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### ► To cite this version:

Léo Girard, Joël Robin, Soraya Rouifed, Vincent Tolon, Robby Wijns, et al.. Diversity and structure of macrophyte communities in two different fish pond systems: Dombes (France) and Midden-Limburg (Belgium). International Congress in Ecology and Evolution (SFE<sup>2</sup>), Oct 2024, Lyon, France. 2024. hal-04808201

HAL Id: hal-04808201

<https://isara.hal.science/hal-04808201v1>

Submitted on 28 Nov 2024

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# Diversity and structure of macrophyte communities in two different fish pond systems: Dombes (France) and Midden-Limburg (Belgium)

Léo GIRARD<sup>1</sup>, Joël ROBIN<sup>1</sup>, Soraya ROUIFED<sup>1</sup>, Vincent TOLON<sup>1</sup>, Robby WIJNS<sup>2</sup>, Luc DE MEESTER<sup>2,3,4</sup>, Alexander WEZEL<sup>1</sup>, Pieter LEMMENS<sup>2,3</sup>

<sup>1</sup> Agroecology and Environment Research Unit, ISARA, Lyon, France  
<sup>2</sup> Laboratory of Freshwater Ecology, Evolution and Conservation, KU Leuven, Leuven, Belgium  
<sup>3</sup> Leibniz Institute für Gewässerökologie und Binnenfischerei (IGB), Berlin, Germany  
<sup>4</sup> Institute of Biology, Freie Universität Berlin, Berlin, Germany

