

## A new species of *Alpheus* (Decapoda: Caridea: Alpheidae) from the Gulf of Mexico

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**Abstract.**—A new snapping shrimp, *Alpheus hortensis*, n. sp., of the *A. macrocheles* species group is described from the northern Gulf of Mexico. The new species most closely resembles *A. crockeri*, but differs from the latter in having shorter fingers of the minor chela, lacking a spine overhanging the articulation of the dactylus of the minor chela, and having longer infero-lateral spines of the telson. The new species is yellow in life, and lives subtidally among rocks and coral rubble.

### Introduction

Under the auspices of the Flower Garden Banks National Marine Sanctuary, one of us (MKW) has collected specimens of decapod crustaceans by SCUBA diving at Stetson Bank (28° 10' N, 94° 17' W). On 27 June 2001, an unusual specimen of a snapping shrimp, genus *Alpheus*, was retrieved from a hole in a piece of shale. It was recognizable as belonging to the *Alpheus macrocheles* species group, characterized by the presence of orbital teeth, the palm of the major chela moderately compressed, twisted and with 3 heavy longitudinal ridges separated by grooves, the superior ridge terminating distally in a strong acute tooth above the dactylar articulation, the lateral ridge usually terminating in an acute tooth below the dactylar articulation, the adhesive discs well developed, the dactylus of the major chela with a small, truncated or reduced plunger, and the small chela not balaeniceps (Coutière, 1899, 1905).

Comparison of the specimen from Stetson Bank with other specimens in the

collections of Texas A&M University (TAMU) indicated that they all belong to the same species. This species previously had been reported as "*Alpheus* sp." by Pequegnat and Ray (1974) in a publication on biota of the West Flower Garden Bank. Linda Pequegnat confirmed these specimens belonged to the same species. The previous specimens, however, were broken and lacked the first pereopods. After comparing these specimens to material and descriptions of similar species from the Gulf of Mexico, Caribbean and Atlantic, we concluded that the unidentified specimens belong to an undescribed species.

### Materials and Methods

We compared our unidentified specimens to two specimens of *A. amblyonyx* Chace, 1972 from the collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM); and four specimens of *Alpheus peasei* (Armstrong, 1940) from the TAMU collection. Comparisons to other species were made using descriptions and illustrations in the literature. Carapace lengths (CL), measured from the base of the rostrum to the posterior margin, are given in millimeters.

The holotype of the new species has been deposited in the collections of the USNM. The other paratype specimens remain in the collections of Texas A&M University.

### Taxonomy

*Alpheus hortensis*, new species

Figs. 1-3

*Alpheus* sp. "Yellow Snapping Shrimp":

Pequegnat & Ray, 1974: 247. (Sic, typographical error).

*Alpheus* sp. ("Yellow snapping shrimp"): Pequegnat & Ray, 1974: 282, fig. 52.

*Alpheus* sp.: Rodriguez, 1986: 163, fig. 38.

Material examined.—Holotype: female, CL 4.4. Stetson Bank, (28°10'N, 94°17'W) near Buoy Number 2, 21-24 m, in hole in shale rubble, 26 June 2001, Mary K. Wicksten, coll., USNM. Paratypes: female, CL 7.8. East Flower Garden Bank (27°55'N, 93°36'W), 15 January 1972, rotenone station. Female, ovigerous, CL 2.7. West Flower Garden Bank (27°52'N, 93°49'W), NE Transect, 72 m, Van Veen Grab No.1, 24 October 1972, sta. WFG721024. Female, CL 4.3. West Flower Garden Bank, NE Transect, 72 m, Van Veen Grab No. 2, 24 October 1972, sta. WFG721024. Male, CL 7.0. East Flower Garden Bank, 21 m, 3 December 1972, rotenone station EFG 721203. Male, CL 7.2. West Flower Garden Bank, 64-92 m, dredge, 6 October 1973, Thomas Bright, coll., sta. 73A15-D8, TAMU 2-2837. Female, ovigerous, CL 4.0. West Flower Garden Bank, 81 m, dredge, 5 October 1973, Thomas Bright, coll., sta. 73A15 Leg 2, TAMU 2-2836. Female, CL 5.5. Twenty-eight-Fathom Bank (27°53'N, 93°27'W), 31 m, 27 August 1976, Rob Abbott, coll., sta. 76G8-II.

