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CV-IVAN MAGGINI

Informazioni personali

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Educazione

- **Settembre 2009 – Agosto 2010**: postdottorato presso Institute of Avian Research "Vogelwarte Helgoland", Wilhelmshaven (Germania). Tema: "Strategie migratorie del culbianco *Oenanthe oenanthe*".
- **5 agosto 2009**: dottorato (PhD) in ornitologia presso la Carl von Ossietsky Universität Oldenburg (Germania). Titolo della tesi: "Migratory strategies of Northern Wheatears *Oenanthe oenanthe*". Supervisore Prof. Dr. Franz Bairlein.
- **4 novembre 2004**: Diploma in zoologia presso Universität Zurich (Svizzera). Titolo della tesi: "Do birds refuel when stopping over in the Western Sahara desert?". Supervisore Prof. Dr. Uli Reyer e PD Dr. Lukas Jenni (Vogelwarte Sempach, Switzerland).
- **27 giugno 1998**: attestato di maturità di tipo C (scientifica) presso Liceo Cantonale di Bellinzona (Svizzera).

Altre esperienze lavorative

- **Ottobre 2011**: inanellatore responsabile presso la stazione di inanellamento Passo dello Spino, Italia, parte del Progetto Alpi, condotto dall'Università di Trento (Italia).
- **Giugno – Luglio 2011**: partecipazione come ricercatore invitato ad un progetto di telemetria di berte maggiori (*Calonectris diomedea*) in due colonie nel Tirreno (La Maddalena, Sardegna e Pianosa, Arcipelago Toscano, Italia). Progetto condotto dalla LIPU (BirdLife Italia).
- **Marzo – Maggio 2011**: tecnico di campo nel progetto "Stopover of passerine birds at the northern desert edge in Morocco". Progetto a capo di Gabriel Gargallo (Istituto Catalano di Ornitologia, Barcellona, Spagna). Finanziato da Institute of Avian Research, Wilhelmshaven (Germania).
- **Novembre – Dicembre 2010:** inventario e revisione della collezione di uccelli tropicali presso il Museo Cantonale di Storia Naturale, Lugano (Svizzera) e informatizzazione dei file di sistematica.
- **Luglio 2009 – 2010**: partecipazione come ricercatore invitato ad un progetto di telemetria di berte maggiori (*Calonectris diomedea*) in una colonia nel Mediterraneo (Isole Tremiti, Italia). Progetto condotto dalla LIPU (BirdLife Italia).
- **Inverno 1998**: volontariato presso lo Zoo Zürich (Svizzera).

Esperienze di ricerca

Tematiche: ecofisiologia dello stopover nei passeriformi migratori; ritmi circannuali in uccelli in cattività; orientamento dell'attività notturna negli uccelli migratori; connettività migratoria negli

uccelli; adattamenti metabolici alla temperatura ambientale negli uccelli; mutualismo tra uccelli e mammiferi.

Metodi: vari metodi di cattura e marcaggio (inanellamento) di uccelli selvatici; campionaggio di sangue ed altri tessuti; ricerca di nidi e approvvigionamento dei pulcini; analisi di metaboliti del sangue ed isotopi stabili in laboratorio; misurazione dell'attività notturna in uccelli in cattività; esperimenti di orientamento con uccelli in cattività; misurazioni del metabolismo basale in uccelli in cattività; osservazioni comportamentali; radiotelemetria degli uccelli; censimenti di uccelli selvatici; telemetria satellitare di uccelli marini.

Interessi di ricerca

Profondo interesse per l'ecologia e la conservazione, specialmente degli uccelli migratori. Vari aspetti concernenti la migrazione, p.es. ecologia ed ecofisiologia dello stopover, connettività migratoria, fenologia, conservazione di aree chiave.

Lingue

Italiano: lingua materna
Inglese: ottimo (scritto e orale)
Tedesco: ottimo (scritto e orale)
Francese: ottimo (scritto e orale)
Spagnolo: buono (scritto e orale)

Pubblicazioni e presentazioni

Articoli

Maggini I, Bairlein F (2012) Innate sex differences in the timing of spring migration in a songbird. *PLoS ONE* 7(2):e31271.

Mori E, **Maggini I** (2011) Osservazione di un culbianco *Oenanthe oenanthe* in provincia di Grosseto a febbraio. *Alula* 18(1-2):150-151.

Arizaga J, Alonso D, **Maggini I**, Romero L, Vilches A, Belamendia G (2011) Características de los paseriformes europeos que invernan en el Parque Nacional Djoudj (África occidental). *Munibe* 59:41-51.

