



HAL
open science

Understanding and modeling ecosystem structure and function through ecoacoustics

Camille Desjonquères

► **To cite this version:**

Camille Desjonquères. Understanding and modeling ecosystem structure and function through ecoacoustics. Full-stack bioacoustics: field kit to AI to action, Aug 2022, Leiden, Netherlands. hal-04849197

HAL Id: hal-04849197

<https://hal.science/hal-04849197v1>

Submitted on 19 Dec 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Understanding and modeling ecosystem structure and function through ecoacoustics



- Profile: ecoacoustician, postdoc at the Université Grenoble Alpes
- Topics: environmental sounds and their ecological context
- Media: water, solids, and air
- Scales: individuals, populations, communities and ecosystems



1. Individuals

Question: What are the consequences of social interactions?

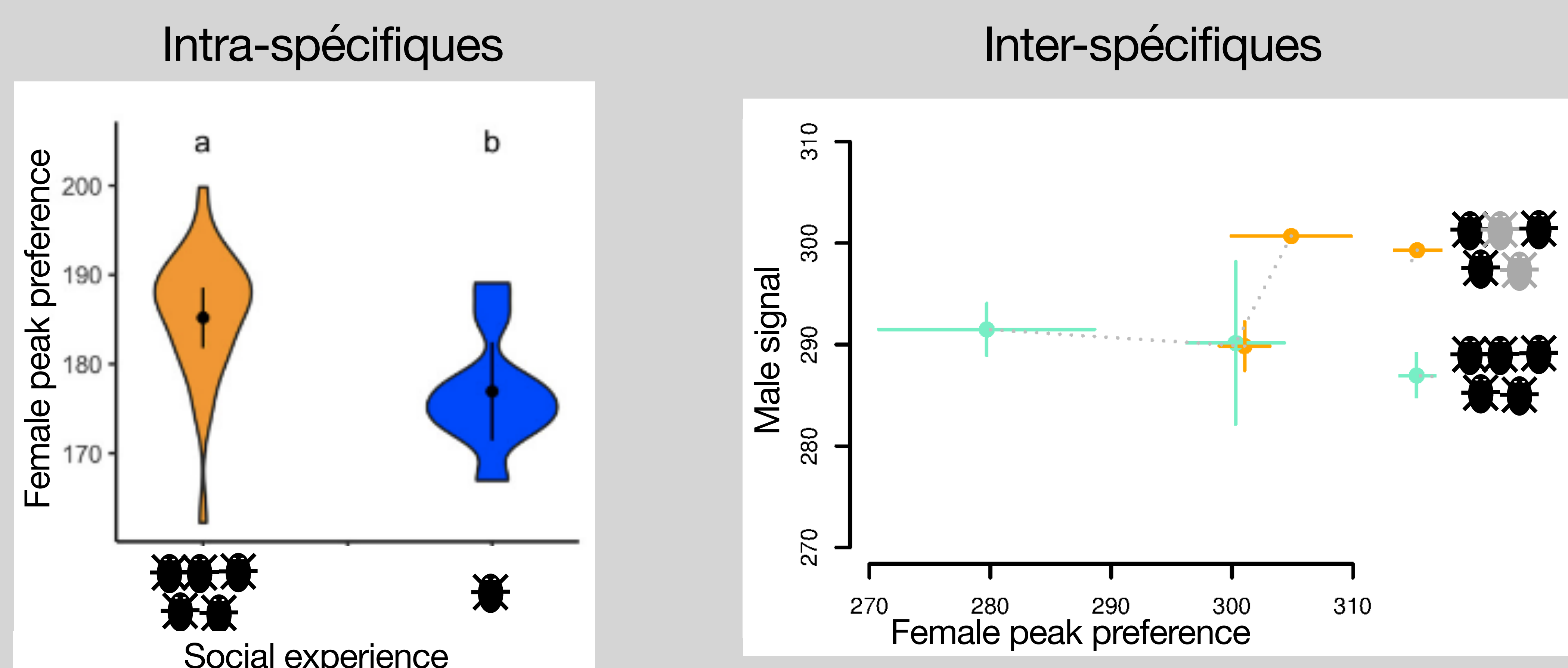


Figure 2: Effect of social interactions on signals and preferences

Results: Effects on signals and preferences

Conclusion: Social interactions can be detected

Desjonquères et al. 2019. *Animal Behaviour*
Desjonquères et al. 2019. *Behavioural Processes*
Desjonquères et al. 2021. *Evolution*
Desjonquères et al. in review. *The American Naturalist*

3. Communities

Question: Can we measure diversity with acoustics?

