions. Last-hatched nestlings seem to follow an “all-or-nothing-strategy” by investing in structural growth and refraining from large body fat stores under good conditions to catch-up in growth. Under bad conditions, last-hatched nestlings with their small body energy stores have to switch more rapidly to a survival mode.

C1**Musil, P., Musilová, Z., Haas, M., Fychs, R. & Polakova, S.***Department of Zoology, Faculty of Sciences, Charles University, Viničná 7, Praha 2, CZ-128 44, Czech Republic, p.musil@post.cz***How important are climatic changes for wintering waterbirds in Central Europe: analysis of long-term changes (1966–2008) in numbers and distribution of wintering waterbirds in Czechia**

Wintering waterbird numbers and distribution are monitored in Czechia (former Czechoslovakia) by the International Waterbird Census (IWC) since January 1966. This presentation will be based on analysis of mid-winter (IWC) population trend (computed by TRIM software) on 849 wetland sites and its relation to Czech (mean month temperature) and European (NAO Index) climatic condition. Trends in numbers were analysed in 37 most abundant waterbird species wintering in Czechia in 1966–2008. Increase in wintering numbers was recorded in 18 species (49 %) and significant decrease was recorded in 7 species (19 %). Wintering population trend followed the Western Palearctic trend. The increasing population trend prevailed among fish-eating birds, geese and ducks. Climatic variation affected wintering population trends only in 5 species (local temperature in Czechia) and in 3 species (NAO Index). Positively correlated species increased in numbers in mild winters (i.e. *Podiceps cristatus*, *Anser fabalis*, *Tringa ochropus*, *Larus canus*). On the other hand, negatively correlated species increased in numbers in severe winters (i.e. *Bucephala clangula*, *Mergus merganser*, *Cinclus cinclus*). Changes in numbers show the same pattern as changes in distribution (i.e. numbers of occupied wetland sites). Furthermore, we analysed long-term changes in Adult Sex Ratio. We found that proportion of females increased in colder winter in northern species, i.e. *Bucephala clangula* and *Mergus merganser* and on the contrary decreased in southern species (e.g. *Anas strepera*). The long-term pattern in urbanisation of particular species will be included in presentation.

C15**Němečková, I.***Administration of Protected landscape area Poodří, 2. května 1, 742 13 Studénka, Czech republic, iva.nemeckova@nature.cz***Relationship among nest site selection, individual reproduction of Marsh Harrier (*Circus aeruginosus*) and landscape heterogeneity in PLA Poodří (the Czech republic) conditions**

Nest site selection and nest choice are critical aspects of reproduction in most birds. They have been so important for effective protection and management on local population of Marsh Harriers (*Circus aeruginosus*) in Special Protection Area (SPA) Poodří, the Czech republic, Central Europe. The study was undertaken in 2002–2008 and the aims were to quantify landscape-scale habitat characteristics surrounding all tested nest sites in relation to their heterogeneity (from 200 m up to 3 km from tested nest habitats) at two hierarchical scales: 1) comparison of nest site choice between occupied (37) and unoccupied (19) nest sites and 2) comparison of nest sites between successful (47) and unsuccessful nests (33). PCA was used to analyse the structural variables. Females of Marsh Harrier occupied and bred more successfully inside larger reedbeds plots (usually *Phragmites* dominated) than in more vegetated open water habitats. Successful nest sites were immediately surrounded by larger percentage coverage of foraging habitats. The Marsh Harriers avoided habitats characterized by higher cover of forest, developed areas and frequented roads. Human disturbance should be avoided in the breeding period as for other birds of prey.

C2**Nemeth, E. & Brumm, H.***Max Planck Institute for Ornithology, Post Box 1564, 82305 Starnberg/Seewiesen, Germany, enemeth@orn.mpg.de***Blackbirds sing higher-pitched songs in cities: adaptation to habitat acoustics or side effect of urbanization?**

When animals colonize cities they often have to adapt their physiology, life history and behaviour to the novel environment. Songbirds rely on acoustic communication for reproduction, and recent studies indicate that bird songs vary between urban and non-urban habitats. In cities, birds sing louder or use higher frequencies compared to their conspecifics in forests. These habitat-specific differences in song have been interpreted as an adaptation of the city birds to mitigate acoustic masking by low-frequency traffic noise. We compared the songs of Blackbirds, *Turdus merula*, from the city centre of Vienna and the Vienna Woods and found that forest birds sang at lower frequencies and with longer intervals between songs. This difference in song pitch might reflect an adaptation to urban ambient noise. However, the song divergence could also be the result of more intense vocal interaction in the more densely populated city areas or a side effect of physiological adaptation to urban habitats. We emphasize the need for experimental studies in Blackbirds, but also in other species, to clarify a possible causal link between urban acoustics and song characteristics of city birds.

S1**Newson, S.E.***British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, United Kingdom, stuart.newson@bto.org***A review of climate change effects on migratory birds**

Migrants are particularly vulnerable to climate change because they rely on a network of often globally dispersed sites and they must travel between them, often under strong temporal constraints, for instance timing arrival to match periods of resource abundance. Given the scale and complexity of migratory systems, direct experimental evidence of the impacts of climate change independent of any other factors, is almost impossible to obtain; consequently much has to be inferred from other lines of evidence. Here I review the evidence for effects of climate change on distribution, phenology and demography of migratory bird populations. I examine the importance of these effects as drivers of population change and explore the implications for future mitigation and adaptation strategies.

C6**Nikolov, S.C.**

Central Laboratory of General Ecology / Bulgarian Academy of Sciences, 2 Yurii Gagarin Str., 1113 Sofia, Bulgaria,
 nikolov100yan@abv.bg

Variations in habitat use of fragmented and continuous Macedonian pine forests by birds in the Pirin National Park, Bulgaria.

Habitat selection in birds regarding fragmented and continuous Macedonian pine forest was studied during three successive years (2004–2006) in the Pirin National Park, Bulgaria. A total of 185 fixed radius circular study plots were randomly located in three microhabitat types: fragmented forests, edge and interior of continuous forests. The study plots were visited twice per year, vegetation characteristics were collected and birds were recorded using point-counts. Nineteen species of birds were tested for their microhabitat preferences. When data were pooled in the analyses, three general groups of birds were established: 1) species preferring fragmented forests and avoiding interior of continuous forests; 2) species preferring interior of continuous forests and avoiding fragmented forests; 3) species with no preferences. When data were compared among years, many species showed variations in their microhabitat use during 2005. This year differed from 2004 and 2006 by higher precipitation and lower winter temperatures. Five types of variation patterns in microhabitat use of birds were observed: 1) microhabitat use kept proportional (in *Prunella modularis*, *Phylloscopus collybita* and *Fringilla coelebs*); 2) amplification of preferences and avoidances to microhabitat types during the unfavourable period (in *Erithacus rubecula*, *Certhia familiaris* and *Pyrrhula pyrrhula*); 3) amplification of microhabitat preferences and avoidances one year after the unfavourable period (*Dendrocopos major*, *Phoenicurus ochruros* and *Turdus viscivorus*); 4) mitigation of microhabitat preferences and avoidances (in *Regulus regulus*, *Parus montanus*, *Sitta europaea* and *Loxia curvirostra*); 5) no clear variation pattern (in *Troglodytes troglodytes*, *Parus ater* and *Nucifraga caryocatactes*). This study shows the potential of upland forest birds to change their habitat use in respect of forest fragmentation and points on the importance of long-term studies in this field.

S4**Nordt, A.**

Polar & Bird Ecology Group, Institute of Ecology, Friedrich Schiller University, Dornburger Straße 159, D-07743 Jena, Germany, anja_nordt@web.de

The transgenerational transfer of plastic particles in a small seabird

Waste marine plastic debris on the ocean surface, bottom and coastlines is a worldwide, marine pollution problem that affects a wide range of wildlife species. Seabirds are known to ingest floating litter. Small plastic particles might be mistaken for potential prey or consumed along with food items. Some species are able to regurgitate indigestible stomach contents as pellets, while others, like most Procellariiformes, seldom regurgitate pellets, allowing plastic particles to accumulate in their stomachs. It was suggested, that during the chick-rearing period adults pass these objects to their nestlings during provisioning. This results in a reduction in adult plastic particle load but increases the threat for their chicks. Once swallowed, the particles can lead to reduced digestive efficiency, blockages or ulcerations of the digestive tract, and increased contaminant loads due to plastic digestion.

We examined nestlings of the smallest breeding seabird of the Antarctic, the Wilson's Storm-Petrel (*Oceanites oceanicus*), regarding the amount of anthropogenic material in their stomach. With this study we provide evidence for how marine pollution affects birds even in the South Polar Ocean.

C1**Nowakowski, J.K.***Bird Migration Research Station, University of Gdańsk, Przebendowo, 84-210 Choczewo, Poland, j.k.nowakowski@gmail.com***Wing shape adjustment in three species of tits *Parus major*, *Cyanistes caeruleus* and *Periparus ater* – the answer of partial migrants to environmental change during the last four decades**

Questions have been raised as to whether the observed changes in parameters of bird migration (such as timing or distance) are due to evolution or are just behavioural responses to changing environment. To show that migration pressure can act on wing morphology I analysed biometrics of three species of tits: *Parus major* (72,716 individuals), *Cyanistes caeruleus* (44,006 individuals) and *Periparus ater* (14,680 individuals) taken during 1965–2006. I found that wings became less pointed during this period. The direction of change in the wing shape, indicating a more sedentary lifestyle, is the same in all three tit species both from local population breeding in northern Poland and in migratory individuals moving through this area. Observed shape adjustment trend was the same for both sexes, but the tendency to change was stronger in males. As far as I know, this is the first evidence, that tendency to become more sedentary in populations of partial migrants during the last decades is reflected in ecomorphology change, namely - wing parameters. I am convinced that this change has evolutionary background.

S15**Nygård, T.***Norwegian Institute for Nature Research, Tungasletta 2, NO-7485 Trondheim, Norway, torgeir.nygard@nina.no***The use of satellite transmitters in eagle research in Norway**

The first satellite transmitter for birds in Norway was deployed on a White-tailed Sea Eagle in 1992. Since then, 21 Golden Eagles (2002–2008) and 37 White-tailed Sea Eagles (2003–2008) have been tagged. The Golden Eagle research has been in connection with the relation between eagles and semi-domestic reindeer, while the White-tailed Eagle research has been performed to study eagle behavior in a wind-farm area (Smola). The transmitters were 70 g solar-powered Argos/GPS transmitters and 105 g battery-driven GPS transmitters, and also a few of the Argos PTT type, all produced by Microwave Telemetry, Inc., USA. The results have given new insight into the dispersal patterns, area use and mortality factors. Golden Eagles mainly dispersed southwards in October, moving to Sweden, Finland, Russia and the Norwegian Coast. Males travelled further than females (up to 1500 km to the south). A cyclic pattern of return to their natal areas during summer was shown. Recoveries of transmitters indicate that some illegal killing takes place. The tagging of young White-tailed Eagles born in a wind-farm area has shown that they stay fairly close to their natal area during their first winter. Then they generally travelled northwards during their second summer, females further than males, with a return movement in autumn. Females repeated this pattern during the third summer, while the males showed more philopatry to their natal site. Some birds have been killed by the turbines, and has thus provided turbine-related mortality estimates. We have also used the GPS data to produce collision risk estimates relative to wind-turbines, using different probability estimators, combined with known turbine-related mortality rates. The research has given new insights in eagle behavior and mortality that would not have been achievable without the use of satellite transmitters.

S17**Osborne, P.E., Leitão, P.J. & Moreira, F.***Centre for Environmental Sciences, School of Civil Engineering and the Environment, University of Southampton, Highfield, Southampton, UK, SO17 1BJ, p.e.osborne@soton.ac.uk***Multiscale species distribution modelling and the benefits and pitfalls of very high resolution environmental data**

It seems very likely that birds perceive habitats (or certain characteristics of habitats) at multiple spatial scales. The most appropriate scale for studying aspects of one species' biology may not be the same as for another species and may also depend on the purpose of the study. If so, there is a strong case for

conducting multiscale studies of species distributions and habitat selection, but this has rarely been done. Instead, the choice of a single spatial scale is often dictated by available data layers rather than any ecological reason, with unknown consequences. In this paper, we summarise the outcome of a study we started in 2003 which has attempted to model the distributions of a suite of cereal steppe birds in the Baixo Alentejo region of Portugal at three nested spatial scales. We combined extensive, spatially accurate surveys of breeding birds with digital data layers at 1 km (AVHRR imagery), 100 m (Landsat imagery) and 10 m resolutions (ATM, CASI and LiDAR), the latter derived from airborne remote sensing. We describe the complex procedures needed to process the finer resolution imagery, to co-register it with the bird data, and to derive any meaningful variables for modelling. To date, no analyses have been possible at the 10 m scale although the LiDAR data have been incorporated into models at 100 m resolution. We show how the "added value" of the Landsat and LiDAR data differed between species although in most cases the broad scale relationships uncovered at 1 km resolution were difficult to improve at finer spatial scales. We discuss why this might be the case in cereal steppe habitats and offer advice on the all-important question: is multiscale modelling at fine spatial resolutions worth the effort?

C7

Ozarowska, A.

Bird Migration Research Station, University of Gdansk, Przebendowo, PL-84-210 Choczewo, Poland, bioat@univ.gda.pl

The *Sylvia* warblers in the East – winners or losers

A distinct decline was observed in a number of Palearctic trans-Saharan migrants. The *Sylvia* warblers were one of the groups showing the most dramatic changes in the last century. While the decline is still observed in birds migrating along the western Palearctic flyway, the long-term studies on the Polish Baltic coast indicated increasing trend in most common warblers: *Sylvia atricapilla*, *S. borin*, *S. curruca* and *S. communis* from the 1990s onwards. In order to determine the likely reasons for the observed difference, studies on biology/ecology of populations following different migration routes and wintering in different winter African quarters are essential. A network of ringing stations located along the SE flyway (SE European Bird Migration Network) enabled the studies of migrants heading along this route towards wintering quarters in East Africa. This study included data from several ringing stations in Russia, Poland, Ukraine, Turkey, Jordan, Palestine, Israel and Egypt. The results showed clear difference in spring/autumn migration pattern of *Sylvia* warblers in eastern Turkey, the Middle East, North-Eastern Africa. Moreover some details of migration strategy, including fattening process, and some species-specific characteristic were analysed. The comparison of the Baltic, Black Sea and Mediterranean regions clearly point out at the Middle East and North Africa as very important areas for migrating birds, particularly in autumn prior to Sahara crossing.

S8

Paris Le Clerc, N.¹, Clark, J.A.² & Rehfisch, M.M.²

¹Université Paris-Sud 11, UFR des Sciences, Building 301, 91405 Orsay CEDEX, France, ²British Trust for Ornithology, The Nunnery, Thetford IP24 2PU, Great Britain, nathanaelle.parisleclerc@gmail.com, marc.rehfisch@bto.org

What existing turnover studies tell us

A new model to calculate turnover has been developed by Atkinson, Choquet, Frederiksen, Pradel and Rehfisch. This model has been applied to data gathered by the Ligue Pour La Protection des Oiseaux (LPO). Between 2001–2007 *Tringa totanus* were individually colour-marked and resighted at the Réserve Naturelle Nationale de Moëze Oléron in the Charente Maritime, France, primarily during the post-breeding period. From these LPO data annual survival and turnover of the birds was estimated for 2005–2007. Survival was 0.77 ± 0.16 , 0.65 ± 0.18 and 0.67 ± 0.18 , respectively. The birds stayed on average 48 (27–60), 28 (23–31) and 30 (22–36) days, much longer than the estimates of 21, 20 and 13 days using the minimum stopover duration approach. Having allowed for turnover, the total numbers of individuals estimated to have used the site in the three years were 1.51, 1.61 and 1.9 times greater than the annual peak counts. In one year, the site reached the national importance level for *Tringa totanus*. This study has clearly shown that the widely used minimum stopover duration and the peak counts underestimate stopover duration and population size. The results have major implications for the present approach taken to identify

sites worthy of conservation under national and international legislation as the peak counts used considerably underestimate the number of birds making use of a site. Thus it is possible that many sites worthy of conservation designation remain unidentified. We compare and contrast these results to those obtained from individually colour-marked *T. totanus* and *T. nebularia* on two pilot study sites set up on two British Natura 2000 sites.

S2

Partecke, J.

Max-Planck-Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, 78315 Radolfzell, partecke@orn.mpg.de

Evolutionary consequences of an urbanizing world

The human impact in the global biosphere now controls many major facets of ecosystem function. One of the most striking man-made environmental changes is the existence and rapidly ongoing spread of urban areas. Although ecologists used to dismiss urban areas as unworthy of study, they have recently begun to realize that cities provide an ideal theatre in which to see animals adjusting to novel environments at a pace rarely seen in the wild. Whereas ecological consequences of human-induced habitat alteration are receiving increasing attention, studies on evolutionary consequences of urbanization have only recently begun attracting significant interest. This is remarkable because there is increasing evidence that human ecological impact has enormous evolutionary consequences and can greatly accelerate evolutionary change in species around us. In this talk I will focus on the European Blackbird (*Turdus merula*) which is now one of the most common urban species throughout Europe. I will review what we know about changes in life history, morphology, physiology, and behaviour following the colonization of urban areas. In addition I will elucidate to what extent the invasion of urban areas leads to micro-evolutionary changes due to altered and novel selection regimes in urban settings or whether these changes result from other mechanisms, e.g. phenotypic plasticity of individuals experiencing different environmental conditions. Finally I will address what we still need to do in order to better understand the proximate (mechanistic) and ultimate (evolutionary) processes of urbanization.

S10

Pehlak, H.¹ & Mägi, E.²

¹Estonian University of Life Sciences, Riia 181, 51014 Tartu, Estonia, ²State Nature Conservation Centre, Institute of Agricultural and Environmental Sciences, hannes.pehlak@eesti.ee

The decline of Ruff *Philomachus pugnax* breeding population in Estonia and action planned for the species

The Ruff is one of the most numerous waders in the world, but its population breeding in wet grasslands in Europe has declined approximately tenfold since the 1950s. The reasons for the decline surely include breeding habitat loss, probably accompanied by predation, climate change, and degradation of wintering grounds. The numbers of the species in Estonia have followed the regional collapse and have dropped from at least 2000 to just 10-30 breeding females within the last fifty years. The meadows of Matsalu wetland complex have been the most important breeding area of Ruff in the country, holding a half of the national population in the 1950s and the only permanent breeding site known nowadays.

The first national action plan for the species' breeding population in Estonia was prepared in 2008. The action plan prescribes management for 18 potential Ruff breeding sites (28 km²) at coastal and alluvial grasslands in western Estonia. The habitat needs of other endangered species were also considered when giving guidelines for management. Besides Ruff, Baltic coastal meadows are valuable e.g. as the breeding sites for Southern Dunlin *Calidris alpina schinzii* and Natterjack Toad *Bufo calamita*, and as stop-over sites for Lesser White-fronted Goose *Anser erythropus*. In managing of grassland habitats for Ruff, mowing, combined with grazing where possible, should be preferred to mere grazing. In the sites where the existing management was suitable for achieving conservation targets, no change was suggested. The monitoring of the breeding sites recently used, inventories of less visited potential breeding sites, and research on the reasons of decline are planned. The action plan stresses the importance of continuous international co-operation for the success of Ruff conservation.

C10**Peters, A., Kingma, S.A., Hall, M.L. & Delhey, K.***Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, 78315 Radolfzell, Germany, peters@orn.mpg.de***Purpler, faster, longer? Sexual signals and testosterone in Purple-crowned Fairy-wrens**

The pleiotropic actions of testosterone (T) are central to male allocation trade-offs, particularly those concerning investment in reproduction and sexual competitiveness. While T is known to stimulate many signals involved in mate attraction, its role in regulating male sexual plumage is more enigmatic. One of the best described examples is the positive effect of T on acquisition of the seasonal sexual plumage in male fairy-wrens. Fairy-wrens are notorious among birds for their sexual conflict and competition: they display among the highest levels of extra-pair paternity and extreme male investment in sexual signals. Here we compare the role of T in sexual signals in the Purple-crowned Fairy-wren, *Malurus coronatus*. Contrary to its congeners, this species is virtually monogamous and has lost many behavioural and morphological adaptations to extreme male competition. However, like other *Malurus*, males develop a striking seasonal breeding plumage for part of the year, and the timing and duration of its acquisition is highly variable. We predict therefore that if phylogeny prevails, T will be important for development and/or maintenance of the sexual plumage, whereas if contemporary selective pressures prevail T will not be involved. Our first results indicate that phylogenetic inertia does not play a major role.

S8**Pradel, R., Atkinson, P., Choquet, R., Drewitt, A., Frederiksen, M. & Rehfisch, M.***Centre d'Ecologie Fonctionnelle et Evolutive (CEFE), UMR CNRS 5175, 1919 Rte de Mende, 34293 Montpellier cedex 5, France, roger.pradel@cefe.cnrs.fr***Methodological overview**

National and international conservation designations to protect bird sites are usually based on the relative importance of their bird populations. It is therefore important to develop methods that take turnover into account so that the true numbers of birds using such sites can be calculated. Estimating turnover in birds and other fauna poses several difficulties. The first one is turnover itself. How do we know whether the birds present one day are those present the day before? This can be determined by placing a unique mark on individuals. Another problem is detection. As detection is rarely perfect, we must correct for the presence of undetected birds. A further complication is the fact that the probability of departure of an individual often depends on the time that it has spent on the site and this time is normally not known precisely. A final complicating factor lies in the fact that on a given site there may be birds of different origins and destinations with different staging behaviours. Existing methods to estimate turnover have more or less successfully dealt with these difficulties. I will review the existing solutions to these issues and identify the issues that remain to be tackled.

S13**Prinsen, H.A.M. & Smits, R.R.***Bureau Waardenburg bv, consultants for environment & ecology, P.O. box 365, 4100 AJ Culemborg, The Netherlands, h.prinsen@buwa.nl***Assessing collision risk for Bewick's Swan (*Cygnus columbianus*) and Eurasian Wigeon (*Anas penelope*) with a 150 kV power line in the Netherlands**

The threat of power lines for birds has been widely studied. Many studies have shown that the number of collision victims can be impressive and include vulnerable species such as eagles, bustards, spoonbill and cranes. Most studies, however, only report the number of collision victims. Rarely, an attempt is made to assess the risk for birds to collide with overhead wires. For this, the number of flight movements ('flux') crossing the power line needs to be quantified, which is often time-consuming and difficult for bird species that also fly at night. However, for species that commute daily between resting and foraging areas, flux is relatively straightforward to determine and information on collision risk would then be very useful to estimate the number of collision victims for a stretch of power line without intensive field research. Such an

approach is often used in environmental impact assessments (EIA) for wind turbines, but as far as we know rarely in EIA for power lines.

We present a study near a 150 kV power line in which we both assessed the number of collision victims as well as the number of nocturnal flight movements of Bewick's Swans and Eurasian Wigeons. The study was carried out in the Netherlands in the winter of 2007/2008 near a Natura 2000 area that functions as an important roost for both species. When commuting to the foraging grounds both species pass a nearby 150 kV power line and therefore risk a collision with the overhead wires. Using a setup with two radars we were able to simultaneously gather flight altitude data as well as map the spatial distribution and intensity of flight movements near and across the power line during several nights. In combination with the number of collision victims throughout the winter we calculated the collision risk for both species in this specific situation.

The mortality due to collisions with power lines is thought to be an order or several orders larger than mortality due to wind turbines. We compare the calculated collision risk for the studied stretch of power line with known collision risks for swans and ducks from studies at wind farms.

S5

Randler, C.

Univ. Education Heidelberg, Section Biology, INF 561-2, D-69120 Heidelberg, Germany, Randler@ph-heidelberg.de

Avian hybrids – a macroecological perspective

The main aim of this presentation is to give an overview of the present knowledge in avian hybridisation and give an outlook for further research. Hybridisation and speciation are central aspects of evolutionary biology. Birds are among the classes of vertebrates that have been studied most thoroughly. However, apart from some recent efforts to understand natural hybridisation in birds, we are still far away from general understanding. Natural hybridisation is rather common in birds. To test different hypotheses on avian hybridisation, data from field observations were used.

Results are:

- Population size was associated with the number of hybrids.
- Detectability was related to hybridisation with more colourful and easy to detectable hybrids being more often reported.
- Parapatric species hybridised more often than sympatric species pairs.
- A high threat status was associated with hybridisation, suggesting that rare species tend to hybridise more often.
- Species with a high tendency for extra-pair copulations did not hybridise more often compared to species with a low proportion of extra-pair copulations.
- In wildfowl, hybridisation was associated with forced extra-pair copulations and with interspecific brood parasitism.
- In hybrid zones, there was strong effect of assortative mating which keeps hybrid zones stable and small.
- Postzygotic barriers have been rarely tested, and one example in Carrion *Corvus corone* and Hooded Crows *C. cornix* is presented: Hybrids differ in flight distances between both parental species (with lower flight distances) suggesting a selective disadvantage in hybrids. In goose hybrids *Anser cygnoides* x *A. anser*, however, no differences and, hence, no selective disadvantage, has been found in aggressive encounters between hybrids and one of their parent species.

As a future outline the Barton & Hewitt (1989) model of stability of hybrid zones should urgently tested in bird species.

S11**Remisiewicz, M.^{1,2}, Underhill, L.G.¹, Tree, A.J.³, Gustowska A.² & Taylor P.B.⁴**

¹Animal Demography Unit, Department of Zoology, University of Cape Town; Rondebosch 7701, Cape Town, South Africa, ²Avian Ecophysiology Unit, Dept. of Vertebrate Ecology and Zoology, University of Gdańsk, al. Legionów 9, 80-441 Gdańsk, Poland, ³Zoology Dept., Nelson Mandela Metropole University, PO Box 1600, Port Elizabeth, 6000, South Africa, ⁴School of Biological and Conservation Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, Pietermaritzburg, South Africa, biomr@univ.gda.pl

Extended moult as an adaptation of waders to the use of ephemeral freshwater habitats at their wintering grounds

Contrasts in life histories and consequential attributes such as population sizes, genetic variability and immunocompetence have been shown between waders using freshwater and marine habitats. We verify the hypothesis that moult strategy, an important part of life-cycle and migration strategy, differs between waders using these two habitats in the wintering season. We predict that waders using irregular freshwater wetlands that provide unpredictable food resources would need a more flexible moult strategy than waders relying on the abundant and predictable food supplies of coastal habitats. We compare attributes of primary moult in adult birds in southern Africa among: Wood Sandpipers *Tringa glareola*, which exclusively use freshwater habitats; Little Stints *Calidris alpina*, which use freshwater and coastal habitats; and Knots *Calidris canutus*, Sanderlings *Calidris alba*, Ruddy Turnstones *Arenaria interpres* and Grey Plovers *Pluvialis squatarola*, which use mostly coastal marine habitats (literature data). We analysed moult cards from 1496 adult Wood Sandpipers collected in 1900–2008, for Little Stints moult cards from 1851 adults collected in 1966–2008, for the remaining species we used data from literature. For all these species the parameters of moult were estimated with the Underhill-Zucchini model (1988). We plotted the moult durations of these species against their mean wing lengths. Populations that used freshwater habitats had a more extended primary moult, achieved by the slower growth of each primary and longer inter-shedding intervals than similar-sized waders using coastal habitats. We consider this extended moult to be an adaptation to the use of irregular wetlands that provide unpredictable food resources and to the birds' need to move between ephemeral water bodies while staging at their wintering grounds. These irregular wetlands to which these waders are adapted are under increased threat because of climate change, new farming practices and increasing demand for their water by man.

S3**Richner, H.**

University of Bern, Zoology Institute, Evolutionary Ecology Lab, Baltzerstrasse 6, 3012 Bern, Switzerland, heinz.richner@iee.unibe.ch

Maternal effects in bird-ectoparasite interactions

Exposure to ectoparasites during growth and development can permanently modify the morphological, physiological and behavioural phenotype of individuals and entail fitness consequences throughout adult life. Mothers may alleviate the impact of ectoparasites by the allocation of substances that can counteract these developmental impairments including antioxidants, hormones and immunoglobulins. Such maternal effects can be targeted directly at the parasite to limit host exploitation and parasite reproductive success, or else to compensate for the parasite-imposed damage on offspring. Furthermore, a parasite-induced change in the allocation of maternal substances can entail trade-offs both for mothers and offspring. I will review the evidence for both mechanisms and their consequences from field studies on the Great Tit and its ectoparasites as experimental model systems.

S9**Riechert, J., Chastel, O. & Becker, P.H.***Institute for Avian Research "Institut für Vogelforschung, Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany, juliane.rieichert@ifv.terramare.de***Is the reproductive success of breeding Common Terns influenced by prolactin or corticosterone plasma levels?**

To achieve high breeding success, constant incubation, protection of the clutch and chicks and high provisioning rates are very important in birds. Parental care is controlled by hormones, especially by prolactin and corticosterone, and interspecific differences in these hormone levels and in reproductive performance are known. We studied whether baseline plasma levels of prolactin and corticosterone in breeding Common Terns (*Sterna hirundo*) are related to their hatching and fledging success. Therefore we took blood samples from 272 Common Terns 9–14 days after clutch completion in three consecutive years and related age and reproductive success to their hormone concentrations. The blood samples were obtained via blood-sucking bugs (*Dipetalogaster maximus*), a non-invasive method without stress for the birds. The results showed clear positive effects of high prolactin levels on the hatching success, especially in 2007, when hatching rate was lower compared to the other two years. For a high fledging success of the terns increasing age was the most important factor. In addition, the results indicated a sex dependent effect of corticosterone: only in males higher levels were correlated with the fledging rate, especially in years with a low overall breeding success. Elevated prolactin levels may be associated with constant incubation and may support the harmonization of mates in incubation shifts. Increased corticosterone levels could trigger foraging and feeding activities of the father, whose role is providing the young with food, whereas the mother is brooding. This mechanism may be of particular importance in years with reduced food availability.

S6**Robles, H., Ciudad, C., Matthysen, E. & Baglione, V.***Evolutionary Biology Group (GIBE), University of A Coruña, Faculty of Science, Campus Zapateira, 15008, A Coruña, Spain, hugo.roblesdiez@ua.ac.be***Postfledging habitat selection and movements of juvenile Middle Spotted Woodpeckers**

The ecological mechanisms underlying habitat selection and movements of juvenile birds are poorly understood. We examined postfledging habitat selection and movements of radio-tracked juvenile Middle Spotted Woodpeckers (*Dendrocopos medius*) in NW Spain. Habitat selection was examined at multiple hierarchically-nested spatial scales. At the landscape and home range scales, old oak forest was the most used and selected habitat, young oak forests and pine plantations were avoided, and riverside forests were used as available. At a lower scale, birds selected larger diameter trees for foraging. The home ranges of juveniles had higher densities of large deciduous trees selected for foraging by juveniles than non-used areas. These results suggest that foraging conditions may drive, at least partly, habitat use decisions by juvenile birds. Contrary to previous studies on migrant forest specialist birds, postfledging juvenile Woodpeckers and breeding adults selected the same habitat (old oak forest), indicating that migrant and resident specialist species may require different conservation actions. Throughout the dependence period, fledglings gradually increased the distances between consecutive fixes and from the nests to the fixes. Besides, movements were shorter when higher proportions of suitable postfledging foraging habitats (old oak and riverside forests) were crossed and young in better condition moved longer distances. After independence, juvenile displacements were also shorter when higher proportions of suitable habitat (old oak and riverside forests) were crossed, suggesting that young may use habitat cues when searching for a settlement area farther away from the natal area. Unlike females, juvenile males significantly reduced inter-day displacements after encountering other conspecifics. Because this effect stayed in the model after controlling for the proportion of suitable habitat crossed, males may have used conspecific cues beyond structural habitat cues. We suggest that male-biased conspecific attraction of postfledging juveniles could be a mechanism driving female-biased natal dispersal in some bird species.

S1**Roport-Coudert, Y.¹, Kato, A.¹ & Chiaradia, A.²**¹Institut Pluridisciplinaire Hubert Curien, DEPE-CNRS, 23 rue Becquerel 67087 Strasbourg, France, ²Research Department, Phillip Island Nature Park, Po Box 97, Cowes, Victoria, 3922, Australia, Yan.ropert-coudert@c-strasbourg.fr**Do not think only globally: the impact of small-scale environmental perturbations on marine predators**

While the impact of environmental changes on the demographic parameters of top-predators is well established, the mechanisms by which populations are affected remain often poorly understood. Here we show that a reduction in the thermal stratification of coastal water masses between a normal and an El Niño year resulted in reduced foraging and breeding success of Little Penguin (*Eudyptula minor*), a major bio-indicator of the Bass Strait ecosystem in Australia. The foraging patterns of the penguins suggest that their prey are dispersed in weakly stratified waters in a year of poor breeding success. This finding has important consequences as mixed water regimes, resulting from violent storms, are unusual during the breeding period of these birds but are expected to become more frequent in relation to climate change.

C5**Rönkä, M., Saari, L., Hario, M., Hänninen, J. & Lehikoinen, E.**

University of Turku, Section of Ecology, Department of Biology, FI-20014 University of Turku, Finland, mia.ronka@utu.fi

Breeding success and population trends of waterfowl in the northern Baltic Sea – implications for monitoring

Traditional waterfowl monitoring only includes breeding population sizes, but the assessment of breeding success would provide valuable information for the interpretation of population trends and for the early targeting of management measures and further studies. The relationship between breeding success and population trends is not very well known in particular for many waterfowl species. Using transfer function models, we analyse the relationship between breeding success measured as chick numbers or autumn population sizes (numbers of adults and young in July), and breeding population trends for seven waterfowl species on the Finnish coast. In addition, we analyse to what extent the fledgling numbers of the Eider *Somateria mollissima* transform into recruitment and breeding population size. As a complement to the traditional methods of population monitoring, we present a simple and cost-effective method for the monitoring of breeding success: the monitoring of autumn population sizes using a combination of point and round counts. The breeding population sizes of the Mallard *Anas platyrhynchos*, Eider, and Goosander *Mergus merganser* were positively related with their breeding output with a time lag corresponding to their recruitment age. There was also a coupling between the autumn and breeding population sizes of the Mallard, Eider and Goldeneye *Bucephala clangula* with a lag corresponding to the recruitment age for the Mallard and the Eider, but for the Goldeneye one year larger than the usual recruitment age. The autumn population sizes correlated with the chick numbers for all target species. Our results show that for the Mallard, Eider, Goosander and Goldeneye, the chicks recruit to the local population to an extent sufficient for affecting local population trends. The breeding success of our target species can be assessed on the basis of their autumn population sizes. This easy and rapid monitoring method is also suitable for voluntary bird-watchers.

C4**Rössler, M.¹ & Schauer, C.²**¹Biological Station Hohenau-Ringelsdorf, Weststraße 7, A-2273 Hohenau / March, Austria, ²Nocturnal Bird Migration Network Eastern Alps, Wielandgasse 37, A-3003 Gablitz, Austria, roessler@vogelzug.net, schauer@vogelzug.net**Flight directions and spatial distribution of nocturnal bird migration across the Eastern Alps: a moon-watching survey in Austria**

Little is known about the nocturnal passage of migrating birds across Austria. Based on radar studies south of Munich, it was postulated that migrating birds divide into SW and SE cohorts to avoid the Alps. Strong WSW flows at the northern border of the Swiss Alps support this idea but there is still no information about

the complementary SE flow. Simultaneous observations by moon-watching were organized over a three year period (2005–2007) to give an initial indication of bird movements in the eastern Alps in Austria, with the main focus on regions east of 13° E. 19 observation nights in autumn and 25 observation nights in spring at a total of 60 observation sites yielded 6888 individual observations. The autumn results show that the main direction of migration is SSW and unexpectedly corresponding with previous observations of broad-front migration in southern Germany. Flight directions within the Alpine regions do not differ from those above the eastern lowlands. The Migration Traffic Rate (MTR) is only 10 % lower than over the rest of the country. There is no significant flow to the SE, as postulated. In contrast, a significant westward movement is observed north of the Alps. The migration intensity of this westerly flow comprises around 15 % of the main SSW flow. The findings in spring are different. There is no significant eastbound flow north of the Alps, while at the eastern border of the Alps flight directions are in a more northerly direction than expected. As strong movements to avoid the Alps can be ruled out, regional differences in migration intensity between autumn and spring and the finding that directions of spring migration differ from those in autumn are consistent with the idea of large-scale anti-clockwise loop migration.

C8

Roth, T. & Amrhein, V.

University of Basel, Zoological Institute, Vesalgasse 1, 4051 Basel, Switzerland, t.roth@unibas.ch

Hierarchical Bayes estimation of apparent survival in observed territory occupancy surveys

Observed territory occupancy data are often available from long-term surveys of large bird populations, in which individuals are not necessarily captured and individually marked. In contrast to capture re-capture data, observed territory occupancy data have rarely been used to estimate population parameters such as apparent survival, because of the absence of a theoretical framework for the analysis of those data. Here, we provide a simple Bayesian framework and analyse the data of a long-term research project on Nightingales *Luscinia megarhynchos*. From 1996 to 2008, the territory occupancies were surveyed in about 60 territories. During the same time period, individuals were also captured and ringed. We used Bayesian modelling to estimate apparent survival over the years for the observed territory occupancies. We then compared the estimates with the apparent survival rates obtained by classical capture re-capture analysis. We show that animal demography parameters, such as apparent survival, might be accurately inferred from observed territory occupancy data, without the need to mark individuals.

S5

Rubtsov, A.S.^{1,3}, Panov, E.N.² & Irwin, D.E.³

¹State Darwin museum; Vavilova str., 57, Moscow, 117292, Russia, ²Severtsov Institute of Ecology and Evolution; Leninskiy ave., 33, Moscow 117071, Russia, ³Department of Zoology, University of British Columbia, 6270 University Blvd., Vancouver, BC, V6T 1Z4, Canada, alexrub@darwin.museum.ru, panoven@mail.ru, irwin@zoology.ubc.ca

Causes, dynamics and evolutionary role of natural hybridization: the case of interrelationship of *Emberiza citrinella* and *E. leucocephala*.

The zone of sympatry and hybridization between the Yellowhammer *Emberiza citrinella* and the Pine Bunting *E. leucocephala* spreads more than 2500 km from the Ural Mountains to Baikal Lake. Analyses of phenotype composition, song structure and playback experiments indicate that at different localities the amount of hybridization ranges from almost zero (i.e. full reproductive isolation; at Baikal Lake) to quite high (in the Altai Mountains). The vast area in the middle of the contact zone is inhabited by mixed populations of *E. citrinella* and phenotypic hybrids, with *E. leucocephala* being very rare. Hybridization in this territory seems to have intensified recently due to human impact to the buntings' habitats, possibly causing decline of *E. leucocephala*. The two taxa do not differ significantly in frequencies of mitochondrial DNA haplotypes, and the genetic distance between the most divergent haplotypes is remarkably low compared to other *Emberiza* species pairs. In contrast, nuclear DNA (as sampled using AFLP markers and sequencing of the nuclear gene CHD1Z) differs clearly between the two species; the genetic distance between the most divergent CHD1Z-haplotypes is comparable to that within other species pairs. Both types of nuclear DNA markers suggest some amount of genome mixture between the species via hybridization. The apparently contradictory patterns in mitochondrial and nuclear DNA

can be explained by recent mitochondrial DNA introgression between the species. Hybridization has had considerable impact on the species genomes, the two taxa still maintain their phenotypic differences. During their history of divergence the two species may have experienced multiple cycles of geographic isolation, secondary contact, and introgressive hybridization. These results raise the possibility that hybridization has provided a source of genetic diversity that enhances the adaptive evolution of these two hybridizing species.

C2

Rutkowski, R¹, Rejt, Ł¹, Kübler, S², Kupko, S³ & Janic, B⁴.

¹Museum and Institute of Zoology Polish Academy of Sciences, Wilcza 64, 00-679 Warsaw, Poland, ²Humboldt-Universität zu Berlin, Institute of Geography, Department of Climatology, Unter den Linden 6, 10099 Berlin, Germany, ³Spenerstrasse 31, 10557 Berlin, Germany, ⁴Department of Ecology and Vertebrate Zoology, University of Łódź, Banacha 12/16, 90-237 Łódź, Poland, robertrut@miiz.waw.pl

Molecular ecology of European Kestrel *Falco tinnunculus* in Central Europe — different cities, different populations?

Presence of wild animals in urban areas has long been observed and become widely studied phenomenon. For many species it was confirmed that living in such environment is interlinked with changes in some behavioural and ecological traits – so called synurbization. However, it is still unclear how these urban populations interact with their ex-urban relatives. In the case of poorly dispersing species clear isolation from outer populations is expected, resulting in reduced gene flow and increasing genetic differentiation. However, in the case of species which actively colonized urban areas, the relation between urban and ex-urban populations could be much more complex.

European Kestrel *Falco tinnunculus* is an “active colonizer” of the European cities and one of the few birds of prey which excellently adapt to urban environment. Some aspects of urban Kestrels breeding biology, density and level of extra-pair copulations as well as significant genetic differentiation between urban and rural populations, were confirmed at least in cases of some cities. This suggested that urban populations of Kestrel might be formed and maintained according to “urban island” model. In the present study, we address this problem more thoroughly. We collected feather samples from several cities in Central Europe, differing in “age” and size of urban population, and from neighbouring ex-urban areas. Analysing polymorphic microsatellite markers, we estimated level of genetic variability within each population and genetic differentiation among them. These allowed us to determine whether urban populations are isolated and/or experience bottleneck during the foundation, as well as genetic relationship among different cities. In the case of sampling localities, from which we obtained complete broods, we estimated a ratio of extra-pair offspring. We discuss the results in the context of colonization pattern of cities by Kestrels and history of synurbization process in these birds.

