Mesocarnivores vs pest rodents in an agroecosystem: a One Health solution for farmers?

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Ecological Rodent Management

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Rodent impact in agroecosystems

- Crop pests affecting yield (Massawe et al. 2011, Singleton et al. 1999)
- Hence important to food security and human health (Williams et al. 2017, Mulungu, 2017)

Conventional rodent control

Intercropping
(Abate et al. 2000)

Trapping
(Taylor et al. 2012)

Rodenticide
(Abate, 1997)

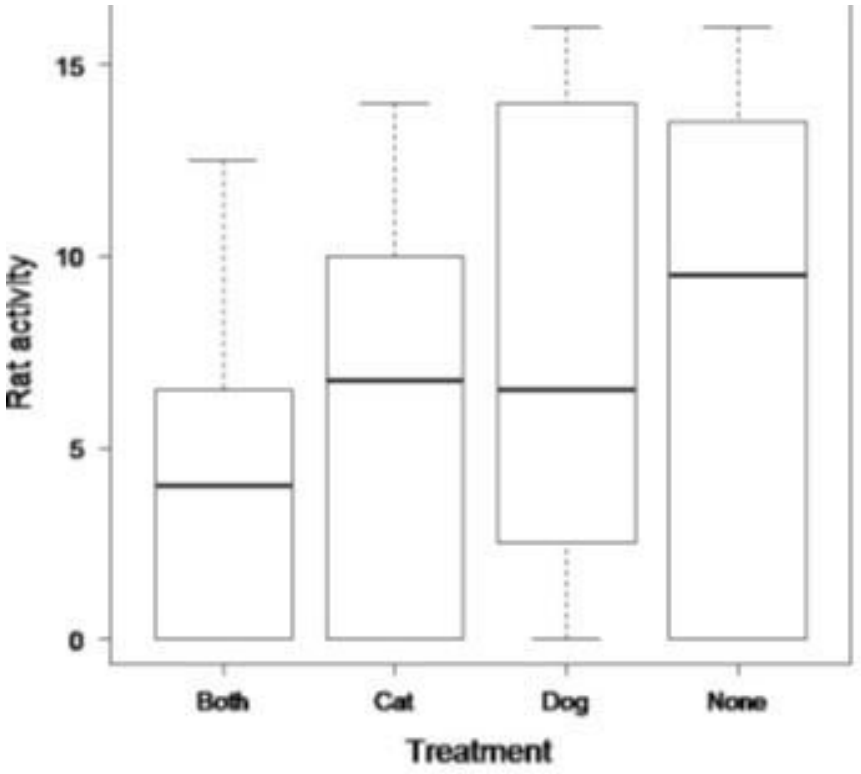
Ecologically-Based Rodent Management (EBRM)

- EBRM provides effective management by integration of methods (Singleton et al. 1999, Mulungu, 2017, Makundi & Massawe, 2011)
- EBRM has low environmental impact (Swanepoel et al. 2017, Taylor et al. 2012)

e.g., trap barrier system

Ecologically-Based Rodent Management (EBRM)

Domestic predators



Mahlaba et al. (2017)

