Next-generation biomonitoring: creation of an independent device to monitor aquatic environment

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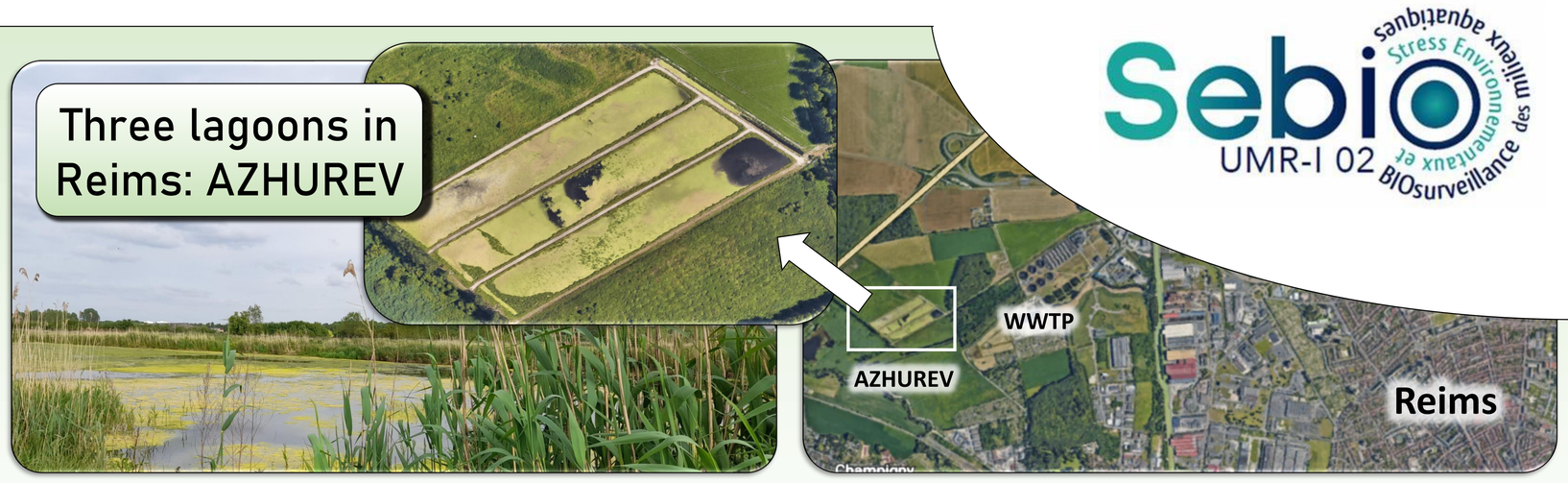
How to adapt a biomonitoring method for AZHUREV?

A constructed wetland

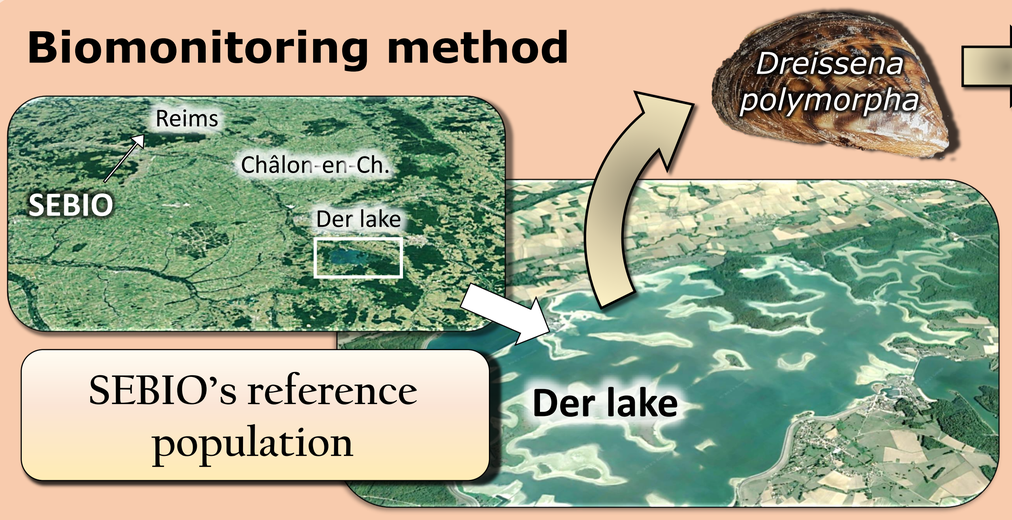
The aim is to reduce contaminants concentrations in waters before the reject in the Vesle river.

