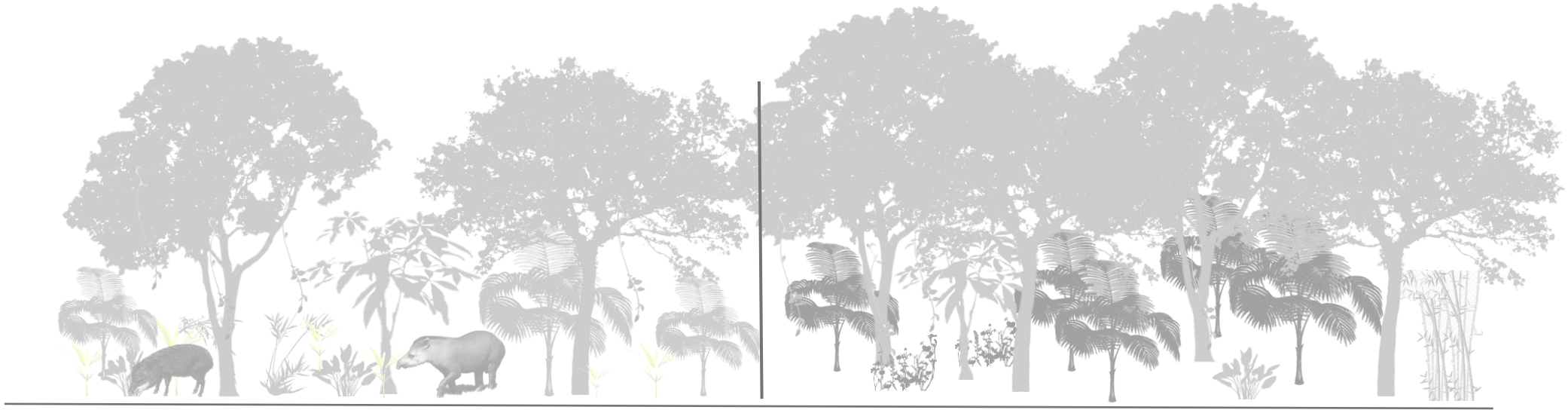
Do medium and large herbivores affect plant community dynamics in a tropical rainforest?

