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Environmental DNA, an innovative method for the early detection of aquatic species: The case of the invasive crayfish *Cherax quadricarinatus*.

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Introduction

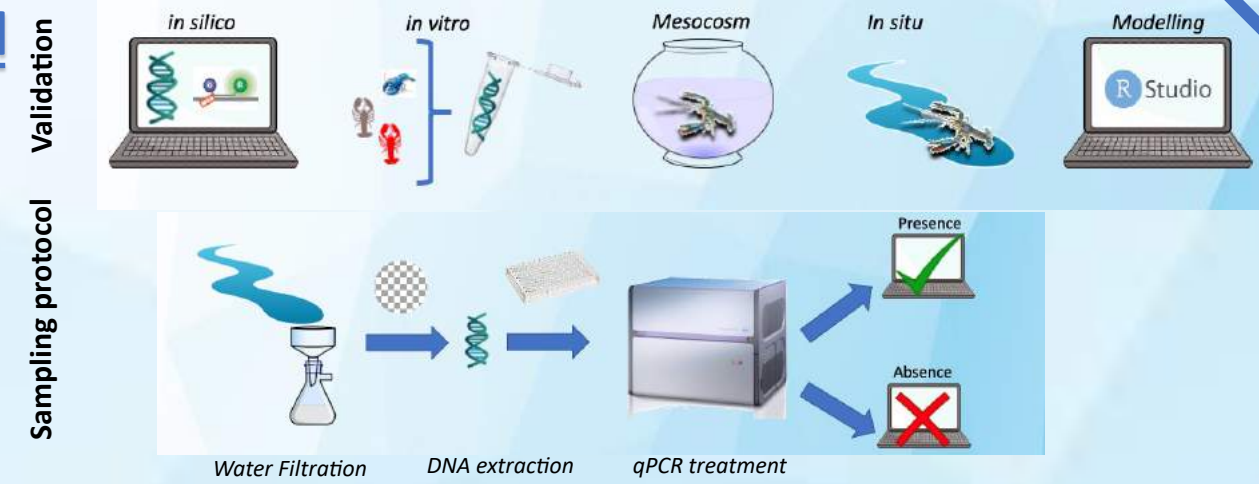
Lesser Antilles archipelago in the Caribbean is known as a **biodiversity hotspot**, hosting many endemic species.

Introduction of a highly invasive species often leads to significant threats to this fragile ecosystem.

First essential step in their management is the **early detection** to identify the invaded areas and the non-invaded in order to contain species.

Here we **developed, validated, and optimized** a species-specific eDNA-based qPCR detection protocol targeting the 16S region of the mitochondrial gene of *Cherax quadricarinatus*, a freshwater invasive crayfish in Martinique.

Method



Results

Assay validation:

