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A New Species of Hippolytid Shrimp from the West Coast of Mexico

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Abstract.—*Thor algicola* n. sp. is described from the Gulf of California and southwestern Mexico. Related to *T. manningi* and *T. floridanus* of the warmer western Atlantic, *T. algicola* can be distinguished by the spines on its first pereopods and its larger size. *T. algicola* usually lives on rocky bottoms, often among algae.

Species of *Thor* are shallow-water hippolytid shrimps living in warm-temperate and tropical marine areas. During studies of the caridean fauna of the Gulf of California, a common species of *Thor* was found among algae. Chace (1972) reported *T. manningi* from the eastern Pacific, but the species from western Mexico was considerably larger than *T. manningi* and had a more robust rostrum. I originally identified the species as *T. paschalis* (Heller) (Wicksten, 1983). Further study of the eastern Pacific species, *T. manningi*, and *T. paschalis* indicated that the eastern Pacific species was in fact undescribed. The new species is described herein.

Thor algicola new species

Figs. 1-3

Thor manningi.—Chace, 1972:137 (part: the Islas Tres Mariás specimens).—
?Ríos and Carvacho 1982:459.

Thor paschalis (Heller): Wicksten 1983:24-25. (Not *Hippolyte paschalis* Heller 1862).

Diagnosis.—Small hippolytid shrimp lacking supraorbital spine. Anterior margin of carapace with antennal spine only, rounded elsewhere. Spine at base of stylocerite. Ischium of first pereopod bearing small spine on distal flexor margin, two small spinules on flexor margin of merus. Dactyl of third pereopod bearing two stout claws and 3-4 spinules, merus with one stout distal spine. Merus of fourth pereopod with one stout subdistal spine, merus of fifth pereopod with one or no stout subdistal spine. Free-living, not commensal with cnidarians.

Description.—Rostrum at most barely reaching anteriorly as far as distal margin of first segment of antennular peduncle, reaching pigmented area of eye, armed with one spine on dorsal midline of carapace and 3-6 spines on dorsal surface of rostrum proper, one ventral spine on rostrum in line with tip, giving rostrum bifid appearance. Rostrum of larger females slightly arched over eye, deeper than rostrum of males or immature females. Spacing of rostral teeth variable.

Eyes large, pigmented; with ocellus.

Carapace with prominent antennal spine, otherwise rounded on anterior margin.

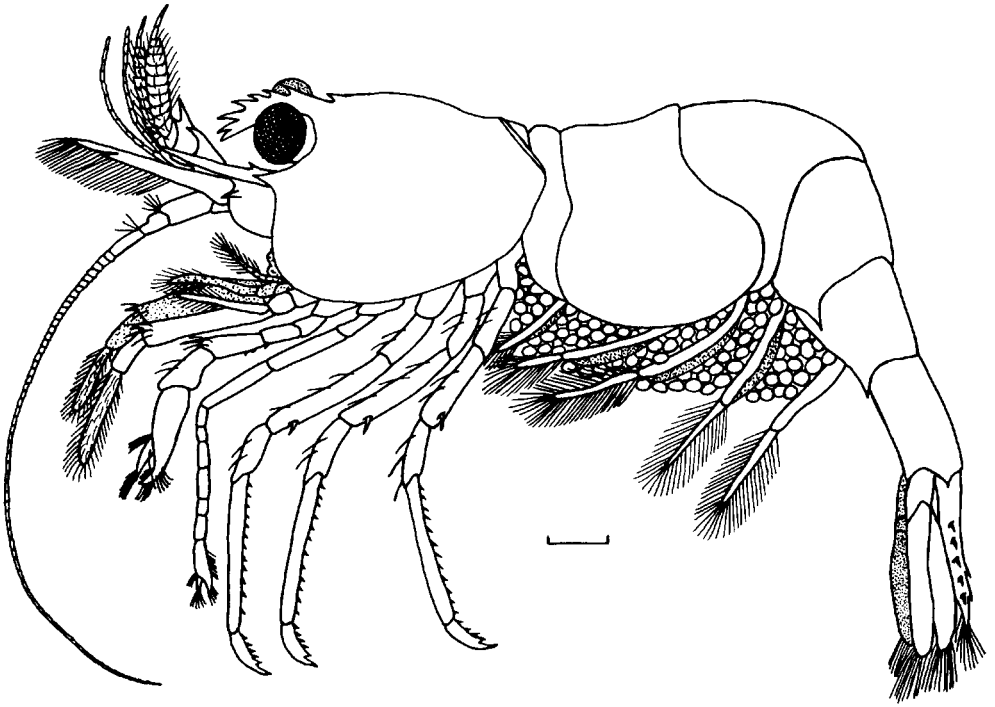


Fig. 1. *Thor algicola* n. sp. Female in lateral view. Carapace length 5.1 mm. Specimen from Bahía Bocoachibampo, Mexico. Scale in all figures is 1 mm.