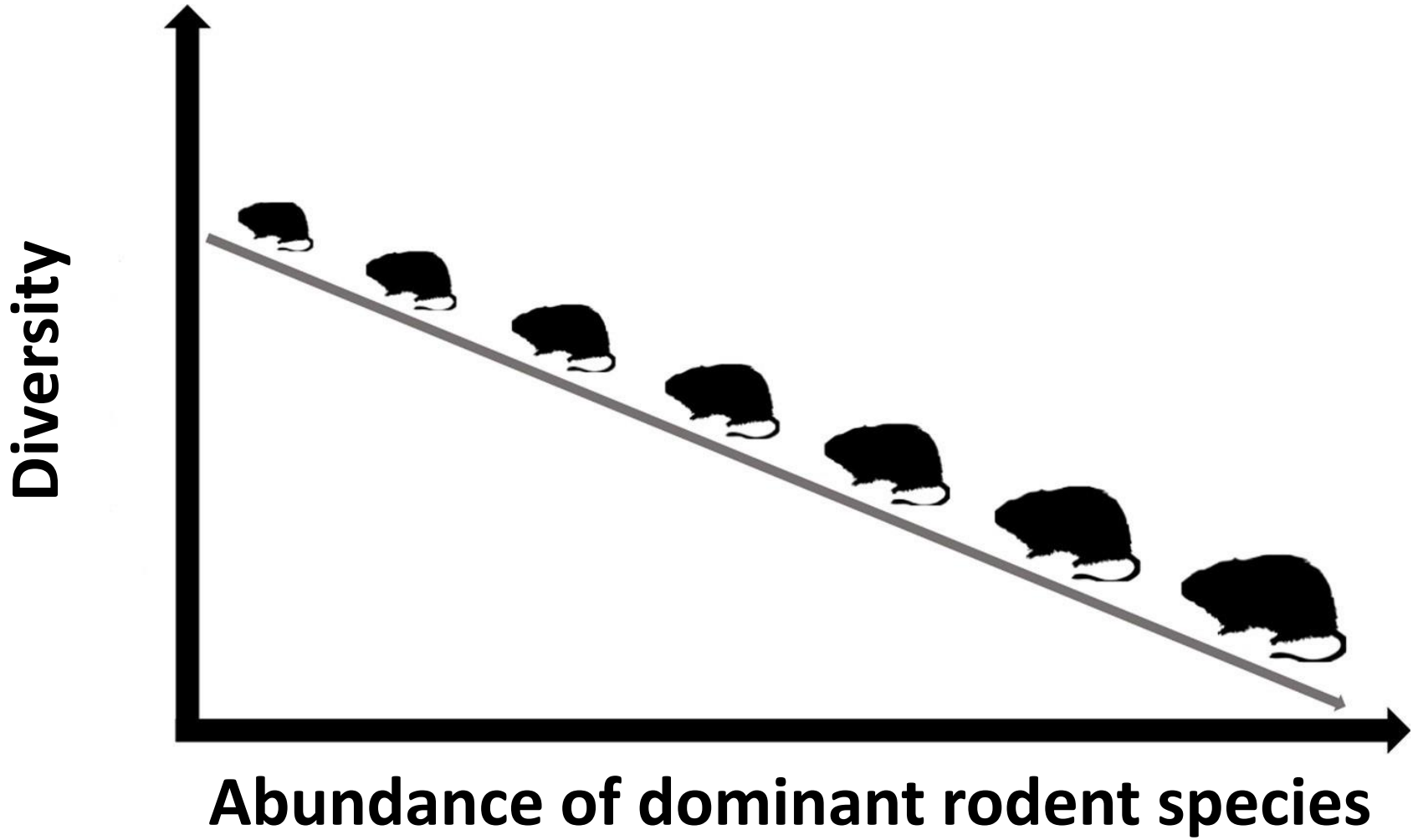
Avian predators

Labuschagne et al. (2016)

