

Parasitic interactions in the wake of Nile perch invasion in Lake Victoria and its impact on the parasite fauna of haplochromine cichlids

KJM Thys¹, MPM Vanhove¹, N Kmentová^{1,2}, M Van Steenberghe^{1,3}, TP Gobbin¹¹ Hasselt University, Centre for Environmental Sciences, Research Group Zoology: Biodiversity and Toxicology, Belgium² Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Belgium³ Royal Belgian Institute of Natural Sciences, Operational Directorate Taxonomy and Phylogeny, Belgium

Nile perch introduction & invasion

The **introduction of the Nile perch** (*Lates niloticus*) into Lake Victoria (East Africa) in the 1950-80s, has led to ecological transformations, influencing the native fish communities.

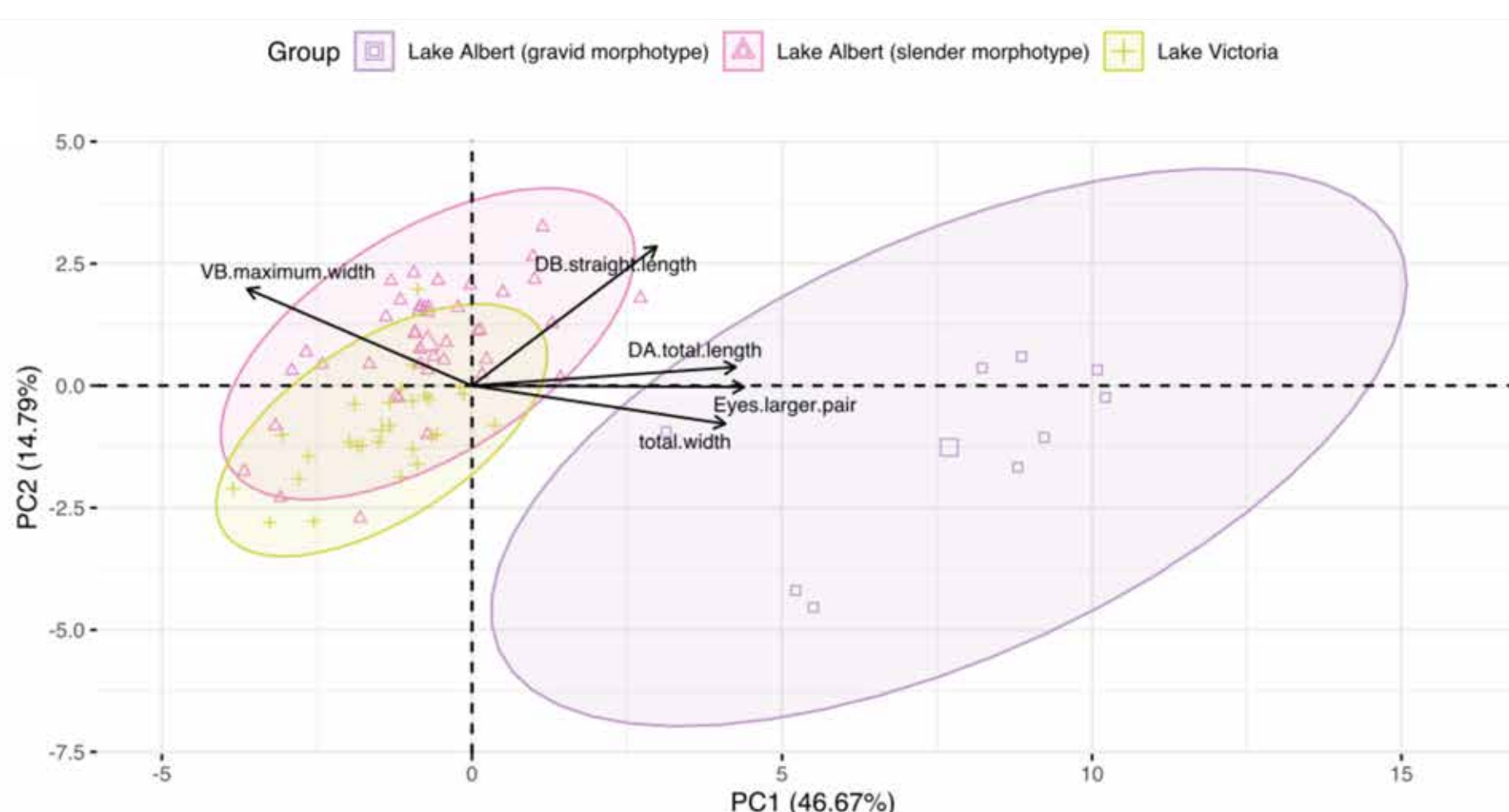
However, little is known about:

- The co-introduction dynamics of its potentially co-invasive parasites,
- The impact on gill macroparasites of the native haplochromine cichlids (which drastically declined after the Nile perch invasion).