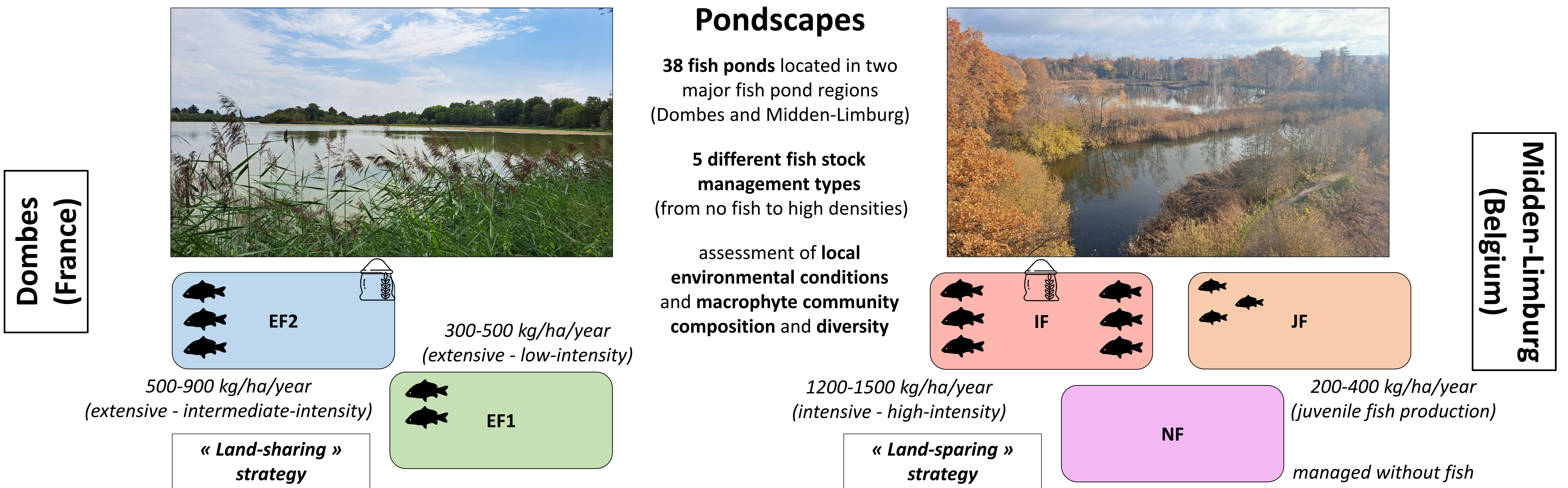
## Context

- Numerous landscapes with ponds ("pondsapes") used for fish farming across Europe
- For most: a wetland transformed during the Middle Ages by monastic communities (Avocat, 1975; Guichenon, 1650 cited in Sceau, 1980)
  - Artificial and managed environments (Hansson et al., 2005) with variable management practices (Aubin et al., 2017)
- That can also host significant biodiversity (Wezel et al., 2014; Robin et al., 2014)
- Among this biodiversity : macrophytes that play a pivotal role on pond ecosystem functioning and diversity (Carpenter and Lodge, 1986; Jeppesen et al., 1997; Scheffer, 2004, Folke et al., 2004; Oertli and Frossard, 2013)

