

***Eualus berkeleyorum* n.sp., and Records of Other Caridean Shrimps (Order Decapoda) from British Columbia**

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A new shrimp species *Eualus berkeleyorum* (family Hippolytidae) is described. The first known occurrence off British Columbia of four pelagic species are recorded: *Parapasiphaë sulcatifrons* Smith (family Pasiphaeidae); *Acantheephyra curtirostris* Wood-Mason, *A. quadrispinosa* Kemp, and *Systellaspis braueri* (Balss) (family Ophlophoridae).

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L'auteur décrit une nouvelle espèce de crevette, *Eualus berkeleyorum* (famille Hippolytidae). Il mentionne pour la première fois la présence de quatre espèces pélagiennes au large de la Colombie britannique: *Parapasiphaë sulcatifrons* Smith (famille Pasiphaeidae); *Acantheephyra curtirostris* Wood-Mason, *A. quadrispinosa* Kemp et *Systellaspis braueri* (Balss) (famille Ophlophoridae).

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DURING the course of surveys by this station's vessels between 1963 and 1969, a large and varied collection of shrimps was obtained. Examination of the material has led to the preparation of this paper, which aims to describe a new species, *Eualus berkeleyorum*, and to record the first known occurrences in the British Columbian marine environment of four bathypelagic species: *Parapasiphaë sulcatifrons*, *Acantheephyra curtirostris*, *A. quadrispinosa*, and *Systellaspis braueri*. Each of the four bathypelagic shrimps has a cosmopolitan distribution, normally occurring in low latitudes. *Acantheephyra quadrispinosa* was collected in the western Pacific Ocean (37°08'-45°07'N, 146°11'-162°53'E) during the first trans-Pacific cruise of the Canadian research vessel *Endeavour* in March and April 1969 (Anon. MS 1970). The other three species have been caught previously off the Oregon coast (Pearcy and Forss 1966).

In 1964 and 1968, the *G. B. Reed*, equipped with Agassiz and shrimp otter trawls and a "triangle"

dredge¹, was employed for fishing in deep water adjacent to the west coast of Vancouver Island (Bernard et al. MS 1967, MS 1970). The same vessel, in 1964, carried out midwater trawling near the Queen Charlotte Islands, B.C. (Taylor MS 1967, 1968). Two smaller vessels, *A. P. Knight* and *Investigator No. 1*, each equipped with a shrimp otter trawl, made five cruises, yielding shrimp material of interest in the Strait of Georgia and Chatham Sound from 1963 to 1969.

I am privileged on this occasion to name the new species as a tribute to Cyril and the late Edith Berkeley. I personally owe much to both for help and inspiration.

Abbreviations used here are: c.l. for carapace length, from the eye orbit to the posterior mid-dorsal edge; and t.l. for total length, from tip of rostrum to tip of telson.

Family PASIPHAEIDAE

***Parasiphaë sulcatifrons* Smith 1884**

Distribution — North Atlantic Ocean, West Africa, Indian Ocean, North Pacific Ocean to Queen Charlotte Sound, B.C.; 500-5400 m.

Present collection — 35 miles S × W Cape St. James (51°26'N, 131°09'W), June 15, 1964; *G. B. Reed* station 64-6-21; daytime, horizontal tow between 640 and 730 m

¹Having a triangular frame of heavy iron, each side 40 inches (102 cm), with attached bag of $\frac{3}{4}$ -inch (19-mm) mesh.

This issue of the *Journal of the Fisheries Research Board of Canada* is dedicated to Dr Cyril Berkeley and to the memory of the late Mrs Edith Berkeley.

with a large nonclosing Engel midwater trawl². One male, c.l. 22.1 mm, total length unobtainable due to damaged telson.

Remarks — The paper by Sivertsen and Holthuis (1956) has been consulted for the previously known range of the species. The present specimen fits the description by Chace (1940) very closely.

Family OPLOPHORIDAE

Acanthephyra curtirostris

Wood-Mason 1891

Distribution — Caribbean region of Atlantic Ocean, east coast of Africa, Indo-Pacific region to Japan and the Hawaiian Islands, west coasts of North and South America, Peru to Vancouver Island, B.C.; 200–5000 m.