Description.—Rostrum sharply triangular, dorsally rounded, not carinate, reaching just over half of length of visible portion of basal segment of antennular peduncle (Fig. 2a, b). Frontal margin between rostrum and orbital hoods broadly U-shaped, anterior margin slanting anterolaterally from base of rostrum to orbital tooth. Orbital hood concealing eye and armed with sharp tooth anteriorly directed (Fig. 2b). Anterior margin of carapace almost vertical from base of orbital hood to pterygostomian angle (Fig. 2a). Posterior margin of carapace with well developed cardiac notch.

Pleura of first to fourth abdominal somites broadly rounded, that of fifth somite subrectangular; sixth somite with postero-ventral

angle and posterior projection rounded both dorsal and ventral to insertion of uropod. Telson approximately twice as long as wide; posterior margin about half width of anterior margin; with 2 pairs dorsal spines, anterior pair inserted at mid-length of telson, posterior pair at mid-distance between anterior pair and posterior margin of telson; posterior margin slightly rounded, armed with 2 pairs of postero-lateral spines, mesial spines more than twice as long as lateral spines (Fig. 3c).

Antennular peduncle with third segment about half length of second segment; second segment subequal in length to first (Fig. 2b); first segment with large mesio-ventral carina bearing subtriangular tooth, latter distally with small anteriorly directed acute tip (Fig. 2c); stylocerite proximally convex, narrowing to sharp point almost reaching distal margin of basal segment (Fig. 2b).

Scaphocerite about three times as long as wide; outer margin slightly concave; distal tooth strong, reaching distal margin of antennular peduncle; blade narrow distally, shorter than tooth (Fig. 2b). Carpocerite slightly longer long than spine of scaphocerite. Basicerite with sharp ventro-lateral tooth (Fig. 2a).

Endopod of third maxilliped in full extension reaching to distal margin of scaphocerite, ultimate segment distally unarmed, setose; as long as penultimate segment, tapering towards tip; antepenultimate segment about as long as combined lengths of distal two segments; exopod overreaching antepenultimate segment.

First to fourth pereopods with epipods. First pereopods strongly asymmetrical. Major cheliped (Figs. 2d, e, f) with dactylus twisted, distally rounded, reaching far beyond pollex, with blunt, subtriangular plunger situated on extreme proximal portion, and fitting into shallow socket on pollex (Fig. 2d, e, f); palm subcylindrical, slightly compressed, outer (lateral) face with deep, broad notch on inferior margin (Fig. 2e), and deep, longitudinal-oblique groove starting proximally at about 3/5 length of palm and extending distally to propodo-dactylar



Fig. 1. *Alpheus hortensis*, new species, holotype, in life.

articulation and partly continued by transverse groove (Fig. 2e); inner face with short longitudinal, supero-distal groove proximal to propodo-dactylar articulation, continued for short distance by same transverse groove thus being connected to outer face; longitudinal ridge below longitudinal groove distally terminating in blunt tooth, inferior margin without notch but slightly concave proximal to pollex (Fig. 2d). Carpus stout, short, cup-shaped only in lateral view. Merus robust, with 9-10 movable spinules and prominent, sharp distal tooth on mesial flexor margin. Ischium short, with 6 small movable spinules on mesial flexor margin.

Minor cheliped (Fig. 2g, l) with dactylus slightly shorter than palm, lateral surface of extensor margin convex, mesial surface flattened. Palm with low distal mesio-dorsal elevation terminating in blunt distal tooth; without acute teeth on either side of propodo-dactylar articulation; ventral margin not notched. Merus with 9-10 movable spinules and sharp distal tooth on mesial flexor margin. Sexual dimorphism unknown because chelipeds preserved only in holotype.

Second pereopod (Fig. 2h) with dactylus of chela slightly longer than palm; carpus about 4 times as long as chela, with 5 articles; first article 1.8 times as long as second;

second article approximately equal to combined lengths of third and fourth articles, third and fourth articles nearly equal in length, fifth article 1.6 times as long as fourth article; merus as long as proximal 3 carpal articles and slightly longer than ischium.

Third pereopod (Fig. 2i) slender; dactylus (Fig. 2j) about 0.4 length of propodus, slender, simple; propodus with 7-9 slender spines on flexor margin; carpus about 0.8 length of propodus; merus unarmed, more than 5 times as long as wide, longer than carpus; ischium with spine on ventral margin. Fourth pereopod (Fig. 2k) similar to third but shorter, ischium with movable spine on ventral margin. Fifth pereopod damaged or lacking, ischium with spine on ventral margin.

