

## A new genus and species of alpheid shrimp (Caridea: Alpheidae) from the Galapagos Islands

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**Abstract.**—*Coronalpheus natator* new genus, new species is described from the Galapagos Islands. It lives under subtidal rocks. It is similar to species of *Automate* in having the eyes exposed in dorsal view, the pterygostomian angle of the carapace unarmed, the mandible with a palp and molar process, the first pereopods dissimilar and the dactyl carried extended dorsally, the second pereopod with 5 articles in the carpus and epipods on the 4 anterior pairs of pereopods. However, it has an appendix masculina on the second pereopod, the pigmented part of the eye is well developed and there are distinct spinules on the basal article of the antennular flagellum. The rostrum reaches to the pigmented part of the eye. The stylocerite and scaphocerite are well developed. In life, it is colored yellowish with a bright red line along the dorsal midline.

### Introduction

While participating in a faunal survey in the Galapagos Islands, colleagues and I collected specimens of a brightly colored alpheid shrimp. The specimens at first glance appeared to belong to the genus *Automate* De Man, 1888. I compared the unidentified specimens with descriptions and illustrations in the literature of species of *Automate*, and also with specimens of *Automate* cf. *evermanni* Rathbun from the Gulf of Mexico (Texas A&M University Marine Invertebrate Collection catalogue numbers TAMU 2-6141, 2-6413). Examination of the new specimens and comparisons with previously collected specimens and descriptions indicate that the

shrimp belong to an undescribed species. Herein, the material is described as a new genus and species.

### Materials and Methods

Specimens were collected through the auspices of the Charles Darwin Research Station (CDRS) during a week-long cruise of the research boat *Beagle*. The specimens were collected by hand with the aid of small nets. Specimens photographed in life during the trip have a catalogue number ending in numerals. One specimen that was not photographed is designated by the letter "A". Specimens were frozen and later preserved in 70% ethanol. Except as noted, specimens were returned to the collections of CDRS. Carapace lengths (CL) (orbit to posterior margin of the carapace) are given in mm. The illustrations were prepared by Michael Hodnett, Texas A&M University.

### Systematics

#### *Coronalpheus* new genus

**Diagnosis.**—Carapace compressed, pterygostomian angle rounded; rostrum reaching to pigmented part of eyes; no articulated plate on sixth abdominal somite; telson not terminating posteriorly in triangular tooth; eyes completely exposed, with distomesial tubercle, pigmented area well-developed; antennular peduncles long, first article with spinules on dorsomesial surface; stylocerite prominent, exceeding first segment of antennular peduncle; mandible with 2-jointed palp and molar process; first pereopods dissimilar, carried extended with mov-