AZHUREV receive two water types :

- Treated waters (from WWTP)
- Urban wet weather flow waters

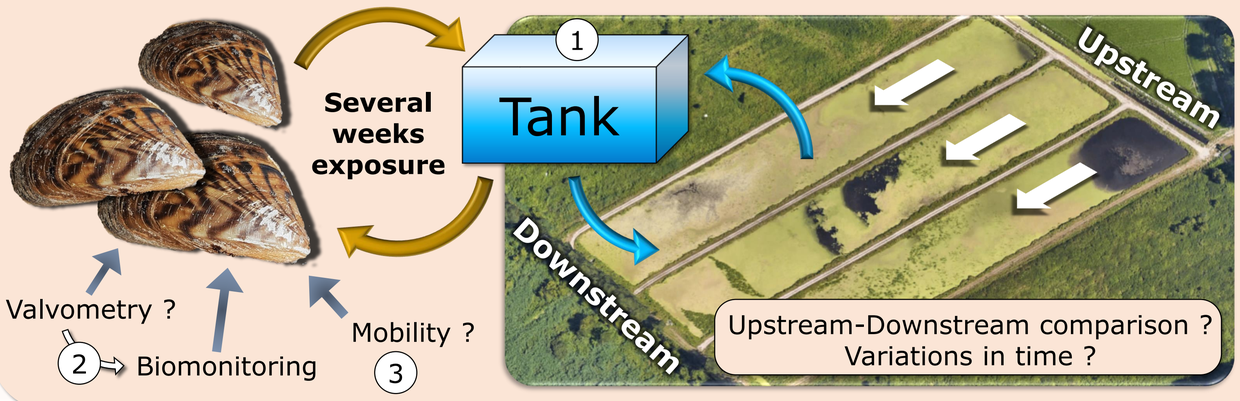


Biomonitoring method



1 Development of a field tank for biomonitoring: adaptation to AZHUREV

- Standardisation of caging methodology
- No possibility for caging directly in lagoons



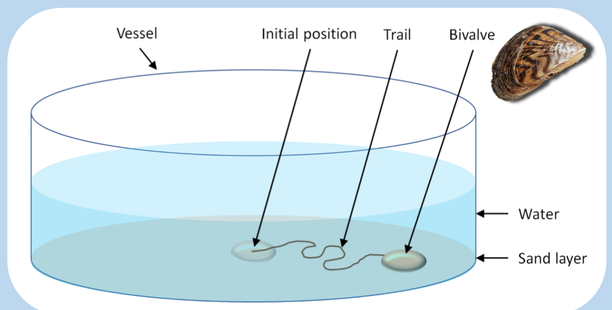
Development of mussels' behavior markers

2 **Valvometry** : Time spent in contact with water could be used to improve water exposure assesment

3 **Crawling** : can this behavior be use as marker of toxicity ? ⇨ Development of the methodology

Method development for mobility measurement in zebra mussel

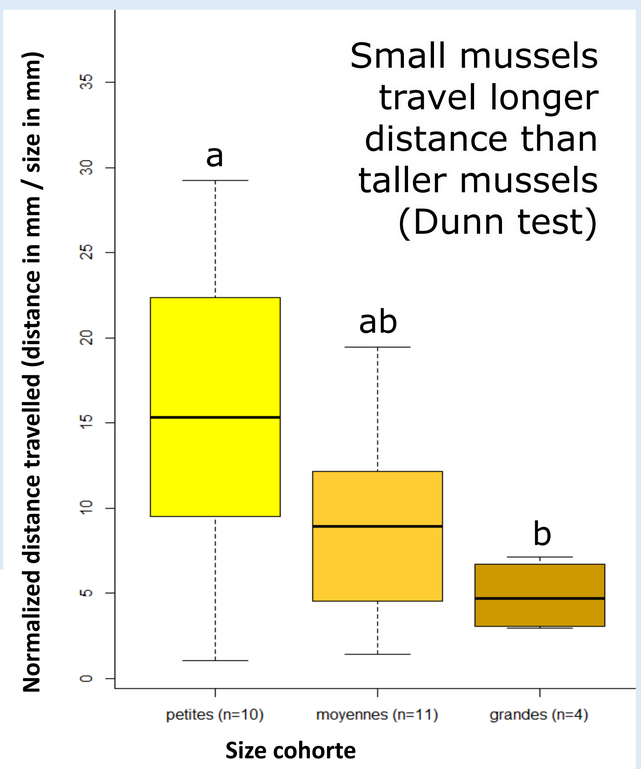
Current methodology



- Crawling in obscurity
- Water temperature at 14-16°C
- Water aerated before experiments

➢ **Measurement of the trails and count of mobile individuals**

What is best mussels size?