Present collection — 67 miles WSW of Cape Scott, Vancouver Island (50°56.4'N, 130°12.2'W), maximum depth 2178 m, September 11, 1964; *G. B. Reed* station 64-212; daytime tow on the bottom with shrimp otter trawl³. One male, c.l. 16.3 mm, total length unobtainable due to damaged rostrum; rostral spines, 8/1.

Remarks — The general distribution was summarized from earlier published records (Chace 1937, 1940; Percy and Forss 1966). It is not unlikely that the specimen was captured while the trawl was being returned to the surface, and the same could apply to other records of oplophorids here.

Acanthephyra quadrispinosa Kemp 1939

Distribution — South Atlantic Ocean, Indian Ocean, Indo-Pacific region, North Pacific Ocean to the open ocean off Japan, and Vancouver Island, B.C.; vertical distribution uncertain.

Present collection — *G. B. Reed* station 64-212 (details above). One female, c.l. 17.7 mm, t.l. 83 mm; rostral spines 12/4.

Remarks — Earlier records of the distribution of the species were taken from Kemp (1939). The tips of both branchiostegal spines are broken off but enough of the flared supporting carinae remain to permit, along with other characters, a definite identification.

²This net was 1200 20-cm meshes (stretched measure) in circumference, and graded through a series of mesh sizes to 2 cm in the codend.

³The so-called Gulf of Mexico flat trawl, having head-rope and foot-rope each 40 ft (12.2 m) in length, and a mesh size throughout of 38 mm.

Systellaspis braueri (Bals 1914)

Distribution — Atlantic Ocean, Bermuda to Georges Bank and Gulf of Guinea to Scotland; Indian Ocean; northeastern Pacific Ocean, Los Angeles to Vancouver Island; within 150 m of the surface and to 4000 m.

Present collection — 35 miles W × N of Estevan Point, Vancouver Island (49°19.0'N, 127°26.6'W), 1460 m. September 9, 1964; *G. B. Reed* station 64-197; daytime tow on the bottom with shrimp otter trawl. One male; c.l. 27.1 mm, t.l. 110 mm, rostral spines 12/2. *G. B. Reed* station 64-212 (details above). Three females; one, c.l. 15.6 mm and t.l. 67 mm; others, c.l. 14.8 and 20.3 mm, total lengths unobtainable due to damaged telsons and rostrum; rostral spines 9-12/2-3.

Remarks — According to Chace (1940), and Sivertsen and Holthuis (1956), this species is quite rare.

Family HIPPOLYTIDAE

Eualus berkeleyorum n.sp.

Material examined — All 15 specimens examined were females. Table 1 lists details of capture and carapace lengths.

Description — Body moderately slender, little compressed. Integument thin, smooth. Rostrum fairly short, about 0.4 times carapace length, not reaching second segment of antennular peduncle; descending; upper limb wider than lower; spines 8-11/2-5, dorsal spines all much same size, closely and evenly spaced giving a serrated appearance, and larger than ventral; tip normally acute, rarely bifid or trifid. Carapace about 0.25 times total length; anterior high in profile (Fig. 1), and frontal margin rather sinuous (Fig. 2f).

Carapace spines: suborbital strong, pointed and slightly ascending; antennal strong with supporting carina; pterygostomial small, yet conspicuous.

Eye moderate in size, including cornea. Antennule: peduncle moderately long, second segment longer than third; stylocerite strong and almost reaching end of basal segment; inner (lower) flagellum slightly longer than outer, both extending far beyond end of scaphocerite.

Antenna: scaphocerite oblong, lamella exceeding spine (Fig. 2b); flagellum exceeds total length. Mandible: palp of two segments, incisor process having 3 teeth; molar process with large irregular surface (Fig. 2a). Third maxilliped: stout, extending considerably beyond scaphocerite; having about 10 spines on distal end (Fig. 2c); with epipod, and long exopod. Pereiopods: I, stout, shorter than third maxilliped, all segments much same length, chelate (Fig. 2d), with epipod; II, slender, about 1.5 times length of I, carpus with 7 segments, chelate, with epipod; III, slender, merus armed with 4 strong spines, dactylus slender and slightly curved, with epipod; IV, slender, merus with 5 spines, dactylus as in III; V, slender, merus having 1 or 2 spines, dactylus as in IV; III-V, all about equal in length, and longer than II.