S11

Salewski, V.¹, Tegetmeyer, C.², Bargain, B.³ & Flade, M.⁴

¹Vogelwarte Radolfzell at the Max-Planck-Institute for Ornithology, Schlossallee 2, 78315 Radolfzell, Germany, ²University of Greifswald, Institut für Botanik und Landschaftsökologie, Grimmer Str. 88, 17487 Greifswald, Germany, ³Bretagne Vivante, Trunvel, 29720 Tréogat, France, ⁴Landesumweltamt Brandenburg, Trämper Chaussee 2, 16225 Eberswalde, salewski@orn.mpg.de

Factors effecting population dynamics of Palearctic-African migrants in the non-breeding season – a case study of the Aquatic Warbler

The population dynamics of long-distance migrants are affected by conditions in the breeding areas as well as in the non-breeding areas. There is correlative evidence that numbers, survival and reproductive success of several Palearctic non-passerines and passerines are correlated with conditions in the African non-breeding areas. However, the mechanisms how factors experienced in the non-breeding season affect population dynamics of migrants are barely known.

Acrocephalus paludicola is the only globally threatened passerine species in Europe, declining by more than 90 % within the last century due to drainage and agricultural intensification in the breeding areas. Although the most important breeding areas are protected now, the species is declining at some sites without an apparent change of the conditions in the breeding areas. Factors acting in the non-breeding areas may therefore be affecting the respective populations.

Until recently the exact non-breeding areas of the species and therefore its habitat requirements were unknown. At least parts of the non-breeding areas were discovered in 2007 in the flood plains of the Senegal River in and around the Djoudj National Park, Senegal, West Africa. The species was found exclusively in shallowly inundated marshes of *Scirpus littoralis*, *Oryza barthii*, *Eleocharis mutata* and *Sporobolus robustus*. A satellite image analysis using current on-ground data from 2007/2008 revealed that - in contrast to former analyses - only a tiny fraction of West Africa is covered by this habitat. Most of the former available habitat was converted into rice fields or freshwater reservoirs. Thus, the species is threatened by habitat loss due to agricultural and hydrological transformation, in the breeding as well as in the non-breeding areas. As most of the breeding areas now have a high conservation status, the detection and protection of the non-breeding areas should be the priority for the conservation of *Acrocephalus paludicola*.

S10

Schifferli, L., Spaar, R. Gruebler, M. & Rickenbach, O.

Swiss Ornithological Institute, CH – 6204 Sempach, Switzerland, luc.schifferli@vogelwarte.ch

Ground-nesting farmland birds in conflict with intensive agriculture and heavy predation

Many meadow birds have been declining throughout European farmland. Predation and machines for agriculture reduce the hatching success of ground-nesting birds. Especially nidifugous chicks suffer from predation, but also from food shortage on dry soils. In densely growing crops, the mobility of foraging birds is much reduced. Low hatching rates and heavy chick mortality result in poor breeding success which is considered as a key factor accounting for population declines of numerous farmland species. To enhance the reproductive output by improving the ecological conditions in farmland to stop the negative trends, management plans have been implemented in many European countries. However, the benefits of measures taken in a recovery programme for the Northern Lapwing *Vanellus vanellus* breeding in intensive Swiss farmland were virtually counterbalanced by heavy nest and chick predation. To reduce egg losses, the ground nests were temporarily removed during farming activities. Moreover, as an alternative to predator control by shooting, electric fences to exclude ground predators were tested. Nest protection from the impacts of agriculture and predation increased the hatching rate to 79 %, compared to 24 % in unprotected nests. Nevertheless, chick survival to fledging 5–6 weeks after hatching was less than 10 %. Daily survival of young followed by telemetry was 0.96 within fields surrounded by electric fences, but outside the enclosures, nocturnal predation wiped off whole broods within two weeks of hatching (daily survival 0.86). Thus, breeding success can be increased substantially by nest protection only, if fencing is continued to the fledging stage and extended to suitable foraging grounds. This prediction was tested successfully: fledging rates increased to 0.8 per pair, a figure adequate for population stability, compared to < 0.4 when broods had to forage outside electric fences.

C11

Schindler, S.¹, Pollheimer, M.², Schmitzberger, I.², Peterseil, J.¹ & Wrabka, T.¹

¹Department for Conservation Biology, Vegetation & Landscape Ecology; University of Vienna, Rennweg 14, A-1030 Vienna, Austria, ²coopNATURA, stefan.schindler@univie.ac.at,

Austrian agri-environmental scheme enhances bird diversity in arable land, but rarely in grassland

Providing subsidies to farmers for environmentally friendly agricultural practices, agri-environmental measures (AEM) are the most important policy instruments to protect European biodiversity in agricultural landscapes. To assess the environmental effects of the Austrian AEM, we mapped landscapes and surveyed birds in 2003. The ten sampling areas of 3 km² were located in the three most important types of Austrian agricultural landscape, i.e., grassland in alpine valleys and basins, mixed agriculture in mountain areas, and eastern arable land. We investigated the AEM in a parcel-wise manner and recorded the bird observations in relation to the investigated field parcels. Bird species were classified into character guilds based on their breeding strategy (ground breeders, breeders within the herb layer, and breeders within small remnants of reed) and according to their vulnerability status. These communities should serve as good indicators as they are heavily affected by agricultural treatment such as mowing and harvesting.

The results suggested that the effects of AEM on bird diversity were generally stronger in arable fields. There, even the less specific “reduction measures” led to significantly higher densities of ground breeders and endangered species. In grasslands, the AEM were much less effective. One explanation is that characteristic grassland species such as Whinchat, Common Grasshopper Warbler and Marsh Warbler normally breed rather late in May and June. Thus, first mowing of grasslands delayed by the reduction measure to May is not postponed enough. The only AEM that clearly promoted the investigated grassland bird communities were those of the bundle “Specific habitat conservation measures for bird habitat”. But these very specific measures have such limited coverage that they cannot guarantee the continuous survival of populations. As targeted measures that directly address threatened species were most effective, we highly recommend that increased participation of farmers in these measures should be encouraged.

C5

Schwerdtfeger, O.

Quellenweg 4, D-37520 Osterode am Harz, Germany, o.schwerdtfeger@gmx.de

The population dynamics of Tengmalm's Owl *Aegolius funereus* over 30 years

The population ecology of Tengmalm's Owl was researched in the Harz Mountains, Northern Germany. Nearly all nesting attempts took place in the 200 nest-boxes that were spread out in a study area of 200 km² of spruce forests. During 1979–2008 altogether 830 broods were monitored. The annual size and make-up of the breeding populations fluctuates remarkably depending on the abundance of small mammals. The number of prey stored in the nests correlated significantly with the number of broods, the clutch size and the breeding success.

Information about the population structure was obtained by the ringing and capturing of adult owls (83 % of males, 97 % of females). The recapture rate was 66 % for males and 27 % for females. Thus, the share of resident males was extensively higher than that of females. Few broods were reared by local recruits (21 % of males, 13 % of females). Thus, reproduction depends largely on owls immigrating from other breeding areas situated even up to 550 km away. For the entire period of the study, immigrant males had significantly higher breeding success with their first brood, than those males already present in the area before. This was not the case for females.

The age of the captured owls could be determined according to the species specific part-moult of the wings. The difference in age structure between sexes demonstrates the longer survival of males. Within the sexes the age structure shows no significant differences between breeding owls and singles, between recruits and others as well as between residents and immigrants.

All the broods monitored were separately evaluated during the study period. The resident males and females had no clearly recognisable advantage regarding breeding success. Different results are observed in shorter periods of research, due to the very strong fluctuations in supply of prey and natural variations in population structure. A long-term trend has resulted in a decrease of resident adults.

S5

Secondi, J., Bensch, S. & Faivre, B.

University of Angers, LEESA, Faculté des Sciences, 2 bld Lavoisier, 49045 Angers, France, jean.secondi@univ-angers.fr

Moving hybrid zones – interests and limits

Hybrid zones are natural situations where to study the different steps of the speciation process. A strong emphasis has been put on their genetic analysis thanks to the increasing availability of markers, and the development of statistical methods for hybrid assignment and cline estimation. However, if hybrid zones provide insight into the dynamics of allele diffusion and selection, they also allow the investigation of a broader range of issues. Their study can bring original knowledge about host-pathogens interactions, especially host shift events. Interspecific responses to song commonly occur in song-learning birds like passerines. Thus, hybrid zones also provide ideal setups to contrast the diffusion dynamics of genetic and cultural traits. Moving zones present an additional interest: the investigation of current processes driving the dynamics of species distribution. This last issue is theoretical as well as conservation-oriented as several species are threatened by hybridization around the world. However, the identification of one major factor responsible for a geographical shift is not straightforward. In contrast, several factors acting at different levels can interact and account for the observed pattern. Here we present results of a series of studies on

the moving hybrid zone between *Hippolais polyglotta* and *H. icterina*. We will use this particular case as an example to illustrate the interests of such zones as well as the constraints and limits to different ecological and evolutionary approaches that can be used to determine which factors drive a geographical shift.

C13

Serra, L.¹, Casasole, G.¹, Griggio, M.², Fusani, L.³ & Pilastro A.⁴

¹Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Via Ca' Fornacetta 9, I-40064 Ozzano dell'Emilia BO, Italy, ²Konrad Lorenz Institute for Ethology, Savoyenstrasse 1/A, A-1160, Vienna, Austria, ³Dipartimento di Biologia ed Evoluzione, Università di Ferrara, Via Luigi Borsari 46, 44100 Ferrara, Italy, ⁴Dipartimento di Biologia, Università di Padova, Via Ugo Bassi 58/B, I-35121 Padova, Italy, lorenzo.serra@infs.it

Elevated testosterone levels during moult affect structural and pigment-based plumage colourations in Blue Tits

Feather colours can be structural colours, pigment colours (mainly melanins and carotenoids), or a combination of the two. There is ample evidence that feather colours are condition dependent, but the mechanisms linking condition to the expression of these ornaments are not always clear, in particular for structural colours. Testosterone is a key hormone in the regulation of moult initiation, with high levels generally suppressing moult, but it also influences (either positively or negatively) the expression of melanin, and possibly structural feather colours. Testosterone levels may have both direct (influencing melanin feather content) and indirect (regulating moult timing or influencing body condition) effects on the expression of plumage colours. However, very little is known on the effect of testosterone levels during moult on different feather colours.

We implanted with testosterone 10 male (12 controls) and 12 female (16 controls) yearling Blue Tits *Cyanistes caeruleus* after the onset of their first pre-basic moult. After 40 days, mean testosterone plasma levels were 2.9 ng/ml in T-implanted birds and 0.4 ng/ml in controls. Body moult was suspended in T-implanted birds 30 d \pm 4.67 SD after implant, and resumed 38.5 d \pm 7.81 SD after implant removal. Moult duration from implant date, excluding suspension, did not differ between treatments and controls.

At the end of the moult, we measured spectral reflectance from 320 to 700 nm of four plumage regions: crown (UV-blue), cheeks (white), breast (yellow), wing coverts (UV-blue). Spectral analyses, based on PCA and colour indexes (Yellow-Chroma, UV-Chroma, Brightness), revealed that high testosterone levels reduced both the carotenoid-based yellow and the UV blue. The immunosuppressive action of testosterone could have recruited carotenoids for the immune function and so depleted the deposition of carotenoids in feathers. The mechanisms linking testosterone levels with structural colours remain unknown.

S7

Shamoun-Baranes, J.¹, Bouten, W.¹, Baaij, E.³, Camphuysen, K.² & van Loon, E.E.¹

¹Universiteit van Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, Computational Geo-Ecology, Nieuwe Achtergracht 166, 1018WV Amsterdam, The Netherlands, ²NIOZ, P.O. Box 59, NL-1790 AB Den Burg (Texel), The Netherlands, ³UvA, Faculty of Science, Technology Group, Valckenierstraat 65, 1018XE Amsterdam, The Netherlands, shamoun@uva.nl

Quantifying movements and inferring gull behaviour from high resolution GPS telemetry

Using a GPS tracking system, recently developed at the Universiteit van Amsterdam, we monitored the movements of four adult Lesser Black-backed Gulls (*Larus fuscus*) breeding on the island of Texel, in the Netherlands. The tracking system includes 14 g GPS tags, a base and relay stations for data download and program transmission and data processing software. Some key features of the system include wireless data transmission up to 8 km distance, dynamic and wireless alteration of measurement scheme and a battery recharged with solar energy. The birds were tracked for several weeks. Locations were collected at different time intervals ranging from once every 15 minutes to once every 2-3 seconds. During this period over 41000 locations were collected.

This paper shows the incredible research potential of high resolution tracking. With hundreds of fixes per day we can answer questions about foraging areas, time budgets, flight times during foraging, times spent on other activities, individual and daily variability in behaviour and preferential tracks. Movement statistics can be used to identify specific behaviours. With ultra frequent sampling every 2–3 seconds we can study flight strategies, such as soaring along the coast and dynamic soaring over water, by monitoring small differences in altitude and speed, turning angles and directions. Movements behind fishing vessels with

characteristic speeds and trajectories were also clearly identifiable. This paper also discusses some of the technical and analytical challenges that must be addressed such as: the trade off between the weight of the tag and the number of measurements, frequency of measurements vs. gaps in the data, communication distance, measurement program flexibility and system complexity, and collecting environmental measurements at similar resolution.

C11

Si Bachir, A., Djeddou, N. & Chenchouni, H.

Laboratoire d'Ecologie et environnement, Département de Biologie, Faculté des sciences, Université de Batna, 05000 – Algeria, si_bachir@yahoo.fr

Ecology of the White Stork (*Ciconia ciconia* L. 1758) in the region of Batna (south-eastern Algeria)

This work aims at studying the ecology of the White Stork (*Ciconia ciconia*) on the territory of the wilaya of Batna (south-eastern Algerian), an area of 1345 km².

A tri-annual census showed 490 nests in 2006, 593 in 2007 and 670 in 2008 at 52 colonies. The average density varied from 11.5 breeding pairs/100 km² in 2006 to 15.9 breeding pairs/100 km² in 2008. This increase was partly due to an increase in survey effort, but also to a natural increase of the breeding population.

White Storks breed preferentially in the center of cities (43.5 % of the total number of the nests). Most of the nests were established on artificial supports (64.7 %), whereas trees had only 35.3 %. The average height of the nest supports was 13.4 ± 6.7 m and the average height of the nests was 13.1 m ± 6.1. The average number of emancipated chicks (> 7 weeks) is 2.08 ± 0.11 per nest for all years considered with some variation between years.

The average number of nests per colony was 11.64 ± 4.2. Most (87 %) colonies were monospecific, but 13 % of them were mixed with the Cattle Egret (*Ardeola ibis*).

In 2006, a survey carried out in the El Madher colony showed that the clutch size varied from 1 to 6 eggs with an average of 4.04 (± 0.26) eggs per nest. The proportion of hatched chicks per nest was high (85.7 %) and the percentage of fledged chicks per nest was 52.4 %. Adult storks regurgitated pellets which contained on average 55.5 ± 12.6 prey items. The composition of the diet showed important variation during the breeding period, but was dominated by insects which represented 88.4 % by number of the consumed preys. *Coleoptera* represented the highest frequency: both in numbers and in occurrence throughout the breeding season.

C15

Sierdsema, H.¹, Brotons, L.², Jiguet, F.³ & Newson, S.⁴

¹SOVON Dutch Centre for Field Ornithology / IBED-University of Amsterdam, Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, The Netherlands, ²CTFC, Area de Biodiversitat, Pujada del Seminari s/n, 25280, Solsona, Spain, ³MNHN, CRBPO, CP 51, 55 rue buffon, 75005, Paris, France, ⁴BTO, The Nunnery, Thetford, Norfolk, IP24 2PU, United Kingdom, henk.sierdsema@sovon.nl, lluis.brotons@ctfc.es, fjiguet@mnhn.fr, stuart.newson@bto.org

Multi-scale modelling of spatial abundance and trends of European farmland birds

Farmland breeding birds are amongst the most threatened group of (bird) species in Europe. Most species show a large-scale decline. The European Bird Census Council (EBCC) monitors the change in the abundance of farmland birds (and many other bird species) with the Pan-European Common Bird Monitoring Scheme (PECBMS). This scheme combines national and regional trends into European trends and trends for bioregions. Here we see that the trends of farmland birds may differ considerably across Europe. The often coarse resolution of the information (countries or sometimes regions) however, offers limited possibilities for the analysis of these trends in order to obtain information on the driving forces behind the changes. More detailed information on the driving forces may be obtained by combining changes in local count data with local information on (changes) in land use with spatial statistical models resulting in distribution and trend maps and information on possible driving forces. The heterogenic nature of the observations and the sparseness of high-quality European environmental data however, make it difficult to model the distribution in detail on a European scale. Here we present how high-quality distribution maps and trend maps could be made by using a multi-scale approach. Results of a pilot study

for a number of countries will be presented, as well as provisional European maps for a selection of farmland bird species.

S12

Sillett, T.S.¹, Royle, J.A.², Kéry, M.³ & Morrison, S.A.⁴

¹Smithsonian Institution, Smithsonian Migratory Bird Center, National Zoological Park, Washington, DC 20008, U.S.A.,

²USGS Patuxent Wildlife Research Center, ³Swiss Ornithological Institute, ⁴The Nature Conservancy, silletts@si.edu

Rangewide population size and habitat-specific abundance of the Island Scrub-Jay (*Aphelocoma insularis*)

Aphelocoma insularis is North America's sole island endemic bird species and exists only on Santa Cruz Island, California. This jay's very small range and resulting small population size make it especially vulnerable to natural disasters such as catastrophic fire, disease, and habitat alteration due to climate change. Concerns about the viability of *A. insularis* became acute in 2006 when researchers noticed an apparent negative population trend on their long-term study plot in the island's central valley. However, no rigorous population size data existed for the species. Therefore, we conducted island-wide surveys in October 2008 and in April 2009 to estimate: 1) population size and 2) habitat-specific abundance during the breeding and non-breeding seasons. We used distance sampling to survey 308 randomly selected points throughout the island. Using a hierarchical model to accommodate point-level abundance covariates, we estimated that total population size was considerably lower than previously published estimates of 10,000–18,000. Jays were most abundant in low to mid-elevation forest and chaparral habitats with extensive oak canopy cover.

S14

Silva, J. P.^{1,2,3}, Palmeirim, J. M.² & Moreira, F.³

¹Nature Conservation Institute, ²Centre for Environmental Biology, 1749-016 Lisbon, Portugal, ³Centre for Applied Ecology "Prof. Baeta Neves", Institute of Agronomy – Technical University of Lisbon, Portugal, silvaj@sapo.pt

Higher densities of the threatened Little Bustard *Tetrax tetrax* occur in larger grassland fields: management implications

The Little Bustard *Tetrax tetrax* is a steppe bird that presently depends mostly on agro-ecosystems, and has become threatened in Europe due to changes in agricultural systems.

Research undertaken in France and Spain found breeding male density to be greater on small fields, presumably due to increased habitat diversity, but exceptionally high densities have also been found in large fields in Portugal, suggesting that the influence of this parameter varies geographically and is not yet fully understood. To contribute to the definition of best agricultural management practices, we studied how field size, together with vegetation structure, influences the presence and density of *T. tetrax*.

Eighty-three grassland fields varying between 23 and 172 ha, all far from major sources of disturbance were studied in Alentejo, Portugal. A total of 183 breeding males were found in 47 of these fields, reaching densities of up to 37 males/100 ha. A logistic regression model was used to evaluate how field size and vegetation structure influenced the presence of breeding males in fields, and we concluded that larger fields with vegetation of adequate height had a greater probability of being used. In addition, using only grassland fields where *T. tetrax* was found, we studied how these factors influence the density of the species using a Generalised Linear Model (GLM), and found that field size alone explained male density. These results suggest that larger continuous areas attract many males, presumably as a consequence of their lek mating system. We conclude that within a context of large property in priority conservation areas for the species in southern Portugal, and presumably in other regions of Iberia: (1) conservation resources should be channelled mostly to farms containing the largest fields, (2) grassland should be grazed to attain adequate vegetation structure, and (3) managers should ensure the maintenance of continuous grassland habitat, through careful and synchronized planning of field rotation in adjacent farms.

C4

Sinelschikova, A.¹, Vorotkov, M.², Bulyuk, V.¹, Bolshakov, C.V.¹ & Griffiths, M.E.³

¹Biological Station Rybachy ZIN RAS, Rybachy 238535, Kaliningrad Region, Russia, ²Pulkovo Observatory of RAS, 196140, Saint-Petersburg, Pulkovskoye chaussee 65/1, ³Durrell Institute of Conservation and Ecology, Anthropology Dept., University of Kent, Canterbury, Kent. CT2 7NS, UK, Sinelsch@bioryb.koenig.ru, biser_gao1@mail.ru, M.E.Griffiths@kent.ac.uk

Electronic-optical system and its application for the study of nocturnal migration of birds

Electronic-optical matrix device was designed especially for automatic detection, monitoring and recording of nocturnally migrating birds at the altitudes 100–1000m). The principle design features are:- 1) an optical device for receiving images of targets on two high-sensitivity CCD matrices when illuminated by white light from searchlight beams and 2) instantaneous parallactic electronic computation enabling the distance from device to target to be accurately measured. This method was tested in the field and reveals the following features:-

1. Distinguishes reliably the birds from insects and bats;
2. Reveals clear images of flying birds as a set of the silhouettes in consecutive phases of flight over a track of 10–40m long;
3. Allows the estimation of linear size of the birds (wing span and body length), altitude, direction of flight and heading;
4. Measurement of ground speed of the birds, wing-beat frequency and pause duration between each series of beats;
5. Enables the collection of statistically representative data in particular taxonomic groups and species.

This makes it possible to study aerodynamic characteristics of flight in various wind conditions, to estimate the mechanism of compensation for lateral wind drift by birds flying in darkness; and to estimate number and spatial distribution of migrants in the course of night and season. Application of the electronic-optical system is limited by the low overcast, fog and precipitation.

For the period of autumn migration at the Courish Spit, in the SE Baltic region, three model groups of passerines have been defined. These groups are well distinguished by their linear size and during specific autumn periods by 80–90% are represented by single species as follows:- the Song Thrush *Turdus philomelos*, Robin *Erithacus rubecula* and Goldcrest *Regulus regulus*. Our data on these three groups of passerine migrants in combination with wind data allows us to make some important preliminary conclusions as follows:-

1. An ability of birds to compensate for lateral wind drift depends on their morphologically determined potential to gain air speed;
2. The passerine nocturnal migrants seem to be able to estimate and control their air speed depending on wind direction and velocity. In tail winds their air speed is decreased whereas in head winds it is increased;
3. Ground speed control could be governed not only by wing beat frequency but also by varying the duration of active and inertial phases of flight.

S14

Siriwardena, G.M.¹ & Diaz, M.²

¹British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2LW, UK, ²Instituto de Recursos Naturales (IRN-CCMA-CSIC), c/Serrano 115 bis, E-28006 Madrid, Spain, gavin.siriwardena@bto.org, mario.diaz@ccma.csic.es

Future threats and opportunities for farmland birds

Research has revealed the likely causes of many farmland bird declines across Europe and management solutions to this conservation problem have been put into practice mostly via agri-environment schemes (AESs). However, despite evidence of success in some cases, the effectiveness of current AES options is highly variable and unpredictable. We will provide a brief overview of the progress made in respect of farmland bird conservation via AESs. It is likely that many “first generation” schemes would now benefit from reviews to ensure that they are meeting conservation objectives and some such reviews are already underway. Success for a given species is likely to be related to how well an AES delivers the resources it needs at the field scale, but also to the extent to which the relevant options are adopted at the landscape scale.

Conservation measures must also be robust to new changes in agriculture such as intensification in eastern Europe due to EU enlargement, as well as rapid and possibly unpredictable changes in cropping patterns

(new crops and different balances between existing crops) due to changes in agricultural markets. Voluntary AESs are likely to be less popular during periods with high commodity prices, potentially making large-scale resource provision by this route difficult. Alternatives include using cross-compliance, strengthening links between EU farm subsidies and environmental management, and preservation of farming systems of high conservation value. More broadly, measures should be sufficiently flexible to be adjusted rapidly to changing circumstances. Bird and habitat monitoring must be maintained to detect threats from future land-use change and research must continue to fill gaps in our knowledge of farmland bird ecology to inform any necessary future conservation efforts. Future AESs or other management measures must be designed from sound scientific evidence and must be monitored to ensure that they achieve their aims.

C9

Skipnes, K.

Stavanger Museum, Lensmannsveien 17, 4070 Randaberg, Norway, Kolbjorn.skipnes@stavanger.museum.no

Variation in nest reliefs in Arctic Terns (*Sterna paradisaea*)

In Arctic Terns both parents incubate and they relieve each other at varying intervals. Sometimes there are several nest reliefs in an hour, while at other times there is only one nest relief in several hours. How the terns behave during the nest reliefs can also vary considerably. In some nest relief situations the on-duty bird flies off the nest immediately when the off-duty bird arrives to the territory of the pair. In these cases, the arriving bird will often land directly at the border of the nest. In other cases, the behaviour of the birds during the nest reliefs is more elaborate. Then, the off-duty bird lands outside the nest and performs some activities there before it walks or flies to the nest. In these cases, the on-duty bird will not be so quick to leave the nest, and will often perform nest-building movements while it slowly walks away from the nest. Some of the nest reliefs are accompanied by feeding of the relieved bird.

In a study of colour-marked and sexed Arctic Terns, data in relation to nest reliefs was collected for 24 hours a day. The study included data on: time of the day, time since egg-laying, length of time between successive nest reliefs (incubation bouts), off-duty bird's landing distances from the nest, behaviour of the off-duty bird from landing until it settles on the nest, length of time from landing until settling on the nest, behaviour of the on-duty bird from the time of the mate's landing until the relieved bird leaves the nesting area, and length of time from when the off-duty bird lands until the relieved bird leaves the nesting area. This paper will present a range of factors that affect how nest reliefs are performed, some of which have been overlooked in the research on this species.

C15

Skorka, P.¹, Lenda, M.² & Tworek, S.¹

¹Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, 31-120 Krakow, Poland, ²Institute of Environmental Sciences, Jagiellonian University, Gronostajowa 7, 30-387 Krakow, Poland, skorka@iop.krakow.pl

Patch size and habitat quality affect presence of the Common Gull *Larus canus* in water reservoirs in southern Poland

Most of the studies on metapopulation theory were undertaken on species occurring in landscapes that have undergone substantial fragmentation. Unfortunately, it is mostly unknown what affects species populations occurring in habitat patches that are naturally fragmented. Understanding metapopulation dynamics in such species may be a reference for studies that were done on species in landscapes fragmented due to human activity.

Here, we studied patch occupancy in Common Gull, which is a species occurring at water reservoirs, that are naturally fragmented habitat patches. The study was carried out in southern Poland during 1999–2008. All potential habitat patches (water reservoirs) were visited three times during the breeding season and presence or absence of breeding gulls were noted. We found that the occupied patches were larger and had higher availability of suitable islets than empty ones. We did not find differences between occupied and empty habitat patches as far as isolation indices, presence of corridors, availability of food resources, landscape composition and human disturbance are concerned. Our results indicate that habitat quality is probably the most significant factor affecting presence of the Common Gull in habitat patches.

S2**Slabbekoorn, H.***Institute of Biology, Leiden University, Kaiserstraat 63, Leiden, The Netherlands,
h.w.slabbekoorn@biology.leidenuniv.nl***Songs and the city: ecology and evolution in the urban soundscape**

Worldwide urbanization and the ongoing rise of urban noise levels form a major threat to living conditions in and around cities. Urban noise may cause stress and evasive behaviour, disturb or restrict activity patterns such as breeding and feeding, and may mask communicative signals as well as other relevant sounds. These negative consequences of noisy conditions likely contribute to the homogenization of avian communities; the same bird species surviving and colonizing urban environments everywhere. Insight into behavioral strategies of urban survivors may explain the sensitivity of other species to the apparently selectively harsh urban conditions. The great tit (*Parus major*) is a good example of a very successful urban species for which we have revealed a remarkable vocal flexibility. Songs that are important to mate attraction and territory defense have significantly diverged between noisy cities and relatively quiet forests. Urban songs were shorter, sung faster, and had a higher minimum frequency in ten out of ten city-forest comparisons from London to Prague and from Amsterdam to Paris. We believe anthropogenic noise is a dominant factor driving these changes, especially because noise-dependent song variation was also found at the individual level within a single urban population in Leiden. Experimental noise exposure experiments reveal even more about how individual singing behaviour can yield noise-dependent acoustic variation. Data on a range of different species at the population and individual level are now needed to get a better picture of which song characteristics are critical to cope with anthropogenic noise and what level and type of behavioral plasticity may allow species enough time to survive and adapt to noisy city life. I will review where we are and where we go in our efforts to gain understanding and to provide tools for conservation.

S10**Smart, J., Bolton, M., MacDonald, M. & Eglington, S.M.***Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK, jennifer.smart@rspb.org.uk***Here today, gone tomorrow...Predation – the issues and practical solutions.**

There have been widespread and severe population declines of breeding wading birds on lowland wet grasslands in Europe. These declines have been associated with the loss and degradation of breeding habitat mainly through changes in agriculture such as drainage and intensification of grassland management. A growing body of evidence suggests that appropriate habitat management is essential for the maintenance of healthy wader populations. However, recent work suggests that, even on some nature reserves, levels of predation on wader nests may be unsustainably high such, that even when habitat management produces ideal conditions, the recovery of populations may be prevented by high predation levels. Analyses of the factors important in determining predation levels in lapwing show that survival is higher when nests are distant (>50m) from field edges, when densities of nesting lapwing are higher and where predator abundance is lower.

Predator control is one way of reducing predator abundance but success, measured as the improvement in wader breeding success and population size, is dependent on a number of factors. In addition, there is also likely to be interactions between predators and reducing the abundance of one predator species, through predator control, may allow another predator species to thrive.

Manipulating breeding habitat to discourage nesting near field edges and encourage nesting at high densities may result in significant reductions in nest predation. We present results from a large-scale field experiment where we use the known habitat requirements of nesting Lapwing and Redshank to manipulate lowland wet grassland fields in an attempt to alter the breeding distribution and reduce predation.

In this presentation, we review the evidence for the relative importance of different predators species and for the efficacy of lethal and non-lethal methods for reducing the impacts of predators on lowland wet grassland breeding waders.

C10**Spée, M.¹, Beaulieu, M.¹, Marchal, L.¹, Lazin, D.¹, Thierry, A.M.¹, Chastel, O.², Le Maho, Y.¹ & Raclet, T.¹**¹Institut Pluridisciplinaire Hubert Curien, Département d'Ecologie, Physiologie et Ethologie, UMR 7178 CNRS-UdS, 23 rue Becquerel, 67087 Strasbourg, ²Centre d'Etudes Biologiques de Chizé, CNRS, F-79360 Villiers en Bois, marion.spee@c-strasbourg.fr**Corticosterone is involved in the control of nest abandonment in breeding Adélie Penguins (*Pygoscelis adeliae*)**

Reproduction in penguins is associated with spontaneous long-term fasting. Prolonged fasting is defined by three phases. Below a body mass threshold corresponding to the entrance into phase III of fasting (PIII), hormonal and metabolic shifts characterized by lipid towards protein utilization occur. These changes are concomitant with nest abandonment and stimulation of refeeding behaviour. Both corticosterone and prolactin govern reproductive behaviour, stimulating foraging and incubation performance, respectively. In the current study, we 1) focused on hormonal status in departing birds, and 2) we investigated the involvement of corticosterone in the induction of refeeding, by characterizing its effects on nest abandonment.

To do this, 1) breeding male penguins were weighed and sampled for blood before the laying period and when leaving the colony to refeed at sea, either consecutive to the female return or nest abandonment, and 2) treated birds were implanted with 0 (sham) or 100 mg (C100) of corticosterone and were weighed and sampled as described above.

We showed that 1) breeding males that abandon their nest were in PIII of fasting, with high corticosteronemia and low prolactinemia; interestingly, we found penguins in PIII relieved by their females, displaying high corticosteronemia, while prolactinemia remained high and, 2) CORT implantation induced 70 % of nest abandonment, 14 days after treatment; abandoning penguins treated with CORT were heavier than control deserting birds (4.2 vs. 3.5 kg).

We conclude that nest abandonment requires not only a rise in plasma CORT levels but also concomitantly a marked decrease in prolactin concentration. The experimental study shows that corticosterone is of major importance in the refeeding decision. In addition, to what extent corticosterone affects prolactin concentration need to be investigated. In further studies it would also be of interest to examine whether an experimental decrease in prolactin levels induces nest abandonment.

C8**Sprau, P.¹, Roth, T.², Amrhein, V.² & Naguib, T.¹**¹Netherlands Institute of Ecology (NIOO-KNAW), PO Box 40, 6666 ZG Heteren, The Netherlands, ²University of Basel, Switzerland, p.sprau@nioo.knaw.nl**Distance dependent use of vocal features in Nightingales (*Luscinia megarhynchos*)**

In communication, animals often use complex signals with different traits carrying different information. In the song of songbirds, such traits can either be structural patterns or temporal patterns. Most structural song patterns such as the use of rapid broadband trills are exposed to stronger spectral degradation than temporal patterns such as song overlapping. Consequently trills may better function as close range signals whereas song overlapping may also maintain its function at longer distances. Here, we investigated whether in Nightingales (*Luscinia megarhynchos*) the signal value of song overlapping and the use of rapid broadband trills changes when broadcasted from different distances using nocturnal playbacks. Males' responses indicate that males perceived close intruders as a stronger threat, regardless of the song traits that were used to signal aggressive singing. However, males did not adjust their responsiveness to the degradation level of the different traits. These findings suggest that rapid broadband trills are used during close range interactions in order to define a repelling area. Moreover, the results suggest that strongly degraded traits can maintain their function even at far distances.

S4**Steiger, S., Fidler, A.E., & Kempnaers, B.***Max Planck Institute for Ornithology, Eberhard-Gwinner-Strasse, 82319 Seewiesen, Germany, steiger@orn.mpg.de***Evidence for increased olfactory receptor gene repertoire size in two nocturnal bird species**

The molecular basis of the sense of smell is mediated by olfactory receptors (ORs) expressed on sensory neurons in the olfactory epithelium. Both the total number and the number of intact (i.e. putatively functional) OR genes vary greatly amongst the genomes of vertebrate taxa. We investigated whether two nocturnal bird species that are known to rely on olfactory cues, the brown kiwi (*Apteryx australis*) and the kakapo (*Strigops habroptilus*), have evolved a larger OR gene repertoire than their day-active, closest living relatives. We show that the nocturnal birds did not have a significantly higher proportion of intact OR genes. However, the estimated total number of OR genes was larger in the two nocturnal birds than in their relatives. Our results confirm and extend previous behavioral studies suggesting that some nocturnal bird species have a well-developed sense of smell. Our results strongly suggest that ecological niche adaptations such as daily activity patterns have shaped avian OR gene repertoires.

C5**Sternberg, H.¹ & Grinkov, V.G.²**

¹OAG für Populationsforschung Braunschweig, OAG für Populationsforschung Braunschweig, Im Schapenkamp 11, D-38104 Braunschweig, Germany, ²Evolutionary Biology Dept., Faculty of Biology, M.V.Lomonosov Moscow State University, Leninskie Gory 1/12, Moscow 119992, Russian Federation, Helmut.Sternberg@t-online.de

Age and reproductive success in Western Siberian population of the Pied Flycatcher (*Ficedula hypoleuca*)

Since 2001 we have been studying a *F. hypoleuca* population near Tomsk (Western Siberia, Russian Federation; 56°20' N 84°56' E) in relation to reproductive success and adult age. Reproductive success was estimated as number of recruits produced by bird for local population. We analysed more than 2000 breeding attempts. During the study period more than 11000 nestlings were ringed, and more than 800 recruits were recaptured as breeders.

Pairs with one year old birds started to lay eggs on average 3 days later than older birds. The recruitment probability was negatively correlated with first egg laying date. Nevertheless, the number of recruits was not related to bird age, i.e. one year old birds and older ones produced same number of recruits if they were breeding on the same dates in the breeding season.

The possible reasons driving the disappearance of age related differences in reproductive success in this population are discussed.

C11**Stier, K., Spiess, M., Zollinger, J.-L. & Spaar, R.**

Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, kimstier@yahoo.de, martin.spiess@vogelwarte.ch

Important small-scale habitat structures for the Whitethroat *Sylvia communis*: a comparison of occupied and unoccupied habitats nearby

The Whitethroat *Sylvia communis* population has decreased severely in abundance and distribution in Switzerland, most probably due to changes in breeding habitats. Accordingly, the conservation strategy in Switzerland aims to improve the Whitethroats' breeding habitat.

This study focussed on the importance of small-scale habitat characteristics for the habitat selection of the Whitethroat. We compared occupied habitats with similar, but unoccupied habitats nearby. The Whitethroats established territories in either hedgerows or arable fields. For both habitat types, a total of 28 variables were tested for their effect on presence/absence in both habitats. In hedgerows, the occurrence of thorny shrubs and brambles and a higher proportion of arable land in the surroundings positively affected the occupation probability, whereas the width of the hedgerow margin and the proportion of grass showed a negative effect. Arable fields were selected for higher, denser and more heterogeneous vegetation. Arable

fields with plants and shrubs of the genera *Dipsacus*, *Tanacetum*, *Urtica*, *Solidago*, *Centaurea*, *Cirsium* and *Rubus* were preferred.

To improve breeding habitats of the Whitethroat in Switzerland, we recommend promoting brambles and thorny shrubs in existing hedgerows and planting such species in newly created hedgerows. Ideally, margins along hedgerows are herbaceous rather than grassy. The quality of arable land might be improved by tolerating *Dipsacus*, *Tanacetum*, *Urtica*, *Solidago*, *Centaurea*, *Cirsium* and *Rubus* plants or hedgerows along field margins.

S11

Strazds, M. & Grinblate, S.

Dept. of Zoology and Animal Ecology, University of Latvia, Kronvalda bulv. 4, Riga, LV-1010, Latvia, mstrazds@latnet.lv

Preliminary report about the impact of DDT and other pesticides on breeding success of Black Stork in Latvia

Long term data of Black Stork (*Ciconia nigra*) breeding success in Latvia show that the failure rate for 1993–2008 was significantly higher than for the 1979–1992 period; $Z = 3,492$, $p < 0.001$ (Mann-Whitney U test). Earlier studies have identified three major causes — disturbance by forestry activity, predator impact and food availability. However these causes did not explain the extent of variation nor growing increase of low breeding success.

In 2008 we addressed this issue by testing the possible impact of chore-organic pesticides on Black stork breeding success. We paid special attention to eggshells found under nests and collected all failed eggs. At least 14.7 % (32 of 217) of eggs laid appeared broken or unsuccessful. The sizes of collected eggs also indicated possible impact of pesticides — four of them in at least one of dimensions were smaller than any stork egg ever recorded. For reference we measured stork eggs collected prior to 1947 in museum collections in Riga, Stockholm and Tring ($n = 161$).

Analyses of DDT presence were carried out using the gas-liquid chromatography. DDT or its isomers were found in all eggs analysed in concentrations 0.163–5.768 $\mu\text{g/g}$. Since the most contaminated eggs were found in long known nests (21 and 19 years) we tested hypothesis if the breeding success in a nest changes during its lifetime. Data from 23 long know nests show “clear” decrease of productivity. Although this trend is not significant, it suggests that a decrease might be caused by accumulation of pesticides during the lifetime of birds.

We discuss two possible origins of DDT — Eastern Africa (wintering grounds of Black Stork), where it is used to combat malaria or other diseases or Europe, where illegal use cannot be excluded. We call on other countries and researchers for cooperation to solve this problem.

S17

Strubbe, D.^{1,2}, Graham, C.H.¹ & Matthysen, E.²

¹SUNY Stony Brook, Dept. of Ecology & Evolution, Stony Brook, NY 11794 USA, ²Evolutionary Ecology Group, Dept of Biology, University of Antwerp, 2020 Antwerp, Belgium, diederik.strubbe@ua.ac.be

Assessing the potential impact of invasive species on native biota: a case study on the invasion of Ring-necked Parakeets in Belgium

Understanding species interactions and predicting the impact of species invasions on native biota is one of the biggest challenges facing invasion ecologists. In Europe, Ring-necked Parakeets (*Psittacula krameri*) have been widely introduced, and their growing populations are raising concerns for the loss of native biodiversity, as they are known to compete with native cavity-nesters such as Nuthatches (*Sitta europaea*). Given this threat, we applied species distribution modelling to predict the potential impact of Ring-necked Parakeets on other species.

In Belgium, Ring-necked Parakeets currently occur only around Brussels, and we applied a regression model on a regional dataset of Parakeet and Nuthatch abundances to obtain a competition coefficient, quantifying the Parakeets' impact on Nuthatches. Spatially explicit predictions of potential Parakeet and Nuthatch abundance across Flanders were obtained using Boosted Regression Trees (BRT). Based on environmental variables that influence Parakeet abundance in its current range, we predicted Parakeet abundance across Flanders while Breeding Bird Atlas data were used to obtain region-wide predictions of Nuthatch abundance. The interaction between Parakeets and Nuthatches was then quantified by

superimposing their abundance maps and applying the competition coefficient, resulting in an estimate of the number of Nuthatches that will be lost when Parakeets have occupied all suitable sites.

Results show that there is ample suitable habitat for the parakeets to spread into, and that they could become one of Flanders most numerous cavity-nesters. However, the expected impact on Nuthatches is only moderate, with a maximum loss of $\pm 25\%$ of Nuthatch pairs, probably because Parakeets reach their highest densities in urban areas while Nuthatches prefer larger, more natural forests. This study highlights how species distribution modelling can be used to distinguish between invaders with minor effects and those with large effects, thus yielding crucial information for prioritization of management efforts.

C6

Sweeney, O.F.McD., Wilson, M.W., Kelly, T.C., Irwin, S. & O'Halloran, J.

University College Cork, Department of Zoology, Ecology and Plant Science, Cooperage Building, Distillery Fields, University College Cork, North Mall, Cork, Ireland, o.sweeney@ucc.ie

What differences exist between the bird communities of first and second rotation plantation forests?

Research on first rotation forests has demonstrated that the bird communities of non-native plantations change at different temporal stages of the forest cycle. However, when afforested areas are harvested and replanted, aspects of these forests will change. It is not yet clear whether, and to what extent, bird communities in the second rotation differ from those in corresponding stages of the first rotation. Such information is needed to evaluate the contribution of second rotation forests to bird conservation, and the likely responses of birds to an increasing proportion of second rotation forest in the landscape.

