Electricity pylons are used by olive baboons (*Papio anubis*) as sleeping sites in Laikipia, Kenya.

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November 18, 2023

Abstract

Olive baboons (*Papio anubis*) use fixed, secure and naturally-occurring sleeping sites such as tall trees and rocky cliffs, as protection from predators. Although these sleeping sites are safe, they can be limited in availability. We documented olive baboons' use of 45m tall high-tension electrical pylons (towers) as sleeping sites in Laikipia, Kenya. These observations suggest that olive baboons may use anthropic infrastructure for sleeping sites in areas where naturally occurring cliffs and tall trees are limited.

Manuscript Category

Nature Notes

Title

Electricity pylons are used by olive baboons (*Papio anubis*) as sleeping sites in Laikipia, Kenya.

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Word Count

Abstract: 76

Body: 1022

Acknowledgements

This research was carried out with permission from the Wildlife Research and Training Institute permit No. WRTI-0234-010-22. I extend my warm gratitude to Miquel Torrents-Ticó for his support and Alexander Pritchard, Jake Goheen, and Stanislaus Kivai for their initial insight into the paper. Much appreciation to

Ol Pejeta team: Samuel Mutisya, Benard Gituku and Mercy Waithira for their kind thoughts and property access.

Data Availability Statement

All raw data available in supporting materials.

Conflict of Interest

The authors declare no conflict of interest in the publication of this manuscript.

Abstract

Olive baboons (*Papio anubis*) use fixed, secure and naturally-occurring sleeping sites such as tall trees and rocky cliffs, as protection from predators. Although these sleeping sites are safe, they can be limited in availability. We documented olive baboons' use of 45 m tall high-tension electrical pylons (towers) as sleeping sites in Laikipia, Kenya. These observations suggest that olive baboons may use anthropic infrastructure for sleeping sites in areas where naturally occurring cliffs and tall trees are limited.

Introduction

Olive baboons (*Papio anubis,* hereafter ' baboon') use secure and naturally-occurring sleeping sites such as tall trees and cliffs as an anti-predator strategy while sleeping (Hamilton, 1982; Isbell et al., 2018). In addition to predation risk, parasite infestation and fecal-matter load within sleeping sites can influence their frequency of use (Hausfater and Meade, 1982), and the limited availability of good quality sites is generally thought to regulate baboon distribution and group sizes (Cheney et al., 2003; Markham et al., 2015; Suire et al., 2020). While other primate species have been observed using anthropic structures such as rooftops and electricity poles (Bracken et al., 2021; Brotcorne et al., 2014; Hoffman and O'Riain, 2012; Sarker et al., 2005), this behavior has not been observed in long-term baboon studies in Laikipia, Kenya (Bidner et al., 2018; Butynski, and Jong, 2014; Danish and Palombit, 2014; Isbell et al., 2017; Matsumoto-Oda, 2015; Strum, 2005; Suire et al., 2020). However, recently installed electrical transmission pylons (hereafter 'pylons') to transmit power between Kenya and Ethiopia (Fichtner, 2009) are a novel anthropic feature in an environment with relatively low human disturbance. Here we document the use of pylons as sleeping sites by baboons within *Acacia* woodland-savannah and discuss the possible reasons for their use.

Material and Methods

Observations were collected on March 5-6, 2023, at the 255 km^2 Agriculture Development Corporation (ADC) Mutara ranch within Laikipia County, Kenya. Laikipia County is an 8,700 km^2 region of semi-arid bushland in central Kenya, with a mean annual temperature of 18.3° C (range: 13.0-25.2° C), and a mean total of 812mm of precipitation annually (monthly mean range: 23-133 mm). ADC Mutara is in the southern part of the greater Laikipia-Samburu ecosystem, which is a mosaic of grassland,*Euclea* shrubland, as well as *Acacia* and riverine woodland (Woodroffe and Frank, 2005).

On the evening of March 5^{th} between 18:00 and 19:00, we opportunistically encountered baboons roosting on pylons during ongoing large mammal surveys by vehicle. After encountering, we scanned the troops, counting and aging individuals. We used a GPS to record the locations of the roosting sites. We used Empire Model 218 Binoculars (7x35) to enhance counting individual baboons in each troop, and a Canon EOS 1300D camera to take photos to confirm observations. We returned to the sleeping sites on the morning of March 6^{th} at 06:30, to confirm presence as an overnight sleeping site. Due to the limit replicates ($n = 3$ troops, 1 event), we did not have sufficient samples to conduct a statistical analysis.