(n = number of mussels which have moved among a total of 20)

Small mussels have significantly move more often than taller mussels (relation between size and mobility tested by Chi2 test)

How is the repetability?

Same protocol repeated at the same hour with different 30 mussels

Dunn test

Experiment	Number of moving mussels	% of moving mussels	Chi2 test	Mean straight line (mm)	Mean total distance (mm)	
1	15	50,0	p.value: 0,76	28,9	41,3	
2	12	40,0		21,7	29,1	*
3	14	46,7		26,9	56,7	
4	16	53,3		26,4	43,5	

Next ?

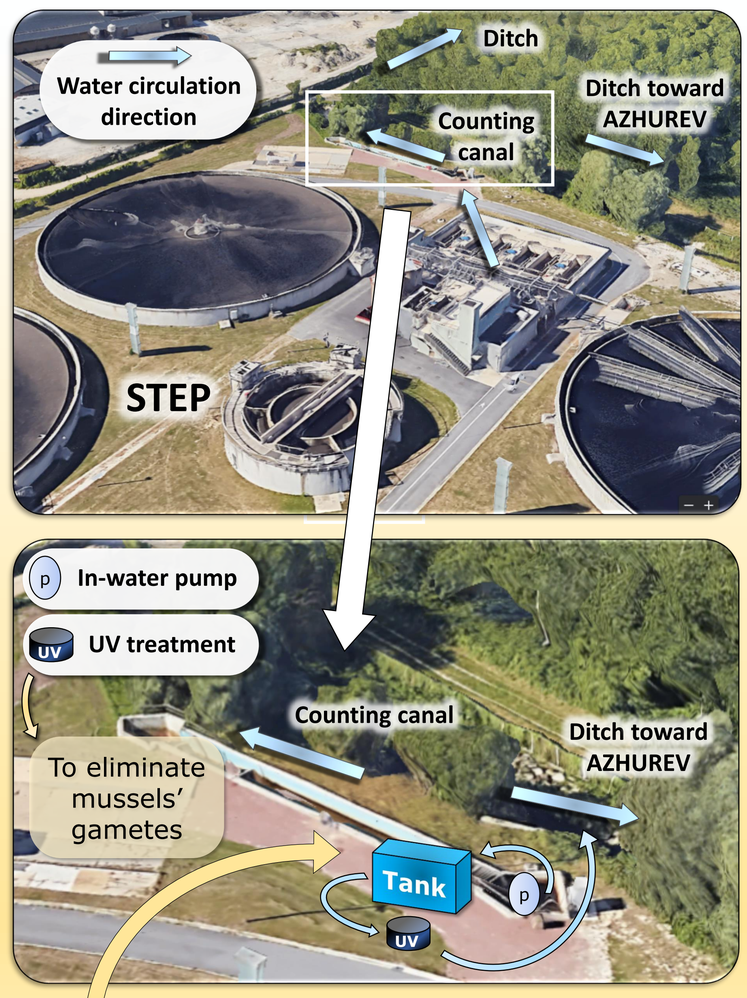
Adapt the mobility measure as **Video Tracking system** and optimize **data treatment methodology**.

Test mobility of mussels exposed in AZHUREV, toxics-exposed mussels, etc.

Tested Chemicals?
Antidepressant?
Pesticide?
Etc.

↳ **Could Crawling be used as a marker of toxicity?**

An *in situ* application for first developments



Mussels from Der lake exposed in several 3-week campaigns.

Comparison of:

- Mussels behavior developments
- Mussels bioaccumulation of varied chemicals
- Mussels biomarkers
- WWTP chemical analysis
- Other biomonitoring data

Next ?

Adapt the device to AZHUREV lagoons:

➢ Evaluate contaminant and toxicity reductions in AZHUREV

➢ Evaluate the efficacity of the created device and its autonomy