We conducted point transects in 20 first rotation and 20 second rotation plantation forests of four different age classes: Pre-thicket (<5yrs), Thicket (8-15yrs), Mid-rotation (20-30yrs) and Mature (30-50yrs). Point counts were of 50 metre radius and all birds heard and seen were recorded, and their distance from the observer estimated. We used *Distance* software to generate bird densities. We then compared the densities and species richness of first and second-rotation forests to determine changes in bird communities between rotations. Patterns in bird species assemblages were visualised using ordination, rank-abundance curves and indicator species analysis.

As bird communities of Mid-rotation and Mature forests were indistinguishable from one another, these forests were combined into a single age class. Communities in first and second rotations were broadly similar throughout the forest cycle. The greatest difference between rotations was in Pre-thicket forests, where both overall bird density and migrant bird density were significantly higher in the second rotation. Differences between rotations decreased as forests matured. This study suggests that the species likely to benefit from the different habitat conditions early in the second rotation are likely to be the more common ones in the regional species pool, and those to whom shrubby habitats are important.

C13

te Marvelde, L.¹, Webber, S.², Meijer, H.³ & Visser, M.E.¹

Netherlands Institute of Ecology (NIOO-KNAW), PO Box 40, 6666 ZG, Heteren, The Netherlands, ²Centre for Ornithology, University of Birmingham, Birmingham B15 2TT, UK, ³Faculty of Mathematics and Natural Sciences, Isotope Research — Centre for Natural Sciences and Technology, University of Groningen, The Netherlands, l.temarvelde@nioo.knaw.nl

The energetic costs of egg laying in early and late reproducing Great Tits

Due to increased temperatures in spring, the date of peak food availability has advanced over the past decades. Laying dates of Great Tits (*Parus major*) did advance in the Hoge Veluwe population (The Netherlands), but not sufficiently strong, resulting in directional selection for birds that lay early. Variation in laying date among females may be due to their sensitivity for temperature but, alternatively, there may also be variation in how much females are constrained in their laying date. Only females of high quality, or those breeding in high quality habitat, are able to reproduce early as egg laying is costly and the earlier birds lay, the harsher the conditions will be. It has been shown that daily energy expenditure (DEE) during egg laying increase when it is colder. This relation between temperature and DEE may be different for early and late reproducing females, which might explain why late females are not able to lay earlier. To test this, we compared daily energy expenditure of early and late laying free living females under identical weather conditions using the Doubly-Labeled-Water technique. We compared the DEE of the day the birds laid

either their 4th or 8th egg and compared the DEE of different females on the same day. DEE increased under colder conditions, but the amount of energy that females spent on a given day did not differ between early and late females. Our approach is valid as the DEE of the same female on the day she produced her 4th or 8th egg depended on temperature in the same way as for the across female data, demonstrating that the costs of eggs early and late in the laying sequences are the same, as expected for an income breeder. Our results show that variation in the energetic cost of egg production cannot explain variation in laying date among females. Early laying is expensive but may be traded off against the costs during chick feeding, as early breeders are better matched with the food peak and therefore will have to work less hard to feed their chicks.

From most of the females of which we have DEE data during egg laying, we also have DEE during chick rearing. We have just received the DLW data from the chick rearing phase, but had no chance to analyse it yet. I will also present the link between DEE during egg laying and chick rearing of the same individuals during the presentation

S15

Trierweiler, C.^{1,2,3}, Drent, R.H.¹ (†), Exo, K.-M.², Komdeur, J.¹, Bairlein, F.² & Koks, B.J.³

¹Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, P.O. Box 14, 9750 AA Haren, The Netherlands ²Institut für Vogelforschung "Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany, ³Dutch Montagu's Harrier Foundation, P.O. Box 46, 9679 ZG Scheemda, The Netherlands, C.Trierweiler@rug.nl

Autumn migration routes and migratory connectivity of European Montagu's Harrier (*Circus pygargus*) populations – results from satellite tracking

Satellite-tracked Montagu's Harriers (*Circus pygargus*) from breeding populations in the Netherlands, Germany, Denmark, Poland and Belarus use three pathways through the Mediterranean on autumn migrations (2005–2008): via Spain, Italy or Greece. The latter pathway is a new discovery. Migratory connectivity was high: longitudinal distribution of birds in the breeding areas was mirrored in the wintering area. However, NW-European breeding birds migrating via Italy wintered closer to central European breeding birds (on average 740 km) than to NW-European breeding birds migrating via Spain (1,680 km). Despite the segregation of breeding and wintering areas, there is some overlap in wintering areas of individuals from NW and central Europe, as well as a certain proportion of (female) breeding dispersal within the NW and central European breeding ranges. The complete migratory period covered c 42 days, including 2–3 stopovers of 6–7 days each. Consequently, 30 % of the migratory period was spent on stopovers, much less than shorebirds or passerines (up to 90 %). This may be related to a different strategy of the Harriers with respect to body reserves. Average daily rates of travel increased between the breeding areas and the Mediterranean. A peak (260 km/day) occurred above the Mediterranean Sea, followed by slower rates in N-Africa (110 km/day). Above the Sahara desert, highest rates occurred (270–340 km/day), decreasing gradually until the birds reached the wintering grounds. Low rates did not only result from increased stopover time, but also from slow travel days. On most latitudinal segments, migratory directions did not differ significantly between the three routes.

S5

Vabishchevich, A.P.

Moscow State University (Department of Vertebrate Zoology, Faculty of Biology), 119899, Leninskiye Gory 1/12, Moscow, Russia, vas.ka@list.ru

Variability of the Pied Flycatcher's (*Ficedula hypoleuca*) song in an eastern zone of sympatry with the Collared Flycatcher (*F. albicollis*)

In the sympatry zone many males of *Ficedula hypoleuca* perform songs that resemble those of a sibling species (*F. albicollis*): these are so-called mixed songs. This type of vocalization is non-adaptive within the bounds of Mayr's Biological Species Concept since it leads to hybridization and partly sterile offspring and a decrease in the fitness of parents. The numerical superiority of *F. albicollis* was formerly considered a possible cause of mixed singing. We studied the influence of *F. albicollis* on the interpopulation song variability of *F. hypoleuca*. Four local areas where the density of *F. albicollis* differs were chosen. We focused on: 1) the abundance of mixed singers and their distribution; and 2) geographical variations of typical *F. hypoleuca*.

We show for the first time that mixed singing in *F. hypoleuca* is common also when their densities are as high as and higher than that of *F. albicollis*. At the same time, mixed singers were concentrated in areas of local distribution of *F. albicollis*. With reference to our data we propose a hypothesis of mixed song-formation. We suggest that the final variant of *F. hypoleuca*'s repertoire is developed from year to year and is partially determined by contacts with neighbours. If there are *F. albicollis* males, one may expect the development of mixed songs (if the Collared Flycatcher song was imprinted along with the interspecific song).

We have also shown seasonal and geographical variability in the tempo of pure songs of *F. hypoleuca*, with song tempo increasing when the density of *F. albicollis* rises. This pattern is in agreement with the theory of character displacement and acoustic divergence in a sympatry zone, but presumably the differences discovered in pure vocalization are not the result of interactions with the sibling species.

S5

Väli, Ü., Dombrovski, V., Treinys, R., Bergmanis, U., Daróczy, S.J., Dravecky, M., Ivanovski, V., Lontkowski, J., Maciorowski, G., Meyburg, B.-U., Mizera, T., Zeitz, R. & Ellegren, H.

Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Riia 181, EE-51014 Tartu, Estonia, ulo.vali@emu.ee

Widespread hybridisation with the Lesser Spotted Eagle threatens the Greater Spotted Eagle in Europe

Hybridisation is a significant threat for endangered species and could potentially even lead to their extinction. This concern applies to the globally vulnerable Greater Spotted Eagle *Aquila clanga*, a species that co-occurs, and potentially interbreeds, with the Lesser Spotted Eagle *A. pomarina* in a vast area of Eastern Europe. We studied hybridisation and introgression in 14 European spotted eagle populations using genome-widely developed single nucleotide polymorphism and microsatellite markers. We show that too low resolution power of used markers may seriously affect the result and appropriate set of markers is essential for successful hybrid identification. We detected asymmetrical hybridisation, prevalent between *A. pomarina* males and *A. clanga* females, as well as introgression to the more common *A. pomarina* in most of the sympatric regions studied. However, such a pattern was not as obvious in regions where *A. clanga* is still numerous. In the course of nine years of monitoring of a mixed population in Estonia, we observed temporary hybridisation, abandonment of *A. clanga* breeding territories and the replacement of *A. clanga* pairs by *A. pomarina*. Although the total number of Estonian *A. clanga* x *A. pomarina* territories was twice as high as that of *A. clanga* pairs, the annual numbers were approximately equal, which suggests a higher turnover rate in interbreeding pairs. This study shows that interspecific introgressive hybridisation occurs rather frequently in a spotted eagle hybrid zone with a width of at least 1700 km; it poses an important threat for the vulnerable *A. clanga* and may contribute significantly to the extinction of its populations.

S17

van Horssen, P. & Poot, M.

Bureau Waardenburg, Ornithological Department, Varkensmarkt 6, Culemborg, Netherlands, p.w.van.horssen@buwa.nl

Large-scale mapping of seabird densities on the North Sea

Mapping of seabird densities on the Dutch part of the North sea is done with regression kriging. The high resolution, high quality bird density estimates are used for population estimates and environmental impact assessment studies at sea. For both applications examples are presented. Due to the lack of ecological data like food availability, proxy variables are used as explanatory variables. These are usually static (easy to obtain) variables like distance to coast, distance to colony and depth. Here we show that the explanatory power of the method is greatly enhanced if we include (derivatives of) sea surface temperature as explanatory variables in the analysis. Sea surface temperature is modelled, but also gradients of temperature change as proxy for marine fronts. Weekly mean sea surface temperature on a 4x4 km grid are combined with the seabird measurements. The study shows that dynamic explanatory variables for the prediction of seabird distribution are better proxies than static variables. Results, assumptions, drawbacks and potential pitfalls of the method are discussed.

C6**van Noordwijk, A.J.***Netherlands Institute of Ecology, Boterhoeksestraat 48, 6666GA Heteren, The Netherlands,
a.vannoordwijk@nioo.knaw.nl***Lessons from a mirror image source sink system in Great and Blue Tits: the role of habitat outside the forest**

Data from long term population studies of Great Tits (*Parus major*) and Blue Tits (*Cyanistes caeruleus*) on the island of Vlieland show that there are two sub populations of each species. These sub-populations show persistent source sink characteristics. However, although these species are ecologically similar, the source sink systems are a mirror image.

I will discuss several hypotheses. Habitat differences in the forest are not a likely cause since there is much more variation within than between the two areas. Moreover, the forest has changed considerably over time, while the source sink system has remained constant. Competition between the species is also not a likely candidate. The extensive use of reed-beds by Blue Tits in autumn and the distribution of reed-beds on the island seems currently the best explanation for the observed source sink dynamics in two bird species that are considered to typical forest birds.

C14**Van Overveld, T.***University of Antwerp, Evolutionary Ecology Group, Groenenborgerlaan 171, BE-2020 Antwerpen, Belgium,
thijs.vanoverveld@ua.ac.be***Personality and spatial behaviour in relation to food-manipulations in juvenile Great Tits (*Parus major*)**

It is generally assumed that personality differences measured under standardized lab-conditions reflect differences in the way individuals cope with spatio-temporal changes in their natural physical or social environment. Few attempts, however, have been made to reveal how these personality differences are expressed in the field, despite increasing evidence showing that variation in personality may indeed have important ecological consequences in terms of fitness and dispersal. In order to gain a better insight in the underlying behavioural mechanisms of personality differences under natural conditions, we experimentally investigated whether personality (as measured by exploratory behaviour in a novel environment) predicts differences in spatial behaviour/routines in a natural population of Great Tits (*Parus major*). Our experiment was based on laboratory-experiments, suggesting that in Great Tits fast-exploring (FE) and slow exploring (SE) individuals differ in their way of using environmental information, with FE being superficial explorers that more readily develop routines and SE being thorough explorers that are flexible towards environmental changes. In two consecutive summers we manipulated the availability of artificial food at feeding stations and recorded the behaviour of juvenile Great Tits before, during and after the food-manipulations using radio-tracking (spatial behaviour) and PIT-tags (detailed pattern of feeder visits). We found no evidence for personality differences in spatial behaviour or use of feeders when food was present. However, when birds were challenged by an abrupt change in food-supply, FE more rapidly switched to different foraging areas and at longer distances from the feeder. We found no differences in return visits to the empty feeder nor in home-range size between FE and SE. Overall, this study provides evidence for a relationship between personality and patterns of spatial behaviour and suggests that individuals of different personality may follow different foraging-strategies when facing changes in food-availability.

C9**Vibanc, V., Mathien, A. & Groscolas, R.***Département Ecologie, Physiologie et Ethologie, IPHC, UMR 7178, 23 rue Becquerel, 67087, Strasbourg, France, Vincent.vibanc@c-strasbourg.fr***Comfort behaviour incurs substantial energy cost in breeding-fasting King Penguins, *Aptenodytes patagonicus*.**

Birds may allocate a significant part of time to comfort behaviour (e.g. preening, stretching, etc.) in order to maintain plumage waterproofing, to eliminate parasites and, possibly, to reduce muscular contraction. Discussions on the adaptive value of comfort behaviour may benefit from knowledge of energetic costs the animal is willing to pay for this behaviour, particularly in situations of energy constraints, e.g. during food shortage. We determined time and energy devoted to comfort activities in freely breeding King Penguins, seabirds known to fast for up to one month during incubation shifts ashore. A time-budget was estimated from focal observations and energetic cost of comfort activities were calculated from the associated increase in heart rate (HR), using a previously determined equation relating HR to energy expenditure. We found that incubating birds spent 14 % of the 24 hrs day for comfort behaviour (with no differences between day- and night-time) mainly devoted to preening (75 %) and body shaking (16 %). The average energy cost of comfort behaviour, i.e. energy expended in excess to resting metabolic rate, was 58 kJ/hr. Costs varied greatly among various types of comfort behaviour, e.g. from 18 kJ/hr for preening to 180 kJ/hr for flipper beating associated with stretching. Comfort behaviour contributed for 7 % to total daily energy expenditure, with preening contributing for 1-2 % and flipper beating plus stretching for 2-3 %. Thus, long-term fasting king penguins allocate a substantial part of their energy to comfort behaviours. This suggests that not only plumage waterproofing, but also maintenance of a functional musculature (through stretching, flipper beating and shaking) are required and must be paid ashore, for the penguins to be efficient divers and foragers as soon as they go back to sea for restoring energy reserves.

S8**Vögel, M., Laiolo, P., Serrano, D. & Tella, J.L.***Estación Biológica de Doñana, Department of Conservation Biology, c/ Américo Vespucio, s/n, E-41092 Sevilla, Spain, matthias@ebd.csic.es***Who are we sampling? Apparent survival differs between methods in a secretive species**

Survival is a fundamental parameter in population dynamics with increasing importance in the management and conservation strategies of wildlife populations. Survival probability in vertebrates is usually estimated by live-encounter data obtained by means of physical mark-capture-recapture protocols. Non-invasive acoustic marking relying on individual-specific features of signals has been alternatively applied as a marking technique, especially in secretive species. Nevertheless, to date no research has compared survival rate estimates obtained by acoustic and physical marking. We estimated half-yearly and annual survival and recapture rates of a secretive and threatened passerine, the Dupont's Lark *Chersophilus duponti*, using two separate live-encounter data sets of males collected simultaneously by physical and acoustic marking in the same study area. The separate analysis of both methods led to different model structures, since transient individuals had to be accounted for in the acoustic marking but not in the physical marking data set. Furthermore, while re-encounter probabilities did not differ between methods, survival estimates employing physical marking were lower than those obtained acoustically, especially between the post-breeding and the breeding period when the apparent survival of colour-banded birds was twice as low as for acoustic marking. The combination of marking methods suggested the existence of different subsets of individuals differentially sampled within the population: whereas colour-banded males seemed to represent the territorial fraction of the population, both resident and floater individuals were probably detected by acoustic marking. Using traditional mark-recapture methods exclusively could have misled our estimates of survival rates, potentially affecting prospective predictions of population dynamics. Acoustic marking has been poorly applied in mark-recapture studies, but might be a powerful complement to obtain accurate estimates of fundamental demographic parameters such as survival and dispersal.

C11**von Post, M., Olsson, O. & Smith, H.G.***Lund University, Ecological Institution, Department of Animal Ecology, Ecology building, SE-223 62 Lund, Sweden, Maria_von.post@zooekol.lu.se***Is the decline of the *Passer domesticus* caused by reduced farmland heterogeneity?**

Swedish farmland bird populations have declined for decades, reflecting similar trends throughout northern Europe. These declines have been attributed to agricultural intensification. The House Sparrow, *Passer domesticus*, has declined by more than 50 % in Sweden during the last decades. The changes in farming and building techniques, pesticide use, landscape changes, and several other aspects connected to our cultural development during the last decades has had a strong effect on the house sparrows population development.

During the spring of 2008, an inventory was performed in the farmland of Scania in southern Sweden. Approximately 200 farms in areas with different intensification of agriculture and production (crop/animal/mixed farming) were investigated to determine presence and density of house sparrows. In our preliminary results we found a significantly higher occurrence of House Sparrows on farms in areas with higher heterogeneity and mixed farming than on farms in areas with high intensification and specialisation. These results show that heterogeneity and agricultural land-use is of importance for the occurrence of House Sparrows. We are presently performing additional analyses to determine at what spatial scales (farmstead, surrounding fields, landscape) variation occurs that affects the distribution of House Sparrows. We are now establishing colonies of House Sparrows on farms in landscapes with different values of heterogeneity. We will monitor these colonies and collect data on the aspects that influence population demographics. We will report results from the first field season.

C6**Vera, P.¹, Belda, E.J.², Encabo, S.I.¹, Kvist, L.³ & Monrós, J.S.¹**

¹"Cavanilles" Institute of Biodiversity and Evolutive Biology, Universitat de València, Apartat Oficial 2085, E-46071 Valencia, Spain, ²IGIC, Universidad Politécnica de Valencia, Carretera Nazaret-Oliva s/n, E-46730, Gandia, Spain, ³Department of Biology, University of Oulu, Finland, pablo.vera@uv.es

Predictive habitat models as a key to assist the management of endangered *Emberiza schoeniclus witherbyi*

Species' distribution predictive models are supposed right now as one of the most interesting tools in habitat selection and biodiversity analysis. Practical applications of these models show their usefulness, in special in the assessment of conservation and management of threatened or endangered species. However, their use in modelling distribution patterns and habitat selection in fragmented areas is not extended as other uses in the scientific literature. The Iberian Reed Bunting *Emberiza schoeniclus witherbyi* is catalogued as "Endangered" in the Spanish Bird Red List, with a reduced population (254–360 breeding pairs) highly fragmented in several lagoons and marshes in the Centr and East of the Iberian Peninsula (SW Europe). Generalized Linear Models were implemented to explain the current distribution and predict the presence or absence of *E. s. witherbyi* in Iberian Peninsula. Obtained models were based exclusively in vegetation variables, with no interest in non biotic variables. The most parsimonious model from the obtained set using an additive step-to-step method has in consideration parameters related to reed and rush-reed mixed formations (considered as well as emergent vegetation). Our results show that *E. s. witherbyi* selects those lagoons with high occupation of reed as dominant vegetation (with other elements present in minority) and high perimeter of the rush-reed patches. Iberian wetlands management must work in this way, encouraging these specific-vegetation parameters in order to reach *E. s. witherbyi* habitat fitness, and so on to the creation of a positive scenario in the recovery plans of this endangered species.

S12**Voříšek, P.¹, Škorpilová, J.¹, Klvaňová, A.¹, Van Strien, A.² & Gregory, R.D.³**¹Pan-European Common Bird Monitoring, Czech Society for Ornithology, Na Bělidle 252/34, CZ-150 00 Prague 5, Czech Republic, ²Statistics Netherlands, P.O. Box 24500, 2490 HA The Hague, The Netherlands, ³Royal Society for Protection of Birds, The Lodge, Bedfordshire, SG19 2DL Sandy, United Kingdom, euromonitoring@birdlife.cz, asin@cbs.nl, richard.gregory@rspb.org.uk**Pan-European Common Bird Monitoring Scheme: using bird monitoring and science at European scale**

The Pan-European Common Bird Monitoring Scheme (PECBMS) aims to use common bird species as indicators of the general state of biodiversity in Europe. The scheme collates data from annually operated national breeding bird surveys spanning different periods in more than 20 European countries. The PECBMS produces regularly so called 'wild bird indicators', which are used by policy makers as official biodiversity indicators in Europe. The Farmland Bird Indicator has been adopted by the EU as a Structural Indicator and Indicator of Sustainable Development and the Wild Bird Indicator has been incorporated in the set of indicators to assess progress towards the European target of halting biodiversity loss by 2010. The regional and European trends and indices have been produced via combination of national indices weighted by national population size of each species instead of using raw data from heterogeneous schemes. The PECBMS seeks also to improve quality of its source data, i.e. national monitoring schemes through e.g. provision of tools for data processing and data quality control. Further issues considered for improvements include detectability or potential use of monitoring data for production of distribution maps. Great piece of experience and good practice was summarised in a publication 'A best practice guide for wild bird monitoring schemes' published in 2008. Although methods and results were published in scientific papers, a potential for further use of European trend datasets is bigger and new challenges, e.g. climate change have been explored.

C8**Vrezec, A. & Vrh Vrezec, P.**

National Institute of Biology, Vecna pot 111, SI-1001 Ljubljana, Slovenia, al.vrezec@nib.si

Heterospecific response rate to the playback in sympatric competitive predators, Ural (*Strix uralensis*) and Tawny Owls (*Strix aluco*)

Territorial owls can perform territorial activity towards conspecific as well as heterospecific owl invaders. Interspecific territoriality can therefore be a good indicator of interspecific competition between sympatric owl species. One of the easiest ways to determine the interspecific territoriality in owls is to compare conspecific and heterospecific response rate to playback. We tested the interspecific territoriality between sympatric Ural (*Strix uralensis*) and Tawny Owl (*Strix aluco*), for which severe competitive exclusion was established in some previous studies. We performed playback experiments in territories of the Ural and Tawny Owls on Mt. Krim (central Slovenia) during spring and autumn. We measured the response rate of the Ural and Tawny Owl on the broadcast territorial song of the male of the Ural and Tawny Owl, and additionally to playback of the Tengmalm's Owl (*Aegolius funereus*), as a response to smaller sympatric competitor, and to playback of the Great Grey Owl (*Strix nebulosa*), which is not breeding in Slovenia. The last was used as a control and considered as a non-territorial response to a disturbance. Ural Owl territorial vocal activity was very low since conspecific response rate reached only 34 %, while Tawny Owl's response rate was 65 %. However, in the analysis we confirmed that Ural Owl was interspecific territorial towards smaller sympatric competitors Tawny and Tengmalm's Owl. Tawny Owl did not show interspecific vocal defence activity against Ural and Tengmalm's Owl. Lack of a response to the playback of a larger competitor could be due to an increased predation risk. We suspected that Tawny Owl did not respond to the broadcast of smaller competitor, the Tengmalm's Owl, not to scare away a potential prey. According to our results we suggest that high rate of habitat segregation between Ural and Tawny Owl is caused by asymmetric interspecific territoriality.

S6**Wesołowski, T.¹ & Fuller, R.J.²**¹*Department of Avian Ecology, Wrocław University, Sienkiewicza 21, Poland,;* ²*British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, UK, tomwes@biol.uni.wroc.pl, rob.fuller@bto.org***Spatial variation in habitat use by birds at the European scale**

The perceived strong coupling of habitats and birds is widely used in ornithology. Examples include mapping bird distributions using habitat features as proxies; preparation of conservation/ management plans; predicting distributional shifts in response to climate change; and the reconstruction of prehistoric environmental conditions. Validity of all these applications critically depends on an underlying assumption that relationships between habitat and birds are immutable, or their variation across space and time is so insubstantial that it can be ignored. We challenge this assumption. First we summarise the known extent of geographic variation in patterns of avian breeding habitat use that is evident at different scales of spatial resolution across Europe. After demonstrating that spatial variation in patterns of habitat occupancy is widespread, and that geographical differences in occupied habitats are often substantial, we conclude that these differences cannot be ignored in many large-scale applications. They have to be more rigorously accounted for in analyses attempting to extrapolate local data on current habitat/bird relationships to situations far removed in space. Similar arguments apply to extrapolation across large intervals of time. We conclude with a brief review of the mechanisms that could underlie observed spatial variation in habitat use.

S1**Willis, S.G.***School of Biological and Biomedical Sciences, Durham University, South Road, Durham, Co. Durham, DH1 3LE, UK, s.g.willis@durham.ac.uk***Observed recent changes and modelled future changes in European bird ranges and populations as a result of climatic change**

Recent climatic change is already causing changes in species ranges and populations across many taxa and is projected to continue to cause pronounced shifts in range margins, and consequently population sizes in regions, during the current century. Here I show that recent recorded changes in populations of European birds can be related, in part, to climatic change and that the phenomenon is more common than we currently perceive. I will also demonstrate how we can use 'climate-envelope' models to construct an indicator of climate change impacts for European bird populations in order to summarise how species are responding to ongoing climatic change. Finally, I will examine the potential for turnover of birds in European protected areas as a consequence of projected future changes in climate.

S7**Wilson, M. W., O'Mahony, B., Dell'Omo, G., Irwin, S., Kelly, T. C. & O'Halloran, J.***PLANFORBIO Research Programme, Dept. ZEPS, University College Cork, Enterprise Centre, Distillery Fields, North Mall, Cork, Ireland, mark.wilson@ucc.ie***GPS tracking of Hen Harriers (*Circus cyaneus*) using a novel system combining VHF and GPS**

The Hen Harrier is threatened across much its range, and efforts to protect this species rely heavily on knowledge of its ecological requirements. Because males provide the majority of food for both females and chicks, the availability of suitable habitat for hunting males is critically important in determining the success of Hen Harrier nesting attempts. Previous studies on foraging Hen Harriers have used direct observation to derive time budgets, or have followed Hen Harriers using VHF radio tracking. The first method yields very little data per unit effort, while the spatial accuracy of VHF tracking is insufficient to allow analysis of fine-scale habitat associations. This paper describes a method for studying the foraging ecology of breeding male Hen Harriers using miniaturised GPS loggers. Males are captured on their breeding territories, and fitted with harnessed backpacks containing a GPS datalogger and a VHF tag. The GPS collects detailed positional data over the week following its deployment. The attaching harness system is designed to detach after a period of 1-2 weeks, and is subsequently retrieved by homing in on the VHF tag. This system of

detachment and retrieval provides a low-cost method for deploying GPS units on small animals (<0.5 kg) that cannot be reliably recaptured. We describe the operation of this system and provide preliminary results from this year's field season.

S1

Zalakevicius, M. & Stanevicius, V.

Institute of Ecology of Vilnius University, Akademijos 2, LT-08412 Vilnius, Lithuania, zalakevicius@eko.i.lt

Can recent strategies of bird diversity conservation be effective in future in the face of increasing impact of climate change?

It is obvious that recent conservation strategies are not adapted properly to climate change induced impacts on biological diversity. In the process of designation and creation of the protected territories and their incorporation into the NATURA 2000 network the climate change factors are not taken into consideration. The existing system of protected territories under the impact of rising cold period air temperature and declining of warm period precipitation affecting birds through both successive overgrowth of breeding and feeding habitats and the changes in ground-water table and soil moisture, timing of ice cover scale and duration of spring floods becomes not effective. Consequently, some of the protected territories are becoming irrelevant. No management plans and measures will help the species of the southern edge of the species range when their survival is threatened by global pressure. In this case the predicted future decline in species will not be stopped. These changes reveal new urgent practical problems at the science-policy interface. We have to learn to forecast future conditions in the protected areas and to create specific conditions optimal for species survival. It should be attempted that the new protected areas would be located in the northernmost or at least central part of species distribution range. The presentation introduces a new approach to threats faced by birds and a new vision of their protection, stressing the importance of the knowledge of species-specific ecology of habitat selection, the migratory status of breeding birds, the populations' location within the entire species range as well as the trends and scope of the regional climate change in designing effective measures and ways of bird protection. The existing gaps in the information on the climate change impact on bird distribution, abundance and various stages of bird life cycle are still topical and require further research.

C12

Zavalaga, C., Halls, J., Taylor S., Mori, G. & Dell'Omo G.

Pro-dolphinus, Av. Guardia Chalaca 1333, Callao 1- Callao, Peru, cbz3724@alum.uncw.edu

At-sea movement patterns and diving behavior of Peruvian Boobies *Sula variegata* in northern Peru

We used GPS-loggers and depth-meters to characterize the foraging behavior of the sexually dimorphic Peruvian Booby (*Sula variegata*, females 19 % heavier than males) on two islands in northern Peru. Birds foraged only during daylight hours, 1–3 times a day of short duration (median 1.8 h). They fed exclusively on anchovies (*Engraulis ringens*), which were captured in shallow dives (median 2.5 m), and with a median high rate of 11 dives/h. The foraging range varied between 4.5 and 68 km (median 25 km), whereas the total distance travelled in the foraging path ranged from 14 to 179 km (median 69 km). Foraging areas were located 1–67 km from the colonies (median 21 km). Birds returned to the same feeding areas in subsequent trips, and within a day, the orientation of flights was similar among birds that departed at the same time of the day. There were no sex-specific differences in 13 of 15 variables involving timing of foraging, movement patterns, at-sea activities, home range and foraging areas. However, females dived slightly deeper and spent a larger proportion of the foraging time sitting on the water. The results of this study suggest that (1) the foraging behavior of Peruvian boobies markedly contrast with that of tropical boobies as a result of the proximity and predictability of food sources, high energetic demands of the brood (up to 4 chicks), and higher prey encounter in the Peruvian coastal upwelling system, and (2) the lack of spatial segregation between females and males may be related to the attraction of birds from both sexes to conspicuous multi-species feeding aggregations that are regularly formed in areas close to the booby colonies. Once the foraging patches are localized, females dive slightly deeper as a result of passive mechanisms associated with a heavier mass.

C3**Zehtindjiev, P.¹, Dimitrov, D.¹ & Bensch, S.²**¹*Institute of Zoology, Bulgarian Academy of Sciences, Blvd. Tzar Osvoboditel 1, Sofia 1000, Bulgaria,* ²*Lund University, Pavel.zehtindjiev@gmail.com***Bird - Malaria interactions in experimental infections: fitness and specificity**

Little is known about the development of infection and specificity of malaria parasites of the genus *Plasmodium* in wild birds. We used *Plasmodium ashfordi* (GRW2 cyt.b lineage) and *Plasmodium relictum* (GRW4 cyt.b lineage), to monitor changes in intensities of parasitemia in captive Great Reed Warblers (*Acrocephalus arundinaceus*) from summer to spring. *Plasmodium (Haemamoeba) relictum* is a wide spread parasite registered all over the world with transmission in North America, Central Africa and South Asia. *Plasmodium ashfordi* has not been recorded in juvenile birds in Europe. It is likely that transmission takes place mainly when overwintering in Africa. It is probable that the parasite is present in warblers returning from their African winter quarters in the Palearctic. The experiment demonstrated that *P. ashfordi* and *P. relictum* lineages differ substantially in several life-history traits and that individual hosts show substantial differences in responses to these infections. The intensity of parasitemia of lineages in mixed infections co-varied positively, suggesting a control mechanism by the host. The intensity of parasitemia for individual hosts was highly repeatable suggesting variation between the host individuals in their genetic or acquired control of the infections. The same parasites were studied concerning their specificity. We predicted that if the absence of the appropriate vector(s) is the limiting condition the infection will be successfully developed in experimental birds. We have tried to develop experimentally two species of avian malaria – *P. relictum* (GRW4 cyt.b lineage) in House Sparrow (*Passer domesticus*) and *P. ashfordi* (GRW2 cyt.b lineage) in House Sparrow, Tree Sparrow (*Passer montanus*) and Song Thrush (*Turdus philomelos*) at the Kalimok Biological Station, NE Bulgaria. Results of our experiment indicate difference in specificity of Afro-European and American GRW4 lineages of *P. relictum*. It is also demonstrated that the newly described African species *P. ashfordi* can be highly specific concerning local bird species in temperate zone of Europe.

C14**Zimmer, C., Boos, M., Robin, J-P. & Petit, O.***Institut Pluridisciplinaire Hubert Curien, Département Ecologie Physiologie Ethologie, UMR 7178 CNRS/ULP, 23 rue Becquerel, 67087 Strasbourg Cedex 2, France, cedric.zimmer@c-strasbourg.fr***Optimal behavioural adjustment to environmental pressure: an experimental study**

Any bird has to deal with environmental perturbations. The primary and the most sensitive response of such perturbations is a behavioural modification. This behavioural response could be affected by the priorities they assign to different activities. The aim of this experimental study was to determine whether captive Mallards (*Anas platyrhynchos*) can adjust their behaviour in response to an imposed high disturbance level. Two groups of Mallards (G1, G2) maintained in outdoor aviaries were intensively disturbed (respectively 2x15 and 4x20 min daily) at one-month intervals during one-week sessions with a radio-controlled car. Foraging, preening, sleeping and vigilance behaviour together with body mass and food intake were recorded throughout the week before, during and after disturbance sessions. Disturbed groups were compared to a control group (undisturbed). Behaviour of control group did not change all along the three weeks period. Conversely, all behaviours were modified during the week of disturbance in both treatment groups. During this week, preening was lower in G1 than in control group. Vigilance was lower in G2 than in G1 and control group. Sleeping increased in G1 and G2 compared to control group. Moreover, foraging was lower in both disturbed groups than in control birds. Although provided *ad libitum*, food intake decreased in disturbed groups and became lower than in control birds until day 4 of disturbance. Body mass loss was similar in G1 and G2. To summarize, disturbed Mallards adjusted their foraging behaviour and their food intake in order to strategically reduce their body mass. This regulation improved their escape flight capabilities (lower wing loading). Disturbed birds increased the sleeping duration and reduced vigilance probably to compensate for the energetic costs associated to the high frequencies of take-off flights (40–120/ind/day) and their voluntary limited reduction of food intake.

C8**Zimmer, I.¹, Ropert-Coudert, Y.¹, Kato, A.¹, Ancel, A.¹ & Chiaradia, A.²**¹Institut Pluridisciplinaire Hubert Curien, DEPE-CNRS, 23 rue Becquerel 67087 Strasbourg, France, ²Research Department, Phillip Island Nature Park, Po Box 97, Cowes, Victoria, 3922, Australia, izimmer76@gmail.com**Experience in Little Penguins (*Eudyptula minor*): Is there a better age to forage?**

The link between environmental conditions and population trends of marine predators is an important parameter in climate change studies. Indeed, relating foraging effort to breeding effort of free-ranging animals allows researchers to investigate the environmental conditions that control individual reproductive success and, therefore, the population trends.

Recent studies on seabirds foraging and breeding activities revealed substantial individual variability in foraging and breeding strategies. These suggest that not only sex and body condition influence the breeding effort/success ratio, but also age and/or experience (defined here as the accumulation of knowledge that would enhance foraging and breeding activities over time) of an animal. While it is known that breeding success of penguins is influenced by their age and breeding experience, there is little information on how these factors affect the foraging performances of birds. Yet, chick provisioning is closely dependent on foraging success at sea. Advances in this domain are constrained by both lack of information on the age and breeding history of birds, and the difficulties of monitoring their at-sea activity with enough precision to obtain not only the foraging success but also the availability of the resource.

Our study aims at addressing these issues on Little Penguins (*Eudyptula minor*) from Phillip Island, Australia, using one of the few existing long-term databases on penguin breeding colonies. We examined the influence of individual quality (age/experience) on foraging and breeding strategies of little penguins so as to understand the processes that may control their reproductive success. To this aim, we combined two approaches: i) breeding chronology recorded by an automated penguin monitoring system (APMS); and ii) data of at-sea foraging activity recorded by miniature data loggers on individuals of known-age, sex and breeding history.

C3**Zoratto, F., Chiarotti, F., Santucci, D., Alleva, E. & Carere, C.**Section of Behavioural Neurosciences, Department of Cell Biology and Neuroscience, Istituto Superiore di Sanità, Viale Regina Elena 299, I-00161 Rome, Italy, francesca.zoratto@iss.it**Aerial hunting behaviour and predation success by Peregrine Falcons (*Falco peregrinus*) on Starling flocks (*Sturnus vulgaris*)**

Predators use diverse hunting strategies, which have coevolved to maximise hunting success, while prey adopt anti-predator strategies to maximize escape chances, leading to a co-evolutionary arms race, among which flocking, communal roosting, and the related collective responses are a common pattern in gregarious species. However, little attention has been given to predation strategies and predation performance on these species. We focused on the predation behaviour of Peregrine Falcons (*Falco peregrinus*) on Starlings (*Sturnus vulgaris*), a highly gregarious species, in proximity of two winter urban roosts in order to describe and quantify the aerial hunting strategies in relation to predation success. A total of 329 hunting sequences, with an overall success of 23% were recorded. They usually consisted of several attacks, predation success being higher when hunting sequences lasted less than 1.5 min, included less than 3 attacks and no other falcons were hunting simultaneously. Predation success was higher when hunts were directed on singletons than when directed on flocks (63.6 % vs 18.8 %). However, most hunting sequences (93.3 %) were directed on flocks. Nine hunting strategies directed to flocks were identified. The most frequent was the “surprise attack” (19.8 %), which was also the most successful (5.8 %). We interpret the common and successful use of this strategy to minimize the amount of anti-predator displays by flocks and to economize energy spent hunting. The persistence of hunting behaviour on flocks could be due to the effect of the supernormal stimulus represented by thousands of starlings engaged in aerial displays. Since predator presence was regular at the communal roosts and did not seem to affect the prey population, both parts could have reached a “mutual local optimum”, with predators able to get daily amounts of food and preys being buffered by the dilution effect and the other advantages of collective behaviours.

Workshops

Kwak, R.

*Vogelbescherming Nederland (BirdLife Netherlands), PO Box 925, 3700 AX Zeist, The Netherlands,
Robert.kwak@vogelbescherming.nl*

Conservation of Birds in Urban Environments – experiences from practice

BirdLife International invites interested people to a workshop on the Conservation of Birds in an Urban Environment. The workshop is moderated by BirdLife Netherlands and the BirdLife International Group on Urban Birds.

The aim of the workshop is to share experiences and ideas on bird conservation in the urban environment. [strong request: be so kind not use the workshop as a platform for discussion on the pro's and contra's of urbanisation].

The Dutch example:

Since 2004 BirdLife Netherlands runs a programme on the conservation of Urban Birds. One main immediate cause was the fact that the House Sparrow became one of the new birds put on the Dutch Red List in that year.

The programme constitutes of two main pillars:

- peoples awareness
- conservation measures

Peoples awareness

The peoples awareness points at the notion that birds are everywhere; also in everyone's vicinity and that people actually can help bird individually.

This is nourished with Public Campaigns like:

- Nationwide garden bird count
- Arrival of summer migrants (Spring Alive!)
- Webcams page on the internet ("Experience Spring")
- School education package

Conservation measures

Conservation measures are being developed on two levels:

- individual citizens
 - o information material
 - o network of voluntary "garden bird consultants" for individual advise
 - o cooperation with Vivara – CJ-wildfoord (company on garden bird equipment)
- municipalities, companies
 - o cooperation on basis of a Menu on Bird Friendly measurements
 - o cooperation with Monier (company on building equipment) to develop the Birdloft (adaptation for nesting sites for House Sparrows)
 - o network of voluntary "city bird gards" for advise on scale of business sites, quarters or even cities and for keeping a close watch on the urban environment (for birds)

Role of Urban Bird Conservation for BirdLife International

Next to the conservation value to Urban Bird Conservation especially strengthening the basis for bird conservation is an important aim. Many BirdLife partners are small, eg. only have few members and funding, and in several countries there are no partners at all. In my opinion unfolding the BirdLife family over the world can benefit strongly from activities in urban areas.

Winter, M.

Cornell University, Lab of ornithology, Hesselohrstr. 22, 82396 Paehl, Germany, mw267@cornell.edu

Climate change: research topic or call to action? The role of scientists during the global climate crisis

Climate change is affecting many bird species all over the world. Changes in home ranges, migratory behavior, and timing of nesting are just some of the effects we can observe already. Such studies on the effects of climate change on bird populations are tremendously important to help us understand how to help species adapt to the changing climate. However, climate change is not just an interesting phenomenon that gives us a new area of research, it is not just an issue that affects birds and ecosystems, but the climate crisis will affect all parts of our lives. It is a matter of survival for millions or even billions of people. As the most recent research has indicated, global climate is changing faster than the most pessimistic models of the IPCC have calculated, and we have to return from the current 385 ppm CO₂ in the atmosphere to at most 350 ppm to avoid a global catastrophe.

I claim that we are passed the point where scientists can afford to only observe, analyse, and publicize; where the fear of losing credibility overrules our responsibility to speak up. Instead, I believe that it is high time that we give concrete advice and demand concrete action. Who else but scientists have the knowledge and understanding of the complexity of the natural world to truly understand what is happening before our eyes? Who else but scientists therefore have the responsibility to clearly communicate our concern?

After a summary of the most recent findings in climate science we will discuss the urgency of the crisis and what we as scientists can and must do or not do to ensure that the outcome of the UN climate conference in Copenhagen in December 2009 will not be a failure.

Posters

43

Aberle, H.

Chair of Forest Inventory and Remote Sensing, Faculty of Forest Sciences and Forest Ecology, University of Goettingen, Buesgenweg 5, 37077 Goettingen, Germany, haberle@gwdg.de

Habitat suitability analysis for Middle Spotted Woodpecker (*Dendrocopos medius*) in EU-SPA "Unteres Eichsfeld"

The Middle Spotted Woodpecker (*Dendrocopos medius*) has been considered a specialist found only in oak forests. However the outcome of several recent studies has put this connection to oak stands as exclusive habitat into question. Nevertheless, to forage for arthropods rough-barked trees represent inevitable habitat resources, and the bird furthermore needs soft and often dead wood for building nest holes. The species' dispersal ability is limited to few kilometres and it avoids colonisation of very small stands. Thus landscape configuration is likely to be crucial for habitat colonisation, with isolation and area of suitable stands being the most important factors.

