

ESTIMATING ORIGINS OF SHORT-DISTANCE MIGRANT SONGBIRDS IN NORTH AMERICA: CONTRASTING INFERENCES FROM HYDROGEN ISOTOPE MEASUREMENTS OF FEATHERS, CLAWS, AND BLOOD

DANIEL .F. MAZEROLLE^{1,3} AND KEITH A. HOBSON^{1,2}

¹*Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2 Canada*

²*Canadian Wildlife Service, Environment Canada, 115 Perimeter Road, Saskatoon, SK S7N 0X4 Canada*

Manuscript received 9 August 2004; accepted 12 January 2005.

³E-mail: dan.mazerolle@ec.gc.ca

Abstract. Tracing movements of migratory birds between breeding and wintering areas is important for both theoretical and conservation purposes. Intrinsic markers such as stable isotopes have received considerable attention because of their usefulness for evaluating migratory connections without the need to mark and recapture individuals. Establishing migratory linkages using stable-isotope markers hinges on knowing which tissues most accurately reflect the isotopic signature of previous feeding locations of interest. Here, we assessed the correspondence among stable-hydrogen isotope (δD) values of feathers, claws, and cellular portions of blood from migrating White-throated Sparrows (*Zonotrichia albicollis*) to determine if these measures provided concordant estimates of origins. δD values of claws from birds captured during spring and fall migration were positively correlated with δD values of head feathers grown on the wintering grounds and tail feathers grown on breeding grounds, respectively, indicating that claws contained information on wintering origins of individuals. However, analyses contrasting δD measurements of base and tips of claws, and head and tail feathers suggest that a significant amount of claw growth occurred during migration resulting in biased estimates of breeding and wintering origins. Thus, for ground-foraging birds like White-throated Sparrows, we caution against using isotope measurements of claws as long-term position indicators. δD values of blood were correlated with the δD values from the base of claws, which represented the most recent claw growth, but were not correlated with the δD values of claw tips and head feathers. Thus, it appears that the δD values of blood cells are not useful for estimating wintering latitudes of White-throated Sparrows captured during spring migration.

Key words: *deuterium, natal origin, stable isotopes, turnover, White-throated Sparrow.*