Phylogenetic diversity of herbaceous plants community and alien plant dominance within vanilla landscapes in NE Madagascar

❖Background:

- Madagascar: center of vascular plants diversity in the world but plant biodiversity within human dominated landscapes remains understudied

- Phylogenetic diversity and alien plants dominance poorly used for conservation value evaluation

❖Statistical model question

What is the influence of land-use intensity on the phylogenetic structure of herbaceous plants community within vanilla landscapes in Madagascar?

❖Dynamical model question:

How does the dominance of alien plant species influence the density of native species within vanilla landscapes in Madagascar?

Acknowledgement: *Cara, Christian, Tanjona, Andres, Fara, Sarah, Sylviane Miharisoa, Laurence and Marie Rolande*

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What is the influence of land-use intensity on the phylogenetic structure of herbaceous plants community within vanilla landscapes in Madagascar?

Explanatory variable: Land-use types (LUT)

Response variable: Mean Pairwise Distance between species (MPD)

Data type: continuous variable with negative and positive values

Family: Gaussian

R code: lm (MPD ~ LUT, data=my.data)

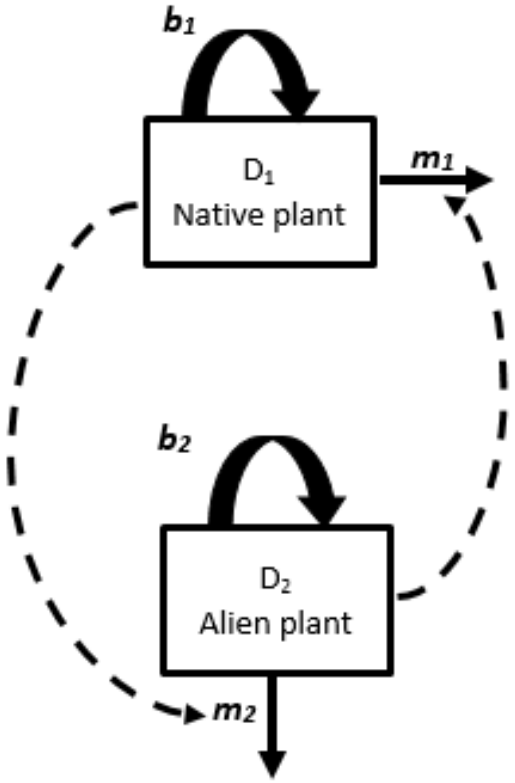
Hypothesis:

We hypothesize that the MPD will decrease when the intensity of land-use is increasing

Data summary:

- 12 sites, 7 Land-use types, 80 plots
- Phylogenetic tree of all assessed species
- Mean Pairwise Distance between species in each plot

How does the dominance of alien plant species influence the density of native species within vanilla landscapes in Madagascar?



States:

D_1: density of native plant
D_2: density of alien plant

Processes:

m_1: mortality rate of native plant
m_2: mortality rate of alien plant

b_1: germination rate of native plant
b_2: germination rate of alien plant

$$\frac{dD_1}{dt} = b_1D_1 - m_1D_1D_2$$

$$\frac{dD_2}{dt} = b_2D_2 - m_2D_2D_1$$

Next steps:

❖Add other parameters into my model to understand what ecological factors drive the change of phylogenetic structure of herbaceous plant community (Canopy closure, forest cover, soil quality, Alien plant cover)

❖ Use another response or dependent variable (MNTD) to draw more consistent conclusion on phylogenetic homogenization of herbaceous plant community

❖Understand what factors influence the invasiveness of alien plant