Results

We recorded three troops using pylons as sleeping sites in two distinct locations. The first sleeping site consisted of three different pylons and two troops (N. 0.08278@, E. 36.75079@) see (Figure 1; Table 1). We encountered another baboon troop using pylons as a sleeping site encountered 2.5 km away (N. 0.0909@, E. 36.77193@). We observed two pylons occupied by baboons, but visibility was minimal given low light,

and we could not identify demographics at each pylon. Baboons were still atop all pylons asleep at 06:30 on March 6 when we arrived, confirming that all three baboon troops used the pylons as sleeping sites. Total troop sizes were estimated that morning (Table 1).

Discussion

We report a rare observation of three troops of olive baboons utilizing electrical transmission pylons as sleeping sites in Laikipia County, Kenya. Usually, in this landscape, tall *Acacia* trees and rocky cliffs are predominantly selected as sleeping sites by baboons (Bidner et al., 2018; Hamilton, 1982; Suire et al., 2020). ADC Mutara has no cliffs, the landscape is flat and dominated by short *Vachellia drepanolobium* (Figure 1). The lack of cliffs as an available sleeping site possibly prompted the use of newly erected pylons as alternative sleeping sites. For example, at Mpala Research Centre in Laikipia, despite the availability of pylons from the same transmission line, baboons still use cliffs and tall trees as their preferred sleeping sites and have yet to be observed using pylons (LL, unpublished data).

Pylons are vertically erect towers, with tall, smooth crossbar pillars that can be used by multiple baboons. Such a structure provides strong physical support for resting baboons, and may be difficult for predators, such as African leopards (*Panthera pardus pardus*) to climb. Additionally, the pylons limited surface area may minimize parasitic loads from poop piles, and thus could be cleaner than naturally occurring sites. Pylons are also evenly spaced every 270 m, limiting the distance travelled from a sleeping site to a baboon's preferred foraging area. However, trees and cliffs likely offer greater thermoregulatory benefits as sleeping sites due to their structure, which shields baboons from the wind (Bidner et al., 2018; Hamilton, 1982; Markham et al., 2015), whereas the pylon structure is engineered to reduce wind resistance. Since the pylons traverse natural habitat such as ADC ranch and extend into small-scale farms, they may encourage baboon crop raiding behavior, potentially resulting in heightened human-wildlife conflicts in this region (Strum, 2010). The use of pylons may therefore present a cost-benefit tradeoff based on local conditions, and the factors that promote the use of such structures warrants further study.

Brotcorne et al., (2014) reported that anthropic features influenced sleeping site choice of long-tailed Macaques, whereas Sarker et al., (2005) reported that Rhesus macaques used rooftops and electricity poles while foraging and resting. To our knowledge, there have been no reported cases of pylon use as sleeping sites in olive baboons. Electrocutions from use of anthropic power infrastructure have been documented in five species of primates in Kenya including yellow baboons (Katsis et al., 2018), but the survival risk posed by high-tension electrical pylons as sleeping sites remains unknown. The use of pylons as sleeping sites is intriguing, and given the potential risk of electrocution, encourages further research.

References

Bidner, L.R., Matsumoto-Oda, A. and Isbell, L.A., 2018. The role of sleeping sites in the predator-prey dynamics of leopards and olive baboons. American journal of primatology, 80(12), p.e22932.

Bracken, A.M., Christensen, C., O'Riain, M.J., Fehlmann, G., Holton, M.D., Hopkins, P.W., Fürtbauer, I. and King, A.J., 2021. Socioecology explains individual variation in urban space use in response to management in Cape chacma baboons (*Papio ursinus*). International Journal of Primatology, pp.1-18.

Brotcorne, F., Maslarov, C., Wandia, I.N., Fuentes, A., Beudels-Jamar, R.C. and Huynen, M.C., 2014. The role of anthropic, ecological, and social factors in sleeping site choice by long-tailed macaques (*Macaca fascicularis*). American Journal of Primatology, 76(12), pp.1140-1150.