Co-introduction dynamics

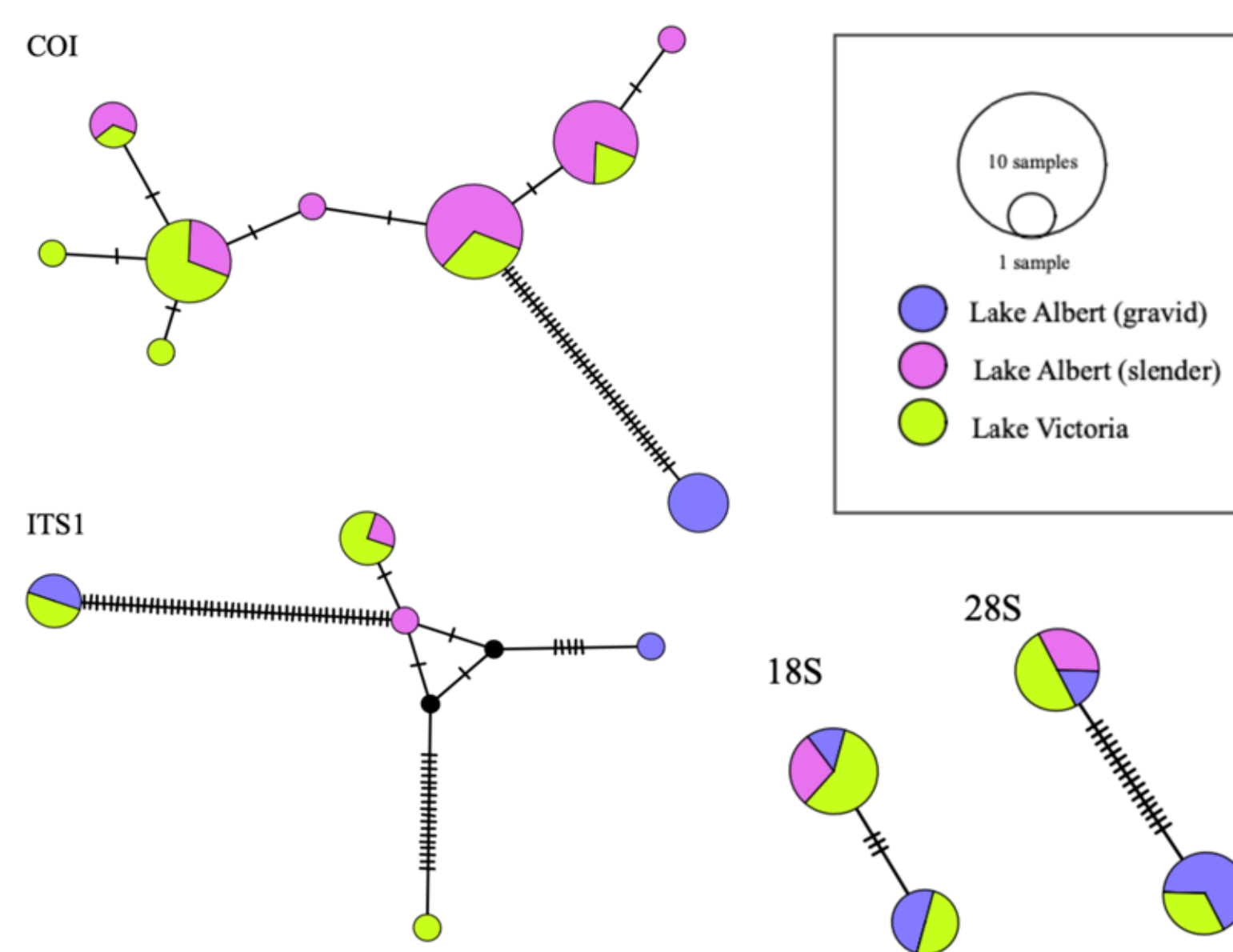
Methods We examined the intraspecific diversification of the single monogenean parasite infecting *L. niloticus* in sub-saharan Africa: *Dolicroplectanum lacustre*. We assessed morphological variation in Lake Albert (native range) and Lake Victoria (introduced range) and genetic differentiation using the mitochondrial COI and the nuclear 18S, 28S and ITS-1 markers.

Results



Two morphotypes of *D. lacustre* were present in **Lake Albert**: 'gravid' and 'slender'¹. While, only the 'slender' morphotype was co-introduced to **Lake Victoria**.

Specimens from the 'slender' and 'gravid' morphotypes had genetically diverged only in the mitochondrial COI marker with the 'gravid' morphotype represented by a single haplotype. Mitonuclear discordance within the morphotypes of *D. lacustre* indicates an incomplete reproductive barrier.