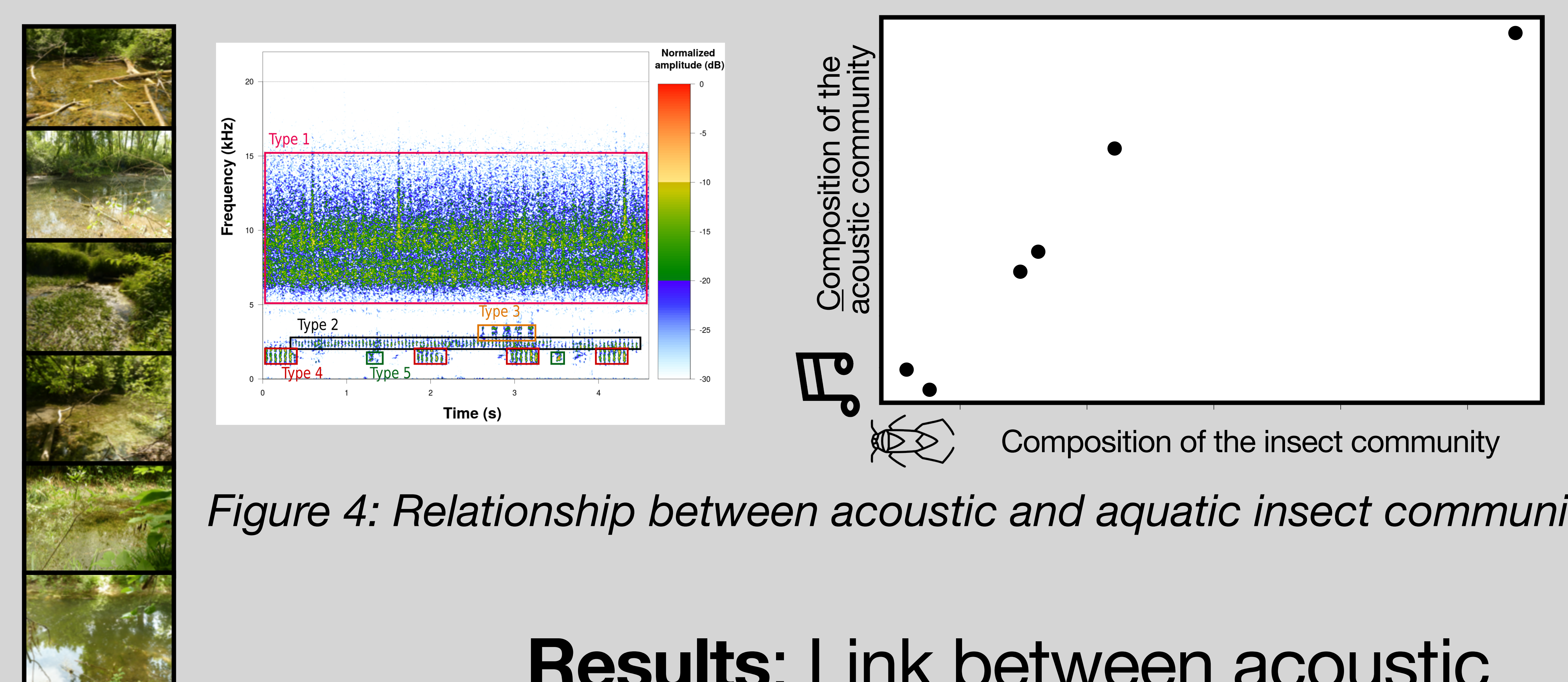


Figure 4: Relationship between acoustic and aquatic insect communities

Results: Link between acoustic and aquatic insect communities

Conclusion: Acoustic allows to characterize biological diversity

Desjonquères et al. 2018. *Scientific reports*

2. Populations

Question: Use of acoustics to build SDMs?

