[1]MTA-PE Evolutionary Ecology Research Group, Department of Limnology, University of Pannonia, Veszprém, Hungary; [2]Department of Limnology, University of Pannonia, Veszprém, Hungary; [3]University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, Faculty of Veterinary Medicine, Department of Parasitology and Parasitic Diseases, Cluj-Napoca, Romania

Thermoregulatory properties of plumage is determined both by the structure and the number of feathers per unit body surface. Given that birds inhabiting colder environments have more feathers and that temperature in cities is higher than in their surroundings, one can expect that urban birds may adapt to the generally warmer urban climate with decreased feather density. To study this, we compared the number of feathers of breeding great tits between two urban and two forest areas that differ in local temperatures. We developed a non-invasive method which is –contrary to former studies –applicable on living birds, and based on counting feather number on close-up photos of the ventral feather tract of 6-9 days-old nestlings. At this age feathers are already emerged from under the skin but their tips are still only slightly opened, so individual feathers can be reliably identified and counted. Our preliminary results indicate that urban nestlings (n=134) have fewer feathers than forest nestlings (n=89). Furthermore, the pattern of observed differences in feather number between study sites is consistent with temperature differences: feather number was highest in the coldest forest site, while it was lowest in the two warmer urban sites. Our results suggests that the lower feather number in urban nestlings might reflect adaptation to local urban climate, but other environmental factors, e.g. reduced availability of high-quality nestling food in urban areas, may also contribute to these observed differences.

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Micro-scale architecture of the blue tit feathers

Katarzyna Janas[1], Anna Łatkiewicz[2], Olga Woźnicka[3], Mariusz Cichoń[1], Szymon Drobniak[1]

[1]Institute of Environmental Sciences, Jagiellonian University, Kraków, Poland; [2]Institute of Geological Sciences, Jagiellonian University, Kraków, Poland; [3]Institute of Zoology and Biomedical Research, Jagiellonian University, Kraków, Poland

According to the Zahavi hypothesis (1975) an ornament can play role of an honest quality indicator if its production and maintenance are physiologically costly or its possession is associated with a certain handicap e.g. increased exposure to predation. Although this hypothesis is central to many studies on signalling, the actual mechanism of colour production was described only for relatively few species. The blue tit (*Cyanistes caeruleus*) is an important model species in evolutionary ecology and a perfect organism for studying colouration, as it expresses colour patches based on structural, carotenoid-based and mixed type mechanisms. The signalling role of those colour patches and factors shaping their expression have been extensively studied in this species. However, only recently the crown feathers of the blue tit have been comprehensively analysed for the relationship between their microstructure and reflectance properties. In this study, we aim to characterize the micro and nano-scale architecture underlying remaining colour patches of the adult blue tits. We focus here on structurally coloured: rectrices, secondary coverts, nape, achromatic patches of cheeks and white dots on coverts, carotenoid-based yellow breast feathers and greenish back feathers with the mixed type of colouration. By using scanning electron microscopy (SEM) and transmission electron microscopy (TEM) we investigate barbs anatomy, and check how it translates into the reflectance properties of the feathers. We propose that rectrices, beside the crown feathers, should be another trait of interest in the search for a link between the internal feather structure, its colouration and the condition of an individual.

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Hindlimb morphology and the foraging ecology of the extinct Haast's eagle (Accipitriformes: *Hieraaetus moorei*)

Andrei Zinoviev[1]

[1]*Tver State University, Tver, Russian Federation*

New Zealand was inhabited by a number of large flightless birds as well as their aerial predators. One of such predators was an impressive Haast's eagle, which extinction coincides with the extinction of the other New Zealand megafauna. As the earlier predictions on the foraging ecology of Haast's eagle were based on the analysis of skeletal elements, I reconstruct muscles and ligaments of the large eagle's hindlimbs to get the further insight into the problem. Although similar to muscles and ligaments of other eagles, hindlimb morphology of *Hieraaetus moorei* shows several adaptations for securing and processing particularly large prey. Powerful retractors of the femur were enlarged, while its pronators *mm. iliotrochanterici* originated across a much broader region of the pelvis in comparison with other species of Accipitridae. Flexor tubercles of the ungual phalanges as well as the tubercles for the insertion of markedly larger *m. abductor digiti 2* and *m. abductor digiti 4* muscles were also enlarged. Well-adapted for hunting large prey Haast's eagle went extinct due to the inability to adapt to a reduction in megafauna availability.

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Investigating differentiation in closely related European nightjar populations using an integrative approach

Céline Kowalczyk[1,2], Ruben Evens[2,3], Nyambayar Batbayar[4], Natalie Beenaerts[2], Batmunkh Davaasuren[4], Frederik Hendrickx[5], Joachim Mergeay[6], Luc Lens[1], Tom Artois[2]

[1]*Ghent University, Ghent, Belgium;* [2]*Hasselt University, Diepenbeek, Belgium;* [3]*Swiss Ornithological Institute, Sempach, Switzerland;* [4]*Wildlife Science and Conservation Center of Mongolia, Ulaanbaatar, Mongolia;* [5]*Royal Belgian Institute of Natural Sciences, Brussels, Belgium;* [6]*Research Institute for Nature and Forest, Brussels, Belgium*

The European nightjar (*Caprimulgus europaeus*) is a widespread migratory bird species which encompasses six recognized subspecies. This subspecific taxonomy has been determined based on size, plumage characteristics and geographical distribution but needs reexamination according to the current literature. Here, we will use an integrative approach (i.e. using phenotypic and bioacoustic data as well as data on migration) to characterize closely related European nightjar populations and thoroughly investigate their differentiation. We will describe phenotypic variation of populations distributed across the entire breeding range and assess the validity of four subspecies. Digital photography will be used to analyze plumage color and pattern variation. Furthermore, we will examine wide geographical variation in acoustic characteristics of song as well as migratory behavior. Preliminary results solely based on mensural data showed a lack of diagnosable differences among the four studied subspecies. Overall, these analyses will enable to review subspecies boundaries of the European nightjar.

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Ordering of song and responses to playback of conspecific song: a study of three sympatric species of *Seicercus (Phylloscopus) burkii* complex

Yulia Kolesnikova[1], Alexey Opaev[1]

[1]*Severtsov Institute of Ecology and Evolution, Moscow, Russian Federation*

It is well known that transitions between different song types in a song sequence are non-random in many species, but the signaling significance of non-random vocal streams is poorly understood. Here, we firstly