

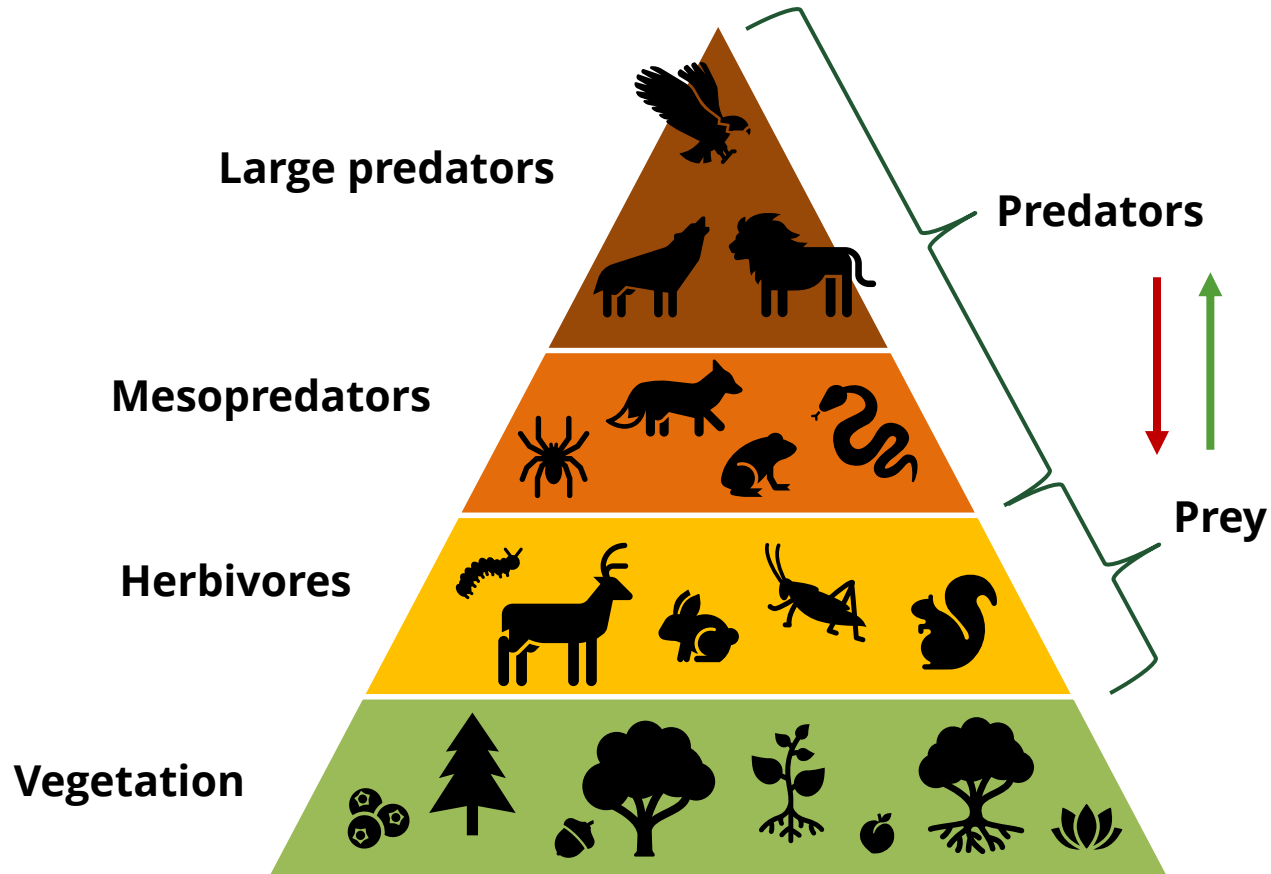


Humans acting as 'super predators' in Central African forests: trophic erosion and disruption of predator-prey dynamics

S. Tossens (ULiège), M. Drouilly (Panthera), Z. Woodgate (Panthera), M. Ruwet (ULiège), E. Vanderbeck (ULiège), S. Lhoest (ULiège), C. Vermeulen (ULiège), S.T. Kehou (ULiège) & J.-L. Doucet (ULiège)



