



Factsheet #3

How antelope respond to heat in an arid savanna

Background

Animals inhabiting the arid parts of southern Africa face particularly harsh conditions. Firstly, temperatures have been rising at twice the global rate and are projected to further increase by 3–5°C by 2100¹. Secondly, the food and water scarcity in arid regions places substantial constraints on the ability of animals to tolerate heat². We studied how three antelope species that differ in body size, habits and habitat respond to heat.

Methods

Springbok *Antidorcas marsupialis*, kudu *Tragelaphus strepsiceros* and eland *T. oryx* were collared in the Etosha area in northern Namibia to measure activity³ at five-minute intervals over a period of two years (Figure 1).

Air temperature (measured in the shade) was continually recorded at a weather station in the study area. Data collected during the hottest months of the year (October – December) were analysed.

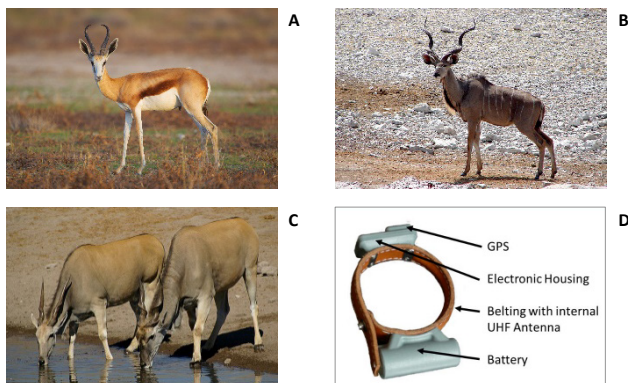


Figure 1: Springbok (A), kudu (B) and eland (C) were fitted with collars (D) to measure their activity in response to heat.

Results

Springbok reduced their activity the most as temperatures rose, followed by eland, followed by kudu (Figure 2). Moreover, springbok activity was particularly reduced from mid-mornings to mid-afternoons (Figure 3) when solar radiation was highest.

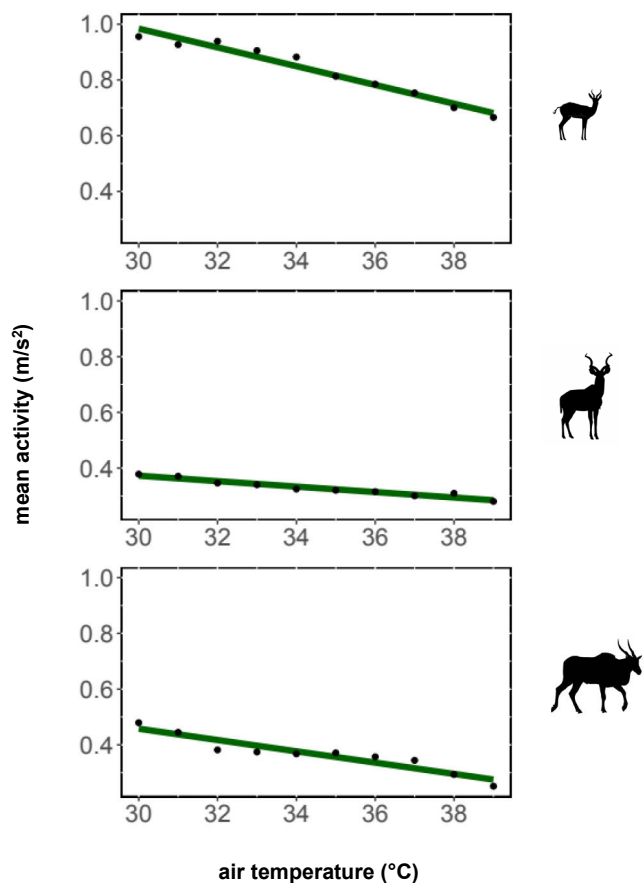


Figure 2: Activity as a function of air temperature for springbok (top), kudu (middle) and eland (bottom).