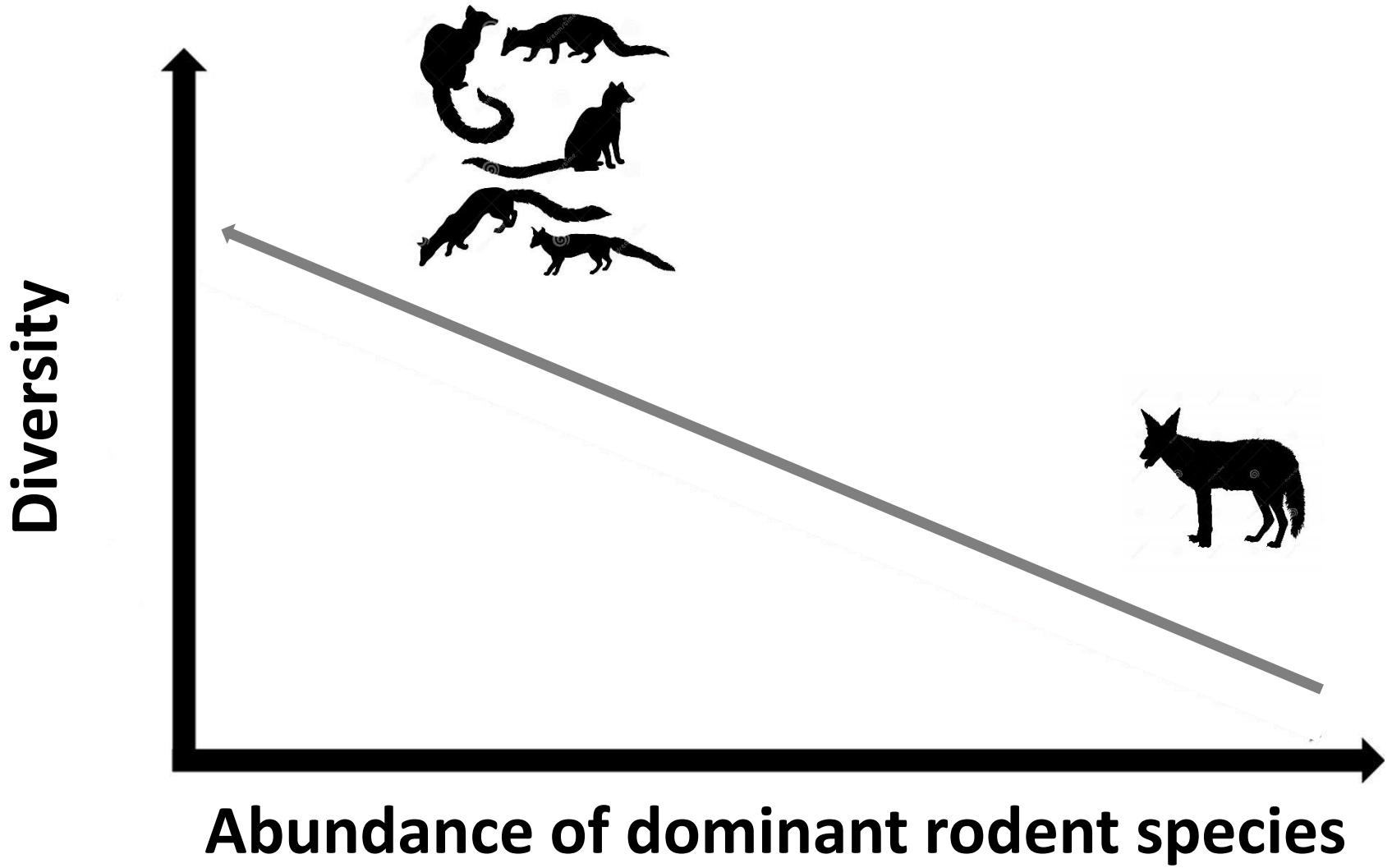
Aim of study

Identify impact of mesocarnivores on rodent community in an agroecosystem landscape