TROPHIC INTERACTIONS



Top-down effects

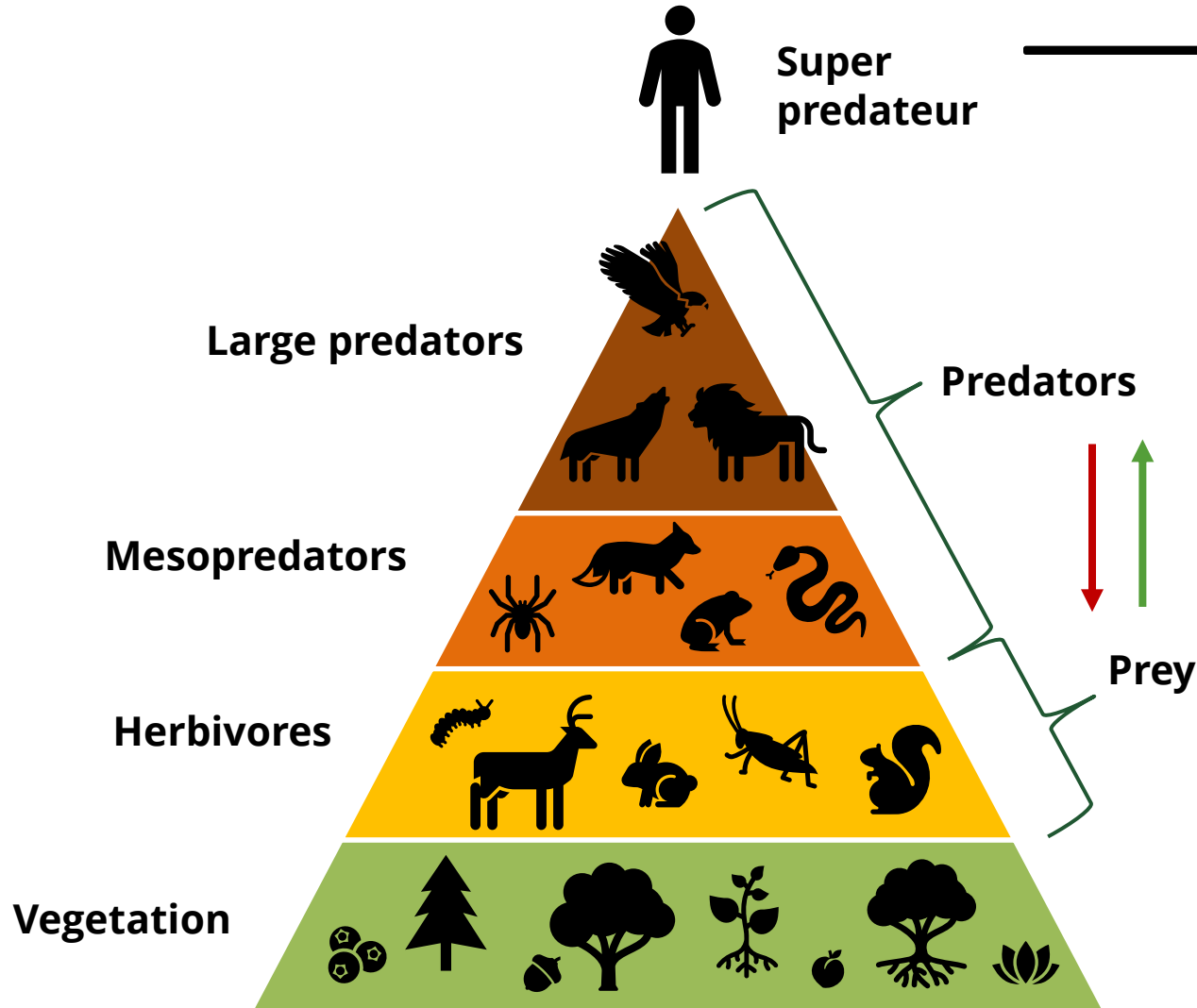
- Predation
- Landscape of fear

Bottom-up effects

- Resources

→ Influence **behaviors** & **spatiotemporal dynamics**

TROPHIC INTERACTIONS



Top-down effects

- Predation
- Landscape of fear

Bottom-up effects

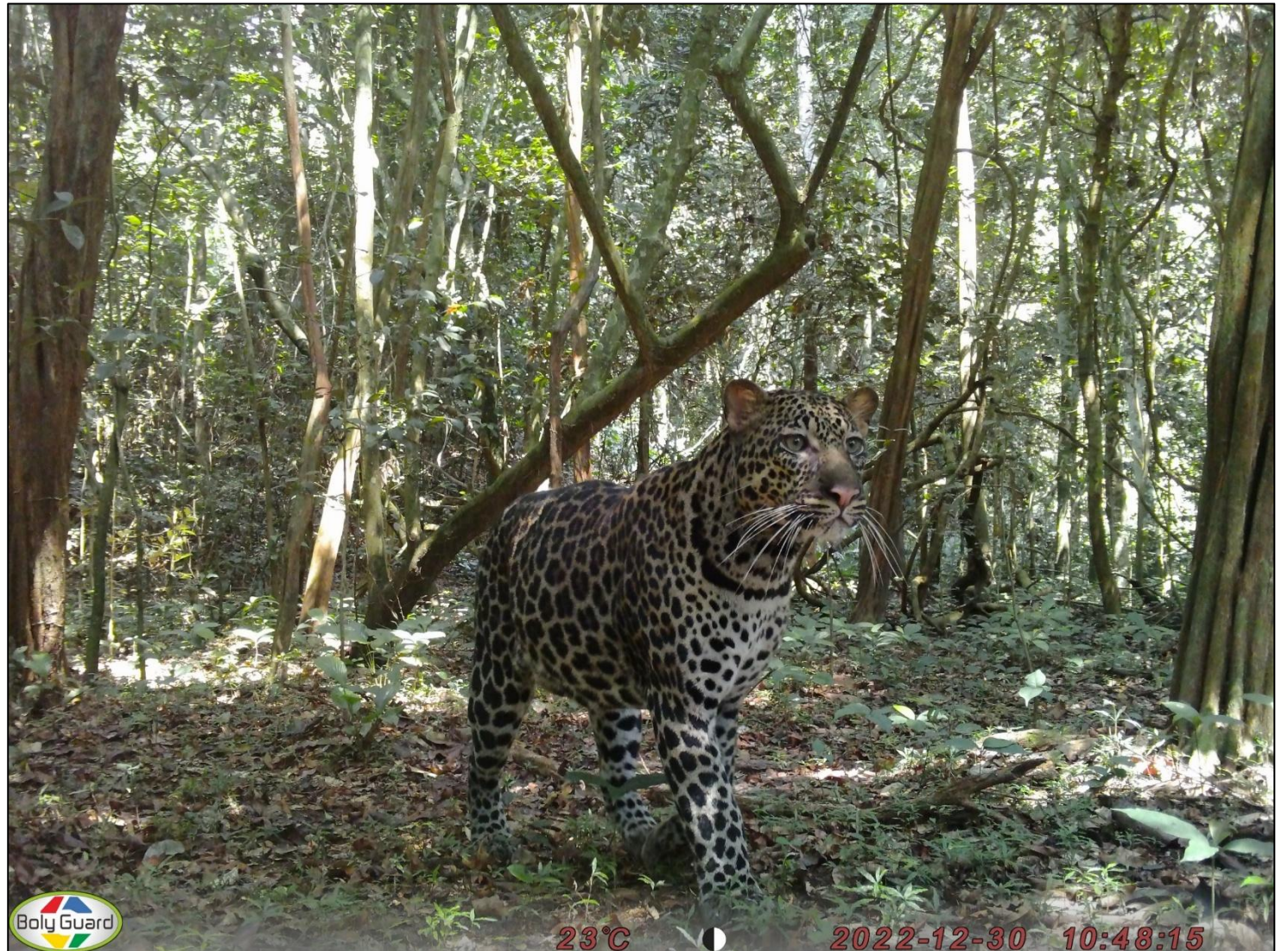
- Resources
- Influence **behaviors** & **spatiotemporal dynamics**

WILD CATS

- Hypercarnivores
- Solitary & ambush predators
- Emblematic carnivores

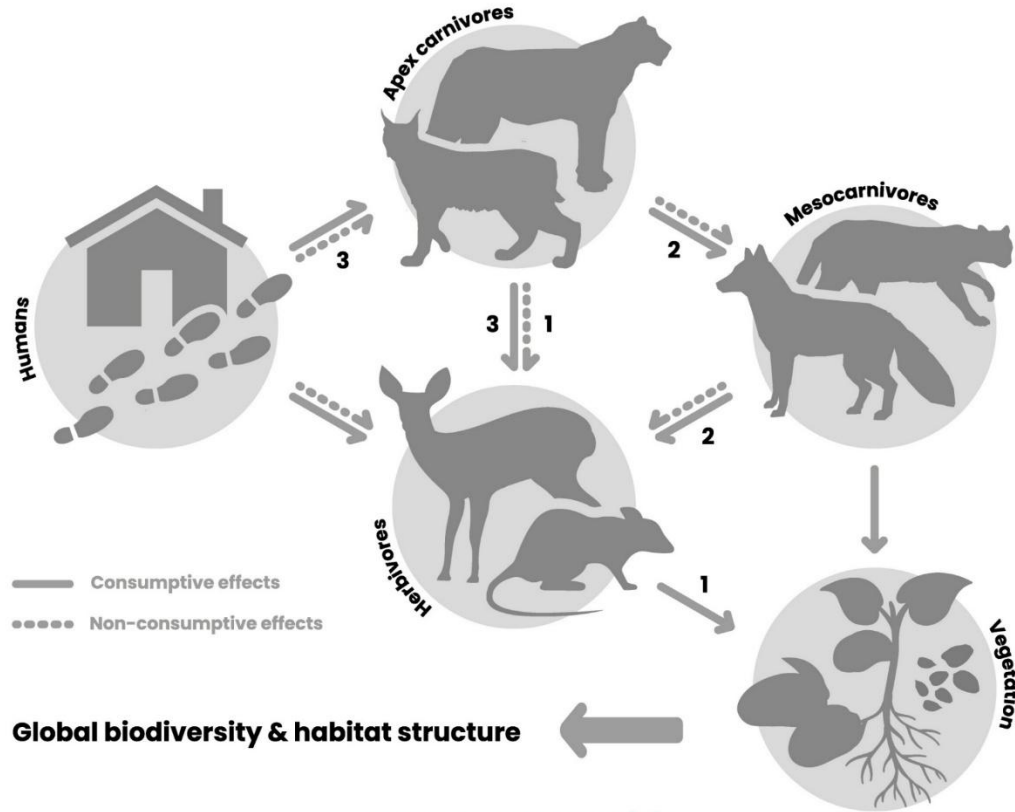


**Great potential to impact
food webs**

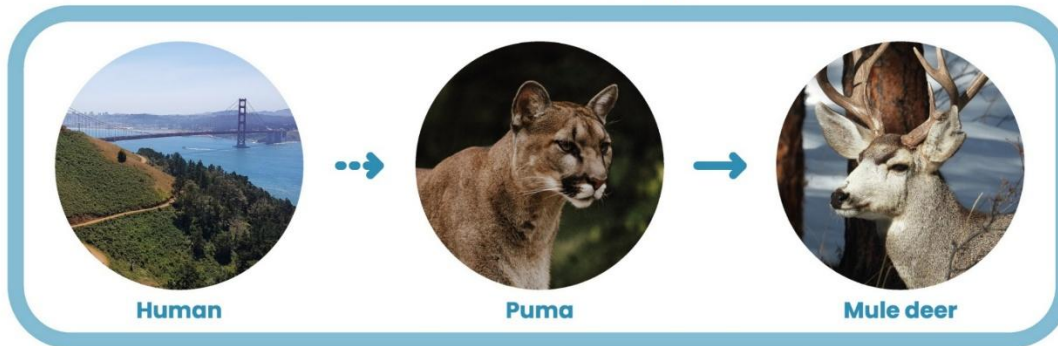


WILD CATS

Classic (1)



Human-induced (3)



Intraguild (2)

