



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

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

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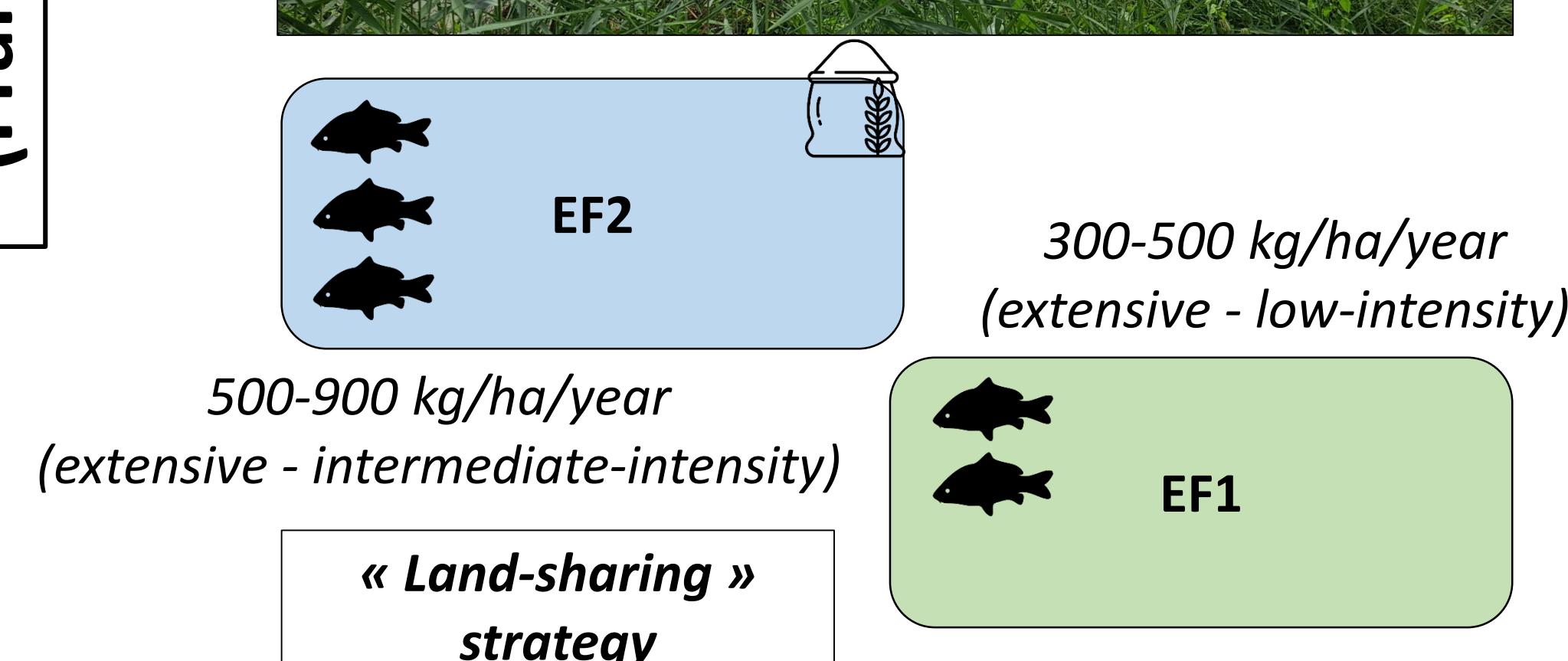
Context

- Numerous landscapes with ponds (“pondscapes”) 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) ?