High species-specific

- *in silico*
- *in vitro*
- all biomass treatment amplified
- *in situ*

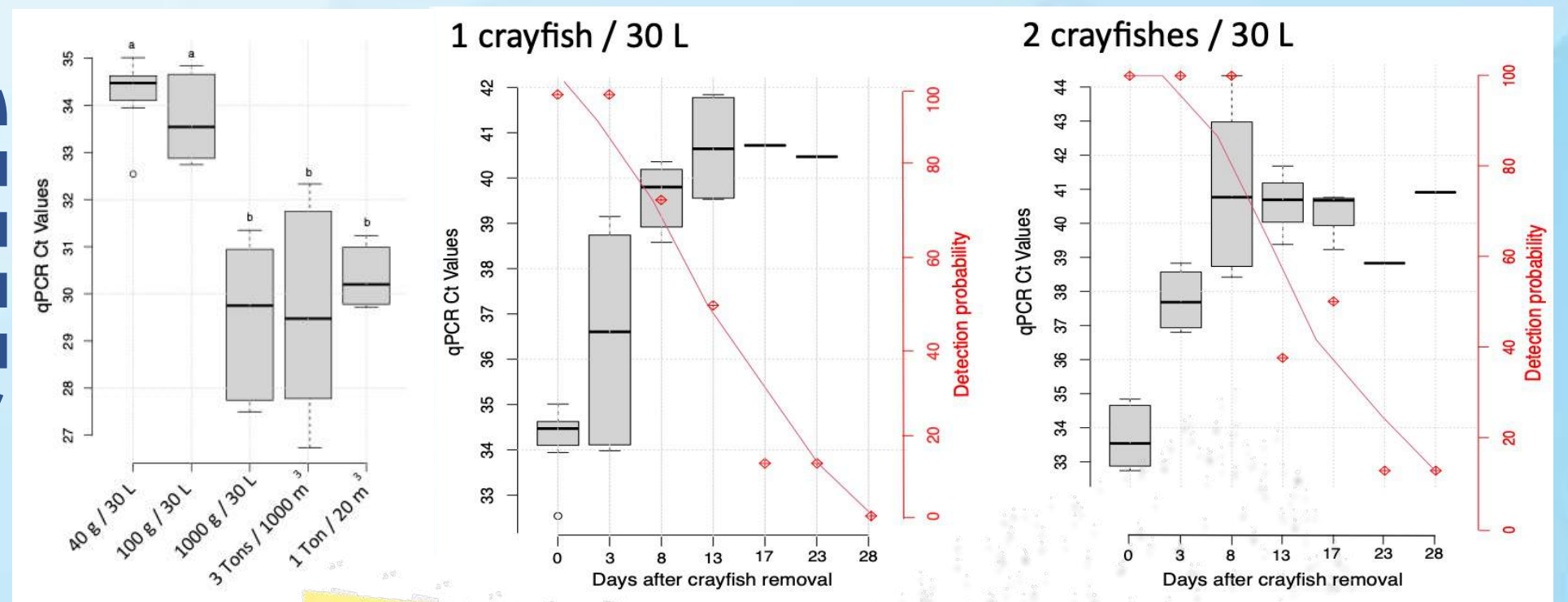
Highly sensitive

- Limit of Detection = 1.19×10^{-6} ng.μL⁻¹
- Limit of Quantification = 1.91×10^{-5} ng.μL⁻¹

1- Significant influence of biomass on detection efficiency (t = 8.1001, p-value = 9.502e-06)

2- Decrease of eDNA detection efficiency over time after crayfish removal

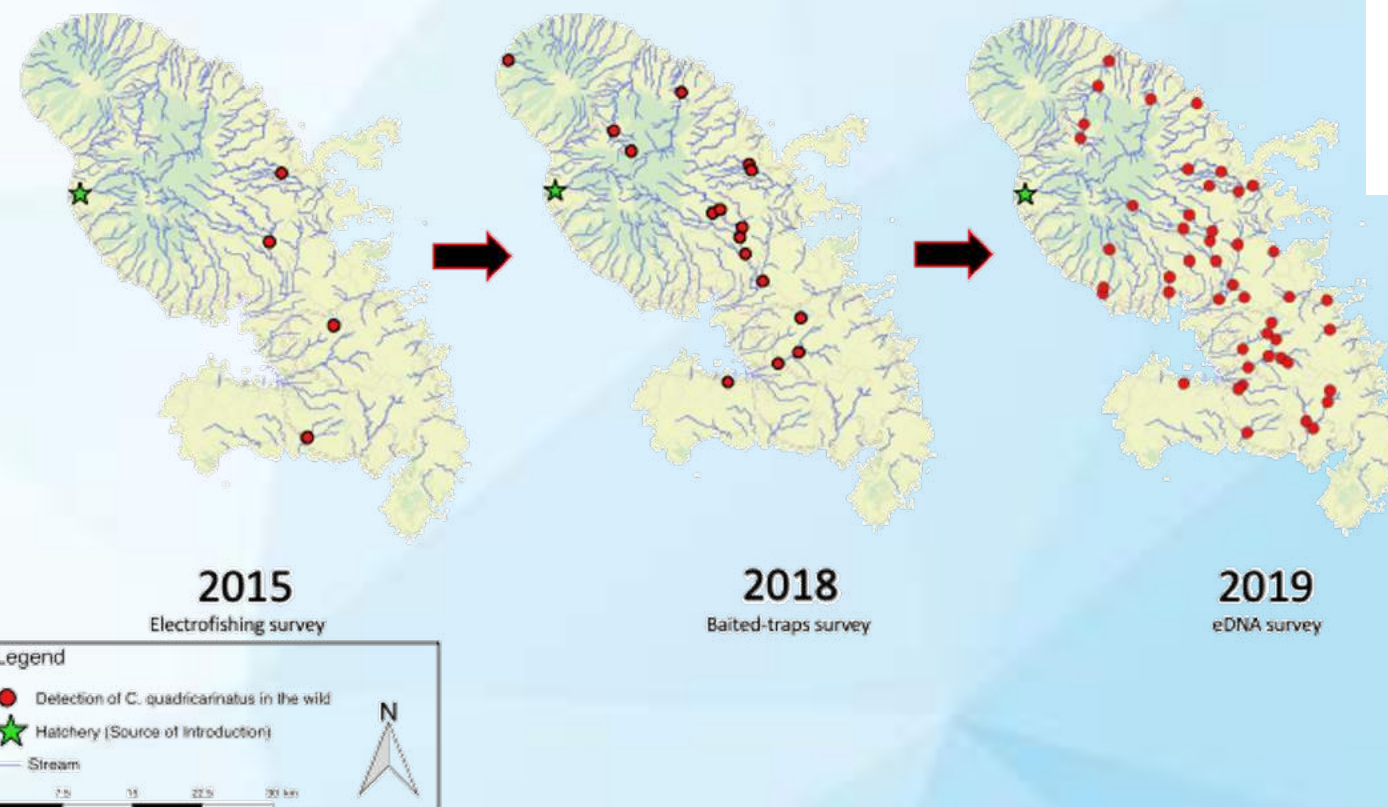
3- Persistence of eDNA up to 23 days (1 crayfish treatment) and more (28 days for 2 crayfishes treatment)



High validated and optimized eDNA method for *C. quadricarinatus* in Martinique.

- Influence of biomass on eDNA detection efficiency.
- Persistence of eDNA up to 23 days in warm water.
- ⇒ eDNA seems to be more reliable than traditional method for large-scale study.
- ⇒ **Adaptable** to all aquatic (marine and freshwater) species !!

The invasion situation in Martinique is a disaster with watersheds being totally invaded ...



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