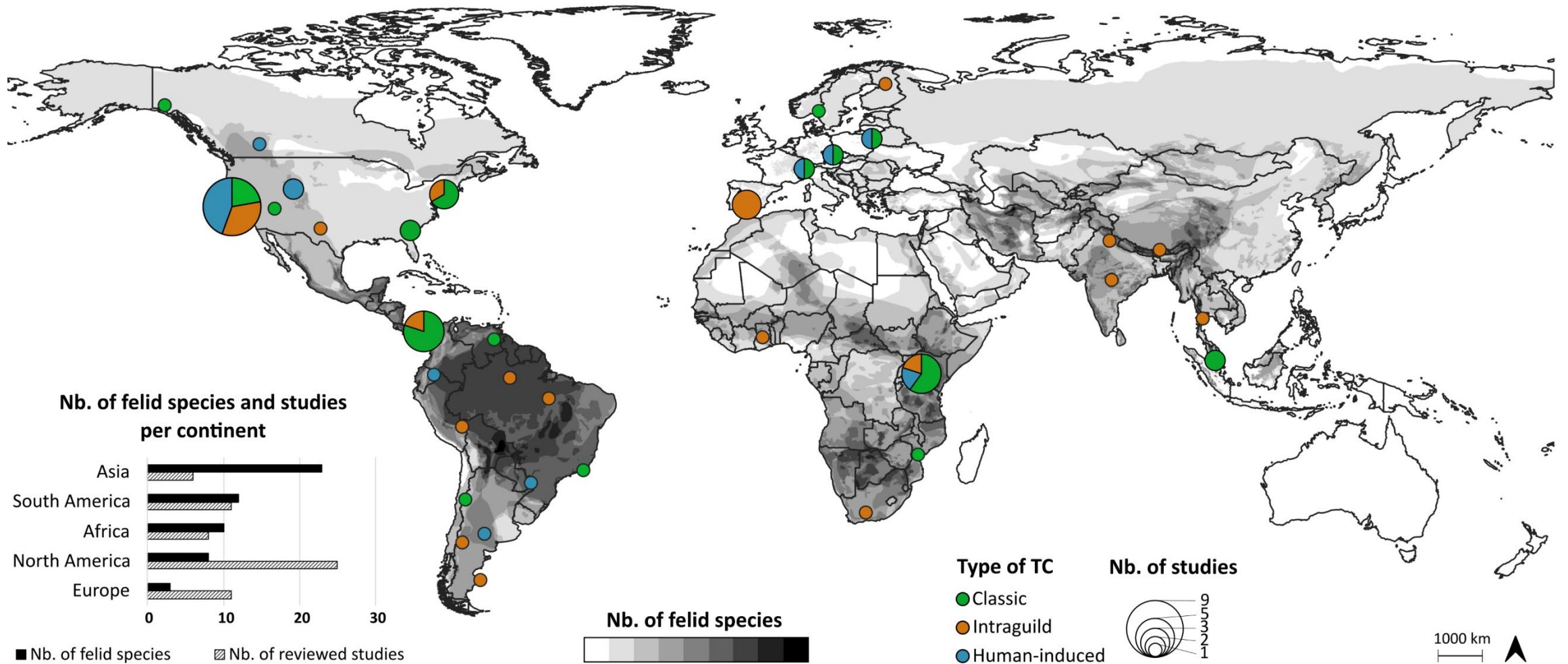


Literature review:



Tossens et al., 2024

CENTRAL AFRICAN FORESTS



CENTRAL AFRICAN FORESTS



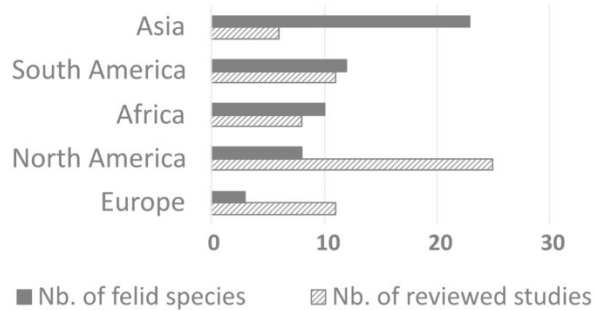
Leopard
Panthera pardus



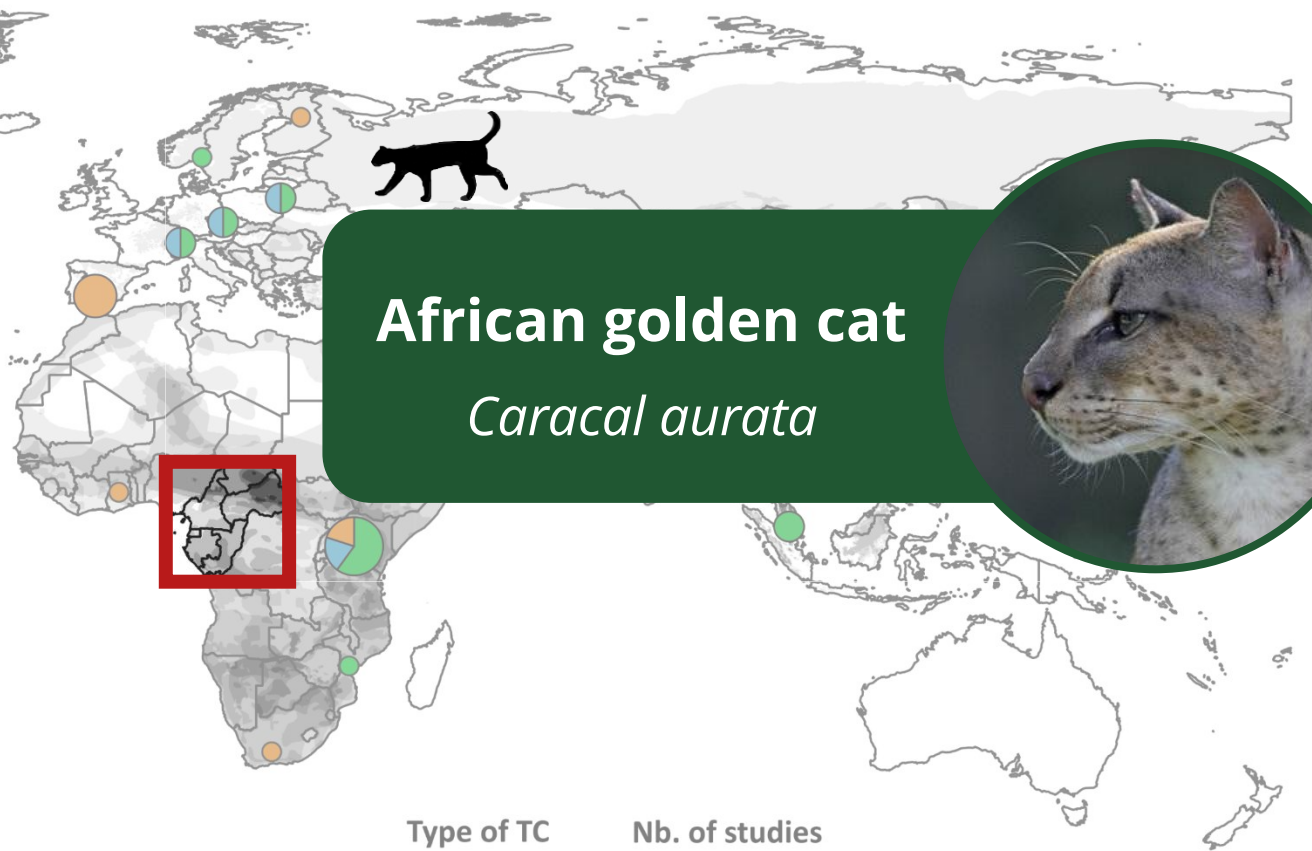
African golden cat
Caracal aurata



Nb. of felid species and studies per continent



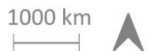
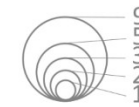
Nb. of felid species



Type of TC

- Classic
- Intraguild
- Human-induced

Nb. of studies



OBJECTIVES

General: Examine trophic structures and predator-prey spatiotemporal interactions using camera trap data **across a human pressure gradient in three sites**, and assess the influence of human activity on these ecological dynamics

1

What are each site's community structure and diversity?

2

What are the spatial and temporal predator-prey patterns?