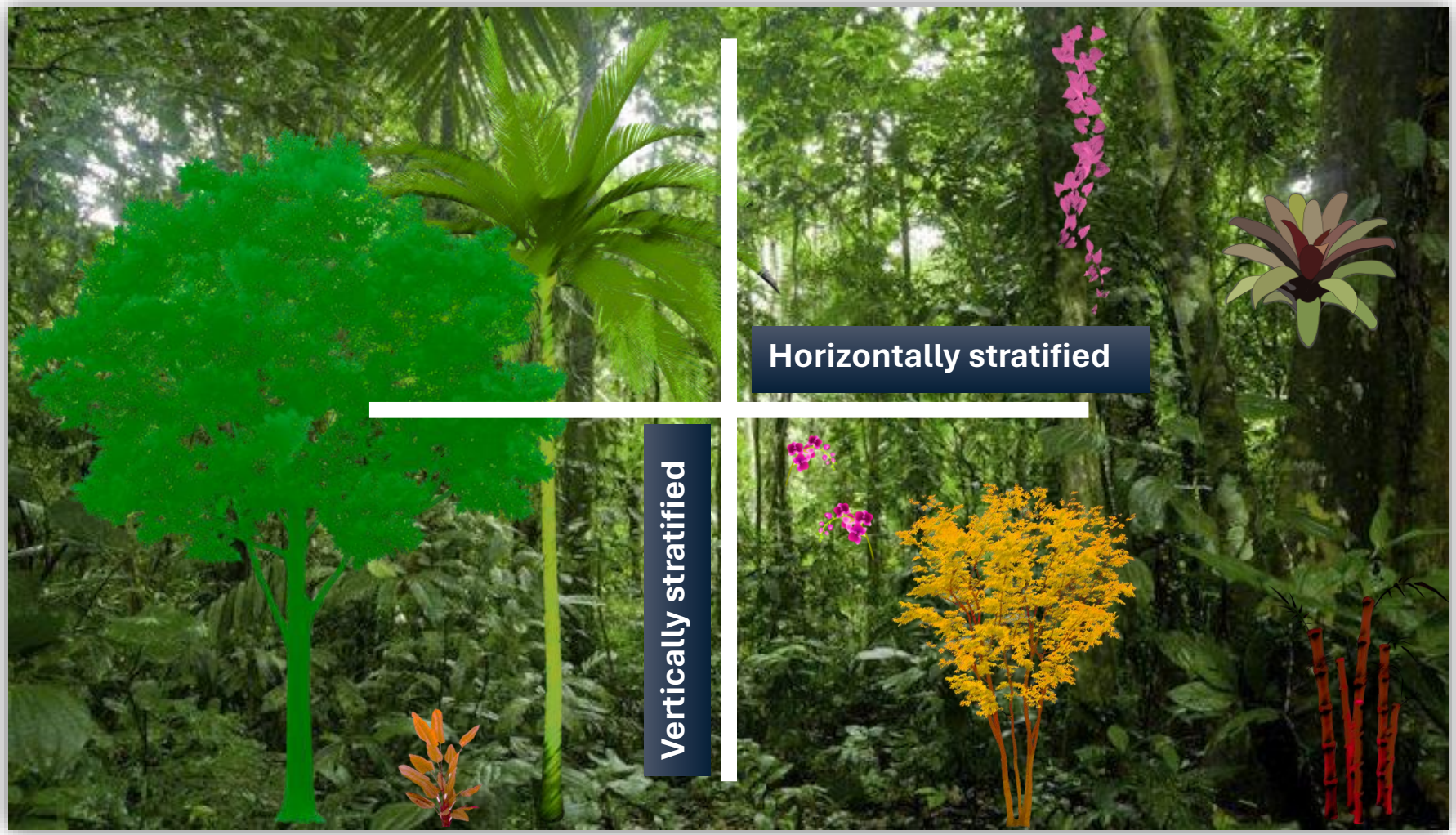


Yuri Souza

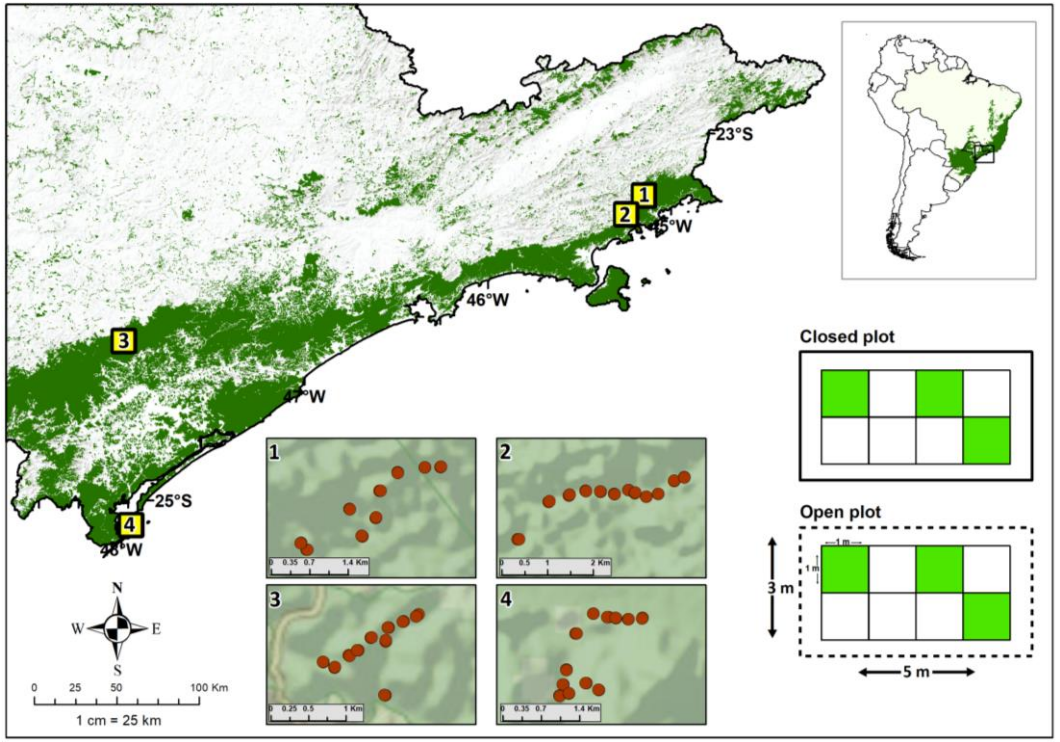
Exam 3: PCB-5443/2024

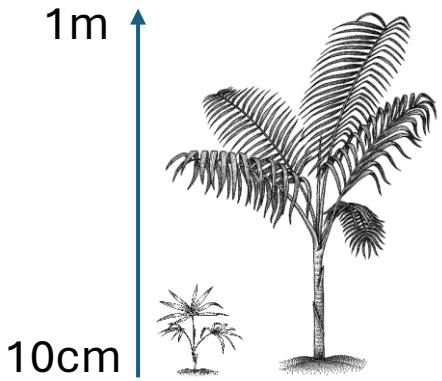
Medium and large terrestrial mammals shape tropical forests through herbivory and frugivory