Results: Robust models predicting distribution

Conclusion: Prediction of climate induced spatio-temporal shifts

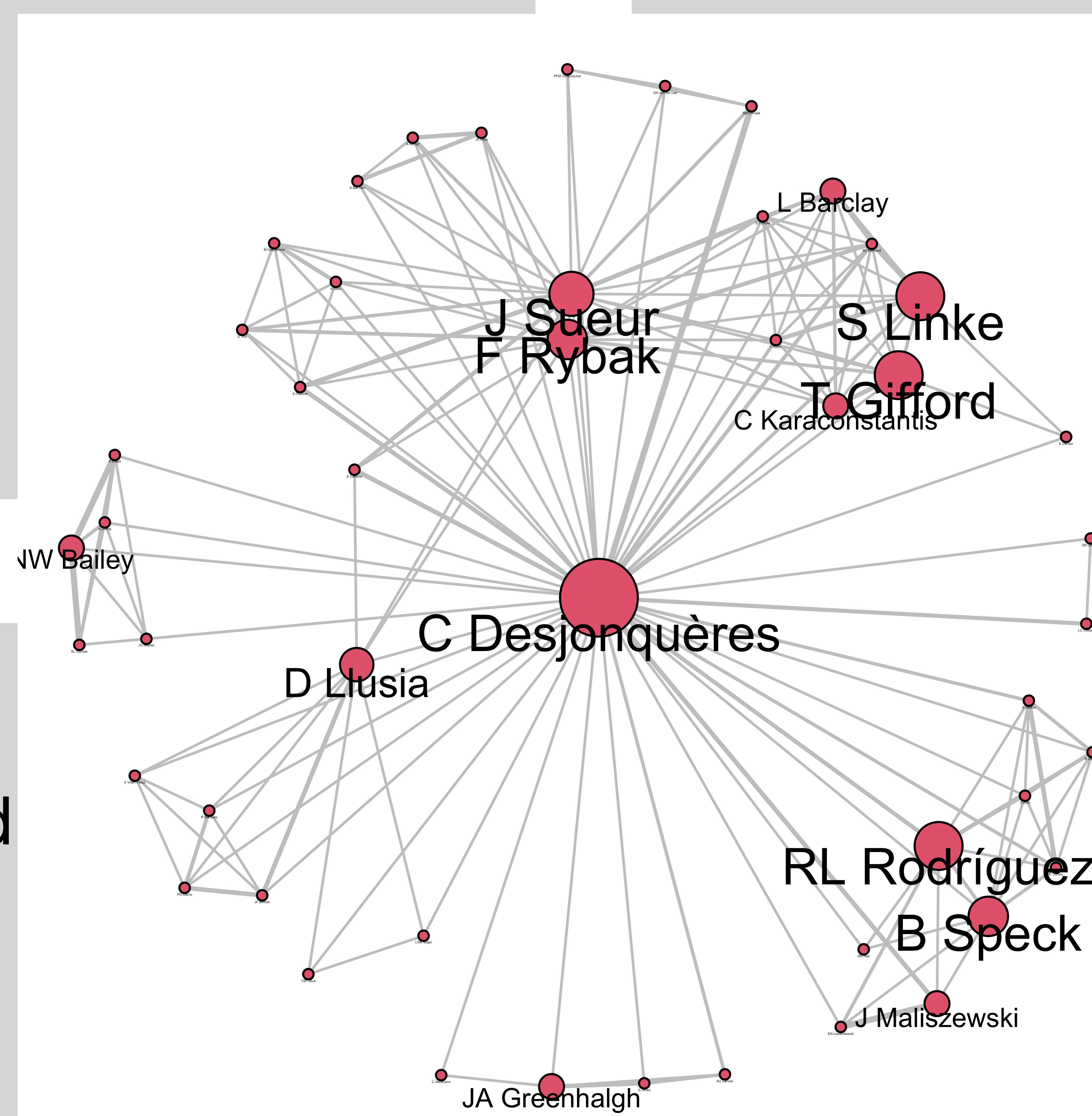


Figure 1: Collaboration network

4. Ecosystems

Question: Can we measure ecosystem function?

