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## The Effect of Livestock on Wild Herbivores in a Savanna Rangeland (Maasai Mara, Kenya)

### Summary

#### Background

Savannas cover around ~25% of the land surface of the world, though found most extensively on the African continent. Today savanna ecosystems are under great pressure due to climate change, land degradation, and increasing human and livestock populations. Wildlife populations have decreased on average by 68% from 1977 to 2016, whereas the livestock population have increased across Kenya. As livestock population are increasing, so are the potential for wildlife-livestock interactions. The nature of the interaction between wildlife herbivores and domestic herbivores is still of debate, but it is essential to understand the interactions, to be able to conserve both wildlife and the pastoral lifestyle. Domestic and wild herbivores often utilize the same resources, which can lead to either a negative (competition) or a positive interaction (facilitation). Competition can have great negative consequences for tourism, as tourism in Kenya is largely based on wildlife viewing. Finding a way for livestock and wildlife to co-exist is essential to conserve both the pastoral lifestyle, tourism and wildlife.

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## Aim of the study

To investigate how rotational grazing of livestock affect wildlife herbivores grazing patterns in Mara North Conservancy.

The study looks at the following four hypotheses:

1. Wild herbivores have greater densities in areas without livestock grazing.
2. Grazers avoid areas with livestock grazing more than browsers and mixed feeders.
3. Species that prefer short grass decrease in density according to increase in time since livestock grazing.
4. Species that prefer tall grass are expected to increase in density according to increase in time since livestock grazing.

## Fieldwork – Mara North Conservancy (MNC)

The data used in the study was collected in MNC between the 24<sup>th</sup> of September and the 04<sup>th</sup> of December 2019. With the help of David Noosaron, I conducted 79 transect in which I counted all livestock and wildlife herbivore species. The herbivores counted were; white-bearded wildebeest (*Connochaetes taurinus mearnsi*), Cape buffalo (*Syncerus caffer*), Thomson's gazelle (*Eudorcas thomsonii*), Grant's gazelle (*Nanger granti*), impala (*Aepyceros melampus*), topi (*Damaliscus lunatus jimela*), Grant's zebra (*Equus quagga boehmi*), eland (*Tragelaphus oryx*), reedbuck (*Redunca redunca*), kongoni (*Alcelaphus buselaphus*), Maasai giraffe (*Giraffa camelopardalis tippelskirchi*), savanna elephant (*Loxodonta africana*), ostrich (*Struthio camelus massaicus*), cattle, and shoats. The transects were distributed in different grazing blocks, thereby creating a timeline since last grazed by livestock, from currently grazing (0 months since livestock grazing) to 5 months since livestock grazing. All animal counts were transformed into animal density for each time since livestock grazing category.

## Results and discussion

From the study, it is seen that wild herbivores have greater densities in areas without livestock grazing, which could indicate some sort of competition for food resources or water. The study also investigated if grazing species were more affected by livestock grazing than browsers and mixed feeders. The study found that the density for grazers, browsers and mixed feeders did not differ, hence herbivore functional types does not play a role. Furthermore, the study found that it is very species specific how the wildlife is affected.

The study found some indications of facilitation from cattle grazing on Thomson's gazelle, impala and Grant's gazelle. The density of all three species was found to fluctuate greatly over time since livestock grazing and it looks like there is a time lag between current livestock grazing and how these species are using the area. The time lag between current livestock grazing and where Thomson's gazelle, impala and Grant's gazelle are found could indicate a form of feeding facilitation. The reason for this is that Thomson's gazelle, impala and Grant's gazelle are all mixed feeders with

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a relatively small body-size. Small herbivores are dependent on high quality forage and prefer short nutritious grass, which is something livestock grazing maintain. Additionally, the maintained short grass cover might be lowering the risk of predation, making smaller species prefer areas with livestock grazing.

The study also found some indications of competition with cattle and topi, zebra, and wildebeest. Topi, zebra and wildebeest were all found to avoid areas with cattle. One explanation for this can be diet and habitat overlap. Furthermore, topi, zebra, and wildebeest showed sign of competition with shoats, as they were found to avoid areas with shoats. Shoats is currently not included in conservancy management plans but are kept near settlements where they forage. The number of shoats in the Mara Region has increased extensively by 235.6% from 1977 to 2014. Large herds of shoats can be very damaging to grassland. Goats have prehensile lips that enable them to eat grass close to the roots as sheep, thus accelerating over-grazing.

Cattle were observed multiple times in areas outside the indicated grazing zones. There can be several reasons for this. In MNC some cattle are kept in movable bomas near the grazing site. In the morning and afternoon cattle are herded to and from the current grazing zones possibly passing other grazing zones. Furthermore, cattle sometimes have to enter other grazing zones to get to a water point, which is especially true during the dry season. Conducting transect during the morning and afternoon was intentionally avoided, so the observation outside of the current livestock grazing zones can either be from cattle on their way to a water point or illegal grazing.

MNC rotational grazing plan is a step in the right direction, to reduce negative effects of livestock on wild herbivores. Nevertheless, our results still suggest widespread negative interaction between livestock and various wild herbivore species and also highlight the need to ensure grazing plans are enforced. The future of many wildlife populations on the African savanna is uncertain, making rotational grazing plans an important management tool. For an effective rotational grazing plan, it is essential that all guidelines are being followed. We would further argue that it is highly relevant to include shoats in the management plan since they can compete with wildlife just as much as cattle.

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