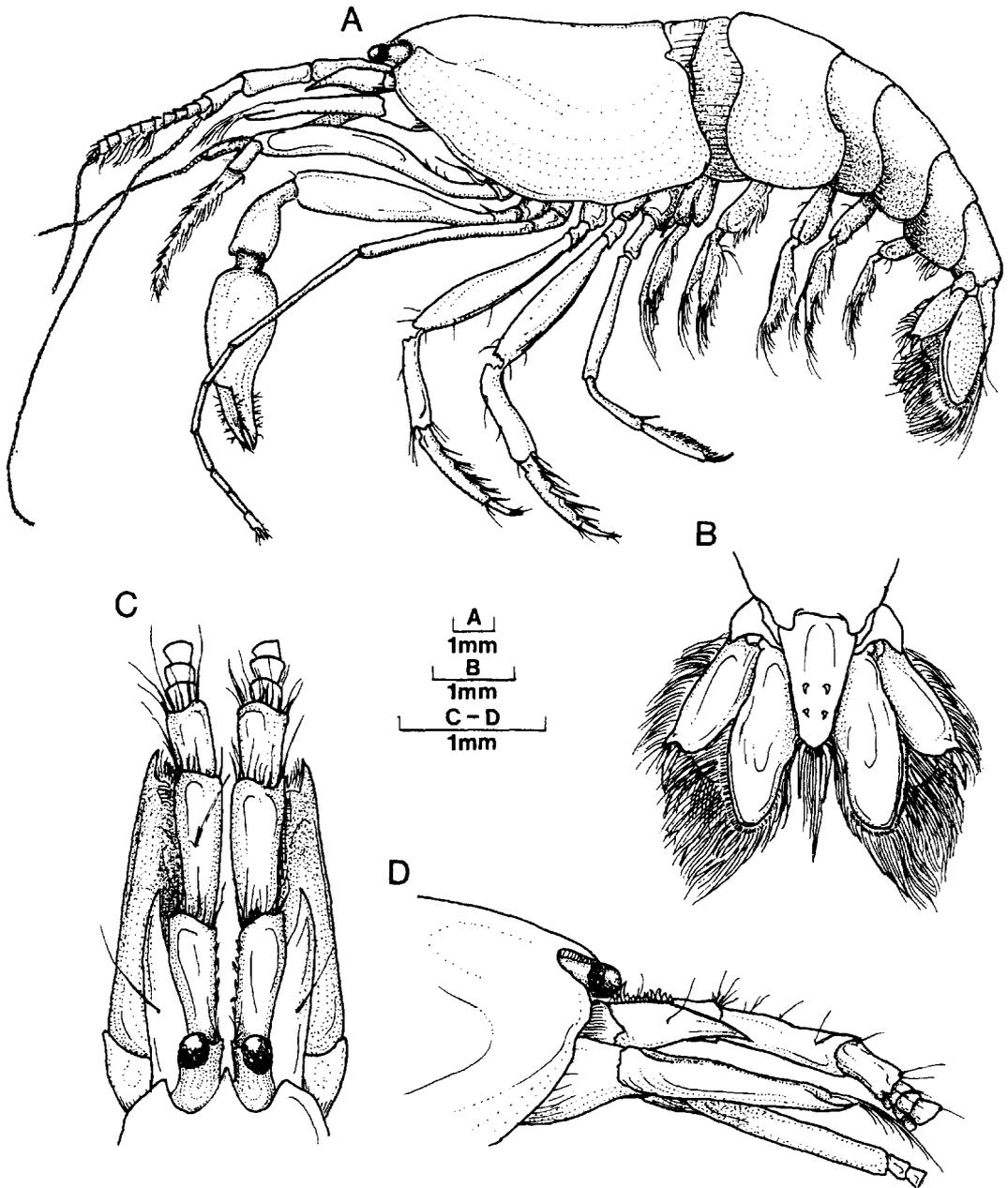


Fig. 1. *Coronalpheus natator*, new genus, new species; female paratype (CL 6.6 mm), CDRS 98-515, USNM 28-7088: A, entire animal in lateral view; B, telson and uropods; C, frontal region in dorsal view; D, frontal region in lateral view. Scales indicate 1 mm.

able finger dorsal; male major chela with gape between fingers, tips crossing, large tooth on immovable finger; second pereopod with carpus having 5 articles; epipods

on first 4 pereopods; male second pleopod with appendix masculina.

Type species.—*Coronalpheus natator*, new species.

**Etymology.**—From “corona”, meaning “crown”, referring to the type locality known to divers as Devil’s Crown; and “alpheus” the type genus of the family. Gender masculine.

**Remarks.**—*Coronalpheus* most closely resembles *Automate* De Man, 1888. Both have a mandible with a palp and molar process, epipods on the first 4 pereopods and the carpus of the second pereopod with 5 articles. Both lack an articulated plate on the sixth abdominal somite. The articles of the second antennae are slender, the eyes are visible in dorsal view. However, in *Automate*, the scaphocerite tends to be reduced, and the cornea of the eye is reduced (Banner and Banner, 1973; Chace, 1988), but not in *Coronalpheus*. No species of *Automate* is reported to have spinules on the first article of the antennular peduncle. Although species of *Automate* may have large teeth on the fixed finger of the major chela, none of them have the shape of the large tooth of *Coronalpheus*. Species of *Automate* are colored pale white to yellow or orange, not marked with bright stripes.