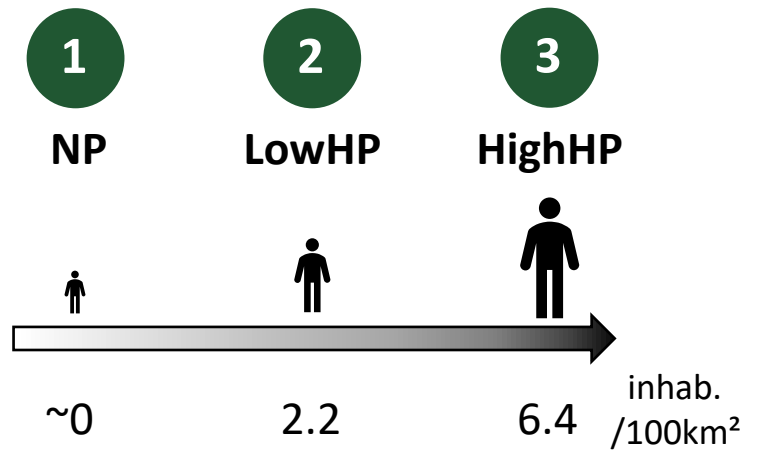
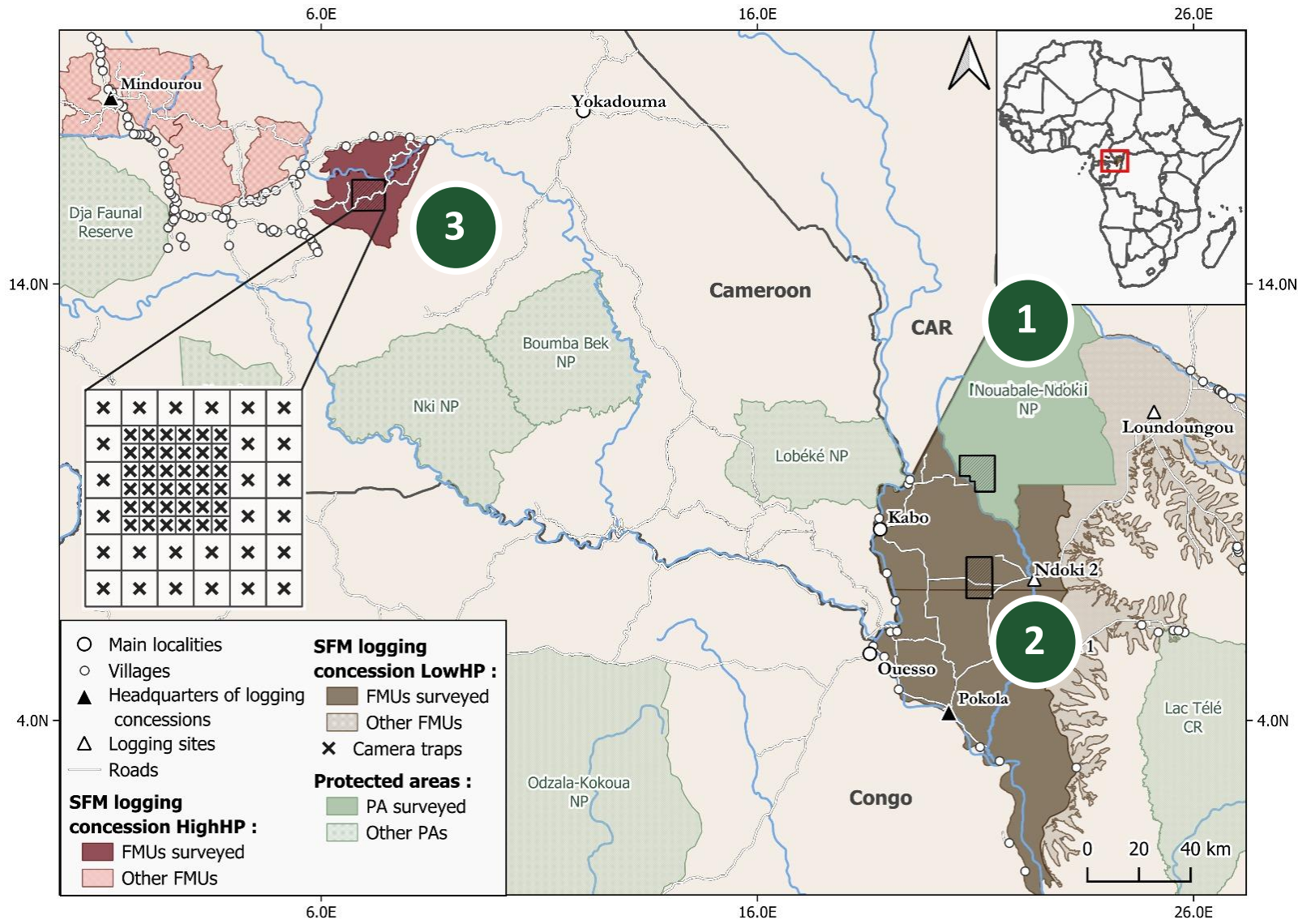
3

How humans influence trophic structure and dynamics?



1. CAMERA TRAP SURVEYS

Methods



- 3 x 63 camera trap stations installed = **378 CT**
- **~4-6 months** of survey
- **384 000 pictures** collected



2. PREY SPECIES IDENTIFICATION

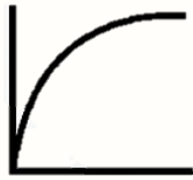
Methods

- Literature review
- Scat collection + molecular diet analysis
- Camera trap data





Community structure & diversity



Species accumulation curves

$H =$

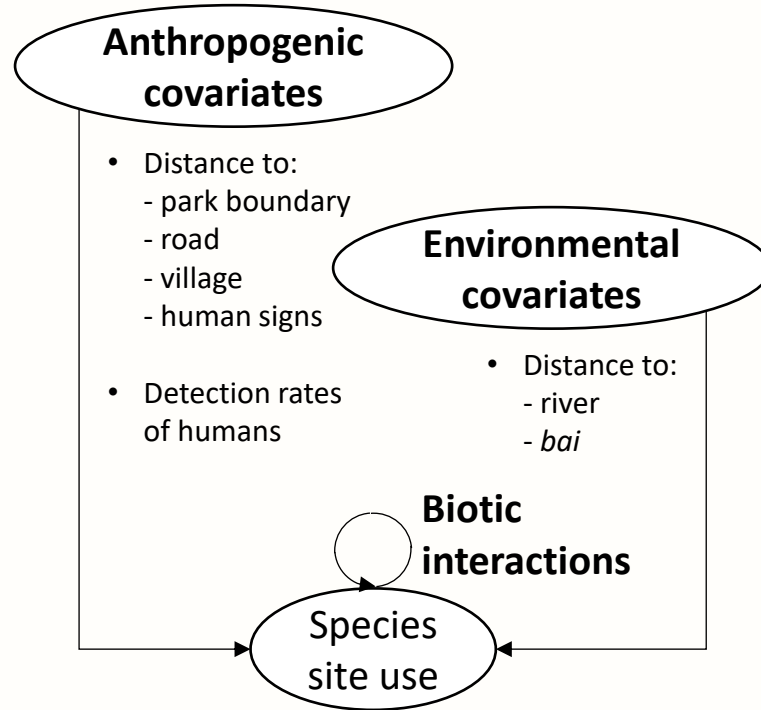
Non-parametric indices



Relative abundance indices

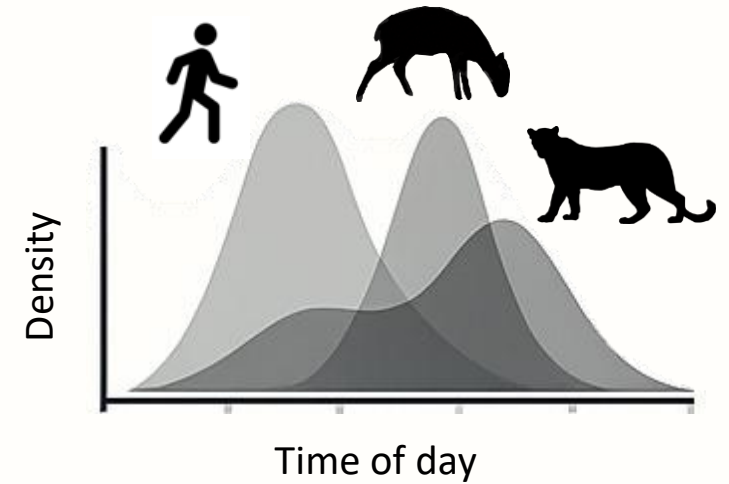
Trophic structures

Structural Equation Models (SEMs)



