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FEATURE ARTICLES

SEASONAL ACCLIMATIZATION IN THE AMERICAN GOLDFINCH REVISITED: TO WHAT EXTENT DO METABOLIC RATES VARY SEASONALLY?

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Abstract. We evaluated seasonal changes in cold tolerance, basal metabolic rate (BMR), and summit metabolic rate (M_{sum}) for American Goldfinches (*Carduelis tristis*) from southeastern South Dakota to determine if goldfinches differ in pattern of metabolic acclimatization from other species of small birds. Goldfinches were captured in winter (January–February), spring (April), and summer (June–August) and tested on the day of capture. Cold exposure tests involved subjecting individual birds to a decreasing series of temperatures in an atmosphere of 79% helium to 21% oxygen (helox) concurrent with open-circuit respirometry. The helox temperature eliciting hypothermia was designated the cold limit (T_{cl}). Whole-animal metabolic rates were analyzed. Winter goldfinches demonstrated significantly higher BMR (46%) and M_{sum} (31%) and significantly lower T_{cl} (-9.5°C vs. 1.3°C) than their summer counterparts. Spring goldfinches also showed significantly higher M_{sum} (21%) and significantly lower T_{cl} (-5.3°C) than summer birds. Winter birds had higher BMR (23%) and M_{sum} (8%) than spring birds. In winter birds, T_{cl} was also significantly lower than in spring birds. These data support the view that prominent winter increases in M_{sum} and BMR are components of winter acclimatization in American Goldfinches from South Dakota and that seasonal changes in metabolism in goldfinches are similar to those for other small temperate-wintering birds.

Key words: aerobic capacity, American Goldfinch, basal metabolism, *Carduelis tristis*, oxygen consumption, seasonal acclimatization, summit metabolism.