

## Arthropoda, Crustacea, Amphipoda

Currently, 24 species of Amphipoda are described from hydrothermal vent samples. In addition, some other species were collected in the surroundings of vents or at stations not strictly linked with hydrothermal vent communities. A certain number of new species are currently being described.

The following preliminary conclusions can be drawn from the species so far identified (BELLAN-SANTINI 1998):

(1) The subfamily of Lysianassoidea (including Lysianassidae sensu lato and Uristidae) is exclusively found in Pacific samples with 10 species.

(2) Twelve other families are represented by one to three species.

(3) The number of endemic species is very high. However, the large repartition of species most likely is due to insufficient identification and appears doubtful.

(4) Four species are abundant and build swarms: *Ventiella sulfuris* and *Halice hesmonectes* in Pacific Ocean and *Bouvierella curtirama* and *Luckia striki* in Atlantic Ocean (VAN DOVER et al. 1992; MARTIN et al. 1993; SHEADER et al. 2003). The other species are known to occur only in small numbers per sample.

(5) Different techniques have been used in the past to sample amphipods. Trawls are not recommended because large surfaces are sampled without distinction of communities (in the case of the sampling of the Guaymas area). Also, only large animals are collected and the delicate amphipods are often broken. Slurp guns or grabs manipulated by the submarine are the best methods for collecting fragile animals but for rare species they are not very efficient. Washing of mytilids, tubeworms and other species is a good method if rinsing of samples is conducted carefully. Sediment traps deployed for a certain period of time are also a good, but probably selective method.

Amphipods are delicate and fragile animals in particular the representatives of the deep-sea families. They frequently loose appendices and damaged individuals are difficult to determine. Generally there are only one or two individuals of a species per sample. Consequently, if they are damaged identifications and descriptions are impossible. Alcohol is the best fixative, but colors will vanish after preservation.



1: *Ventiella sulfuris* from East Pacific Rise: 9°N; by M. Bright.

### References:

- BELLAN-SANTINI D. (1998) Cah. Biol. Mar. **39**: 143-152.  
BELLAN-SANTINI D. (2005) J. Nat. Hist. **39**(39): 3435-3452.  
MARTIN J.W., FRANCE S.C. & C.L.VAN DOVER (1993) Can. J. Zool. **71**: 1724-1732.  
SEGONZAC M. (1992). C.R. Acad. Sci. Paris. **314**: 593-600.  
SHEADER M. VAN DOVER C.L. & M.H. THURSTON (2004) Mar. Biol. **144**: 503-514.  
VAN DOVER C.L., KAARTVEDT S., BOLLENS S.M., WIEBE P.H., MARTIN J.W. & S.C. FRANCE (1992) Nature **358**: 25-26.  
VINOGRADOV G.M. (1993) Zool. Zh. **72**(2): 40-53.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Ampeliscidae

