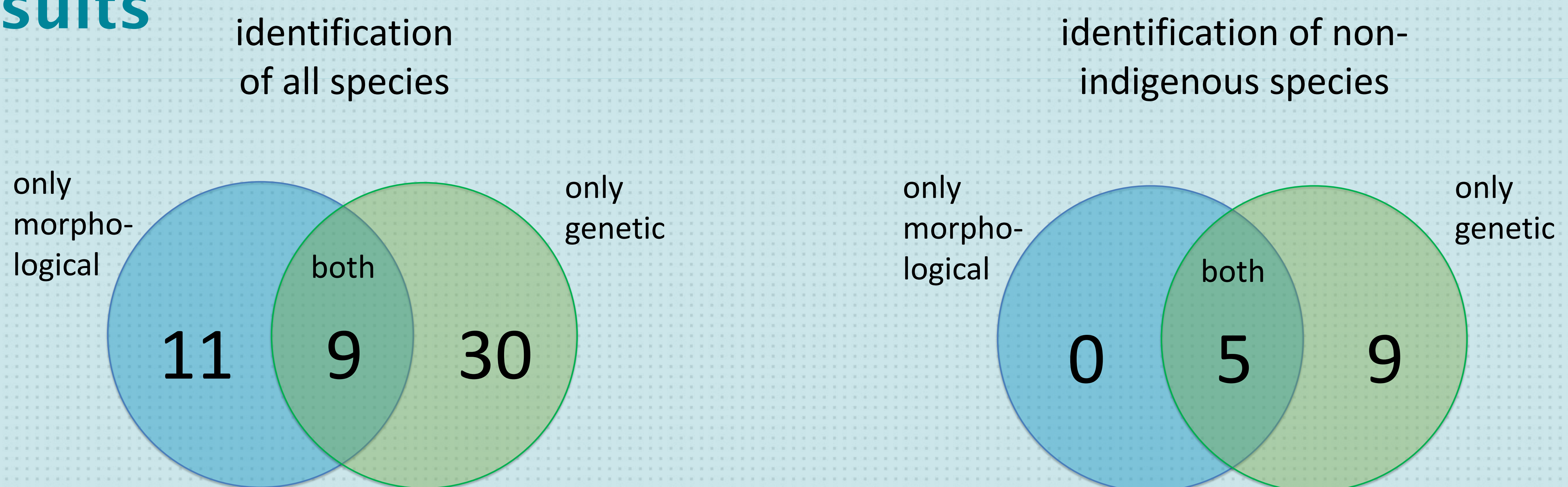


Time and cost efficient DNA-based monitoring of marine non-indigenous species in the harbour of Ostend (Belgium) using nanopore sequencing

Anton Bilsen^{1,2}, Ruben Schols^{3,4}, Sander Delacauw^{5,6}, Filip A.M. Volckaert¹, Klaas Deneudt⁵ & Pascal I. Hablützel^{5,*}

¹ Laboratory for Biodiversity and Evolutionary Genomics, KU Leuven, Leuven, Belgium; ² Animal Physiology and Neurobiology, KU Leuven, Leuven, Belgium; ³ Laboratory of Aquatic Biology, KU Leuven Kulak, Kortrijk, Belgium; ⁴ Department of Biology, Royal Museum for Central Africa, Tervuren, Belgium; ⁵ Flanders Marine Institute (VLIZ), Ostend, Belgium; ⁶ Flanders Research Institute for Agriculture, Fisheries and Food, Ostend, Belgium; * corresponding author

Results



Methods

- Settlement plates and plankton samples deployed at three locations in the harbour of Ostend according to OSPAR/HELCOM protocols.
- Species on settlement plates identified with microscopes.
- 18S and COI metabarcoding for both settlement plates and plankton samples.



- We used nanopore technology to generate long 18S and COI reads (about 650-700 base pairs) to allow species level identification (at 99 % identity cut-off).
- Nanopore sequences are inherently noisy. We corrected errors using a density based clustering algorithm (OPTICS) as implement in *ashure* (Baloğlu et al. 2021 Methods in Ecology and Evolution).
- We did not yet publish our bioinformatics pipeline. Please contact PIH for early access.

Discussion

- Depending on the scale of the project, metabarcoding with our methods can cost less than 15 €/sample.
- Results can be obtained within two days.
- A fast desktop computer or access to high performance cluster is needed to run the OPTICS algorithm.

Conclusion

Genetic techniques are more sensitive, more accurate and more efficient than traditional analyses with microscopes.

But unfortunately they still do not work for all species. We are not yet ready to put the microscope aside, but eventually we will.



Vlaams Instituut voor de Zee vzw
Flanders Marine Institute

We would like to thank the Ostend harbour authorities to grant us access to the sampling locations and Bart Hellemans for assistance in the laboratory. This project is part of Interreg GEANS and was also supported by LifeWatch.