

SHORT COMMUNICATIONS

**LABORATORY METABOLISM OF INCUBATING SEMIPALMATED PLOVERS**

MARK WILLIAMSON<sup>1,3</sup>, JOSEPH B. WILLIAMS<sup>2</sup>, AND ERICA NOL<sup>1</sup>

<sup>1</sup>*Department of Biology, Trent University, Peterborough, Ontario K9J 7B8, Canada*

<sup>2</sup>*Department of Evolution, Ecology and Organismal Biology, Ohio State University, 290 Aronoff Laboratory, 318 W. 12th Avenue, Columbus, OH 43210*

Manuscript received 30 November 2005; accepted 14 July 2006.

<sup>3</sup>E-mail: [marwilli@flemingc.on.ca](mailto:marwilli@flemingc.on.ca)

*Abstract.* The Semipalmated Plover (*Charadrius semipalmatus*), an arctic-nesting migratory shorebird, regularly encounters low temperatures during the breeding season. We measured the basal metabolism of adults during incubation at Churchill, Manitoba, Canada to determine basal metabolic rate (BMR), lower critical temperature ( $T_{lc}$ ), total evaporative water loss (TEWL), and dry thermal conductance ( $C_m$ ). BMR and  $T_{lc}$  were  $47.4 \text{ kJ day}^{-1}$  and  $23.3^\circ\text{C}$ , respectively, TEWL was  $2.5 \text{ mL H}_2\text{O}^{-\text{d}}$ , and  $C_m$  was  $1.13 \text{ mW g}^{-1} \text{ }^\circ\text{C}^{-1}$ . Measured BMR and  $T_{lc}$  were consistent with high values found for other shorebird species breeding in the Arctic, while  $C_m$  was 18% higher than predicted from allometric equations. These metabolic data suggest that Semipalmated Plovers are adapted to balance the requirements of incubation against energetic and thermoregulatory demands in the Arctic, especially in harsh early breeding season conditions.

*Key words:* Arctic, basal metabolic rate, *Charadrius semipalmatus*, lower critical temperature, Semipalmated Plover, thermal conductance, total evaporative water loss.