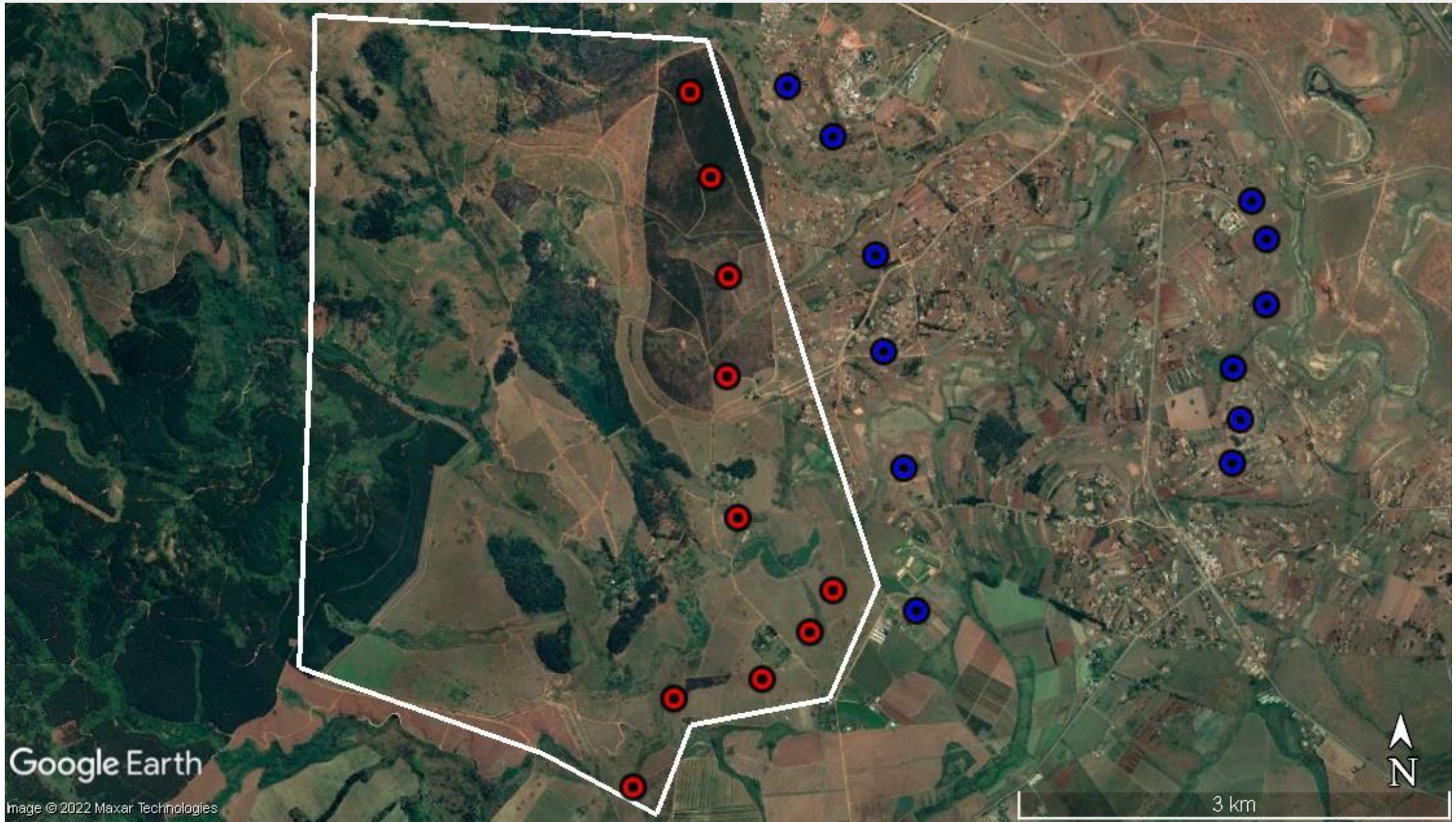
1st prediction



2nd prediction

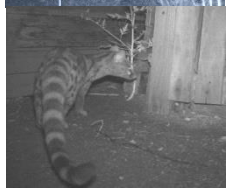


Study site: Mlilwane Game Reserve



Rodent and mesocarnivore sampling

Mesocarnivore community

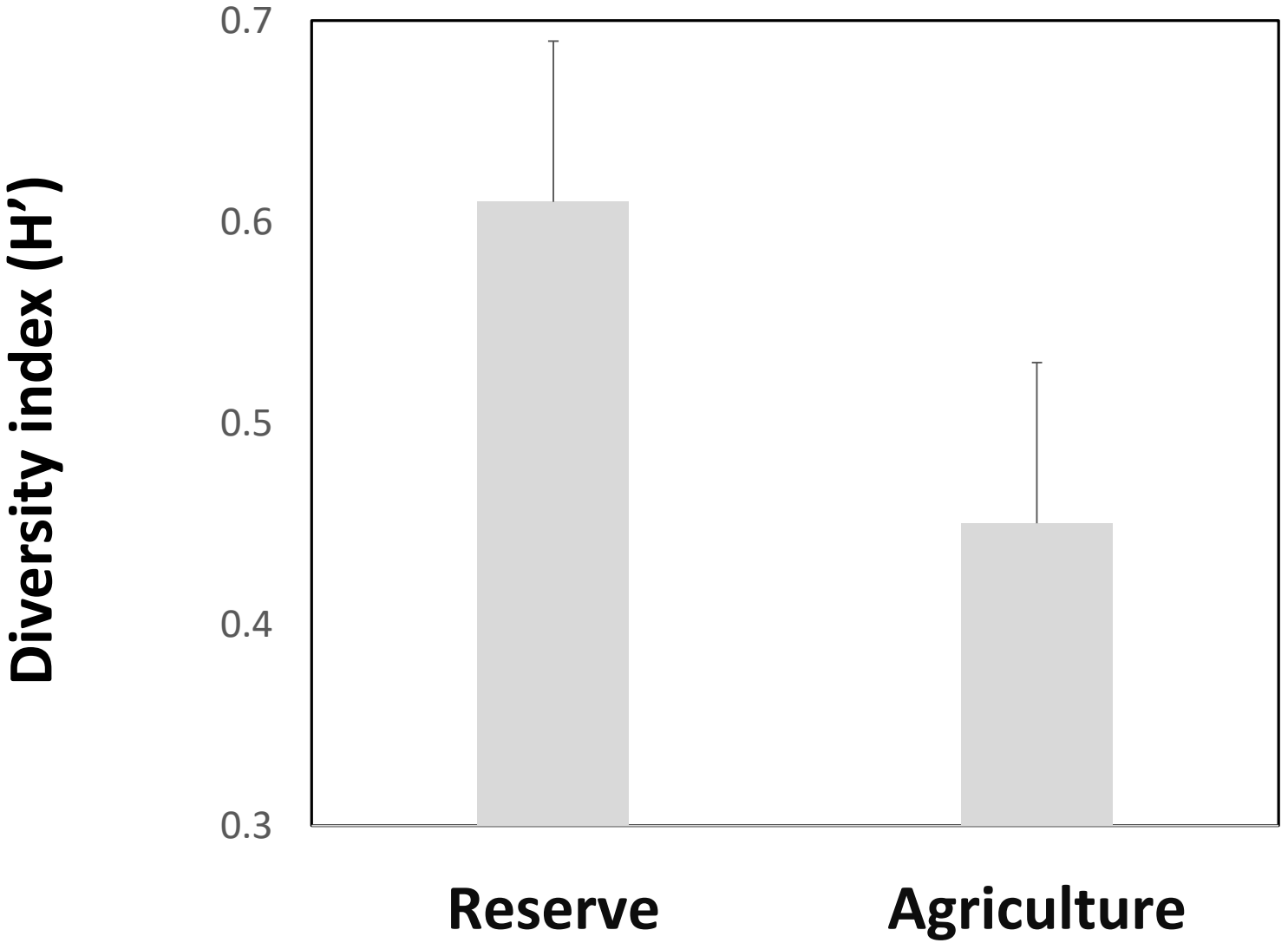
Species		Reserve	Agriculture
Leptailurus serval		12	0
Canis adustus		6	0
Canis mesomelas		2	0
Civettictis civetta		1	0
Genetta maculata		0	1

