Symbiotic Mimicry

Exploring the Symbiotic Seastar Shrimp Coloration

Lisa Mussoi, Alexia Lourtie, Gilles Lepoint, Frank David & Guillaume Caulier

Biology of Marine Organisms and Biomimetics Unit, University of Mons, Belgium

Lisa.mussoi@umons.ac.be, Alexia.lourtie@umons.ac.be, G.Lepoint@ulg.ac.be, fk.david@protonmail.com, Guillaume.caulier@umons.ac.be

Context

- **Introduction:** *Zenopontonia soror*, a symbiotic shrimp associated with at least 27 species of tropical seastars.
- *Z. soror* has the ability to **adapt its coloration** to its host.
- There is variability of **color morphotypes** (Fig. 1)
- The carotenoids are predominant in crustaceans and primarily **obtained through diet**.
- **Objective**: Understand *Z. soror* color adaptation to its host.
- **Hypothesis:** *Z. soror* acquires carotenoids through a diet similar to its host, *C. novaeguineae.*

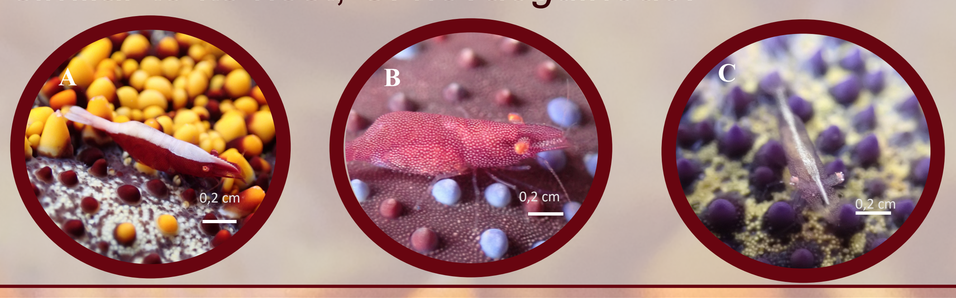
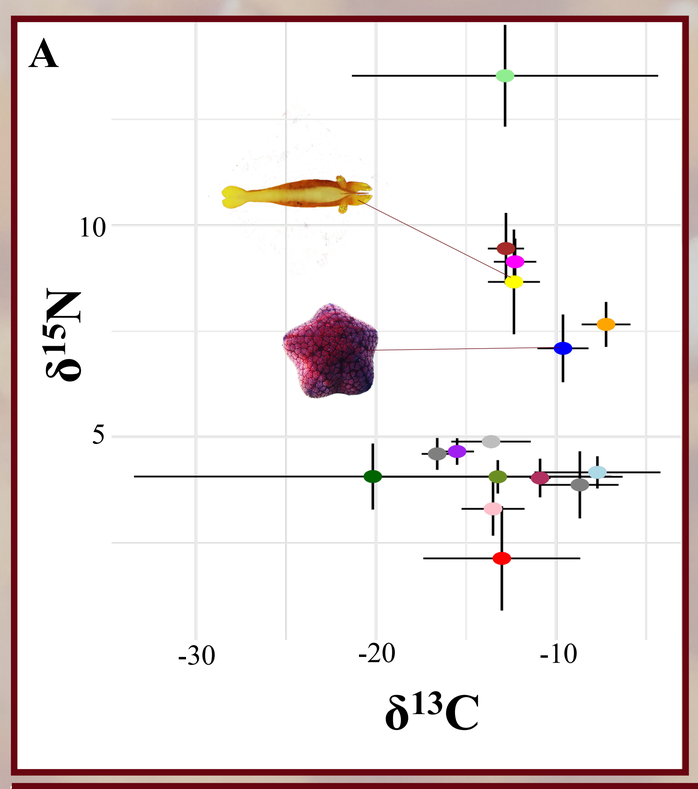
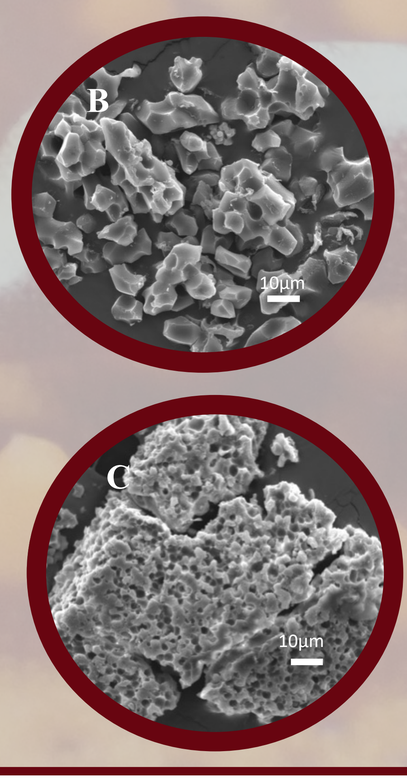