No supraorbital spine or prominence, but slight supraorbital ridge visible in largest individuals.

Pleura of abdominal segments 1–3 rounded, those of fourth and fifth segments with posterolateral points, sixth segment with distolateral point. Sixth segment longer than fifth. Telson with 4–5 pair prominent posterolateral spines, 3 pair terminal spines and long setae.

Stylocerite nearly as long as third segment of antennular peduncle, with curved spine at base. First segment of antennular peduncle with spine on ventromesial margin, setae at distal margin, about $0.66 \times$ length of stylocerite. Statocyst obsolescent. Second segment of antennular peduncle with sharp distolateral spine. Third segment with subtriangular dorsal scale. Dorsolateral flagellum stout and heavily setose, ventromesial flagellum thin and whip-like.

Second antenna with sharp distolateral spine on basicerite. Carpocerite less than $0.5 \times$ length of antennal scale. Antennal scale broad, about $3 \times$ as long as wide, blade greatly exceeding tooth.

Mandibles asymmetrical. Molar process swollen, armed with numerous teeth; incisor process narrow, armed with 5 teeth. First maxilla with slender lower endite, broad upper endite and bilobed palp. Second maxilla with large scaphognathite, well developed palp, bilobed upper endite and small lower endite. First maxilliped with exopod, two-jointed palp, and bilobed epipod. Second maxilliped with exopod, podobranch, and epipod. Third maxilliped with setose terminal segment, ending in sharp dark spines. Penultimate segment about $0.4 \times$ length of ultimate,

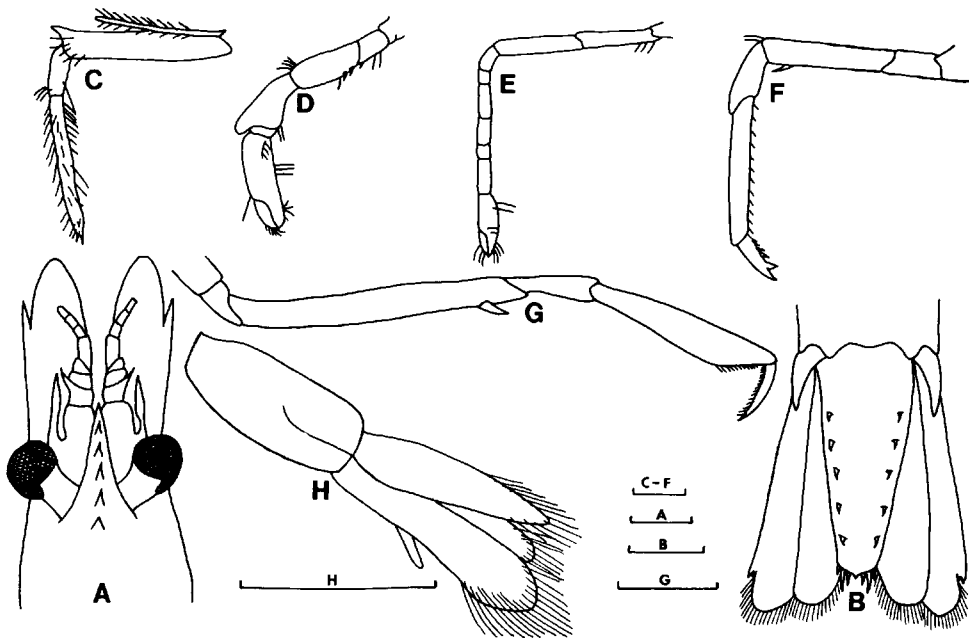


Fig. 2. *Thor algicola* n. sp. A, frontal region of female in dorsal view; B, telson and uropods; C, third maxilliped; D, first pereopod; E, second pereopod; F, third pereopod of female; G, third pereopod of functional male; H, second pleopod of male.

with tuft of setae on mesial distal margin. Antepenultimate segment with tooth and stiff setae on distal margin, about equal to ultimate segment. Exopod and small epipod present.