The main aim of the study, which is ongoing, is to set up an empirical multivariate breeding-habitat model for the Middle Spotted Woodpecker. Forest inventory data, remote-sensing imagery, geo-datasets and dead-wood surveys serve as information sources to derive predictor variables. The woodpecker presence data is based on a 2005 field survey. Structure analyses on multiple scales utilising quantitative landscape metrics will be used to include habitat structure variables in the modelling process. Finally, the environmental variables influencing habitat choice of the focal species most strongly are identified and habitat suitability maps will be derived.

Nature conservation planning requires exact spatial definition of areas to be protected. Since managed forests are not characterised by continuous transitions, but rather hard boundaries between stands, interpolated models based on sample points are not feasible. Hence a link between single landscape cells - typically used as spatial reference units in habitat modelling - and the entire landscape is needed. Existing silvicultural sub-compartments represent forest partitions showing homogeneous conditions inside regarding many of the models' predictor variables. Based on these precise spatial units, evaluation of habitat quality is conducted allowing for an integration of the study results into conservation planning for the Middle Spotted Woodpecker.

33

Albayrak, T. & Erdoğan, A.

University of Mehmet Akif Ersoy, Mehmet Akif Ersoy Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü, Burdur, Turkey, albayraktamer@gmail.com

Distribution and density of Krueper's Nuthatch in Turkey and Lesvos Island, Greece

Krueper's Nuthatch (*Sitta krueperi*) was surveyed at 1343 point sample sites in coniferous forests in Turkey and 51 points on Lesvos Island, Greece, during the breeding season between early March and early June from 2005 to 2007. A geographical information system (GIS) was used to prepare distribution maps of Krueper's Nuthatch. For each site we recorded the tree species and altitude. The average density of Krueper's Nuthatch recorded at the various sites was 10.16 ± 0.33 ind./km² in Turkey and 1.94 ± 0.79 ind./km² on Lesvos Island, Greece. The highest mean density was found in Cedar (*Cedrus libani*) stands (14.44 ± 2.2 ind./km²; n = 49), followed by Black Pine (*Pinus nigra*, 14.25 ± 0.67 ind./km²; n = 304), Fir Tree (*Abies cilicica*, 14.15 ± 1.28 ind./km²; n = 99), Red Pine (*Pinus brutia*, 9.32 ± 0.45 ind./km²; n = 715), Scots Pine (*Pinus silvestris*, 5.46 ± 1.09 ind./km²; n = 70), Juniper (*Juniperus* sp., 1.7 ± 1.2 ind./km²; n = 25), Stone Pine (*Pinus pinea*, 0.74 ± 0.74 ind./km²; n = 19), and Spruce (*Picea* sp., 0.35 ± 0.35 ind./km²; n = 40). We didn't observe Krueper's Nuthatch in non-coniferous forests.

67

Amini Nasab, S.M., Ghaffari, S. & Ghahramanpouri, M.*Department of Environmental Sciences, College of natural resources of Behbahan, Chamran University of Ahvaz,, Behbahan, Khuzestan province, Iran, smamininasab@yahoo.com***Effects of climate conditions and Time of day on the density and behaviour of White Wagtail (*Motacilla alba*) in human ecosystems in the south of Behbahan (Khuzestan Province, Iran)**

This study involves a survey of the effects of climate conditions and time of day on the density and behaviour of White Wagtail in human ecosystems in south of Behbahan from December 2005 to June 2007. High densities (40.95 %) of birds were found in areas with a temperature range of 8-14 °C. Higher temperatures appeared to have resulted in a decrease in wagtail density. Search behaviour, for water resources, was observed as a dominant behavior in sun condition (26.51 % frequency). Movements on the land was a typical behaviour in cloudy conditions (33.83 %) and at dusk (maximum percentage 24.65 %). The maximum search behaviour was observed in 10am, 14-16 and >16pm hours. The maximum percentage of individuals were single birds and high percentages of individuals (19.18 %) were observed in <1 m distance to the nearest neighbour. The majority of birds (64.47%) escaped from people at 0-5 m. The maximum percentage of observations (56.82 %) was <50 m distance from human places.

68

Amini Nasab, S.M.¹ & Ghahramanpouri, M.²*Department of Environmental Sciences, College of natural resources of Behbahan, Chamran University of Ahvaz,, Behbahan, Khuzestan province, Iran, smamininasab@yahoo.com***Effect of research or field activities on breeding success of Whiskered Tern (*Chlidonias hybridus*) in Marzoonabad artificial wetland (Mazandaran Province, Iran)**

This study involves measuring the effect of research activities on Whiskered Terns (*Chlidonias hybridus*) from May to September 2003. Two groups of nests were selected (group A, B). At group A nests, boat movements and human activities were estimated and related to timing of egg laying and chick fledging. Group B nests were observed remotely using binoculars. Clutch size in group A and B varied between 1-5 and 1-4 eggs, respectively. Breeding success in group A and B were calculated as about 83% and 85%, respectively. There was no significant difference (Chi-squared) between the two groups ($p > 0.05$). Field or research activities did not appear to have any effect on Whiskered Tern breeding success.

83

Angelier, F., Bost, C.A., Giraudeau, M., Le Bouard, F., & Chastel, O.*Centre d'Etudes Biologiques de Chizé, CEBC-CNRS, Villiers en Bois, 79360, France, frederic_angelier@yahoo.fr***Are stress hormone levels a good proxy of foraging success? An experiment with King Penguins, *Aptenodytes patagonicus***

In seabirds, variations in stress hormone (corticosterone; henceforth CORT) levels have been shown to reflect changing marine conditions and, especially, changes in food availability. However, it remains unclear how CORT levels can be mechanistically affected by these changes at the individual level. Specifically, the influence of food acquisition and foraging success on CORT secretion is poorly understood. In this study, we tested whether food acquisition can reduce baseline CORT levels ("the food intake hypothesis") by experimentally reducing foraging success of King Penguins (*Aptenodytes patagonicus*). Although CORT levels overall decreased during a foraging trip, CORT levels did not differ between experimental birds and controls. These results demonstrate that mass gain at sea is not involved in changes in baseline CORT levels in this species. The overall decrease in CORT levels during a foraging trip could result from CORT-mediated energy regulation ("the energy utilization hypothesis"). Along with other evidence, we suggest that the influence of foraging success and food intake on CORT levels is complex and that the ecological meaning of baseline CORT levels can definitely vary between species and ecological contexts. Therefore, further studies are needed to better understand (1) how baseline CORT levels are functionally regulated

according to energetic status and energetic demands and (2) to what extent CORT can be useful for conservation of seabird populations.

87

Arnaiz-Villena, A., Reguera, R., Gomez-Prieto, P., Parga, C. & Ruiz-del-Valle, V.

Dept Immunology, University Complutense at The Madrid Regional Blood Center, Avda Democracia s/n, 28032 Madrid, Spain, aarnaiz@med.ucm.es

Definition of parallel North American *Carduelis* species evolutive radiations

Genus *Carduelis* is composed of different and separate evolutive species radiations, being the oldest group appeared on Earth about 9 MYA on Miocene Epoch (Eurasian greenfinches). Cyt-b molecular phylogenies by using maximum likelihood and Bayesian inference and linearized trees show that North American *Carduelis* species probably stem from Eurasian Siskin (*C. spinus*) or an extinct related ancestor.

Pine Siskin (*C. pinus*) is a sister species of Antillean (*C. dominicensis*, La Hispaniola Island pine forests) and Black-capped Siskin (*C. atriceps*, Mexico and Guatemala Highlands), all of them showing a separate radiation. American Goldfinch (*C. tristis*) evolutive radiation comprises the habitat-restricted Lawrence's Goldfinch (*C. lawrencei*, southern USA "spots") and *C. psaltria* (Dark-backed Goldfinch), which has reached northern Peru in a large southwards habitat extension. Finally, the extant parental species of the South American Siskin radiation is a North American Siskin: *C. notata* (Black-headed Siskin, which thrives in Mexican tropical forest borders). The questions about the time of appearance of radiations in relation to climate and geology (after late Miocene Epoch), distribution, and why the American *Carduelis* species' ancestor, Eurasian Siskin, is not now thriving in America are addressed.

115

Atemasov, A.A., Atemasova, T.A., Devyatko, O.S., Goncharov, G.L. & Korshunov, A.V.

Kharkov National University, 4 Svobody sq., Kharkov 61077, Ukraine, atemasov@gmail.com

Geographical variation in the vocalisation of the Corncrake *Crex crex* in the North-eastern Ukraine

Geographical variation in the structure of Corncrake (*Crex crex*) call was examined by the analysis of 43 recordings collected on five plots in Kharkov and Sumy regions of Ukraine (Seversky Donets, Oskol, Merla, Seym and Boromlya rivers). The distance between outermost plots is near 400 km. Corncrake calls were recorded in June 2008. Recordings were digitised and measurements were made from waveform representations of calls. We used an ANOVA model to test the difference between call parameters. The calls recorded at different sample plots differed significantly in duration of the first syllable unit, number of pulses in first syllable and total duration of both syllable and within-call interval ($p < 0.05$). Discriminant function analysis correctly attributed more than 90 % of individuals to the population from which they were recorded, based upon twelve temporal parameters (duration of first syllable unit, within-call interval and ten pulse-to-pulse durations) aggregated into four discriminant functions. The distance between populations in hyperspace of discriminant function does not correspond to the real distance between populations in nature. In addition, we compared our own data with the data from other plots within Corncrake range. The duration of first and second syllable units as well as the total duration of both syllable and within-call interval were significantly shorter than in Corncrake calls recorded in Poland (t-test, $p < 0.05$). However, some other parameters proved to be equal, e.g. the ratio of duration of second syllable unit to duration of first syllable unit and the rhythm of calls.

32

Bahadori, F., Alizadeh, A., Kaboli, M., Karami, M., Shariati, M. & Ahmadi, Y.*Faculty of Natural Resources, University of Tehran, Department of Fishery and Environment, Faculty of Natural Resources, University of Tehran, Tehran, Iran, Bahadori_fatemeh@yahoo.com***A probabilistic model for the presence of Eurasian Nuthatch (*Sitta europaea*) in northern Iran**

Habitat suitability modeling have been used to evaluate wildlife habitat and the effects of management activities. These models are based on functional relationships between wildlife and habitat variables. The aim of this study was to develop a methodology to identify suitable habitat for the Eurasian nuthatch (*Sitta europaea*) in Kheyrood hyrcanian forest located in northern Alborz, Iran. The focus of this study was to investigate the factors affecting *S. europaea* distribution which can be identified using field data. In fact, field surveys and logistic models of Eurasian Nuthatch presence-absence were used to investigate the relative influences of habitat quality, plant structure and topographic factors on the prevalence of the species in Kheyrood forest. This study was undertaken from autumn 2007 to summer 2008. Habitat parameters were recorded from a range of factors that determined the occurrence and distribution of Nuthatch. Vegetation structure, floristics and topographic factors (slope, elevation and aspect) were identified as the main influencing factors. Sampling took place in a circular area with a 12 m radius around each random observation point in a line transect, where habitat parameters and presence or absence of the species were recorded. Sampling points were at least 200 m apart.

Binary Logistic Regression was performed to develop the distribution model of the nuthatch according to habitat variables. Significant parameters were identified as height, diameter, stand, and type of trees. In fact, habitat suitability depended on the abundance of old trees; *Fagus orientalis* and *Carpinus betulus*. The result showed a significant correlation ($P=0.00$) between the presence and absence of the Nuthatch and the considered environmental gradients. To test the model, three Goodness of fit tests were performed. The field test showed that the model was successful in the prediction of the presence probability of nuthatches in Kheyrood forest.

48

Bartíková, M., Melišková, M., Sobeková, K. & Országhová, Z.*Department of Zoology, Faculty of natural sciences, Comenius University, Mlynská dolina B-1, SK-842 15 Bratislava, Slovakia, michaela.bartikova@gmail.com, meliskova@fns.uniba.sk, sobekova@fns.uniba.sk***An investment in young always pays the best interest**

Parents should be selected to care for their offspring in relation to how certain they are of being the parents of those offspring. But how is parental care related to parentage in reality? The aim of our study was to assess the relation between the rate at which males fed young and the proportion of feeding visits that they made to their share of paternity in brood. We studied a part of the population of *Passer montanus* in National Nature Reserve in south-western Slovakia from 2006 until 2008. A total of 32 pairs of Tree Sparrows breeding in nest boxes in Alder Fen wood were observed in the morning and late afternoon hours to assess the feeding frequency of individuals visiting the observed brood. DNA samples from young and adults were used for assessing the rate of extra-pair paternity (EPP) and finally for relation between male contribution to care and incidence of EPP.

14

Bayly, N.J. & Rumsey, S.R.*The Wetland Trust, Elms Farm, Pett Lane, Icklesham, Winchelsea, East Sussex, TN36 4AH, UK, nick_bayly@hotmail.com***Habitat quality is limiting for migratory birds wintering and fuelling in sub-Saharan Africa**

Palearctic migratory birds often utilise a wide range of habitats in their non-breeding areas, however, these habitats are not expected to be of equal quality or offer the same chances of survival. Given the widespread declines identified in Afro-palearctic migrants, it is important to determine if habitat quality is a limiting factor and prioritise habitats for conservation action. We examined the abundance, over-winter body

condition, fuelling mass and survival of *Phylloscopus collybita* and *Sylvia cantillans* in three habitats, reedbeds, seasonally flooded tamarisk and dry scrub in the Sahel region of west Africa. *P. collybita* was most abundant in reedbeds and tamarisk, whilst *S. cantillans* favoured dry scrub. Body mass has previously been correlated with habitat quality/survival and in both species body mass differed significantly between habitats in early winter, late winter and migration. In *P. collybita*, body mass was generally higher in tamarisk, whilst body mass was always highest in dry scrub in *S. cantillans*. In both species, body mass decreased between early and late winter in all habitats, with the greatest decrease in dry scrub, indicating that limiting factors prevented birds from maintaining their body mass. A decrease in resources associated with the dry season is considered the probable cause, having its greatest effect in the most water-stressed habitat, dry scrub. Over-winter survival was estimated for *P. collybita* in reedbed and tamarisk only and was highest in tamarisk for both first year and adult birds. This supports the result for body mass by habitat and suggests that body mass/over-winter mass loss could be a useful surrogate for identifying habitat quality in west Africa. These findings demonstrate that non-breeding habitats in Africa vary in quality and can affect over-winter survival, and point to the need to identify and protect high quality habitats for species of concern.

75

Boos, M., Bernard-Laurent, A. & Robin, J-P.

Naturaconst@, Research Agency in Applied Ecology B/H, Département Ecologie, Physiologie, Ethologie/IPHC (CNRS), 14 rue principale, F-67 270 Wilshausen, France, info@naturaconsta.com

Assessment of body condition in the Rock Partridge (*Alectoris graeca*)

Rock Partridge is particularly sensitive to heavy winter snow cover that hinders access to food. Such harsh conditions lead to difficulties for the birds to equilibrate their energy balance and may seriously affect their body condition, increasing the risk of predation and starvation. By analyzing the body composition of 52 rock partridges collected in the Alps, we aimed to: 1) determine the contribution of each body fuel component to the whole energy resources and 2) elaborate body composition indices that can be easily used as a tool for population management.

Body mass ranged between 323 g and 693 g in males and between 261 g and 570 g in females. Adiposity ranged from 2.5 to 14.0 %. Compared to body proteins, body lipids were the most variable fuel compartment and accounted for 40 to 85 % of the metabolisable energy. From energy stores, resistance to a prolonged fast was estimated to range between 1 day for the leanest and 9 days for the fattest birds. Body mass was highly correlated to total proteins ($r^2 > 0.97$, $p < 0.0001$), but it explained less than 70 % of the total lipid mass variation. The most accurate body lipid index for field applications was the combination of the body mass and the abdominal fat pad mass ($r^2 > 0.90$, $p < 0.0001$). However, the best lipid predictor was obtained when combining the dry body mass and the abdominal fat pad mass ($r^2 > 0.94$, $p < 0.0001$). It does not seem that Rock Partridge store high lipid amounts compared to ducks which can build up to 25 % of fat. A higher wing loading in partridges would impair such an energy storage strategy and may therefore explain why this species would be highly vulnerable when food access remains restricted. Body fuel indices will be a valuable management tool to measure the energy storage capabilities of Rock Partridges in the context of environmental changes.

25

Boos, M., Auroy, F., Sion, I., Bourguemestre, F., Chavas, G., Arcanger, J-F. & Arnauduc, J-P.

Naturaconst@, Research Agency in Applied Ecology, 14 rue principale, F-67 270 Wilshausen, France, info@naturaconsta.com

Global warming: are abiotic factors good predictors of the termination of nesting in ducks?

Migratory birds such as ducks have to cope with physiological and environmental components involved in the reproductive cycle. The selection process underlying breeding is mainly under the ultimate photoperiod factor that controls the availability and quality of food and hormonal changes. But in the context of global warming how are proximate factors affecting the reproductive cycle?

Here we set out to determine the contributions of abiotic factors (daylength, ambient temperatures and precipitation), recorded during the period of egg formation, to the termination of hatching events among several duck species (Mallard, Gadwall, Tufted Duck, Common Pochard, Red-crested Pochard) breeding in

different regions of France over three years. Overall, daylength explained more than 60 % of the cumulated hatching event variations; this contribution however differed by species, being lowest in Tufted Ducks, and regions. Mean daily maximal or minimal temperatures combined or not with precipitation significantly ($p < 0.05$) contributed to the variation of hatching date. According to species, the contribution of those proximate factors was positive or negative. The mathematic models derived explained 74–95% of the variation of the cumulated hatching events. Overall, in the context of global warming, we show that photoperiod remains the principal factor driving the termination of nesting whatever the species and the breeding region. However, the even low but significant contribution of ambient temperature and precipitation cannot be neglected. Interestingly, it is possible, for each species and region, to assess the ending of the hatching period (100 % of hatchings completed) with an error of prediction lower than one decade. Based on those results, the software we developed will be very helpful for managers to anticipate, four decades in advance, the progress of the breeding period and, for example, to evaluate the risks changes of habitat quality may have on the sensitive period of incubation.

95

Braun, M. & Wink, M.

Institute of Pharmacy and Molecular Biotechnology, Dept. Biology, Im Neuenheimer Feld 364, D-69120 Heidelberg, Germany, psittaciden@yahoo.de

Population development and breeding biology of feral Ring-necked Parakeets (*Psittacula krameri* SCOPOLI, 1769) using nest boxes in Heidelberg, Germany

In 1974, the Ring-necked Parakeet bred for the first time near Heidelberg. By 2008, the roosting population in Heidelberg consisted of more than 800 birds. Together with the adjacent cities of Mannheim, Schwetzingen, Ludwigshafen, and Worms, the total population was found to be nearly 3,000 birds. The birds breed in tree cavities, often in plane tree (*Platanus x hispanica*). In the year 2000, the Ring-necked Parakeet began to expand its ecological niche by breeding in façades of buildings with thermal insulation. From 2004 on, the breeding pairs were translocated from façades to special nest boxes. Since then, the number of pairs in nest boxes increased while the number using façades decreased. Using nest boxes, it is possible and relatively easy to survey eggs and hatchlings and monitor females and chicks by ringing, sampling, and measuring.

101

Breitbach, N., Laube, I., Steffan-Dewenter, I. & Böhning-Gaese, K.

Community and Macroecology Group, Department of Ecology, Institute of Zoology, Johannes Gutenberg-University, J.-J.-Becher-Weg 13, D-55099 Mainz, Germany, breitbach@uni-mainz.de

Land-use intensity, biodiversity and ecosystem function: compensation by mobile links

Few studies have investigated the relationship between biodiversity and ecosystem function at the landscape scale although relationships and mechanisms known from experimental studies might be different in natural systems. We quantified bird diversity and seed removal from wild cherry trees (*Prunus avium* L.) along a human land-use gradient from forest to structurally simple agricultural systems. High human land-use intensity led to a depauperate local bird community around wild cherry trees, but had no influence on seed removal rates. Thus, ecosystem function was robust in spite of a locally reduced diversity of the respective functional group. There was no evidence for complementarity mechanisms such as density or efficiency compensation of ecosystem function. Instead compensation occurred presumably because birds moved over larger distances when human land-use intensity increased. Such “mobile link compensation” adds a new level of complexity to the relationship between biodiversity and ecosystem function and might also be common in other systems in which ecosystem function depends on mobile links.

19

Briedis, M. & Keiřs, O.*Laboratory of Ornithology, Institute of Biology, University of Latvia, Miera iela 3, LV-2169 Salaspils, Latvia, oskars.keiss@lu.lv***What does biometry tell us about the origin of migrating birds in Latvia?**

Biometric measurements of birds of different migration peaks at Pape, Latvia (56°09'N; 21°01'E) were compared. Years were compared to test if the same pattern in differences in biometrical data existed. The timing of peaks during autumn migration was compared with timing of recoveries at Pape of birds ringed as pulli to NNE from Latvia (Estonia, Finland, NW Russia) in order to analyse if biometric differences correspond to different origins of migrating birds. Data for 42 years (1966–2008) were used in the analyses. Birds were captured by Rybachy (Rossitten) type trap (until 1992) and with Helgoland trap (from 1993) from end of August until end of October and mist-netted from mid July until September. Data on eight species were analysed: *Acrocephalus scirpaceus*, *A. schoenobaenus*, *Erithacus rubecula*, *Locustella luscinioides*, *Parus major*, *P. caeruleus*, *Regulus regulus* and *Turdus philomelos*.

40

Brigadirova, O.V.¹ & Bakulina, A.A.²*¹Scientific center RANS "Biodiversity protection", Moscow, Russia; ²Marata str. 26, 85, Tula, 300001, Russia
Brigadirova.ov@gmail.com***The role of water – near water ornithocomplexes in the spatial organization of birds in the south of the Central region of European Russia**

This research was conducted in the years 1999–2006 in three natural subzones in the south of the Central region of European Russia. Approximately 70 water bodies were observed, as well as terrestrial habitats of birds. The data treatment to test spatial-typological structure of ornithocomplexes and estimation of connection between environmental factors and territorial distribution of birds was carried out by multidimensional factor analysis (calculation was made in the zoomonitoring laboratory of ISEA SB RAS). 130 bird population variants were used.

Four types of population were defined on the basis of the spatial distribution and quantitative characteristics of bird density: water-bog-forest, upland meadow-anthropogenic, agricultural and synanthropic types (37.2 % of ornithocomplexes similarity coefficient dispersion).

Specific character of spatial organization of ornithocomplexes is connected with the presence of various anthropogenic water-near water biotopes, which significantly alter habitation conditions of birds in comparison with typical natural conditions that are characteristic of the given region.

The highest bird population density was recorded in human settlements (1300-1650 sp/km²), the lowest – in meadow-field landscapes (240 sp/km²). In the majority of times, changes in the numbers of recorded species correlate with changes in the numbers of background species, population density and bird biomass.

The main trends in bird communities' changes are connected with afforestation, watering, anthropogenic use of water bodies, ploughing and building on land, "mosaicity" and food capacity of the habitat. Increasing watering at the expense of anthropogenic water bodies correlates with increase of general bird species abundance (up to 120 species) and background composition of ornithocomplexes (up to 57 species).

Water-near water ornithocomplexes make a significant contribution to maintaining of species abundance and avifauna diversity, and considerably define organization and spatial-typological structure of bird population of the studied territory.

64

Buczma, A. & Goc, M.*Department of Vertebrate Ecology and Zoology, University of Gdańsk, Legionów 9, 80-441, Gdańsk, Poland, buczma.anna@gmail.com***Dynamic mortality of chicks of the Great Cormorant *Phalacrocorax carbo sinensis* and Grey Heron *Ardea cinerea* in a colony at Katy Rybackie (N Poland)**

The study was conducted in one of the largest European Cormorant breeding colony (8126 pairs) at Katy Rybackie (northern Poland). Data were collected in two study plots: one in the oldest part of the colony (204 Cormorants nests) and one in a part where Cormorants are nesting together with Grey Herons (243 Cormorant & 89 Heron nests).

The study area was visited every week from 9th March until 19th July 2008 (altogether 20 visits). During every visit the number of occupied nests was recorded and eggshells were collected. Chicks fallen from their nests were aged, noted and marked with numbered plastic strip and left *in situ*.

Cormorants in the oldest part of the colony hatched earliest, but had similar chick mortality as in the mixed part (c. 0.4 dead chicks per nest). In both plots, the highest number of dead Cormorant chicks was observed in the middle of May and in the middle of June (two peaks), the highest number of dead Heron chicks at the end of May, decreasing slowly until July. Approximately 70 % of Heron chicks found were 3 or more weeks old, while only 35 % of Cormorants were of this age. More Cormorant chicks younger than 3 weeks were noted in the mixed part of the colony.

More than 30 % of Cormorant chicks on both plots died in nests and fell down later, but only less than 5 % of Herons found on the ground had died before falling down.

65

Bukvareva, A.A.¹, Udilova, E.I.¹, Grinkov, V.G.¹ & Sternberg, H.²*¹Evolutionary Biology Dept., Faculty of Biology, Moscow State University, Leninskie Gory 1/12, Moscow 119992, Russian Federation, ²OAG für Populationsforschung Braunschweig, Im Schapenkamp 11, D-38104 Braunschweig, Germany, v.grinkov@gmail.com***Fledgling survival related with their weight in Western Siberian population of the Pied Flycatcher (*Ficedula hypoleuca*)**

We studied survival probabilities of fledglings in relation to their weight in a Western Siberian population of *F. hypoleuca* (Tomsk Region; 56°20' N 84°56' E) during eight years (2001–2008). We weighed 4,495 fledglings and captured 396 of them later as breeding birds in the study area.

Survival probabilities of fledglings were related to their weight when birds were 14 days old. The age of parents was found to be not influenced by fledgling weight and their survival probability. Brood size affected fledgling weight only in the smallest (1–4) and biggest (9 and more) broods. Breeding time (first egg laying date) was the main factor which negatively influences both fledgling weight and their survival probability.

General Linear Regression model shows that fledgling weight influences survival probability when breeding time was taking into account. The highest survival probability was found for birds with a weight in the nest of around 14 g, and heavier and lighter birds had a lower survival probability.

77

Bushuev, A.V.¹, Ivankina, E.V.² & Kerimov, A.B.³*¹Dept. of Vertebrate Zoology, Biological Faculty, Moscow State University, Leninskie Gory 1/12, 119991 Moscow, Russia, ²Zvenigorod Biological Station of Moscow State University, P.O. Box Shihovo, Odintsovo District, 143036 Moscow Region, Russia, ³Dept. of Vertebrate Zoology, Biological Faculty, Moscow State University, Leninskie Gory 1/12, 119991 Moscow, Russia, ¹a_bushuev@mail.ru, ²Ficedula@yandex.ru, ³anvar_kerimov@mail.ru***Repeatability of basal metabolic rate in Pied Flycatcher (*Ficedula hypoleuca*)**

Basal metabolic rate (BMR) is a widely examined energetic trait, which is often considered to be an indicator of competitive ability of an animal. Several studies have shown that BMR is a very flexible physiological trait and can vary under the influence of many endogenous and environmental factors. To test whether BMR could be a characteristic feature of an individual, we estimated the repeatability of mass-

specific BMR in natural population of Pied Flycatcher (*Ficedula hypoleuca*) in Moscow region (55°44' N, 36°51' E) using our long-term (1992–2007) data-set on Pied Flycatchers. In some years BMR of the same Pied Flycatcher males was measured twice within the reproductive season: 1) shortly after arrival to the breeding area in late April or early May, when males perform advertising behaviour; 2) in the middle of the chick-rearing period in June. Males showed highly significant BMR increase from advertising period until chick-rearing period. As a consequence, BMR repeatability (R) within the same year did not significantly differ from zero (n=81). However, repeatability estimate of BMR measured in the same period of a season was $R=0.37\pm0.09$ between consecutive years (n=79), $R=0.60\pm0.15$ for 2 years interval (n=25) and $R=0.85\pm0.14$ for 3 years interval (n=5). This is a first report of BMR repeatability in free-living animals over a period of more than one year. The repeatability value is often regarded as an upper estimate of heritability. Therefore, our findings of stable intra-individual variation of BMR during such considerable time intervals assume the potential for direct selection on this energetic trait.

78

Carello, L.^{1,2}, Costantini, D.^{1,2} & Dell'Omo, G.¹

¹*Ornis italic, Piazza Crati 15, 00199 Roma, Italy,* ²*University La Sapienza, viale dell'Università 32, 00185 Roma, Italy,* david.costantini@uniroma1.it

Reproductive success, weather conditions and NAO index in Eurasian Kestrel (*Falco tinnunculus*)

The reproductive activity of birds of prey may be particularly affected by weather conditions. In this study, we sought to evaluate the covariation between local weather conditions (temperature and rainfall), the North Atlantic Oscillation (NAO) index and both hatching and fledging success in Eurasian kestrel (*Falco tinnunculus*). The study was undertaken from 1998 to 2007 in the Rome region, Italy. Reproductive data were collected from nest-boxes attached to the pylons of utility lines. Nest-boxes were visited each year between the end of March and mid-July to assess occupation and to record hatching success (ratio between the number of hatchlings and the clutch size; 537 nests) and fledging success (ratio between the number of fledglings and the number of hatchlings; 382 nests). Data on local climatic variables were collected from two local meteorological stations and NAO values were taken from <http://www.cgd.ucar.edu/cas/jhurrell/indices.html>. We found that hatching success (range: 80.0 to 92.5 %) and fledging success (range: 89.0 to 98.0%) were both higher in warmer and wetter springs. In conditions in which rainfalls were never severe, our results suggest that dry springs may negatively affect the reproductive output of Kestrels, perhaps because they reduce prey availability, such as insects and lizards. Future studies will be needed to clarify these results.

97

Čiković, D., Barišić, S., Tutiš, V. & Kralj J.

Institute of Ornithology CASA (Croatian Academy of Sciences and Arts), Gundulićeva 24, HR-10000 Zagreb, Croatia, cikovicd@hazu.hr

Spacing behaviour of Middle Spotted (*Dendrocopos medius*) and Great Spotted Woodpecker (*Dendrocopos major*) in an urban forest

Although urbanization may decrease biodiversity of an area, some urban areas may provide beneficial conditions for some species. Urban forests may provide better habitat conditions for woodpeckers than surrounding non-urban but managed forests, if specific habitat and area requirements are satisfied. Very dense populations of Middle Spotted *Dendrocopos medius* (29 p/km²) and Great Spotted Woodpecker *D. major* (43 p/km²) exist in the Maksimir park of Zagreb (Croatia). Total area of park is 3 km² with 1.5 km² of compact old sessile oak-hornbeam forest which is in some parts older than 300 years. In order to test the hypothesis that home ranges in such dense populations should be small, we radio-tracked 11 adult Great Spotted and 7 adult Middle Spotted Woodpeckers to investigate their ranging behaviour. Field work was undertaken in the 2007 and 2008 breeding seasons, from the second half of May to the end of June. Home-range sizes (95 % MCP) in Great Spotted Woodpecker averaged 2.4 ha (n=5, SE=0.89) and in Middle Spotted 4.9 ha (n=4, SE=1.34). Core areas (50 % MCP) averaged 0.256 (SE=0.08) and 1.2 ha (SE=0.41) respectively. Average home range of Middle Spotted Woodpecker was twice as large as the home range of Great Spotted, while core areas were five times bigger. Unlike Middle Spotted Woodpecker,

Great Spotted used gardens and orchards in the park's neighbourhood as supplemental feeding grounds. Birds that breed closer to the edge of the park were more apt to take ventures to gardens than those that breed in the park's centre.

108

Cojan, C. & Bogdea, L.

Institute of Zoology, Academy of Sciences Moldova, Academy' Street, 3, MD – 2028, Chisinau, R. Moldova, costel_cojansor@yahoo.com

The Ramsar site "Lower Prut's Lakes" – refuge for rare bird species in R. Moldova

The lakes of Lower Prut represent the only Ramsar site in R. Moldova (no. 1029/20.06.2000), being a natural border between Moldova and Romania. There are small and large natural lakes like Manta and Beleu, having connections with the Prut River, floodplains and swampy areas, rivulets and channels. This perimeter represents one of the most important refuge areas on the left banks of the Prut River basin for aquatic birds and waders, during the entire year, offering suitable habitats for breeding and wintering, but also, abundant and various food resources, good sites for resting and sheltering during the migration time. In this paper, we focus on the situation of the globally threatened species and other rare birds present in the area, providing information on their numbers and trends, but also on the factors threatening their status. Some of these species are winter visitors: *Branta ruficollis*, *Anser erythropus*, *Oxyura leucocephala*. Breeding species include the continual presence of *Aythya nyroca*, while the fish-eating species (*Pelecanus onocrotalus* and *P. crispus*) appear to feed in the perimeter from late spring until the end of August. Some natural predators represent limiting factors for the aquatic and semi-aquatic breeding bird species. During the last decade, but especially in the last 3–5 years, human pressure has increased, through, for example, infrastructure development and the ecosystems' quality has constantly decreased, resulting in part of the favourable habitats for birds having disappeared in the last two years.

112

Cooleman, S.¹, Mulrenin, A.², Mergen, P.¹, Heerlien, M.³, Meirte, D.¹ & Louette, M.¹

¹Royal Museum for Central Africa, Leuvensesteenweg 13, 3080 Tervuren, Belgium, ²Salzburg Research Forschungsgesellschaft, Jakob-Haringer-Str. 5/III, 5020 Salzburg, Austria, ³Naturalis National Museum of Natural History, PO Box 9517, 2300 RA Leiden, The Netherlands, stijn.cooleman@africamuseum.be, michel.louette@africamuseum.be

STERNA advanced semantic web tool for ornithology

STERNA (Semantic Web-based Thematic European Reference Network Application <http://www.sterna-net.eu>) intends to provide bird related information in order to develop a European Digital Library as a virtual bridge between natural history and cultural heritage. This project is mainly a communication service for ornithologists, especially taxonomists. One of the objectives is to increase access to bird collections of several natural history institutions.

The STERNA Consortium currently includes: Salzburg Research Forschungsgesellschaft m.b.H. (Project Leader), Archipelagos, DOPPS Birdlife Slovenia, Heritage Malta, Hungarian Natural History Museum, Icelandic Institute of Natural History, Natural History Museum / Municipality of Amaroussion, Natural History Museum of Luxembourg, Naturalis, Netherlands Institute of Sound and Vision, Royal Museum for Central Africa, Teylers Museum, Wildscreen/ARKive and the IT-company Trezorix. STERNA is funded by the EU eContentplus Program of the DG Information Society & Media in topic Digital Libraries (http://ec.europa.eu/information_society/activities/econtentplus/index_en.htm).

STERNA's participants collect and manage content on biodiversity, wildlife and nature in general.

The Royal Museum for Central Africa (RMCA) has a Use Case scenario to provide information on ornithological publications and specimens as well as on certain ethnographical objects (e.g. composed of feathers).

The integration of these digitalised bird related data into one web-accessible network is an ongoing challenge. Taxonomical items are linkable to their references in a multi modelled, multilingual tool, stored and managed at different locations throughout Europe. STERNA's architecture is based on Resource Description Framework (RDF) as data exchange standards. Due to its experience in Biodiversity Information Standards, RMCA is involved in the project as work package leader for "technology improvement, target user validation and evaluation of the STERNA approach".

If successful, the STERNA approach will lower the bar for institutions to contribute to European and similar initiatives like Biodiversity Heritage Library. Digitalising of RMCA's types was financed by a project of the Federal Belgian Science Policy Office.

79

Costantini, D.^{1,2}

¹*Ornis italic, Piazza Crati 15, 00199 Roma, Italy,* ²*University La Sapienza, viale dell'Università 32, 00185 Roma, Italy,* david.costantini@uniroma1.it

Effects of diet quality on growth and oxidative stress in nestling Pigeons (*Columba livia*)

Poor early nutritional conditions may alter growth pattern and may also potentially affect levels of oxidative stress. In this study, I have compared the growth pattern (body size and body mass) and the serum oxidative state (oxidative damage, total serum antioxidant capacity, circulating thiols) between nestling Pigeons (*Columba livia*) grown on a high quality diet (HQD; richer in antioxidants and nutrients) and nestlings growing on a low quality diet (LQD). Differences in growth pattern emerged when nestlings were 18-days-old. At fledging, HQD nestlings were larger than LQD ones. When 7 days old, the two groups did not differ in any of the oxidative stress markers measured. In contrast, at fledging, HQD nestlings had higher levels of oxidative damage and serum antioxidant capacity than LQD ones. These results suggest that the higher rate of growth of HQD nestlings caused a higher level of peroxidation, which did not impair antioxidant defenses, though.

80

Costantini, D.^{1,2}, **Carello, L.**^{1,2} & **Fanfani, A.**¹

¹*Ornis italic, Piazza Crati 15, 00199 Roma, Italy,* ²*University La Sapienza, viale dell'Università 32, 00185 Roma, Italy,* david.costantini@uniroma1.it

Patterns of variation of oxidative stress markers and body condition index in nestling Common Starlings (*Sturnus vulgaris*)

In ecological research, there is growing interest in measuring oxidative stress markers in free-living birds. In this preliminary study, we analysed the patterns of variation of oxidative stress markers and body condition index in nestling Common Starlings (*Sturnus vulgaris*). During the 2008 breeding season, we took blood samples from 31 nestlings from 8 nest-boxes located in a park near Roma. Three plasma markers of oxidative stress were measured: the level of oxidative damage (d-ROMs test; Diacron International), total antioxidant capacity (OXY-Adsorbent test; Diacron International) and concentration of thiols (i.e., a group of synthesized antioxidants; -SHp test; Diacron International). In each bird, we also measured body mass, tarsus and wing length in order to calculate a body condition index. We found that females had higher body condition than males. While insignificant, females tended to have had lower levels of oxidative damage and higher levels of total antioxidant capacity and of circulating thiols. Nestlings that died before fledging were in a poorer body condition and had lower antioxidants. Apparently, nestlings from nests located in pastures had a better health status. Finally, nestlings sampled in the morning had higher oxidative stress than nestlings sampled in the afternoon. These preliminary results do not allow us to draw conclusions; however, follow-up studies have been planned for the 2009 breeding season.

39

Cozma, M.M. & Gache, C.

Environmental Protection Agency Neamt County, Piatra Neamt, 22 December Place, 5, 61007, Neamt County, Romania, maria10i77@yahoo.com

Wintering dynamics of the aquatic birds in the mountain sector of Bistrita River in northern Romania

Our study is focused on the tree dam lakes (Pangarati, Vaduri and Batca Doamnei) situated on Bistrita River in the mountain sector of Romania. The Pangarati and Vaduri lakes are Important Bird Areas (IBA)

and part of the Romanian Natura 2000 network. Our monitoring programme started in January 2006 and it is ongoing due to the high importance of these lakes for wintering aquatic birds in the north-eastern part of Romania. The birds find there favourable climate conditions but also various and abundant trophic resources that explain the presence of flocks. Hundreds and thousands of individual birds, especially Anseriforms, use this area from early November until the middle part of March. Our study also reports on the daily movements of the birds, searching feeding sites. During daytime, the Anseriforms feed on the surface of the lakes, while in the evening the birds leave, searching for food on the Bistrita River and the nearest rivulets (Oantu, Pangaracior, Secu-Vaduri, Doamnei, Agarcia and Cracau). In the coldest winters (e.g. January 2006 and January 2008), when the lakes were frozen, we observed the Anseriform groups near cereal silos, on the cereal fields near farms or on the garbage platforms (Girov – January 2006). We also recorded some unusual wintering birds in this area, including *Gallinago gallinago*, *Phalacrocorax carbo*, *Ardea cinerea* and *Casmerodius albus*.

85

Cucco, M., Pellegrino, I. & Malacarne, G.

University of Piemonte Orientale, Dept. Life and Environmental Science, Via Bellini 25 15100, Alessandria, Italy, cucco@unipmn.it

Inter-sexual differences in body condition after immune challenge in breeding Grey Partridges (*Perdix perdix*)

The life-history theory, assuming that the development of the immune system is energetically costly and resource-limited, predicts the presence of trade-offs between immune function, condition and/or reproductive effort allocation. Recent experimental studies have confirmed, in both sexes, the occurrence of costs to sustain an activated immune system and the presence of trade-offs. Some of these studies describe a pattern of differential vulnerability to disease according to sex, where males show higher rates of parasitic diseases than females. Moreover, males may exhibit a lower immune response than females and may show higher susceptibility to infections.

In order to test the occurrence of a male-female difference in immune responsiveness, we measured immune reaction and body conditions of adults in two groups of breeding Grey Partridges, i.e. a control group with no challenge and an immune-challenged group (NDV Newcastle disease virus vaccine). In each breeding group, some pairs were fed a diet with high beta-carotene content, and others with a low content. After laying, eggs were collected and analysed (mass, volume, and lysozyme concentration).

The vaccine treatment led to different effects on the two sexes. NDV-treated males showed a body mass decrease and this negative effect on body condition was paralleled by an enhanced erythrocyte sedimentation rate. The diet rich in beta-carotene (an immune stimulating substance) counteracted this negative effect. In contrast to males, immune-challenged females did maintain good body conditions. However, a possible trade-off was found on the reproductive output, since treated females laid slightly smaller eggs. Interestingly, egg lysozyme concentration increased after the immune challenge. This experiment suggests that an intrinsic sexual difference in immune competence exists, but environmental factors, such as a rich diet, can substantially alter the immune response. The inter-sexual differences in immune response are discussed as a part of sexual strategies theorized in behavioural ecology.

49

Czyz, B.

Department of Avian Ecology, Wroclaw University, Sienkiewicza 21, 50-335 Wroclaw, Poland., czyz@biol.uni.wroc.pl

Do female Penduline Tits adjust their parental decision to males' behaviour?

The Penduline Tit *Remiz pendulinus* is a small passerine bird with uniparental care provided by a female or a male. During the egg laying period, one parent (or both) abandons the nest and starts a new breeding attempt. The aim of this study was to find out whether the parental care decision of female Penduline Tits was affected by the decision of their mates. At the nests where I experimentally removed a male, most females (18 out of 20) continued egg laying. However, 12 females mated with the second male at the experimental nest. In spite of this, the share of females that stayed and started incubation (55 %) was similar to that found in the control group (51 %).

