

(*Melanocorypha calandra*). Loss and degradation of habitat related to recent land use practices, such as agricultural intensification, have resulted in a general decline in the populations of these species and a contraction in their distribution. GIS-based Habitat Suitability Index models were used to determine the potential distribution of five critical species in the Baixo Alentejo region: Great Bustard, Little Bustard, Calandra Lark, Montagu's Harrier (*Circus pygargus*) and Stone Curlew (*Burhinus oedicnemus*). For this purpose, presence and absence data was collected for all five species and combined with AVHRR satellite imagery data, a Digital Elevation Model, and road, river and town map data in a GIS matrix. As a result, habitat-based distribution modeling techniques can now be used for monitoring changes in the distribution of these species and their habitats.

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Sex, age and survival differences between adjacent functional units of tropical wintering habitat in a flocking long-distance migrant shorebird

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What happens to a bird in one season at one site may affect its state and behavior in subsequent seasons and at distant sites. At the individual level, such carry-over effects are very hard to establish, simply because individuals are difficult to follow throughout the year, and measuring the environmental conditions an individual experiences in the wild is all but simple. Recent studies on American Redstarts (*Setophaga ruticilla*) and Black-tailed Godwits (*Limosa limosa*) have suggested that birds from low-quality wintering habitats perform relatively poorly during the subsequent breeding season due to their suboptimal reproductive timing and/or the use of suboptimal breeding habitats. In the major wintering area of the Afro-Siberian Red Knot (*Calidris canutus canutus*), the Banc d'Arguin, Mauritaniawe, we found that birds differing in age, sex and molt characteristics seemed to segregate into different areas (high tide roosts with connected intertidal foraging habitats, i.e. "functional unit") which were only a few kilometres apart. In each of the four study years, one wintering area contained a greater proportion of juveniles and males. Additionally, making a few untested but reasonable assumptions, the annual survival of adults in the area with more juveniles and more males was 20% lower than in the other area. This suggests that these two adjoining areas are of different quality. We are surprised that in a flocking species without documented dominance hierarchies, this difference was upheld. The contrast between the two apparently similar areas may enable us to evaluate seasonal carry-over effects of differences in the quality of wintering habitats that may lead to survival differences. We are now in the process of developing tags that will enable us to find out how differences in wintering habitat quality influences other stages of the annual cycle, especially during northward and southward migration.

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Utilizing single nucleotide polymorphism and mitochondrial DNA to monitor genetic introgression between Melodious and Taiwan Laughing-thrushes

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Admired for their rich songs, Melodious Laughing-thrushes (*Garrulax canorus*) have been introduced in large numbers to Taiwan since the 1970s. Since then, occasional individuals of the Taiwan Laughing-thrush (*G. taewanus*) have been observed with *canorus*-like plumage. Because there is no behavioral evidence for hybridization, we adopted a genetic method to detect it, using a set of interspecific single nucleotide polymorphic (SNP) loci from both nuclear and mitochondrial genomes. From one of each of nine unlinked anonymous nuclear fragments, we chose 9 interspecific SNP loci to genotype 58 Taiwan Laughing-thrushes and 10-15 Melodious Laughing-thrushes collected over the entire range of the species in southeast China, Laos and Vietnam. We found that eight individuals of Taiwan Laughing-thrushes (14% of samples examined) were either F₂ or backcross progeny between the two forms, indicating that reproductive isolation between them might not be complete. Moreover, mitochondrial SNP sites indicated that the Haldane's rule might not hold either: three introgressed individuals carried Melodious Laughing-thrush mitochondrial genotypes. Our data imply that hybridization between the two laughing-thrushes may result, from the aspect of conservation, in a worst-case scenario: the formation of a natural hybrid swarm leading to the genetic extinction of an island endemic. Thus, for formulating an appropriate conservation plan for the Taiwan Laughing-thrush, monitoring of the temporal and spatial dynamics of its introgression with the Melodious Laughing-thrush is urgently needed.

