

Biodiversity, Land Use Change, and Human Health: Evidence from Northeastern Madagascar

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OBJECTIVES

Our aim is to understand how zoonotic disease risk varies across landscapes in Madagascar. We investigated potential disease transmission among small mammals & people in human settlements, agricultural fields, & rainforests to investigate the following questions:

How does human land use affect small mammal communities?

How do changes in small mammal communities affect infectious disease risk?

How do social relationships among people facilitate disease transmission?

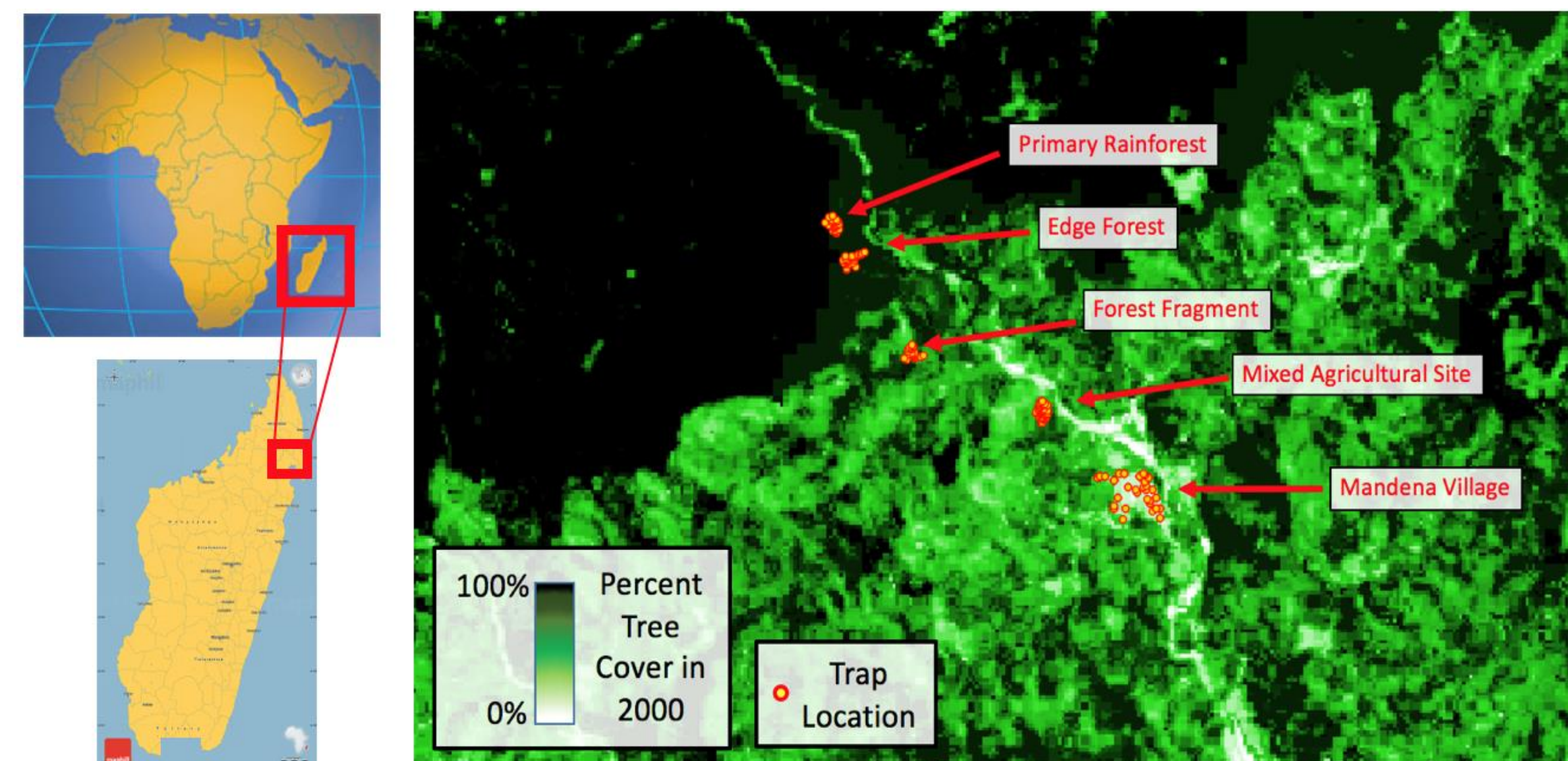
Predictions

We predict that increased intensity of human land use makes habitat unsuitable for endemic species, and more suitable for invasive species that live in close proximity to humans, such as rats and mice.