First pereopod stout, chelate. Dactyl about $0.4 \times$ length of propodus, with tuft of setae at end. Fixed finger with tufts of setae, row of setae on outer proximal margin of propodus. Carpus about $0.5 \times$ length of propodus. Merus shorter than propodus, with 2 small spines on proximal flexor margin. Ischium about $0.5 \times$ merus, with small distal spine on flexor margin. No epipod or exopod.

Second pereopod slender, chelate. Fingers of chelae with tufts of setae. Dactyl about $0.3 \times$ length of propodus. Carpus of 6 divisions, the sixth the longest. Merus shorter than carpus, ischium shorter than merus. No epipod.

Third pereopod of female with slender dactyl, $3 \times$ as long as wide; tip with two stout darkly pigmented claws, that on flexor margin the broader, and 3–4 spines on flexor margin. Propodus $4 \times$ length of dactyl, with 10–14 spinules occurring singly or in pairs on flexor margin, tufts of setae on extensor margin. Carpus about $0.3 \times$ length of propodus. Merus about equal to propodus, with prominent distolateral spine. Ischium about $0.4 \times$ length of merus. Third pereopod of male prehensile, subchelate, barely overreaching scaphocerite. Dactyl with bifid tip and 9 closely appressed spines on flexor margin. Propodus $3 \times$ length of dactyl, distal third of flexor margin converging toward extensor margin, armed with spinules; carpus about $0.5 \times$ propodus, merus $1.5 \times$ propodus, with distolateral spine, ischium without spine. No epipod in either sex.

Fourth and fifth pereopods similar to third of female in both sexes. Fourth pereopod with one meral spine, fifth pereopod with one or no meral spine.

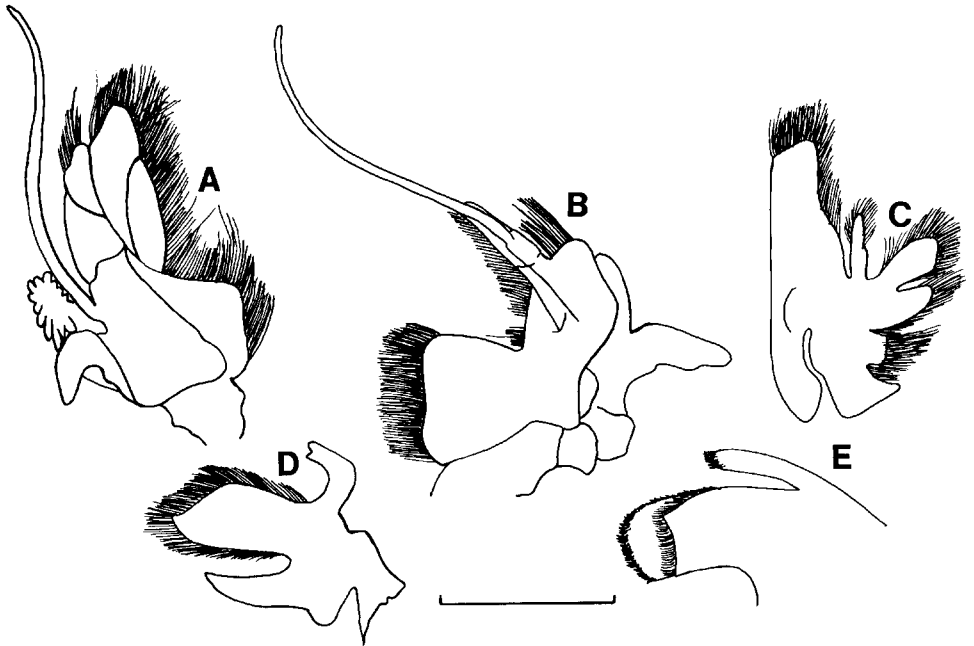


Fig. 3. *Thor algicola* n. sp. A, second maxilliped; B, first maxilliped; C, second maxilla; D, first maxilla; E, mandible.

Female with appendix interna on second pleopod. Male with first pleopod smaller than other pleopods. Male second pleopod with setose appendix masculina.

Uropods longer than telson, fringed with setae. Outer branch of uropod with small distolateral tooth and movable spine.