Male second pleopod (Fig. 3a, b) with appendix masculina subequal in length to appendix interna. Uropod (Fig. 3c) with lateral margin of exopod having acute tooth and long spine; endopod with series of spinules on distal and mesial margin.

Eggs measuring about 0.5-0.6mm in maximum diameter.

Size.—CL of male: 7.2, CL of females: 2.7-7.8 mm.

Color in life.—Mostly yellow (Fig. 1); major chela with reddish patch near base of

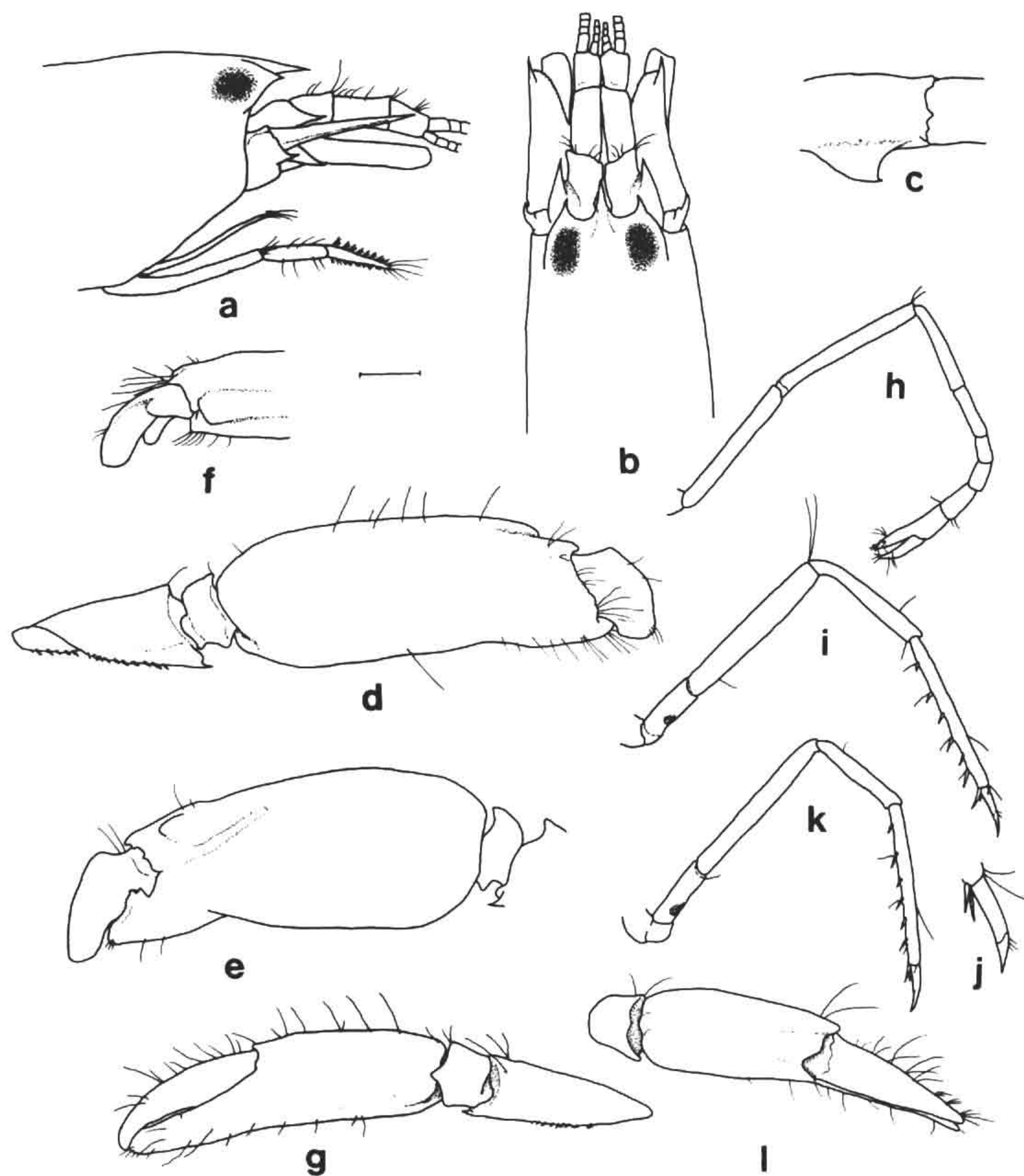


Fig. 2. *Alpheus hortensis*, new species, holotype female, carapace length 4.4 mm. a, frontal region, lateral view; b, frontal region, dorsal view; c, detail of basal segment of antennular peduncle; d, left major chela, mesial view; e, major chela, lateral view; f, fingers of major chela, superior view; g, right minor chela; h, left second pereopod; i, left third pereopod; j, dactylus of left third pereopod; k, left fourth pereopod; l, minor chela in superior view. Scale: a-b, d-i, k = 1mm; c, j= 2mm.

