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# Body temperature upon mist-netting procedures in three species of migratory songbirds at a stopover site: implications for welfare

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## Abstract

*Capturing wild birds with mist nets is very common for studying many aspects of avian biology. However, except for adrenocortical reactivity, little is known about other physiological responses to this potentially stressful procedure. Here, we focused on body temperature (Tb) in migratory songbirds, as large numbers are caught for population monitoring and studies of migratory biology. Tb is sensitive to acute stress in other vertebrates and contexts, usually showing an increase (stress-induced hyperthermia). We sampled garden warblers (*Sylvia borin*), whinchats (*Saxicola rubetra*) and barn swallows (*Hirundo rustica*) captured with mist nests using standard protocols at an island stopover site in the central Mediterranean during spring migration. Tb was measured within 3 min (T0), 30 min (T30) and 180 min (T180) from the time the bird hit the net, using an analogue probe inserted into the throat, and a body condition score was calculated for each bird. In the garden warbler, but not the other two species, a slight but significant reduction in Tb occurred after 180 min. In all species, the change in Tb after 3 h of confinement was positively correlated to the change in ambient temperature (Ta) but not to body condition. The mean (± SEM) change in Tb over 3 h was –1.68 (± 0.16)°C for garden warblers, therefore within the expected range of normothermy in small birds. Such reduction in Tb is contrary to the expectation of stress-induced hyperthermia; these results suggest that garden warblers are able to modulate their body temperature and that these small changes are influenced by fluctuations in ambient temperature. Therefore, Tb might not be a good indicator of capture stress in small passerine migrants. Our results also indicate that restraint for ringing procedures is unlikely to have adverse effects on Tb regulation of migratory birds, if held within the time-frame typical of ringing operations.*

**Keywords**: *animal welfare, bird migration, heterothermy, hypothermia, mist-netting, stress response*