Human-predator-prey spatiotemporal dynamics

Activity patterns

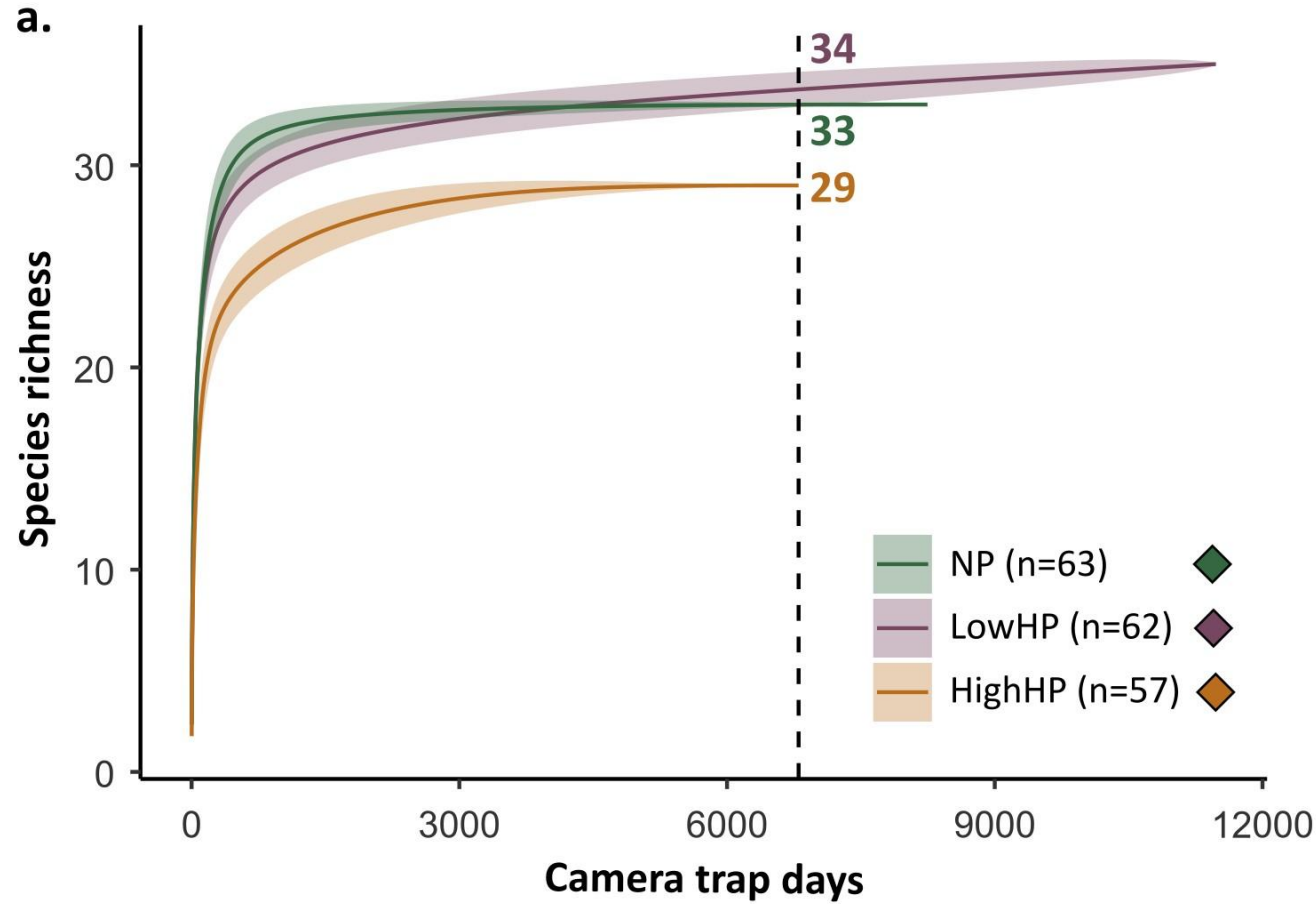




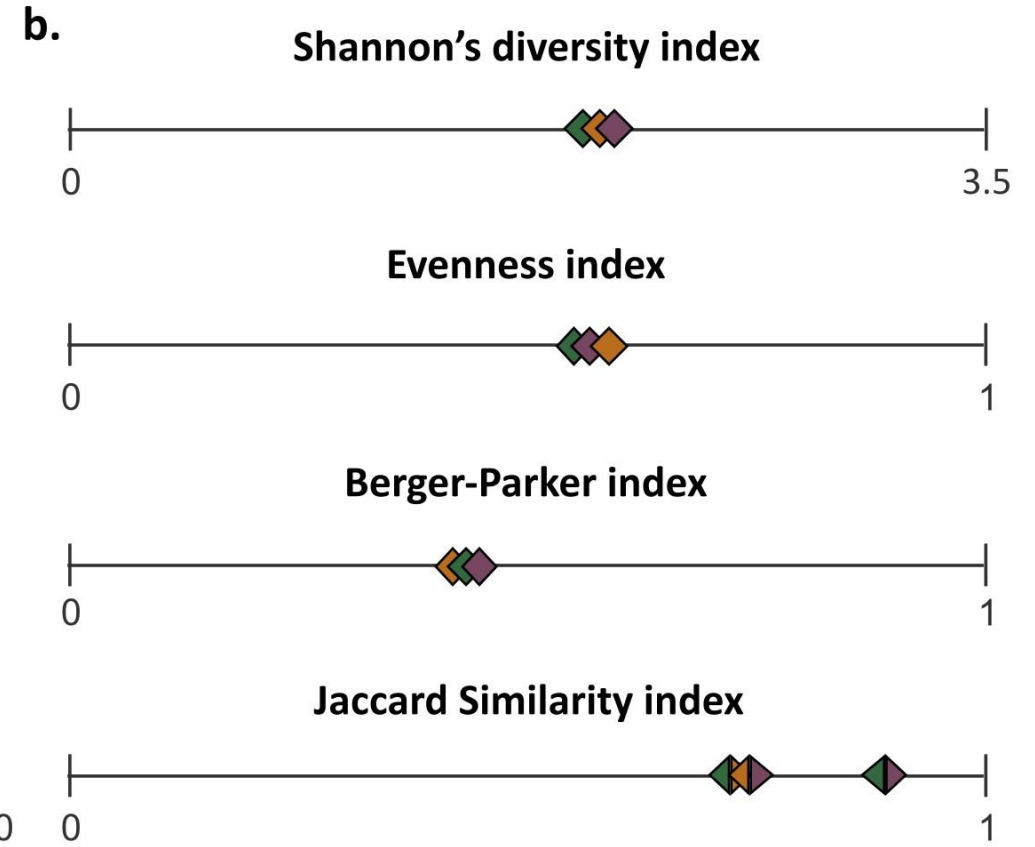
1. COMMUNITY STRUCTURE & DIVERSITY

Results

SPECIES RICHNESS



