Summary

Introduction

Functional Ecology → Functional Traits

From Hutchinson definition of niche (Hutchinson, 1957), Violle and Jiang (2009) extended the definition to a multi-dimensional volume, called the "functional space". In such a space an individual is defined by all the values of its traits, each one on a distinct axis; a species functional space would then be the average of trait values of all individuals of the species.

Importance of all axes to have good view of ecological strategies

Diameter Growth & Tropical Forests → French Guiana Context

Several growth models created, used → estimate growth using measured traits

Generally consider traits as specific, all individuals of the same species sharing an average trait

However, there is trait variability, intra-specific variability. What importance does it have? To what extent is it important to consider it?

Being different from mean species trait → importance?

Materials and Methods

Data Provenance

Growth Data

The nine plots used through this article, Guyafor network, plots, French Guiana, map. Several sites Longitudinal data.

Followed over tens of years. Diameters were measured at breast height (1.3m), during the following period we had Diameter at Breast Height (DBH) values for each tree.

Due to various inconsistency of followed year. Choose a common time period between plots. To estimate Annual Growth Rate (AGR), we regressed DBH over years, taking the slope of the regression as the AGR.

Trait Data

Bridge database, traits measured in Baraloto, (Baraloto et al., 2010a,b). Selected traits from wood and leaf spectrum economics.

Growth model

Linear mixed-model explaining annual growth rate. With plot and species random effect.

Extracted residuals from above model.

Data analysis

All data analyses were made using R Core Team (2015), plots were made with Wickham (2009). We fit mixed-models with "lme4" R package (Bates et al., 2014) and computed adapted R-squared (Nakagawa and Schielzeth, 2013) with "MuMIn" R package (Bartoń, 2015).

Results

Discussion

Authors Contributions and Acknowledgments

References

Baraloto, C., Timothy Paine, C. E., Patiño, S., Bonal, D., Hérault, B. and Chave, J. (2010a). Functional trait variation and sampling strategies in species-rich plant communities. Functional Ecology *24*, 208--216.

Baraloto, C., Timothy Paine, C. E., Poorter, L., Beauchene, J., Bonal, D., Domenach, A.-M., Hérault, B., Patiño, S., Roggy, J.-C. and Chave, J. (2010b). Decoupled leaf and stem economics in rain forest trees. Ecology Letters *13*, 1338--1347.

Bartoń, K. (2015). MuMIn: Multi-Model Inference. R package version 1.13.4.

Bates, D., Mächler, M., Bolker, B. and Walker, S. (2014). Fitting Linear Mixed-Effects Models using lme4. arXiv:1406.5823 [stat] .

Hutchinson, G. E. (1957). Concluding Remarks. Cold Spring Harb Symp Quant Biol *22*, 415--427.

Nakagawa, S. and Schielzeth, H. (2013). A general and simple method for obtaining R2 from generalized linear mixed-effects models. Methods Ecol Evol *4*, 133--142.

R Core Team (2015). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing Vienna, Austria.

Violle, C. and Jiang, L. (2009). Towards a trait-based quantification of species niche. J Plant Ecol *2*, 87--93.

Wickham, H. (2009). ggplot2: elegant graphics for data analysis. Springer New York.