Antagonistic vs Mutualistic

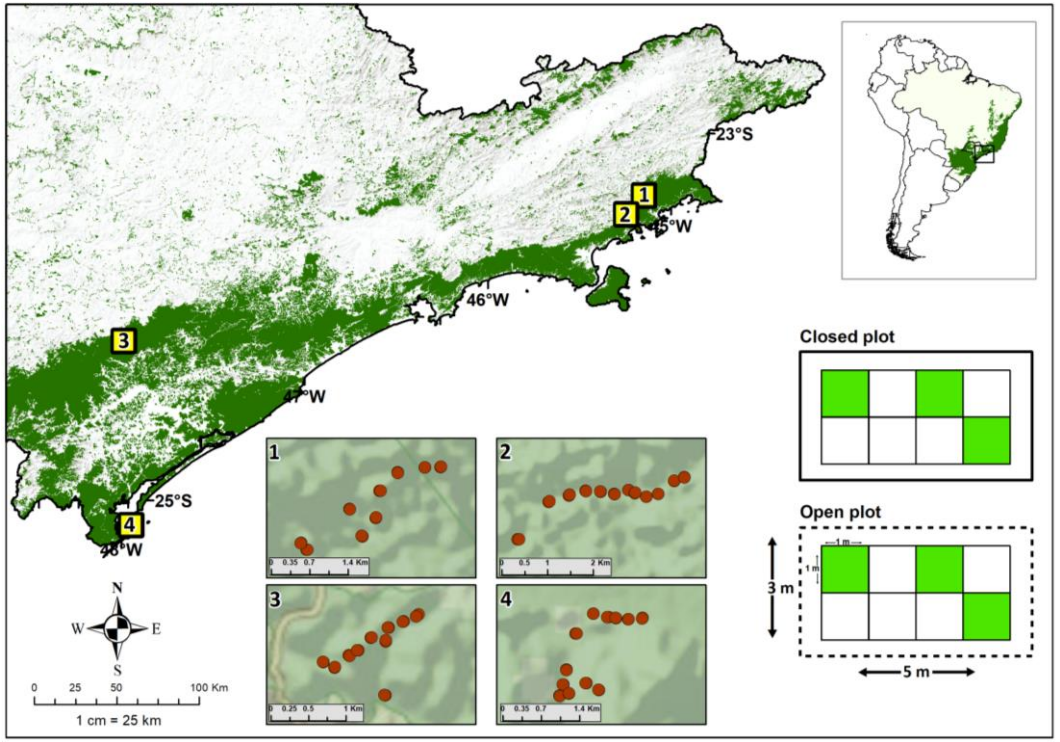


Exclusion Plots





Exclusion Plots



Response Variables

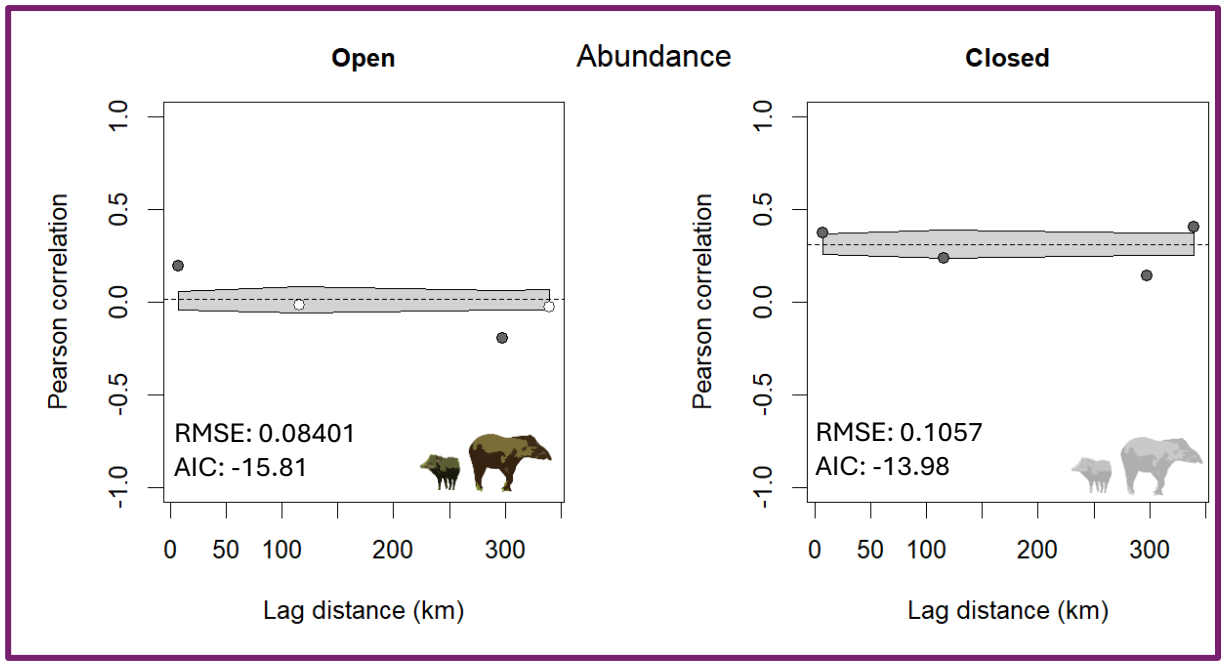
