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DATA PAPER

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Ecological consequences of large herbivore exclusion in an African savanna: 12 years of data from the UHURU experiment

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Abstract

Diverse communities of large mammalian herbivores (LMH), once widespread, are now rare. LMH exert strong direct and indirect effects on community structure and ecosystem functions, and measuring these effects is important for testing

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ecological theory and for understanding past, current, and future environmental change. This in turn requires long-term experimental manipulations, owing to the slow and often nonlinear responses of populations and assemblages to LMH removal. Moreover, the effects of particular species or body-size classes within diverse LMH guilds are difficult to pinpoint, and the magnitude and even direction of these effects often depends on environmental context. Since 2008, we have maintained the Ungulate Herbivory Under Rainfall Uncertainty (UHURU) experiment, a series of size-selective LMH exclosures replicated across a rainfall/productivity gradient in a semiarid Kenyan savanna. The goals of the UHURU experiment are to measure the effects of removing successively smaller size classes of LMH (mimicking the process of size-biased extirpation) and to establish how these effects are shaped by spatial and temporal variation in rainfall. The UHURU experiment comprises three LMH-exclusion treatments and an unfenced control, applied to nine randomized blocks of contiguous 1-ha plots ($n = 36$). The fenced treatments are MEGA (exclusion of megaherbivores, elephant and giraffe), MESO (exclusion of herbivores ≥40 kg), and TOTAL (exclusion of herbivores ≥5 kg). Each block is replicated three times at three sites across the 20-km rainfall gradient, which has fluctuated over the course of the experiment. The first 5 years of data were published previously (*Ecological Archives* E095-064) and have been used in numerous studies. Since that publication, we have (1) continued to collect data following the original protocols, (2) improved the taxonomic resolution and accuracy of plant and small-mammal identifications, and (3) begun collecting several new data sets. Here, we present updated and extended raw data from the first 12 years of the UHURU experiment (2008–2019). Data include daily rainfall data throughout the experiment; annual surveys of understory plant communities; annual censuses of woody-plant communities; annual measurements of individually tagged woody plants; monthly monitoring of flowering and fruiting phenology; every-other-month small-mammal mark–recapture data; and quarterly large-mammal dung surveys. There are no copyright restrictions; notification of when and how data are used is appreciated and users of UHURU data should cite this data paper when using the data.

KEYWORDS
climate change, dik-dik (*Madoqua*), East African savannas, elephants (*Loxodonta africana*), extinction, food webs, grazing and browsing herbivores, impala (*Aepyceros melampus*), long-term ecological field experiments, plant communities, rangeland ecology, species interactions

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data are available as Supporting Information and are also available in Dryad at: https://doi.org/10.5061/dryad.1g1jwstxw.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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