Jenni-Eiermann S, Almasi B, **Maggini I**, Salewski V, Bruderer B, Liechti F, Jenni L (2011) Numbers, foraging and refuelling of passerine migrants at a stopover site in the western Sahara: diverse strategies to cross a desert. *Journal of Ornithology* 152(Suppl.1):S113-S128.

Maggini I, Bairlein F (2011) Body condition and stopover of trans-Saharan spring migrant passerines caught at a site in southern Morocco. *Ringing & Migration* 26:31-37.

Maggini I, Bairlein F (2010) Endogenous rhythms of seasonal migratory body mass changes and nocturnal restlessness in different populations of northern wheatears *Oenanthe oenanthe*. *Journal of Biological Rhythms* 25(4):268-276.

Maggini I (2010) Zugstrategien des Steinschmätzers (*Oenanthe oenanthe*). *Die Vogelwarte* 48:55-56.

Maggini I, Bairlein F (2010) Endogene Kontrolle des Zugverhaltens von Steinschmätzern *Oenanthe oenanthe* verschiedener Herkunft. *Jahresbericht Institut für Vogelforschung* 9:6.

Förschler M, Metzger B, **Maggini I**, Neumann R, Bairlein F (2008) Seebohm's wheatear *Oenanthe oenanthe seebohmi* in West Africa. *Bulletin of the African Bird Club* 15(2): 242-244.

McElligott A, **Maggini I**, Hunziker L, König B (2004) Interactions between red-billed oxpeckers and black rhinos in captivity. *Zoo Biology* 23(4): 347-354.

Poster

Maggini I, Bairlein F (2006) Endogenous control of migratory behaviour in Northern Wheatears. 24th International Ornithological Congress, Amburgo (Germania).

Berset T, Kolb P, **Maggini I**, Hajnal A (2001) Identification of genes involved in lateral inhibition during vulval cell fate specification. 13th International *C.elegans* Meeting, University of California, Los Angeles (USA).

Presentazioni

"Estrategias migratorias de la collalba gris *Oenanthe oenanthe*", Sociedad de Ciencias Aranzadi, Donostia-San Sebastián (Spain). 7.3.2012. Host Dr. Juan Arizaga.

"Zugvogelberingung auf Ventotene." Dessau (Germany), Pro-Ring Seminar 2011. 17.9.2011.

"Strategie migratorie del culbianco *Oenanthe oenanthe*." Università di Ferrara (Italy) 15.2.2011. Host Prof. Dr. Leonida Fusani.

"Zugvogelberingung auf Ventotene." Wilhelmshaven (Germania), Beringertagung 2010. 20.3.2010.

"Endogene Grundlagen des Zugverhaltens vom Steinschmätzer." Institute of Avian Research "Vogelwarte Helgoland" (Germania) 4.11.2009 Host Prof. Dr. Franz Bairlein.

"Migration strategies of the Northern Wheatear." University of Nairobi (Kenya) 6.2.2007 Host Prof. Nathan Gichuki.

"Do birds refuel when stopping over in the western Sahara?" Schweizerische Vogelwarte Sempach (Svizzera) 15.1.2004. Host PD Dr. Lukas Jenni.

Referenze

Prof. Dr. Franz Bairlein, Institute of Avian Research, Wilhelmshaven, Germania.
PD Dr. Lukas Jenni, Schweizerische Vogelwarte Sempach, Svizzera.
Prof. Fernando Spina, ISPRA, Ozzano dell'Emilia, Italia.
Roberto Lardelli, Ficedula, Morbio Inferiore, Svizzera.

Riassunto della tesi di dottorato

Migratory strategies of Northern Wheatears (*Oenanthe oenanthe*)

This study aimed to integrate experimental data and field data in order to better understand how genetic and environmental factors interact resulting in the observed migration. I chose the Northern Wheatear (*Oenanthe oenanthe*) as a model species since it is both easy to rear and keep in captivity and is easily observable in the field. Furthermore, it is widespread in the whole Holarctic and all populations overwinter in subsaharan Africa. From this it follows that there are huge variations in migratory timing, in distances to be covered and in ecological barriers to be crossed between the different populations. In a common-garden experiment, I tested for the genetic basis of the differences in migratory timing, in the amount of body mass changes and of nocturnal activity, and in the orientation between four different populations: (1) Icelandic birds (from the ssp. *leucorhoa*), which have the longest distance to cover to reach their wintering grounds, an initial sea crossing of nearly 1000 km, and the need to change their direction at least once during autumnal migration; (2) Norwegian birds, which migrate almost wholly over land, except for a maximum North Sea crossing of around 500 km; (3) German birds, which migrate a shorter distance, completely over land; and (4) Moroccan birds (from the ssp. *seebohmi*), which are short-distance migrants, and only need to cross the Sahara desert to reach their wintering grounds.

