

Genetic structure and parasite diversity of the invasive Atlantic blue crab *Callinectes sapidus* in Moroccan coastal ecosystems

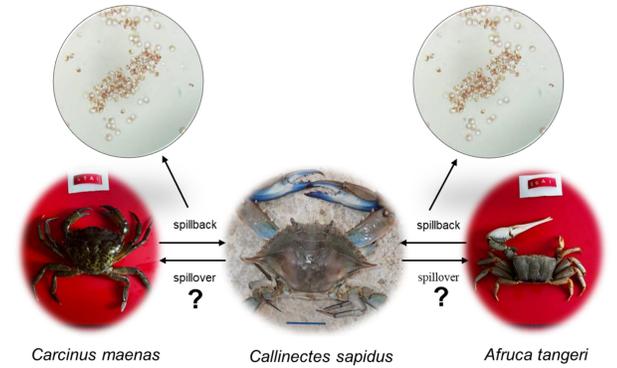
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Introduction

The Atlantic blue crab, *Callinectes sapidus*, is a well-established invasive species along the Mediterranean and the Atlantic coasts of Morocco. The present study aims to:

- ✓ Determine the origin and structure of Moroccan populations of *C. sapidus*;
- ✓ Explore parasites of the invasive *C. sapidus*, and the native crabs *Carcinus maenas*, and *Afruca tangeri* in Morocco;
- ✓ Test the enemy release hypothesis in the invasive blue crab, and detect potential parasite spillover or spillback between native and non-native species.



Material and Methods

- ✓ Specimens were collected from four Moroccan coastal lagoons along the Mediterranean and Atlantic coasts (Figure 1).
- ✓ 110 *C. sapidus* specimens + 599 published sequences to study global population structure.
- ✓ Hemolymph was microscopically screened for parasites belonging to *Hematodinium* and internal organs (hepatopancreas, gills, heart, stomach, and ganglion) were examined for other parasites.
- ✓ Genetic analysis of *Hematodinium* was performed using Sanger sequences (13 sequences from *C. sapidus*, 3 from *C. maenas*, and 17 from *A. tangeri* were obtained).

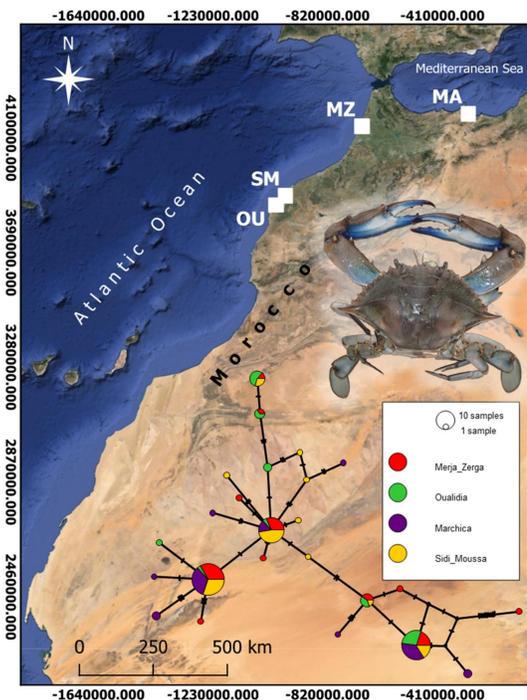


Figure 1: Map showing the location of the study sites

Results

- ✓ Moroccan populations of *C. sapidus* present a high genetic variation, and link with populations along the eastern coast of the United States (Figure 2).
- ✓ Parasites identified are reported in Figure 3.
- ✓ *Hematodinium perezii*, is the first confirmed parasite reported in *C. sapidus* in Morocco.
- ✓ The haplotype network (Figure 4) reveals that Moroccan *H. perezii* sequences are closer to those from England and Greece, but more distant from those in the USA.

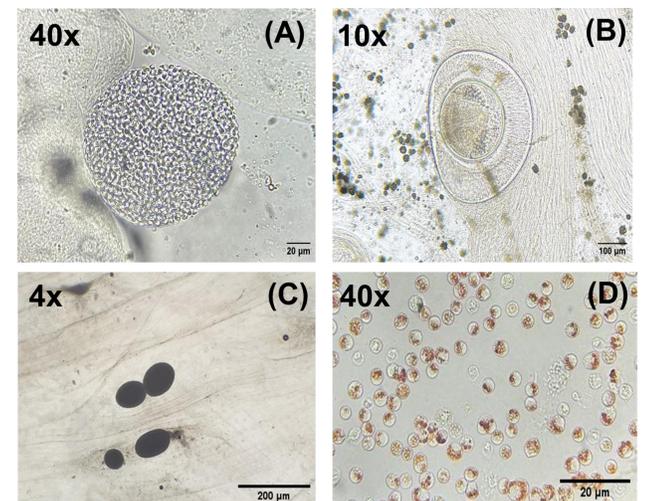


Figure 3: Haplosporidian (A) observed in the ganglion of *Afruca tangeri*, metacercaria (B) and microsporidian (C) in the ganglion of *Callinectes sapidus*; *Hematodinium perezii* (D) in the hemolymph of *C. sapidus*.

