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The Range Expansion of *Minuca pugnax* into the Gulf of Maine

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USDA NIFA
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Introduction

This summer, I was a Marine Crab Technician Intern for PhD candidate Jordanna Barley in Brian Cheng's lab. I worked with larvae from the Mud Fiddler Crab, *Minuca pugnax,* which I collected from a salt marsh in Scituate, MA. *Minuca* spawn in estuaries and use vertical migration to migrate to the coastal ocean where they go through 5 planktonic (zoeal or larval) stages. I looked at the 6 stages (5 zoeal and 1 megalopal) under a microscope and took images of them to determine how their anatomy changed throughout each stage. Once they finish larval development, they metamorphose into megalopa, start to settle to the floor, and migrate back to the estuary. This is where they will continue development into juvenile benthic crabs and find a settlement area in the estuary.

Methods

Ovigerous female *Minuca pugnax* were collected from Scituate and West Dennis MA, and Painter and Cushman beaches in VA. Once the larvae spawned, 40 were counted from each crab and put in a separate mason jar with seawater at 18°C. We performed water changes everyday and fed them rotifers to start and *Artemia* when they progressed to later stages. After a little over a month, they molted into Megalopa and were separated from surviving larvae.

Characterization of the Larval Development of the Mud Fiddler Crab (*Minuca pugnax*)

STAGE 1

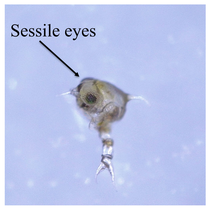

Figure 1. Stage 1 Zoea with sessile (non-moving) eyes.

STAGE 2

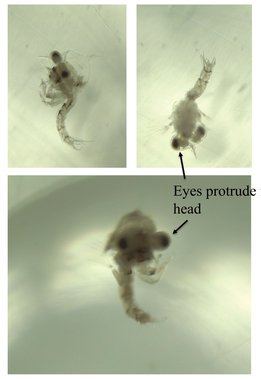

Figure 2. Stage 2 Zoea with stalked eyes (eyes projected from the head).

STAGE 4

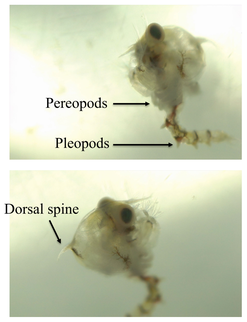

Figure 4. Stage 4 Zoea. Pereopods (upper) and pleopods (lower) are starting to form on the abdomen (both are appendages used for swimming).

STAGE 5

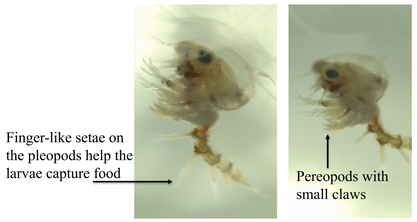

Figure 5. Stage 5 Zoea. Pereopods are forming into appendages and pleopods show more defined setae. The beginnings of small claws are forming.

MEGALOPA

Figure 6. Megalopa. Squared head, loss of dorsal spine, shortened abdomen, and presence of defined appendages and claws.

Figure 7. Me holding a female *Minuca* with eggs in West Dennis, MA.

Figure 8. Jori holding a beautiful blue female *Minuca* with eggs in Scituate, MA.

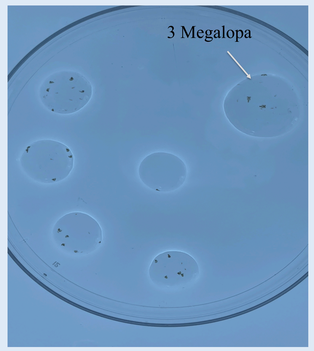

Figure 10. Counting larvae on a petri dish during water changes.

Figure 9. Larvae from Scituate after spawning.

Literature cited

Korn, O., Kornienko, E., Scherbakova, N. (2010, September). A key for the identification of larvae of brachyuran and anomuran crabs in spring plankton of Peter the Great Bay, Sea of Japan. Russian Journal of Marine Biology. 36. 373-382. 10.1134/S106307401005007X.

Paran, B. C., Jeyagobi, B., Kizhakedath, V. K., Antony, J., Francis, B., Anand, P. S., . . . Paulpandi, S. (2022, January 05). Production of juvenile mud crabs, Scylla serrata: Captive breeding, larviculture and nursery production. Retrieved from https://www.sciencedirect.com/science/article/pii/S2352513421004208

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