

DESCRIPTION OF *EUALUS LINEATUS*
NEW SPECIES, WITH A REDESCRIPTION
OF *HEPTACARPUS HERDMANI* (WALKER)
(CARIDEA: HIPPOLYTIDAE)

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Abstract.—A small striped hippolytid shrimp has been identified as *Eualus herdmani* by several authors. Examination of the holotype of *Spirontocaris herdmani* Walker revealed that this unique specimen should be assigned instead to the genus *Heptacarpus*, and that it differs from an undescribed species assigned to it in the literature. *Heptacarpus herdmani* is redescribed. The common subtidal striped shrimp of the western coast of North America is described herein as a new species, *E. lineatus*.

Species of *Eualus* live in boreal to cool temperate waters of the northern and southern hemispheres (Wicksten 1979). A small striped shrimp of this genus has been collected subtidally along the Pacific coast from Alaska to western Mexico. This shrimp has been identified as *E. herdmani* (Walker). However, specimens of this animal do not agree completely with the description given by Walker (1898). We borrowed specimens from the Allan Hancock Foundation (AHF), and the U.S. National Museum (USNM) to compare them with the holotype, borrowed from the British Museum (Natural History).

This paper describes as a new species *E. lineatus*, previously misidentified as *E. herdmani*. *Spirontocaris herdmani* is redescribed and assigned to *Heptacarpus*.

This work was supported in part by a fellowship from the Allan Hancock Foundation and a minigrant from Texas A&M University. Figures 1-2 were prepared by Alastair Denbigh, Pacific Biological Station.

Heptacarpus herdmani (Walker)

Spirontocaris herdmani Walker, 1898:277-278, pl. 16, fig. 2.

Heptacarpus herdmani.—Holmes, 1900:204.

Spirontocaris herdmani.—Rathbun, 1904:100-101 (in part).

Eualus herdmani.—Holthuis, 1947:11 (in part).—Word and Charwat, 1976:103-104 (in part).—Butler, 1980:197-198 (in part).

Not *Eualus herdmani* of Hobson and Chess, 1974:579 (= *Eualus lineatus* n. sp.)

Description.—Rostrum horizontal, reaching beyond second segment of antennular peduncle and almost to end of scaphocerite. Two dorsal teeth on carapace, series of 3 to end of eyestalk, distal half of rostrum without dorsal teeth. Apex of rostrum sharp. Rostrum with 1 prominent ventral tooth just behind tip, slight knob behind tooth.

Carapace smooth, dorsum straight. Very small knob at level of suborbital spine. No supraorbital spines. Antennal spines strong, prominent; pterygostomian spine very small and sharp.

Abdomen smooth. Pleurae of segments 1–4 rounded, those of segments 5 and 6 with sharp points. Telson with 3 pairs of lateral spines. Spines at apex of telson broken.

Eye darkly pigmented, round.

Stylocerite reaching end of first segment of antennular peduncle. First segment with 2 lateral spines. Second segment less than $0.5\times$ length of first, with 1 spine. Third segment and flagella broken. Entire peduncle "about $0.5\times$ length of antennal scale" (Walker 1898).

Basis of second antenna with sharp ventral spine, large blunt knob above. Scaphocerite broken, but broad. Flagella missing.

Mouthparts dehydrated and fused in holotype. First and second maxillipeds with exopods. Third maxilliped without exopod, but with epipod, "reaching beyond end of antennal scales" (Walker 1898).

First pereopods strongly chelate, overreaching scaphocerite, with epipods. Fingers shorter than palm, with tuft of setae at tip. Propodus about $2\times$ length of carpus, merus about equal to propodus. Ischium about $0.5\times$ length of merus.

Second pereopods chelate, with epipods. Fingers of chela shorter than palm. Carpus with 7 segments, the third of these the longest. Merus and ischium about equal, both about $0.5\times$ length of carpus.

Third pereopods with long, curved simple dactyls. Dactyls with a few long setae on curved margin, about $0.33\times$ length of propodus. Carpus about $0.5\times$ propodus, with overhanging knob at articulation with propodus. Merus longer than propodus, with 2 spines. Ischium about $0.5\times$ merus. Fourth and fifth pereopods similar to third, all without epipods. Fourth merus with 4 lateral spines, fifth merus without spines.