Usually, the rostrum is absent or reduced in species of *Automate* (Banner and Banner, 1973). However, in *A. salomoni* Coutière, 1908 and *A. talismani* Coutière, 1902, the rostrum reaches the level of the extreme anterior margin of the carapace (Chace, 1998). I have been unable to examine specimens of either species. *Automate salomoni* was described briefly and without illustrations from a female from Salomon Island in the Chagos Archipelago. The brief description of *A. talismani*, is based on two specimens, and lacks illustrations. Holthuis (1951) discussed the taxonomic placement of *A. talismani* and concluded that the type locality was the Cape Verde Islands. However, his work did not include any information on the morphology of the species. It would be useful to re-examine these two species to compare them with material of *C. natator*.

According to Chace (1988), species of *Automate* do not have an appendix masculina. Hart and Manning (1981) illustrated and described a single male specimen, identified as *A. dolichognatha* De Man, 1888 from Bermuda. This specimen had an appendix masculina. *Automate dolichognatha* is the type species of the genus, so the presence or absence of an appendix masculina in this species is noteworthy. I believe that the specimen described by Hart and Manning is not *A. dolichognatha*, and may not belong to *Automate*. The specimen from Bermuda has a chela of the first pereopod carried extended with the dactyl ventral, not dorsal or lateral. No other specimen of *Automate* that I have seen myself or for which I have seen illustrations has the dactyl of the first pereopod carried ventral. The proportions of the eyestalks and antennae seem shorter and broader than those of *A. dolichognatha* that I have seen. The pigmentation of the eye is greatly reduced. The specimen came from Tucker’s Town Cave, where one might expect to find unusual crustaceans.

### *Coronalpheus natator* new species

Figs. 1–4

**Material.**—Holotype: Female, ovigerous, CL 6.5. Devil’s Crown (Isla Onslow), north of Isla Floreana, 15 m, under rock, 18 Aug. 1998, CDRS cat. no. 98-676, Natural History Museum of Los Angeles County (LACM) catalog no. 98-103.

Paratypes: Female, CL 6.4. Devil’s Crown, 15 m, 18 Aug. 1998, CDRS cat. no. 98-509. Female, ovigerous, CL 6.6, Devil’s Crown, 15 m, 18 Aug. 1998, CDRS cat. no. 98-515; United States National Museum of Natural History (USNM) cat. no. 287088. Fragment, Devil’s Crown, 17 m, 17 Aug. 1998, CDRS cat. no. 98-504. Female, ovigerous, CL 7.9; male, CL 5.2, Isla Pinzón, 15 m, 19 Aug. 1998, CDRS 98-530. Female, CL 4.8, female, CL 4.1, Conway Bay, Isla Santa Cruz, 9 m, 22