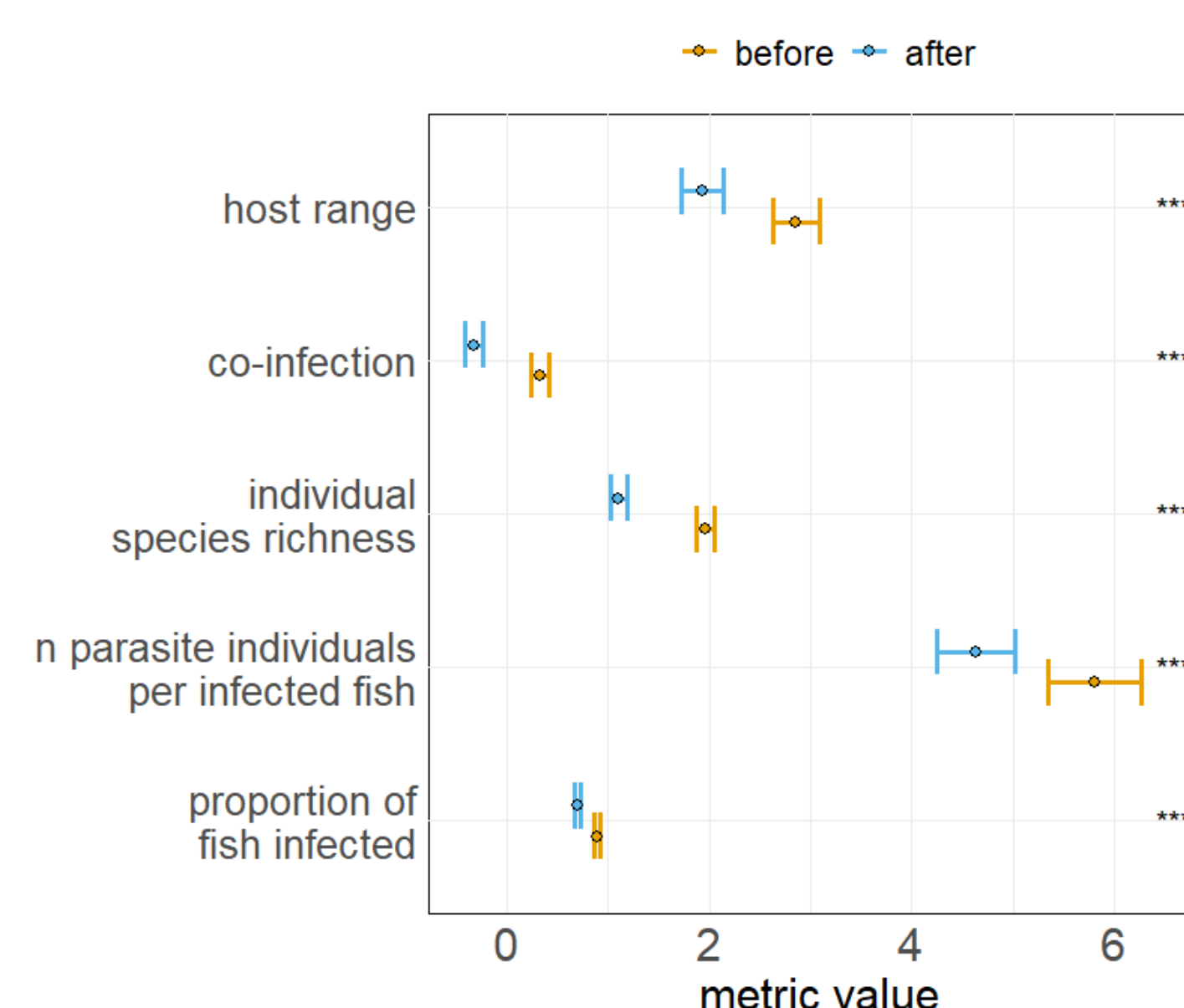


Genetic and morphological diversity is reduced, potentially being a result of a founder effect in Lake Victoria².

Impact on parasites of native cichlids

Methods Comparison of gill macroparasite communities infecting 13 haplochromine cichlid species before and after the Nile perch invasion and human-induced eutrophication.