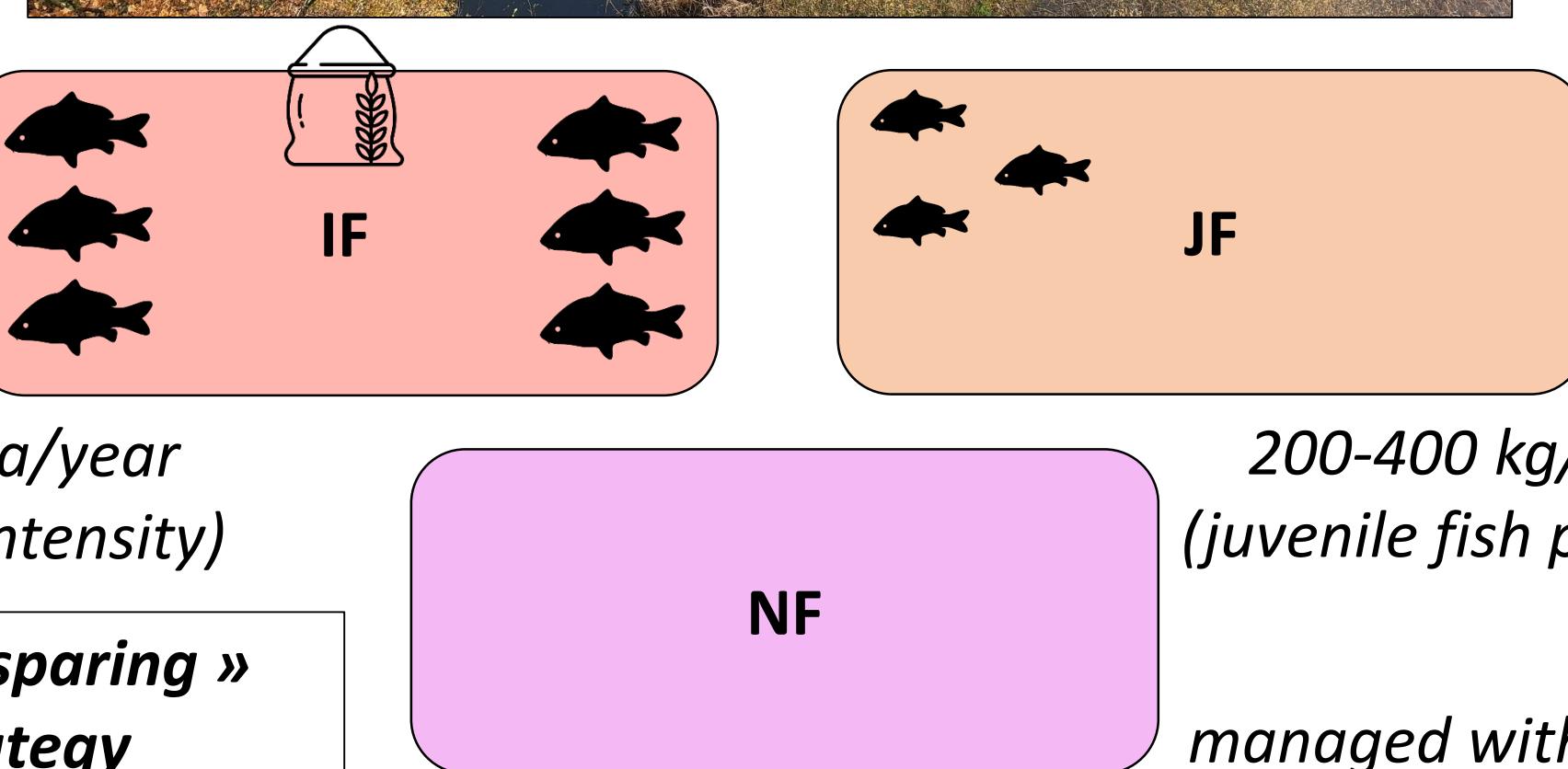