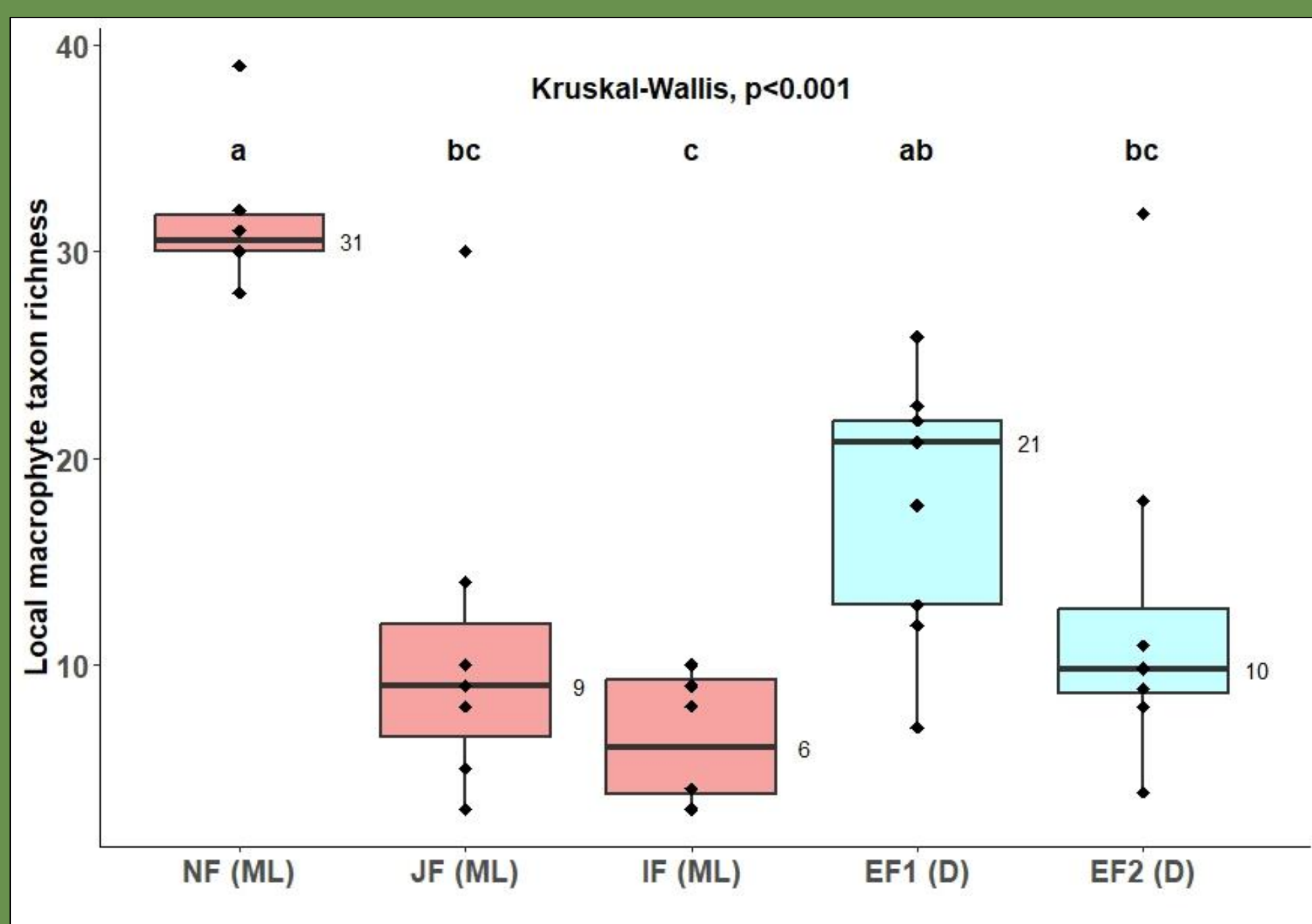


*Persicaria amphibia* (Dombes, summer 2023)

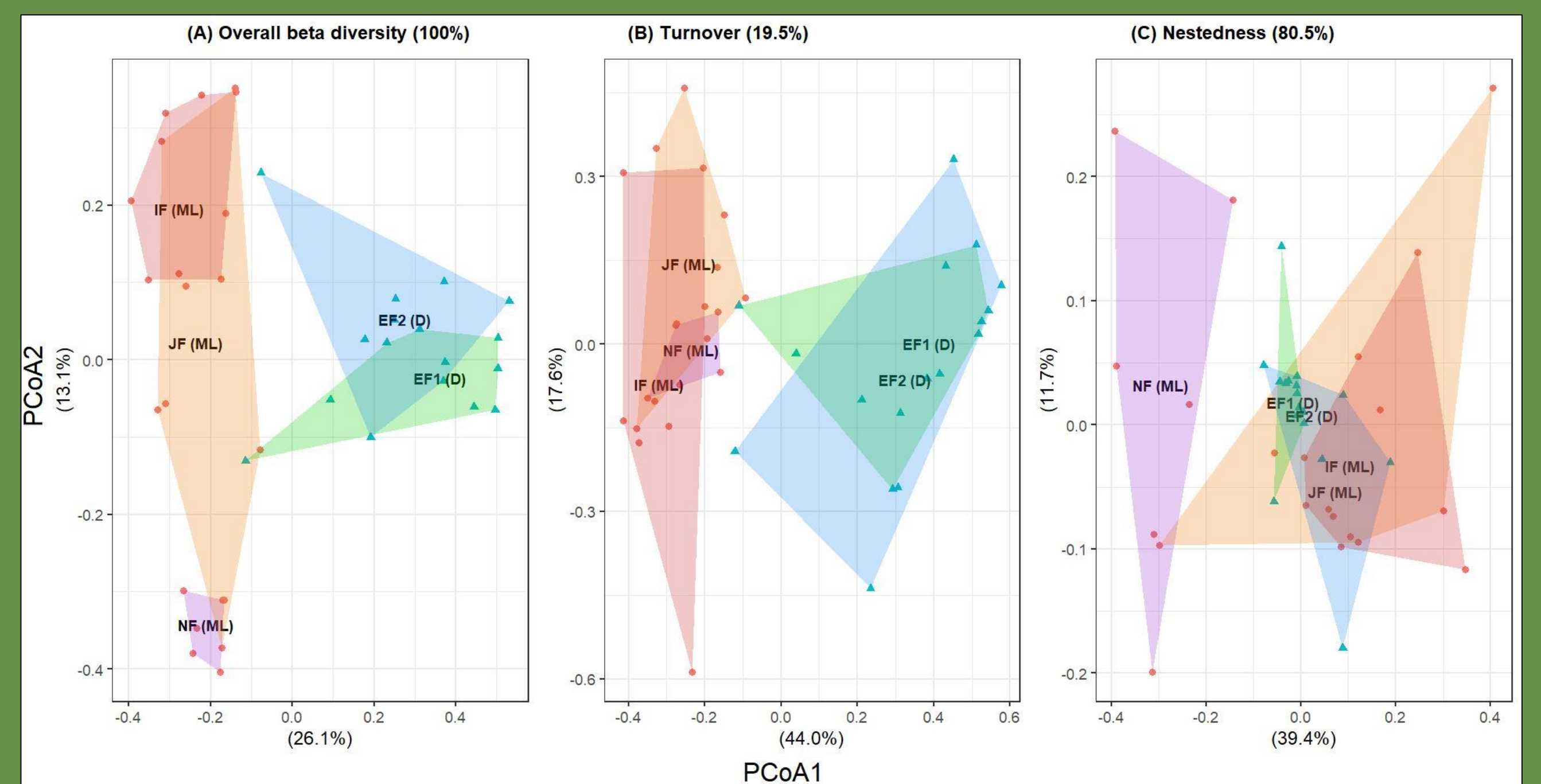
How fish stock management affects macrophyte community characteristics at different spatial scales, in two fish pond systems with radically different fish management approach (land sharing versus land sparing strategies) ?