Rodent community

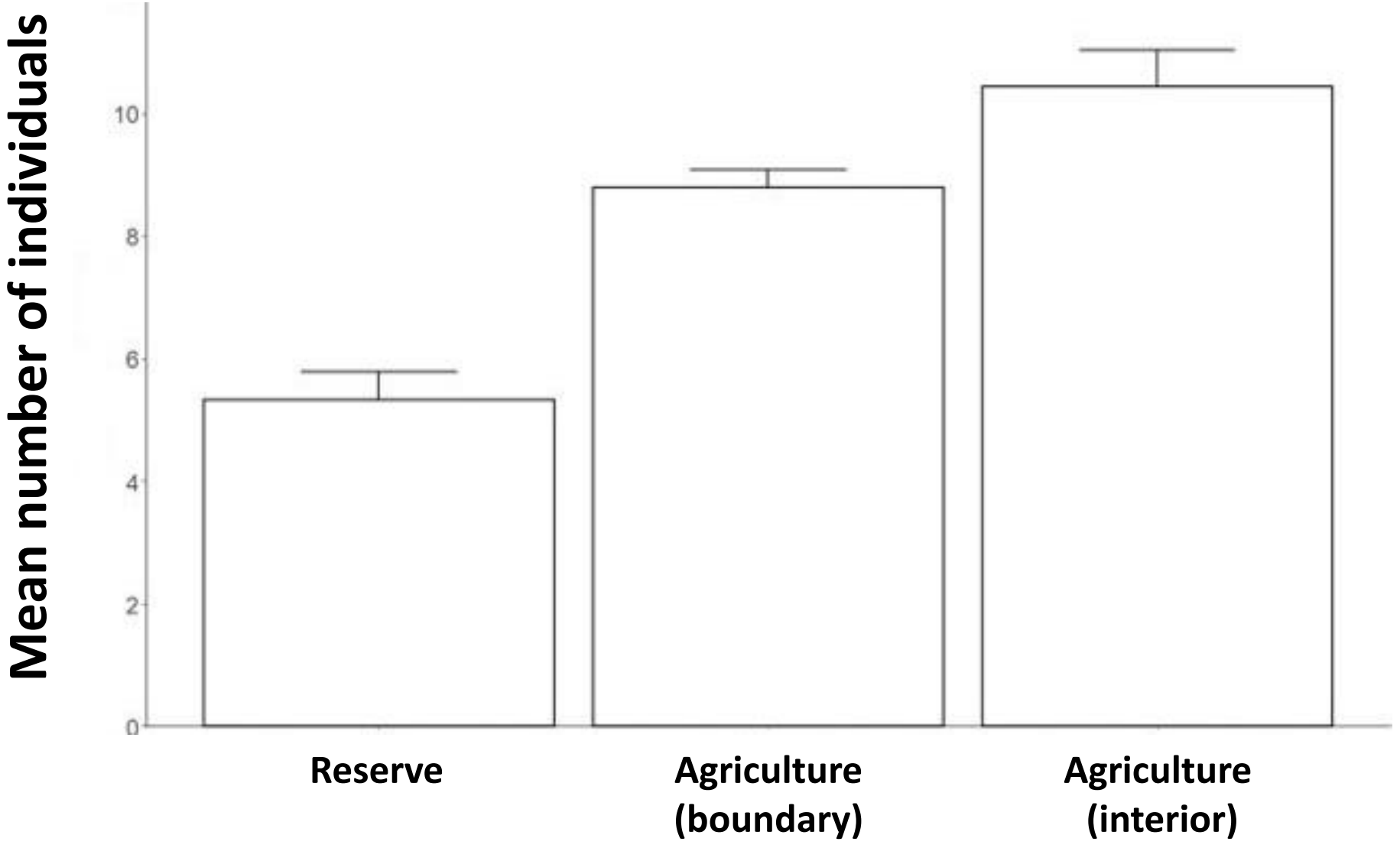
Species	Reserve	Agriculture	Total
Mastomys natalensis	30	111	141
Otomys angoniensis			12
Rattus rattus	0	12	12
Lemniscomys rosalia	6	5	11
Dendromus mesomelas	4	1	5
Crocidura mariquensis	4	0	4
Mus minutoides	0	3	3
Rhabdomys chakae	1	1	2