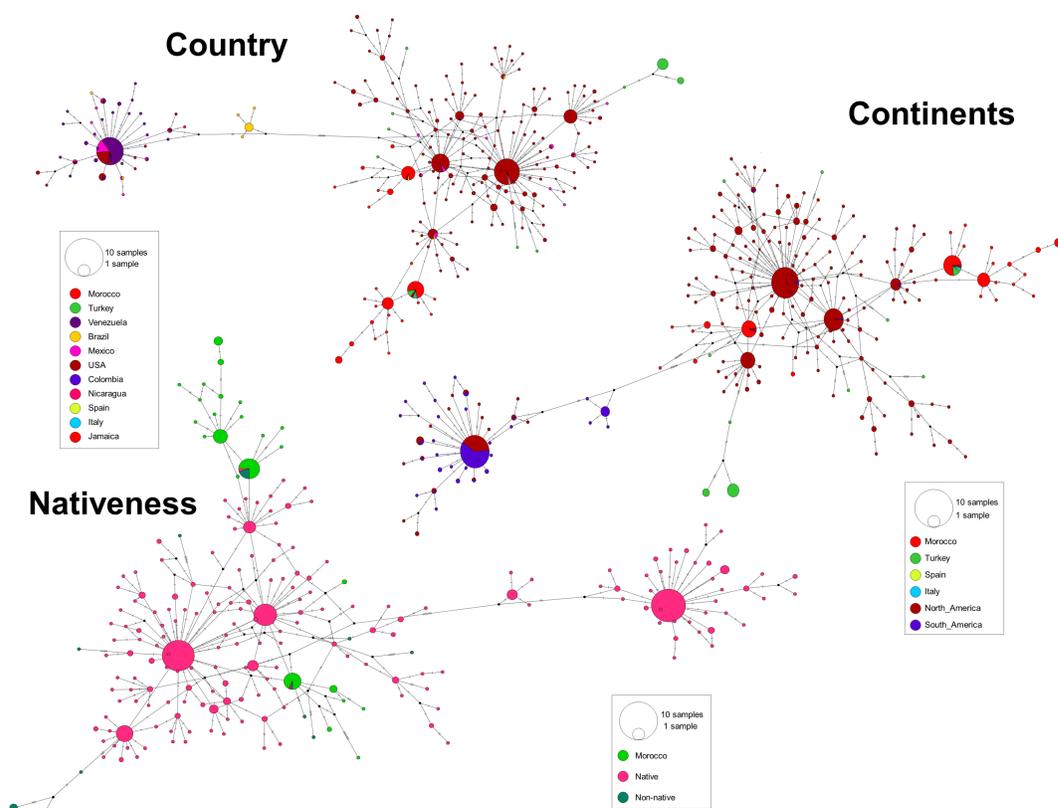


Figure 2: Haplotype networks of COI sequences of *C. sapidus* from Morocco and GenBank sequences. Circle size indicates haplotype frequency; vertical lines represent the number of mutations.

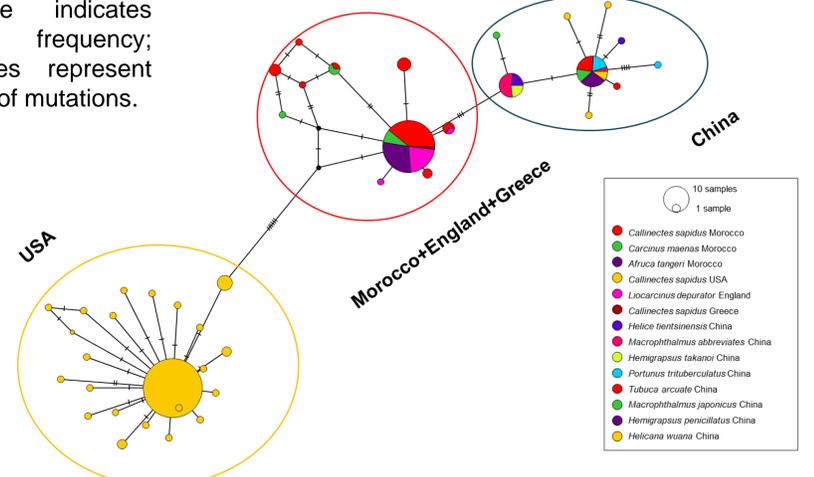


Figure 4: Haplotype network of *H. perezii* (ITS1 rDNA) from the crab species studied and GenBank sequences, grouped by host and country. Circle size indicates haplotype frequency; vertical lines represent the number of mutations.

Conclusion

- ✓ High genetic diversity of *C. sapidus* with North American populations as a source of global distribution.
- ✓ Parasite spillback from the native crab species in Morocco.
- ✓ Parasites as additional source of information on the impact of invasions.

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