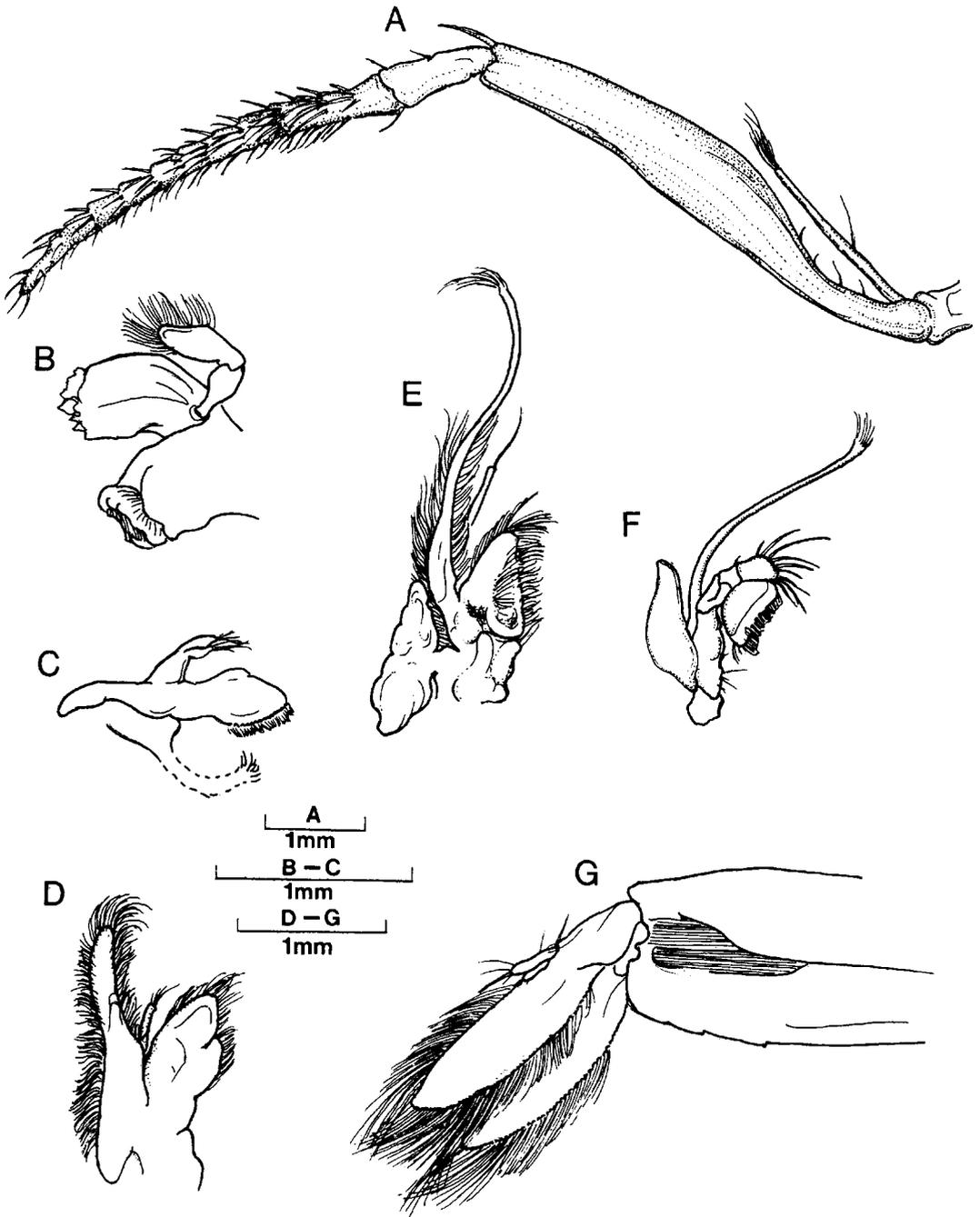


Fig. 2. *Coronalpheus natator*, new genus, new species; A-F, female paratype, CDRS 98-A; G, male paratype, CDRS 98-530: A, third maxilliped; B, mandible; C, first maxilla, proximal endite torn in material illustrated; D, first maxilla; E, first maxilliped; F, second maxilliped; G, right male second pleopod (mesial view). Scales indicate 1 mm.

Aug. 1998, CDRS cat. No. 98-A. All specimens collected by Cleveland Hickman, Jr., Rodrigo Bustamante, Mary Wicksten and party.

**Description.**—Body slender, laterally compressed. Rostrum triangular, with acute apex, reaching to pigmented part of eye. Carapace smooth, with cardiac notch, pterygostomian angles rounded.

Abdominal pleura with rounded margins. Sixth abdominal somite without articulated plate on posterolateral margin. Telson about 2X long as wide, tapering gradually to rounded apex, with two pairs of dorsolateral spines and two pairs of posterolateral spines, long setae at apex.

Eyes pigmented, fully exposed in dorsal view. Eyestalk with distomesial tubercle ending in 2 long setae.

Antennule long and slender. Stylocerite well developed, reaching past end of basal article of antennular peduncle. Basal article with row of spinules along dorsomesial margin. Exposed part of basal article and penultimate article about equal in length, ultimate article about 0.6X length of second article. Upper flagellum with stout and setose proximal portion, distal portion slender; lower flagellum filiform.