Fig 2. Social network of agricultural based relationships
Circles are men, triangles are women, size indicates the number of people with whom they practice agriculture, colors illustrate in which village they live, & arrows show who asks whom for help.

METHODOLOGY

Fig 1. Map of forest cover around 5 study sites



Socio-economic Surveys

Total interviews: 301

177 network surveys on working & social relationships

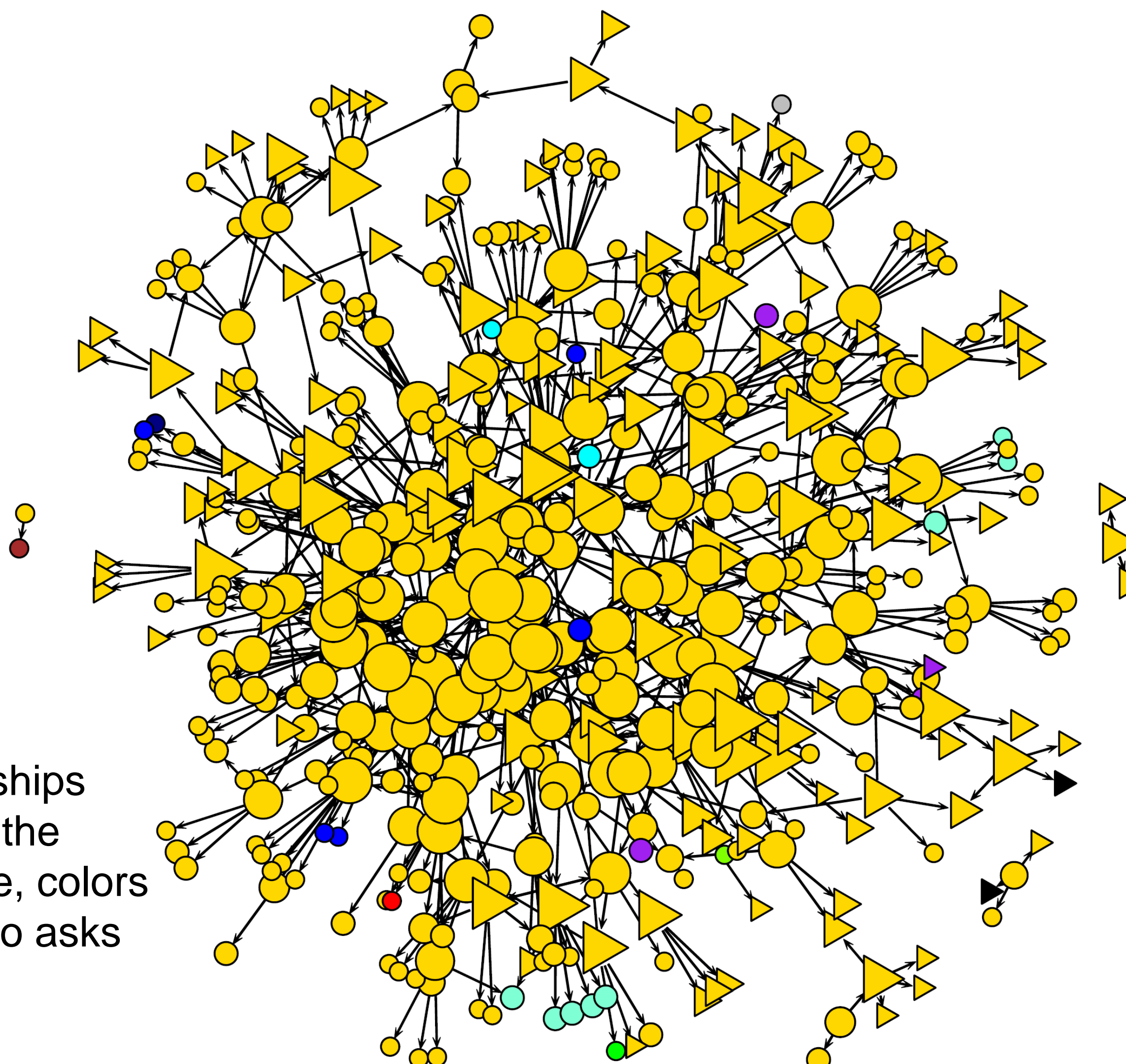
94 household surveys on agriculture and health

