



Stable isotopes (C, N, O, H) of feathers collected in an Italian alpine region, during postbreeding migration

Luana Bontempo (1), Florencia Ceppa (1), Paolo Pedrini (2), Simone Tenan (2), and Federica Camin (1)

(1) Department of Food Quality and Nutrition, Research and Innovation Centre, Fondazione Edmund Mach (FEM), Via E. Mach 1, 38010 San Michele all'Adige, Italy, (2) Vertebrate Zoology Section, Museo delle Scienze Sezione, Via Calepina 14, 38122 Trento, Italy

Over the last 20 years the analysis of stable isotope ratios of carbon, nitrogen, oxygen, hydrogen and sulphur have gradually become a formidable tool for the animal ecologists (Hobson and Wassenaar, 1997; Marra et al., 1998; Inger and Bearhop, 2008). In particular many studies have been developed on tracking the movement and the diet of birds in time and space, fundamental to understanding their ecology, but also inherently difficult to determine. The aim of this study was to deepen the origin and behaviour of migratory bird species crossing the Trentino area, an Italian alpine region, during the post-nuptial migration period, and monitored by a long term study by ringing activities (Progetto Alpi, Pedrini et al. 2008).

About 800 samples of feathers from 48 local bird species were collected during 2010 – 2012 years. Analysis of $d_{13}C$, $d_{15}N$, $d_{18}O$ and dD were performed on these samples using an Isotope Ratio Mass Spectrometer (IRMS) interfaced with an Elemental Analyser or a pyrolyser after a pre-treatment of the feathers (cleaning with diethyl ether:methanol 2:1, equilibration to ambient humidity for 4 days and, for $d_{18}O$ and dD a final drying step with P_2O_5 for another 4 days).

A first survey of the obtained data is presented in this work. As expected, the first statistical elaboration/'look' of them confirmed that ^{13}C can be used to trace the importance of different carbon pools to a consumer (e.g. C_3 , C_4 or CAM plants, marine algae) whereas $d_{15}N$ vary as a function of a variety of biological, geochemical and anthropogenic processes and is a very effective tracer of trophic level. In particular, it was interesting to note that the specie *Loxia curvirostra* showed particularly high $d_{13}C$ and low $d_{15}N$ values probably due to the eating of conifer seeds and whereas the specie *Motacilla flava*, that bases its diet primarily on worms and insects, presented high $d_{15}N$ values. On the other hand $d_{18}O$ values mainly depends by geographical/diet factors whereas dD values are strongly affected by the geographical characteristics of the regions in which the birds grown or emigrated. The specie *Troglodytes troglodytes*, which is mainly sedentary, showed the higher dD values, whereas *Carduelis spinus*, which during autumn migrates from the north of Europe to the Mediterranean area, presented the lower values. As regards $d_{18}O$, interesting was the very high values presented by *Anthus pratensis* specie.

Further elaborations/studies by adopting a multi-isotope approach could surely increase the resolution of migratory origins.