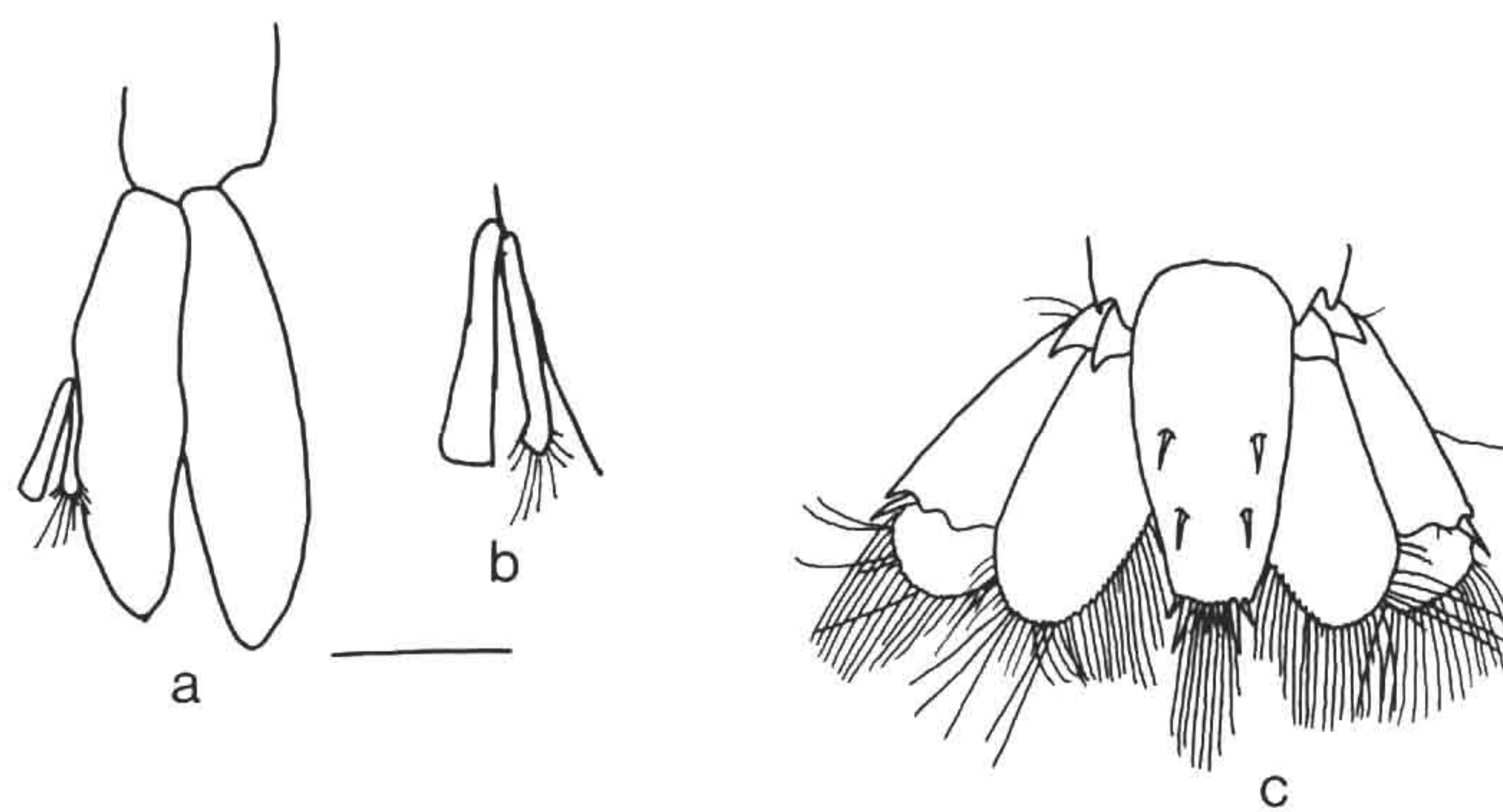


Fig. 3. *Alpheus hortensis*, new species, male TAMU 2-1538. a, second pleopod; b, detail of appendices interna and masculina; c, telson and uropods. Scale: a-b = 2 mm, c=1mm.

dactylus.

