LARVAL DEVELOPMENT OF *PAGURUS ACADIANUS* BENEDICT, 1901, REARED IN THE LABORATORY (DECAPODA, ANOMURA)

BY

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Benedict (1901) established *Pagurus acadianus* as a species distinct from *Pagurus bernhardus* (L., 1758) despite considerable morphological similarity. The points of distinction are: the proportionally greater length of the fingers of both chelae in *P. bernhardus*, the sharper granules on the chelipeds of *P. acadianus*, the relatively larger eyestalks of *P. acadianus*, and, perhaps most important, geographical separation.

With two such closely related species, it is of considerable interest to compare the larval instars. MacDonald, Pike & Williamson (1957) based their description of *P. bernhardus* on a carefully constructed plankton series after identification of the first zoea from laboratory hatchings. This description was verified and supplemented slightly by Bookhout (1964) who studied cultured specimens.

The present study was undertaken to describe the external anatomy of *P. acadianus* larvae reared in the laboratory. The description of these larvae is then compared to that of its near relative, *P. bernhardus*. A comparison is also made with larvae of other North American *Pagurus* species.

Drawings of appendages of each instar were made from dissected exuvia and verified by dissection of the small number of available preserved specimens. The description was prepared from figures and notes made at the time of examination.

The following abbreviations are used throughout the description: A 1 = antennule, A 2 = antenna, Mn = mandible, Mx 1 = maxillule, Mx 2 = maxilla, Mxp 1 = first maxilliped, Mxp 2 = second maxilliped, Mxp 3 = third maxilliped, P 1 to 5 = pereiopods 1 to 5, Pl 2 to 5 = pleopods 2 to 5, U = uropods.

RESULTS

The eggs of this species average 0.48 × 0.50 mm in diameter when first deposited on the pleopods of the female; when ready to hatch, they average 0.58 × 0.64 mm. Observation of a single female carrying eggs deposited in the laboratory suggests an incubation period of 30 days at 13°C. The eggs have a dark green-black yolk; the embryo has a few red and yellow chromatophores and brown-black eyespots as it nears eclosion.

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Four zoeal and one megalopal instar were observed in the development of this species. Mean intermolt durations for the zoeal instars were 9.0 days for Zoea I, 9.0 days for Zoea II, 10.7 days for Zoea III, and 11.6 days for Zoea IV. The intermolt duration for the megalopa was not determined.

**Zoea I (fig. 1)**

Carapace with rostrum and posterolateral spines. Eyes unstalked. Abdomen with 5 somites and fused 6th somite-telson; abdominal somite 5 with long posterolateral spines plus four posterodorsal spines; somites 2 through 4 with minute posterolateral and posterodorsal spines; somite 1 without spines. Telson formula 7 + 7; process 1 a fused lateral spur; process 2 a minute hair; process 4 longest, equaling 1/2 telson width. Length/width (L/W) of 6th somite-telson = 1.6 to 2.0. Anal spine present.

A 1 (fig. 1D). — Unsegmented, uniramous, with four terminal aesthetascs plus a short seta. A long plumose seta on a minute subterminal knob.

A 2 (fig. 1E). — Scale straight, narrow, with 7 (6-8) plumose setae on inner margin and a terminal spur. Endopod unsegmented, fused to peduncle, slightly longer than scale. Short ventral spine with cuneate spinules at base of endopod.

Mn (fig. 1F). — Numerous teeth, incisor and molar processes indistinctly separated. No palp.

Mx 1 (fig. 1G). — Coxal endite with 7 (8) setae, basal endite with 2 fused spines plus 2 setae. Endopod with 2, 1, 3 setae on medial margin.

Mx 2 (fig. 1H). — Coxal endite bilobed, with 7 setae on proximal lobe, 4 on distal. Basal endite bilobed, with 5 setae on proximal lobe, 4 on distal. Endopod with 4 terminal setae, 3 on inner margin. Scaphognathite with distal lobe only, with 5 plumose setae.

Mxp 1 (fig. 1I). — Coxa nude, basis with 9 setae on inner margin. Endopod with 3, 2, 1, 2, 4 setae on inner margin, a long plumose seta on outer margin of segment 5, and tufts of minute hairs on outer margin of segments 1, 2, and 3. Exopod with 4 terminal plumose setae.

Mxp 2 (fig. 1J). Coxa nude, basis with 3 setae on inner margin. Endopod with 2, 2, 2, 4 setae on inner margins of segments, a plumose seta on outer margin of segment 4, and tufts of minute hairs on outer margin of segments 2 and 3. Exopod with 4 terminal plumose setae.

Mxp 3 (fig. 1K). — Minute uniramous rudiment, nude.

P 1 to 5 — Barely visible rudiments.

**Zoea II (fig. 2)**

Carapace and abdomen unchanged. Telson formula 8 + 8, with process 8 added medially; L/W = 1.9. Anal spine reduced. Eyes stalked.

A 1 (fig. 2D). — Essentially unchanged from Zoea I; plumose seta on minute subterminal knob.