# Genetic and taxonomic diversity of Aquitaine coast lakes isoetid communities

Estelle-Marie Blanquart, Aurélien Jamoneau, Olivier Lepais

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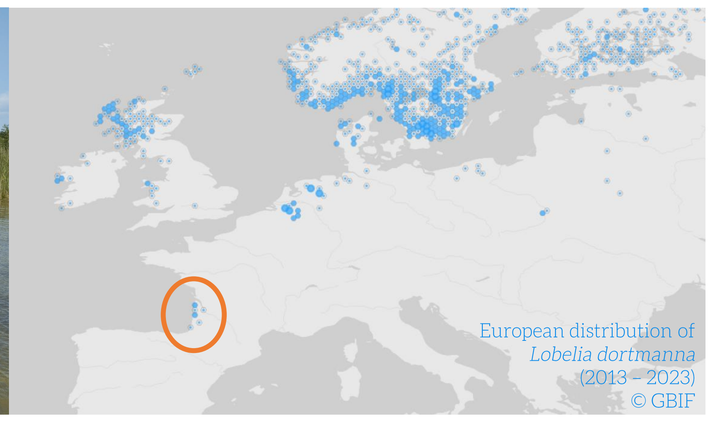
Blanks of Cazaux - Sanguinet Lake
© Lola Deschamps



European distribution of *Lobelia dortmanna* (2013 – 2023)
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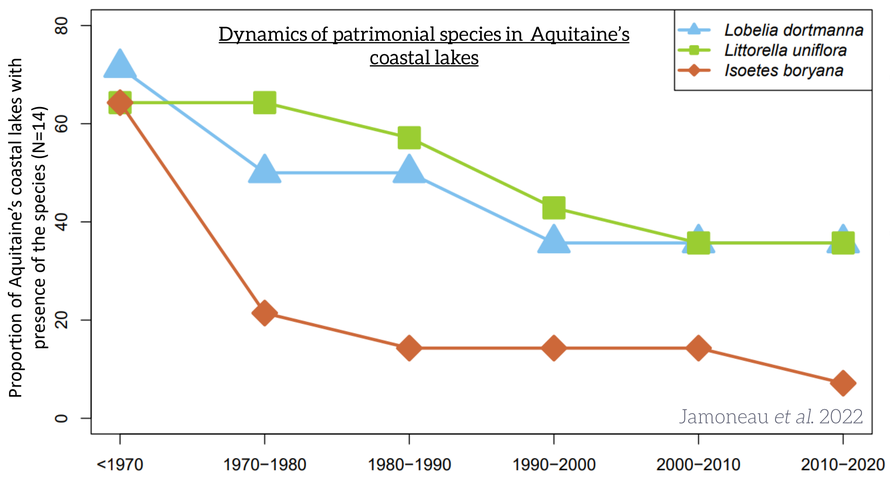
## CONTEXT




- Aquitaine lakes host original plants **communities**
- These communities are endangered by global changes (i.e. : climatic changes, human activities).

Classification of patrimonial species in red lists. Loriot, 2022

| Taxa | Red list France | Red list Aquitaine | Regional rarity index | Scalable trend | Territorial responsibility | Asset valuation |
|---|---|---|---|---|---|---|
| *Isoetes boryana* | EN | EN Endangered | Exceptional (E) | ↘ | Major | ●●●●● Outstanding patrimonial interest |
| *Lobelia dortmanna* | NT | EN | Exceptional (E) | ↘ | Major | ●●● Strong patrimonial interest |
| *Littorella uniflora* | - | NT Near-threatened | Quite rare | →? | Important | ●●● Quite strong patrimonial interest |

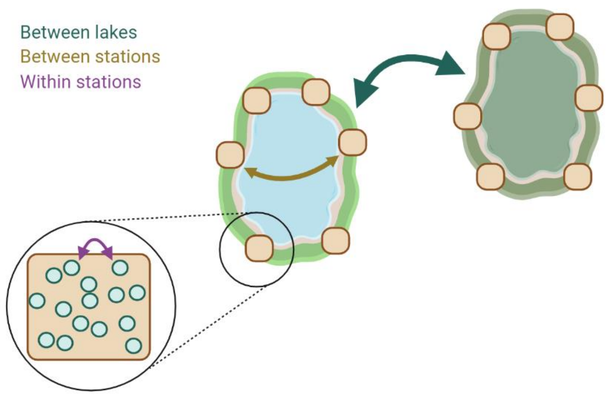
**PLAN NATIONAL D'ACTION** | 27 novembre 2020 (v3.0)
***En faveur des végétations de bords d'étangs arrière-littoraux des Landes et de Gironde***

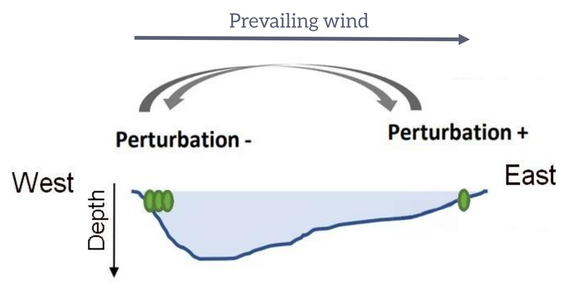
| Influence factors observed |
|---|
| Water activities (kite-surfing, water skiing, etc.) |
| Leisure activities (hunting, fishing, horseback riding) |
| Invasive Alien Species (Flora) |
| Grazing on riparian plots |
| Oil extraction |
| Anchorages outside ports |
| Erosion |
| Sediment pollution |