Dominant species

Rodent species diversity



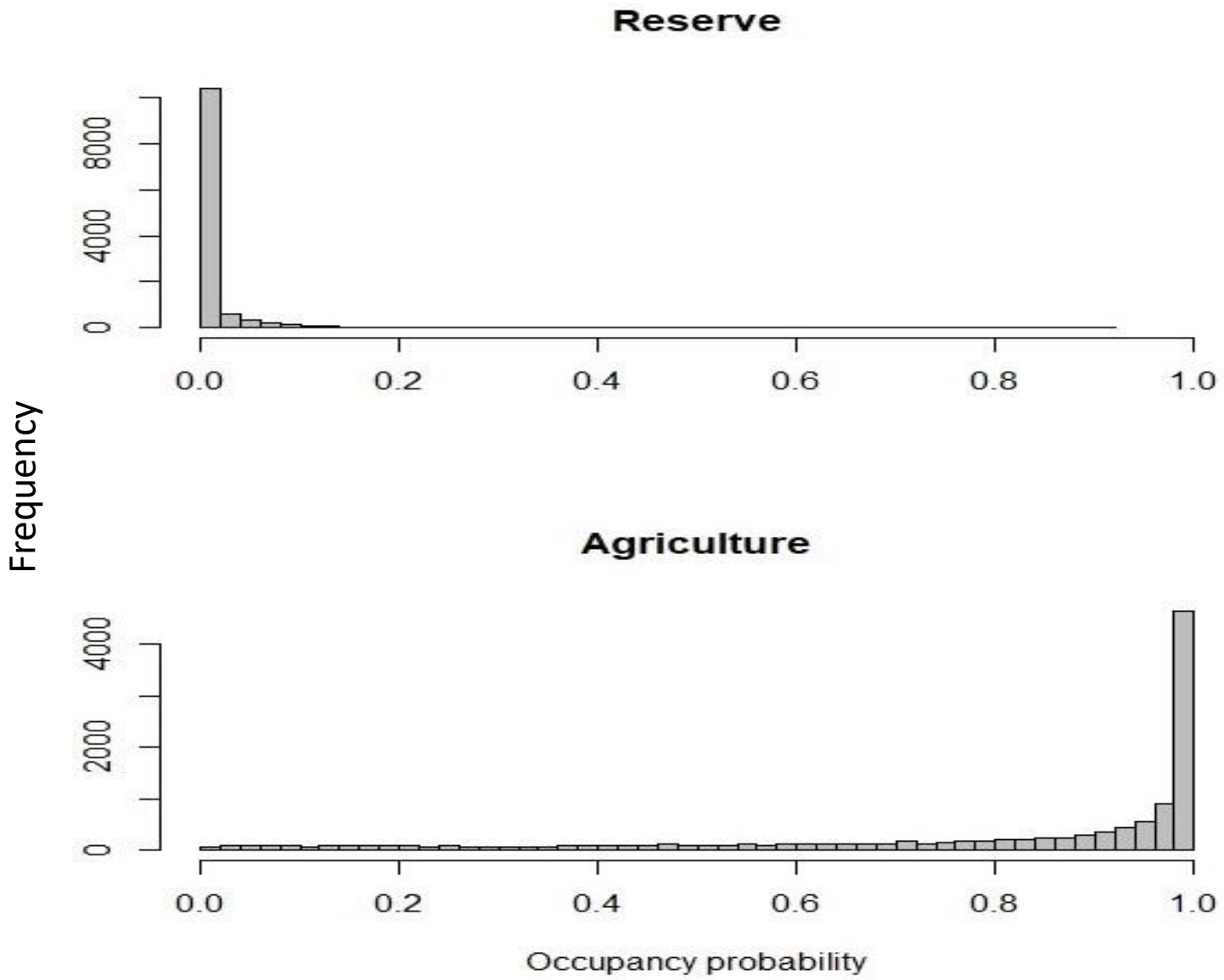
Abundance of dominant species *Mastomys natalensis*