Pleopods dehydrated in holotype. Eggs small, numerous. Uropods broad, ovate.

Type-locality.—"Puget Sound" (Walker 1898).

Remarks.—The unique holotype of *Heptacarpus herdmani* has been broken and dehydrated so that many fine details cannot be observed. However, the lack of an exopod on the third maxilliped clearly shows that the species does not belong to the genus *Eualus*. Indeed, Walker noted the lack of an exopod in his original description.

Heptacarpus herdmani is related to *H. paludicola* Holmes, and *H. flexus* (Rathbun) in having epipods on the first and second pereopods. *Heptacarpus paludicola* differs from *H. herdmani* in having 6–8 dorsal rostral spines and 2–4 ventral rostral spines, sharp points on the pleura of the fourth abdominal segment, and bifid dactyls with 5 spines on the third to fifth pereopods. *Heptacarpus flexus* has a very slender rostrum with 4–5 dorsal spines and 5–8 ventral spines, a pronounced hump on the dorsal surface of the third abdominal segment, and a sub-orbital spine consisting of a prominent knob.

One may ask who was responsible for the confusion between *H. herdmani* and the species of *Eualus*. Rathbun (1904:60) grouped *Spirontocaris herdmani* with species having both an exopod and an epipod on the third maxilliped and epipods on the first, second, and third pereopods. Specimens from the U.S. National Museum labelled *S. herdmani* in Rathbun's handwriting belong to the new species of *Eualus*, not *Heptacarpus* (nor *Spirontocaris*, as now interpreted). Apparently, Rathbun missed Walker's mention of the lack of exopods on the third maxillipeds, or assumed that he made an error in his description.

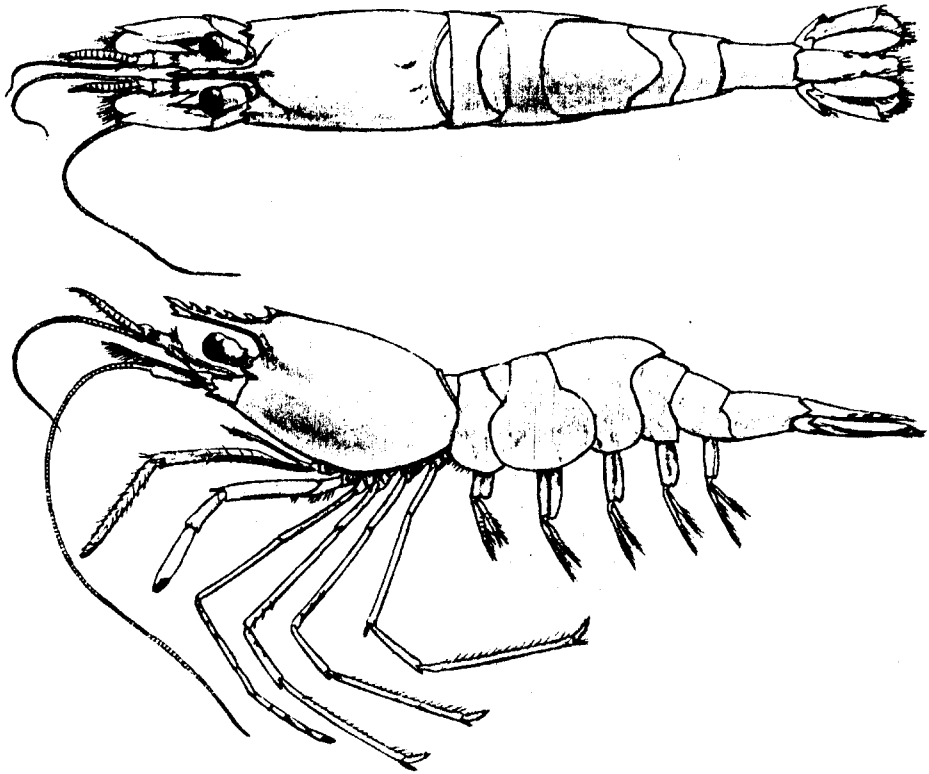


Fig. 1. *Eualus lineatus*: Dorsal and lateral views of female, carapace length 3.1 mm.