TABLE 1. *Eualus berkeleyorum* n.sp. Material examined.

Vessel	Locality	Geographic location	Depth		Gear	Date	No. female specimens	Carapace length (mm)
			(fath)	(m)				
<i>Investigator No. 1</i>	Off Gabriola Is., Strait of Georgia	49°09.0'N 123 32.6 W	210	384	Shrimp otter trawl	Dec. 3, 1963	4	6.8, 8.8 ^a , 9.5, 9.8
"	Off Bowen Is., Strait of Georgia	49 18.4 N 123 30.7 W	88-89	161-163	"	Dec. 11, 1963	2	7.4, 7.6
"	Off Denman Is., Strait of Georgia	49 36.6 N 124 46.6 W	50	91	"	Oct. 25, 1968	1	5.8
"	Off Comox Bar, Strait of Georgia	49 38.6 N 124 48.8 W	48-49	88-90	"	May 22, 1969	1	6.9
"	Off Comox Bar, Strait of Georgia	49 39.1 N 124 49.8 W	40	73	"	May 23, 1969	1	5.0
<i>A. P. Knight</i>	Off Greentop Is., Chatham Sound	54 11 N 130 28 W	50	91	"	Aug. 3, 1964	1	7.1
<i>A. P. Knight</i>	Off South Rachael Is., Chatham Sound	54 10 N 130 32 W	58	106	"	Aug. 3, 1964	3	6.5, 7.2, 7.6
<i>G. B. Reed</i>	Off La Pérouse Bank, west coast of Vancouver Is.	48 47.0 N 126 31.0 W (station 68-47)	156	285	Agassiz trawl	Sept. 11, 1968	1	8.6
<i>G. B. Reed</i>	Off La Pérouse Bank, west coast of Vancouver Is.	48 53.0 N 126 20.2 W (station 68-49)	86	158	Triangle dredge	Sept. 11, 1968	1	7.3

^aHolotype.