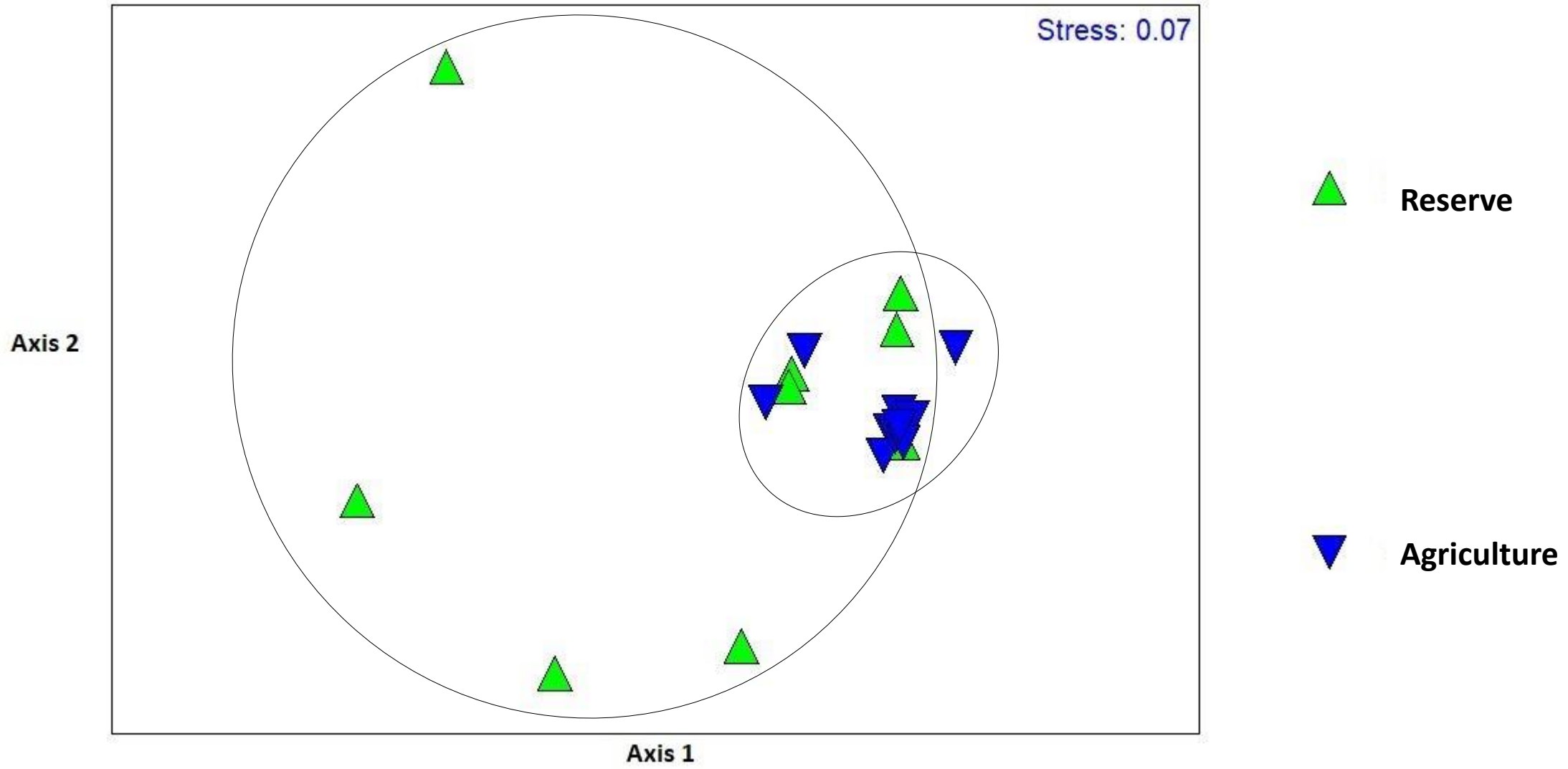
Rodent species occupancy

Species	Occupancy (Ψ)	Detection (P)
Mastomys natalensis	0.911	0.665
Lemniscomys rosalia	0.704	0.093
Dendromus mesomelas	0.643	0.032
Mus minutoides	0.550	0.021
Rhabdomys chakae	0.320	0.110
Otomys angoniensis	0.256	0.228
Crocidura mariquensis	0.141	0.312
Rattus rattus	0.113	0.566