As now interpreted, the only known specimen of *H. herdmani* is the holotype from Puget Sound, either from Washington, U.S.A. or the Canadian side. No depth or substrate were mentioned for the specimen, but the long, simple dactyls suggest that the species lived on a soft bottom. Perhaps future dredging or sampling with SCUBA gear will discover more specimens of this poorly known shrimp.

Eualus lineatus, new species

Figs. 1-2

Spirontocaris herdmani.—Rathbun, 1904:100-101 (in part).

Eualus herdmani.—Holthuis, 1947:11 (in part).—Hobson and Chess, 1974:579.—

Word and Charwat, 1976:103-104 (in part).—Butler, 1980:197-198 (in part).

Description.—Rostrum short, reaching second segment of antennular peduncle, straight, with 3-6 dorsal teeth and 1-3 ventral teeth, all of dorsal margin toothed.

Carapace smooth, dorsum straight. Small suborbital spine, moderate antennal spine with supporting carina, moderate pterygostomial spine.

Abdomen smooth. Pleura of segments 1-3 rounded, pleura of fourth segment with weak posterolateral spine, fifth with strong posterolateral spine. Median dorsal margin of third segment strongly produced posteriorly. Telson with 3 pairs dorsolateral spines.

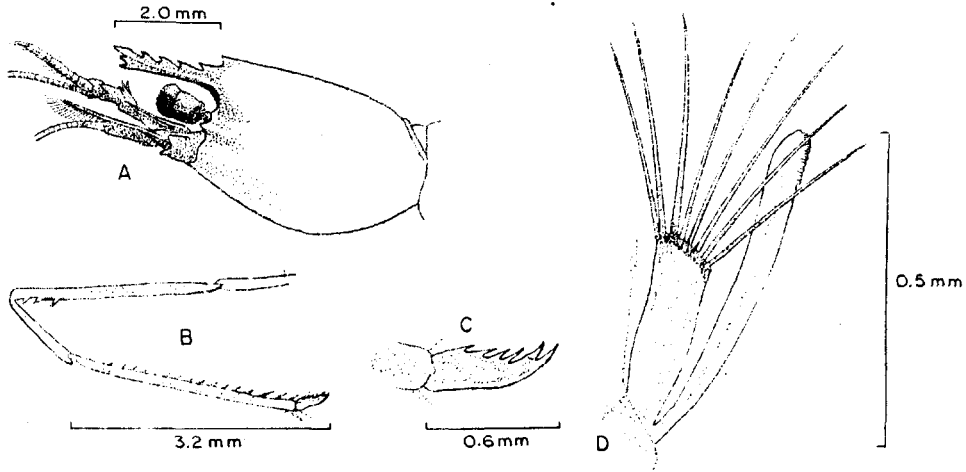


Fig. 2. *Eualus lineatus*: A, Anterior lateral view of female, carapace length 3.1 mm; B, Left third pereopod of female; C, Dactyl of left third pereopod of same female; D, Appendix masculina of male, carapace length 4.1 mm.

Eyes moderately large, darkly pigmented.

Stylocerite reaching end of first segment of antennular peduncle. First segment with 3 moderate dorsal spines. Second segment about $0.5\times$ length of first, with 2 strong spines. Third segment shorter than second, with 2 spines. Inner flagellum more than $2\times$ length of outer.

Basis of second antenna with sharp ventral spine, large blunt upper lobe. Scaphocerite oblong, shorter than carapace, lamella slightly longer than spine. Flagellum slightly exceeding body length.

Mandible with slender incisor process, ending in small teeth. Molar process with spinules. Two-jointed palp present. First maxilla with lower endite slender, upper broad; palp faintly bilobed. Second maxilla with lower endite reduced, upper endite larger, bilobed; palp and scaphognathite well developed. First maxilliped with exopod and 2-jointed palp; epipod bilobed, caridean lobe very small; endites of coxa and basis separated by notch. Second maxilliped with exopod, podobranch, and epipod. Third maxilliped with exopod and epipod, exceeding antennular peduncle, stout and setose.