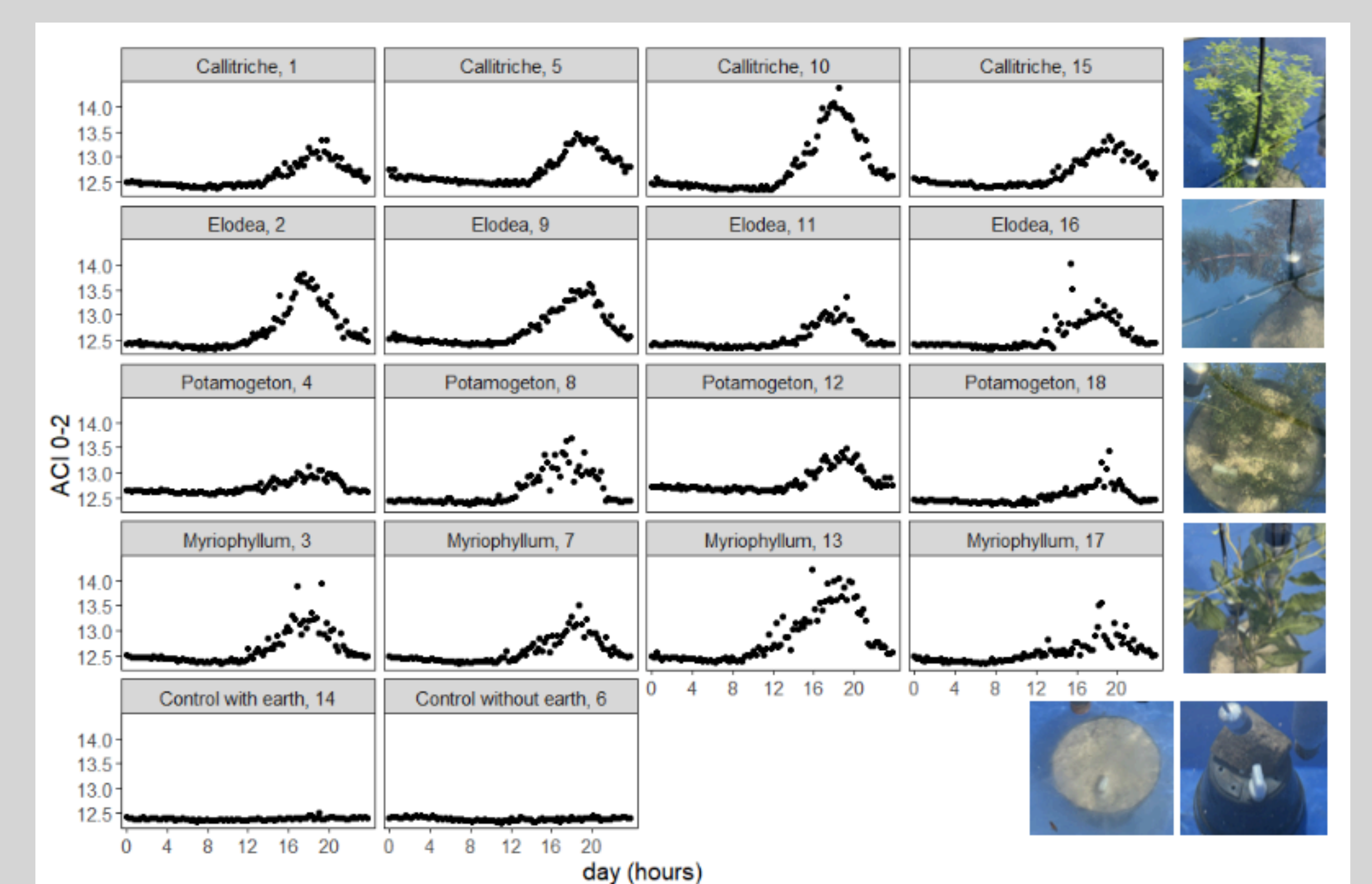
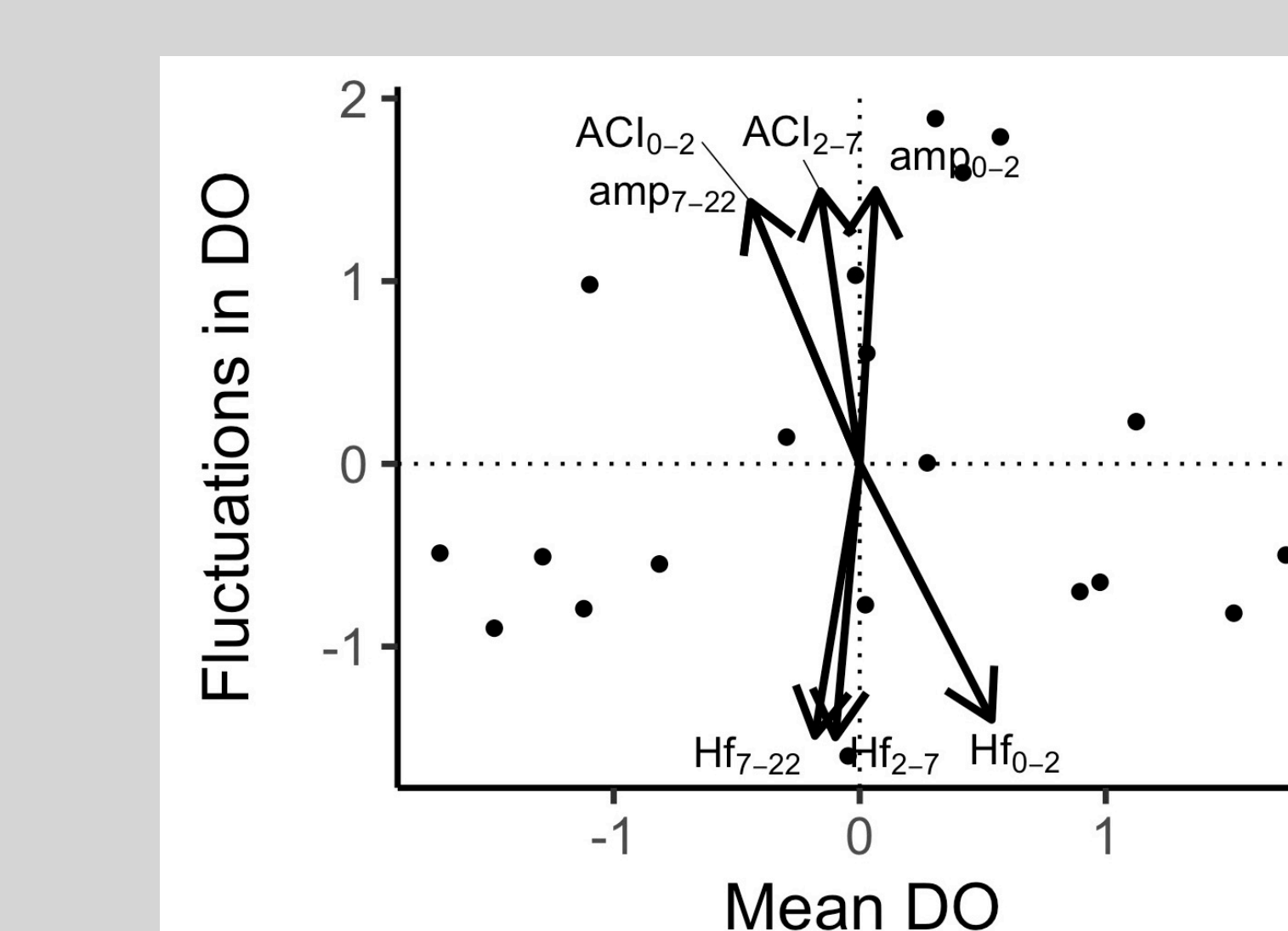


Figure 3: Acoustic Species Distribution Model (aSDM) framework

Desjonquères et al. 2022. *Methods in Ecology and Evolution*



Results: Plants are noisy

Conclusion: Potentially possible to study primary production with acoustics

Van der Lee et al. 2021. *Ecological indicators*
Desjonquères et al. in prep.

5. Perspectives

Community-level aSDM taking into account interactions to understand community structure and diversity in response to environmental changes