*Ampelisca romigi* BARNARD, 1954

**Synonyms:** *A. isocornea*: BARNARD, 1954, *A. romigi ciego* BARNARD, 1966.

**Size:** Up to 16 mm.

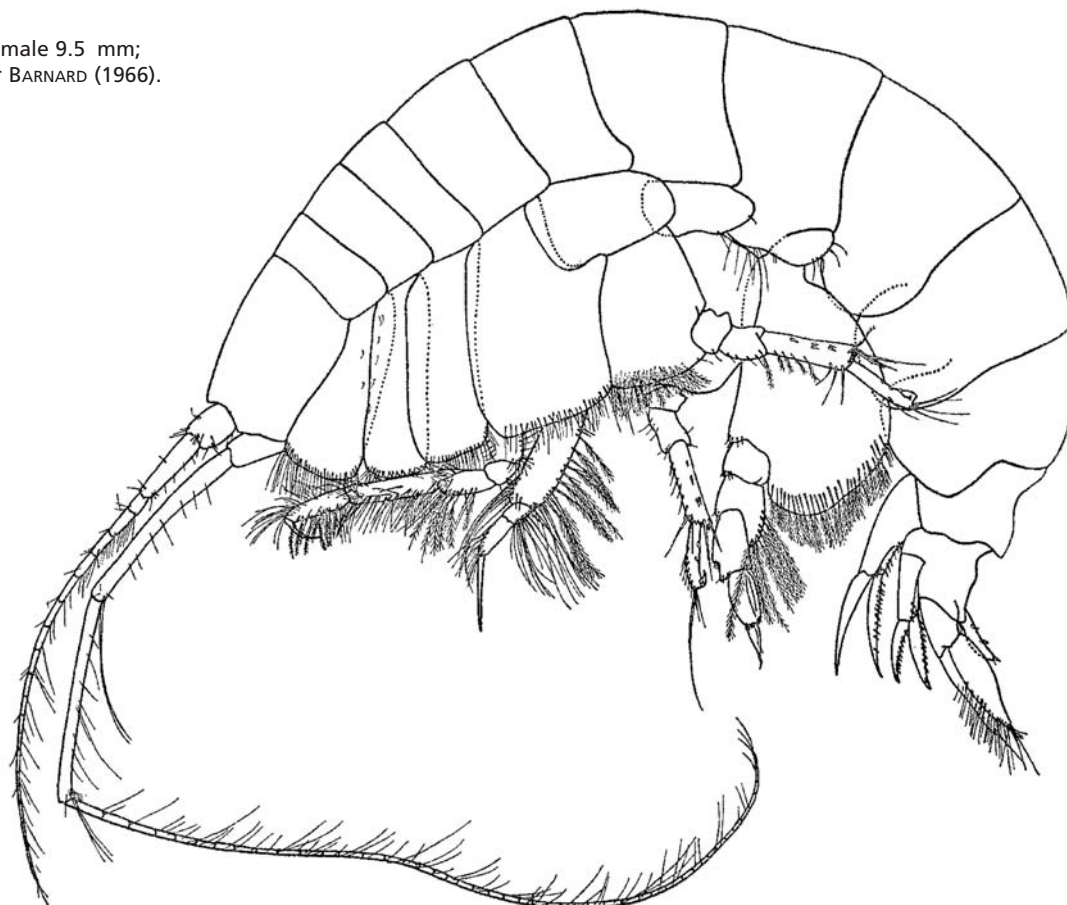
**Morphology:** (Family) Mouthparts basic. Eyes composed of corneal lenses or absent. Body without process except urosomite 1. Urosomites 2 and 3 coalesced. Antenna 1 without accessory flagellum. Gnathopods 1 and 2 slender subchelate or nearly simples. Pereopods 3-4 slender with merus elongate. (Genus) Pereopods 5-6 with basisvery broad. Pereopod 7 basis dilated with posterior lobe greatly expanded distally, bearing marginal plumose setae. Telson longer than broad and deeply cleft. (Species) Eyes present. Pereiopod 7 lower edge of basis reaching joint between merus and carpus, merus with a posterior setose lobe, carpus with distal anterior edge notched.

Epimeral plate posterior edge convex, lower posterior corner quadrate. Urosomite 1, dorsal surface with a weakly saddle-shaped process. Telson rather broad. (Subspecies *A. romigi ciego*) Eyes absent. Pereiopod 7 with propodus more strongly narrowed in the proximal part while the propodus is wider.

**Biology:** Unknown. Dredged mainly from soft-bottom areas. Trawl in periphery of hydrothermal vents.

**Distribution:** East Pacific Rise. Along the coast of southern California and in the Channel Islands; Gulf of California at Angel de la Guardia Island, Isla Partida; Angeles Bay, San Marcos Island, Tortuga Island and Tiburon Island; Isabel Island, Mexico; Salinas Bay, Costa Rica; Secas Islands, Panama; Santa Elena Bay, Ecuador, 3-500 m. The subspecies *A. romigi ciego* was found also at Guaymas vent site.

1: Female 9.5 mm;  
after BARNARD (1966).



**References:**

- BARNARD J.L. (1954) Allan Hancock Pac. Exped. **18**(1): 1-137.  
BARNARD J.L. (1966) Allan Hancock Pac. Exped. **27**(5):1-166.  
VINOGRADOV G.M. (1993) Zool. Zh. **72**(2): 40-53 [in Russian].