113

Das, K.S.A. & Vijayan, L.*Division of Conservation Ecology, Salim Ali Centre For Ornithology and Natural History, Coimbatore 657108, Tamil Nadu, India, dasksa@gmail.com***Conservation significance of the forest types along the altitudinal gradient for the birds. A tale from the tropical rainforest of Western Ghats, India**

This study addressed how altitude affected the distribution of birds. Three variants of the evergreen forest at an altitude of 900–2200 m, two variants of the montane wet temperate (shola) forests at 2000–2200 m and the broad-leaved hill forests (BLHF) located at 1500–1700 m habitat types investigated. A total of 5253 individuals belonging to 108 bird species were recorded, which included 14 species endemic to the Western Ghats. Highest species richness (83) was found in the wet evergreen forest sites. Species richness was significantly lower in broad-leaved hill forest (37) and montane wet temperate forest (50) compared to the other habitat types. Bird community structure of various habitats in corresponding altitudes varied significantly in terms of composition, abundance and diversity. The maximum species (59.2 %) and individuals (27.2 %) were in evergreen forest habitat and minimum in BLHF (22.8 % and 5.73 % respectively). Shola habitats located at higher altitudes in the study area possessed higher species richness than mid-elevation broad-leaved hill forest, which occurs within the altitudinal range of 1500–1700 m. The significant difference in tree species richness of BLHF with adjacent EG and SHOLA habitats partly explain the reduction in number of bird species in this transitional zone. The study showed an increased abundance of birds at mid-elevation evergreen habitats and the highest shola habitats with a unique dip at the intermediate broad-leaved hill forests. Present analysis showed that altitude appears to be the primary environmental variable responsible for the distribution of species. Apart from the new understanding on the nuances of vegetation-bird community interaction, the study has brought into focus the importance of maintaining and enriching the vegetation complexity as a major objective of the overall Park Management plan.

107

Davydenko, I.V.*Kyiv Shevchenko University, Biological Department Volodymyrs'ka Str., 64, KNU, 01601 Kyiv, Ukraine, i_davydenko@ukr.net***Artificial waterbodies as important places for a wetlands bird in Ukraine.**

Recently reservoirs of a synthetic parentage – reservoir, fish ponds, settling ponds of industrial plants, the reservoirs – cooling agents, etc. present an increasing value in the life of many wetland birds. Here rare and vulnerable species, and such, that increase the number and extend the geographical range; also this types of wetlands frequently will be utilized by birds which use the areas as staging posts for feeding and resting during migration or wintering. Among infrequent and irregular species in this type of wetlands are: Black-throated Diver (*Gavia arctica*), Red-necked Grebe (*Podiceps griseigena*), Great White Egret (*Egretta alba*), Black Stork (*Ciconia nigra*), Shoveler (*Anas platyrhynchos*), Scaup (*Aythya marila*), Goldeneye (*Bucephala clangula*), Goosander (*Mergus merganser*), Osprey (*Pandion haliaetus*), White-tailed Eagle (*Haliaeetus albicilla*), Grey Plover (*Squatarola squatarola*), Marsh Sandpiper (*Tringa stagnatilis*), Red-necked Phalarope (*Phalaropus lobatus*), Ringed Plover (*Charadrius hiaticula*), Spotted Redshank (*Tringa erythropus*), Terek Sandpiper (*Xenus cinereus*), Ferruginous Duck (*Aythya nyroca*), Black Kite (*Milvus migrans*). Among species, which expand their geographic range and increase in number: Cormorant (*Phalacrocorax carbo*), Mute Swan (*Cygnus olor*), Greylag Goose (*Anser anser*), Tufted Duck (*Aythya fuligula*), Black-winged Stilt (*Himantopus himantopus*), Whiskered Tern (*Chlidonias hybrida*), Little Tern (*Sterna albifrons*). This type of wetland is important for moulting, for migration stopover and wintering and is frequently utilized by such most numerous species: Mallard (*Anas platyrhynchos*), Pochard (*Aythya ferina*), Coot (*Fulica atra*), Yellow-legged Gull (*Larus cachinnans*), Black-headed Gull (*Larus ridibundus*) and Great Crested Grebe (*Podiceps cristatus*).

56

De Coster, G., De Neve, L., Martín-Galvez, D., Therry, L. & Lens, L.*Ghent University, Department of Biology, Terrestrial Ecology Unit, Ledeganckstraat 35, 9000 Ghent, Belgium, Greet.decoster@ugent.be***Innate humoral immunity decreases with age in Great Tits**

To what extent, and by which causes, levels of natural antibodies (Nabs) vary during avian development remains largely unknown, despite the fact that the degree of constitutive innate immunity may have a strong bearing on early survival as it procures the first defense against parasites. We manipulated ectoparasite load in Great Tit (*Parus major*) nests prior to egg-laying, quantified effects on immune-competence of adult females (incubation and chick rearing) and nestlings, and compared adult haemagglutination levels with those measured after the breeding season. To disentangle egg-mediated maternal effects from those caused by parentage, we also performed a cross-foster experiment in which half of the broods were reciprocally swapped between infested and uninfested nests. Adult females did not show significant variation in haemagglutination levels between incubation, chick rearing and post-breeding, and immune reactions of adults as well as nestlings were not affected by nest parasite loads either. However, nestling immune responses were negatively related to those of the genetic mother, but not of the foster one, and exceeded adult levels. Possible implications of this apparent decrease, rather than increase, of innate humoral immunity with age in Great Tits are discussed from an evolutionary-ecological perspective.

44

Delhey, K.*Max Planck Institute for Ornithology, Vogelwarte Radolfzell, Schlossallee 2, D-78315 Radolfzell, Germany, delhey@orn.mpg.de***Birds as ecosystem engineers: the case of the Neotropical Furnariidae**

Ecosystem engineers are organisms that modulate the availability of resources to other species through the physical modification of the environment. Among birds a classic example are woodpeckers (Picidae), since they provide breeding or roosting sites to many species due to their excavating habits. Here I suggest that many species of the Neotropical family Furnariidae which build enclosed vegetative nests could be considered ecosystem engineers since, similar to woodpeckers, their nests are used by a variety of other bird species. In order to test this idea I carried out a large scale literature search on Furnariid nest reuse by other species in the Neotropical region. At present the database comprises over 1000 events of nest reuse, built by 18 species of Furnariids and reused by 61 other bird species. The frequency distribution of Furnariid builders and hosts was strongly skewed and the most important Furnariid nest providers were *Furnarius rufus* (36 %) and *Phacellodomus rufifrons* (20 %) and the most common hosts were *Sicalis flaveola* (30 %) and *Agelaioides badius* (20 %). I will explore, through comparative analyses, whether the most important Furnariids as nest providers have characteristics in common such as nest type or size, habitat, etc. Finally, I will discuss the possibility that some Furnariid species, in their role as nest providers for other species, can be considered keystone species in structurally simple habitats, such as shrublands, where the availability of natural holes or woodpecker cavities is limited.

100

Dulisz, B.*Department of Ecology and Environmental Protection, Warmia & Mazury University, Plac Łódzki 3, 10-727 Olsztyn, Poland, beata.dulisz@uwm.edu.pl***Nesting predatory in urban parks and suburban forest – experiment with artificial Blackbird nests**

In Olsztyn (NE Poland) in 2006–2007 experiments relying on exhibiting the artificial Blackbird (*Turdus merula*) nests with quail eggs were carried out with the aim to estimate nest predator pressure. We conducted six experiments in urban park and a suburban forest in two periods of breeding season – early (10 April – 15 May) and later (1 June – 10 July). In one experiment 12 nests were examined. In both the early and late periods of breeding season higher losses of nests were recorded in park (early – 89.1 %, late – 82.4 %) than in suburban forest (early – 70.8 %, late – 51.4 %). Average time of detecting nests by

predators in the early period of the breeding season amounted to 2.5 days in park and 3.0 days in forest. The average time of detecting nests increased in the late period to 2.8 days in park and to 5.4 days in forest. The nests situated in deciduous trees were detected significantly more frequently during the early period in park only. In the park nests located at a height above 2.25 m were detected by predators more frequently (early – 100 %, late – 100 %) than the nests located below 2.25 m (early – 87.5%, late – 69.2%). In the forest the share of nests detected by predators were lower than in park (nest located >2.25 m: early – 50 %, late – 33.3 %; nest located <2.25 m: early – 66.6%, late – 36.8%). The time of nest exposure to the first predator detection was considerably shorter when the nests were situated on the deciduous trees (the park and forest in the both periods of breeding season), in the fork of tree branches (the park in the early period), at the altitude of above 2.25 m (the park in the early period), and when the nests were poorly hidden (the park in the both periods of breeding season).

2

Duriez, O.¹, Dell'Omo, G.² & Sarrazin, F.³

¹Muséum National d'Histoire naturelle, UMR 5173 MNHN-CNRS-UPMC, Conservation des Espèces, Restauration et Suivi des Populations, 61 rue Buffon, 1er étage, 75005 Paris, France,, ²Technosmart, Viale dei Quattro Venti 253, 00152 Rome, Italy, ³UPMC University Paris 6, UMR 5173 MNHN-CNRS-UPMC, Conservation des Espèces, Restauration et Suivi des Populations, 61 rue Buffon, 1er étage, 75005 Paris, France, duriez@mnhn.fr, giacomo.dellomo@iss.it, sarrazin@mnhn.fr

How do vultures find their prey? First results from a GPS-GSM telemetry study

Scavenging raptors are declining worldwide despite their important ecological function. Griffon vultures *Gyps fulvus* evolved in Europe as commensals of extensive pastoralism. In order to find carrion spread over in the environment in a spatially and temporally stochastic way, they developed social foraging strategies. In particular, the attraction of searching individuals by feeding conspecifics with local enhancement increases their search efficiency. However, questions remain about the importance of individual and social contribution in the success of prospection behaviour, i.e. before a carrion is discovered. Different processes may be involved: 1) vultures disperse at random, with the constraint of topographical features that create ascending currents necessary for soaring flight; 2) vultures use individual knowledge of food availability and visit, in priority, places with higher probability of finding carrion; 3) vultures forage in an actively formed network, being regularly interspersed and keeping observing the behaviour of other flying vultures, in order to aggregate quickly when a carrion is found.

During the 20th century, vulture populations declined due to modifications in pastoral practices and persecutions. Since 1980 in France, vultures were reintroduced in the south of Massif Central (Grands Causses area), and feeding stations dedicated to vultures were established. Feeding stations are provisioned with carrion collected in nearby farms, where food is therefore predictable spatially and, to a varying degree, temporally. But vultures can also find carrion outside feeding stations in a more natural way. Hence this network of feeding places offers the possibility to test these hypotheses and processes of prospection.

Answering these questions necessitates accurate tracking of flying vultures over long time periods, to determine the features of their foraging trips. Recent advances in GPS technology allow such monitoring and we developed new GPS tags that transmit positions by SMS via the GSM network. We present here the first results from the tracking of groups of vultures in the Grands Causses area. In the actual context of declining vulture populations and suspected damages to living domestic animals, partly caused by food shortage in Spain, it is urgent to better understand vulture prospection behaviour.

51

Dyrcz, A.¹ & Cichon, M.²

¹Dept. Avian Ecology Wrocław University, ul. Sienkiewicza 21, 50-335 Wrocław, Poland, ²Institute of Environmental studies Jagiellonian University; ul. Gronostajowa 7, 30-364 Kraków, Poland, dyrcz@boil.uni.wroc.pl, mariusz.cichon@uj.edu.pl

Sex-specific fledging success and brood sex ratio in the Great Reed Warbler (*Acrocephalus arundinaceus*)

We examined sex ratio variation and sex-specific probability of successful fledging in relation to hatching date across 376 broods of Great Reed Warblers. The sex ratio of complete broods as well as broods with

partial mortality did not deviate significantly from parity (0.5 and 0.53). Variation in sex ratio between broods was not greater than might be expected from binomial distribution, thus females seem not to manipulate the sex ratio of their broods in the studied population. As a consequence, sex ratio did not vary in relation to hatching date, years and fishpond habitat. Female offspring showed lower fledging success than their brothers but the relationship between probability of successful fledging and hatching date differed between sexes. Fledgling success of female offspring declined with hatching date more strongly than the success of male offspring. Thus, our study shows that Great Reed Warblers do not adjust offspring sex to match observed seasonal sex-specific variation in survival.

118

Dzyubenko, N.V. & Bokotey, A.A.

State Museum of Natural History, National Academy of Sciences of Ukraine, Teatralna Str. 18, Lviv 79008, Ukraine,
NDzyubenko@gmail.com

The present status of the Black Stork (*Ciconia nigra*) population breeding in the Western Polissia (Ukraine).

In 2006-2007 the Western Ukrainian Ornithological Society by the financial support of the Fund "Ciconia" (Liechtenstein) has studied the population of *Ciconia nigra* in Western Polissia.

The survey involved a questionnaire sent to the staff of State Forestries (SF) in three studied regions (Volyn, Rivne and Zytomyr). The verification of questionnaires and collecting of data was conducted by scientists at SF offices and in forestry's area. Nests were mapped using GPS, each nest being listed in a special 'passport', containing the entire information.

Over 17000 km² of forest areas belonging to 44 forests were investigated, making up above 75 % of the total. On the whole, 216 nests and 122 nesting areas of *Ciconia nigra* have been found in three regions of Western Polissia (the Ukrainian territory). If we assume the density of Black Stork nesting in unstudied areas the same as those investigated, the overall number of Western Polissian population of Black Stork in Ukraine might be close to 450 nesting pairs.

On the basis of the study, we can state with some confidence that the number of *Ciconia nigra* in Western Polissia is increasing, and that there is some evidence of adaptation of this species to anthropogenic pressure upon forest ecosystems. The nature conservation measures, in particular a considerable increase of protected areas in the whole region studied, also seem to be having a positive effect.

The greatest threats to *Ciconia nigra* is the problem of disturbance by humans due to the intensive forestry activities. The second is the reduction of feeding resources because of drainage. Another negative influence is the lack of trees which are used by storks for nesting. The intensive forestry activities have resulted in considerable rejuvenation of forests.

54

English, P.A. & Montgomerie, R.

Queen's University, Department of Biology, Biosciences Complex, 116 Barrie St., Kingston, ON, Canada K7L 3N6,
paenglis@lakeheadu.ca

Robin's egg blue: testing whether egg colour is a sexual signal in *Turdus migratorius*

A recent hypothesis for explaining blue-green eggs in birds suggests that they may be a sexually selected signal of female (and nestling) quality that males use to make parental investment decisions. Although this hypothesis has found mixed correlational support in a variety of species, well-controlled experimental support has been lacking in non-cavity-nesting species with vivid blue eggs. In this study, we isolate the influence of egg colour on male behaviour by replacing natural *Turdus migratorius* clutches with four artificial eggs (all of the same colour) representing extremes in natural colour intensity. After incubation, three unrelated nestlings were fostered into each experimental nest immediately after hatching, and parental behaviour was monitored when nestlings were 3, 6, and 9 days old. For the youngest nestlings, male provisioning rate significantly increased in the dark egg treatment; however, the effect of egg colour disappeared at the oldest nestling stage. This result remains significant when controlling for slight variation in nestling age as well as female behaviour. These results suggest that blue-green egg colour acts as post-mating sexual signal in at least some cup-nesting species, but it in no way excludes the possibility that the blue-green pigment also serves other adaptive purposes.

81

Erbrech, A.¹, Martrette, J-M.², Guérin, N.¹, Verrier, D.¹, Trabalon, M.², Groscolas, R.¹ & Robin, J-P.¹¹Institut Pluridisciplinaire Hubert Curien, Département Ecologie Physiologie Ethologie, UMR 7178 CNRS/UdS, 23 rue Becquerel, 67087 Strasbourg Cedex 2, France, ²Nancy – Université, Faculté des Sciences & techniques BP239. Bld des Aiguillettes, 54506 Vandoeuvre, France, jean-patrice.robin@c-strasbourg.fr**Myosin heavy chains expression in the pectoral and pelvic muscles during the early phase of growth in the King Penguin chick, *Aptenodytes patagonicus***

A continuous growth and a sustained food supply characterize the rearing period of young birds, but exceptions to this trend arise in species with long breeding periods. Parental food provisioning may then fluctuate seasonally. In such situations, the conflict between the necessary maturation of tissues and these energetic constraints remains poorly understood. This question was addressed in King Penguin chicks whose growth, that lasts one year, is transitorily stopped during winter when the parental food provisioning is drastically decreased. We compared the expression of the myosin heavy chains (MyCHs) in pelvic and pectoral muscles during the first two months of growth, before winter. Comparisons were also made with adults. Data originated from freshly predated birds whose body mass and statural development did not differ significantly from free-living chicks. During this period, in the pelvic girdle, but not in the pectoral muscle, muscle masses increased more rapidly than body mass ($P < 0.05$). In adults the pelvic and pectoral muscle masses were 3–4 and 30 times increased above chick's values, respectively. Six bands of MyCHs were revealed from SDS-PAGE but only 4 bands (1, 3, 4, and 6) representing more than 99 % of the total were detected by densitometric analysis. Except for a transitory band 3 representing 5 ± 2 % of the total MyCHs, only band 1 was detected in the pectoral of chicks and adults. In the leg muscles of chicks and adults, bands 1 and 4 represented, respectively, 70–90 and 10–15% of the MyCHs but transitory bands (3 and 6) were detected in the early stages of growth in chicks. To conclude, MyCH maturation in the pectoral muscle of King Penguin chicks does not follow the sequence described for chicks in other bird species. These data will be discussed according to muscle fibre composition, thermoregulatory constraints and locomotor activity differences between chicks and adults.

9

Erciyas, K., Özsemir, A.C., Yavuz, N. & Barış, Y.S.

Ondokuz Mayıs University, Ornithological Research Center, 55139 Kurupelit Samsun, Turkey, erciyaskiraz@yahoo.com

The migratory behaviour of *Sylvia borin* at the Black Sea coast, north of Turkey

Since 2002 ringing and orientation cage experiments have been performed with migrating passerines at Cernek Ringing Station, Turkey. Results of orientation cage experiments showed that directional preferences of most long distance nocturnal migrants headed almost in the same direction. In 2004, in two locations at Kızılırmak delta, northern Turkey, Samsun, we did orientation cage experiments at different sites of the delta. Both directions recorded lead to the Kızılırmak valley, which penetrates the coastal mountain belt in the North – South direction. Our results suggested that orientation experiments show directional preferences related to the local topography / conditions. To support our hypothesis we radio tagged 4 *Sylvia borin* during their autumn migration in 2008. This poster focuses on the preliminary findings of the radio tagged birds and compares the results with our previous experience.

In one case the radio tag battery ran out and in a second we lost signal after the first day of attachment. The other 2 tags were followed during their autumn migration flight by night. One of them was tracked 18 km, the other approximately 45 km from their starting point. Both followed the same route. In addition to the data collected on migration route, some additional information on stopover duration, flight height, weather circumstances and speed was also recorded.

5

Fiuczynski, K.D., Howey, P.W., Meyburg, C. & Meyburg, B.-U.

World Working Group on Birds of Prey (WWGBP), Wangenheimstr. 32, 14193 Berlin, Germany, BUMeyburg@aol.com

Intercontinental migration of an Eurasian Hobby (*Falco subbuteo*) tracked by means of a 5 g satellite transmitter

When using telemetry as a study method, the weight of the transmitter should not exceed 3 % of the body mass of the bird under study in order not to unduly impair the bird and thereby falsify the study results. This still excludes 85 % of all bird species from satellite telemetry studies. On 9 August 2008 an adult female Hobby (weight 265 g) which had raised two offspring was trapped near its eyrie slightly northwest of Berlin and fitted with a new type of transmitter which was still in the trial phase. The device was a solar transmitter weighing only 5 g. After departure on migration in the second half of August, with a short rest from 6 to 13 September on the island of Elba off the west coast of Italy, migration continued at first in a southerly direction as far as North Africa. From Libya (20 September) the bird flew in a SSW direction and reached the most westerly point of its migration route on 30 September in western Nigeria close to the border with Benin. After an initial swing of 90° towards the southeast, the falcon took a southerly course from 8 October in Cameroon. It maintained this course until reaching its main wintering area in the Zambezian Baikiaea woodlands and to some extent also in the Angolan Miombo woodlands in southern Angola on 17 October. After more than 2 months it continued migration reaching the most southerly point of its route between Bulawayo and Harare in central Zimbabwe on 1 January 2009. The length of the outward migration route from the nest site, excluding regional movement in Angola, was 10,065 km. This smallest and lightest satellite transmitter produced to date delivered astoundingly high numbers of good Argos Doppler fixes (LC:2 and LC:3).

23

Freiberger, I. & Keiřs, O.

Laboratory of Ornithology, Institute of Biology, University of Latvia, Miera iela 3, LV-2169 Salaspils, Latvia, oskars.keiss@lu.lv

Can we observe delay of autumn migration by small passerine birds in Latvia?

Timing of autumn migration was analyzed using capture data of 20 years (1989–2008) at Lejasciems, Latvia (57°16'N; 26°34'). Birds were mist-netted annually from August 1 until September 30 each year. The median date of annual captures for each species was used to represent migration timing in each year. Data for 12 species were analyzed: *Carduelis spinus*, *Erithacus rubecula*, *Fringilla coelebs*, *Parus major*, *Prunella modularis*, *Regulus regulus*, *Sylvia atricapilla*, *S. borin*, *S. communis*, *Phylloscopus collybita*, *P. trochilus* and *Troglodytes troglodytes*. The only species without linear trend in migration timing was *Erithacus rubecula*. Four species showed increasingly later migration dates over the study period: *Fringilla coelebs* ($p=0.005$) *Parus major* ($p<0.05$), *Regulus regulus* ($p=0.005$), *Phylloscopus collybita* ($p<0.03$), *Troglodytes troglodytes* ($p=0.005$), two species non-significant tendencies in the same direction: *Sylvia atricapilla* (n.s.) and *Phylloscopus trochilus* (n.s.). Four species showed a tendency for increasingly earlier migration dates: *Sylvia communis* (n.s.), *S. borin* (n.s.), *Carduelis spinus* (n.s.) and *Prunella modularis* (n.s.).

109

Gache, C. & Müller, J.W.

"Al. I. Cuza" University, Iasi, Romanian Ornithological Society, Faculty of Biology, Bd. Carol I, 20A, Iasi, 700505, Romania, cgache@uaic.ro

Bird fauna evolution and conservation actions in the Romanian lower Prut River basin

Our studies in the Romanian Prut River basin began in the summer of 1992 and are ongoing, focusing on the diversity of the bird fauna. We present data on patterns of diversity and population trends during the last 18 years, under the pressure of a transition economy period in this area. The Prut River basin's bird list includes 248 bird species (67 % from Romania's birds). Among these, 139 are breeding species, some of them very rare breeding species for Romania (*Platalea leucorodia*, *Plegadis falcinellus*, *Limosa limosa*,

Recurvirostra avosetta, *Himantopus himantopus*, *Luscinia svecica*, etc.). Three Important Bird Areas (IBAs) were designated in the lower part of the Romanian Prut River basin (Carja-Mata-Radeanu ponds & Roscani Forest, Vladesti - Frumusita Prut River valley and Brates Lake, the last two are belonging to the natural park "Lower Meadow of Prut River"). The conservation status of the ecosystems and the biodiversity value are still good due the border status that restricts the presence of people, but also due to low level of industrial development in the area – for decades, human activities were restricted to the hydro-technical arrangements, fisheries activities, agriculture and occasionally hunting. During the last ten years, human pressure increased through deforestation actions, fisheries abandonment, quarries for sand, gravel and limestone, illegal electrical fishing and hunting activity, infrastructure development and, recently, wind farm development. The habitats lost, associated with the natural calamities (very dry summers or historical flooding, in 2008) represent the principal threats, resulting in negative trends of the breeding populations and low reproductive success recorded in the last three years.

102

Gandolfi, M. & Daniel, O.

Research Station Agroscope Changins-Wädenswil ACW, Schloss, P.O. Box, 8820 Wädenswil, Switzerland,
 michela.gandolfi@acw.admin.ch

Impact of pesticides on farmland birds: ecotoxicological risk assessment

Pesticides can only be authorized if they do not have any unacceptable adverse effects on the environment. As a part of the approval procedure it has to be demonstrated that a pesticide is safe for organisms coming in contact with it after field application. In Switzerland this regulatory task is performed by the ecotoxicology group at the Research Station Agroscope ACW in Wädenswil. The experts assess the ecotoxicological risk of a pesticide for a broad palette of organisms: aquatic organisms (fish, water fleas, aquatic insects, algae and macrophytes), soil organisms (worms, microorganisms), and terrestrial organisms (insects, wild mammals, birds).

In this poster we focus on the risk assessment procedure for birds, which is a particularly complex issue. The risk to birds is mainly assessed by comparing the toxicity of the pesticide to birds with the actual exposure of birds to the pesticide in the field. Birds are exposed to the pesticide by feeding on contaminated food in fields after pesticide application. To quantify this exposure, extensive knowledge is required at an agronomic, chemical, biological and ecological level. Specialists have to know how the pesticide is applied, in which culture and at which growing stage. They have to identify the potential bird food present in the field (insects, seeds, plants or worms), the degradation and bioaccumulation of the compound and the resulting residues on this food. Further, experts have to know which bird species are actually occurring in the given crop, what and how much they eat, their habitat preferences, their feeding, nesting and reproductive behaviour, as well as the availability of alternative uncontaminated habitats. Specific ecological field data and observations are often required. The poster presents how these ecological factors are considered in the pesticide risk assessment for birds.

92

Gonzalez¹, J., Förchler², M. & Wink¹, M.

¹Institut für Pharmazie und Molekulare Biotechnologie (IPMB), University of Heidelberg, Abteilung Biologie 4. OG, Im Neuenheimer Feld 364, 69120 Heidelberg, Germany, ²Institut für Vogelforschung, Vogelwarte Helgoland, An der Vogelwarte 21, 26386 Wilhelmshaven, Germany, javier.gonzalez@urz.uni-heidelberg.de

Genetic distinctiveness of the Canarian Southern Grey Shrike (*Lanius meridionalis koenigi*)

The genus *Lanius* contains 27 species that are mainly restricted to the Old World except for two in North America. The Southern Grey Shrike (*Lanius meridionalis*) is considered as a polytypic species which inhabits the Canary Islands, northern Africa, the Middle East and Central Asia. At least ten subspecies of Southern Grey Shrike are recognized differing in coloration, body size, structure of face-mask and the extent of white in the wings. Among these subspecies, the juveniles of the Canarian subspecies (*L. meridionalis koenigi*) uniquely bear vermiculated underparts.

We obtained nucleotide sequence data from mitochondrial (cytochrome *b*) and nuclear genes (myoglobin and ornithine decarboxylase) in order to reconstruct the phylogenetic relationships among several species of shrikes (genus *Lanius*). Specifically, we test the hypothesis that two subspecies, *L. meridionalis koenigi*

(on the Canary Islands) and *L. meridionalis algeriensis* (on the African mainland), may be considered as synonymous. Phylogenetic analyses are based on maximum parsimony, maximum likelihood and Bayesian inference.

We also provide evidence from inter simple sequence repeats (ISSR) genomic fingerprinting to test the genetic distinctiveness of *L. m. koenigi*.

24

Grandāns, G., Avotiņš, A. & Keišs, O.

Department of Zoology and Animal Ecology, University of Latvia, Kronvalda bulv. 4, LV-1586 Rīga, Latvia, gaidis_g@inbox.lv

Breeding phenology of Tawny Owl *Strix aluco* in Eastern Latvia

Factors influencing breeding phenology of Tawny Owl *Strix aluco* in Eastern Latvia were analyzed. Data on the laying date of the first egg were obtained from 344 nests during 1991–2008. Data on owls breeding in natural cavities and nest-boxes in seven sample plots in five districts (Aizkraukle, Balvi, Gulbene, Ludza, Madona, Rēzekne and Ludza) were used. Capture and ringing of females were performed (although not for all nests) and morphological parameters and age of the female were recorded. Data on small mammal abundance at Teiču Nature reserve (Madona district) were used for analyses. Publicly available information on weather conditions at Zīlāni (Jēkabpils district) was used. Timing of breeding varied substantially between years: mean laying date of the first egg ranged between March 13 (2002) and April 14 (1996). Range of the recorded extremes was even greater: February 20 (2002) and April 30 (1998 and 2001). There was no trend of the timing of the laying of the first egg during the study period of 18 years. Female characteristics (age, weight, wing-length) had no effect on the date of the first egg. Similarly small mammal abundance neither in previous autumn, nor in spring had an effect on the timing of breeding. The only two factors having a statistically highly significant influence were mean air temperature in February and March (positive effect), as well as depth of snow cover in February and March (negative effect). Mean air temperature and snow depth in January had no effect. We conclude that the Tawny Owl *Strix aluco* are benefiting by warm springs with little snow cover, which might have helped in relatively recent colonization of Finland (first observation of the species in 1875) and gradual increase from rare to common species in Estonia since 1960.

62

Greño¹, J.L., Barba¹, E. & Belda², E.-J.

¹ "Cavanilles" Institute of Biodiversity and Evolutionary Biology, University of Valencia, PO Box 22085, E-46071 Valencia, Spain, ² Instituto de Investigación para la Gestión Integrada de Zonas Costeras – IGIC, Universidad Politécnica de Valencia, Crta. Nazaret- Oliva s/n, E-46730-Gandia, Spain, jogreru@gmail.com

Why some parents do not become grandparents?

During reproduction, parents transmit their genes to their offspring, but genes will only be incorporated into the population if these offspring survive and reproduce. We could know why some parents contribute more to the population gene pool by studying factors and parental decisions affecting the probability that at least one of the chicks of a given brood recruit into the breeding population.

The Great Tit *Parus major* was used here as a model species, and a 14-year capture-recapture dataset from a population breeding in nest-boxes in Sagunto (Valencia, Spain), analysed. For constructing every nest's capture history, we only considered a "nest recapture" each occasion in which at least one chick of that nest was recaptured.

The study was based on 1010 different clutches where at least 1 chick fledged between 1992 and 2004. In subsequent years (1993-2005), chicks belonging to 258 of these nests were recaptured as adult breeders in nest-boxes. We categorised clutches into two groups: first (780) and later clutches (230, combining second and replacement clutches). The independent variables we used were: laying date, clutch size, hatching date, number of hatchlings and fledglings, mean minimum temperature during the nestling period, mean nestling weight and weight of the heavier chick (both measured when chicks were 14-15 days old).

Our results show that the probability that at least one chick per nest recruits into population did not depend on clutch type *per se* (0.32 ± 0.03 and 0.32 ± 0.05 for first and later clutches respectively), and increased with the number of fledglings per nest. A negative effect of high temperatures was found on recruitment probabilities of first but not later clutches. Moreover, the probability of having at least one recruit in later

clutches was positively affected by higher clutch sizes (related with female quality) and mean nestling weight.

10

Gursoy, A.¹, Kefelioglu, H.¹ & Baris, Y.S.²

Ondokuz Mayıs University, ¹Ondokuz Mayıs University Art & Science Faculty, Department of Biology, 55139 Kurupelit – Samsun, Turkey, ²Ondokuz Mayıs University Ornithological Research Center 55139 Kurupelit – Samsun, Turkey, agursoy@omu.edu.tr

Analyses of morphological features of *Motacilla flava* (Linnaeus, 1758) populations which migrate from Kizilirmak Delta

This study was conducted from 4 April - 3 May 2004, 27 March - 3 May 2005, 19 - 21 April 2006 and 1 April - 1 May 2007 at the wildlife protection area of Cernek Lake in Kizilirmak Delta during the spring migration season. Eight taxa were identified; these are *M. f. beema*, *M. f. dombrowskii*, *M. f. feldegg*, *M. f. flava*, *M. f. lutea*, *M. f. melanogrisea*, *M. f. superciliaris* and *M. f. thunbergi*. This study, which aims to identify the taxonomy of *M. flava* subspecies is the first and most detailed study in Kizilirmak Delta in Turkey.

Statistical evaluations were carried out on supercilium, subocular patch, moustachial stripe both area and projection length of head photographs which were obtained from 179 ringed *M. flava* male individuals. The size and resolution of the photographs were different and head photographs of samples were evaluated with AutoCAD program. In order to calculate the length and area and standardize the measurements on head photographs, a constant plane was determined. And then, the measuring standard was obtained by the projections falling perpendicular to the plane and taken at the end of measures.

Supercilium area analysis showed that *M. f. superciliaris* was distinguished from *M. f. beema*, *M. f. dombrowskii*, *M. f. flava* distinctively. According to results three different groups were formed: first one was *M. f. thunbergi*; the second *M. f. flava*, *M. f. superciliaris* and the third *M. f. dombrowskii*, *M. f. flava*, *M. f. beema*.

According to subocular patch area analysis, *M. f. dombrowskii*, *M. f. flava* and *M. f. beema* were separated from each other significantly.

Supercilium length projection analysis showed that *M. f. dombrowskii*, *M. f. flava* and *M. f. beema* have separated into different groups and *M. f. flava*, *M. f. dombrowskii* and *M. f. superciliaris* have formed another group.

As to results of subocular patch length projection analysis *M. f. flava*, *M. f. dombrowskii* and *M. f. beema* have not formed a group and are distinctively separated from each other.

We conclude that there were some gradual changes in head patterns, these parameters provide little taxonomic support for the yellow wagtail subspecies taxonomy in the western Palearctic.

12

Gyurácz, J. & Bánhidi, P.

University of West Hungary, Institute of Biology, István Chernel Ornithological and Nature Conservation Society, Károlyi G. tér. 4., H-9700 Szombathely, Hungary, gyjozsi@ttmk.nyme.hu

Autumn migration of Blue Tits (*Parus caeruleus*) in a West Hungarian stopover site

The autumn migration of the Blue Tit (*Parus caeruleus*) has not been examined in detail yet in Hungary. In this study the autumn movements were analysed using data from 3429 birds ringed during the years 1998 to 2007 at the Bird Ringing Station of Tömörd (West Hungary). We established that the Blue Tit was a partial migrant species, but it did exhibit major irruptions in 2004. The irruptions in the study area are most likely explained by the low beech crop in the Alps and Carpathians as well as in northern areas (Poland and Baltic region). The smaller part of the local population, primarily the males are resident, the majority of juveniles and females being migratory. The autumn migration begins in the second part of August. No temporal shift was found from 1996 to 2006. The juveniles migrated earlier than the adults. The most northern irruption birds migrated at the end of September and in the first half of October through the study area. The proportion of recaptured birds was smaller and the stopover time of recaptured birds was shorter in the irruption years than in others. The forest and the bushy habitat types were better habitats for feeding and fat deposition than the grassland with bushes and the marsh. Some birds of the migrating through the study area winter on the Adriatic coast (Croatia).

22

Harnos, A., Csörgő, T., Nagy, K., Kovács, Sz. & Fehérvári, P.

*Szent István University, Faculty of Veterinary Sciences, István u. 2, H-1078 Budapest, Hungary,
harnos.andrea@gmail.com*

The change in timing of migration of Chiffchaff *Phylloscopus Collybita* sexes in the Carpathian Basin

In case of many passerine bird species, the lack of visible sexual dimorphism hinders the investigation of the sex-based differences in migration strategies and timing.

The Chiffchaff shows marked sexual size dimorphism with males being considerably larger than females. The limit between males and females may vary between populations since birds breeding in the northern parts are larger than the ones breeding near the southern extent of the breeding range. Individuals from different populations may mix together during migration, therefore size-based sexing of individuals is only possible during the breeding season when the brood patch and the enlargement of the cloacae are reliable sexual traits. The Chiffchaff population of the Carpathian Basin is considered as an isolated population as very few northern birds migrate through the area; therefore size dimorphism can be reliably used to identify the sexes.

We analysed the data for approximately 13000 Chiffchaffs ringed in Hungary, at the Ócsa Bird Ringing Station between 1984–2007. Using the wing and tail length measurements, we sexed the individuals with model-based clustering. Gauss curves were used to approximate migration waves of both sexes; the timing of migration was characterized by the location of the maximum of the curves.

In spring, males arrive earlier than females. Higher temperatures in February lead to earlier arrival of males. The average arrival dates have shifted 5–6 days earlier for this sex in the past 24 years. Meanwhile the difference in spring arrival of males and females increases with higher temperatures in March. The situation is reversed in autumn, when warm September temperatures delay the migration of males compared to females, thus a gradual shift in sex ratio can be shown during the autumn migration.

Our studies show sex dependent migration strategies of the Chiffchaff, and that the sexes react differently to weather changes.

69

Hetmański, T.

*Department of Zoology, Pomeranian University in Słupsk, Arciszewskiego 22b, 76-200 Słupsk, Poland,
t.hetmanski@onet.eu*

Female-female couples in socially monogamous Feral Pigeon *Columba livia f. domestica*

The Feral Pigeon is a socially monogamous species with bi-parental care. During a four-year study of breeding colonies under natural conditions, adults of both sexes occurred in similar proportions. The same number of nestlings of both sexes hatched, and the survival of young males and females was similar, so they entered the breeding population in the same proportions. Under natural conditions, only few males and females were unpaired over the breeding season. They accounted for 0 to 7 % of the breeding adults. But seasonally, the proportion of unpaired birds was higher, especially early in the breeding season. Unpaired females laid eggs, but usually abandoned the nest immediately after laying. Only some of them incubated eggs and raised nestlings without males. Over the four-year study, no female-female pairs were recorded in the colonies of free-living Feral Pigeons in the town of Słupsk (N Poland).

An experimental colony had a female-biased sex ratio. Of 20 unpaired females, 10 formed female-female pairs. The remaining females accompanied the males paired with other females. Females in same-sex pairs most often laid 4 eggs. The presence of 4 eggs reduced hatchability as a consequence of poor incubation. For this reason, 2 eggs were experimentally removed. Hatching success of these pairs was high (75 %), but a little lower than in female-male pairs (81 %). Fledging success was, 50 % and 73 % respectively, for the number of eggs laid. The persistence of female-female pairs was high also when young males appeared. These pairs actively defended their nesting territories, even against males. Unpaired females often incubated eggs under aviary conditions, but had much lower hatching success (48%) and fledging success (18 %) than female-female and female-male pairs.

The study shows a high behavioural plasticity in females due to which they can form pair bonds and raise chicks in colonies with female-biased sex ratio. The formation of female-female pairs may be facilitated by a weak sexual dimorphism in this species.

42

Hovhannisyan, T., Janoyan, G., Schäfer, M. & Aghababyan, K.*Acopian Center for the Environment, American University of Armenia, 40 M.Baghramian 0019, Yerevan, Armenia, tsovinarhov86@gmail.com, karen@aua.am***Some habitat preferences of Long-legged Buzzard (*Buteo rufinus*) in Armenia**

The Long-legged Buzzard (hereinafter LLB, *Buteo rufinus*) in Armenia was studied in 2006-2008 during general bird survey trips and special trips aimed at searching of the LLB nests. The study area covers some districts in central part of Armenia. The distances between the nests (nearest neighbour distance) vary in different regions of Armenia: in Vedi district the mean distance is 1.98 ± 0.19 km ($n=10$) while in Vayots Dzor region the mean distance is 3.04 ± 0.3 km ($n=5$); $t=3.14$, $p=0.008$. The difference in density seems correlated with steepness of surrounding area, since the Vedi district is generally more flat than the Vayots Dzor region, which indicates that probably LLB prefer habitats with less steepness of slopes. This is probably best explained by the hunting technique used by LLB, which catches the prey on the ground and then drops the prey down to the ground from 5–10m. The other limiting factor is cliff availability, since in Armenia LLB breeds only on cliffs. Although LLB does not show dependence on the height of the cliffs and can place the nest at a height of 2–30 m, it does not breed on trees, like in some parts of its area in Siberia.

74

Ignat, A.E.*"Al. I. Cuza" University, Faculty of Biology, Bd. Carol I, 20A, 700505, Iasi, Romania, alinaei@yahoo.com***Observations on the hatching of the Night Heron (*Nycticorax nycticorax*)**

The present poster provides data about the hatching process of *Nycticorax nycticorax*. At the end of the incubation period, a hatching crack appears. The egg shell cracks in one point initially at the obtuse pole of the egg, using 'the diamond', a hard portion on the top of the beak that remains visible for a few days after the hatch. After the creation of the first window through which the hatchling can take its first breath, it will make two types of rotation movements inside the egg shell in order to hatch. The first type of movement it makes is along the small diameter of the egg. Pecking the shell around, it makes a circle (360°) using 'the diamond' to create the cleft through which it will hatch. Once the air enters in the egg, the shell begins to dry, becoming brittle and easy to break. When the cleft is finished, the hatchling's position in the egg is with the legs at the pointed pole and the head at the obtuse pole. The second rotation movement follows at 180° within the egg, along the big diameter, describing a semicircle. When the rotation is finished, the hatchling reaches with its legs the obtuse pole and with its head and shoulders the pointed pole. It begins to push its shoulders and back of the head against the shell, simultaneously stretching its legs, doing a 'lifting' movement to get out. Furthermore, this position remains impressed on the hatchling in its first hours of life. The little cap previously cut cracks and the hatchling gets its legs out first from the egg. Through rubbing against the cover and withdrawal movements, it completely releases itself from the egg shell. We consider that this manner of hatching is particularly important because the gradual exit, first with the inferior part of the body and then of the superior one, offering protection for the vital organs.

103

Kazartseva, S.N.*Voronezh State Pedagogical University, 86 Lenin st., Voronezh, zip 394043, Russia, sof.nik@rambler.ru***Transformation of avifauna on fallow land**

Reduction of croplands in Voronezh region (200,000 ha in 2001) resulted in their gradual occlusion of natural vegetation.

Avifauna of ground-nesting birds of forest-steppe and steppe areas (2003-2008 years) on lands taken out of agricultural usage (fallow land), with three initial stages of succession of soil-dwelling canopy: weeding, weeding couching and false couching has been examined. During succession, small reduction of nesting species and great reduction of population density occurs. In different places *Alauda arvensis* and *Saxicola rubetra* dominate with population density of 60–80 %.

