**Notes from meeting 12 Feb 2025**

**Molly, Diego and Gretchen**

The points brought up by reviewers are in italics.

**Reviewer 1 comments**

*Disturbance leads to decreased modularity – need to clarify steps*

*How does the mechanism affect each of these and which indices represent that in a simple way.*

**Key paragraph in manuscript:**

These changes to the plant and pollinator assemblages, whether positive or negative, are reflected in the architecture of community interactions (Fig. 1). Past studies suggest that disturbances increase network generality (Peralta et al. 2017), nestedness (Memmott et al. 2004), and connectance (Brown et al. 2017), while they decrease modularity (Peralta et al. 2017). Lower levels of modularity may increase resistance to disturbance (Thébault & Fontaine, 2010), presumably because modularity increases as a result of decreased connectance and generality (Prado and Lewinsohn 2004, Olesen et al. 2007). In mutualistic networks, nested networks are thought to be more stable (Memmott et al., 2004; Okuyama & Holland, 2008; Thébault & Fontaine, 2010). This stability likely leads to higher resistance to disturbance as the communities are less likely to have secondary species extinctions after losing specialists. Disturbance also leads to increased connectance, as more generalized networks are inherently more connected. The more modular a network is, the less generalized and connected it is (Thébault & Fontaine, 2010). Therefore, disturbance leads to decreased modularity.

**Discussion at meeting**

**Generalization**

Influences connectance (*not true*)

Can use H2’ Blüthgen et al 2006 in bipartite package quantitative index to quanity degree of specialization (0-1 specialized) not as sensitive as connectance to sampling artifacts

**Nestedness**

Influences stability (*not true?*) and that influences resistance (*weak*)

Refers to location of interactions in interaction matrix, binary, property of interactions being concentrated in part of the matrix. Quantitative version is more complicated and confounds two things. – not sure whether it is better.

**Connectance**

Influences modularity

Recently burned sites had an increased dominance of generalized species that erased the modular structure of network. Generalized species were much more connected so modularity decreased because they were connected to many more species.

There is a quantitative version that takes into account frequency of interactions and occurrence of the interactions. So it weights more frequent interactions.

This version is in bipartite. Note that it takes a lot longer to do the analysis – computationally demanding

**Modularity**

Influences resistance (not true?) – double check the literature, is this what we want to measure or some other measure of stability. Re-read to see if we are clarifying what this is early enough and when we present the hypothesis.

We should be more careful about this – is it robustness? Robustness is measured as proportion of extinctions following perturbation

Influences generalization

*L217 – modify methods, consider using weighted versions*

Consider in some cases

*L539 – energy-minimization graphs*

**Reviewer 2**

*Compare the two baseline years and provide a possible explanation for differences*

Use Poisson and a Generalized linear mixed effect model

Look at sampling completeness – Roswell Ital – Rae Winfree- in Oikos 2020 – coverage of richness based on structure of data- this will help us decide on using all or a subset of sampling dates

*Description of sampling sites*

*Patchy nature of fire may explain patterns – fire did not affect vegetation or pollinators*

Refer to what we say in introduction about patchy nature in fire could lead to lack of pattern

Observed patterns be due to year to year variation networks instead of spatial variation in occurrence of fire, it would be temporal variance in occurrence of interactions. Petanidou 2008 has a table that shows the temporal variance - low similarity between years – if effect of fire is weak you may not detect effect. 2017 paper showed some effects only in the sites that had been burned very recently. Long term recovery shouldn’t be an issue.

*Incomplete sampling.* *Chao estimates?*

Break paragraph 3 up. Say more about it being difficult to be conclusive with relatively low level of completeness (Chacoff et al had @60%) – less than half even with substantial sampling – may change with full data sets. If completeness is comparable across sites then they were equally sampled and comparable. Unlikely….

Use null models to make the indices relative to what you expect given community structure.

Instead of comparing nestedness value, compare standardized nestedness with expected nestedness of a null model that you run on randomized networks that use the same number of species and interactions. If that variation in species number, this corrects for this.

Reference for null models:

Blüthgen, N. & Staab, M. (2024) A critical evaluation of network approaches for studying species interactions. Annual Review of Ecology, Evolution, and Systematics, 55, 65-88

<https://www.annualreviews.org/docserver/fulltext/ecolsys/55/1/annurev-ecolsys-102722-021904.pdf?expires=1739408672&id=id&accname=guest&checksum=3D5E384C1329E7DB621F92B0687A39FF>

**Next Steps:**

1. Do the Chao and completeness analysis
   1. Roswell, M., Dushoff, J. and Winfree, R., 2021. A conceptual guide to measuring species diversity. *Oikos*, *130*(3), pp.321-338. (<https://nsojournals.onlinelibrary.wiley.com/doi/epdf/10.1111/oik.07202>)
   2. decide which data to use probably use all the data
   3. Also look at this for each site and each year.
      1. If so then relativize our network indices in Blüthgen paper.
2. Re-run the estimates of species richness, abundance and networks using that data set

Options

Use all the data and have # samples as covariate?

For GitHub

diegopvazquez@gmail.com