**Introduction**

Previous research by Méndez et al. (2022) demonstrated that isolation (i.e., the target effect) exerts a strong negative influence on vascular plants and bryophytes biodiversity, both across all species and particularly among specialists. This contrasts with other types of edaphic islands, such as mountain tops and rocky outcrops, where isolation plays only a minor role. These findings highlight that fens require spatial connectivity to sustain diverse communities of vascular plants and bryophytes. However, it remains unclear whether this pattern extends to other taxonomic groups.

In this study, we will assess the effect of isolation not only for vascular plants and bryophytes but also for a broader range of taxa with differing dispersal capacities, including soft algae, diatoms, testate amoebae, spiders, oribatid mites, collembolans, and fungi.

**Methods**

* Standardizing richness against the potential regional species pool for each pH class
* std\_richness = observed\_richness / potential\_richness\_at\_given\_pH

Interation term in glm pH:TE for example

Or just + pH as covariate

**Statistical recommendation:**

We have only 30 islands (Acka) SEM with multiple parameters can lead to Convergence issues, Poor fit statistics, Unreliable parameter estimates, Limited statistical power. Rule of thumb is at least 10 observation per variable. Option would be Piecewise SEM with only 3 most important parameters. If we would create standardized richness.

Obsah obrázku text, diagram, snímek obrazovky, Plán

Obsah vygenerovaný umělou inteligencí může být nesprávný.

Partial Least Squares Path Modeling (PLS-PM) is an alternative approach to traditional covariance-based SEM that's particularly well-suited for smaller sample sizes like your 30 fens.

Here's what makes PLS-PM valuable for your situation:

1. **Sample size flexibility**: While traditional SEM typically requires hundreds of observations, PLS-PM can work with smaller samples - even as few as 30 observations.
2. **Prediction-oriented**: PLS-PM focuses on maximizing the explained variance in your dependent variables (like species richness) rather than reproducing the covariance matrix.
3. **Fewer assumptions**: It doesn't require multivariate normality, which is often an issue with ecological data.
4. **Handling complex models**: Can incorporate many variables and relationships even with limited observations.
5. **Latent variable approach**: Similar to SEM, it allows you to group related measured variables into conceptual constructs (like "isolation" or "habitat quality").

In your fen study, you could create a PLS-PM with:

* **Latent variables**:
  + "Isolation" (measured by NND, TE)
  + "Connectivity" (measured by NIB1, NIB2, NSS, LGSSP)
  + "Patch characteristics" (measured by Age, IS)
  + "Environmental conditions" (measured by pH and other relevant variables)
* **Path structure**: Similar to what you'd use in SEM, but with more relaxed statistical requirements

The main limitations are that PLS-PM doesn't provide global goodness-of-fit measures like traditional SEM and doesn't account for measurement error as effectively.

You can implement PLS-PM in R using packages like 'plspm' or 'semPLS'. It gives you much of the explanatory power of a causal modeling approach while being more appropriate for your limited sample size.

focus on understanding ecological relationships rather than just prediction

For your specific situation with nutrient enrichment affecting degraded plots differently, I would recommend:

**First approach**: Run separate analyses for pristine and degraded plots to see if different variables emerge as important (this is conceptually clearest)

**Second approach**: Use a mixed model with condition interactions to formally test these differences while maintaining statistical power

The advantage of analyzing separately is that it's clearer conceptually - nutrient enrichment in degraded plots might create fundamentally different ecosystem dynamics that are better modeled independently. However, if you're concerned about sample size, the interaction approach within a mixed model framework gives you more statistical power while still allowing you to identify different causal factors between conditions.

 Taxa with poor dispersal abilities might show stronger isolation effects

 Degraded sites might show stronger environmental filtering and weaker isolation effects

 pH might emerge as a master variable across multiple taxonomic groups

 Some taxonomic groups (e.g., microorganisms) might show weaker isolation effects than others