

**COMBINING STABLE ISOTOPE ANALYSIS AND GEOLOCATOR DATA TO INVESTIGATE LINKS BETWEEN WINTERING AND BREEDING GROUNDS OF A LONG-DISTANCE EURASIAN-AFRICAN MIGRANT, THE RED-BACKED SHRIKE *LANIUS COLLURIO***PEDERSEN, L.<sup>1</sup>, FRASER, K. C.<sup>2</sup>, KYSER, T.K.<sup>3</sup>, TØTTRUP, A. P.<sup>1</sup><sup>1</sup>Center for Macroecology, Evolution and Climate, Department of Biology, University of Copenhagen, Universitetsparken 15, DK—2100 Copenhagen, Denmark. Email: lypedersen@bio.ku.dk, aptottrup@bio.ku.dk<sup>2</sup>Department of Biology, York University, 4700 Keele St., Toronto, Ontario, Canada. Email: fraserkev@gmail.com<sup>3</sup>Department of Geological Sciences and Geological Engineering, Queens University, Bruce Wing/Miller Hall 36 Union Street, Kingston, Ontario, Canada. Email: kyser@geol.queensu.ca

Until recently, studies focusing on conservation of declining bird populations in Europe have primarily taken place at the European breeding grounds. Yet, this approach may prove inadequate for migratory birds that spend the year in widely different geographical locations with great variations in habitat. In fact, there is a paucity of knowledge about the biology of long-distance migratory birds in the African non-breeding areas and how the wintering grounds may affect the timing of spring migration as well as the reproductive success at the breeding grounds. To target conservation efforts, we need to understand how factors during one period of the year can carry over to affect subsequent periods. Year-round tracking of red-backed shrikes *Lanius collurio* breeding in Denmark by light-level geolocators has shown that these birds winter along a moisture gradient in sub-Saharan Africa during which time a full body moult occurs. Here, we use stable-isotope analysis of carbon, nitrogen and hydrogen in bird feathers to assess the quality of the wintering habitats of 49 red-backed shrikes breeding in Denmark. Stable isotopes are widely used for this purpose, especially in Nearctic-Neotropical migrants; however, data validation has been limited because moult locations are often thousands of kilometres away or are unknown. By determining specific wintering locations from geocator data we are able to validate the data from stable-isotope analysis and make more robust inferences regarding winter habitat quality. In this talk, we focus on the comparability of the two methods and how we can combine them to investigate the quality of wintering habitats. Furthermore, we investigate how habitat quality in the non-breeding area may carry over to affect timing of spring migration and breeding success at the high latitude breeding grounds.