Figure 1: Morphotypes of *Z. soror* **A)** Striped-color individual **B)** Full colored morphotype **C)** Translucent morphotype

Stable isotopes analysis

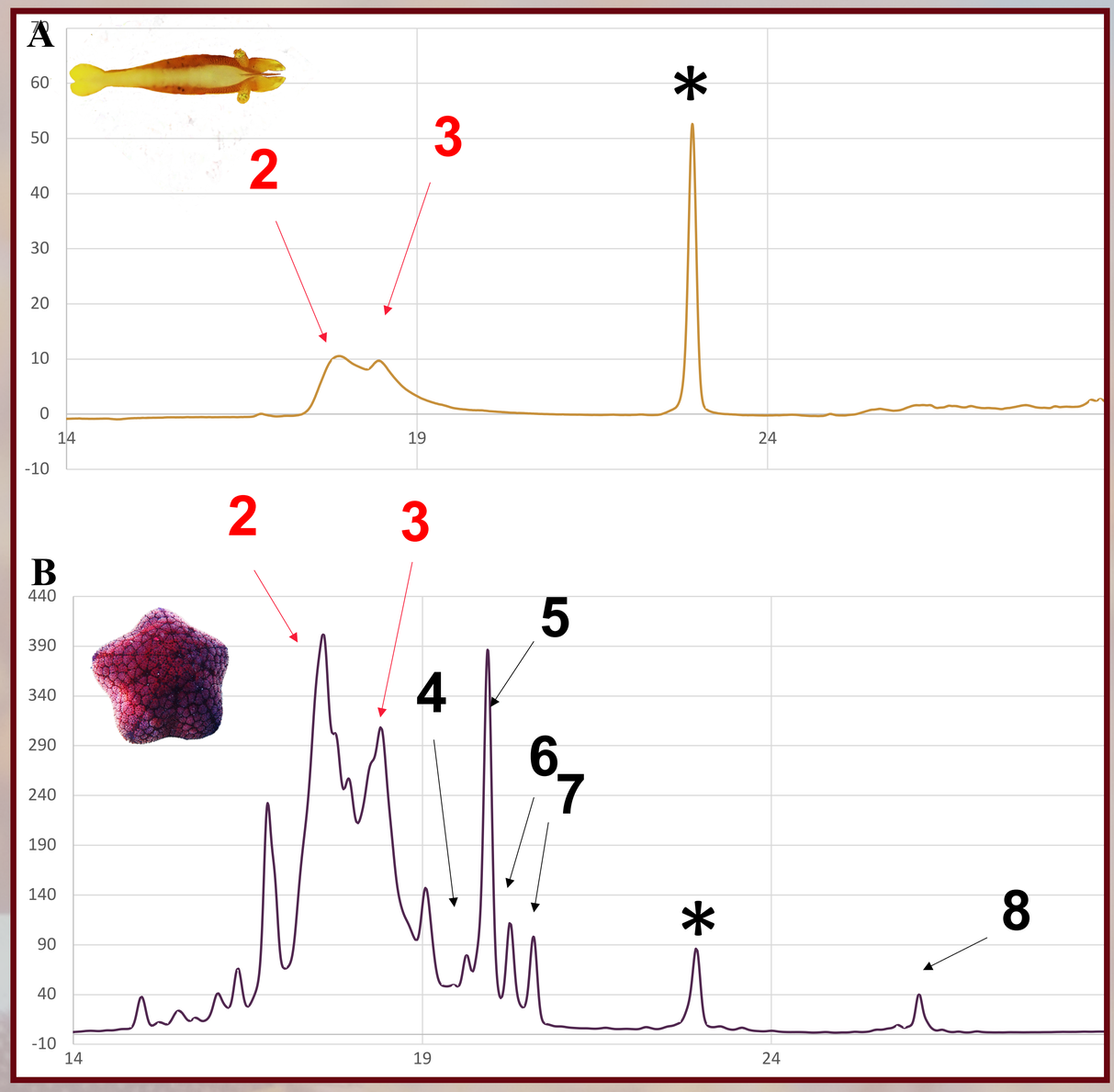




Z. soror (2021) · *Z. soror* (2022) · *C. novaeguineae* (2021) · *C. novaeguineae* (2022) · *Asterophila* sp. (2022) · *E. chardewalli* (2022) · *P. acuta* (2022) · *Pocillopora* sp. (2022) · *E. mathaei* (2022) · Coralline algae (2022) · Biofilm (2022) · Algae 1 (2022) · Algae 2 (2022) · Algae 3 (2022) · Algae 4 (2022) · Algae 5 (2022)