Holotype.—Female, ovigerous, total length in millimeters 18.4, carapace length 5.1. Bahía Bocoichampo, Guaymas, Sonora (27°57'N, 111°02'W), 5 m, among *Sargassum* sp., 19 June 1978, Alex Kerstitch, Allan Hancock Foundation (University of Southern California) type number 786.

Paratypes.—Cholla Bay, Sonora, on sand, 16 Aug. 1966, Tom and Beatrice Burch, 2 specimens.—S. shore, Isla Tiburon, Gulf of California, shore, among shingle, 25 Jan. 1940, *Velero III* sta. 1045-40, 2 specimens.—Isla San Nicolas, Sonora, 20 m, rubble, 2 July 1978, Alex Kerstitch, 1 specimen.—Isla San Pedro Nolasco, Sonora, 10 m, rocks, 23 Dec. 1978, A. Kerstitch, 1 male.—Punta Doble, Sonora, 25 m, under rock, 25 June 1983, Alex Kerstitch, 1 specimen (dissected).—Isla Candelero, Sonora, 20 m, among rocks, 2 Jan. 1984, Alex Kerstitch, 1 specimen, California Academy of Sciences.—Bahía San Carlos, Sonora, 20 m, rocks and sand, 28 Dec. 1982, A. Kerstitch, 1 specimen.—Bahía Bocoichampo, Guaymas, 5 m, 19 June 1978, A. Kerstitch, 4 ovigerous females in addition to holotype.—Bahía San Gabriel, Isla Espíritu Santo, Gulf of California, shoal, among coral, 14 Feb. 1940, *Velero III* sta. 1110-40, 2 females.—Bahía San Gabriel, Isla Espíritu Santo, 2 m, coral, 15 March 1949, *Velero IV* sta. 1737-49, 36 specimens, 1 of them male.—Zihuatanejo, Guerrero, shore, among rocks, 11 June 1979, R. C. Brusca, 4 specimens.—Bahía Santa Lucia, Acapulco, Guerrero, 2-8 m, mud

and sand, 1–2 Feb. 1954, *Velero IV* sta. 2596-54, 15 specimens, 2 of them males.—San Lorenzo Rocks, Acapulco, 0–4 m, rocks, 30 Jan. 1954, *Velero IV* sta. 2591-54, 15 specimens.—Islas Tres Marías, Mexico, 1927, 4 specimens, United States National Museum (USNM).—Bahía Piñas, Panamá, 4–7 m, coral, 29 Jan. 1935, *Velero III* sta. 444-35, 1 ovigerous female (USNM).—Bella Vista, Panamá, shore, rock, 2 Feb. 1935, *Velero III* sta. 445-35, many specimens (USNM). Except as noted, all specimens are in the collection of the Allan Hancock Foundation, University of Southern California.

Size range.—Total lengths 8–18.4 mm, carapace lengths 1–5.9 mm. Males with prehensile third pereopods: carapace lengths 1–2.4 mm. Ovigerous females: carapace lengths 1.6–5.9 mm.

Color in life.—Mottled with brown and white, closely resembling algae in the habitat. Lines of chromatophores on carapace. Tail fan with white stripe across proximal dorsal surface. Legs banded with brown and white. Very small individuals translucent.

Etymology.—The specific epithet means “dwelling in algae,” referring to the common habitat of the shrimp.

Remarks.—*Thor algicola* resembles seven other species of *Thor* in lacking supraorbital spines. Unlike *T. paschalis*, it has a proximal tooth on the stylocerite. In *T. intermedius* Holthuis, there is only one pair of minute dorsal spines on the telson; *T. algicola* usually has five pair. *Thor marguitae* Bruce has three–four meral spines on the third pereopod; *T. algicola* has only one spine. *Thor dobkini* Chace has one or two spines on the distal half of the flexor margin of the merus of the first pereopod, *T. algicola* has at most two spinules on the proximal margin of the merus of the first pereopod. *Thor amboinensis* (De Man), a commensal of cnidarians, can be distinguished easily from *T. algicola* in life by its distinctive pattern of large spots, as well as by the angular anterolateral margin of its carapace and the relatively shorter dactyls of its third–fifth pereopods. Of these related species, only *T. amboinensis* has been reported from the eastern Pacific (Abele and Patton 1976).