The height of grass stand is a very important factor influencing the population density in fallow land. Using regression analysis of data from fallow land of false couching succession, there is a statistically significant negative correlation between population density of *Saxicola rubetra* and the height of the first ($r = -0.88$) and the second ($r = -0.96$) layers of grass canopy. The population density of *Alauda arvensis* in the same conditions is in parabolic dependence from the layers of grass that can be evaluated by the equations: $y = -64.33x^2 + 21.69x - 16.47$ (for the first layer), $y = -82.61x^2 + 35.45x - 35.06$ (for the second layer).

While moving from forest-steppe area (the Northern part of Voronezh region) to the steppe area (the South) there is a greatly marked tendency of an increase in species richness and general population density of birds on the fallow land not taking into account the level of succession. The average population density of *Alauda arvensis* rises from 33 to 41 pairs/km² in northern areas (forest-steppe) and to 131 pairs/km² in steppe area. The average population of *Saxicola rubetra*, which is the same in the North and the South of the region, decreases in the central parts.

Fallow land occlusion of woody species in forest-steppe area (*Pinus sylvestris* L., *Ulmus glabra* Huds., *Acer negundo* L.) results in a drop of the general density of bird populations and change in species. With growing of age and forest crop the birds from the open areas (*Alauda arvensis*, *Saxicola rubetra*, *Motacilla flava*) are replaced by forest species (*Anthus trivialis*, *Chloris chloris*, *Lanius collurio*).

It is determined that transformation of avifauna depends on de-mutative processes and connected with them changes of ecological conditions.

105

Keišs, O., Auniņš A., Brūmelis, G.

Department of Botany and Ecology, University of Latvia, Kronvalda bulv. 4, LV-1586 Rīga, Latvia, oskars.keiss@lu.lv

Management history and forest biodiversity: what does the forest bird index show?

Standardized common bird monitoring is carried out in Latvia since 2005. Previously, forest bird surveys by line transect method were conducted in Latvia in 1960–1964 and 1983–1994. The potential study sites are uniformly distributed in all territory of Latvia and volunteer observers can choose a 5 km square, where a sample plot with 4 km transect line for bird survey is selected at random. Full cycle of surveys consisting of 3 standard counts (end of April, mid May and early June) and optional early count (end of March) to cover the early breeding species was carried out for two or more years (2005–2008) in 36 sample plots. The index of population change was calculated based on results of these plots. A subset of plots in forests with different management history were surveyed by professional ornithologists in 2006 and 2009 in order to see whether management history has an impact on the avifauna. We compared forests formed since 1920s (by overgrowing of agricultural lands) with forests formed earlier. Various organisms were studied at these plots, birds being the only vertebrates. Standard bird surveys were conducted. Species-specific indices were calculated using loglinear regression. Several species showed a significant increase of the index – most of the sedentary, partial and short-distance migrants: four species of the genus *Parus*, *Sitta europaea*, *Dendrocopos major*. Two other species showed significant decrease – *Carduelis spinus* and *Bonasa bonasia*. Being a partial migrant and sedentary species correspondingly, they indicate direct and indirect role of recent, not historical, forest management practices. Monitoring of the common birds in forests we might see more species increasing, but analyzing the historic management impact, populations of several formerly common species have dramatically decreased during the last 40 years.

35

Kochanov, S., Selivanova, N. & Mineev, O.

Institute of Biology of Komi Scientific Centre of Ural, Komi Republic, 167982 Syktyvkar Kommunisticheskaya 28, Russia
kochanov @ib.komisc.ru, Selivanova @ib.komisc.ru

Bird fauna and populations on the Upper Pechora area

Field research was performed in 2000–2004 in plains, foothill and the mountain landscapes on the upper Pechora river, Shugor and Oenja. 67 variants of bird populations were studied in 30 different habitats. We established the occurrence of 198 bird species from 16 orders (149 species have a status of nesting). The research aimed to test the effects of topography, the high-altitude zone and human activity on the quantitative characteristics of the bird fauna and population. With the increase of high-altitude the species richness decreases from 169 to 109 species, which is conditional upon the reduction of patchiness and

variety of the ecological conditions of the territories and by change in forest structure. In the plain territories, bird communities have higher representation of the European species, but lower percentage of the Siberian, Arctic and Chinese birds. At all districts 24 protected species were registered, of which the biggest number was registered in plain and piedmont districts – 20 and 18 species, and 7 species were registered in the mountainous area. Forestry and agriculture resulted in a reduction in the number of birds that nest in treetops and in holes. As a result we noticed the growing number of birds that nest on the ground and in bushes. Analysis of the specific and ecological structure of the population of birds shows a special role of the piedmont area. Here we note a higher ecological diversity of communities of the forest birds, here the largest quantity of nesting protected species occur, waterfowl and birds of prey, and a high number of birds that have a strong economical significance. This territory plays a role of a certain refuge for the support of the specific and ecological diversity of birds of contiguous territories.

70

Kosmalski, W. & Goc, M.

University of Gdańsk, Department of Vertebrate Ecology and Zoology, Al. Legionów 9, 80-441 Gdańsk, Poland, biowojt@gmail.com

Daily feeding rhythm of the Grey Heron during the breeding season

The activity of many birds is changing during the day as well as their foraging rhythm. This study describes the feeding activity at a Grey Heron *Ardea cinerea* breeding colony located in N Poland with over 600 breeding pairs. We placed cameras at the colony and continuously recorded several nests in May and June 2007 during daylight. The time of single feeding was measured and the number of visits made by adults during a day was counted. About 40 % of feedings took place in the early hours after sunrise, then the number of visits dropped around noon and rose again before sunset, but did not reach the level of the morning activity. Weather condition may have impacted on foraging success and therefore on the number of feedings and the daily feeding rhythm.

21

Kovács, Sz., Csörgő, T., Harnos, A., Nagy, K. & Fehérvári, P.

Szent István University, Faculty of Veterinary Sciences, H-1078, Budapest, István u. 2, koviszilvi@freemail.hu

The difference in the timing of migration of sex and age groups in several Sylviidae warbler species

In recent decades, the timing of migration of several bird species has changed. Most previous studies did not differentiate age and sex groups in their analysis. However the timing of migration is strongly dependent on sex during spring, and is sex- and age-related during autumn.

We used the ringing data of 7 Sylviidae warbler species (Reed Warbler - *Acrocephalus scirpaceus*, Marsh Warbler - *A. palustris* – Sedge Warbler - *A. schoenobaenus*, Chiffchaff - *Phylloscopus collybita*, Wood Warbler - *P. sibilatrix*, Blackcap - *Sylvia atricapilla*, - Garden Warbler - *S. borin*). Approximately 100,000 birds were ringed, at the Ócsa Bird Ringing Station (Hungary) between 1984 and 2007. We treated the age groups (i.e. 1st calendar year birds and adults), and – if possible – the sexes separately. Five of the seven species can be classified as passage migrants, the Chiffchaff and the Reed Warbler are Carpathian-Basin isolates.

In spring, the arrival of all species – except the Marsh Warbler, and female Chiffchaffs and Blackcaps – has shifted earlier. In case of the two species where it was possible to determine sex (Blackcap and Chiffchaff), males arrived earlier than females. In autumn on the other hand, males left the study site, on average, later than females. The autumn migration of adult birds, other than chiffchaffs, was earlier than that of the young, while the deviation in timing amongst age groups – except for Marsh Warblers – changed differently. In case of Wood Warbler, Garden Warbler, Blackcap and Marsh Warbler, the timing of migration of young birds shifted later, while the timing of adults did not change during the 24 years, therefore the difference between the age groups grew steadily.

Our results confirm the importance of treating sex and age groups separately when analysing the impacts of climate change on the timing of migration of passerine birds.

114

Krams, I., Bērziņš, A., Krama T., Wheatcroft, D. & Rantala, M.J.*Institute of Systematic Biology, Daugavpils University, Vienības iela 13, LV-5401 Daugavpils, Latvia, indrikis.krams@biology.lv***The increased risk of predation enhances cooperation in breeding Pied Flycatchers**

Theory predicts that animals in unpredictable environments can decrease individual risks and increase long-term benefits by cooperating with neighbours. However, some empirical studies suggest that animals facing uncertain futures focus on short-term benefits, which reduces the likelihood that they will cooperate with others. In this experimental study, we tested between these two alternative hypotheses by evaluating whether increased predation risk (as a correlate of environmental unpredictability) enhances or diminishes the occurrence of cooperation in mobbing, a common anti-predator behavior, among breeding Pied Flycatchers (*Ficedula hypoleuca*). We tested whether birds would join their mobbing neighbours more often and harass a stuffed predator placed near their neighbours' nests more intensely in areas with a higher perceived risk of predation. Our results show that birds attended mobs initiated by their neighbours more often, approached the stuffed predator significantly more closely, and mobbed it at higher intensity in areas where the perceived risk of predation was increased. This study demonstrates the positive impact of environmental uncertainty on cooperation in breeding songbirds, which might help to explain the emergence and evolution of cooperation.

53

Krist, M.*Museum of Natural History, Nam. Republiky 5, 771 73 Olomouc, Czech Republic, milos.krist@volny.cz***Egg size and offspring quality in birds: a meta-analysis**

Trade-off between egg size and clutch size is the central tenet of life-history evolution in birds. In line with this trade-off, offspring should benefit from being laid in large eggs. Results of empirical studies are equivocal – some found fitness benefits of large eggs while others reported non-significant relationships. Such variation between studies may be caused either by underlying biological phenomena or by sampling error. Quantitative assessment of published results is necessary to distinguish between these possible explanations. I perform a meta-analysis of studies testing for a relationship between egg size and offspring size, growth, and survival in non-domesticated birds. So far I have located 244 studies on 152 bird species that tested for the above relationships. However, in the majority of these studies the results were not published in sufficient detail to enable computation of effect size. I will try to contact authors of these studies for additional details. However, resulting sample size is likely to be smaller than the above figure. I will test whether effect of egg size differs between focal traits (i.e. offspring size, survival, growth), altricial and precocial species, study designs (observational, cross-fostering, intracutch), rearing environment (wild vs. captivity) and whether egg-size effect diminishes as young grow older.

37

Laube, I., Graham, C.H. & Böhning-Gaese, K.*Department of Ecology, Johannes Gutenberg-University Mainz, J.-J.-Becher-Weg 13, D-55099 Mainz, Germany, irina.laube@uni-mainz.de***Range filling: towards a mechanistic understanding of range size**

The range of a species is one of the most important parameters in biogeography, ecology and conservation. Understanding the complex interplay of factors influencing the size and configuration of species' ranges remains a challenge. Species ranges can be shaped by present species characteristics including body size, habitat choice or dispersal ability, a species' history including its phylogenetic age, biotic interactions including competition and present and past geographic and environmental conditions. As a first approach to better understand the factors behind the present configuration of breeding ranges in the genus *Sylvia*, we use species distribution models to create potential geographic distributions based on climate and vegetation and compare these to the actual breeding ranges.

In the genus *Sylvia* we find both species with high range filling, whose distributions are likely limited by present environmental conditions, as well as species that do not occupy all potentially suitable regions. Low

range size seems to be related to low range filling rather than to the restricted geographic distribution of suitable habitat.

To further investigate what might cause differences in range filling, we test whether *Sylvia* warblers who exhibit low range filling tend to have low dispersal ability, be phylogenetically young and face more intrageneric competition in the unoccupied parts of their potential range. In order to explore if large shifts in the geographic location of suitable habitat in the past contribute to low range filling, we employ species distribution models using environmental information from the last glacial maximum.

58

Lenda, M.¹, Zagalska-Neubauer, M.^{1,2}, Neubauer, G.² & Skórka, P.³

¹Institute of Environmental Sciences, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland, ²Ornithological Station, Museum and Institute of Zoology, Polish Academy of Sciences, Nadwiślańska 108, 80-680 Gdańsk, Poland,

³Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, 31-120 Kraków, Poland, lenda.m@vp.pl

Do invasive species undergo metapopulation dynamics? The case study of an invasive Caspian Gull (*Larus cachinnans*) in Poland

The mechanisms of initial dispersal and habitat occupancy by invasive alien species are fundamental ecological problems regarding community and metacommunity dynamics of native species. Most tests of metapopulation theory are performed on local population systems that are stable or in decline. In the study presented here we were interested in the usefulness of metapopulation theory predictions to study patch occupancy, local extinctions and the abundance of the invasive Caspian Gull *Larus cachinnans* at the initial invasion stages on water reservoirs in Poland. The attributes of colonized habitat patches (water reservoirs, 35 in total) and equal sample of 35 randomly selected non-colonized water habitats where this species was absent were compared. The probability of extinction of the already colonized habitat patches and the size of local populations were analysed with generalized linear models.

Colonized habitat patches were significantly larger and less isolated from other habitat patches and other local populations and were located closer to rivers than empty habitat patches. Also, the proximity of local food resources such as fish ponds and rubbish dumps positively affected the occurrence of breeding birds. The probability of extinction was positively related to increasing distance to the nearest local population, nearest habitat patch and distance to the nearest refuse dump. The probability of extinction was also negatively related to the number of breeding pairs. The size of the local population decreased with distance to the nearest habitat patch, local population, river, fishpond and refuse dump. Local abundance was also positively affected by the area of islets available for gulls.

During the initial stages of invasion of Caspian Gulls in Poland, the species has undergone metapopulation-like dynamics with frequent extinctions in already colonized habitat patches. The results have huge practical implications as they make it possible to predict which habitats are more vulnerable to gull invasion and to undertake specific programmes that may minimize the negative effects of the invasion.

94

Lisovski, S., Ritz, M.S. & Peter, H.-U.

Polar and Bird Ecology Group, Institute of Ecology, Friedrich Schiller University of Jena, Dornburger Str. 159, D-07743 Jena, Germany, Simeon.Lisovski@uni-jena.de

Do interspecific differences in arrival at the breeding ground promote hybridisation?

Hybridisation between South Polar Skua *Catharacta maccormicki* and Brown Skua *Catharacta antarctica lonnbergi* has been known at least since the beginning of the last century. Both species occur sympatrically in the area of the Antarctic Peninsula, where they produce viable and fertile hybrids. However, the reasons for the mixed matings have only been speculated about so far.

The two species not only differ in morphometry and food preferences, but they also winter in different areas. While *C. maccormicki* breeding in the Antarctic Peninsula region overwinter in the Pacific Ocean as well as in the Atlantic Ocean at high northern latitudes, *C. a. lonnbergi* stay during the austral winter between the Falkland Islands and the Uruguayan coast in the Argentinean basin. As a consequence, the migration timing of the two species differs as may the timing of arrival at the breeding grounds. Parmelee

1988 first suggested that interspecific and intrasexual differences in the arrival dates at the breeding grounds could be one reason for mixed matings.

We recorded arrival dates in a comprehensively observed and mostly individually marked breeding population on King-George Island, the biggest island of the South Shetland Islands in the maritime Antarctica. The results are combined with long-term data on individual timing of egg laying date and breeding success as well as meteorological data.

Our data show that *C. a. lonnbergi* arrive earlier and partially coupled their territories than *C. maccormicki*. Males of *C. maccormicki* were seen in their breeding territories on average ten days earlier than females. Therefore uncoupled females of *C. a. lonnbergi* and males of *C. maccormicki* may choose the possibility of mixed mating for a better synchronisation in their arrival date and for the possibility to start the breeding season earlier as they could do with a conspecific partner.

29

Maggini, R., Kéry, M., Lehmann, A., Schmid, H. & Zbinden, N.

Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, Switzerland, ramona.maggini@vogelwarte.ch

Are Swiss birds tracking climate change? Detecting elevational shifts using response curve shapes.

Climatic change is affecting birds globally inducing shifts in distributional ranges, altering the timing of main seasonal events such as migration or egg laying, as well as influencing survival and productivity and hence, population dynamics.

Under climate warming, species are expected to shift their distributional ranges pole- and upwards. Switzerland is a small and mountainous country with an important altitudinal gradient; main distributional changes are therefore expected in the vertical dimension.

Monitoring programs are essential in order to detect changes in population trends and distribution. The Swiss national breeding bird survey (MHB) started in 1999. This is a short period of time to refer to climate change; nevertheless, signals of change in the distribution of some species are already apparent. A specific analysis was conducted to highlight differences in the elevational distribution between a first (1999-2002) and a second period of monitoring (2004-2007) over 267 sampling units. For each period, the abundance (number of territories per square kilometre) of breeding birds was modelled as a function of elevation. An improved method is proposed to evaluate significant changes in response shapes as described by five fixed points along bootstrapped smoothed regression curves. This comparison showed an upward movement for at least one third of the 95 species considered. This was rarely a complete shift, but mainly partial shifts or expansions/retractions of the leading and trailing edges. Each case was categorized and coded according to the change that occurred at the five reference points. Due to the short period covered by the analysis, we assume that the categories represent successive steps in the process of an upward shift. However, similar shapes could result from the encountering of barriers or unsuitable habitats along the gradient.

38

Malher, F.

21 allée de Fontainebleau, 75019 Paris – France, frederic.malher@orange.fr

The Atlas of the breeding birds of Paris

During the last four years, around 50 volunteer birdwatchers censused the breeding species in each of the 94 squares (1 km x 1 km) drawn in Paris *intra-muros* (i.e. excluding the two nearby woods: “Bois de Boulogne” and “Bois de Vincennes”).

For a total of 57 species breeding was confirmed in Paris during these 4 years : 8 species were found breeding for the first time: Little Ringed Plover *Charadrius dubius*, Cirl Bunting *Emberiza cirlus*, Great Spotted Woodpecker *Dendrocopos major*, Mistle Thrush *Turdus viscivorus*, Common Kingfisher *Alcedo atthis*, Ring-necked Parakeet *Psittacula krameri*, Reed Warbler *Acrocephalus scirpaceus* and Sparrowhawk *Accipiter nisus*.

The synurbanisation of some species has been highlighted, such as Grey Wagtail *Motacilla cinerea*, for less than 10 years, Green Woodpecker *Picus viridis* for around 5 years. For the first time the density of some species has been estimated (around 100 pairs of Jays *Garrulus glandarius*, at least 250-300 pairs of Stock Dove *Columba oenas*). For some species, we could compare the results with those of previous

census: no large variation for the Kestrel *Falco tinnunculus* or the Magpie *Pica pica*, but a dramatic increase for the Carrion Crow *Corvus corone* since 1989.

11

Marchetti, C.¹ & Zehtindjiev, P.²

¹Vogeltrekstation Dutch Centre for Avian Migration and Demography, NIOO-KNAW, Boterhoeksestraat 48, NL-6666 GA Heteren, The Netherlands, ²Institute of Zoology, Bulgarian Academy of Sciences, 1 Tzar Osvoboditel Blvd., 1000 Sofia, Bulgaria, kalimok@einet.bg, chiaramarchetti@hetnet.nl

Orientation of Sedge Warblers during autumn migration in relation to stress response and personality

The variation in orientation tests performed with Emlen funnels is relatively high. We tested if this variation could be partially explained by taking the birds' personalities into account, checking for the birds' reaction to captivity and characterising their behaviour through a short exploration test.

We studied the orientation of a Passerine trans-Saharan migrant, the Sedge Warbler (*Acrocephalus schoenobaenus*), on autumn passage at the Kalimok station in Bulgaria. Birds caught in the morning were kept in cages with controlled food and their eating behaviour was monitored. In the evening they were tested for orientation, and then kept in cotton bags for the rest of the night, and in the morning they were observed for three minutes in an unfamiliar cage. After that they were released.

Birds that had eaten on the first day of captivity oriented in the expected, southward direction, while non-eating birds were scattered. The next morning, while exploring the new cage, the pattern of movements and of exploration differed between those that had eaten and not eaten: birds that had eaten did not fly around much but rather looked around and made smaller movements (hops), they tended to explore the bottom of the cage, and when presented with a food item they were quick to eat it. We propose that some personality aspects may influence the reaction of the individuals to the experimental situation and therefore the outcome of the tests.

Analysing bird personality, possibly through multiple tests, can help in predicting the birds' performance in an apparently unrelated experiment.

93

Marova, I.M., Fedorov, V.V., Shipilina, D.A. & Alekseev, V.N.

Moscow State Lomonosov University, Vorobjevy Gory, 119899 Moscow, Russia, collybita@yandex.ru

Genetic and vocal differentiation in hybrid zones of birds: the Siberian and Eastern European Chiffchaffs (*Phylloscopus [collybita] tristis* - *Ph. [c.] abietinus*) in Southern Ural

We studied a polymorphic population of Chiffchaff in Southern Ural. Here *Phylloscopus [collybita] abietinus* co-occur with *Ph. [c.] tristis*, and intermediate individuals between them are also known. Data in pure populations were obtained from Yenisei (Siberian Chiffchaff) and in the Kostroma (European Chiffchaff). For 63 males from Southern Ural the complete set of morphological, genetic and acoustic data has been received. According to external appearance all birds were divided into 3 phenotypes: European, Siberian and Intermediates. As a genetic marker we used cytochrome b gene mtDNA. Three haplotypes were found: European, Siberian-1 and Siberian-2. Haplotype Siberian-2 was recorded exclusively in Southern Ural, it is not found in any other population. As an acoustic marker we have applied a vocal index – a ratio of notes with ascending modulation. The substantial level of hybridization was found. From 29 males of Siberian phenotype only 2 individuals carry European haplotype. But the Siberian haplotypes were found at 12 of 28 males of the European phenotype. From 17 males with an intermediate phenotype 14 carried the Siberian-1 haplotype, 2 individuals – Siberian-2 haplotype and only 1 individual – European haplotype. From 43 males with Siberian haplotypes only 2 execute clear European song, 5 - an intermediate song, and all other males belonged to Siberian dialect. From 19 males with European haplotype only 4 included in a song the note with the ascending modulation typical for the Siberian dialect. The area of coexistence of dialects does not exceed 10 km and coincides with the border between broad leaves and coniferous- deciduous forests. The level of genetic introgression in a population reaches 34,7 %. The majority of hybrids (88,5 %) had Siberian haplotypes that shows the spread the Siberian Chiffchaff to the West. The data received do not suggest the species status of *Ph. [c.] tristis*.

20

Martiusheva, O. & Serebryakov, V.

Taras Shevchenko national University of Kyiv, Department of Biology, Volodimirska St., 64, Kyiv, Ukraine 01033,
 martjusheva.alexandra@gmail.com, bcssu@univ.kiev.ua

The long-term trends of swallow (Hirundinidae) migration in Ukraine

The large-scale observation of spring and autumn migration of swallows (*Hirundo rustica*, *Delichon urbica*, *Riparia riparia*) has been carried out for more than 30 years. About 8000 dates of first and last birds' observations were gathered at many points of the country. Using these data the mean date of arrival/departure each year was determined for each of the 25 regions of Ukraine. Based on these data the migration trends were plotted.

The results show differences between the migration trends for the same species in various regions of the country. Thus it is impossible to say comment about a general earlier or later arrival/departure date in Ukraine as a whole, but the data provide evidence for the changes in migration routes and their redistribution. At the same time the changes in migration terms in *Hirundinidae* for 30 years is slight. The terms of migration are most stable for *H. rustica* and most variable for *R. riparia* through prolongation of departure substantially, which was expected from the species' ecological peculiarities.

59

Massimino, D., Orioli, V., Massa, R. & Bani, L.

University of Milano-Bicocca, Department of Environmental and Landscape Sciences, Piazza della Scienza 1, I-20126
 Milano, Italy, dario.massimino@unimib.it

Assessment of population trends of common breeding birds in Lombardy, Italy, by integrating data collected with heterogeneous sampling schemes.

Population trend assessment is crucial to undertake conservation actions, but requires highly resource-demanding monitoring programmes. In order to minimise operating costs and obtain information on recent and past population trends, historical data collected for purposes other than monitoring would be very valuable. In this research we developed a method to analyse population trends by using census data collected in different projects with specific sampling strategies, but acquired with the same survey technique. We set up the method using data derived from different point count surveys performed in Lombardy (Italy) between 1992 and 2005 and tested it on three bird species (*Alauda arvensis*, *Hirundo rustica* and *Luscinia megarhynchos*). The bias due to the different sampling schemes was corrected by defining a population index as the ratio between the numbers of observed and expected (from a habitat suitability model) bird pairs in each point count. We then applied this method to 60 common bird species breeding in the study area. For each species, the overall trend for the period was assessed by fitting the mean population index calculated for each year. Nine negative and eighteen positive trends were recognised, while the remaining species did not show a significant population change. Major declines regarded farmland species. In particular, *Lanius collurio* and *Alauda arvensis* decreased by more than 75% over a 16 year period (1992-2008). Among forest species, only *Phylloscopus collybita* declined, whereas the others either increased or did not show a significant trend. The generalised decline of farmland species, which is known to occur throughout Europe, suggests the need of specific monitoring schemes to better understand the processes that negatively affect their populations.

46

Mazgajski, T.D., Rejt Ł. & Żmihorski M.

Museum & Institute of Zoology, Polish Academy of Sciences, Wilcza 64, 00-679 Warszawa, Poland,
 mazgaj@miiz.waw.pl

Edge, patch and landscape effects in artificial nest predation.

Recently predation on bird broods related with habitat fragmentation has been examined on three spatial scales - edge, patch and landscape scales, and artificial nests are a useful tool in assessing impact of predators.

This study was carried out in 2006-2007 in Central Poland in forests of different sizes (N= 53) using three transects, from the edge to the forestinterior. The artificial nests which resembled those built by thrushes

Turdus sp. and contained one quail egg were deployed. Each transect was 100 m long and contained 5 nests. Nests were placed at 25 m intervals alternately in a shrub, in a tree and on the ground. The first nest was placed at the forest edge (0 m), its site was chosen randomly. The eggs remained in the nests for 13 days. Data were analyzed using multinomial logistic regression.

No edge or patch size effects were found. However, length of forest ecotone in 500 m buffer around transects significantly enhance nest predation. Nest located on the ground were significantly less predated.

116

Mendes, T., Pacheco, C. & Rufino, R.

Mãe d'água, Lda., Travessa das Zebras 23, 1300-589 Lisboa, Portugal, Rui.rufino@maedagua.pt

Using GSM protocol in GPS transmitters

We are developing a GPS transmitter that uses GSM protocol to transmit data. This new equipment uses a standard GSM platform and a GPS module with a solar cell panel to charge the system. This prototype has room space for 150 positions if no network is available to send the data. A complementary VHF transmitter was added to the package in order to increase the likelihood of recovery of the transmitter in case it stopped working or the bird died and the GPS antenna was not able to transmit. In this way it was possible to recover the equipment if anything failed and determine the causes of malfunction and assess accurately its working performance.

A backpack trial model was placed on a black vulture *Aegypius monachus*, which was released after spending some time in a recovery centre, in order to test its efficiency. Regular visits to the current locations were conducted with the aim of observing the individual, assess transmission conditions and collect several variables that could influence its performance, such as cloud coverage, temperature and power of the GSM signal. In the poster we will present data on the transmitter technical specifications as well as results from this trial test.

57

Mestre, A., Mezquita, F. & Monrós, J.S.

Department de Microbiologia i Ecologia, Universitat de València, C/ Dr. Moliner, 50, E-46100 Burjassot, Valencia, Spain, alexandre.mestre@uv.es

Multi-level distribution of feather mites *Trouessartia trouessarti* on the wing of non-moulting Moustached Warbler *Acrocephalus melanopogon*

The distribution of feather mites (Order Astigmata) at the level of the individual bird and at the feather level is an essential theme to understand the spatial ecology of mites on the wings of birds. Nevertheless, there are very few studies that investigate at this level in detail. Here we present a multiscale study on the distribution of feather mites *Trouessartia trouessarti* on the wing of non-moulting individuals of Moustached Warbler *Acrocephalus melanopogon* in the Marjal de Pego-Oliva Natural Park wetland (Eastern Spain). Our results show that different feathers (primary, secondary and tertiary) containing different numbers of feather mites, depending basically on feather size and position within the wing, with particularly low numbers of mites found on the more external primary feathers. At the within-feather level we found differences in the distribution of adult and immature mites; adults appeared with higher abundances on the basal parts of feathers, whereas the immature mites were more abundant at the distal parts of feathers. We discuss the results on the light of general hypothesis relating the spatial distribution of mites with sheltering and avoidance of more disturbed areas during flight.

36

Mineev, Y. & Mineev, O.

*Institute of Biology of Komi Scientific Centre of Ural Division of Russian Academy of Science, Komi Republic Syktyvkar
Kommunisticheskaya 28, 167982, Russia, mineev@ib.komisc.ru*

Distribution of Lesser White-fronted Goose *Anser erythropus* in tundras of European north-east of Russia in the breeding period

Information about distribution of local populations of Lesser White-fronted Geese was collected in 1973-2008 in Nenets Autonomous District of Archangelskaya region. At present geese breed exclusively in optimal habitats, which are presented by separate local areas. Geese breed from Kanin peninsula up to Yugorskij peninsula. In Malozemelskaya tundra moulting birds were registered on the Belaya river. Breeding and non-breeding pairs and small flocks (about 10 birds) were registered by our expedition in upper and middle course of Velt river. In 2001 broods of geese were found. There. Single individuals, pairs and groups of geese (6-8 up to 47 individuals) were met in 1999 in upper watercourse of Neruta river. In Bolshezemelskaya tundra, nesting birds were found in upper stream of Laya river, in low course of Chernaya river, in middle course of More-Yu river and on Syabu-Yu river. In Bolshaya Rogovaya river basin birds are nested including tundra and forest-tundra areas. On beginning of XX century, broods of geese were found in the middle course of Adzva river. Moulting, non-breeding geese (10-15 individuals) were observed in 1958 in upper watercourse of Korotaykha river. During our expedition in 2008 to this area we found breeding geese. In upper stream of Usa river we found nesting and moulting birds (flocks of 10-15 individuals). In upper stream of Kara river we found flocks of moulting birds (10-15 individuals).

110

Müller, J.W. & Gache, C.

*Romanian Ornithological Society, "Al. I. Cuza" University, Iasi, Bucharest, 050108, Av. M. Kogalniceanu, 49/8,
Romania, walimuller@yahoo.com*

Contribution to the bird fauna monitoring in the Middle Meadow of Siret River SPA (Romania)

This paper presents our research in the middle part of the Siret River's basin, beginning from 2005, focused on the bird fauna diversity in order to prepare the scientific documentation to include some territories in the Romanian Natura 2000 Network. Our studies were done in the perimeter of three lakes – Galbeni (1800 hectares), Racaciuni (2000 ha) and Beresti (2800 ha) - that represent Important Bird Areas in Romania, situated around the confluence of the rivers Siret and Bistrita, respectively, Siret and Trotus. The habitats include open water, small islands with meadow forests, small channels, floodplains, swampy areas and large reed beds. Between the breeding bird species, we notice the presence of *Aythya nyroca*, *Anser anser*, *Recurvirostra avosetta*, *Botaurus stellaris*, *Cygnus olor* and *Circus aeruginosus*, but also the mixed colonies of *Chlidonias hybridus* and *C. leucopterus*, and a small population of *Falco vespertinus*, present in the meadow forests. During the migration time, we counted thousands of individuals of waterfowl and waders, dominant species being *Anas platyrhynchos*, *A. querquedula*, *Aythya ferina*, *Ciconia ciconia*, *Vanellus vanellus* and *Philomachus pugnax*. The lakes represent very important wintering areas in this region, sheltering flocks of tens of thousand aquatic birds; dominant are the duck species like *Anas platyrhynchos*, *Aythya ferina* and *Anas crecca*, but we also record hundreds or tens of individuals of *Anser albifrons*, *Bucephala clangula* and *Cygnus cygnus*. We mention the constant wintering presence of *Haliaeetus albicilla*. The whole territory was included in the Natura 2000 Network, like the "Middle Meadow of Siret River" SPA.

71

Nakul, G.L. & Mineev, Yu.N.

*Institute of Biology of Komi Scientific Centre of Ural Division of Russian Academy of Science, Kommunisticheskaya 28,
Syktyvkar, Komi Republic, 167982 Russia, nakul@ib.komisc.ru*

Features of colonial breeding of *Larus heuglini* in the Malozemelskaya tundra

Field observations were carried out in the Malozemelskaya tundra on islands of gulf (the Kolokolkova bay, 2003; the Salt lake Tarovey, 2004 and the Kuznetskaya bay, 2005).

The features of spatial relations and behavior of *Larus heuglini* in monospecific and mixed (Glaucous Gull and Barnacle Goose) colonies were studied. We found that *Larus heuglini* have a tendency to form spatial groups in colonies, consisted of micro-colonies, small aggregations and separate nesting pairs. Under combined nesting of *Larus heuglini* and *Branta leucopsis* reproductive settlements of two species overlapped partly or fully, but subcolonies of *Larus heuglini* and *L. hyperboreus* were isolated.

In the colonies dominant relations, appearing on territorial base between all members of the community, are registered. The relations were made like "rule of strong" when more aggressive individuals of own or different species press less active birds.

Sociodemography process can be considered as complex of functional process. Its homeostatic mechanisms define adaptive strategy of behaviour to varying ecological conditions of the Subarctic.

88

Negri, A., Pellegrino, I. & Boano, G.

Università degli studi del Piemonte Orientale, A. Avogadro, Via V. Bellini, 25/G, 15100, Alessandria, Italy, pellegrino@mfn.unipmn.it

Mitochondrial DNA sequences variation and phylogeographical structure of *Athene noctua* population.

The European Little Owl *Athene noctua* (Scopoli, 1769) is a nonmigratory species of the family Strigidae with a wide Palearctic distribution at mid and low latitudes. Seven different subspecies are recognised for Europe based exclusively on a limited number of morphological characters and especially on the amount of plumage colour saturation and little dimensional variation. In order to better describe the geographical variation and compare levels of genetic diversity and phylogeographic patterns of European Little Owl (*Athene noctua*), sequence variation of a about 700 bps part of the mitochondrial DNA control region (mt-Dloop) was assessed in 155 individuals. Sample locations were chosen to cover the entire natural range of the species in Europe with particular reference to Italian peninsula and nearby regions, where the putative Mediterranean glacial refuges could be located. DNA (mtDNA) control region sequences confirmed the existence of three well-differentiated lineages corresponding to each of the three allopatric refuges (Balkan, Italian and Iberian) connected by different hybrid zones in Italian peninsula. Our data indicate that the Iberian haplogroup is well separated, more than the other two. Our data also suggest the presence of all 3 haplogroups in northern Italy, however a gradient of Balkan and Italian haplotypes was observed along the rest of the peninsula. All individuals sampled in Sardinia differed clearly from other haplogroups. Expansion patterns indicate that *Athene noctua* repopulated most of Europe from the Balkan, Italian and Iberian refuges. In mainland Italy all the three continental haplogroups are present.

82

Nesti, I., Olmastroni, S., Focardi, S., Kato, A. & Ropert-Coudert, Y.

Università degli Studi di Siena, Dipartimento di Scienze Ambientali "G. Sarfatti"- Sezione di Ecologia Applicata, Via Mattioli 4, 53100 Siena, Italy, irene.nesti@unisi.it; alogeno975@hotmail.com

Evolution of diving behaviour over the complete chick rearing period of a marine predator, the Adélie Penguin

Upper trophic level marine predators are known to respond to environmental variability, especially during the breeding season when foraging range is constrained because they need to return regularly to the breeding site. Although several studies described the foraging activity and behaviour of seabirds during the chick-rearing period, few investigated the evolution of the foraging throughout the complete chick-rearing period, including post-guard phase. The diving behaviour of 16 Adélie penguins *Pygoscelis adeliae* was investigated using time-depth recorders, at Edmonson Point (74°21'S-165°10'E) Ross Sea, Antarctica. In 1994-95 and 1995-96 foraging and diving characteristics were compared during the chick provisioning period, i.e. guard and crèche stages, when local sea ice conditions varied. Thirty-five foraging trips with a total of 19898 dives ≥ 3 m were detected. Trip durations ranged from 13.50-202 hours. Birds spent 65% and 84% of their trips in diving in guard and in crèche, respectively. Travelling time from colony to feeding areas was significantly longer in guard than in crèche, while the returning time to colony was similar. Overall around 85 % of dives were in the first 25 m of depth and mean maximum depth distribution was similar in the two periods. Penguins didn't show either variation in terms of number of dives and dive-frequency (nr

dives/h) between stages. In addition, significant differences in mean bottom phase duration, mean post dive duration and diving efficiency were found, yet mean dive duration was similar. Correlation between diving parameters and environmental conditions pointed out that the fast ice extension and/or the sea ice concentration were linked to trip duration, bottom phase duration and travelling time from the colony to feeding area, but exclusively in the guard period.

6

Neumann, R.¹, Wendeln, H.¹, Liechti, F.², Steuri, T.² & Kube, J.¹

¹*Institute for Applied Ecology Ltd., Alte Dorfstr. 11, 18184 Neu Broderstorf, Germany,* ²*Swiss Ornithological Institute (FL, TS), 6203 Sempach, Switzerland, neumann@ifaoe.de*

Portable fixed-beam radar: a reliable tool for quantification of bird migration

Small portable radar devices are increasingly applied to quantify the local intensity of bird migration as part of environmental impact assessment (EIA) studies concerning tall vertical man-made structures and in particular offshore wind farm projects. In recent years for this purpose mainly vertically rotating fan-beam ship radars were intensively used. However, this method has several shortcomings, like the not exactly known beam volume, a short detection range, an insufficient detection capability for low-flying birds, and the lack of information about the echo quality (bird or not). Thus, a quantitative approach (i.e. estimation of migration traffic rates) usually suffers from various uncertainties related to this technique.

As an alternative, we equipped an ordinary ship radar (Bridgemaster 25 kW) with a parabolic dish antenna and operated it in a fixed-beam mode. Knowledge of surveyed volume and detection range and above all the ability to separate birds and non-birds (insects or clutter) by the signature of the radar echoes enable a reliable estimation of traffic rates at all relevant altitudes, at least up to 2.5 km. In addition, wing beat patterns are recorded and allow to identify different groups of migrants. Consequently, estimations about the quantification of bird migration are much more reliable than before. In contrast to tracking radars which are often unaffordable or not applicable for logistic reasons (too large, safety restrictions, etc.), such a small-sized portable fixed-beam radar can be handled easily and is comparably cheap. We carried out simultaneous measurements of our portable fixed-beam radar and the tracking radar "Superfledermaus" (fixed-beam mode) and revealed comparable data quality and quantity for a range up to 3 km. For future EIA and monitoring intentions we therefore recommend the application of fixed-beam radars instead of vertically rotating surveillance radars.

41

Niamir, A.¹, Toxopeus, B.¹, Groen, T.¹ & Muñoz, A.-R.²

¹*International Institute for Geo-Information Science and Earth Observation (ITC), Enschede, the Netherlands,*

²*Fundación Migres, Complejo Huerta Grande, Ctra. N 340 Km. 96.7 11390 Pelayo, Algeciras, Spain, niamir@itc.nl*

Modelling the Short-toed Eagle breeding distribution in southern Spain

Circaetus gallicus (Gmelin, 1788) is a medium-sized bird of prey of the family Accipitridae in the order Falconiformes. The European population migrates mainly to sub-Saharan Africa north of the equator, leaving in September/October and returning from March to May. In Europe it is most numerous in Spain where it is fairly common, but elsewhere it is rare in many parts of its range. The main objectives of this research are to predict and explain the distribution of the Short-toed Eagle in Malaga province, Southern Spain, and generate a map of preferred foraging sites using local expert knowledge.

To select the explanatory environmental variables affecting the breeding distribution of the species and to find out where the suitable habitat for the selected species in Malaga province are located, predictive distribution models were created using Maximum Entropy approach, observation points and a set of independent variables related to bioclimatic, topographic and anthropogenic conditions, as well as NDVI layers (Normalized Difference Vegetation Index). Presence data (observed nest-locations) were collected during the period 2000-2005, and were visited in September and October 2008. A map showing preferred foraging areas was generated by ranking the land cover map using expert knowledge and interviews with local ornithologists.

To identify a distribution model with the fewest predictors that explained the data satisfactorily, five variables were selected and the final predictive model satisfactorily describes the Short-toed Eagle distribution in the Malaga province.

This research suggests re-testing the hypothesis using hyper spatio-temporal species distribution data and further studies on the prey species availability and their contribution on the Short-toed Eagle's distribution.

72

Nikolov, B. & Hristova, I.

Bulgarian Ornithological Centre, Institute of Zoology, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel Blvd., BG-1000 Sofia, Bulgaria, lanius.bg@gmail.com

Time-activity budget of wintering Great Grey Shrikes (*Lanius excubitor*) in Bulgaria

This study was conducted on Great Grey Shrikes (*Lanius excubitor*) wintering on high fields of Central Bulgaria, placed in between mountain ranges. Time-activity patterns and lookout post use were studied in detail, both in relation to presence or absence of snow cover and 3-hour daily time zones. Typically for a sit-and-wait predator, most of the time was spent perching on a branch – nearly 93 %. Among the comfort behaviour patterns, those dealing with preening and feather arrangement occupied most of the time – nearly 82 %; least time was taken by pellet regurgitation and body stretching (less than 1 % each). In lack of snow cover the species spent 7 times more time in comfort behaviour activities compared to snowy conditions. Except for the defecation activity, no other correlations were found in relation to the day length. Successful ground hunting attempts took on average longer time (11.3 s) compared to the unsuccessful attempts (9.96 s). In the morning and early afternoon the successful ground hunting attempts with catching insects significantly predominated over those involving rodents. Most of the time (91.4 %) the birds spent sitting on the uppermost parts of trees and bushes, thus having good visibility for potential prey and predators around. The mean number of perching sites changes per hour was 14.2; the species was almost twice more active in the early afternoon compared to the time before dusk. *Lanius excubitor* happened to change the lookout posts almost twice more often in snowy conditions (22.9 times/h) compared to weather without snow cover (13.1). In snowless conditions the species used topmost parts of lookout posts less than 10 m in height in 74 % of the time, in presence of snow cover – 96.5 %. In lack of snow *Lanius excubitor* tended to use higher perch sites.

52

Nowakowski, J.J.

Department of Ecology and Environmental Protection, Warmia & Mazury University, Plac Łódzki 3, 10-727 Olsztyn, Poland, jacek.nowakowski@uwm.edu.pl

Genetic and environment components of metric trait variance of Reed Warbler (*Acrocephalus scirpaceus*) and Sedge Warbler (*A. schoenobaenus*)

Knowledge of environmental and genetic components of variance of feather growth is important because the traits play critical roles in flight performance. Also the knowledge of heritability of traits are necessary to study the natural selection of metric traits in bird population. Repeatability index is an upper measure of heritability of traits.

