Summary for a midi-veg discussion

An overview of my PhD project in Brazil and my first results.

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The trait-based ecology approach can be used to assess different aspects of biodiversity related to ecosystem functioning and reliability, i.e. functional diversity (FD, diversity of functional traits) and functional redundancy (FR, diversity of species performing similar functions in the ecosystem). I am interested to investigate in what extent FD and FR drive agroecosystem process and functions (e.g. soil cover by plants, weed suppression, crop production and litter mass).

- Here I would like to discuss what the group think about look at the Biodiversity from these two components.

In Brazil, an experiment using three different functional composition of crop plants has been conducted since 2016 in Florianópolis (southern part of Brazil), under agroforestry system management. We used Structural Equation Modeling (SEM) for testing causal models among crop FD, crop FR, weed FD, weed FR and soil cover (the other process and functions I have not analyzed yet).

Seven plant traits were used to determine Rao quadratic entropy index (a measure for FD): maximum plant height, leaf area, leaf nitrogen concentration, specific leaf area, stem specific density, clonality and nitrogen fixing. FR was determined as the difference between Gini-Simpson index and FD.

- Here we could discuss what the group think about the traits I have used.

First results:

We found that FR and FD contribute to soil cover in different ways. High FD of crops, which means more ecological niches occupied by crop plants, causes increase in soil cover by crops. High FR of crops, which means high species diversity with similar functional traits, causes decrease in soil cover by weeds. If we look to weed community, FR was the only component that direct affect the soil cover by weeds.

- I am wondering why FR was so important for weed community.

- In addition, if we consider that FD is a way to assess the complementarity effect, could we consider that FR is a way to assess selection effect?