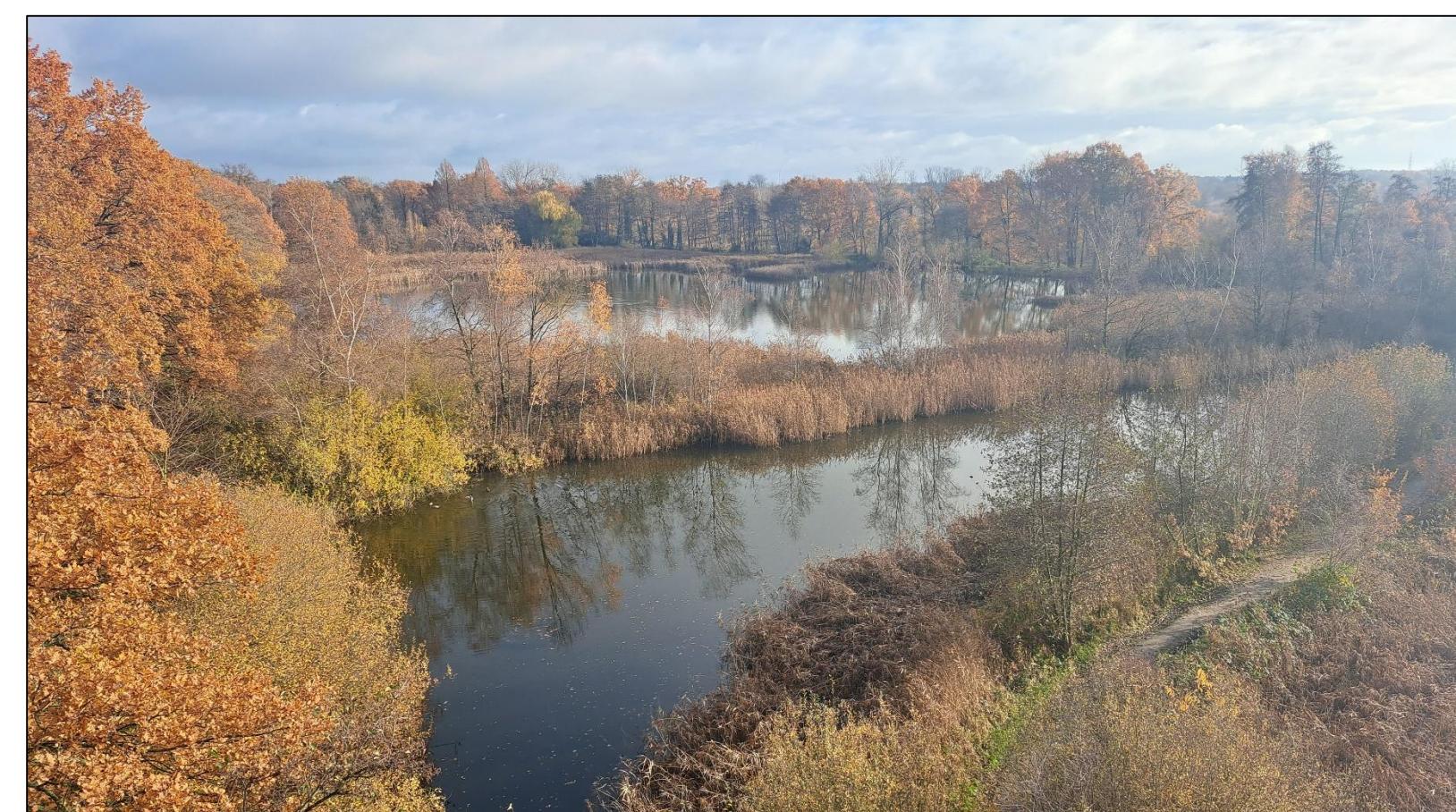