Material were the long-term repeated measures of 127 Reed Warblers (*Acrocephalus scirpaceus*) from central Poland and 267 Sedge Warblers (*Acrocephalus schoenobaenus*) from north-eastern Poland (Biebrza River valley). The measured feather traits were wing length, tail length, 1-10 primaries length, Kipp's distance, allula length. Also were analyzed the tarsus length, body mass and proportion of tail length to wing length. Repeatability index (r_i – index of phenotypic similarity within group) calculates as a within group correlation coefficient – Q_w ,

$$Q_w = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_e^2}$$

when σ_a^2 is a component $\hat{\sigma}_a^2 = (s_a^2 - s_e^2) / k$, and the σ_e^2 is a component $\hat{\sigma}_e^2 = s_e^2$. The square sum of variance between group (s_a^2) and within group (s_e^2) calculated in random effect model of analysis of variance. The number of repeated measures calculated as harmonic mean.

The repeatability indexes of traits important to flight (wing length, primaries length, alula length) were high ($r_i = 0,72 - 0,84$), which show the high share of genotype in determinations of this traits variance. Also high

share of genetic component in traits expression was noted in tarsus length ($r_i = 0,89$). The repeatability indexes of tail length, Kipp's distance and body mass were lower ($r_i = 0,26 - 0,72$). The repeatability indexes of all feather traits and body mass were higher, when to analysis were included the adults birds only – probably the environmental factors of wintering area are not important changes between seasons, and seriously influences on feather growth. The components of variance were similar in males and females (test of Bulmer confidence intervals).

117

Obukhova, N.Yu.

Department of Biological Evolution, Lomonosov Moscow State University, 119992 Moscow, Russia, Lomonosov Moscow State University, n.obukhova@mail.ru

Polymorphism in synanthropic populations of the Blue Rock Pigeon (*Columba livia*) in Europe

The variation of Blue Rock Pigeon plumage colour has been studied in 225 settlements of Europe. As in earlier studies, six colour phenotypes have been distinguished, the main of which are blue, intermediate, melanistic – and three rarer ones – red, albino, and lilac. The phenotype frequency distribution patterns in urban and rural landscapes have been determined. Pigeon populations with increased density are the most melanistic. Rural populations are less melanistic than urban ones. The frequency of birds with aberrant plumage colours varies randomly and is increased in some localities. The phenotypic structure of synanthropic populations of the Blue Rock Pigeon in Europe displays a latitudinal gradient. Different conditions of the origin of the urban populations of Blue Rock Pigeon and consequent high genetic heterogeneity of this species were revealed. The key aspect of colour polymorphism in Blue Rock Pigeon is synanthropization, i.e. anthropogenic evolution.

4

Packman, C.E.¹, Collar, N.J.², Combreau, O.³, Judas, J.³ & Dolman, P.M.¹

¹University of East Anglia (UEA), UK; ²BirdLife International, UK; ³National Avian Research Centre (NARC), UAE, School of Environmental Sciences, University of East Anglia, Norwich, Norfolk, NR4 7TJ, UK, c.packman@uea.ac.uk

Satellite tracking a critically endangered bustard in Cambodia

Houbaropsis bengalensis is the rarest bustard species in the world. Numbers in Cambodia are estimated at fewer than 300 adult males, comprising probably two thirds of the global population. This population, which when breeding concentrates in seasonally flooded grasslands surrounding the Tonle Sap Lake, is threatened by rapid habitat loss through conversion to intensive dry-season agriculture. In response, a number of Integrated Farming and Biodiversity Areas (IFBAs) have been designated to protect key grassland blocks and now cover approximately 30 % of male breeding territories. However, in the wet season, when the Tonle Sap grasslands are flooded and unavailable, the distribution of the species is very poorly known. Based on sparse records of non-breeding birds outside the floodplain, a series of non-breeding IFBAs have also been proposed, to secure habitat in the face of rapid conversion to plantation.

We present initial results from satellite telemetry of three birds moving between breeding and non-breeding locations, supplemented by additional information from seven radio-tagged birds, and relate this to landcover information from ground-truthed satellite data. We use this to examine whether these wet-season IFBAs are appropriately located.

We also examine patterns of movement and habitat selection within the grassland and agricultural mosaics used for lekking and breeding, using information from three males satellite-tagged in 2008 and further birds satellite-tagged in 2009. Implications for conservation strategies and impacts of traditional land-use are discussed.

106

Panchuk, A.*Shevchenko National University in Kiev, Biol. Dept., University, Volodimirska Str., 64, Kiev-01601, Ukraine***Black Stork status in the central part of Ukrainian forest zone**

Black Stork is a Red data book species in Ukraine. So the census of the species was conducted selectively in Kiev region in 2008 because of dense human population and activities. As a result, 6 occupied and 6 abandoned nests were recorded. Besides this, 9-12 potential breeding places were found as well (only birds recorded but not nests). In total 15-18 virtual breeding pairs in 2008; at least twice more than 9 real such pairs in 1990/91, were recorded. Individuals have started to build their nests quite close to forest edge, to feed nearby to villages. Other data prove its number and breeding territory increasing in the rest part of Ukraine.

60

Payevsky, V.A.*Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg, 199034 Russia, payevsky@zin.ru, payevsky@yandex.ru***Sex-specific survival rate in the Chaffinch, *Fringilla coelebs*: when do the females die?**

The population of the Chaffinch at the Courish (Curonian) Spit, Eastern Baltic, was studied annually by the staff of Rybachy Biological Station during 50 years. The number of Chaffinches captured, especially during 1958-1980 (more than 377,000), was sufficient to analyse sex ratio in different parts of the breeding season and for different ages. Adults, juveniles and nestlings ringed during summer months resulted in 5989 retraps in the same and subsequent breeding seasons. Juvenile Chaffinches can be reliably sexed by plumage and wing length from 30-40 days old. The sex ratio in nestlings between 7-12 days old was determined in 93 individuals from 23 broods (hand-raised until full independence). Sex ratio of individual broods varied broadly, from broods consisting exclusively of females, to broods comprised only of males. In total, 47 birds were males and 46 females, i.e. the proportion of males was $50.5 \pm 5.2\%$ which does not differ significantly from equality. Each year in the breeding populations there were significantly more males than females: per cent of males in adults varied from 53.8 to 59.3, in average 55.9, and in juveniles from 56.4 to 61.0, on average 53.8. Annual survival rates of adult birds were 0.498 in males and 0.482 in females, the difference is insignificant. All these data suggest that from the age of one month, male Chaffinches are consistently in the majority and comprise 54-55% of the birds which means 1.2 males per 1 female. One may assume that "mechanism of sex-related mortality rate" is switched on and the females suffer greater mortality than males. Because sex-ratio of nestlings is equal, apparently the increased mortality is typical of female Chaffinches immediately after fledging from the age of 12 days.

7

Peter, D. & Liechti, F.*Swiss Ornithological Institute, Luzernerstrasse 6, 6204 Sempach, Switzerland, dieter.peter@vogelwarte.ch***Online database for "moonwatching" observations of nocturnally migrating birds**

The majority of migrating birds choose to travel in high altitudes at night. Although their calls can be sometimes heard, many birds pass undetected by bird watchers in the night sky. Nocturnal migrant birds can be observed with spotting scopes or telescopes as they pass in front of the full moon. The number of birds per time interval is proportional to the overall intensity of bird migration.

Here we introduce a web-based platform for reporting and analysing moon-watch observation of migrating birds in the northern hemisphere. At <http://mond.vogelwarte.ch/> observers can enter their field data; first results e.g. on migratory traffic rates (the number of birds crossing a virtual section of one kilometre within one hour), and a graph of the directional distribution of your observations are automatically downloadable immediately.

Our website provides an easy-to-handle tool for quantifying nocturnal bird migration. Both, the website and database wants (1) to stimulate observations on nocturnal migrants, especially in regions where other

methods are difficult to apply and (2) to encourage enthusiasts for coordinated and systematic actions across larger geographical scales.

13

Peter, H.-U., Hahn, S., Kopp, M., Lisovski, S., Phillips, R. & Ritz, M.

Polar & Bird Ecology Group, Institute of Ecology, University, Dornburgerstr. 159, D-07743 Jena, Germany, bpe@uni-jena.de

Different overwintering areas of two southern *Catharacta* species

The Skua species (*Catharacta* spec.) have a bipolar distribution. On the Antarctic continent, colonisation and diversification of the southern taxa has been related to the glaciation history in the last 230 000 years. In our investigation area, King George Island, South Shetland Islands, two closely related species, the Brown skua (*Catharacta antarctica lonnbergi*) and the South polar skua (*Catharacta maccormicki*) are breeding sympatrically and hybridize.

The aim of our study was to investigate differences in temporal and spatial migration patterns of these two species. Use of banding recoveries and satellite transmitters gave limited data, showing one *Catharacta maccormicki* had overwintered between Japan and the Aleutian Islands and one bird was found dead in Massachusetts, USA. However, use of GLS-loggers has been more rewarding. For the last two Antarctic seasons, we attached GLS-loggers to the skuas for one year, after this the loggers were removed and the data processed.

The data provides a detailed picture of *Catharacta antarctica lonnbergi* in their overwintering area of the South Atlantic near the Patagonian continental shelf, between the Falkland Islands and Uruguay.

The data also provides the first detailed study of individual *Catharacta maccormicki*, showing wintering ranges and activity patterns. Some birds migrated in an anticlockwise direction to the Northern Pacific and others in a clockwise direction to the Northern Atlantic. The duration of the outward migration from the Antarctic convergence to the wintering area was five weeks, the back-migration only 3 weeks.

111

Petre, C.V., Petre, T. & Petre, C.M.

Faculty of Biology, "Al. I. Cuza" University Iasi, Romania, Iasi, Bd. Carol I, 20A, 700505, School of Arts and Trades, Mihail Kogalniceanu, 927165, Ialomita County, Romania, Spiru Haret School, Tandarei, 925200, Ialomita County, Romania, criss_petre@yahoo.com

The Special Protected Area "Benturi", part of the Danube Green Corridor (Romania)

The Special Protected Area (SPA) "Benturi" includes three parts: Bentul Mare, Bentul Mic and Bentul Mic Cotoi, situated in a natural area, without built dams, part of the lower Danube Green Corridor. Through its position in the middle of Ialomita Marsh, the SPA Benturi represents one of the few territories which did not suffer major negative influences, being visited by many birds. The human impact is really low due to the fact that the only access to the area is by boat, so, this territory is clean and has a rich biodiversity. The bird fauna list comprises 74 bird species that use this territory for its trophic, resting and nesting potential. Between these, we found 27 bird species of EU community interest, 35 bird species that need special protection and 19 bird species from the Romanian Red List (for their conservation is needed a Special Protected Area). The breeding birds' fauna includes 46 breeding species and other 15 probably breeding species; we also recorded the presence of some rare breeding species in Romania and globally threatened species: *Aythya nyroca*, *Ciconia nigra*, *Burhinus oedicephalus* or *Bubo bubo*. During the migration, we counted 10000 - 20000 individuals of *Ciconia ciconia*, respectively, flocks of about 400–500 *Ciconia nigra*. In January 2009, we recorded a group of about 150 individuals of *Branta ruficollis*, while the other anseriform species (*Anser albifrons*, *A. anser*, *Anas platyrhynchos*, *A. strepera* and *A. acuta*) are wintering there with groups of about 22000–25000 birds. Nearest the SPA' perimeter exists an important archaeological site – Popina-Bordusani; together with the archaeologists, the Romanian Ornithological Society through the local *Cygnus* Branch intend to build an Eco-Cultural Park to remind people about the life of their ancestors and, also, to make them aware of the importance of nature in people's life.

3

Pfeiffer, Th. & Meyburg, B.-U.*World Working Group on Birds of Prey (WWGBP), Wangenheimstr. 32, 14193 Berlin, Germany, thpfeiffer@tpfe.de & BUMeyburg@aol.com***Satellite tracking of German Red Kites (*Milvus milvus*)**

In the period 2002 to 2005, nine Red Kites (2 juveniles and 7 adults) were fitted with solar-powered satellite transmitters near Weimar which, until the end of 2008, allowed 5118 fixes to be made by Argos using the Doppler Effect. Most locations recorded were not very precise, but are adequate for studies of migratory behaviour. In total eight autumn migrations to Spain and four return journeys to the breeding area were tracked. Apart from one juvenile, which migrated as early as August and took 47 days to reach Spain, migration began in the first half of October. Arrival in spring took place between the 5th and 12th of March. During migration to winter quarters the birds covered distances of between 1,450 and 2,320 km, for which the adult birds required 12 to 28 days. Spring migration, taking 8 to 22 days, was somewhat faster. An adult female was tracked over a 5 year period. In the first two years the bird spent the winter in the same area in south-western Spain, but in the third autumn the kite only flew as far as northern Spain. In the fourth year of the study the bird did not migrate at all and remained in the vicinity of its breeding area in Germany. In the fifth winter the female migrated again to another wintering area in western Spain. Three members of the same family (one adult male and two juveniles) migrated separately and wintered in different areas. In 2007 and 2008 six birds were fitted with GPS transmitters. This method enabled a more precise evaluation of the home ranges in summer and winter, as well as habitat use, during this ongoing study.

16

Piculo, R., Barba, E., Cantó, J.L., Greño, J.L., Marín, M. & Monrós, J.S.*Institut Cavanilles de Biodiversitat i Biologia Evolutiva, Universitat de València, Apartat Oficial 2085, E-46071 Valencia, Spain, ruben.piculo@uv.es***Temporal and spatial variation in migration and wintering of the European Robin (*Erithacus rubecula*) in eastern Spain.**

Though the European Robin (*Erithacus rubecula*) is one of the most abundant wintering birds in the Mediterranean area, there are few studies on its migratory phenology.

We studied the temporal and spatial variation in the migration and wintering of the European Robin in eastern Spain. The study of the temporal variation is based on data from weekly ringing sessions in extensive orange plantations during 12 seasons (1997–2009). We observed fluctuations in the number of wintering birds, but the population size did not show any significant increasing or decreasing trend over the years.

For the study of the spatial variation we used data from four different ringing stations, also operating weekly, between 2004 and 2008. They were placed in different habitats: extensive orange plantations, a botanic garden, mixed olive and almond plantations and a holm oak (*Quercus ilex*) forest. We observed larger wintering populations in the holm oak forest, descending the number of robins in antropized habitats. We did not find evidences of prenuptial passages in any of the habitats but we found a very marked postnuptial passage in sites close to the Mediterranean coast.

55

Požgayová, M., Procházka, P. & Honza, M.*Institute of Vertebrate Biology AS CR, v.v.i., Květná 8, 603 65 Brno, Czech Republic, carrington@seznam.cz***Sex roles in antiparasitic nest defence in two Common Cuckoo hosts**

Brood parasitism significantly reduces nesting success in birds and works as an important selective force responsible for the evolution of defence behaviours. Most common antiparasitic defences comprise aggressive behaviour towards adult brood parasites and rejection of parasitic eggs. In this context, parental roles in nest protection are of importance, because if both parents show a certain behaviour, e.g. rejection of parasitic eggs, the antiparasitic strategy will spread faster in a host population than if only one of the parents rejects the eggs. We studied antiparasitic defence in two hosts of the Common Cuckoo (*Cuculus canorus*), the Blackcap (*Sylvia atricapilla*) and the Great Reed Warbler (*Acrocephalus arundinaceus*). In the

former host, both mates incubate the clutch, while the latter species has female-only incubation. By dummy presentations, experimental parasitism and filming of host behaviour, we investigated the sex roles in different aspects of antiparasitic defence. In the Blackcap, both mates aggressively responded to the Cuckoo dummy and were able to reject parasitic eggs. However, the female played a significantly more important role in both types of defence, because of her higher proportion in incubation. In the Great Reed Warbler, the male played a key role in aggressive nest defence and in nest guarding against the Cuckoo. The female was always responsible for the recognition and rejection of parasitic eggs. Sex roles in the antiparasitic nest defence of the two host species were equivalent to their shares in parental care at the egg stage.

26

Puchala, P.¹, Sobeková, K.², Bartíková, M.², Melišková, M.² & Országhová, Z.²

¹State Nature Conservancy of Slovak Republic, Administration of PLA Malé Karpaty, Štúrova 115, 900 01 Modra, Slovakia, ²Department of Zoology, Faculty of Natural Sciences, Comenius University Bratislava, Mlynska dolina B-1, 845 12 Bratislava, Slovakia, puchala.peter@gmail.com

Role of the climate in breeding start and breeding performance of the Tree Sparrow

In last decades climate changes caused shifts in phenology of many animal species including birds. Many studies have referred to delay in time of spring migration and laying onset of bird species. Local climate variables can influence different breeding parameters (clutch size, length of breeding season, hatching success, and fledging success) as well.

A population of the Tree Sparrow was studied continuously in south-western Slovakia from 1996 until 2008. Our study is focused on understanding the relationship between NAO index, local weather variables (mean temperature, precipitation and rainfall days) and breeding parameters (initiation of clutch, clutch size, fledging success) of this species nesting in wooden nestboxes. Study area was situated in National Nature Reserve Šúr near Bratislava (south-western Slovakia) in two sites (Alder fen wood and edge of thermophilous Oak wood).

The start of Tree Sparrow egg laying is related to temperature during spring time. Earlier laying onset is significantly connected with higher daily temperature during April. Using statistical method we tried to select the best model explaining the effect of NAO index (winter NAO index and month NAO indexes) and temperature on starting of egg laying of studied species. Other models defined if rainfall and mean temperature could explain interannual variation in overall clutch size, fledging success and overall breeding success during the breeding season.

27

Reif, J.¹, Telenský, T., Šťastný, K., Bejček, V. & Klvaňa, P.

¹Institute for Environmental Studies, Faculty of Science, Charles University in Prague, Benatská 2, CZ-128 01 Praha 2, Czech Republic, jirireif@yahoo.com

The effects of winter and spring temperatures on long-term population trends in birds with different migratory strategies in the Czech Republic

Several studies have shown that recent global climatic change can have different impacts on birds with different migratory strategies. Higher winter temperatures may positively affect populations of resident species, whereas higher spring temperatures may positively affect populations of migratory species. We tested these predictions using long-term (1982-2007) climatic and bird-monitoring data from the Czech Republic. Spring temperatures increased, but winter temperatures did not change during the time period examined. We observed population increases in long-distance migrants, indicating they may benefit from higher spring temperatures, but populations of both short-distance migrants and residents declined. Short-distance migrants might be negatively affected by the deterioration of environmental conditions in southern Europe. Although residents may suffer from the higher competitive pressure of migrants, our analyses do not support this explanation. Our results do not correspond with findings of recent pan-continental or western European studies that have reported declines of long-distance migrants, which have probably been caused by droughts and habitat alterations in sub-Saharan Africa. We speculate that Czech populations of the focal species, which represent just a fraction of the European populations, might winter in areas not affected by habitat deterioration.

96

Reinke, M.I. & Wink, M.*Institute of Pharmacy and Molecular Biotechnology (IPMB), Department of Biology, University of Heidelberg, Im Neuenheimer Feld 364, D-69120 Heidelberg, Germany, m.i.r@gmx.de***Research program “Wild birds and avian influenza”: Are water and song birds in urban parks and gardens in Baden-Württemberg (Nordbaden) infected with avian influenza (AI)?**

The metropolitan region of the Rhine-Neckar Area including the cities of Mannheim and Heidelberg belongs to the most densely populated areas in Baden-Württemberg, making studies on presence and dispersion of the previously detected avian influenza (AI) in this region especially important.

The aim of this project is the analysis of wild birds (“sentinels”) getting into close contact with humans in the area of Northern Baden. Especially water birds in urban parks or open air baths as well as birds in gardens feeding in winter will be sampled. These species however often come into contact with migratory birds (e.g. Mute Swans, gulls, Mallards) often regarded as major virus vectors. Continuous monitoring of sentinels over a period of two and a half years should serve as an early warning system for AI.

Molecular and serological virus diagnostics will be carried out. Former contact with avian influenza can be tested via antibodies in the serum. For positively tested individuals further analysis is needed to detect the exact viral strain. Furthermore it will be investigated if infected birds suffer from additional diseases as salmonella and blood parasites. The percentage of migratory birds in the urban environment and their origin will be determined via DNA sequencing (mitochondrial DNA) and STR analysis. This project provides both basic knowledge for science and information for the public.

In 2007, 2008 and in the first half-year of 2009 we tested 1,283 individuals from 46 species in 2,971 examinations. We took a total of 246 cloaca swaps, 939 pharynx swaps, 2573 excrement samples, 213 blood samples for an avian influenza examination and 12 tissue samples. For the genetic examination we took from the same birds 783 samples of genetic material (487 blood samples, 259 blood feathers, 33 tissue samples and 4 feathers).

76

Robin, J.-P., Boos, M., Petit, O. & Zimmer, C.*Institut Pluridisciplinaire Hubert Curien, Département Ecologie Physiologie Ethologie, UMR 7178 CNRS/ULP, associé à l'Université Henri Poincaré, Nancy 1, 23 rue Becquerel, 67087 Strasbourg Cedex 2, France, jean-patrice.robin@c-strasbourg.fr***Body mass and wing loading adjustments in disturbed Common Teals (*Anas crecca*): an experimental study.**

According to the starvation-predation risks theory, energy reserves are optimized to minimize both components of this trade-off. To date, this theory has only received significant support in birds from data obtained in small passerines. We investigated the adjustments resulting from this trade-off in a larger bird (Common Teal, *Anas crecca*) whose body fuel storage and depletion strategies differ from those in passerines. Two groups of Teals (G1, G2) maintained in outdoor aviaries were intensively disturbed (2x15 and 4x15 min/day, respectively) during 3 one-week sessions at one-month intervals with a radio-controlled car. The number of take-off flights, body mass, food intake and wing loading were recorded. The results in disturbed groups were compared with an undisturbed control group. The number of take-offs was 50-100 % higher in G2 than in G1 during the 3 sessions ($P < 0.001$). Initial body mass and wing loading were not significantly different between females and males in any disturbance session ($P > 0.2$). Whatever the session, body mass loss and final wing loading were similar in G1 and G2 ($P > 0.12$), except for body mass loss during the first session ($P = 0.003$). Body mass loss was similar in both sexes and higher during the first four days of disturbance ($P < 0.05$) compared to the three remaining days. At the end of sessions, wing loading was lower in disturbed groups than in controls ($P < 0.02$). Final wing loading was similar in both sexes ($P > 0.10$) and the higher the initial wing loading, the higher the body mass loss ($P < 0.001$). Although food was provided ad libitum, food intake decreased in disturbed groups to values lower than in controls ($P < 0.001$). Thus, in Teals, whatever the disturbance level, wing loading is set to an optimal value through spontaneous food intake adjustments which strategically improves escape flight capabilities. This clearly supports the starvation-predation risk trade-off in medium sized birds.

86

Ruiz-del-Valle, V., Reguera, R., Serrano-Vela, I., Gomez-Prieto, P., Parga, C. & Arnaiz-Villena, A.
Dept Immunology, University Complutense at The Madrid Regional Blood Center, Madrid, Spain, aarnaiz@med.ucm.es

Mitochondrial DNA phylogenetic definition of a group of 'Arid-Zone' Carduelini Finches

Birds included within the Carduelini tribe (genera *Rhodopechys*, *Carpodacus* and *Leucosticte*) apparently belong to the same radiation according to molecular phylogenetic analyses. Our phylogenetic analyses based on nucleotide sequences of the *cytochrome b* gene (cyt-b) indicate that some of these birds (*Rhodopechys mongolica*, *R. githaginea* and *Carpodacus nipalensis*) do not cluster together with their respective phenetically defined allies. This new group of birds thrives in both hot and cold arid zones (including North America, *Leucosticte*) and are phenetically distinct, probably because of their adaptation to different extreme environments. Both maximum likelihood and Bayesian inference methods support the existence of this new evolutionary basal group among finches which might have originated about 14 million years ago. Eurasian *Leucosticte* expansion to North America is discussed on paleoclimatic and geological changes.

89

Rutkowski, R., Jagólkowska, P. & Zawadzka, D.
Museum and Institute of Zoology Polish Academy of Sciences, Wilcza 64, 00-679 Warsaw, Poland, robertrut@miiz.waw.pl

Genetic structure of Capercaillie (*Tetrao urogallus*) population in Poland

The Capercaillie *Tetrao urogallus* was a formerly widespread breeding bird in Poland. Now, its distribution is restricted to four isolated regions: Augustów Forest, Janów Lubelski and Solska Forest, Carpathians and Sudete Mountains with Lower Silesian Forest. The total population size does not exceed a few hundred individuals. The Polish population of the species is rather poorly recognized in respect of genetic structure and variability. However, preliminary data, based on limited number of microsatellite markers and individuals studied, confirmed that declines in number was interlinked with decrease in genetic variability in all regions. It was also suggested, that the most numerous Polish population in the Carpathians is highly structured. In this study, we address the problem of population genetics of Polish Capercaillie more thoroughly. We have collected more than 200 samples from four Polish strongholds of the species and analysed 12 tetra-nucleotide microsatellite markers, as well as hypervariable domain of mitochondrial control region. Based on these genetic markers we estimated level of genetic differentiation among regions and genetic variability within them. The results confirmed isolation of Polish strongholds of the species and low level of genetic variability, especially in Janów Lubelski and Solska Forest. We also compared control region sequences with data of Capercaillie from other European populations available in GenBank. This suggested that, at least some of our populations should be considered as separate ESUs in conservation programmes.

66

Saggese, K., Korner-Nievergelt, F., Slagsvold, T. & Amrhein, V.
University of Basel, Vesalgasse 1, 4051 Basel, Switzerland, v.amrhein@unibas.ch

Long-term effects of winter feeding on territorial behaviour in the Great Tit

Winter feeding stations are often found in areas that also provide suitable breeding habitat for songbirds. In the Great Tit *Parus major*, males start defending a territory in mid-winter, and supplementary feeding at feeding stations within their territories are likely to increase territorial intrusions by conspecific rivals. We investigated whether supplementary feeding affects territorial behaviour of resident males. We studied dawn singing behaviour of males before the onset of feeding within their territory, and after two weeks of continuous feeding. To investigate possible long-term effects of feeding, we examined the behaviour of our subjects again two weeks after we had stopped supplementary feeding. A control group of territorial males was provided with empty feeding stations, and control males were surveyed on the same mornings as treatment birds. We predicted an earlier start of dawn singing and more intense singing in treatment males than in control males for two possible reasons: residents with supplementary feeding may have to defend

their territory more vigorously due to the larger numbers of territorial intruders, and residents being liberated from food limitations may be able to allocate more time to singing.

18

Serebryakov, V.

Shevchenko National University in Kiev, Biol. Dept., University, Volodimirska Str., 64, Kiev-01601, Ukraine, bcssu2@gmail.com or bcssu@univ.kiev.ua

A new zoogeographical rule

Over 13,000 spring arrival phenological data for 18 bird species were collected on the European territory of the former Soviet Union. The observations on 857 points were conducted in the different years of XX century. Due to statistical analysis the coefficients of variation (C.V.%) of bird spring migration beginning were clarified for each species in all points of observation. As a result, it occurs that the measures of variation are changing in accordance with the geographical latitude: the higher the latitude, the less variation in each species. Along with well-known Allen's, Bergmann's and Gloger's rules this one is the fourth zoogeographical rule considering warm-blooded animals.

31

Shariati, M., Kaboli, M., Alizadeh, A., Karami, M. & Bahadori, M.

Faculty of Natural Resources, University of Tehran, Department of Fishery and Environment, Tehran, Iran, Mitra24sh@yahoo.com

Avifaunal distribution pattern and abundance in northern Alborz (case study Kheirod forest)

This study was conducted to identify the ecological factors relating to vegetation (forest structure, complexity and typology), altitude, climate or geomorphology, that could explain the main gradients of avifaunal richness, abundance and composition in Caspian Hyrcanian mixed forest, Alborz mountain range in northern Iran. The study area was sampled with a 350×350 m grid in a GIS environment. A subset of 84 squares were systematically chosen and each was visited during spring 2008. We first looked for avifaunal, vegetational, and geomorphological gradients using Correspondence Analysis (CA). As we found spatial autocorrelation term, then added this autocorrelation term in ANOVA and stepwise regression to assess the relative role of spatial autocorrelation and environmental explanatory variables. Using Akaike's Information Criterion, the best combination of abundance, and composition was chosen. Our results revealed a main gradient which discriminates dwelling bird species of high tree branches (e.g. *Parus ater* and *P. major*) against understory dwelling species (such as *Erithacus rubecula*) which are found in bushes and seedlings. Temperature and forest structure were found as the best predictors for avian richness and composition. Furthermore, habitat complexity showed to be the best predictors for avifaunal composition. Moreover, mean avifaunal richness and abundance were significantly different between altitudinal zones ($P=0.006$ and $P=0.001$ respectively). Our results suggested that avifaunal abundance and richness at this forest are best predicted by vegetation and structure and climate conditions. As a result, our study proposes that forests in northern Iran should be managed in a way to make sure that vegetation structures is preserved.

104

Sierro, A.¹ & Arlettaz, R.^{1,2}

¹Swiss Ornithological Institute, Valais field Station, 3970 Salgesch, ²University of Bern, Conservation biology, Baltzerstrasse 6, 3102 Bern, Switzerland, antoine.sierro@vogelwarte.ch, raphael.arlettaz@jee.unibe.ch

Habitat selection and conservation measures for the Scops Owl *Otus scops* in Switzerland

The Scops Owl occurs only in the southern part of Switzerland, mainly in the cantons of Valais and Ticino. Its habitat consists of semi-open, low-intensity meadow- and pastureland with hollow trees. Grassland intensification has caused massive declines of its favourite prey, large bushcrickets (Tettigoniidae). Using radiotracking, we hope to identify the suitable foraging habitats and to propose appropriate conservation measures.

In 1998–1999 we studied habitat use, applying radio-tracking and direct observations during night. It turned out that low-intensity, unmown hay meadows were the most important foraging habitat. Consequently, we set up a mosaic of meadow strips which were not mown until late autumn from 2003 to 2005. Our aim was to test whether such strips could increase grasshopper biomass. We counted the number of grasshoppers in the unmown strips and in the mown meadows nearby in July and August.

The number of grasshoppers in July was up to four times higher in the strips compared to the meadows nearby. The difference was less obvious in August because the difference of vegetation height between strips and adjacent meadows was less pronounced in August than in July. The Tettigoniidae, the main prey of the Scops Owl, was also more abundant in the meadow strips than in the mown meadows.

Our experiment shows that unmown meadow strips have a positive effect on grasshopper biomass and therefore are a suitable conservation measure to improve habitat quality for the Scops Owl. Such strips should be accepted as ecological compensation measure by the political authorities in order to motivate farmers to implement them in suitable Owl habitats.

45

Sirot, E.

Laboratoire Ecobio, UMR CNRS 6553, Université de Rennes 1, Université de Bretagne Sud, Campus de Beaulieu, Campus de Tohannic. BP 573, 56000 Vannes cedex, France, sirot@univ-ubs.fr

Can game theory help to understand why bird flocks' tolerance to disturbance is so variable?

One important step towards understanding the effect of non-lethal disturbance on bird populations is to understand how far birds can withstand such disturbing events without taking flight. So far, studies of flightiness in social birds have shown that this trait is extremely variable between species, and this variability remains difficult to explain. Here, we try to understand it from an adaptive point of view, that is, by considering flightiness as a trait undergoing natural selection. High levels of flightiness limit predation risk, but also lead to superfluous flights, especially if non-lethal disturbance is frequent. Thus, birds have to trade energy for safety. Because individual decisions to flee or stay in front of a potential danger are certainly dependent on one another within a bird flock, I propose that game theory could help to understand the evolution of fearfulness in birds. The present model considers bird flocks that are the object of both real predatory attacks and non-lethal disturbance, undistinguishable at first sight. Birds may either be fearful, and take flight at every alert, or be bold, and stay on the ground until identification of threats. Bold individuals do not take flight uselessly, but have more chance of drawing predator attention on themselves. The model determines evolutionarily stable levels of fearfulness as a function of birds' ability to detect and escape predators, flock size, and levels of predation risk and disturbance. Depending on the parameter values, all levels of fearfulness are possible, ranging from extreme fearfulness to total boldness. The model thus suggests that intra-flock relationships, driven by the advantages early leavers may have over stragglers in an attack, as well as the respective levels of predation and non-lethal disturbance in the environment, have a deep effect on the overall level of flightiness in the flock.

84

Spée, M., Beaulieu, M., Thierry, A.M., Dervaux, A., Lazin, D., Le Maho, Y. & Raclet, T.

Institut Pluridisciplinaire Hubert Curien, Département d'Ecologie, Physiologie et Ethologie, UMR 7178 CNRS-UdS, 23 rue Becquerel, 67087 Strasbourg, marion.spee@c-strasbourg.fr

Both corticosterone and prolactin affect locomotor activity but corticosterone is more relevant to mimic a late stage of fasting in captive Adélie Penguins (*Pygoscelis adeliae*)

Fasting is part of penguin breeding constraints. Three metabolic phases occur successively while fasting. In late fasting, the achievement of a low body mass threshold corresponding to the entrance into phase III (PIII) is correlated with egg abandonment in the wild and with an increase in locomotor activity in captivity. Corticosterone and prolactin have conflicting effects on reproductive behaviour, by stimulating, respectively, foraging and parental behaviour. Knowing that corticosteronemia increases in PIII while prolactinemia decreases, this study was designed to understand, experimentally, the respective involvement of these two hormones in the metabolic and behavioural changes characterizing late fasting.

Captive male Adélie Penguins were implanted with 0 (control), 100 mg of CORT (C100) or 10 mg of bromocriptin (suppresses prolactin secretion; B10). They were weighed and locomotor activity was measured daily using data loggers. Blood samples were collected at 0, 3 and 5-17 days after implantation. C100-penguins had increased uric acid levels and decreased α -hydroxybutyrate concentrations 3 days following treatment. In contrast, B10-birds showed no metabolic changes. Two to four days after implantation, locomotor activity was 250 % and 300 % higher, respectively, in C100 and B10-birds than in controls and was comparable to that of birds in PIII. Specific effects of bromocriptin were investigated during moult (a period characterized by a low prolactinemia) and no increase in locomotor activity was observed following treatment.

The experimentally-induced rise in corticosterone levels provoked a rise in protein breakdown and a decrease in lipid utilization, thus mimicking metabolic changes occurring in PIII. However, the experimentally-induced decrease in prolactin levels did not affect substrate use. Interestingly, both treatments triggered behavioural changes similar to those observed in control birds in PIII. Therefore, these two hormones appear to be involved in the refeeding decision, with corticosterone being more relevant to mimic a PIII stage of fasting.

28

Stirnemann, R. L.¹, Donnelly, A.¹ & O'Halloran, J.²

¹Centre for the Environment, Trinity College Dublin, Dublin 2, Ireland, ²Department of Zoology, Ecology and Plant Science, University College Cork, Distillery Fields, North Mall, Cork, Ireland

Impacts of climate warming on Whooper Swan wintering phenology in Ireland

Earlier spring migration of birds has been linked to increases in temperature; however few studies have examined changes in arrival and departure dates of wintering migrants. Phenological changes in the migration dates of winter migrants are likely to provide the first evidence of changing distribution patterns as a consequence of changes in temperature. Shorter stay periods in the wintering grounds are expected prior to a change in status from a migrant to a resident in the breeding grounds. A long term dataset (1972–2008) of Whooper Swan (*Cygnus cygnus*) numbers, arrival, departure dates and duration of stay was examined in a wintering site in Ireland (Kilcolman reserve) to determine if Whooper Swans are altering their overwintering timing with increasing temperatures. To determine the optimal model explaining changes in migrational parameters, the relative influences of: (1) the average daily temperatures prior to arrival and departure at the wintering (Ireland) and breeding (Iceland) sites, (2) the average winter Northern Atlantic Oscillation index (NAO) and (3) wind speed and direction on winter migration phenology were assessed. Results suggested both first arrival date and maximum departure date (when the decline in the number of swans was highest) both showed a significantly negative trend indicating earlier arrival and departure respectively. The duration of departure (the time period between the maximum departure date and last departure date) has also significantly lengthened. In concurrence with these changes average local minimum temperature over the January wintering period seems to have increased. This appears to be correlated with the maximum departure date of the Whooper Swans and is being investigated further. In conclusion, results suggest that Whooper Swans in Ireland are able to adjust the timing of winter migration in response to increasing January temperatures, enabling them to depart wintering grounds earlier and thus arrive at the breeding grounds sooner, where earlier breeding can potentially occur.

61

Strazds, M.¹ & Sierdsema, H.²

¹Dept. of Zoology and Animal Ecology, University of Latvia, Kronvalda blvd. 4, Riga, LV-1010, Latvia, ²SOVON – Dutch Centre for Field Ornithology, Rijksstraatweg 178, Beek-Ubbergen, NL-6573 DG, The Netherlands, mstrazds@latnet.lv, henk.sierdsema@sovon.nl

Possibilities to estimate breeding success rates of Black Stork by means of GIS (map analysis)

A preliminary study of the forestry impact in Latvia has shown that various spring activities such as different cuttings, thinning, forest planting etc. are responsible for almost 25 % of failed breeding cases of the Black Stork (*Ciconia nigra*). So forestry-caused disturbance is obviously playing a significant role in determination

of low breeding success of the Black Stork in Latvia - the annual rate of failed nests since 1993 vary from 23.4 % till 64.7 % (average 41.8; overall trend since 1979 significant; $r_s = 0.662$, $p < 0.01$, $n = 30$).

The preliminary results were obtained analysing more than 11000 single cuttings during 2003–2005 in radius of 3 km around 115 nests in all kinds of properties — both state and private. The analysed information encompasses data often difficult to obtain or even kept as a business secret — sales (cutting) data, volume logged, prices etc. Therefore such analyses can hardly be carried out either over longer time period or in other countries where such data may not be available.

We are studying the possibility to find out a similar relationship by analysing publicly available information about forestry intensity during 2001–2008. We are using the annual cutting volume per municipality as a proxy of forestry pressure to test if these data are explaining breeding success of Black Stork (659 cases with known nesting success). Other data used as variables are forest fragmentation rate, extent of the feeding habitat, and climatic conditions of the given year.

50

Sztiwertnia, H.

Department of Avian Ecology, Institute of Zoology, University of Wrocław, ul. Sienkiewicza 21, Wrocław 50-335, Poland, haniaasz@biol.uni.wroc.pl

Male mate guarding in Reed Warbler *Acrocephalus scirpaceus*

Mate guarding is the paternity protection behaviour in which males follow their mates very close to prevent their infidelity. Many previous studies have shown that male mate guarding is a common way of maximizing paternity assurance in birds – as one of sperm competition strategies. In socially monogamous species minimizing costs of losing energy or mating opportunities by males requires coincidence of paternity guard with female's fertility peak. The intensity of mate guarding is variable and is expected to be related to the threat of paternity loss.

I have studied intensity and timing of male mate guarding in an individually marked population of Reed Warbler *Acrocephalus scirpaceus* at the Milicz fish-ponds (southwest Poland) since 2006. I have collected blood of adults and nestlings for the paternity analysis.

Results show that male reed warblers can adapt their behaviour to the environmental conditions, especially when risk of losing paternity is high. Mate guarding was significantly more intensive during 3 days before laying of the first egg by female (89.1 % of time males spent close to females) than earlier – this is the female fertile period. Males followed their mates very close, spending most of their time closer than 0.5 m from female. On the day of laying the first egg the intensity of mate guarding dropped significantly (21 % of time close to female) – females don't accept copulations after that day. Mate guarding was significantly more intensive in the evening than in the morning, but it was exceptionally intensive before noon in windy days; it was also more intensive in late breeding season than in May (that would be connected with increasing vegetation and breeding pairs density).

73

Tarkhanova, M.

Scientific Research Dept., Moscow Zoo, B. Gruzinskaya, 1, 123242, Moscow, Russia, zoopark-moscow@mail.ru

Some aspects of the Barnacle Goose (*Branta leucopsis*) behaviour at the Moscow Zoo

About 30 Barnacle Geese identifiable through individual marking by colour rings are kept at the pond of the Moscow Zoo together with 15 species of waterfowl. Their behaviour has been observed since 1998.

Dominance increases reproductive success of captive Barnacle Geese. High-ranking males have more chances to acquire and defend a nest site. Low-ranking males, usually younger birds, are often driven away from nest sites by the dominant ones. 4 cases of interspecific and 15 cases of intraspecific nest parasitism were observed.

Adult birds can change their partners not only because of another partner's death. 54 cases of the partner's changes during 10 years of our research were recorded.

Family ties are very strong in Barnacle Geese. In spring, goslings visit the territory of their parents, they may nest here later. After the end of the breeding period parents become tolerant to their older offspring and they usually keep together. Barnacle Geese remain associated with their parents for a long time, at

least for 7 years. The persistence of family bonds are maintained mainly by males because sons prefer to stay close to their fathers.

Barnacle Geese females change their nest sites almost every year. More often (29 cases in 5 years) - for a new nest box, 12 cases - for a new island. The changing of the nest site doesn't strongly depend upon the breeding success of the female in the previous year. In 67 % of cases the birds change their nest site after the breeding failure, but they as well change their nest site in 64 % after the breeding success.

Barnacle Goose females are considered to play the leading role in the process of the nest site choosing, but male can also influence the process. His contribution varies with age, experience and individual features.

34

Thibault, J.-C., Besnard, A., Villard, P., Moneglia, P. & Prodon, R.

EPHE, UMR 5175 CEFE-CNRS, 1919 route de Mende, 34293 Montpellier cedex 5, France, roger.prodon@cefe.cnrs.fr

Threat on an European endemic species: the Corsican Nuthatch

With a distribution area less than 200 km² and a total population number less than 2500 pairs, the Corsican nuthatch is one of the very few European endemics, and is probably the rarest breeding bird in Europe. Its habitat is currently threatened both by logging activities and by increased fire frequency and size. We examine the life traits that made this bird completely dependent of one tree species (the Corsican pine *Pinus nigra laricio*), its food regime, especially in winter, the parameters of the selection of its habitat within the pine stands, and the short-term and long-term impacts of fires and of forest logging on its population. Since its population is currently declining, the Corsican Nuthatch combines enough of the criteria established by the IUCN to be classified as "vulnerable". We stress on the necessary changes in the forestry practices that are needed to ensure the conservation of this highly patrimonial species.

