

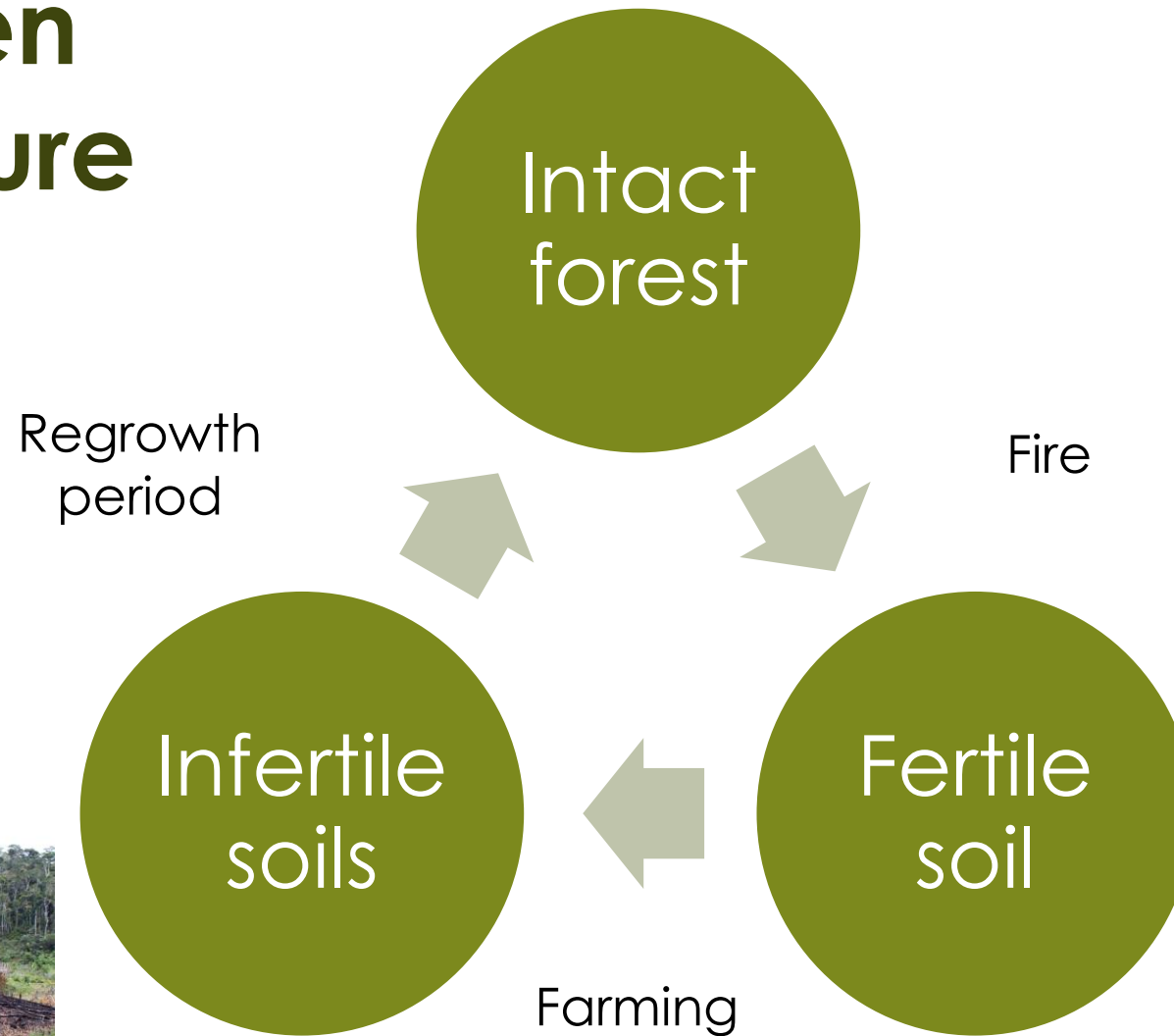
The effect of habitat degradation on earthworm communities in Madagascar

Maria Pestana Correia



Photo credit: Christopher Call Production

Swidden agriculture



Swidden agriculture



Photo credit: Chuan Zhao



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Photo credit: WWF Madagascar