Pondscapes

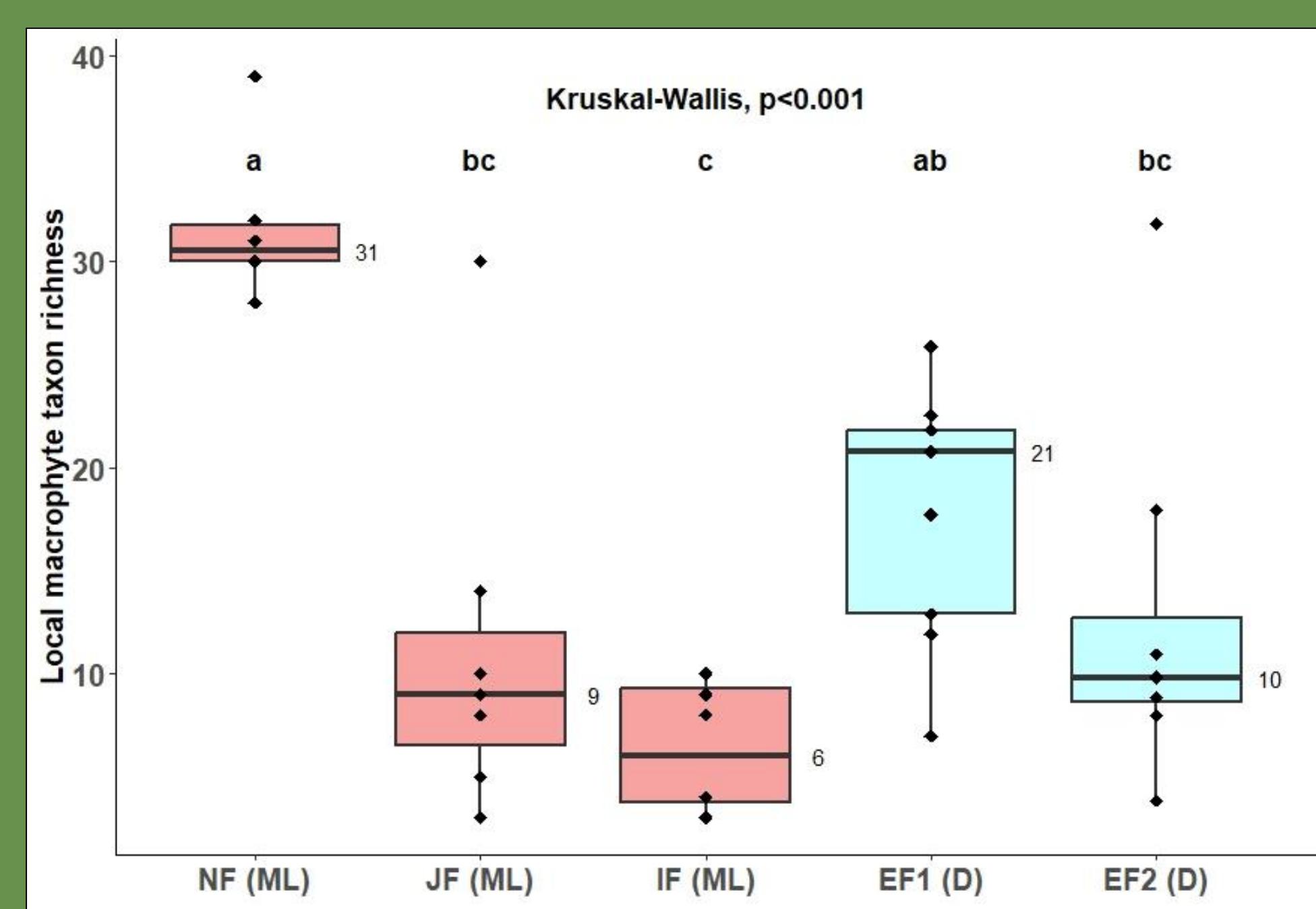
38 fish ponds located in two major fish pond regions (Dombes and Midden-Limburg)

5 different fish stock management types (from no fish to high densities)

