

FEATURE ARTICLES

SEASONAL DIFFERENCES IN IMMUNOLOGICAL CONDITION OF THREE SPECIES OF THRUSHES

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Abstract. Migratory birds are exposed to a diverse pathogen fauna by virtue of their long-distance travels. Although the immune system is an organism's primary defense against pathogenic microorganisms, few studies have investigated avian immune function during migration, much less shown seasonal differences in immune function. We describe the immunological condition of three intercontinental migratory species, Swainson's Thrush (*Catharus ustulatus*), Veery (*C. fuscescens*), and Wood Thrush (*Hylocichla mustelina*) during spring migration. In addition, we compare their immunological condition with conspecifics captured during fall migration and during the breeding season to provide a frame of reference for the spring immunological data. Measures of immunological condition presented include total leukocyte count, heterophil:lymphocyte (H:L) ratio, heterophil and lymphocyte counts, hematocrit, and IgG titers. In addition, we assessed each bird's energetic condition by measuring body mass and calculating a size-corrected condition index. Migrating birds had lower leukocyte and lymphocyte counts, lower hematocrit, reduced fat stores, and higher H:L ratios relative to nonmigrating individuals sampled during the breeding season. We also found that birds sampled during spring migration had lower lymphocyte counts and reduced fat stores, and higher heterophil counts and H:L ratios than fall migrants. Our results suggest that migrating birds are immunocompromised compared with conspecifics during the breeding season. Furthermore, compared with conspecifics sampled after a shorter overland flight, migrants sampled after crossing the Gulf of Mexico exhibited higher H:L ratios, which is indicative of heightened energetic stress.

Key words: body condition, hematocrit, immune function, immunoglobulin, migration, seasonal differences, white blood cell count.