
Springbok *Antidorcas marsupialis*


Greater kudu *Tragelaphus strepsiceros*


Common eland *Tragelaphus oryx*

Factsheet #8

ORYCS

Animal movement behavior

Movement characteristics

Within the ORYCS project, three native antelope species were equipped with GPS sensors (Fig. 1):

- **The greater kudu *Tragelaphus strepsiceros*:** covering an area of ~19 km², traveling 6.4 km (dry season) and 5.9 km (wet season) per day
- **the springbok *Antidorcas marsupialis*:** covering an area of ~205 km², traveling 1.9 km (dry season) and 9.5 km (wet season) per day
- **the common eland *Tragelaphus oryx*:** covering an area of ~421 km², traveling 1.2 km (dry season) and 12 km (wet season) per day

Visits to waterholes decreased for all three species (Fig. 2) during the wet season from every 2.2 to 3.4 days (kudu), from every 2.3 to 2.8 days (springbok), and from 1.8 to 2.2 (eland), respectively. All three species generally visited a waterhole at least every third day.

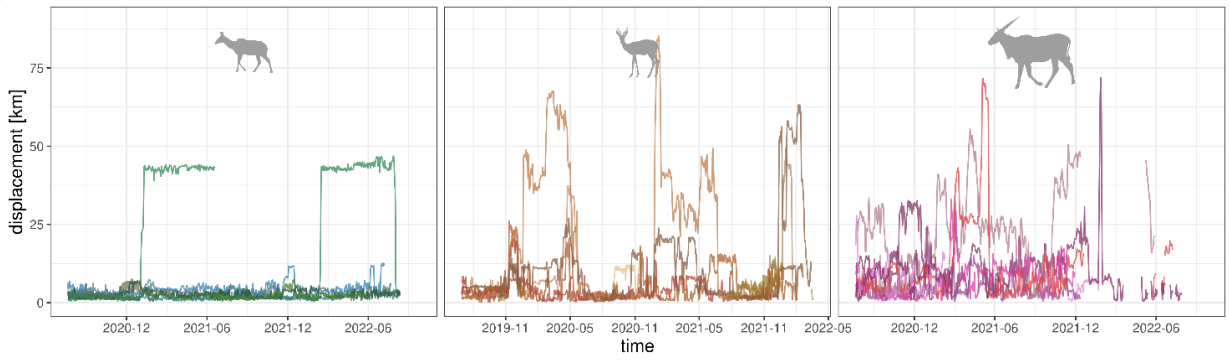

Figure 1: Overview of GPS-based movement patterns. Individuals are shown in different colors. Displacement means the distance in km to the individuals' most visited waterpoint. All kudus except for one individual, which migrated back and forth twice for around 50 km, showed residency. The springbok showed three distinct migrations, up to almost 80 km from their normal home range, whereas eland did almost show no residency.

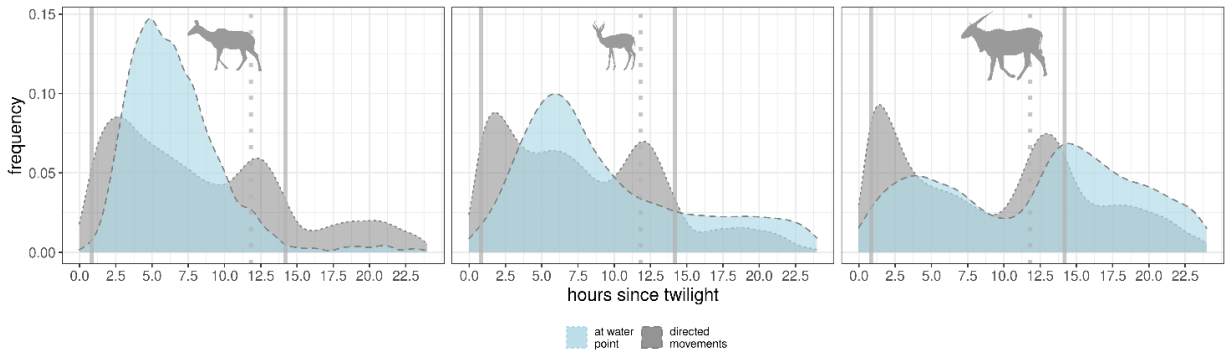

Figure 2: Shown are density distributions of times of directed movements and waterpoint visitations. The left vertical line shows the sunrise, the right vertical dotted line shows the earliest sunset, and the right solid line shows the latest sunset. All three species showed the most directed movements shortly after sunrise and during sunset. Waterpoints were visited mainly during midday, except for eland, which spent most of its time at watering holes after sunset.