- Abundance;
- Inverse Simpson Diversity Index;

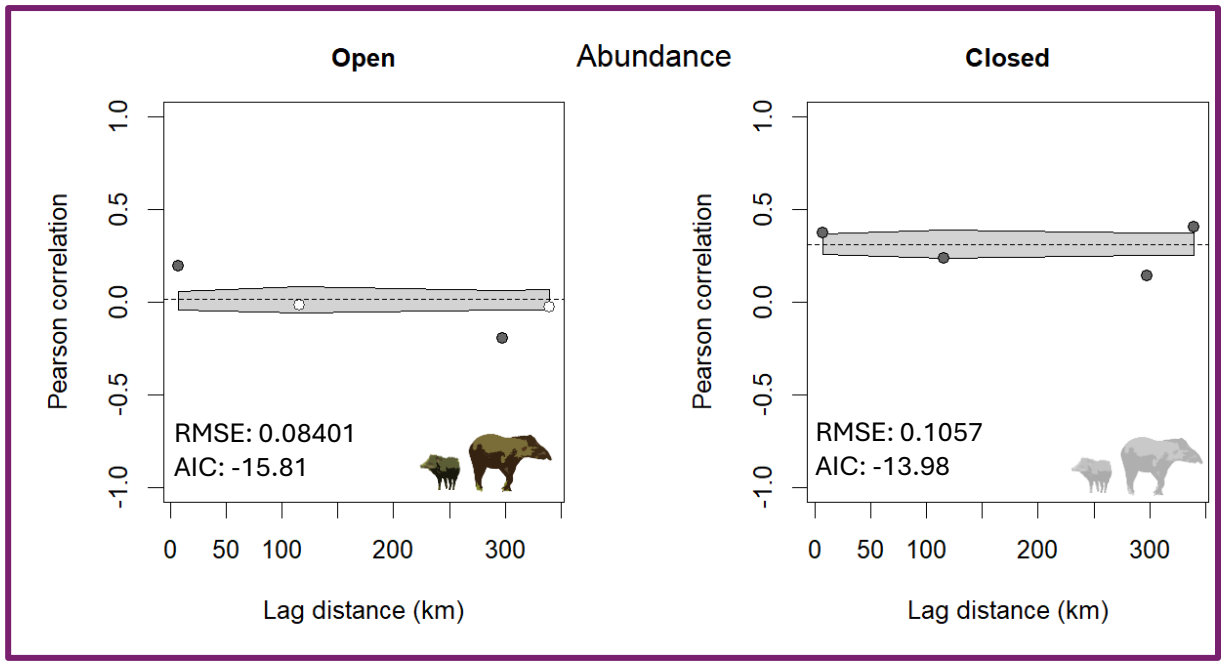
Predictor

- Treatment (*Open* vs *Closed*);