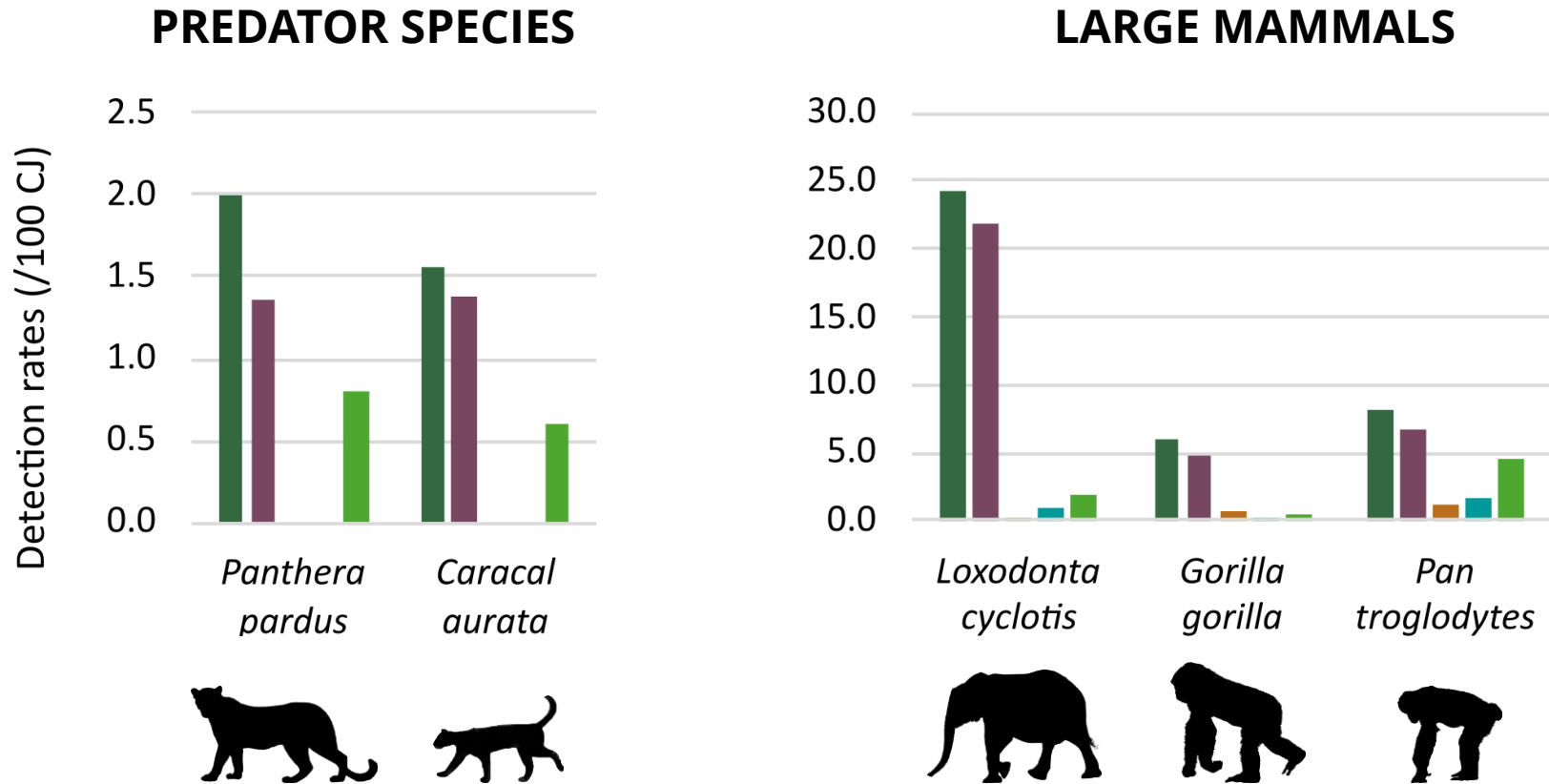
NON-PARAMETRIC INDICES





1. COMMUNITY STRUCTURE & DIVERSITY

Results



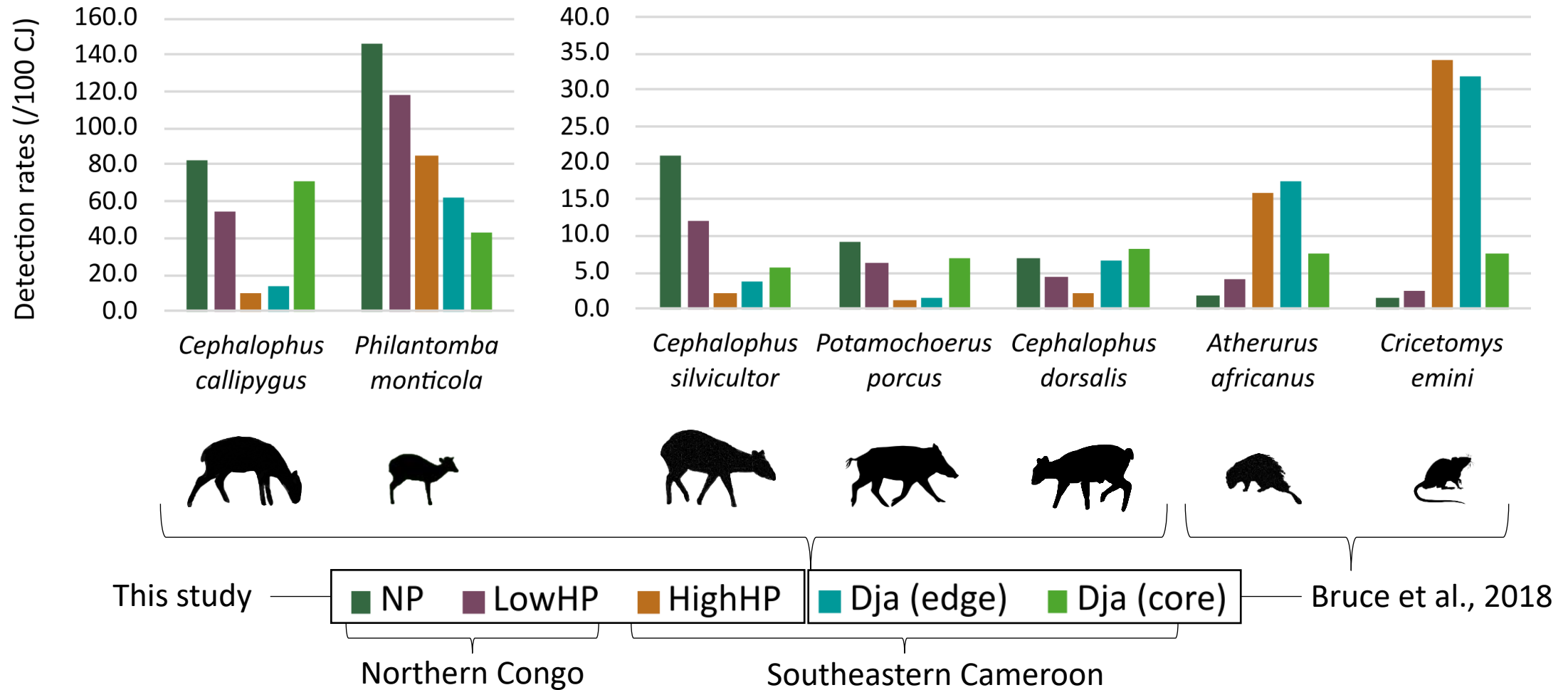
This study — NP LowHP HighHP Dja (edge) Dja (core) — Bruce et al., 2018