Hypothesis

- Habitat degradation has a negative effect on earthworm abundance





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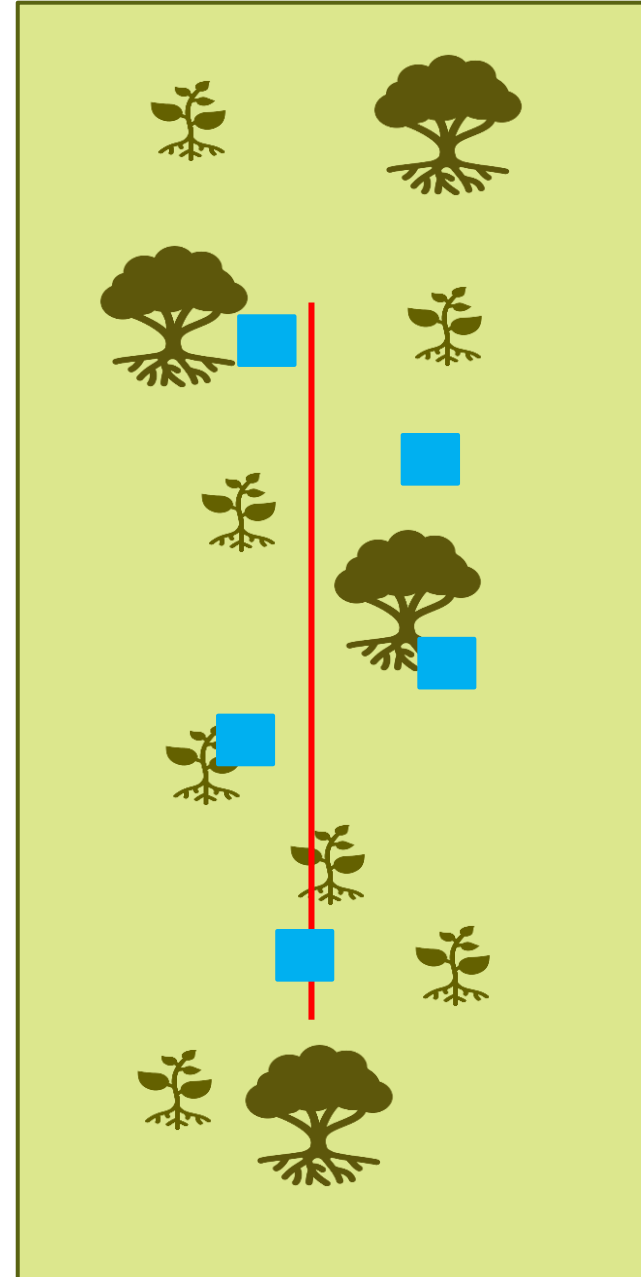
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- Field study in the Ankeniheny-Zahamena Corridor (CAZ)
- 47 transects
 - 100 m long



Methods

- In each transect
 - 5 randomly selected sampling points (10 x 10cm)
- In total, 5 main habitat types and 721 earthworms were collected