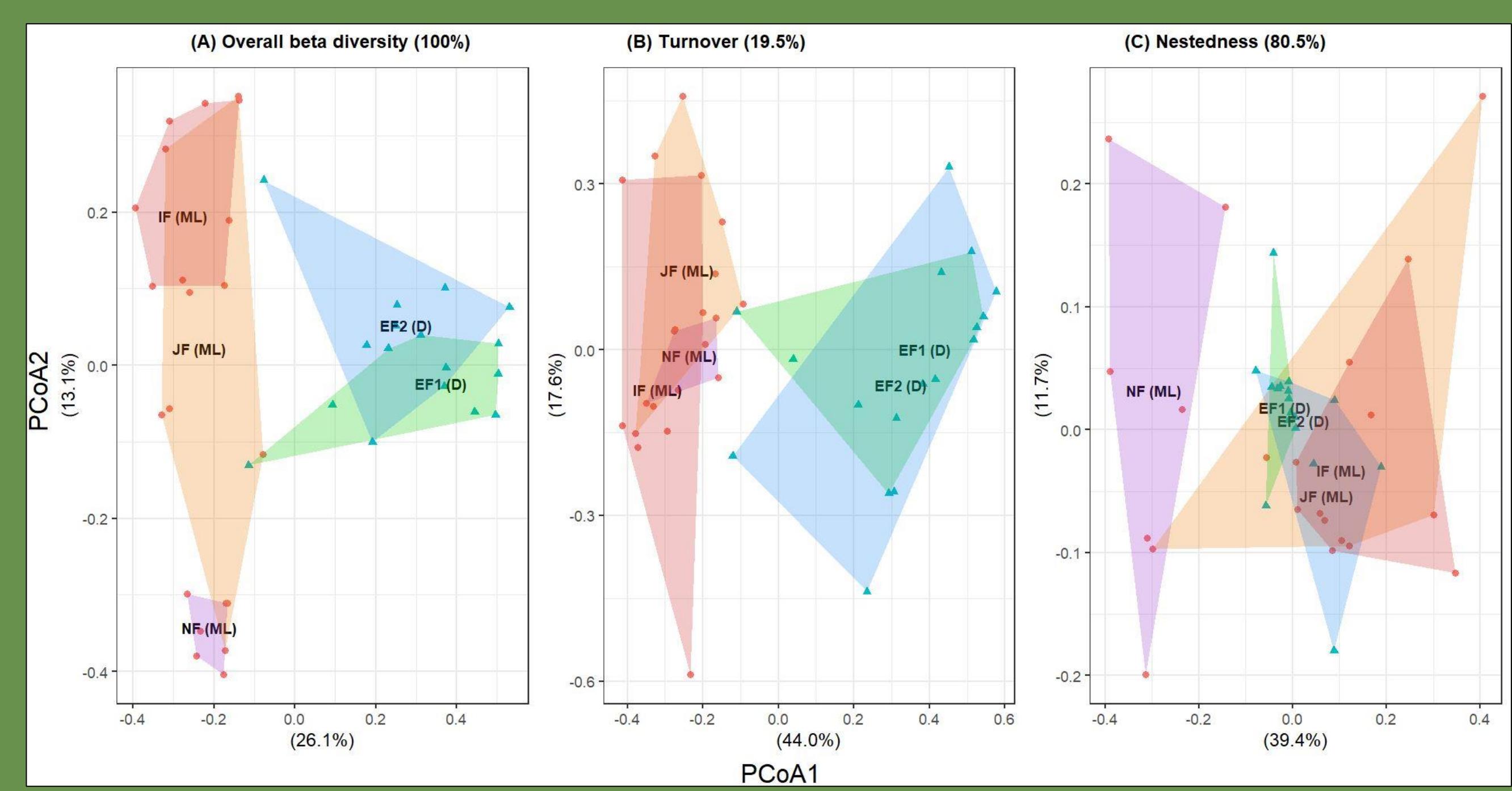
assessment of local environmental conditions and macrophyte community composition and diversity



Results



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



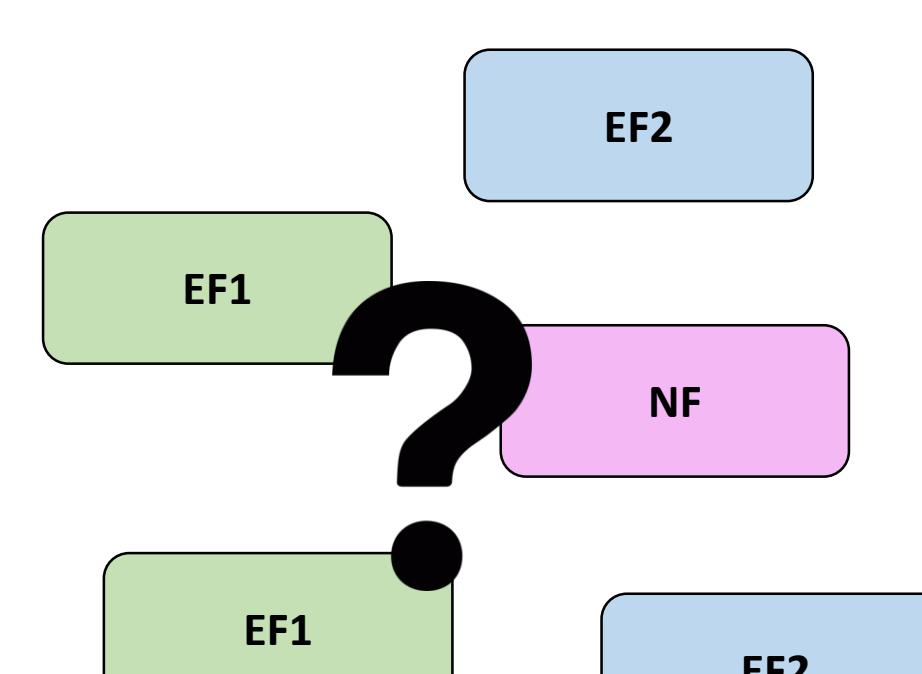
a strong turnover between regions but not between fish stock management types
ponds with higher fish densities form nested subsets of species from communities of ponds with lower fish densities

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

Conclusion



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?