## Results



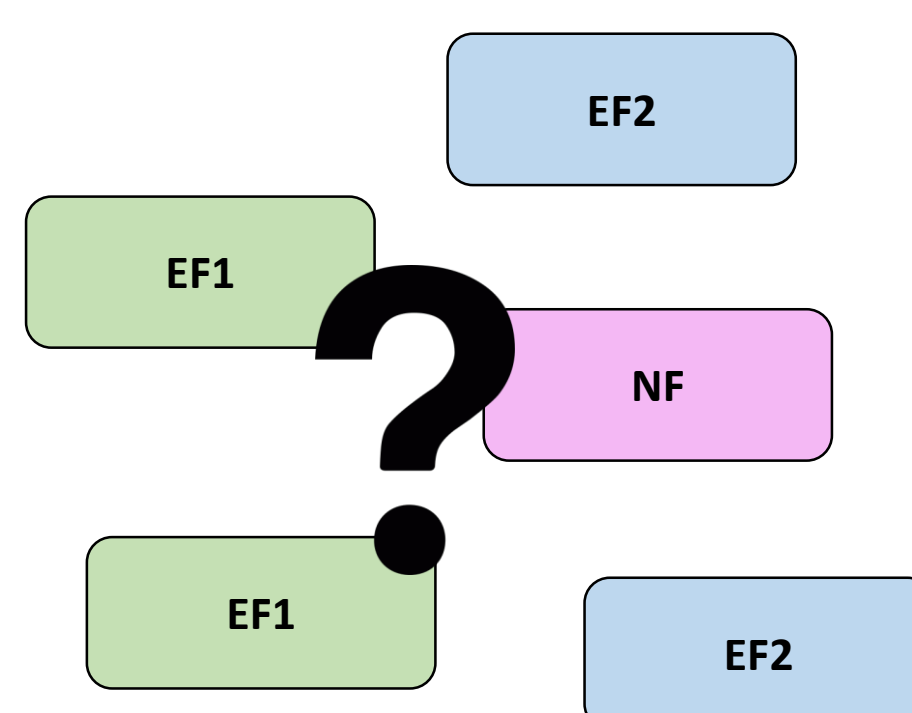
a significant effect of fish stock management types on local macrophyte richness  
 highest richness in ponds managed without fish



a strong turnover between regions but not between fish stock management types  
 ponds with higher fish densities form nested subsets of species from communities of ponds with lower fish densities

## Conclusion

- Intensification of fish production, linked to higher fish densities, have **negative impact on macrophyte richness**
- Ponds managed without fish allow **higher macrophyte species richness** at the pondscape scale, hosting species that do not occur in fish ponds (**nestedness**)
- Extensive fish farming allows for **intermediate levels of macrophyte richness**



An « ideal fish pondscape » for maintaining both fish production and biodiversity conservation ?

Integration of ponds managed without fish to provide habitat to species not observed in fish ponds (to maximize biodiversity), in association with extensive fish farming (for economic reasons)

A mix between both strategies?