Model

- ***Synchrony analysis***: Quantify spatial and temporal patterns using Monte Carlo randomizations;


Abundance
Open
Closed
Pearson correlation
1.0
0.5
0.0
-0.5
-1.0
RMSE: 0.08401
AIC: -15.81
RMSE: 0.1057
AIC: -13.98
0
50
100
200
300
Lag distance (km)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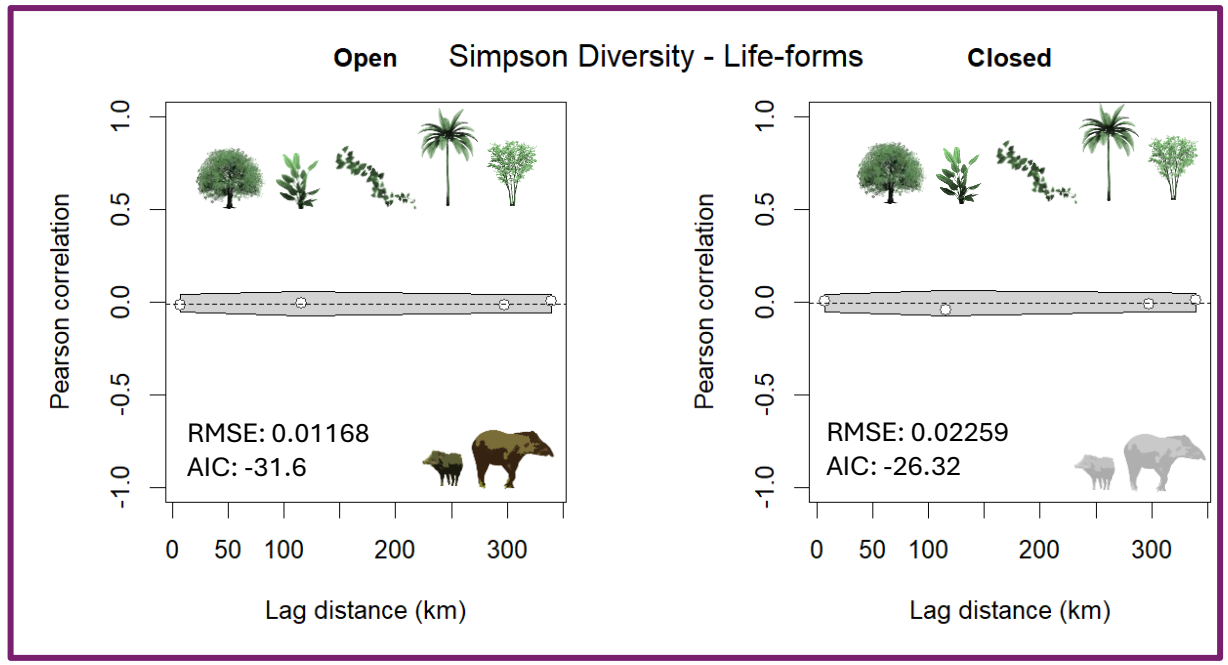
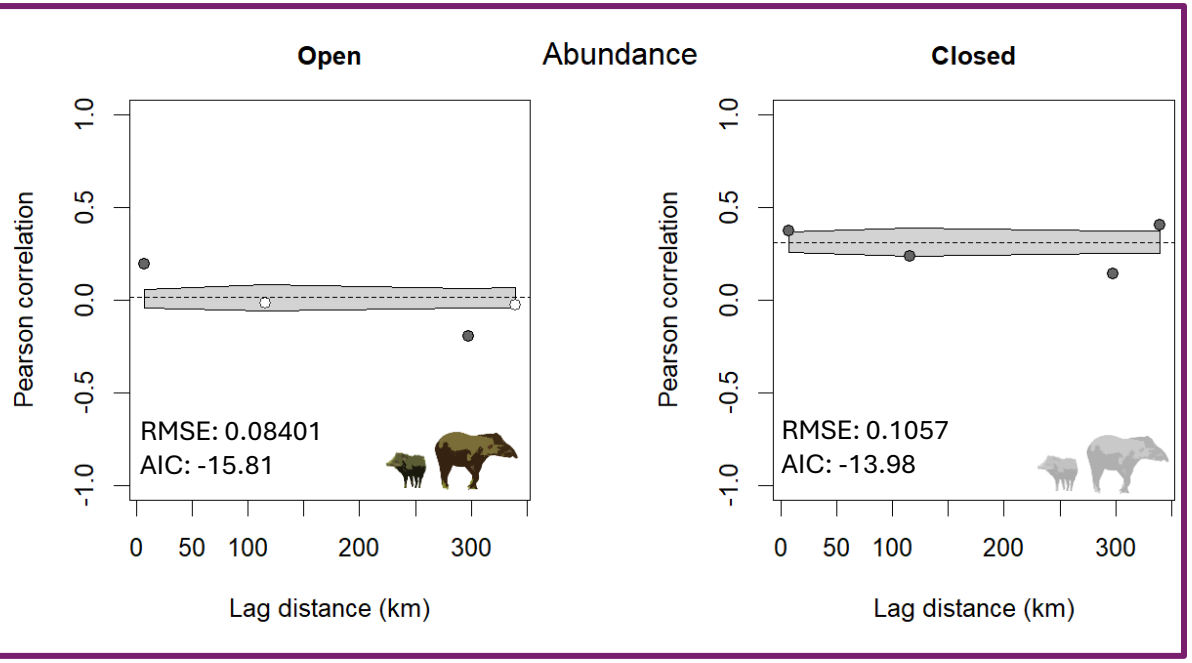
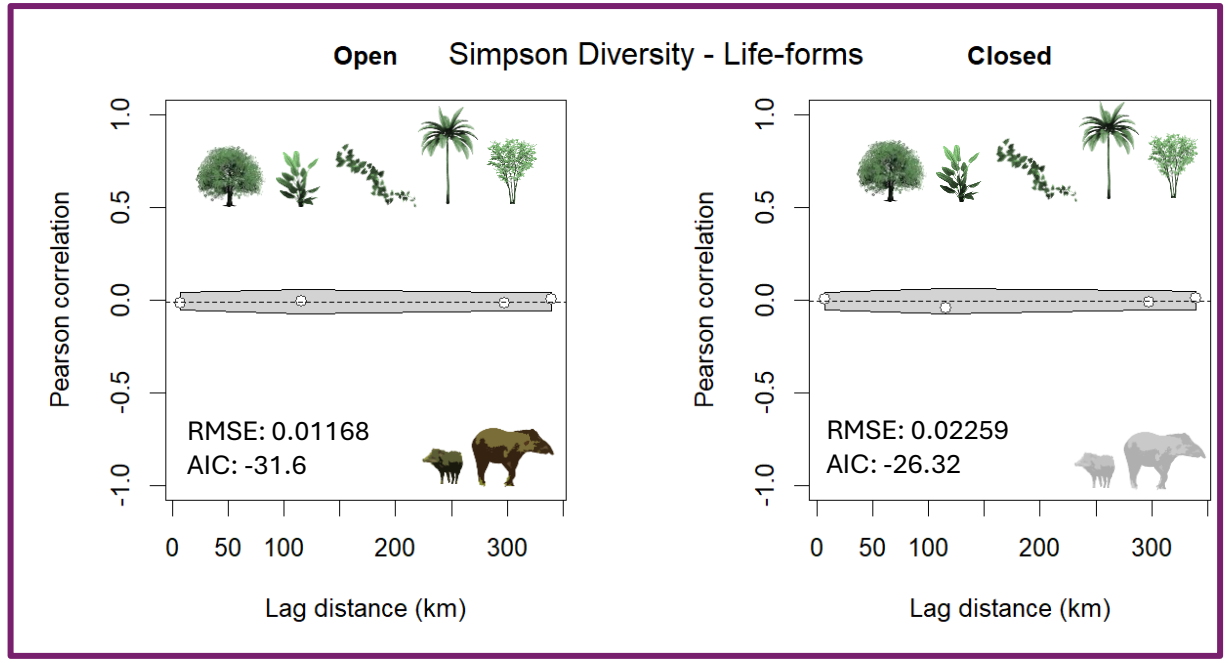
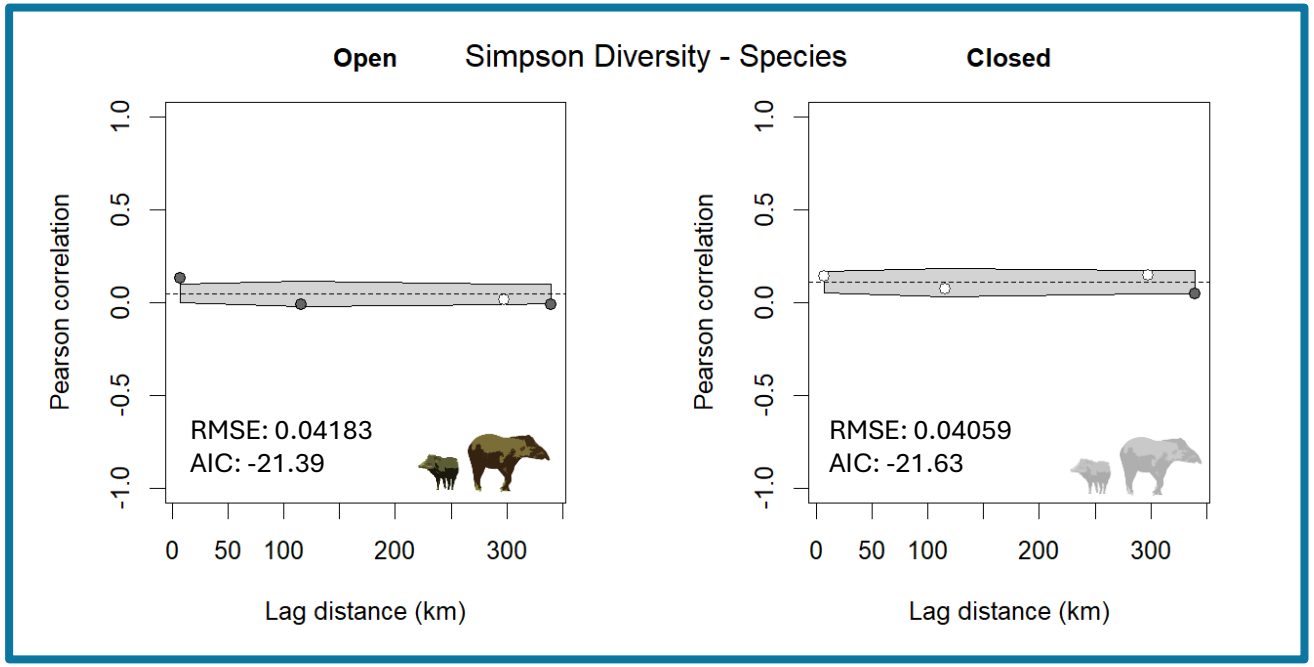
0
50
100
200
300
Lag distance (km)