30 choice experiment surveys on vanilla incentive programs

Animal Sampling

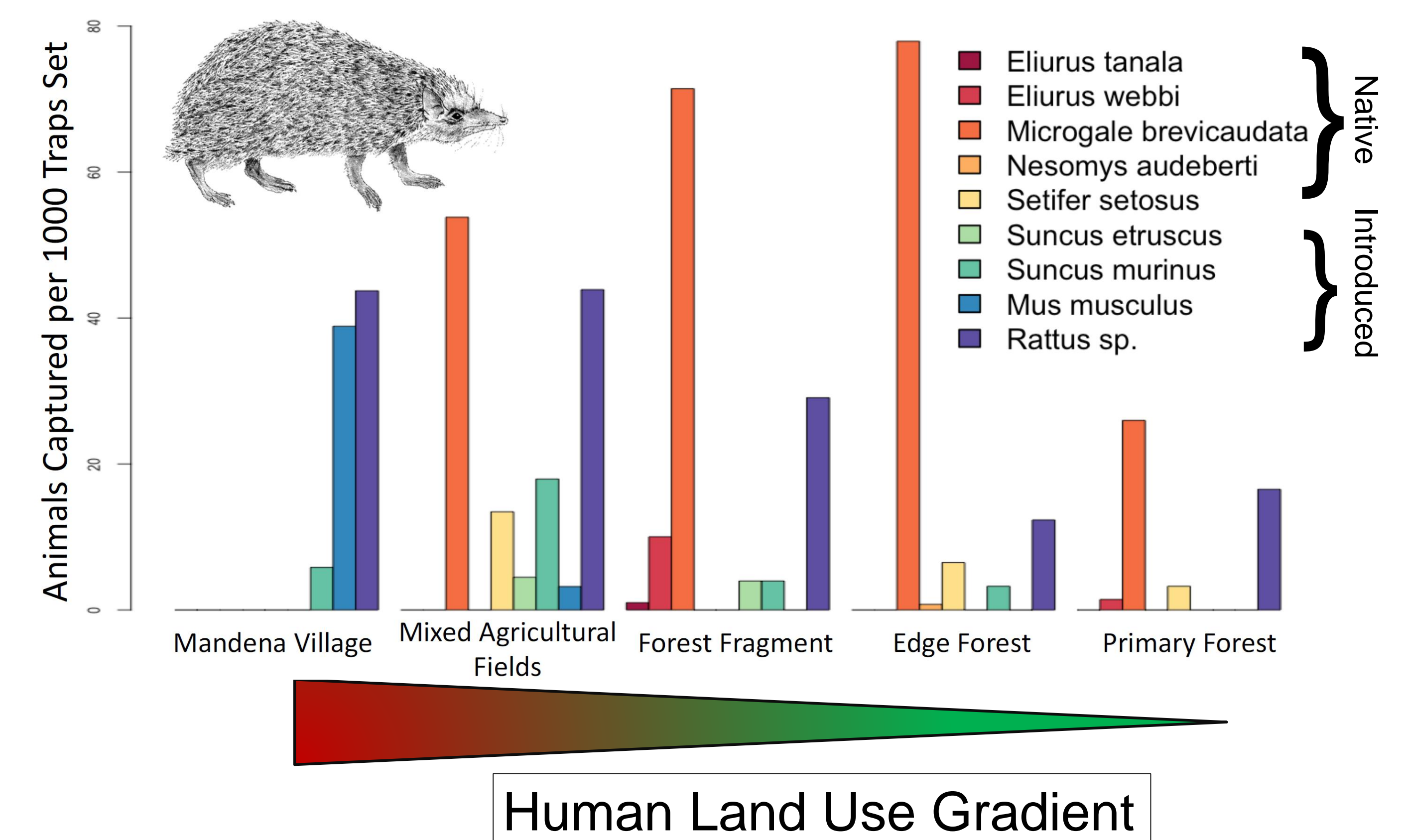
Capture effort: 6,739 traps set

Captured animals: 302 small mammals

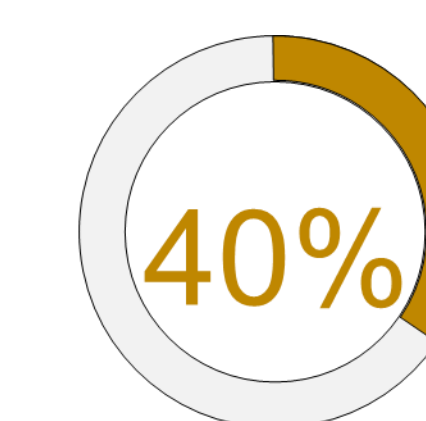


FINDINGS

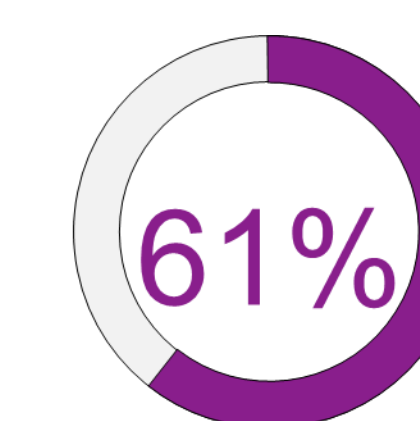
Fig 3. Small mammal diversity varies across habitat types



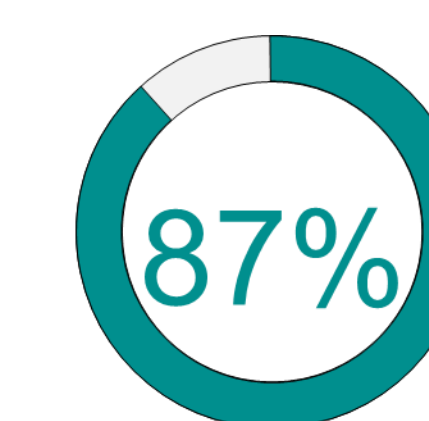
Health Concerns



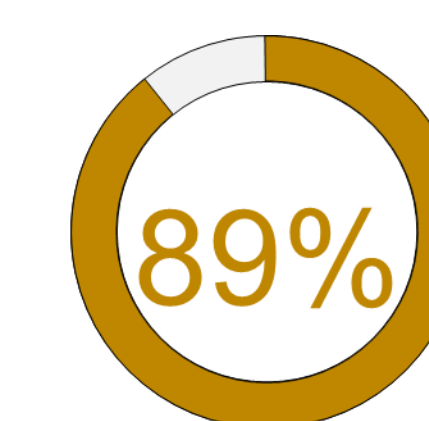
Fever in Past 3 months



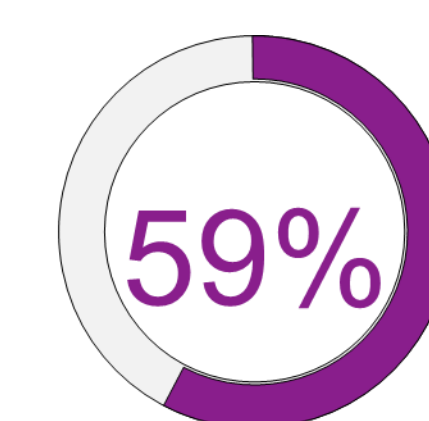
Had Fever & Sought Care



Financial Barrier to Healthcare



Physical Barrier to Healthcare



No Health Insurance

Future Directions

Use social & animal networks to model disease transmission.

Investigate socioeconomic & ecological drivers of infectious disease.

Plan interventions for animal & disease control, which include conservation measures.