First pereopod shorter than third maxilliped, stout, with epipod. Fingers of chela less than $0.5\times$ length of palm. Carpus slightly shorter than palm. Merus about $2\times$ length of carpus. Ischium less than $0.5\times$ merus. Second pereopod chelate, longer than first pereopod, with epipod. Fingers shorter than length of palm. Carpus with 7 segments, the third and fourth the longest. Merus about $0.6\times$ length of carpus, slightly longer than ischium. Third pereopod slightly longer than second, with epipod. Dactyl stout, about $0.2\times$ length of propodus, with 5 spines. Propodus with 16–19 spinules in 2–3 rows. Carpus about $0.4\times$ length of propodus. Merus about same length as propodus, with 3 spines. Ischium less than $0.5\times$ length of merus. Fourth pereopod about as long as third. Dactyl stout, similar to that of third pereopod. Propodus with 15 spinules in single row. Merus with 2–3 spines. Fifth pereopod as long as fourth. Dactyl about $0.2\times$ length of propodus,

with 4–5 small spines. Propodus with 14–22 spinules in 1 or 3 rows. Merus with 0–1 spine. No epipods on pereopods 3–5.

Second pleopod with appendix interna. Appendix masculina little more than half length of appendix interna, stout, apex truncated, with 8 long spinules. Uropods reaching end of telson, with long tooth on outer margin.

Type-material.—HOLOTYPE: female, total length 21.0 mm. 1.5 mi. SW of Gull Island, off Santa Cruz Island, California (33°56'00"N, 119°50'55"W), 89 m, mud and sponge bottom, 8 Nov 1941, *Velero III* sta. 1435-41, AHF type number 4129.—Paratype: female. San Juan Islands, Washington, summer 1930, John C. Queen, collector, USNM.—Paratypes: female, carapace length 3.1 mm, west shore Jesse Island, British Columbia (49°12'N, 123°57'W), 30 Apr 1972; female, carapace length 3.4 mm, Boca del Infierno Bay, Nootka Sound, British Columbia (49°38'N, 126°37'W), 21 May 1973, National Museum of Canada.

Other material.—41 specimens from 24 stations, AHF and USNM, Naha Bay, Alaska; coast of British Columbia, Puget Sound, off Depoe Bay, Oregon; southern California from Redondo Beach and off Long Beach; Santa Cruz, Santa Rosa, and Santa Catalina Islands; Bahía San Gabriel, Isla Espiritu Santo, Gulf of California, Mexico; 17–140 m, among rocks, kelp, sand or mud; on wreck (MKW). 34 specimens from Burnaby Narrows, Queen Charlotte Islands (52°22'N, 131°21'W) to Jesse Island (49°12'N, 123°57'W), intertidally on sand and gravel to 232 m on mud, 1928–1973 (THB).

Records in literature.—Sitka, Alaska to Puget Sound (Butler 1980); Santa Monica Bay, Palos Verdes Peninsula, Santa Catalina Island, and Point Loma, California (Word and Charwat 1976).

Color in life.—Red diagonal lines on carapace and first and second abdominal segments, red spots and blotches on third to sixth abdominal segments, telson, uropods, and protopodites of pleopods, smaller red spots on all anterior appendages, including eye stalk and pereopods (Butler 1980, color plate 1C).

Parasites.—Parasitized by *Bopyroides hippolytes* (Butler, 1980). An unidentified rhizocephalan on a specimen from Neah Bay, Washington.

Remarks.—*Eualus lineatus* is related to *E. avinus* (Rathbun), *E. pusiolus* (Krøyer), and *E. berkeleyorum* Butler in having epipods on the first 3 pereopods. In *Eualus avinus* the rostrum is arched over the eye, and bears 12–14 upper teeth and 1–3 ventral teeth. The dactyl of the third pereopod is slender and simple. *Eualus pusiolus* has a straight rostrum shorter than the second segment of the antennular peduncle, with 2–5 upper teeth and at most 1 lower tooth. The dactyl of the third pereopod is stout. *Eualus berkeleyorum* has a straight rostrum with 8–11 dorsal teeth and 2–5 ventral teeth. The dactyls of its third pereopods are slender and simple. It does not have a ventral spine on the pleura of the fourth abdominal segment.

Most specimens of *E. lineatus* have been taken by trawls. One specimen was collected by a SCUBA diver on the wreck of the *Olympic*, off Long Beach, California. A first stage larva of the species has been hatched in the laboratory (Butler 1980). The species is eaten by rockfishes (*Sebastes* spp.) off Santa Catalina Island, California (Hobson and Chess 1974).

Etymology.—The name of the species refers to the red lines on the carapace and body of the shrimp.

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