Figure 2: **A)** Isotopic niches of *Z. soror* and its sources with means and standard deviations (∂C13 and ∂N15). **B)** Host ossicle particles found in the gut content of *Z. soror* **C)** Corals particles found in the gut content of *Z. soror*

Carotenoids analysis



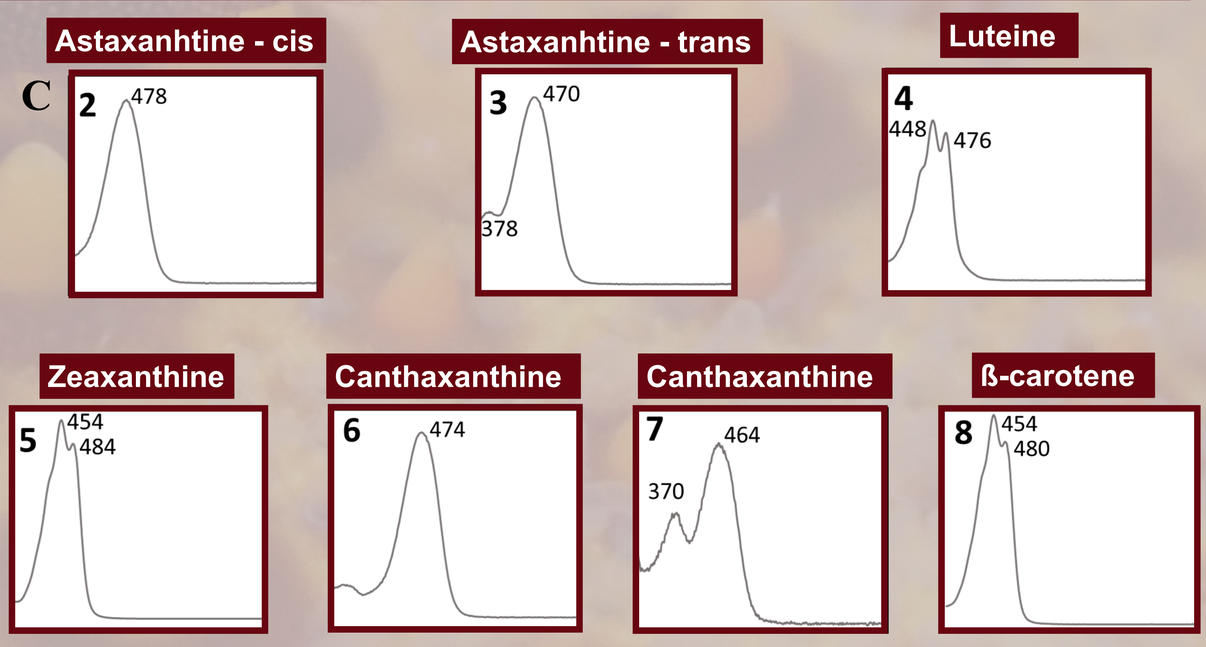


Figure 3: High-performance liquid chromatography (HPLC) carotenoid profile with y-axis as absorbance at 470 nm and x-axis as retention time (min). **A)** Chromatogram of *Z.soror* **B)** Chromatogram of *C. novaeguineae* **C)** Absorbance of each pigment identified. ✱ 8-beta-Apo-carotenal (standard)

Conclusion

In the pigment analysis, various carotenoids were identified in both symbiotic species. Astaxanthin, in particular, was found to be common in both the host and the symbiont. Identical pigments may be involved in this mimetic coloration. Stable isotope analysis suggests that the symbiont feeds on both the host and the same food source as the host. The stomach contents of the symbiont confirm these results. **By feeding on its host, the symbiont could obtains the same pigments as its host, thus mimicking it.**

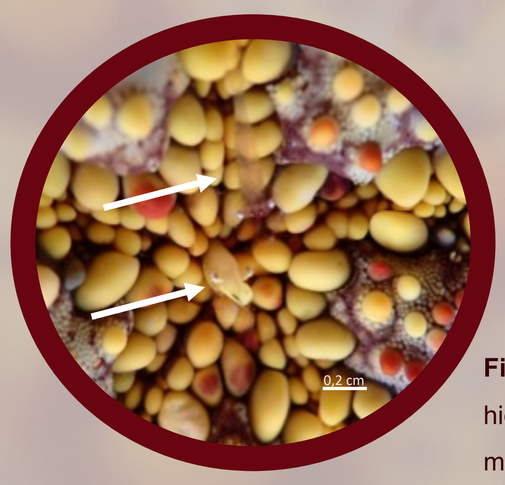


Figure 4: *Z. soror* individual hiding in and near the host's mouth.

References

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