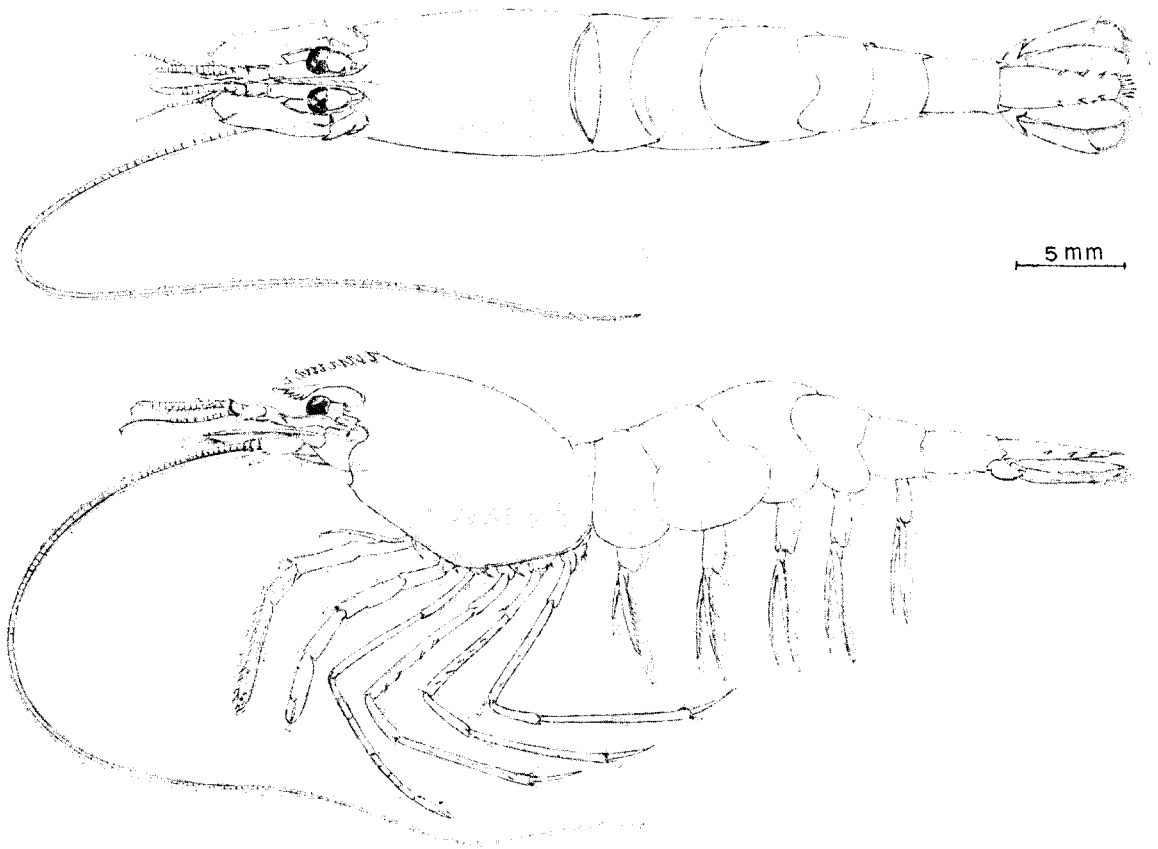


FIG. 1. *Eualus berkeleyorum* n.sp. Dorsal and lateral views of female.

Abdomen: median dorsal margin of third somite strongly produced posteriorly; fifth somite with small recessed spine on postero-lateral margin; pleura of first to fourth somites rounded, fifth with postero-ventral portion projected; sixth somite somewhat longer than fifth, and shorter than telson. Telson with 3 pairs of lateral spines, and posterior margin broadly rounded, almost truncate, bearing 3 pairs of spines that decrease slightly in length from the inner to outer pair. Inner uropod longer than outer, and both extend beyond telson (Fig. 2e).

Colour: background white to cream; red to orange patches on rostrum, frontal, branchial, and postero-dorsal margins of carapace; also on peduncle of antenna, third maxillipeds, and first pereopod; and saddlelike bands of the same colour on the abdominal somites.

Size: carapace lengths of females 5.0–9.8 mm; total lengths 23–38 mm.

Range and habitat—British Columbia coast, Vancouver Island to Chatham Sound; 73–384 m (40–210 fath). One specimen (*G. B. Reed* station 68-47) was captured on a rock and sand bottom, and all others

on soft mud. There is a tendency (Table 1) for larger individuals to inhabit deeper water.

Types—The holotype is a female, c.l. 8.8 mm, and t.l. 34 mm, collected in the Strait of Georgia (49°09.0'N, 123°32.6'W). It is deposited in the National Museum of Canada (NMC 15316) with one paratype (NMC 15317). The U.S. National Museum, Washington, D.C., and the Rijksmuseum van Natuurlijke Historie, Leiden, have specimens.

Remarks—The new species belongs to the genus *Eualus* Thallwitz, 1892, with its main characters: the carpus of the second pereopod with seven segments; exopod on the third maxilliped; and a mandibular palp of two segments (Holthuis 1947). Within the genus, it fits with *E. avinus* (Rathbun 1899), *E. pusiolus* (Krøyer 1841), and *E. herdmani* (Walker 1898) into a group having in common epipods on the first three pereopods and a relatively short rostrum. *Eualus berkeleyorum* differs from the others by the descending rostrum with eight or more