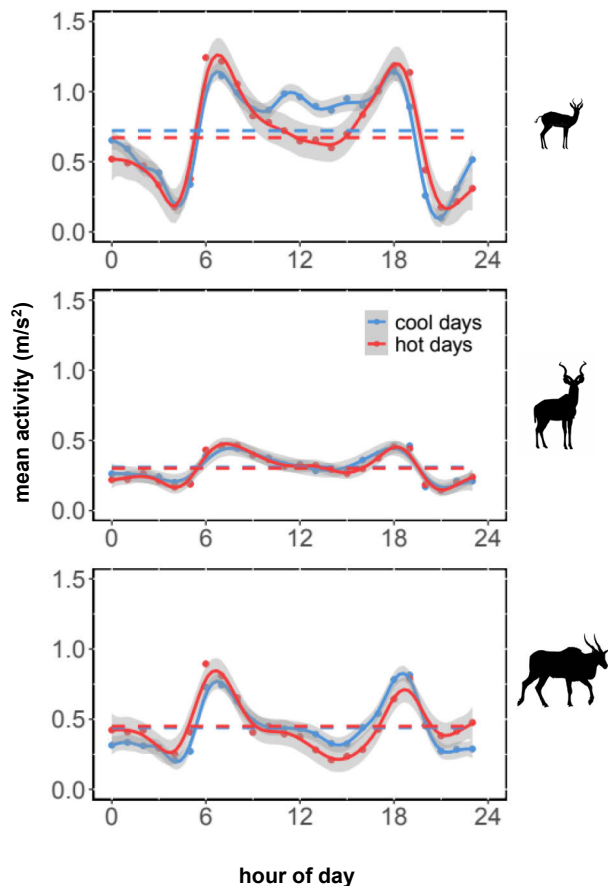


Figure 3: Activity patterns over the 24 h cycle for springbok (top), kudu (middle) and eland (bottom) for the ten hottest (red) and the ten coolest (blue) days within the study period. Dotted lines show means over 24h.

When comparing activity patterns on the ten hottest to the ten coolest days during the study period, springbok showed the greatest decrease in daytime activity as well as the greatest decrease in mean activity over 24h.

Activity patterns in kudu, in contrast, did not differ appreciably between hot and cool days.

Eland decreased daytime activity, but compensated for this by increasing nighttime activity so that there was no significant difference in mean activity over 24h (Figure 3).

Conclusions

Springbok prefer open habitat, exposing them to the sun. On hot days, their small bodies are at risk of overheating quickly⁴. They counter this by orienting themselves towards the sun or seeking sparse shade, both of which drastically curtail activity and the possibility to forage.

Eland select more versatile habitats than springbok. As their large bodies make them less prone to predation⁵, they probably seek the shade of dense vegetation more readily when it is hot and also shift their activity into the cool nighttime.

Kudu prefer woody habitat which affords them both food and shade. Their sedentary lifestyle in this environment seems to protect them from heat relatively effectively.

Habitats differ in the protection they offer against heat load. However, the interplay between habitat, food and water needs, movement, body size and predation risk is complex, leaving some species more vulnerable to heat extremes than others. Thus, a continued rise in temperature could conceivably lead to changes in community composition.

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Authors

Paul Berry (University of Potsdam), **Melanie Dammhahn** (University of Münster), **Niels Blaum** (University of Potsdam)

The ORYCS Project

The German-Namibian research project “ORYCS – Options for sustainable land use adaptations in savanna systems” aims to assess the suitability of wildlife management strategies in Namibia as options for adapting land use to climate change in savanna ecosystems.

www.orycs.org

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Project Coordination

German Coordination
PD Dr. Niels Blaum
E-Mail: blaum@uni-potsdam.de

Namibian Coordination
Dr. Morgan Hauptfleisch
E-Mail: mhauptfleisch@nust.na



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