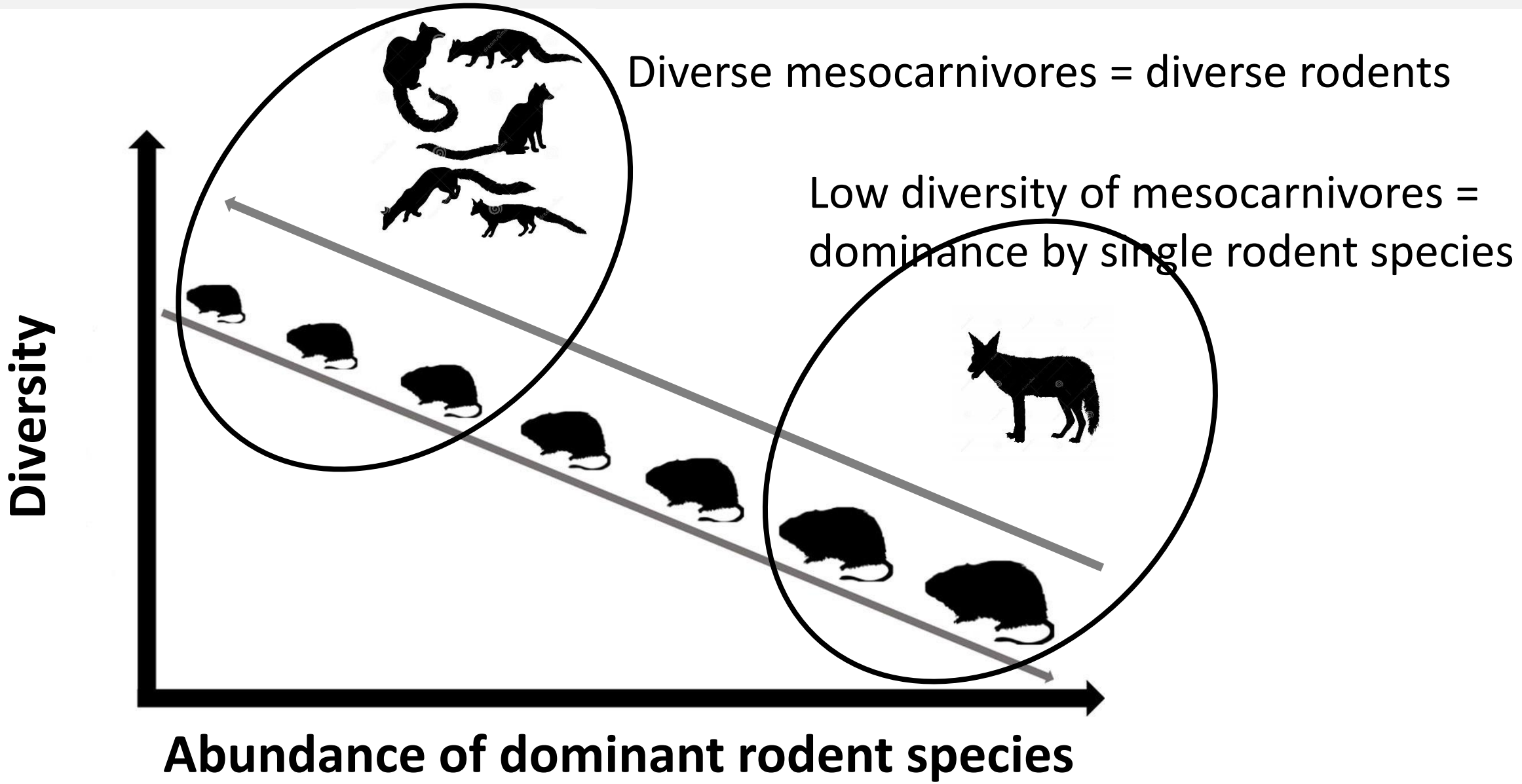
Mastomys natalensis occupancy



Rodent species composition



Conclusion



Diverse mesocarnivores = diverse rodents

Low diversity of mesocarnivores = dominance by single rodent species

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