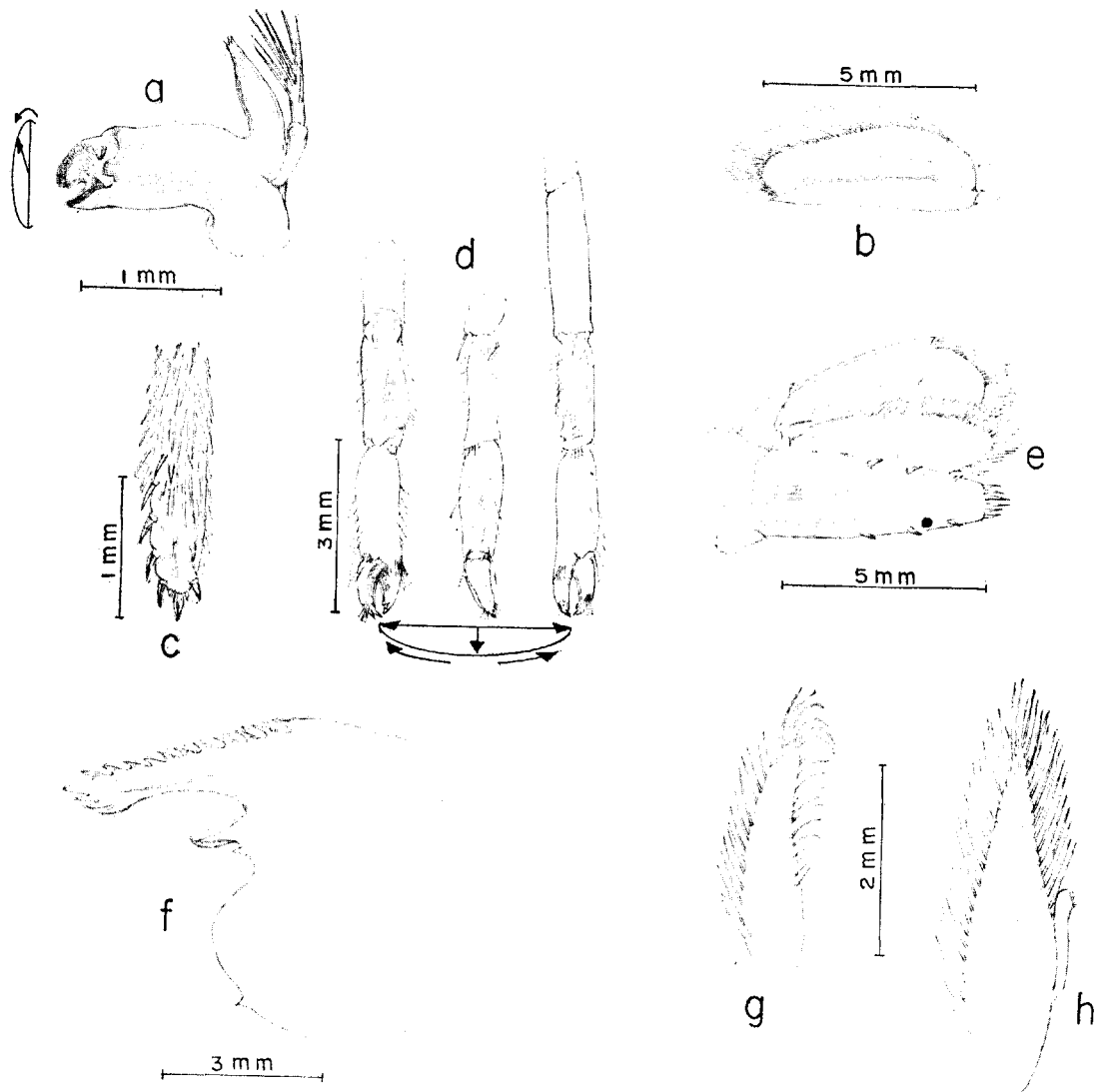


FIG. 2. *Eualus berkeleyorum* n.sp. Parts of female: (a) mandible; (b) scaphocerite; (c) distal end of third maxilliped; (d) first pereopod; (e) tail fan; (f) anterior portion of carapace; (g) endopod of first pleopod; (h) endopod of second pleopod.

closely spaced dorsal teeth; telson with the distal end broadly rounded; absence of a spine on the pleuron of the fourth abdominal somite. Another, even more, unique character is the sinuous frontal margin of the carapace in *E. berkeleyorum*.

One specimen, c.l. 5.0 mm, from near Comox Bar, 73 m (Table 1), was parasitized by the abdominal bopyrid isopod, *Hemiarthrus abdominalis* (Krøyer).

Another female, c.l. 6.9 mm, from the same locality, captured on May 22, 1969, had a few eyed eggs attached to pleopods.

Acknowledgments

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