17

Tsvey, A.

Biological Station Rybachy, Zoological Institute, 238535, Kaliningrad region, Russia, arseny@bioryb.koenig.ru

Ecophysiology of fuelling in European Robins *Erithacus rubecula* during migration

For successful migration passerine birds need to refuel *en route*. To meet this demand, their digestive tract shows great phenotypic flexibility. For example, the mass of the digestive organs may be substantially reduced during long flight over ecological barriers, so these organs must be rebuilt after landing. This may be the reason for low fuel deposition rate (FDR) during the first day(s) of stopover. Our own and literature data show that during migration over favourable areas, FDR is often negatively related to initial bird's body condition. Initially lean birds generally gain mass during stopover while fat individuals lose mass or keep it stable. One of the possible reasons for such behavior might be different quantity of food eaten by lean and fat birds. To test this hypothesis, we captured Robins *Erithacus rubecula* during autumn migration on the Courish Spit (Eastern Baltic) and transferred them to individual cages where we monitored body mass changes, amount of food eaten (meal worms) and faeces production. Lean birds gained mass nearly linearly during the whole experiment (11 days) with an average rate of 0.1 g/day. Fat Robins lose mass during seven days and only then start to gain mass rather rapidly. The greatest difference between groups in the amount of food eaten was observed during the first three days, when lean Robins fed at a maximum rate while fat individuals – at a minimum rate, respectively; later on food consumption was indistinguishable between the groups. Apparent digestive efficiency was also similar between fat and lean Robins. This study showed that negative relationship between FDR and initial body condition in Robins may be explained by the different food amount consumed by lean and fat individuals. However, the reason for such behaviour (different development of digestive tract or different motivation to feed) is still unclear.

63

Vadász, C.¹ & Csörgő, T.²¹Kiskunság National Park Directorate, 6000 Kecskemét, Liszt F. u. 19. Hungary, ²Eötvös L. University of Sciences, 1117 Budapest, Pázmány P. sétány 1/c, Hungary, vadaszcs@knp.hu**Demographic structure of the Moustached Warbler *Acrocephalus melanopogon* population breeding in the Carpathian Basin**

Demographic structure of reed nesting passerine populations is usually poorly known. Being aware of basic demographic parameters is of fundamental importance for further quantitative conservation biological analyses. Our purpose was to model the demographic structure of the *Acrocephalus melanopogon* population breeding in the Carpathian Basin. Our analyses were based on two data sets: the first consisting of capture-recapture data originating from a fully standard effort project having been carried out at Lake Kolon, Central-Hungary, the second being the whole Hungarian ringing database, excluding the former data. The analyses were performed in a stepwise method. At first, individuals ringed as juveniles and having been recaptured as adults with known sex were investigated to reveal sex and age specific annual survival rates. These parameters were incorporated to the successive models built for the rest of juveniles, then for adults and finally for the whole population. Our results demonstrate that survival rate between the first and the second calendar year was higher in females, while there was no sex-specific difference in survival rates from the second calendar year onwards. Calendar-year-specific annual survival rate was constant since the second year of life, indicating a well-balanced demographic structure at population level. Breeding dispersion rate of females was found to be considerably higher than that of males.

90

Van Houdt, J.^{1,3}, Sonet, G.^{2,3}, Breman, F.^{1,3} & Louette, M.¹¹Royal Museum for Central Africa, Tervuren, B-3080 Tervuren, Belgium, ²Royal Belgian Institute of Natural Sciences, Brussels, Belgium, ³Joint Experimental Molecular Unit (Belgian Federal Science Policy), jeroen.vanhoudt@africamuseum.be, michel.louette@africamuseum.be**DNA barcoding of European *Accipiter* and their African relatives**

DNA sequence analysis of the COX1 gene shows that the three European *Accipiters* are members of separate groups. Within these groups, we find molecular differences of 0-7 %.

In the *Accipiter gentilis* group, this difference is of the same order of magnitude (~ 3 %) between the Palearctic *A. gentilis* and the Nearctic *A. atricapillus* and also between each of these two and the Afrotropical *A. melanoleucus*. The molecular analysis supports the existence of three separate species.

In the *Accipiter nisus* group, differences between the Palearctic *A. nisus* with the Nearctic *A. striatus* and the Neotropical *A. erythronemius* amount to ~ 4 % each. To the contrary, the Palearctic *A. nisus* and the Afrotropical taxon *rufiventris* cannot be discriminated by means of the COX1 barcode. The latter is best included, as a recent colonist, in the species *A. nisus*.

In both groups discussed until now, the molecular data show that the Palearctic populations are very homogeneous over their large range (this includes the Corsican-Sardinian populations). Several morphologically well diagnosable subspecies are characterized by identical COX1 DNA barcodes.

A. brevipes belongs to a third group. It is different at the molecular level from its closest relatives *A. badius* (from southern Asia), *A. spheonurus* (from the northern Afrotropics) and *A. polyzonoides* (from the southern Afrotropics). The genetic divergence among these four taxa varies from 2-4 % whereas the variation within these taxa is limited. As such they are best considered as four separate species.

1

Vasilakis, D.^{1,2}, Triandaphyllos, A.² & Schindler, S.^{1,3}

¹WWF Greece – Dadia Project. Dadia, GR 68400 Soufli, Evros, Greece. ²Department of Environment, University of Aegean, 'Xenia' Building, GR 81100 Mitilini, Lesvos, Greece, ³Department of Conservation Biology, Vegetation & Landscape Ecology, University of Vienna, Rennweg 14, A-1030 Vienna, Austria, ecodadia@otenet.gr, takr@aegean.gr, stefan.schindler@univie.ac.at

Flight height and range use of the Eurasian Black Vulture (*Aegypius monachus*) in Thrace, Greece – implications for Vulture management in relation to proposed wind farms

Vultures are thought to fly at high elevations, prospecting large areas during their movements. The objective of the present study was to apply Black Vulture's Utilization Distribution Maps (UDM) obtained in Thrace for wildlife management in relation to a number of proposed wind farm sites. Therefore, we used X, Y and Z high accuracy data from GPS satellite transmitters that were placed on a sample of three vultures. We tested for differences among individuals regarding flight height (FH), flight altitude (FA), ground altitude (GA) and distance to an artificial feeding site, and analysed the distribution of flight heights. In total, 741 locations were included in the analysis. Vultures flew at similar heights and mainly rather low. No significant differences were detected among individuals regarding their FH, but for the other variables. The vulture's FH was not affected by GA or the increment of distances to an artificial feeding site. The median FH was 68 m, the 75 % quartile 183 m, and in 68 % of the recorded vultures were flying at flight heights between 30 and 110 m, which is concordant with those covered by the rotors of the wind turbines in the region. Apparently, vultures exploit the oreographic currents, which are the main sources of commercially used wind energy, too. The flight height distribution can be used for collision risk models, and due to the concentration of movements in dangerous heights, an increased risk of collision with the revolving rotors must be expected. The Black Vulture's UDM is an important tool for the management of the species. Regarding the spatial planning of wind farms in the area, we must recommend to be more conservative and inhibit investments within 15 km of the Black Vulture breeding colony in Dadia National Park or other areas, which are repeatedly used by the vultures.

98

Vasilascu, N., Zubcov, N. & Munteanu, A.

Institute of Zoology, Academy of Sciences Moldova, Academy' Street, 3, Chisinau, MD – 2028, R. Moldova, vasilascunatalia@rambler.ru

Adaptation peculiarities within the urbanization process of Chisinau city bird fauna

The poster presents our observations on the adaptation peculiarities of avifauna in the Chisinau city habitats. Chisinau city's position is in a favourable climatic zone from central part of Republic of Moldova. It has a total surface about 33.7 thousands ha, the green space occupying about 1.1 thousand ha. Our fieldwork was done during the period 2003–2008. In the city's parks, we identified 89 bird species, which belong following ecological categories on dependence of urbanization level:

- a. the complete urban species, including seven sedentary species (*Corvus monedula*, *Columba livia domestica*), some of them are very prolific and made troubles for people (*Passer domesticus*, *Corvus frugilegus*);
- b. the lasting urban species that are 24 species which were recently expanded their breeding area, as the *Phoenicurus ochrurus*, which few decades ago, was present just on rocky slope (cliff), while, now, is a common species in the building site, squares and parks. Another species as *Apus apus*, *Delichon urbica* are allocated to high constructions;
- c. the conditional urban species that include 22 species. One of them is *Turdus merula*, which is in the advanced urbanization process. In this group, we found a big difference between species and within the species, between the populations originated from different geographical zones.

Adaptation for urban environment conditions denoted a high plasticity of some species that are in the urbanization process (*Sylvia atricapilla*, *S. borin*, *S. curruca*, *Phylloscopus collybita* or *Columba palumbus*). In the future, probably, these species will become common for urban habitats, because their presence is evidently bigger every year, but it is very important to increase surface and the trees' diversity in the urban green spaces that are similar to the woodland.

8

Verhelst, B., Hegemann, A. & Trierweiler, C.*University of Groningen, Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, P.O. Box 14, 9750 AA Haren, The Netherlands, a.hegemann@rug.nl***Southwestern Georgia as the most important bottleneck in the Western Palearctic for raptors during autumn migration**

Raptors are known to concentrate at geographical bottlenecks to avoid crossing ecological barriers like oceans or mountains. In Europe, the best known bottlenecks are Falsterbo, Gibraltar and the Bosphorus. There have been indications that SW Georgia is an important bottleneck for raptor migration as well, as the migration of soaring birds is funnelled in this area because of the Black Sea, the Caspian Sea and the Caucasus mountains, but systematic counts were lacking so far. In 2008, systematic migration counts over the whole autumn season have been conducted for the first time. Daily observations have been done from 21st of August till 14th of October near Batumi in SW-Georgia. A total of more than 810,000 raptors from 32 species have been counted. The most abundant species were Honey Buzzard *Pernis apivorus* (> 390.000 ind.), Steppe Buzzard *Buteo buteo vulpinus* (>275.000 ind.) and Black Kite *Milvus migrans* (>58 000 ind.). Other species were counted in important numbers as well: Booted Eagle (*Aquila pennata*), Montagu's Harrier (*Circus pygargus*), Pallid Harrier (*Circus macrourus*), Lesser Spotted Eagle (*Aquila pomarina*), Greater Spotted Eagle (*Aquila clanga*), Levant Sparrowhawk (*Accipiter brevipes*) and Short-toed Eagle (*Circaetus gallicus*). This proves that this area is the most important bottleneck for autumn raptor migration in the entire Western Palearctic.

15

Vostretsova, E.V., Gavrilov, V.V., Goretskaya, M.Ya. & Veselovskaya, E.V.*Zvenigorod Biological Station of Moscow State University, P.O. Box Shihovo, Odintsovo District, 143036 Moscow Region, Russia, vostretsovaelena@mail.ru***Postfledging dispersal of European Robin: the influence of moult**

Postfledging dispersal has been studied in European Robin (*Erithacus rubecula*) at the Zvenigorod Biological Station (Moscow Region, Russia). We analysed data on 3655 juvenile Robins caught in mist-nets (2001-2007) and 345 Robins ringed as chicks (2004-2007). Robins ringed as chicks were defined as local-born birds; juveniles caught in mist-nets were defined as birds of unknown origin. Moult stage of each bird and the age of local-born birds were determined. Our results indicate that almost all local-born Robins left the natal area before the onset of intensive moult: none of examined first-brood Robins (0 %) and only 8.8 % of the second-brood Robins stayed in the natal area for moulting. 6.0 ± 0.8 % of first brood robins of unknown origin and 14.6 ± 3.9 % of second brood birds of unknown origin stayed for moulting in the studied area. We suggest that the greater number of second-brood Robins stayed for moulting in the studied area (both local-born and birds of unknown origin) was influenced by the age when moult began: early-moulting Robins had less time for dispersal. Robins from second broods started moulting earlier than first-brood birds: second-brood birds started moulting on average of 32 ± 0.6 days post-hatching whereas first-brood Robins on average of 44 ± 0.8 days.

47

Weidinger, K. & Kočvara, R.*Department of Zoology and Laboratory of Ornithology, Palacky University, Tr. Svobody 26, 771 46 Olomouc, Czech Republic, weidinger@prfnw.upol.cz***Repeatability of nest predation: effect of predator species and time scale**

It has been proposed that some specific nest locations have higher intrinsic chances of being depredated than other locations. This predicts that fates of consecutive nesting attempts at the same site should be repeatable. We used 20 pairs of old thrush nests baited with quail eggs to simulate repeated nesting attempts at the same sites, both within and between breeding seasons ($n = 40$ sites \times 2 trials \times 2 years = 160). Each nest was monitored by a camera to record multiple predation events and to identify predators. We found that predation was repeatable within a 15-day trial in all predator species, but it was not correlated between pairs of simultaneously exposed nests and not repeatable between trials or between

years, for the principal predator species (*Garrulus glandarius*, *Martes martes/foina*) analysed separately as well as for the total predation (all predator species combined). These findings are consistent with a short-term effect of predator memory – revisitation of previously depredated nests during a current nesting trial, but they do not support an effect of nest site features on multiple nest discoveries and/or effect of nest location on repeated random encounters with the same nest. Long-term repeatability (between-trials and between-years) was detectable only in an occasional predator (*Dendrocopos major*), which we attributed to site fidelity and individual foraging specialization. We conclude that repeatability of nest predation depends on the time scale considered and on the composition of local predator community. We caution against spurious findings of repeatable nest predation resulting simply from statistical properties of binary data (nest fates).

91

Wink, M., El-Sayed, A.-A. & Gonzalez, J.

Institut für Pharmazie und Molekulare Biotechnologie, University of Heidelberg, Abteilung Biologie 4. OG, Im Neuenheimer Feld 364, 69120 Heidelberg, Germany, javier.gonzalez@urz.uni-heidelberg.de

Phylogenetic relationships of the Accipitridae based on nucleotide sequences of mitochondrial and nuclear DNA

Diurnal raptors have been grouped into five families: Accipitridae, Pandionidae, Sagittariidae, Falconidae and Cathartidae, and placed in a common order Falconiformes. Molecular data provide evidence that at least the Falconidae do not share direct ancestry with Accipitridae, Pandionidae, Sagittariidae and Cathartidae, indicating that the order Falconiformes consists apparently of an artificial unit. Because convergent traits are abundant in raptors, molecular data, such as DNA sequences, offer an opportunity to elucidate evolutionary relationships as DNA data provide many characters for comparison and are less biased by parallel evolution than morphological, ecological or behavioural traits.

We obtained nucleotide sequences (2,000 base pairs) of the *RAG-1* nuclear gene (recombination activating gene) and the mitochondrial cytochrome *b* (*cytb*) gene (1,000 base pairs) from more than 100 species representing 40 genera of the Accipitridae, Pandionidae, Sagittariidae and Cathartidae.

Our multi-gene approach, combining a maternally inherited fast evolving gene like the *cytb* and a relatively slow evolving nuclear gene like *RAG-1*, provide resolution in both terminal and basal branches in the phylogeny of the Accipitridae.

99

Wysocki, D.¹ & Greño, J.L.²

¹*Department of Vertebrate Anatomy and Zoology, University of Szczecin, ul. Waska 13, 71-415 Szczecin, Poland,*

²*“Cavanilles” Institute of Biodiversity and Evolutionary Biology, University of Valencia, PO Box 22085, E-46071 Valencia, Spain, darekw@univ.szczecin.pl, jogreru@gmail.com*

Survival and site-fidelity of urban Blackbirds *Turdus merula* in Poland

Studies dealing with individual survival of birds in open populations usually estimate survival according to capture-recapture models like Cormack-Jolly-Seber (CJS). In spite of multiple advantages of CJS model, there is an important limitation on its use; this model does not estimate true survival (S). Contrarily, CJS model estimates apparent survival (Φ), which is a combination of survival and site-fidelity (F) probabilities. As result, death and emigration are confounded.

In this study we have used Barker's model, which allows estimating S and F – and other demographic parameters – separately. This model requires data from different sources: mark, recapture, resightings and recoveries. This model, to our knowledge, has not been previously used with passerines.

Our study was performed in a Blackbird *Turdus merula* urban population breeding in two parks in Szczecin (NW Poland). A total of 490 fledglings and 356 adult birds were ringed and used in present analyses. Every newly captured individual was marked with an unrepeatable colour combination based on one metallic numbered ring and two to four plastic colour rings allowing its identification by eye. We have used data from 1998 to 2008, dividing each year into three capture periods: 1) “Pre-breeding”: March, 2) “End of breeding”: May-June and 3) “Pre-winter”: October-November (30 encounter occasions in total).

According to our results, survival probabilities from “Breeding” to “Pre-winter” were lower in fledglings (0.77 ± 0.01) than in adults (0.94 ± 0.01). From this period onwards, survival probability of all individuals in the population was similar, showing variation among periods. Survival was higher along interval “End of

breeding" - "Pre-winter" (0.94 ± 0.01) and lower during breeding season (i.e. April, 0.89 ± 0.01). Site-fidelity among periods was time-dependent, and according to mean values, lower in individuals ringed as fledglings (0.80 ± 0.05) than in those ringed as adults (0.82 ± 0.03).

30

Zbinden, N.¹, Kéry, M.¹, Keller, V.¹, Brotons, L.², Herrando, S.² & Schmid, H.¹

¹Swiss Ornithological Institute, Luzernerstrasse 6, CH-6204 Sempach, Switzerland, ²Catalan Ornithological Institute, Barcelona, Spain, niklaus.zbinden@vogelwarte.ch

Species richness of breeding birds along the altitudinal gradient – an analysis of atlas databases from Switzerland and Catalonia (NE Spain)

Changes in environmental conditions along the altitudinal gradient of mountains show similarities to those related to latitude. It is expected that climatic changes will lead to changes in distribution of bird species along a latitudinal as well as an altitudinal gradient. As a basis for modelling such changes, we used data collected for distribution maps (atlas) of breeding birds to study species richness of diurnal breeding birds along an altitude gradient in 1x1 km squares from Switzerland (2622 squares) and Catalonia (Spain; 3038 squares). In total, 216 species were recorded (Switzerland 160, Catalonia 188), 125 were shared. As expected, species richness decreased with altitude, however, that decline was not linear. Up to a certain altitude hardly any decrease was found, but beyond this "breakpoint" species richness declined, in Switzerland more strongly than in Catalonia. The location of that "breakpoint" was estimated at approx. 1450 m a.s.l. in Catalonia, and at 1530 m in Switzerland. We argue that this pattern is likely to be influenced by a decrease in plant biomass associated with altitude and matching processes leading to a decline in the diversity of habitat niches for birds.

Author index

- Abadi, F. 16
 Aberle, H. 97
 Adamik, P. 13
 Adriaensen, F. 57
 Aghababayan, K. 119
 Ahmadi, Y. 100
 Albayrak, T. 97
 Alekseev V.N. 125
 Alerstam, T. 25
 Alizadeh, A. 100, 139
 Alleva, E. 94
 Almasi, B. 13
 Álvarez Keller, M. 14
 Álvarez Xusto, E. 14
 Amezian, M. 14
 Amini Nasab, S.M. 98
 Amrhein, V. 71, 81, 138
 Ancel, A. 20, 94
 Angelier, F. 15, 98
 Anselin, A. 15
 Antoine, E. 36
 Arcanger, J-F. 101
 Arlettaz, R. 16, 139
 Arnaiz-Villena, A. 99, 138
 Arnauduc, J-P. 101
 Arnold, L. 32
 Arriero, E. 16
 Arroyo-Solís, A. 16
 Atemasov, A.A. 99
 Atemasova, T.A. 99
 Atiénzar, F. 17
 Atkinson, P. 66
 Atkinson, P.W. 17, 18, 19,
 Auniņš A. 48, 120
 Auroy, F. 101
 Avotiņš, A. 116
 Baaij, E. 75
 Baglione, V. 69
 Bahadori, F. 100
 Bahadori, M. 139
 Bairlein, F. 85
 Bakulina, A.A. 103
 Bánhidi, P. 117
 Bani, L. 126
 Barba, E. 17, 116, 135
 Barber, D. 25
 Bargain, B. 72
 Bariş, Y.S. 113, 117
 Barišić, S. 105
 Bartíková, M. 100, 136
 Bauchinger, U. 18
 Bauer, S. 19
 Bayly, N.J. 18, 19, 100
 Beaulieu, M. 20, 81, 140
 Bechard, M. 25
 Becker, P.H. 69
 Bejček, V. 136
 Belda, E.J. 17, 89, 116
 Bellebaum, J. 20
 Benschi, S. 20, 56, 74, 93
 Bensusan, K. 14
 Bergero, V. 23
 Bergmanis, U. 86
 Bernard-Laurent, A. 101
 Bernshausen, F. 53
 Bērziņš, A. 122
 Besnard, A. 21, 143
 Bildstein, K. 25
 Blasius, B. 50
 Boano, G. 129
 Bogdea, L. 21, 106
 Bogliani, G. 23
 Böhning-Gaese, K. 102, 122
 Bokotey, A.A. 112
 Bollmann, K. 22, 51
 Bolshakov, C.V. 78
 Bolton, M. 80
 Boos, M. 93, 101, 137
 Borowiec, M. 40
 Bost, C.A. 98
 Boulinier, T. 22
 Bourguemestre, F. 101
 Bouten, W. 47, 75
 Brambilla, M. 23
 Braun, M. 102
 Breitbach, N. 102
 Breman, F. 144
 Briedis, M. 103
 Brigadirova, O.V. 103
 Brotons, L. 23, 76, 148
 Brūmelis, G. 120
 Brumm, H. 61
 Brunton, D. 38
 Buczma, A. 104
 Bukvareva, A.A. 37, 104
 Bulyuk, V. 78
 Burfield, I.J. 24
 Buschmann, A. 24
 Bushuev, A.V. 104
 Cadima, J.F. 58
 Cameron, A. 25
 Camphuysen, K. 75
 Cantó, J.L. 135
 Cappelle, J. 25
 Cardinale, M. 26
 Carello, L. 105, 107
 Carere, C. 26, 94
 Casale, F. 23
 Casasole, G. 75
 Castillo, J.M. 16
 Cepak, J. 13
 Cézilly, F. 28, 59
 Charmantier, A. 11
 Chastel, O. 26, 36, 69, 81, 98
 Chavas, G. 101
 Chenchouni H. 76
 Chiaradia, A. 70, 94
 Chiarotti, F. 94
 Cholewa, M. 27
 Choquet, R. 32, 66
 Chylarecki, P. 27, 47
 Cichon, M. 111
 Ćiković, D. 105
 Ciudad, C. 69
 Clark, J.A. 18, 19, 64
 Cojan, C. 21, 106
 Collar, N.J. 132
 Combreau, O. 132
 Cooleman, S. 106
 Coppack, T. 27
 Cortes, J. 14
 Costantini, D. 26, 105, 107
 Cozma, M.M. 107
 Cresswell, W. 28
 Crovetto, G.M. 23
 Csörgő, T. 52, 118, 121, 144
 Cucco, M. 108
 Czyz, B. 108
 Daniel, O. 115
 Daróczy, S.J. 86
 Das, K.S.A. 109
 David, M. 28
 Davydenko, I.V. 109
 De Coster, G. 110
 De Graaf, M. 29, 40
 De Neve, L. 110
 Dechaume-Moncharmont, F.-X. 59
 Dekinga, A. 31
 Delhey, K. 66, 110
 Dell'Omo G. 29, 91, 92, 105, 111
 Denac, D. 30, 50
 Dervaux, A. 140
 Devyatko, O.S. 99
 Dhondt, A.A. 42, 57
 Diamond, M. 45
 Diaz, M. 78
 Diebold, M. 30
 Dietz, M. 31
 Dietzen, C. 52
 Dimitrov, D. 93
 Djeddou, N. 76
 Dodman, T. 25
 Dokter, A. 31
 Dolman, P.M. 42, 132
 Dombrovski, V. 86
 Donnelly, A. 141
 Douglas, D. 25
 Dravecky, M. 86
 Drent, R.H. (†) 85
 Drewitt, A. 66
 Dulisz, B. 110
 Duriez, O. 32, 111
 Düttmann, H. 46
 Dyrz, A. 40, 111
 Dzyubenko, N.V. 112
 Eglinton, S.M. 80
 Ehrnsberger, R. 46
 Eichhorn, G. 32
 El Agbani, M.A. 14
 Ellegren, H. 86
 El-Sayed, A.-A. 147
 Encabo, S.I. 89
 English, P.A. 112
 Ens, B. 19
 Ens, B.J. 32
 Erbrech, A. 113
 Erciyas, K. 113
 Erdoğan, A. 97
 Evans, K. 33
 Excoffier, L. 51
 Exo, K.-M. 85
 Fahrig, L. 56
 Faivre, B. 74
 Falco, R. 23
 Falsone, K. 46

Fanfani, A.	107	Hario, M.	70	Klunen, E.	50
Fedorov V.V.	125	Harnos, A.	33, 52, 118, 121	Klvaňa, P.	136
Fehérvári, P.	33, 52, 118, 121	Hau, M.	40	Klvaňová, A.	90
Ferrer, M.	25	Heckel, G.	54	Knez, K.	34
Fidler, A.	38	Heerli, M.	106	Koce, U.	50
Fidler, A.E.	82	Hegemann, A.	29, 40, 146	Kochanov, S.	120
Figueroa, M.E.	16	Helm, B.	11	Kochert, M.	25
Fiuczynski, K.D.	114	Herrando, S.	148	Kočvara, R.	146
Flade, M.	72	Herrmann, P.	41	Koks, B.	25
Focardi, S.	129	Hetmański, T.	118	Koks, B.J.	85
Förschler, M.	115	Heylen, D.	41	Kölzsch, A.	50
Fouchier, R.A.M.	43	Hilgerloh, G.	42	Komdeur, J.	85
Frederiksen, M.	66	Hochachka, W.M.	42	Kopp, M.	51, 134
Freiberga, I.	114	Hoi, H.	37	Kormann, U.	51
Fuller, M.	25	Holberton, R.L.	15	Korner-Nievergelt, F.	20, 138
Fuller, R.J.	42, 91	Holleman, I.	31	Korshunov, A.V.	99
Fusani, L.	34, 75	Holleman, L.J.M.	17	Korthals, H.	31
Fychs, R.	60	Holt, C.A.	42	Kosmalski, W.	121
Gache, C.	107, 114, 128	Honza, M.	135	Kovács, Sz.	52, 118, 121
Gaidet, N.	25	Horch, P.	38	Kralj J.	105
Gálvez Martínez, M.	14	Hovhannisyan, T.	119	Krama T.	122
Gandolfi, M.	115	Howey, P.W.	43, 114	Krams, I.	122
Gavrilov, V.V.	146	Hoye, B.J.	43	Kremer, P.	52
Geiger, S.	34	Hristova, I.	131	Kreuziger, J.	53
Ghaffari, S.	98	Husek, J.	13	Krist, M.	122
Ghahramanpouri, M.	98	Ignat, A.E.	119	Kruckenberger, H.	50
Giraudeau, M.	98	Ilyina, T.A.	44	Ktitorov, P.	59
Gladbach, A.	35	Imhof, S.	22	Kube, J.	130
Gladbach, D.J.	35	Ioset, A.	16	Kubke, F.	38
Goc, M.	104, 121	Irwin, D.E.	71	Kübler, S.	72
Gomez-Prieto, P.	99, 138	Irwin, S.	84, 91	Kuepper, C.	41
Goncharov, G.L.	99	Isaksson, C.	44	Kunc, H.P.	53
Gonzalez, J.	52, 115, 147	Ivankina, E.V.	44, 104	Kupko, S.	72
Goodwin, T.	38	Ivanovski, V.	86	Kvist, L.	89
Goretskaya, M.Ya.	146	Iverson, S.	25	Kwak, R.	95
Gosler, A.G.	35	Jacob, G.	51	Laiolo, P.	88
Goutte, A.	36	Jagórkowska, P.	138	Lang, Zs.	33
Goymann, W.	34	Janic, B.	72	Laube, I.	102, 122
Graham, C.H.	83, 122	Janoyan, G.	119	Lazin, D.	20, 81, 140
Granadeiro, J.P.	58	Jenkins, A.R.	45	Le Bouard, F.	98
Grandäns, G.	116	Jenni, L.	13, 45, 60	Le Glaunec, G.	32
Gregory, R.D.	90	Jenni-Eiermann, S.	13, 46, 60	Le Maho, Y.	20, 34, 81, 140
Grémillet D.	36	Ji, W.	38	Lehikoinen, E.	70
Greño, J.L.	17, 116, 135, 147	Jiguet, F.	46, 76	Lehmann, A.	124
Griffiths, M.E.	78	Judas, J.	132	Leitão, P.J.	63
Griggio, M.	37, 75	Junker, S.	46	Leivits, A.	54
Grinblate, S.	83	Kaatz, M.	50	Leivits, M.	54
Grinkov, V.G.	37, 82, 104	Kaboli, M.	100, 139	Lenda, M.	79, 123
Groen, T.	130	Kania, W.	47	Lens, L.	110
Groscolas, R.	32, 88, 113	Karami, M.	100, 139	Liechti, F.	31, 39, 130, 133
Gross, K.	53	Kato, A.	70, 94, 129	Lignot, J.H.	34
Grüebler, M.	38, 73	Katzner, T.	25	Limiñana, R.	54
Gschweng, M.	25	Kays, R.	25	Lindsay, K.	56
Gsell, A.C.	38	Kazartseva, S.N.	119	Lisovski, S.	51, 123, 134
Guélat, J.	39	Kefelioglu, H.	117	Liu, Y.	54
Guérin, N.	113	Keišs, O.	103, 114, 116, 120	Lontkowski, J.	86
Gugerli, F.	51	Keller, I.	54	López-López, P.	54
Gursoy, A.	117	Keller, V.	148	Louah, A.	14
Gustowska A.	68	Kelly, T.C.	84, 91	Louette, M.	106, 144
Gwinner, H.	39	Kemp, M.U.	47	Lyet, A.	21
Gyurácz, J.	117	Kempnaers, B.	82	MacDonald, M.	80
Haas, M.	60	Kerimov, A.B.	44, 104	Maciorowski, G.	86
Hagelin, J.	38	Kerus, V.	48	Madsen, J.	43
Hahn S.	51, 39, 134	Kéry, M.	48, 77, 124, 148	Maggini, R.	124
Hall, M.L.	49, 66	Kingma, S.A.	49, 66	Mägi, E.	65
Halls, J.	92	Kirk, D.	56	Maisonnette, C.	25
Halupka, L.	40	Klaassen, M.	19, 31, 32, 43	Majewska, A.	16
Handrich, Y.	32	Klaassen, R.	25	Malacarne, G.	108
Hänninen, J.	70	Klaassen, R.H.G.	49	Malher, F.	124

- Mandel, J. 25
 Mäntylä, E. 55
 Marchal, L. 81
 Marchetti, C. 125
 Marín, M. 135
 Marova I.M. 125
 Marra, P.P. 15
 Martell, M. 25
 Martin, G.R. 55
 Martin, J.-L. 56
 Martin, T.E. 16
 Martín-Galvez, D. 110
 Martiusheva, O. 126
 Martrette, J.-M. 113
 Marzal, A. 20, 56
 Massa, R. 126
 Massimino, D. 126
 Mathien, A. 88
 Matson, K.D. 40
 Matthysen, E. 41, 57, 69, 83
 Maurer, M. 16
 Mazgajski, T.D. 57, 126
 Maziarz, M. 57
 McGrady, M. 25
 McIntyre, C. 25
 McWilliams, S. 18
 Meijer, H. 84
 Meirte, D. 106
 Melišková, M. 100, 136
 Mellone, U. 54
 Mendes, T. 127
 Mennerat, A. 39
 Menz, M. 16
 Mergen, P. 106
 Mestre, A. 127
 Meyburg, B. 25
 Meyburg, B.-U. 58, 86, 114, 135
 Meyburg, C. 58, 114
 Mezquita, F. 127
 Miller, T. 25
 Millet Sargatal, A. 14
 Mineev, O. 120, 128
 Mineev, Y. 128
 Mineev, Yu.N. 128
 Miranda, A.C. 58
 Mizera, T. 86
 Monceau, K. 59
 Moneglia, P. 143
 Monrós, J.S. 89, 127, 135
 Montgomerie, R. 112
 Moorhouse, R. 38
 Moreau, J. 59
 Moreira, F. 63, 77
 Mori, G. 92
 Morrison, S.A. 77
 Motreuil, S. 59
 Mukhin, A. 59
 Müller, C. 60
 Müller, J.W. 114, 128
 Müller, M. 38
 Mulrenin, A. 106
 Muñoz, A.-R. 130
 Munster, V. 43
 Munteanu, A. 21, 145
 Musil, P. 60
 Musilová, Z. 60
 Naef-Daenzer, B. 38
 Naguib, T. 81
 Nagy, K. 52, 118, 121
 Nakul G.L. 128
 Nathan, R. 25
 Negri, A. 129
 Negri, I. 23
 Němečková, I. 61
 Nemeth, E. 61
 Nesti, I. 129
 Neubauer, G. 123
 Neumann, R. 130
 Newman, S. 25
 Newson, S. 76
 Newson, S.E. 61
 Niamir, A. 130
 Nikolov, B. 131
 Nikolov, S.C. 62
 Nordt, A. 62
 Nowakowski, J.J. 131
 Nowakowski, J.K. 63
 Nye, P. 25
 Nygård, T. 63
 O'Halloran, J. 84, 91, 141
 O'Mahony, B. 91
 Obukhova, N.Yu. 132
 Olmastroni, S. 129
 Olsson, O. 89
 Orioli, V. 126
 Országhová, Z. 100, 136
 Osborne, P.E. 63
 Ozarowska, A. 64
 Özsemir, A.C. 113
 Pacheco, C. 127
 Packman, C.E. 132
 Palatitz, P. 33
 Palmeirim, J.M. 58, 77
 Panchuk, A. 133
 Panov, E.N. 71
 Parga, C. 99, 138
 Paris Le Clerc, N. 64
 Parisel, C. 32
 Partecke, J. 65
 Pasinelli, G. 53
 Payevsky, V.A. 133
 Pehlak, H. 65
 Pellegrino, I. 108, 129
 Perez, C. 14
 Peter, D. 133
 Peter, H.-U. 51, 123, 134
 Peters, A. 49, 66
 Peterseil, J. 73
 Petit, O. 93, 137
 Petre, C.M. 134
 Petre, C.V. 134
 Petre, T. 134
 Pfeiffer, Th. 135
 Phillips, R. 134
 Piculo, R. 135
 Pierre, A. 32
 Piersma, T. 31
 Pilastro A. 75
 Polakova S. 60
 Pollheimer, M. 73
 Poot, M. 86
 Požgayová, M. 135
 Pradel, R. 32, 66
 Prinsen, H.A.M. 66
 Procházka, P. 135
 Prodon, R. 143
 Prosser, D. 25
 Puchala, P. 136
 Qninba, A. 14
 Quillfeldt, P. 35
 Raclot, T. 20, 81, 140
 Ramme, S. 46
 Randler, C. 67
 Rantala, M.J. 122
 Reguera, R. 99, 138
 Rehfish, M. 66
 Rehfish, M.M. 64
 Reichlin, T. 16
 Reif, J. 136
 Reinke, M.I. 137
 Rejt, Ł. 72, 126
 Remisiewicz, M. 68
 Rguibi Idrissi, H. 14
 Richarz, K. 53
 Richner, H. 68
 Rickenbach, O. 73
 Riechert, J. 69
 Rijpstra, J.J. 49
 Ritz, M. 51, 134
 Ritz, M.S. 123
 Robertson, J. 38
 Robin, J.P. 34
 Robin, J.-P. 93, 101, 113, 137
 Robles, H. 69
 Rönkä, M. 70
 Ropert-Coudert, Y. 70, 94, 129
 Rössler, M. 70
 Roth, T. 30, 71, 81
 Roulin, A. 13
 Rowiński, P. 57
 Royle, J.A. 77
 Rubtsov, A.S. 71
 Rufino, R. 127
 Ruiz-del-Valle, V. 99, 138
 Rumsey, S.R. 18, 19, 100
 Rutkowski, R. 72, 138
 Saari, L. 70
 Saavedra Bendito, D. 14
 Safi, K. 25
 Saggese, K. 138
 Salewski, V. 72
 Sánchez, X.M. 14
 Sanmartí Blanch, R. 14
 Santos, C.D. 58
 Santucci, D. 94
 Sarrazin, F. 111
 Schäfer, M. 119
 Schaub, M. 11, 16
 Schaublin, S. 22
 Schauer, C. 70
 Schifferli, L. 73
 Schindler, S. 73, 145
 Schmid, H. 124, 148
 Schmitzberger, I. 73
 Schuler, H. 38
 Schwerdtfeger, O. 74
 Secondi, J. 74
 Seegar, W. 25
 Selivanova, N. 120
 Serebryakov, V. 126, 139
 Serra, L. 75
 Serrano, D. 88
 Serrano-Vela, I. 138
 Shamoun, J. 31
 Shamoun-Baranes, J. 47, 75
 Shariati, M. 100, 139
 Shaw, J.M. 45

Shipilina D.A.	125	Sztwiertnia, H.	142	Versteegh, M.A.	40
Si Bachir A.	76	Takekawa, J.	25	Veselovskaya, E.V.	146
Siccardi, P.	23	Tammekänd, I.	54	Viblanco, V.	88
Sierdsema, H.	76, 141	Tammekänd, J.	54	Vickery, J.	12
Sierro, A.	139	Tarkhanova, M.	142	Vijayan, L.	109
Sillett, T.S.	77	Taylor P.B.	68	Vilbaste, E.	54
Silva, J. P.	77	Taylor S.	92	Villard, M.A.	56
Sinelschikova, A.	78	te Marvelde, L.	84	Villard, P.	143
Sion, I.	101	Tegetmeyer, C.	72	Visser, M.E.	17, 84
Siriwardena, G.M.	78	Telenský, T.	136	Vögeli, M.	88
Sirost, E.	140	Tella, J.L.	88	von Post, M.	89
Skipnes, K.	79	Therry, L.	110	Voříšek, P.	90
Skórka, P.	123	Thibault, J.-C.	143	Vorotkov, M.	78
Skorka, P.	79	Thierry, A.M.	81, 140	Vostretsova, E.V.	146
Škorpilová, J.	90	Thorup, K.	25	Vrezec, A.	90
Slabbekoorn, H.	80	Tieleman, B.I.	29, 40	Vrh Vrezec, P.	90
Slagsvold, T.	138	Tome, D.	30	Webber, S.	84
Smallie, J.J.	45	Toxopeus, B.	130	Weidinger, K.	146
Smart, J.	80	Trabalon, M.	113	Weimerskirch, H.	36
Smith, A.C.	56	Tree, A.J.	68	Weinzierl, R.	25
Smith, H.G.	89	Treynys, R.	86	Weissaupt, N.	16
Smith, J.	25	Triandaphyllos, A.	145	Wendeln, H.	20, 130
Smits, R.R.	66	Trierweiler, C.	25, 85, 146	Wesołowski, T.	27, 57, 91
Sobeková, K.	100, 136	Tsvey, A.	143	Wheatcroft, D.	122
Solt, Sz.	33	Tutiš, V.	105	Wikelski, M.	25
Sonet, G.	144	Tworek, S.	79	Wild, M.	38
Sorbi, S.	31	Udilova, E.I.	37, 104	Wilkin, T.A.	35
Spaans, B.	31	Underhill, L.G.	68	Willis, S.G.	91
Spaar, R.	38, 73, 82	Urios, V.	54	Wilson, M.W.	84, 91
Spée, M.	20, 81 140	Vabishchevich, A.P.	85	Wink, M.	52, 102, 115, 137, 147
Spiess, M.	82	Vadász, C.	144	Winter, M.	96
Sprau, P.	81	Váli, Ü.	86	Woods, R.W.	41
St Clair, J.J.H.	41	van Gasteren, H.	31, 47	Wrbka, T.	73
Stanevicius, V.	92	van Horssen, P.	86	Wysocki, D.	147
Šťastný, K.	136	Van Houdt, J.	144	Yavuz, N.	113
States, S.L.	42	Van Landuyt, W.	15	Zagalska-Neubauer, M.	123
Steenhof, K.	25	van Leeuwen, C.	31	Zalakevicius, M.	92
Steffan-Dewenter, I.	102	van Loon, E.	47	Zavalaga, C.	92
Steiger, S.	82	van Loon, E.E.	75	Zawadzka, D.	138
Sternberg, H.	37, 82, 104	van Noordwijk, A.J.	87	Zbinden, N.	124, 148
Steuri, T.	130	van Oers, K.	12	Zehindjiev, P.	93, 125
Stier, K.	82	Van Overveld, T.	87	Zeitz, R.	86
Stirnermann, R.L.	141	Van Strien, A.	90	Zimmer, C.	93, 137
Strazds, M.	48, 83, 141	Vasilakis, D.	145	Zimmer, I.	94
Strubbe, D.	83	Vasilascu, N.	145	Žmihorski M.	126
Suter, M.	30	Vera, P.	89	Zollinger, J.-L.	82
Sweeney, O.F.McD.	84	Verhelst, B.	146	Zoratto, F.	94
Szekely, T.	41	Vermeersch, G.	15	Zubcov, N.	145
Szövényi, G.	33	Verrier, D.	113		

Supported by



SWISS NATIONAL SCIENCE FOUNDATION



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Umwelt BAFU
Office fédéral de l'environnement OFEV
Ufficio federale dell'ambiente UFAM
Uffizi federal d'ambient UFAM



Zürcher
Kantonalbank



Bird Uganda
Safaris Ltd



DO-G

ECOTONE[®].PL



Haupt



ngzh

Naturforschende
Gesellschaft Zürich



Nos Oiseaux



Taylor & Francis
Taylor & Francis Group



WILEY-
BLACKWELL



Ornithologische
Gesellschaft Zürich
Stiftung für Suchende

Organised by



vogelwarte.ch



University of Zurich
Institute of Zoology

BirdLife[®]
SVS/BirdLife Switzerland