Methods

- GLM with negative binomial error distribution and log link function

Response variable

- Earthworm abundance

Main explanatory variable of interest

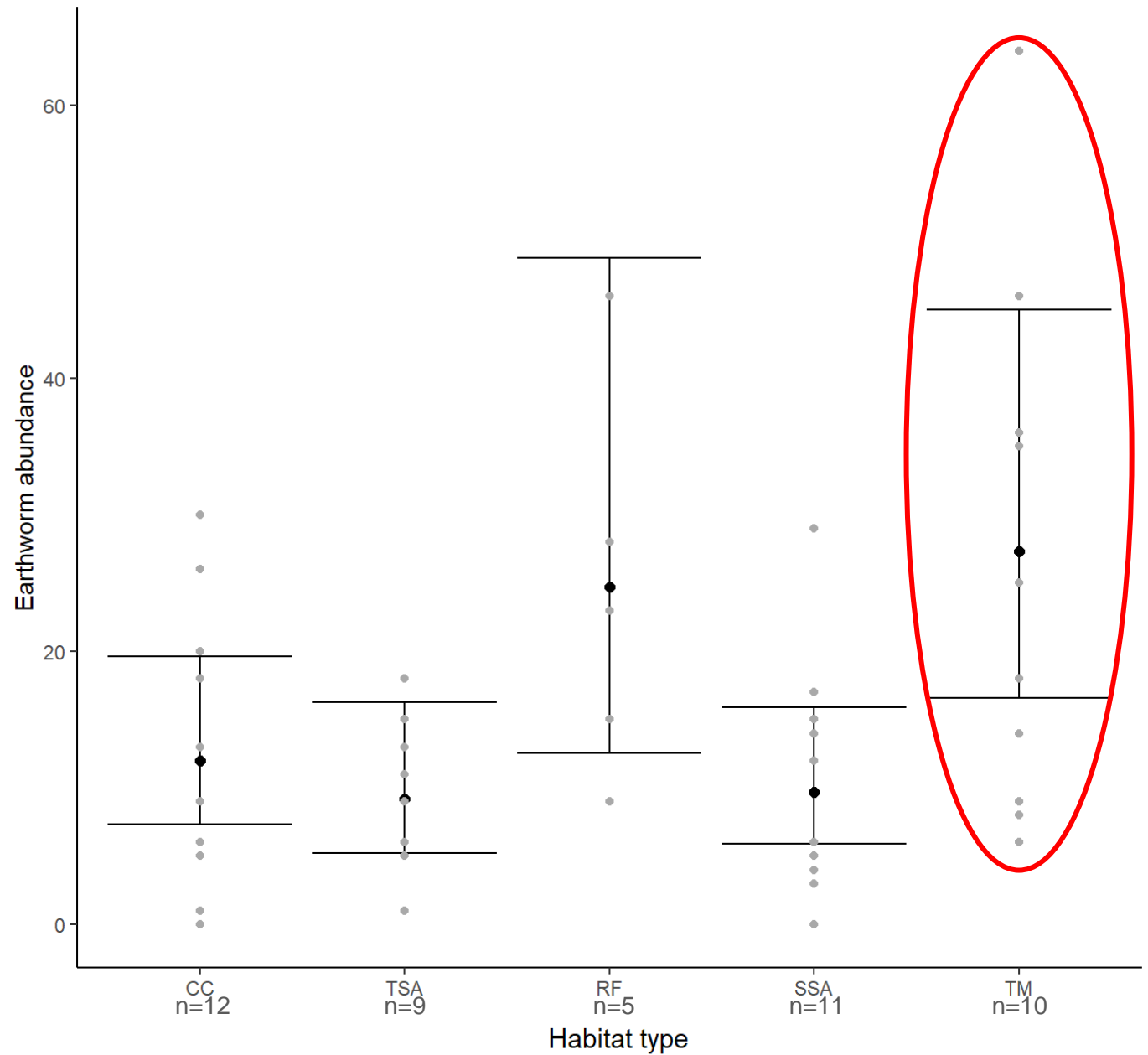
- Habitat type

Covariates

- Soil porosity
- Bulk density
- Saturated hydraulic conductivity

Results

- Earthworm abundance
 - Higher in reforested and degraded habitats
- GLM: Only significant in degraded agricultural land ($p=0.02$)



Why?

- Degraded agricultural land
 - Less competition in degraded areas
 - In Madagascar, 41% of earthworm species are invasive
 - Abundance may not be the most appropriate measure
 - Higher abundance but potentially lower species richness



Future studies

- Larger sample size
- Earthworm species richness or functional diversity
- Other environmental variables
 - Humidity
 - Soil nutrient availability



References

- Andriamanananjara, A., Hewson, J., Razakamanarivo, H., Andrisoa, R., Ranaivoson, N., Ramboatiana, N., Razafindrakoto, M., Ramifehiarivo, N., Razafimanantsoa, M., Rabeharisoa, L., Ramananantoandro, T., Rasolohery, A., Rabetokotany, N., Razafimbelo, T., 2016. Land cover impacts on aboveground and soil carbon stocks in Malagasy rainforest. *Agriculture, Ecosystems and Environment*, 233(7):1-15.
- Finch, E, Rajoelison, E., Hamer, M., Caruso, T., Farnsworth, K., Fisher, B. & Cameron, A., 2022. The effect of swidden agriculture on ant communities in Madagascar. *Biological Conservation*, 265: 1-8.
- Razafindrakoto, M., Csuzdi, C., Blanchart, E., 2011. New and Little Known Giant Earthworms from Madagascar (Oligochaeta: Kynotidae). *African Invertebrates*, 52(2): 285-294.
- Zwartendijk, B., Meerveld, H., Ghimire, C., Bruijnzeel, L., Ravelona, M., Jones, J., 2017. Rebuilding soil hydrological functioning after swidden agriculture in eastern Madagascar. *Agriculture, Ecosystems and Environment*, 239: 101-111.