Observed influence factors in Aquitaine Lakes
Deveaud, 2022

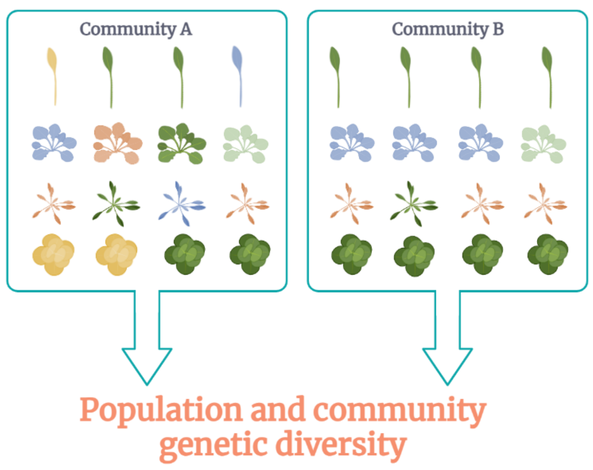
## AIMS

### i – Investigate gene flows and environmental influence on genetic diversity

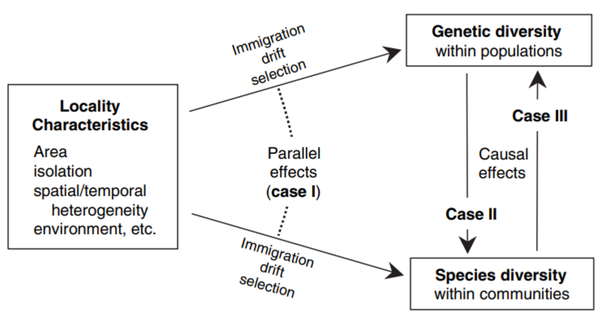



### ii – Estimate genetic diversity and adaptation capacity




### iii – Test the correlation between genetic and taxonomic diversity (SGDC)



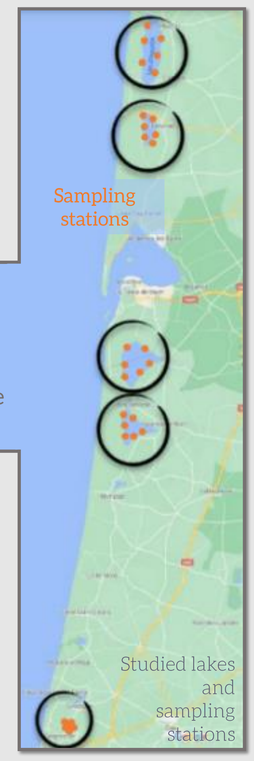

Potential connections between species diversity and genetic diversity
From M. Vellend and M. A. Geber, 2005

**→ Gather useful information to improve the conservation plan for these communities**

## MATERIAL AND METHODS

### Species and sites

- 9 **macrophytes species** from 5 Aquitaine lakes (South West of France)
- **6 stations/lake** & **15 individuals/species**
- A data base of **4000 individuals**.




Protected endangered species


© Aurélien Jamoneau
*Littorella uniflora*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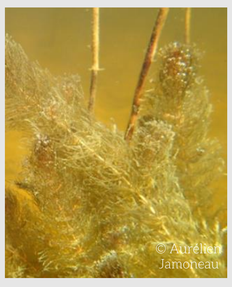
*Lobelia dortmanna*


© Aurélien Jamoneau
*Myriophyllum alterniflorum*


© Aurélien Jamoneau
*Phragmites australis*


© MNHN- CBNBP
*Schoenoplectus pungens*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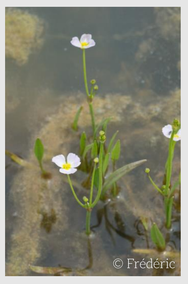
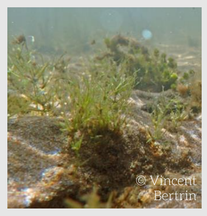
*Juncus bulbosus*


© Frédéric
*Baldellia ranunculoides*


© Aurélien Jamoneau
*Eleocharis multicaulis*


© Vincent Bertrin
*Chara fragifera (algae)*

Plants with different ecological functionality and traits commonly found in isoetid communities

### DNA analyses

- Develop **microsatellites markers** for the project
- Quantify **genetic diversity** among sites and genetic differentiation between populations
- Estimate **gene flows** between populations (reproduction…)
- Study **demographic history**: migration path and variation of the populations effective sizes

➡ Populations **connected or isolated** ?

### Species-genetic diversity correlation (SGDC)

**Species-genetic diversity correlation** : underline the important role of genetic diversity in species assemblage.

**Positive correlation**:
→ Identical **ecological processes** influence diversity at the genetic and taxonomic scale
→ Use taxonomic diversity as a proxy for genetic diversity: **interest for conservation**

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## PARTNERSHIPS AND FOUNDINGS

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METAPROGRAMME BIOSEFAIR