Northern Congo Southeastern Cameroon



1. COMMUNITY STRUCTURE & DIVERSITY

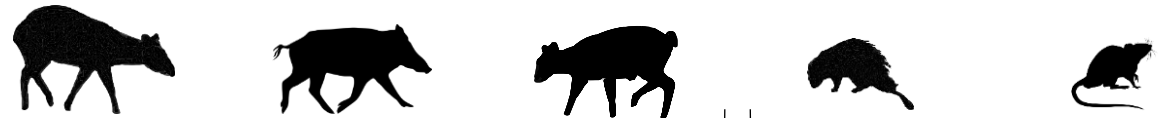
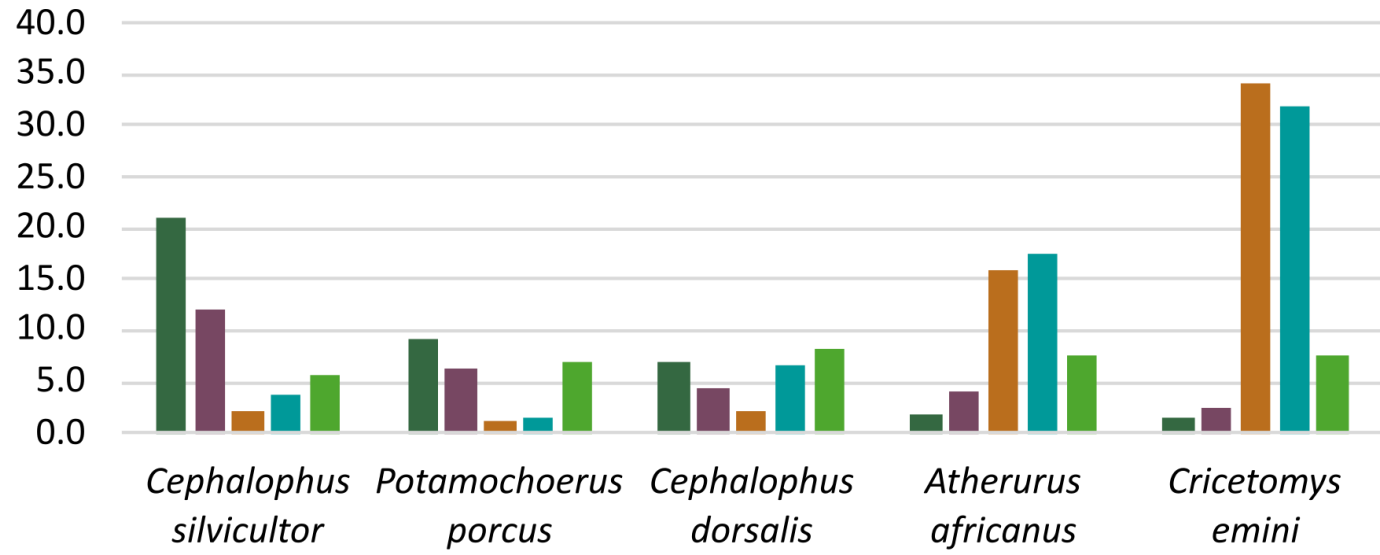
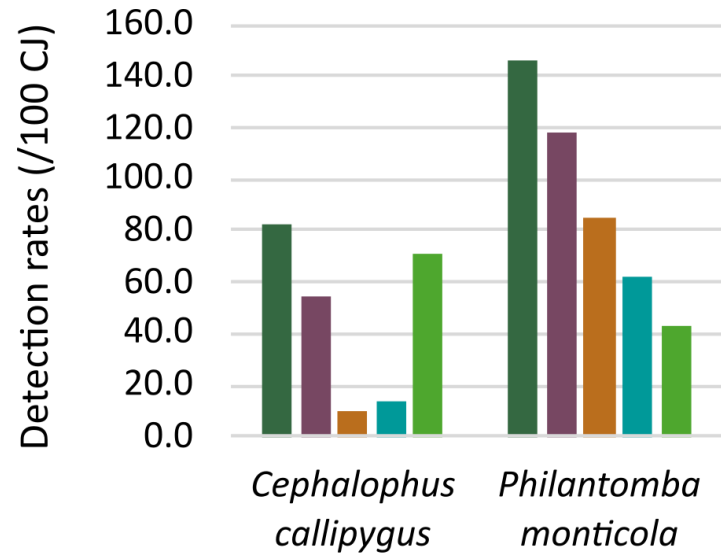
PREY SPECIES





1. COMMUNITY STRUCTURE & DIVERSITY

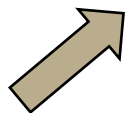
PREY SPECIES



9 times lower



23 times higher

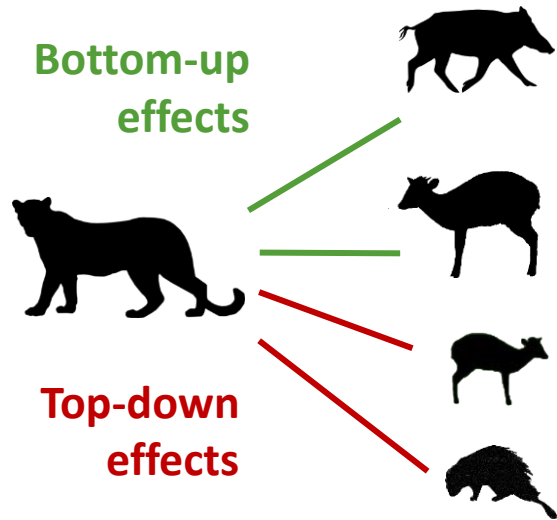




2. HUMAN-PREDATOR-PREY SPATIAL DYNAMICS

NP

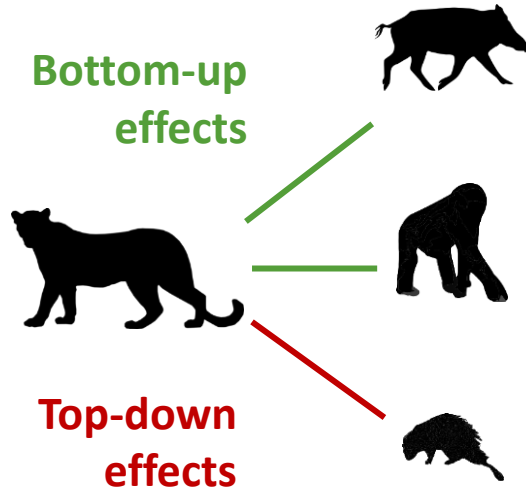
Biotic



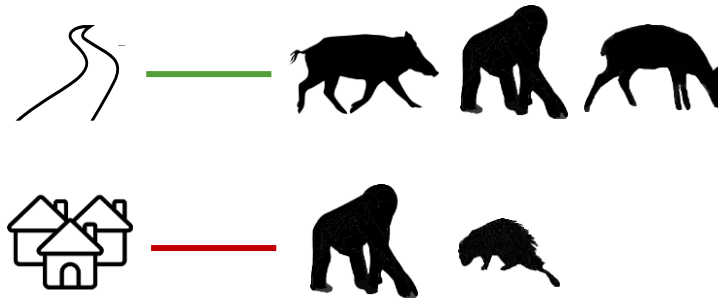
- Positive interactions ($p < 0.05$)
- Negative interactions ($p < 0.05$)

