attempt to find out how metabolic rate at one time of the year might influence future fitness, a question most important for understanding life history trade-offs in birds.

Bushuev A[1], Ivankina E[2], Kerimov A[1]

Sex differences in resting metabolic rate in Pied Flycatchers

(1) Biological Faculty, Moscow State University, Dept. of Vertebrate Zoology, 119992 Moscow, Russia, a_bushuev@mail.ru, parus@soil.msu.ru (2) Biological Faculty, Moscow State University, Zvenigorod Biological Station, P.O. Box Shihovo, Odintsovo District, 143036 Moscow Region, Russia, Ficedula@yandex.ru

In Pied Flycatchers (*Ficedula hypoleuca*), father's basal metabolic rate (BMR) and offspring resting metabolic rate (RMR) were found to be positively related (Bushuev et al., 2003). Recent cross-fostering experiments assumed the existence of heritability of resting metabolic rate in Pied Flycatcher (Bushuev et al., in press). To consider the problem more fully, we studied sexual differences of fledglings in energetics. RMR of fledglings, which reached asymptotic body mass (13-15 days old), was measured by oxygen consumption at nighttime and its estimates were expressed as body mass residuals. Sex identification of monomorphic fledglings was based on analysis of DNA (Kahn et al., 1998) extracted from blood samples (n = 79 from 40 broods). On average, male and female fledglings did not differ in body mass and wing length, but tarsus was longer in females than in males. RMR of male fledglings was higher than that of female ones, and this difference was more pronounced among offspring of old (>= 2 ys) males (ANOVA: F=9.6; p=0.003; n=50). Sexual asymmetry in energetics of fledglings appeared to be unrelated to variation in growth rate and may reflect the superiority of male fledglings in such components of RMR as basal metabolism. The opposite trend was demonstrated by adults during the period of rearing chicks: BMR of females was significantly higher than that of males (n=137). Possible functional consequences of sex-dependent differences in resting metabolism will be discussed.

Lopez-Calleja MV[1], Fernandez MJ[2], Bozinovic F[3], Hodum P[4]

Foraging ecology and energetic of Juan Fernandez Firecrown (Trochilidae)

(1) P. Universidad Catolica de Chile, Depto. Ecologia, Alameda 340, Santiago, CP 651-3677, Chile, mvlopez@bio.puc.cl (2) University of California Berkeley, Department of Integrative Biology, Berkeley, CA 94720 (3) P. Universidad Catolica de Chile, Centro de Estudios Avanzados en Ecologia y Biodiversidad & Departamento de Ecologia, Facultad de Ciencias Biologicas, fbozinov@bio.puc.cl (4) California State University, Department of Biological Sciences, Long Island, USA, phodum@csulb.edu

The Juan Fernandez firecrown (*Sephanoides fernandensis*) is endemic of Archipielago Juan Fernandez and one the most endangered birds of the world. The principal threats to this firecrown includes lost of foraging resources and competition with a continental hummingbird, the Green-backed firecrown (*Sephanoides sephaniodes*). Green-backed firecrown is Juan Fernandez firecrown's sister species, being recently in the island (around 200 years). We present information related with floral offers, foraging strategies and energetic costs of different activities on both species. During two years we visited the island and recover information about flower nectar production, foraging behavior of both species, and made energetic measurements as oxygen consumption during different activities. During the post-reproductive period, the most important plant visited for both hummingbirds was *Dendroseris litoralis* (Col). The nectar concentration and production of *D. litoralis* is similar to the flowers use by hummingbirds. The foraging strategy is totally different in both species, the endemic *S. fernandensis* present a significant preference to perch while foraging like the Andean Hillstar (*Oreothrochilus estella*). *Sephanoides sephaniodes* prefer to hover while foraging, spending more energy in this activity, but being more alert for other hummingbirds and predators. The Juan Fernandez firecrown spend significantly more time and energy defending their foraging patch respect Green-backed firecrown. This information permit us to propose several conservation strategies for recover this very endanger species.

White C, Halsey L, Martin G, Butler P

Wading, walking, waddling: The energetics of terrestrial locomotion in birds

School of Biosciences, The University of Birmingham, Edgbaston, Birmingham, B16 9RR, UK, c.r.white@bham.ac.uk, l.g.halsey@bham.ac.uk, g.r.martin@bham.ac.uk, p.j.butler@bham.ac.uk

In birds, the relationship between speed and rate of oxygen consumption during pedestrian locomotion is linear, where net cost of transport (NCOT, ml O_2 m^{-1}) is calculated as the slope of the line. This value represents the cost of moving an animal a unit distance excluding maintenance and other speed-independent costs. NCOT not only increases as mass increases, but also varies from apparently clumsy animals to apparently graceful ones. Thus waders (turnstones, plovers, oystercatchers) have a low NCOT while waddlers (cormorants, geese, penguins) have a high NCOT. Walking and running birds (emus, guinea fowl, quail) are intermediate. As many of these birds spend a major portion of their day walking to obtain food, understanding the cause of this variation could potentially enable accurate estimates of pedestrian energy expenditure. To throw light on this issue we measured oxygen consumption during treadmill exercise for Great Cormorants (*Phalacrocorax carbo*), of 2289±136 g mass. We also filmed cormorants and Barnacle Geese (*Branta leucopsis*) of 1963±95 g mass during treadmill exercise, and determined foot contact time (t_c, s). We then investigated the relationship between NCOT and $1/t_c$ (rate of force generation) using our new data from cormorants and geese, and combined this with data for a range of species gleaned from the literature, including penguins, emus, quails and turkeys. We conclude that the high net cost of locomotion in waddling species is associated not with waddling *per se*, but with short, fast strides necessitating high rates of force generation. Similarly, the low NCOT of waders is associated with long slow strides, and low rates of force generation. Together, body mass and rate of force generation by the foot account for 99.7% of the 58-fold range of variation in NCOT during pedestrian locomotion among the eight species for which appropriate data are available.