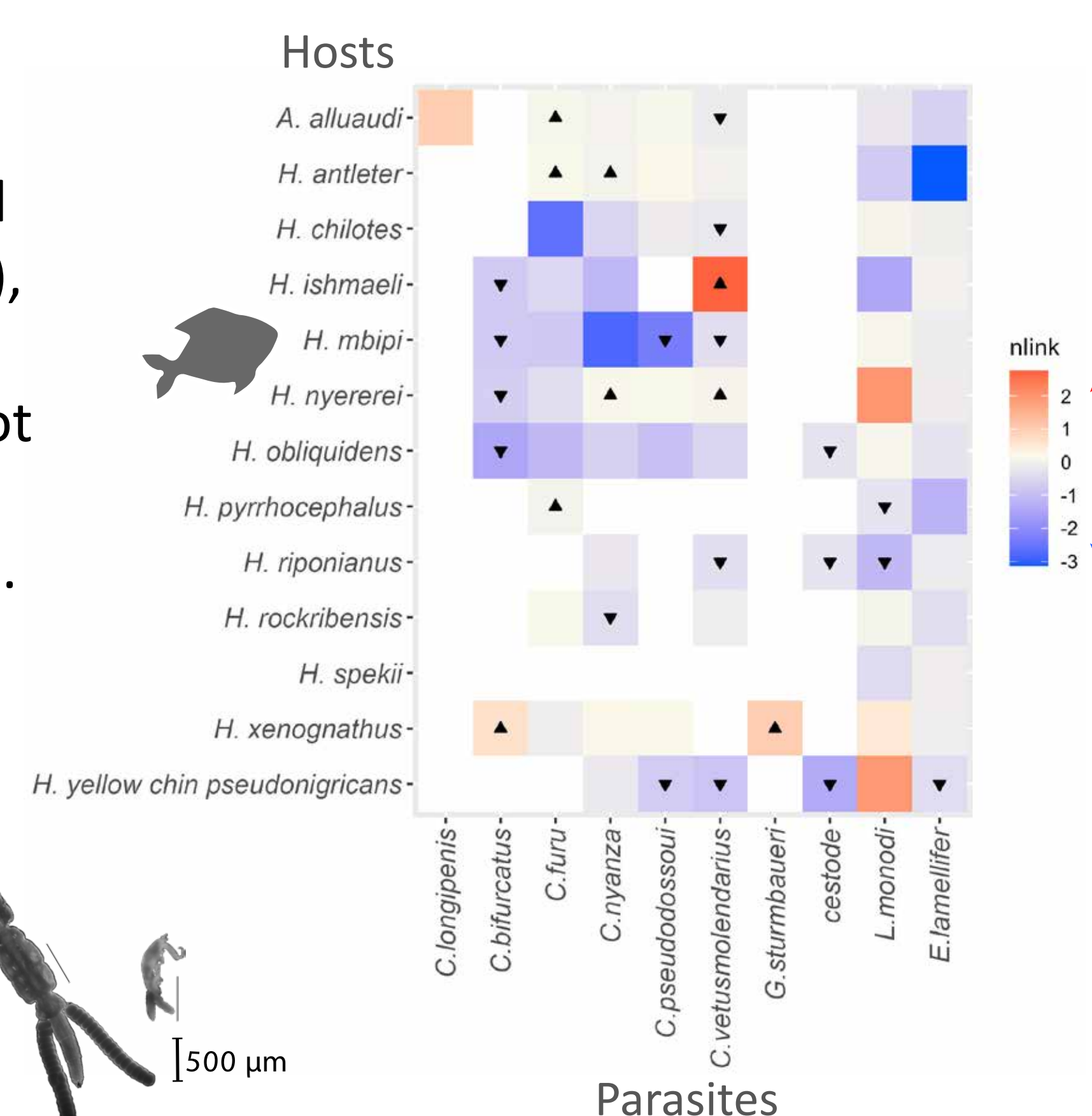
Results



After Nile perch invasion and water eutrophication:

- fewer fish were infected than **before**,
- fish individuals were infected by a lower number of parasites and by fewer parasite species,
- co-infections became less frequent,
- parasite species infected less host species.

The host-parasite network rearranged. Some parasites disappeared from some host species (▼), and colonized few new host species (▲) that they did not infect before Nile perch invasion and eutrophication.



Conclusions

Invasions of free-living animals can affect both co-introduced parasites and parasites of native host species, even if taxonomically distant. The introduction and invasion of Nile perch led to a diversity decline (founder effect) of its co-introduced parasite and of parasites of native cichlid fishes.

By integrating insights from the invasive species dynamics and ecological perturbations, we can contribute to conservation efforts to preserve ecosystem health and resilience in the face of global change.

Funding:

Swiss National Science Foundation (SNSF), Special Research Fund (BOF) UHasselt, Czech Science Foundation, and by Research Foundation – Flanders (FWO-Vlaanderen).

Acknowledgements:

Royal Museum for Central Africa, Belgium
Naturalis Biodiversity Center, the Netherlands

References:

- 1 Thurston, Paperna (1969) Proc. Helminthol. Soc. Wash. 36
- 2 Thys, Vanhove, Custers, Vranken, van Steenberghe, Kmentová (2022) Int. J. Parasitol. 52(12) <https://doi.org/10.1016/j.ijpara.2022.09.001>

tiziana.gobbin@uhasselt.be
kelly.thys@uhasselt.be