Butynski, T.M. and de Jong, Y.A., 2014. Primate conservation in the rangeland agroecosystem of Laikipia County, central Kenya. Primate Conservation, 2014(28), pp.117-128.

Cheney, D.L., Seyfarth, R.M., Fischer, J., Beehner, J., Bergman, T., Johnson, S.E., Kitchen, D.M., Palombit, R.A., Rendall, D. and Silk, J.B., 2004. Factors affecting reproduction and mortality among baboons in the Okavango Delta, Botswana. International Journal of Primatology, 25, pp.401-428.

Danish, L.M. and Palombit, R.A., 2014. "Following," an alternative mating strategy used by male olive baboons (*Papio hamadryas anubis):* quantitative behavioral and functional description. International Journal of Primatology, 35(2), pp.394-410.

Fichtner, 2009. Ethiopia-Kenya power systems interconnection project: Final feasibility study report.

Hamilton, W., 1982. Baboon sleeping site preferences and relationships to primate grouping patterns. American Journal of Primatology, 3(1-4), pp.41-53.

Hausfater, G. and Meade, B.J., 1982. Alternation of sleeping groves by yellow baboons (*Papio cynocephalus*) as a strategy for parasite avoidance. Primates, 23(2), pp.287-297.

Hoffman, T.S. and O'Riain, M.J., 2012. Monkey management: using spatial ecology to understand the extent and severity of human–baboon conflict in the Cape Peninsula, South Africa. Ecology and Society, 17(3).

Isbell, L.A., Bidner, L.R., Crofoot, M.C., Matsumoto-Oda, A. and Farine, D.R., 2017. GPS-identified, low-level nocturnal activity of vervets (*Chlorocebus pygerythrus*) and olive baboons (*Papio anubis*) in Laikipia, Kenya. American journal of physical anthropology, 164(1), pp.203-211.

Isbell, L.A., Bidner, L.R., Van Cleave, E.K., Matsumoto-Oda, A. and Crofoot, M.C., 2018. GPS-identified vulnerabilities of savannah-woodland primates to leopard predation and their implications for early hominins. Journal of human evolution, 118, pp.1-13.

Katsis, L., Cunneyworth, P.M., Turner, K.M. and Presotto, A., 2018. Spatial patterns of primate electrocutions in Diani, Kenya. International Journal of Primatology, 39, pp.493-510.

Markham, A.C., Alberts, S.C. and Altmann, J., 2015. Haven for the night: sleeping site selection in a wild primate. Behavioral Ecology, 27(1), pp.29-35.

Matsumoto-Oda, A., 2015. How surviving baboons behaved after leopard predation: a case report. Anthropological Science, p.150223.

Sarker, G.C., Kabir, M.M., Feeroz, M.M. and Hasan, M.K., 2005. Substrate and height use of rhesus macaque (*Macaca mulatta*) at Gazipur of Bangladesh. Bangladesh J. Life Sci, 17(1), pp.83-92.

Strum, S.C., 2005. Measuring success in primate translocation: a baboon case study. American Journal of Primatology: Official Journal of the American Society of Primatologists, 65(2), pp.117-140.

Strum, S.C., 2010. The development of primate raiding: implications for management and conservation. International Journal of Primatology, 31(1), pp.133-156.

Suire, A., Isbell, L.A., Bidner, L.R., Shinoda, Y., Akasaka, M. and Matsumoto-Oda, A., 2020. Influence of rainfall on sleeping site choice by a group of anubis baboons (*Papio anubis*). American Journal of Primatology, 83(1), p.e23223.

Woodroffe, R. and Frank, L.G., 2005, February. Lethal control of African lions (Panthera leo): local and regional population impacts. In Animal Conservation Forum (Vol. 8, No. 1, pp. 91-98). Cambridge University Press.

Figure 1

Three troops of olive baboons (*Papio anubis*) were observed on March 5, 2023, using recently installed high-tension electric pylons as sleeping sites within*Acacia* woodland-savannah in Laikipia County, Kenya.

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`Data table.docx` available at https://authorea.com/users/701278/articles/687823-electricity-pylons-are-used-by-olive-baboons-papio-anubis-as-sleeping-sites-in-laikipia-kenya