

ORBITAL INFRARED AS AN EARLY INDICATOR OF BOVINE RESPIRATORY DISEASE IN SERO-NEGATIVE CATTLE

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Bovine respiratory disease (BRD) has a major impact on cattle production efficiency and ANIMAL WELFARE globally. The early detection of BRD would enable earlier treatment and/or quarantine, reduce treatment times, cost and reduce co-infection of pen mates. However, early detection is challenging since industry standard practice is to use clinical symptoms which can not be diagnosed until they are well advanced. The purpose of the present study was to use a non invasive and automated infrared thermography method to early detect the onset of thermal aberrations diagnostic of BRD. Thirty six crossbred calves averaging 291 kg were studied. These calves were procured from a closed research herd sero-negative for BVD and IBR viruses. The calves were transported to the Lacombe Research Centre, co-mingled with commercial cattle and studied with the use of an automated, RFID driven infrared camera (FLIR S60) mounted at the water station. Venous blood samples were collected on arrival and when the animals displayed a true positive (TP) condition for BRD. The TP criteria consisted of a score of ≥ 3 out of 4 for clinical score ($>3/20$), WBC ($>10 \times 10^3$ /ml), core temperature (RT ≥ 40 C) and N/L ratios (< 0.1 neutropenia or >0.8 neutrophilia). Clinical scores (CS) included, digestive, respiratory, disposition and core temperature values of 0 (normal) to 5 (extremely ill) for each factor. TP calves (n=13) displayed an average CS of 6.5 ± 2 (sd), WBC of 10.4 ± 2.2 , N/L of 0.1 ± 0.03 and RT of 39.8 ± 1.2 . In contrast the true negative cattle (TN) (n=15) displayed CS of 2.7 ± 0.7 ($P < 0.01$), WBC of 9.7 ± 1.6 ($P = 0.2$), N/L of 0.19 ± 0.1 ($P < 0.01$) and RT of 39.1 ± 0.06 ($P < 0.01$). The mean orbital infrared temperatures for the TP calves was 35.6 ± 0.8 on the day of clinical diagnosis compared to the average TN value of 34.8 ± 0.9 ($P < 0.01$) and differentiated these two groups several days earlier than CS. The current study demonstrates that the non invasive collection of IRT is a useful tool in the early identification of BRD.