Habitat.—Among rock or coral rubble, subtidal. The holotype was collected in a small hole in shale.

Etymology.—The species name is derived from the Latin "hortus", meaning garden, because it was collected at the Flower Garden Banks National Marine Sanctuary.

Remarks.—The new species is similar to *Alpheus crockeri* (Armstrong, 1941), especially to specimens from the eastern tropical Atlantic described by Crosnier and Forest (1966), but can be distinguished from the latter by the proportions of the fingers to the palm in the minor chela, being shorter in the new species; by the absence of armament in the palm overhanging the dactylus in the minor chela, and by postero-lateral spines of the telson, being longer in the new species. The type locality of *A. crockeri* is Samoa. This species also has been reported from many other localities, including Réunion, Thailand, the Philippines, Indonesia, Mariana Islands, and Hawaii (Chace, 1988). There are some differences between specimens described in the Pacific and the eastern Atlantic, which casts doubt on whether the specimens described by Crosnier & Forest (1966) are *A. crockeri*.

Rodríguez (1986) reported a female specimen of *Alpheus* sp. from Venezuela which, except for the presence of an acute tooth at the dactylar articulation of the minor chela, matches *A. hortensis*. It is likely that the two represent the same species, which gives some indication of its geographic range outside of the Flower Gardens Banks.

Five other species of the *A. macrocheles* group occur in the Caribbean-West Atlantic. The new species can be distinguished easily from *Alpheus candei* Guérin-Méneville, 1855 and *A. peasei* (Armstrong, 1940) by features given in the key by Chace (1972), most easily by the dactylus of the third and fourth pereopods: distinctly biunguiculate in *A. candei* and *A. peasei*, simple in *A. hortensis*. In addition, *A. peasei* has a prominent acute tooth on the dorsal surface of the minor chela above the articulation of the movable

finger and an acute process on the distal flexor margin of the merus of the third pereopod, both of which are absent in *A. hortensis*. In *Alpheus pouang* Christoffersen, 1979 the fingers of the minor chela are down-curved. There is a high sharp crest on the extensor margin of the dactylus. In *Alpheus puapeba* Christoffersen, 1979 the fingers of the minor chela are longer than the palm and cross at the tips. There is a prominent spine distal to the articulation of the dactylus.

Among the Caribbean-West Atlantic species of the *A. macrocheles* group, *A. hortensis* n. sp. is closest to *A. amblyonyx* Chace, 1972. The main differences between *A. amblyonyx* and the new species are in the shape of the frontal margin between the rostrum and the orbital teeth, the slenderness of the third pereopod and the shape and sculpture of the major and minor chelae (cf. Chace, 1972, fig. 16). Pequegnat & Ray (1974) reported that the "yellow snapping shrimp" differed from *A. amblyonyx* in having three pairs of dorsal telson spines instead of two, but all of the specimens we examined have two pairs of spines. These authors also noted that the scaphocerite was shorter than the carapocerite. In our specimens, however, these structures are almost subequal.

Among eastern Pacific species, only *Alpheus grahami* Abele, 1975 comes morphologically close to *A. hortensis* n. sp., sharing the absence of deep notches on the superior and inferior margins of the major chela, the dactylus of the minor chela not arched and flattened, and the flexor margin of the merus of the third pereopod being unarmed. However, *A. grahami* has very short, triangular and subacute orbital teeth and a rostrum that barely reaches the middle of the visible part of the first segment of the antennular peduncle. The antepenultimate segment of the third maxilliped is distinctly convex, not straight, as in *A. hortensis* n. sp. The shape of the dactylus of the major chela is more rounded in *A. grahami* than in *A. hortensis* n. sp. (cf. Kim & Abele, 1988, fig. 10 e, f).

In species of *Alpheus*, color patterns usually are species characteristic (Knowlton &

Mills, 1992). The yellow color of *A. hortensis* n. sp. appears to be characteristic. The color pattern of *A. crockeri* from the eastern Atlantic is not known. Specimens from Japan are semitransparent and yellowish, with an orange tinge, and generally very similar in color pattern to *A. hortensis* n. sp. (A. Anker, pers. comm). Information on color would be valuable in differentiating between *A. crockeri*, *A. hortensis* and other related species.

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