Antennal basicerite with lateral spine. Carpocerite longer than scaphocerite. Spine of scaphocerite longer than blade, overreaching end of penultimate article of antennular peduncle. Antennal flagellum long, reaching at least to abdomen.

Mandible with 2-segmented palp; incisor process with irregular blunt teeth, mesialmost of them largest; molar process with rugose ridge and 2 blunt teeth. First maxilla with bilobed palp, each lobe with setae; distal endite broad, lined with setae, proximal endite curved. Second maxilla with slender palp, distal endite bilobed and setose, proximal endite reduced, scaphognathite narrow. All maxillipeds with exopods. First maxilliped with narrow palp, basal endite somewhat tri-

angular in shape, broad and setose; coxal endite also broad, exopod with flagellum well developed, epipod bilobed and large. Second maxilliped with spinose distal segment, propodus broad, exopod well developed; epipod present. Third maxilliped overreaching antennular peduncle by its ultimate segment; with epipod; antepenultimate segment with concave dorsal surface, long stout seta at distal end, exopod reaching about 0.3X of its total length; penultimate segment about 0.2X length of antepenultimate segment, 0.3X length of ultimate segment. Ultimate segment setose.

Pereopods 1–4 with epipods.

Major chela without dense setae, pile or tubercles. In adult male, fixed finger with 1 large tooth bearing three small tubercles. Dactyl with triangular tooth near articulation with palm, blunt tooth and 2 tubercles near apex; fingers crossing and pronounced gape between fingers. In females, fixed finger with one low tooth or triangular ridge, no teeth on dactyl, no gape between fingers, tips of fingers crossing. Flexor surface of palm somewhat sinuous, extensor surface arched. Carpus short, about 0.3 X length of merus in male, 0.5X merus in female. Merus with convex dorsal and ventral surfaces. Ischium with slender spine at dorsodistal end.

Minor chela with smooth margins. Dactyl with tiny subapical tooth, immovable finger slightly spatulate at tip, dactyl closing in concavity. Few tufts of setae on fingers. Extensor and flexor surfaces of palm convex. Carpus about 0.8 X length of palm, without spines. Merus cylindrical, about 2X length of carpus. Ischium with small spine at dorsodistal end.

Second pereopod long and slender, chelate. Carpus with 5 articles: proximal 3 combined longer than distal 2 articles combined; merus slender, slightly shorter than ischium. Pereopods 3 and 4 larger than pereopod 5. Dactyl of pereopod 3