Cover photos: Robert Hering

Tracking of mammals

Attaching collars to wild animals is associated with sacrifices: catching and collaring a wild-living animal clearly impacts the individual.[1–2] Possible impairments may be associated with stress when catching, immobilizing, and collaring an animal affecting locomotion processes or energy expenditure.[3–4] The resulting behavioral changes may affect both the welfare of animals and the output of the respective study.[5–7]

Within the ORYCS project, female individuals of springbok, greater kudu, and common eland were caught and equipped with a combination of GPS (localization) and ACC (activity measurements) collars. For this analysis, we used GPS and activity recordings of the 20 initial days of tracking (Fig. 3). After calculating daily (days 1–10) values of “energy expenditure” & “distance moved”, we related those to the long-term mean (days 11–20).

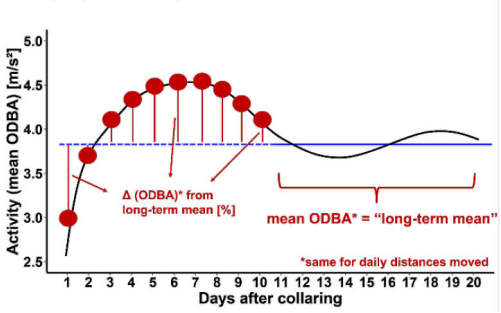

Figure 3: Representation of the relationship between mean activity and days after collaring.

References

1 Grandin, T., Shivley, C. (2015). How farm animals react and perceive stressful situations such as handling, restraint, and transport. Animals, 5(4), 1233–1251.

2 Bergvall, U.A., Morellet, N., Kjellander, P., Rauset, G.R., Groeve, J.D., Borowik, T., ..., Cagnacci, F. (2021). Settle down! Ranging behaviour responses of roe deer to different capture and release methods. Animals, 11(11), 3299.

3 Theil, P. K., Coutant, A. E., Olesen, C. R. (2004). Seasonal changes and activity-dependent variation in heart rate of roe deer. Journal of mammalogy, 85(2), 245–253.

4 Harcourt, R. G., Turner, E., Hall, A., Waas, J. R., Hindell, M. (2010). Effects of capture stress on free-ranging, reproductively active male Weddell seals. Journal of Comparative Physiology A, 196, 147–154.

5 Brogi, R., Brivio, F., Bertolucci, C., Benazzi, M., Luccarini, S., Cappai, N., ..., Grignolio, S. (2019). Capture effects in wild boar: a multifaceted behavioural investigation. Wildlife Biology, 2019(1), 1–10.

6 Northrup, J. M., Anderson Jr, C. R., Wittemyer, G. (2014). Effects of helicopter capture and handling on movement behavior of mule deer. The Journal of Wildlife Management, 78(4), 731–738.

7 Morellet, N., Verheyden, H., Angibault, J. M., Cargnelutti, B., Lourtet, B., & Hewison, M. A. (2009). The effect of capture on ranging behaviour and activity of the European roe deer Capreolus capreolus. Wildlife Biology, 15(3), 278–287.

Impacts of collaring

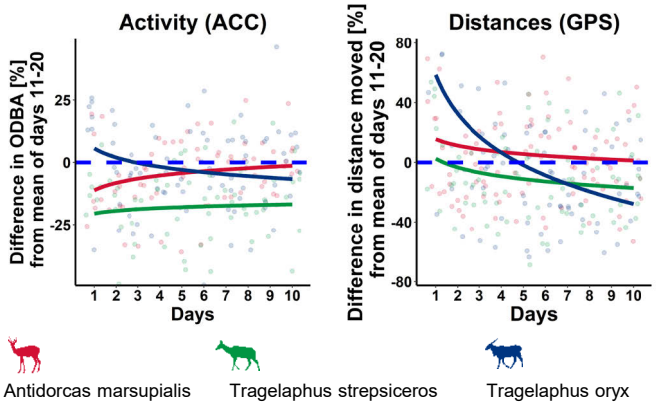

Figure 4: Daily activity (left) and daily distance moved (right) relative to the long-term mean after the initial days after collaring. The impact of catching and collaring the animals seemed to affect their movement and behavior for some time.

Activity and movement are influenced by collaring.

The level of activity (A), as well as the daily distances moved (B), immediately after an animals’ release differ substantially from that of the following days (Fig. 4).

Bad news
Activity and moved distances are clearly impacted by the process of catching, handling, and collaring an individual.

Good news
Behavioral changes gradually decrease during successive days.

Authors

Jonas Stiegler (University of Potsdam; contact: stiegler@uni-potsdam.de), **Robert Hering** (University of Potsdam)

Acknowledgements

We thank collaborators of the Etosha Ecological Institute, Etosha National Park, Etosha Heights, Natural Selection, Giraffe Conservation Foundation, The Ministry of Environment, Forestry and Tourism’s Directorate of Scientific Services, Dr. Burger Oelofsen.

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

The ORYCS project is part of the SPACES II research program and is funded by the German Federal Ministry of Education and Research (BMBF) under the funding reference FKZ 01LL1804A-C.

Project Coordination

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

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

Published by:
ORYCS Project Consortium
Frankfurt am Main, Potsdam, Berlin, Windhoek

May 2023