Evaluating leopard predation pressure on chimpanzee spatio-temporal habitat use in West Africa

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GAB LAB Great Ape Behaviour

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CHIMP&SEE

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Background

- Leopards pose significant predatory threat to chimps[1].
- Chimps and leopards co-occur in much of their West African range and their use of sympatric habitat is not well understood.
- Due to the large home ranges and habitat-dependent behavioural patterns of both species, there is potential for overlap[2, 3].

Objectives

1. Determine whether leopard habitat use affects chimp habitat use (and vise versa).

2. Investigate how habitat characteristics affect spatio-temporal overlap.

- Understanding the effect of top-down predation pressure on chimp ranging contributes to our understanding of predation pressure as a driver for great ape sociality and behaviour.

Methods

- I had access to a large dataset from systematically-deployed camera traps across 7 sites, 3 forested and 4 savannah-woodland (Fig. 1 and 2). Cameras were motion-activated and deployed for 11-14 months.
- Video data was processed through the Chimp&See community science project and by experts at PanAf.
- I constructed generalized linear mixed models to analyze chimp and leopard spatio-temporal relationships.

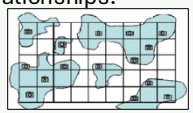

Figure 1. Schematic of camera deployment.

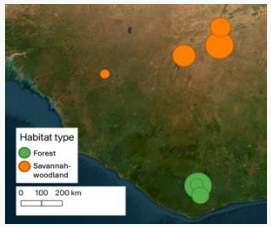

Figure 2. Study sites by habitat, point size representative of number of captures per site.

Results

Temporal overlap:

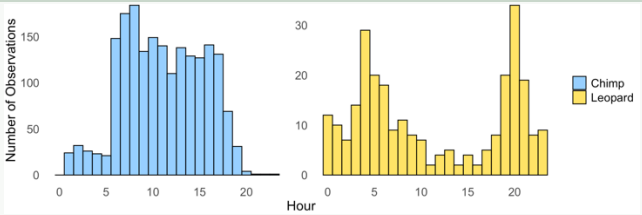

Figure 3. Number of chimp and leopard occurrences each hour of the day, compiled across all sites.

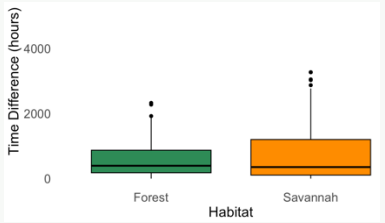

Figure 4. Mean time difference between leopard and chimp captures based on habitat.

Mean time differences:

- Forest: 738 hrs
- Savannah: 805 hrs
- ***P* = 0.051**

Spatial overlap:

- Chimp occurrences were positively correlated with the number of leopard occurrences (***P* < 0.01**).
- Opposite pattern at Sobeya site (***P* < 0.01**), and no evidence of leopards avoiding chimps (*NS*, ***P* = 0.91**)
- More spatial overlap on trails, bridges, and at chimp nest sites.

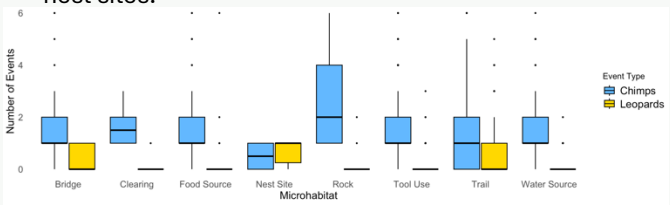

Figure 5. Mean number of leopard and chimp events per microhabitat (mean calculated based on non-zero data).

Discussion

- Temporal overlap at forest sites could be attributed to smaller range sizes and increased leopard diurnal activity.
- A positive correlation between leopard and chimp events was unlikely based on predator-avoidance theories. Prey tracking by leopards and/or habitat fragmentation and human presence across all sites could be driving overlap.
- This may have implications for behavioural diversity and chimp group dynamics[4].

References

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• All photos are camera trap screen captures.