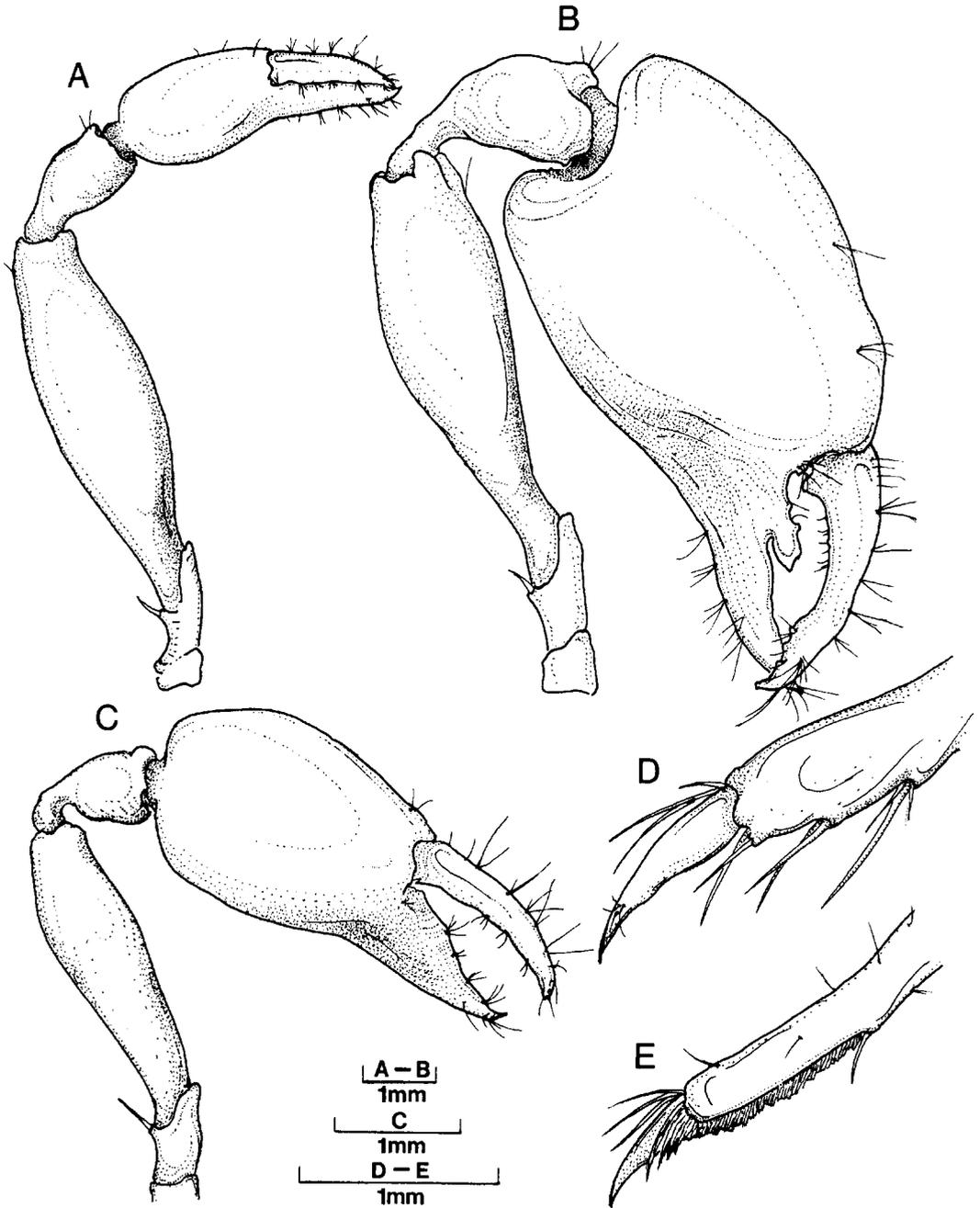


Fig. 3. *Coronalpheus natator*, new genus, new species; A, C-E, female paratype, CDRS 98-515; B, male paratype, CDRS 98-530: A, minor chela; B, major chela of male; C, major chela; D, dactyl of third pereopod; E, dactyl and propodus of fifth pereopod. Scales indicate 1 mm.



Fig. 4. *Coronalpheus natator*, new genus, new species, female paratype, Devil's Crown, CDRS 98-509. Photograph by Cleveland Hickman, Jr.

simple, extensor margin slightly curved, flexor margin slightly concave; propodus with 4 pairs of spinules on flexor margin; carpus slightly shorter than propodus. Merus stout, about 2X carpus; carpus unarmed, ischium without spine. Pereopod 4 similar to pereopod 3, but shorter. Pereopod 5 much smaller and more slender than pereopods 3 and 4; dactyl simple. Propodus with dense covering of setae on flexor surface, about equal in length to carpus, long seta at distal end. Merus 2X longer than carpus.

Second pleopod with appendix interna; male with small, cylindrical appendix masculina bearing long setae. Exopod of uropod with distolateral tooth and strong spine by transverse suture; endopod ovate, longer than exopod or telson.

Eggs round to oval, to 2 mm in largest dimension. At least 12 eggs per female. (Egg masses not intact in specimens examined).

Color in life.—Body with dark red dorsal stripe extending from rostrum to telson; most of sixth abdominal somite and dorsal surface of uropods also red. Minor chela and sides of carapace yellow; yellow marks on third maxillipeds and fingers of major chela, rest of body white.

Habitat.—All of the specimens were collected under rocks in subtidal areas with larger rocks, sand or corals. They were free-living, not in association with larger invertebrates or inhabiting burrows.

Etymology.—The specific name means "swimmer" and is a noun in apposition. These shrimp swam a few millimeters off the bottom when disturbed.

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