Simpson Diversity - Life-forms
Open
Closed
Pearson correlation
1.0
0.5
0.0
-0.5
-1.0
RMSE: 0.01168
AIC: -31.6
RMSE: 0.02259
AIC: -26.32
0
50
100
200
300
Lag distance (km)


Abundance
Open
Closed
Pearson correlation
Lag distance (km)
RMSE: 0.08401
AIC: -15.81
RMSE: 0.1057
AIC: -13.98


Simpson Diversity - Life-forms
Open
Closed
Pearson correlation
Lag distance (km)
RMSE: 0.01168
AIC: -31.6
RMSE: 0.02259
AIC: -26.32

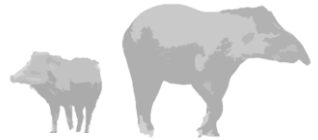

Simpson Diversity - Species
Open
Closed
Pearson correlation
Lag distance (km)
RMSE: 0.04183
AIC: -21.39
RMSE: 0.04059
AIC: -21.63

Medium and large herbivores are essential for shaping plant community dynamics while maintaining spatial heterogeneity

Open

- Increase in heterogeneity by showing different abundance trajectories across space and time;
- Don’t change functional diversity, but change species diversity;
- Positive feedback effect related to abundance and species diversity.

Closed



- Homogenization trend across time and space;
- No changes in functional diversity;
- Negative change in species diversity, where defaunated plots became more similar over time and across space.

Next step: Looking at ontogeny and life history dynamics (recruitment, mortality, competition, density dependence)