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Predicting Recovery from Exertional Heat Strain in Military Working Dogs

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Abstract

A two-compartment (core, skin) rational Canine Thermal Model (CTM) of thermal-physiological responses was developed to predict the core temperature (Tc) of a military working dog (MWD) during recovery from exertional heat stress. Heat storage is represented as the balance among heat loss mechanisms, heat gain from the environment, and heat production from metabolism. Inputs to the CTM include environmental conditions (ambient temperature, relative humidity, solar radiation and wind speed), physical characteristics of the dog (weight, length), and metabolic rate. The CTM was validated against Tc of 16 MWDs measured in a previous study, where training was conducted in October (24°C, 52% RH), March (14°C, 74% RH), and August (28°C, 64% RH). Measured and CTM-simulated Tc were compared at 5, 10, 15, 30 and 60 min