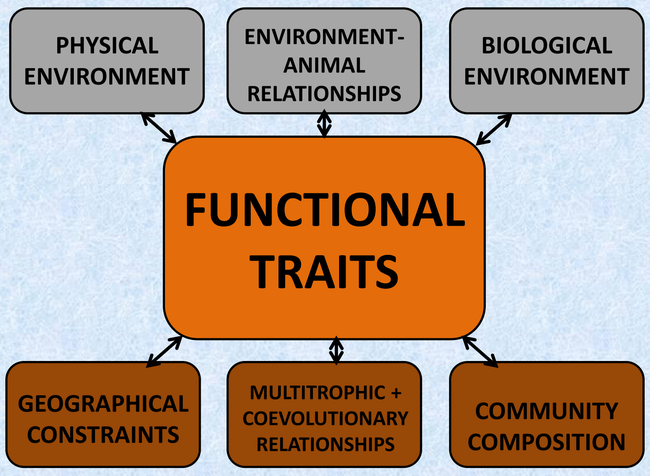
LOCAL DETERMINANTS OF ANT FUNCTIONAL DIVERSITY IN A FOREST FRAGMENT

R.S. PROBST[1,2], R.R. SILVA[3] & C.R.F. BRANDÃO[2]

[1]Graduate Program in Systematics, Animal Taxonomy and Biodiversity, Museu de Zoologia da Universidade de São Paulo/MZSP, **probstrodolfo@gmail.com**;

[2]Hymenoptera Laboratory - MZSP, São Paulo, SP, Brazil

[3]Coordenação de Ciências da Terra e Ecologia - Museu Paraense Emílio Goeldi, Belém, PA, Brazil



The functional trait approach is powerful tool for the development of quantitative and predictive models of community assembly rules. Patterns of morphological variation among species allow us to infer the relationship between morphology and ecology, while revealing a system combining ant resource related traits to environmental scales and/or conditions.

Material & Methods

We evaluated local determinants of ant morphological diversity in three vegetation types inside State Park of Xixová-Japuí (PEXJ), a 900ha Atlantic Forest fragment in Southeastern Brazil (Figure). We employed 60 pitfall traps set for seven days (summer and winter) along two transects of 100 meters per area, sampling points at each 10 meters, and recording thirteen ecological variables (see table on Variables) at each collection point.

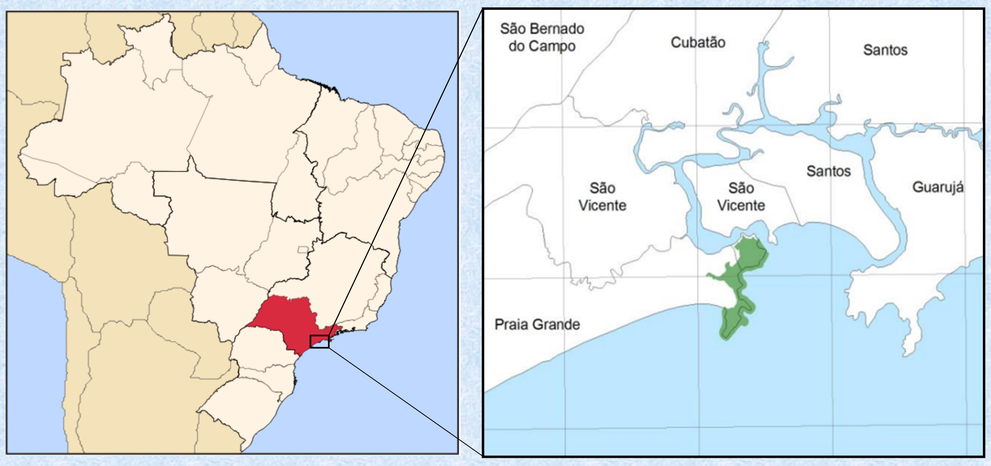


Figure. Left: Political map of Brazil, showing states boundaries. São Paulo State highlighted in red. Right: Zoom of São Paulo Southeast, showing in green the area covered by the present study (PEXJ).

We quantified the influence of the measured variables on richness and composition of communities and the relationship among resources and environment variables. We used GLMMs, LMEs and GAMMs to test the relationship between species richness, morphological diversity and environmental variables (accounting for spatial and temporal correlation). We selected as predictors of ant diversity the following variables in the analyses:

Richness (taxonomic or morphological) ~ litter + temperature + number of herbs + tree distance + soil slope + soil pH

We analyzed summer /winter datasets together to a general model to our study.

11 morphological measures of species workers

Up to 06 individuals of all species → morphological diversity in each sample.

CHARACTER	MEASURE
Mandible size	Mandible width (MW)
Head appendages	Scape length (SL)
Clypeus	Clypeus length (CL)
Eye size	Eye length (EL)
Eye position	Distance of eye to mandible insertion (DEM) Interocular distance (ID)
Leg length	Hind femur length (FL)
Petiole size	Petiole height (PeH) Petiole length (PeL)
Mesossoma	Weber's length (WL)
Gaster	First gastric segment width (FGSW)

Morphological diversity:

1. **PD**: functional diversity (Petchey & Gaston);
2. **MPD**: mean pairwise distance;
3. **MNTD**: mean nearest taxon distance

VARIABLES	
Litter depht (mean of 5 measurements)	Twigs: number, lenght and diameter
Soil: pH, saturation, and slope	Herbs: number and distance of closer herb to trap
Relative humidity	Temperature
Tree: diameter at breast size and distance of closer tree to trap	

Results

Eighty two ant species belonging to seven subfamilies (29 genera) were collected (65 in the summer and 55 in winter).

We found **no** significant relationships between Richness and the predictors. **PD** was better explained by **Number of Herbs** ($p=0.06$), **MPD** and **MNTD** by temperature ($p<0.05$).

Conclusion

Interestingly, we found that different variables at **microscale** affect differently the **ant functional diversity**, depending on the adopted functional metric (**PD, MPD or MNTD**).