Thor algicola is most closely related to *T. floridanus* Kingsley and *T. manningi* Chace. Neither of these species has two spinules on the merus of the first pereopod. In *T. algicola*, the distal claws of the dactyl of the third pereopod of the female are stronger and the claw on the flexor margin tends to be broader than in the other two species, the merus of the third pereopod does not bear more than one spine, the distal margin of the antepenultimate segment of the third maxilliped often bears a stout tooth, the telson often bears five, not three or four, pair of dorsolateral spines, and the cornea and eyestalk are relatively smaller, not equal in length to more than half the length of the entire carapace. However, both the spinules of the merus of the first pereopod and other distinguishing features tend to be missing or difficult to see in smaller animals.

The major difference between *Thor algicola* and the two most nearly related species is size. Chace (1972) gave a carapace length for females of *T. floridanus* of up to 2.3 mm and *T. manningi* of at most 2.5 mm. The majority of ovigerous females of *T. algicola* are over 3.0 mm long, with 16 of those examined over 4.0 in carapace length. Males also are larger: Chace (1972) reported the males of *T. floridanus* as measuring 1.3–1.6 mm and the majority of functional males of *T. manningi* in the carapace length range of 0.9–1.4 mm, while in *T. algicola*, func-

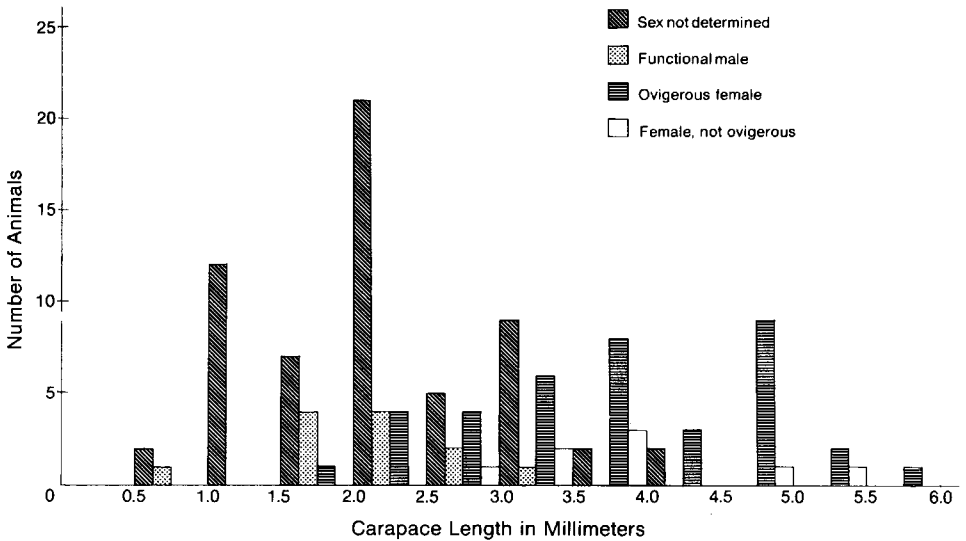


Fig. 4. Size distribution of specimens of *Thor algicola*, by carapace lengths.

tional males range from 1.0–2.6 mm in carapace length, with only one animal with a length less than 2.5 mm. The distribution of all of the specimens of *T. algicola* is given in Fig. 4.

Like *T. manningi*, *T. algicola* may be an imperfect protandric hermaphrodite, with males occurring only in the smallest size ranges. Sexing of the majority of small specimens was not attempted in this study, so males without prehensile third pereopods were not distinguished from females at smaller sizes.

Chace (1972) and Ríos and Carvacho (1982) reported *T. manningi* from the eastern Pacific. I examined the specimens from Mexico which Chace (1972) assigned to *T. manningi*. I consider these specimens to fall within the variation for *T. algicola*. I suspect that the specimens taken by Ríos and Carvacho also belong to *T. algicola*, although I have not had the opportunity to examine material from their area of study.

It is difficult to distinguish specimens of *T. manningi*, known from the Caribbean and western Atlantic, from smaller individuals of *T. algicola*, the eastern Pacific species. The two populations of shrimp, however, have been isolated from each other since the closing of the Panamic seaway, about 3.1–3.5 million years ago (Glynn and Wellington 1983). The differences in the sizes of the animals and slight differences in morphology suggest genetic change on either side of the Panamic land mass. Further studies of the genetics, behavior and color patterns of these shrimp would be useful in determining how closely related these seeming “sibling species” are to one another.

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