

DECLARATION

I declare that this dissertation is my own work, with all assistance acknowledged. This dissertation is being submitted for the degree of Master of Science at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

.....

(KIRSTEN WIMBERGER)

..... day of 2005

I certify that the procedures used in this dissertation were approved by the Animals Ethics Screening Committee of the University of Witwatersrand (AESC numbers: 2000/27/4, 2002/24/5, 2002/41/4, 2003/51/3).

PRESENTATIONS

The presentations listed below are offered in support of this dissertation.

Wimberger, K., Faurie, A. S. and Mitchell, D. (2003) Determining thermal stress during transport of animals (oral presentation). At the 31st Annual Congress of the Physiological Society of Southern Africa (PSSA), Potchestroom, 18-20 September.

Wimberger, K., Faurie, A. S. and Mitchell, D. (2005) Rectal temperatures measured after capture do not reflect core body temperature of large mammals (oral presentation). At the 32nd Conference of the Zoological Society of Southern Africa (ZSSA), Grahamstown, 13-15 July.

ABSTRACT

The high morbidity and mortality of wild mammals and livestock during capture and transport is generally ascribed to thermal stress. Consequently, capture operators can benefit from improved methods that may reduce thermal stress. The aim of my study was to develop a practical method of measuring the body temperature of mammals during capture and transport operations. Firstly, I determined whether intermittent temperature recordings, which allow for minute-by-minute monitoring of an animal's temperature, could accurately reflect continuous measures of an animal's rectal temperature. Intermittent temperatures were measured via telemetry while continuous and off-line recordings were measured with data loggers. Secondly, I compared rectal and abdominal temperatures to determine if rectal temperature can provide a practical, non-invasive method of estimating core body temperature. Additionally, I measured body temperature and environmental conditions throughout transportation and compared pre- and post-transport levels of faecal cortisol, and blood cortisol, haematocrit and catecholamines. Measuring rectal temperatures seems to be the only feasible, non-invasive technique to obtain temperature during transport operations. However, rectal temperature records required about 30 minutes to stabilise after inserting a thermometric device. After rectal temperature stabilised, generally the difference between abdominal and rectal temperatures varied greatly for individual animals, while the average differences in temperatures between the body sites were not significant for all, except one, species. I have also shown that

telemeters and data loggers can be used interchangeably to measure the body temperature of animals. The differences between temperatures measured by the devices were not significant, except for substantial differences shown in two animals. The addition of earphones and a large aerial inside the vehicle improved the telemetry results, by limiting the extraneous noise of the capture and transport environment. These conditions probably caused the anomalous readings in the two animals. General thermal responses to stress are that animals showed a peak in temperature due to capture and a decrease in temperature during transport. Therefore, capture-related stress and the likelihood of animals dying during capture could be minimised by ensuring that the animals are not chased longer than a set cut-off time. Further, globe temperature should be monitored to ensure that animals are not captured in high thermal conditions. In contradiction with the current guidelines regarding the appropriate time of day for capture, I recommend that animals should not be caught at the end of the day, as my results show that this is when their body temperatures are the highest. Body temperatures during transport and differences in faeces cortisol before and after transport seem to indicate that animals adapt to repeated stress events.

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