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Interval dogs: Results and evaluation of Global Positioning System (GPS) units in measuring athletic performance in stock herding dogs

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1 **Interval dogs: Results and evaluation of Global Positioning System (GPS) units**
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8 **Abstract**

9 The skilled movement of livestock by dogs is highly valued amongst livestock
10 handlers in the harsh farming environment of Australia. However, their workload has
11 not been studied empirically. This pilot study aimed to measure the distance, speed
12 and heart rate of a group of sheep dogs (n=6) working during an 11-day period of
13 peak activity (shearing). Additionally, it sought to determine the technological
14 capabilities and limits of a modern GPS device for monitoring working dogs during
15 peak work. Distances recorded ranged from 1.7 km up to 68.3 km in a day. The
16 furthest cumulative distance covered by a dog during the study period was 279.2 km.
17 The maximum speed recorded in the yard area was 37.01 km/h. Due to the limitations
18 of the equipment and the nature of the work, we were unable to measure heart rate
19 reliably. The GPS units used in the study were effective at measuring the considerable
20 variation in movement and speed of the dogs while working. However, battery life
21 limitations prevented recording of the dogs' full activity over each day.
22 Characterizing elite and peak performance in these working dogs may assist in
23 comparisons with other sporting and working breeds, and in identifying phenotypic
24 traits of value in herding and related working contexts.

25 **Keywords:** herding dogs; canine; GPS; exercise; athletic performance; locomotion

26 **Introduction**

27 Livestock working dogs, more specifically herding dogs, are valued in Australia for
28 their cognitive skills as well as their speed and stamina in moving livestock on farms.
29 Like hunting dogs, herding dogs require a combination of sprinting and endurance
30 running to be effective (Ahlstrøm et al., 2006). This requirement for both running
31 speeds could be considered similar to interval running or training in humans; episodes

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