All the birds were taken from their nests when they were 5-7 days old and hand-raised until they were able to feed independently. They were kept indoors for a whole season (August to May) at a constant temperature, and food and water were available *ad libitum*. Some of the birds were subject to constant photoperiodic conditions of 12L:12D, whereas others were subjected to a simulated natural photoperiod, which was changed to coincide with the changes they would have experienced naturally during migration. During the breeding season the birds were kept in pairs in outdoor aviaries to breed. During this process I was able to obtain captive bred birds from pure Norwegian x Norwegian pairs and from "hybrid" Icelandic x Norwegian pairs.

Body mass changed over the season according to the migratory periods, and the timing did not differ between birds under constant and simulated photoperiod. All populations studied showed similar timing. Icelandic birds increased their body mass in autumn to a greater amount than Norwegian and German birds, indicating that they need higher reserves in order to cross the Atlantic ocean safely. In spring, body mass was generally lower than in autumn, indicating that birds invest less time increasing body mass in order to reduce the time needed to reach their breeding sites as early as possible.

Nocturnal activity did not differ between populations in either timing or amount, but under simulated photoperiod the amount of activity was significantly higher in spring than in autumn. This is likely to be an adaptation to reach the breeding sites as quickly as possible in spring.

Simulation of the photoperiod resulted in better synchronization of body mass changes and nocturnal activity within the groups, which confirms the hypothesis that the response to changes in photoperiod is population-specific. Adult birds showed no differences in pattern when compared to first-year birds, leading to the conclusion that the innate pattern remains unchanged over the birds' lives.

Orientation experiments showed that first-year birds which never had access to celestial cues had an unexpected population-specific directional preference which, under natural conditions, would have resulted in the birds migrating in completely wrong directions. First-year birds born in captivity, which had the opportunity to see celestial cues during their first days of life, did not show any population-specific preferential direction, and the same applied to adult birds which could see celestial cues during the breeding season. From this I assume that some external calibration of the birds' magnetic compass is required for proper orientation, but it remains unknown when and to what extent recalibration is required in Northern Wheatears.

In addition to the common-garden experiments, I carried out fieldwork and captured wheatears in different breeding and wintering sites, to try to make assessments on migratory connectivity by means of the analysis of stable nitrogen and carbon isotopes from feathers. I found that the isotopic signatures varied between first-year and adult birds for both $\delta^{15}N$ and $\delta^{13}C$, and additionally that $\delta^{15}N$ differed between sexes and $\delta^{13}C$ varied between different years of sampling. The observed variation is likely to be due to dietary differences and to differences in the isotopic composition of prey between years. Due to this variation, I was not able to assess with any great accuracy the provenance of birds captured in their wintering range, although I would conclude it is probable that Scottish and Italian birds may overwinter in S-Mauritania/NW-Mali. Birds from the ssp. *leucorhoa* and *seebohmi*, which are also morphologically distinguishable, could also be isotopically assigned to the wintering range in Mauritania/Mali.

I also used the common-garden birds for metabolic measurements, in order to assess whether there are innate differences in their responses to breeding at different latitudes. I found that Icelandic birds have a higher resting metabolic rate at low temperatures than Norwegian and German birds. This is likely to be an adaptation to the harsher conditions Icelandic birds experience during the breeding season. I considered it likely that the thermoneutral zone lies above 20°C for all populations. As this temperature is rarely experienced in the breeding grounds and this would mean that birds experience their lowest metabolic costs in their wintering ranges. Probably, they adapted to reduce the costs of cooling down their organism in warm areas, since in contrast it is easier to warm up more quickly and efficiently in cold areas, provided food is largely available, which is mostly the case during the birds' breeding season. This demonstrates how winter conditions can have an effect on the overall fitness of the birds.

From these results I have been able to assess the genetic basis which underlies the migration strategies of the Northern Wheatear, which I have shown to possess an innate disposition for migration. However, this disposition does need to be calibrated by external factors such as photoperiod, celestial cues and perhaps other factors which as yet are still unknown. These results can be seen in conformity with observations made on other species, but due to the integration of experimental work and field observations carried out in this innovative study of Northern Wheatears it has been possible to investigate for the first time the interplay of genetic and environmental factors in avian migration research.