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From old-style interactive datasets on the Euring domain to an ontology-driven open hypermedia

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The Euring community collects an impressive body of data about marked animals to address queries connected directly with the biology of populations and individuals. Further knowledge is needed as well to specify and constrain the values of the complex biological data stored in its national and sub-national federated databases. Starting from the 1960s, a standard coding system was introduced to set accepted rules for digitizing the information that flows through well-established sharing channels between ringing centers and the Euring databank. This Euring exchange code lives on today in three different, fixed ASCII text formats, two of which, released in 1966 and 1979, are old vintage indeed. Our first aim has been to solve the opacity of conversions between different schema structures of the code, modeling an ontology-based representation that will be able to achieve inter-operability despite clashes between local data versions while, at the same time, maintaining the differences. Moreover, the EURING codes and their updated releases are now available only as textual description on a fixed-length string. In order to provide a more flexible tool, we are modeling the ontology with

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RDF/RDFS/OWL dialects of XML-based standards for describing resources, vocabularies, hierarchies and relationships that characterize domains of knowledge. This semantic annotation enables (1) easy modifications in the restructuring of metadata, (2) linkages to the information stored in the federated databases, and (3) machines to make logical connections and take autonomous decisions about formally explicit relationships between distributed data resources. The resulting ontology-driven open hypermedia is available on the EPE website: <http://www.infs-epe.it>.

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Developmental origins of anatomical requirements for begging behavior

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Comparative studies of embryonic development in birds with different modes of development are rare. One recent study nevertheless shows that selection for late ontogenetic characteristics, such as the size of the brain, eyes, organs of locomotion and digestion, which characterize the neonates of precocial and altricial birds, is established at early embryonic stages. In addition to these findings, we here present results suggesting that yet another neonatal characteristic - the anatomical requirements for extensive begging behavior - may be established at early embryonic stages. Using embryos of the precocial Common Quail (*Coturnix coturnix*) and the altricial Fieldfare (*Turdus pilaris*), we compared the development of the vicheral arches and the cervical somites by combining scanning electron microscopy with classical staging techniques that use, as well as morphological measurements, developmental landmarks to categorize embryonic maturity. We found that the mandibular process of the first arch and the cervical somites were relatively larger in the Fieldfare than the quail, in contrast to the maxillary process which was larger in the quail. This is of particular interest because arch and somites contribute to muscle and bone formation in the feeding apparatus and neck, respectively. Such different patterns of development illustrate different functional demands, consistent with establishment of the anatomical requirements for extensive begging behavior at early embryonic stages.

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The influence of parental experience and age on brood care, foraging efficiency and chick growth rate in Common Terns

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The breeding cycle is a period of high energetic demand; and reproductive effort has been shown to increase with parental age and experience in several species. Two hypotheses have been proposed to explain these increases: either a decrease in residual reproductive value (the 'restraint hypothesis' or 'residual reproductive value hypothesis'), or improvement in skills ('constraint hypothesis'). From 2001 to 2004, we studied individual variation in parental care in Common Terns (*Sterna hirundo*) in a colony at Wilhelmshaven on the German Wadden Sea coast, comparing food quality, foraging effort, foraging

success, feeding rate and nestling growth rate between first-time and experienced breeders of known sex. Transponders identified individuals throughout the breeding season, and in successive years, through a system of special antennas. We were thus able to obtain longitudinal data from some individuals. From related observations, we also investigated whether older males and females were more successful in feeding young. Our data show that there is an individual increase in food quality and quantity between first-time breeders (recruits) and experienced breeders: experienced breeders brood more intensively, catch larger fish of higher energy content, and fledge more chicks with higher growth rates and fledging mass than recruits. We assume that with increasing experience and skill, birds are able to forage more efficiently and thus to cope better with the physiological constraints of reproduction. Supported by the Deutsche Forschungsgemeinschaft BE 916/5.

Loneux M

Global climate warming and decline of the Black Grouse in western Europe: Are predictions reliable?

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For two or three decades until 2000, the population dynamics of the Black Grouse (*Tetrao tetrix*) from six different breeding areas in Germany, The Netherlands, Belgium, and Great Britain was modeled by the same method using climatic parameters only. These gave significant results that made sound biological sense. The climatic factors were mean minimal temperature and total rainfall for crucial monthly, or three and four week periods, in the Black Grouse life cycle: winter, incubation and brooding, chick rearing, and autumn. This contribution will analyze model data for several of the breeding populations for a few years more, improving the quality of the modeling through a longer time-period of analysis, and the quality of the explanative variables by shortening the crucial periods so that they do not overlap. Concordant results will be discussed in relation to global climate change detected by variables in the modeling and in relation to other factors affecting population fluctuations. Continuous spring census data on Black Grouse extending back to 1967 are used.

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Why hummingbirds require little protein

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Maintenance of protein balance depends on both organism requirements and the chemical composition of ingested food. Hummingbirds are specialized for feeding on floral nectar, which is rich in energy but extremely low in protein. Several studies indicate that nectar-feeding birds have low nitrogen requirements and are adapted to low protein diets. Here we present new data, and review the patterns of nitrogen requirement in nectarivorous species and the proximal and ultimate factors that explain it. We measured minimal nitrogen requirement (MNR) and total