LowHP

Biotic



Anthropogenic



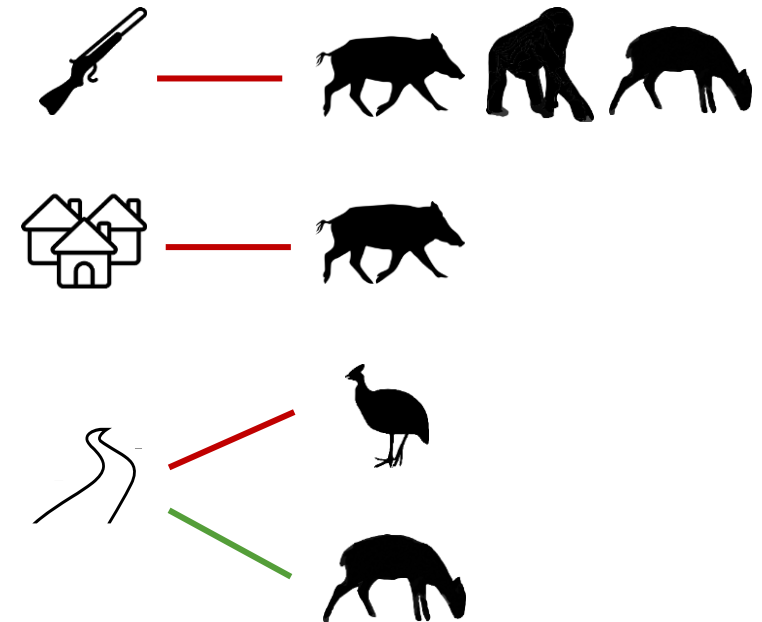
Results

HighHP

Biotic



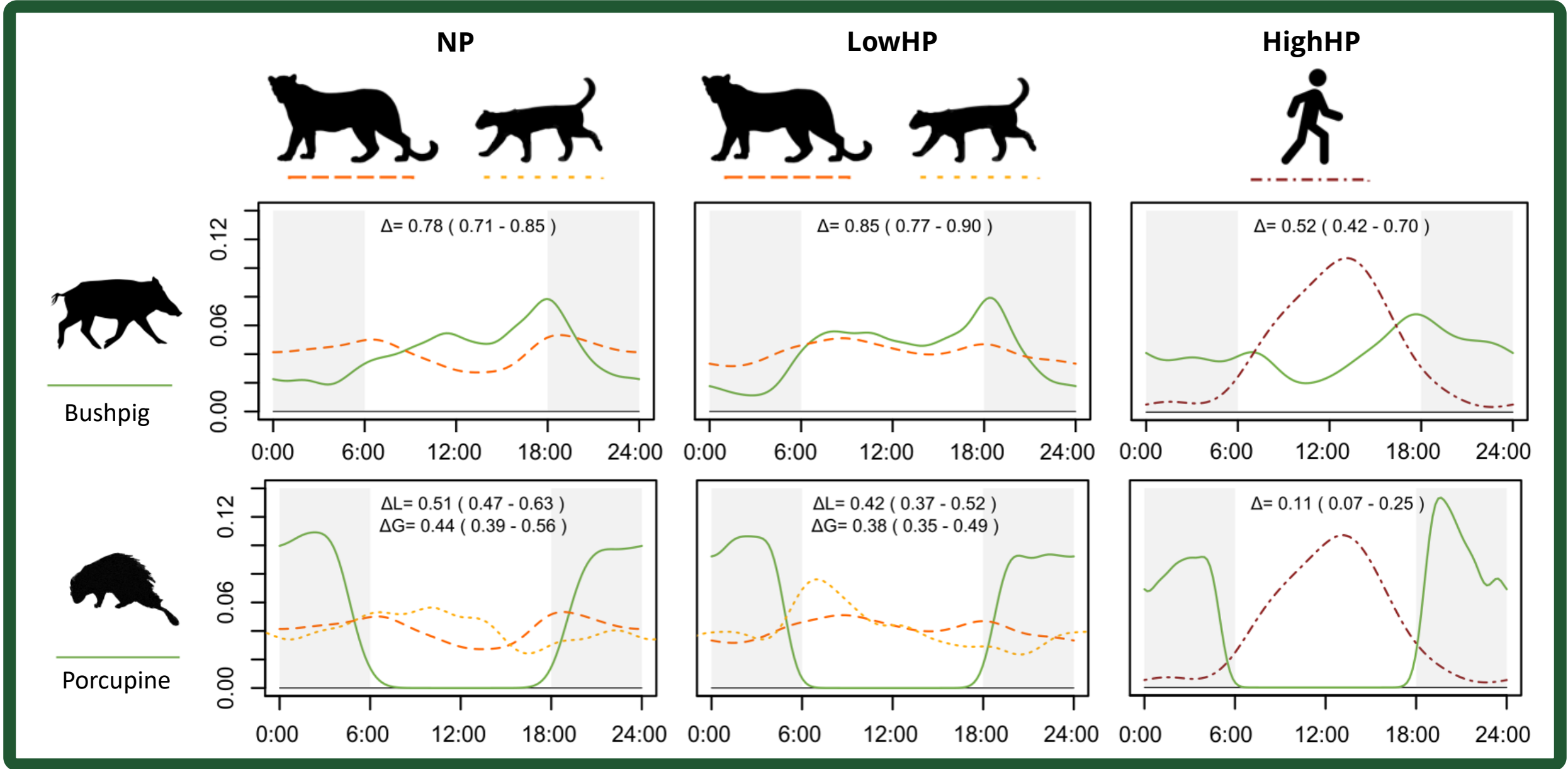
Anthropogenic





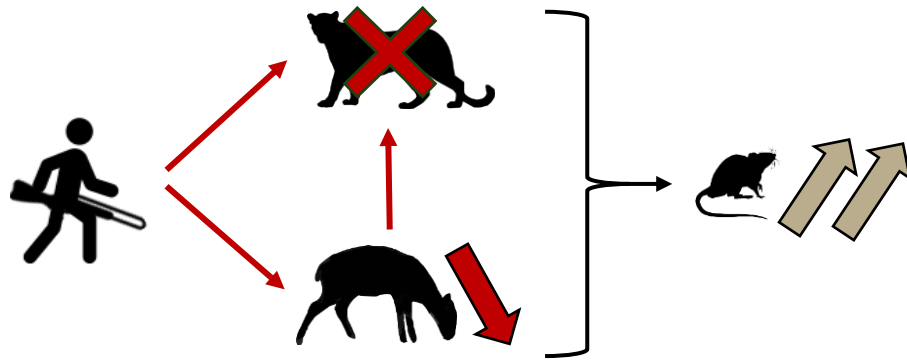
3. HUMAN-PREDATOR-PREY TEMPORAL DYNAMICS

Results



DISCUSSION

SHIFTS IN COMMUNITY DIVERSITY

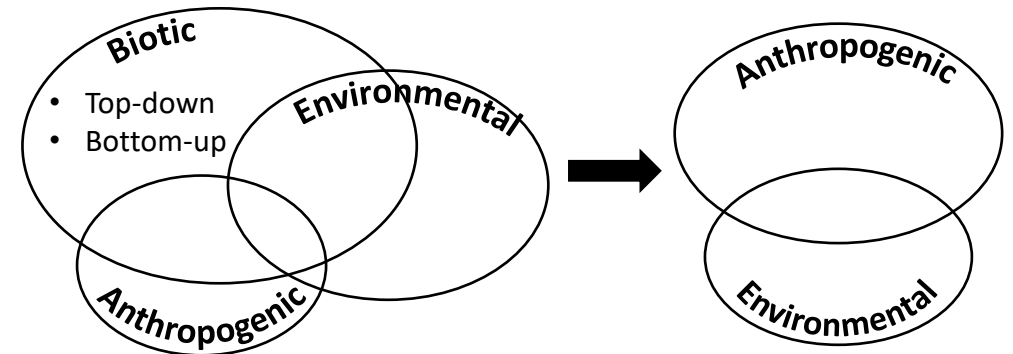


→ Trophic erosion

→ Direct and indirect effects on trophic structure

SHIFTS IN SPATIOTEMPORAL DYNAMICS

- Spatial network reorganization



- Increase in prey nocturnality

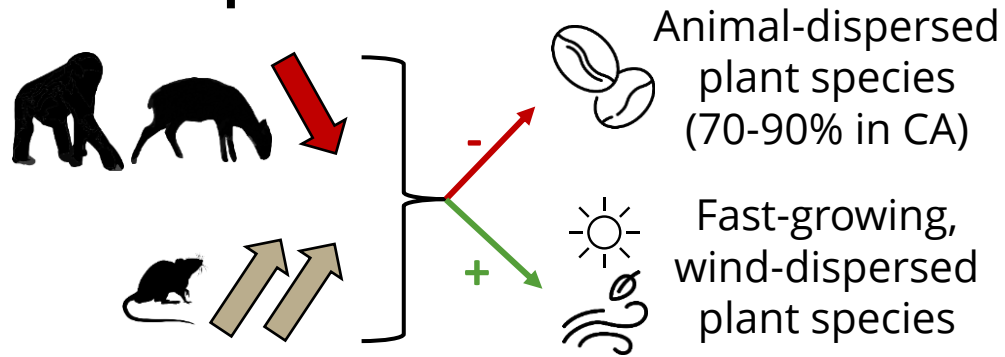
→ Trophic simplification under human domination

→ **Human-induced trophic cascade**

DISCUSSION

IMPLICATIONS FOR ECOSYSTEM FUNCTIONING

- Shift in forest composition
 - Change in **seed predation** and **dispersal**



- Reduced spatial heterogeneity in **herbivory pressure**

CONSERVATION IMPLICATIONS

- Local human pressure & broader landscape context = **stronger predictors** than formal forest management status
- Leopard & golden cat may serve as effective **indicator species** for ecosystem integrity
- Monitoring only species richness is not enough

➔ **Need for landscape-scale, integrative, multi-trophic approaches**

THANK YOU

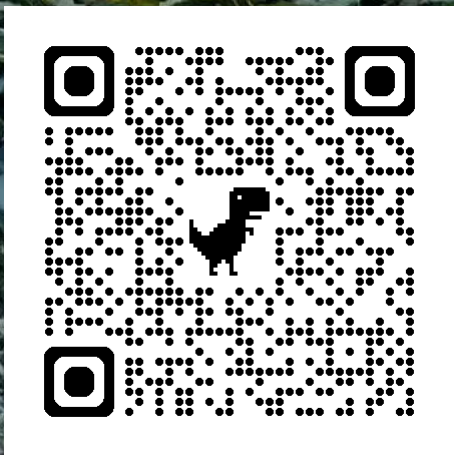


Sarah Tossens



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Global review on wild felids
in trophic cascades:



Tossens et al., 2024