Arthropoda, Crustacea, Amphipoda, Gammaridea, Amphilocheidae

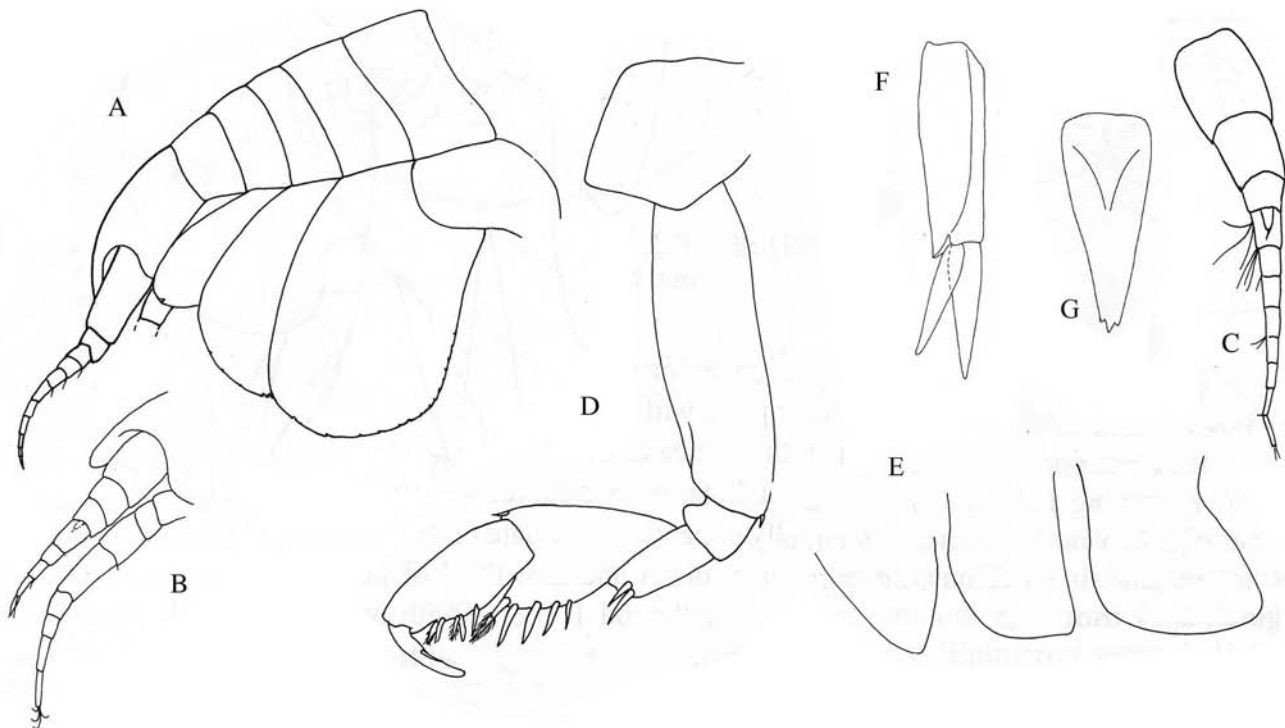
*Gitanopsis alvina* BELLAN-SANTINI & THURSTON, 1996

**Size:** 2.5 mm in adult female.

**Morphology:** (Family) Coxa 4 immensely broadened, coxa 1 very small and hidden by coxa 2. Peduncle of uropode 3 elongate. Telson entire elongate. (Genus) Mandibular molar large, triturate. Dactylus of gnathopods simple. (Species) Head with rostrum. Accessory flagellum one-articulated. Antenna 2 slightly longer than antenna 1. Gnathopods small and feeble. Epimeral plate 3 posterodistal margin rounded. Uropod 3, peduncle 1.5x longer than inner ramus, outer ramus shorter than inner. Telson elongate, triangular, apex tridentate.

**Biology:** Collected in hydrothermal field.

**Distribution:** Mid-Atlantic Ridge: Lucky Strike.



1A: Head incomplete of female; B: Head of juvenile, C: Antenna 1, D: Gnathopod 1, E: Epimeral plates, F: Uropod 3, G: Telson; from BELLAN-SANTINI & THURSTON (1996).

**Reference:**

BELLAN-SANTINI D. & M. THURSTON (1996) J. Nat.Hist. **30**: 685-702.

*Autonoe longicornis* CHEVREUX, 1909

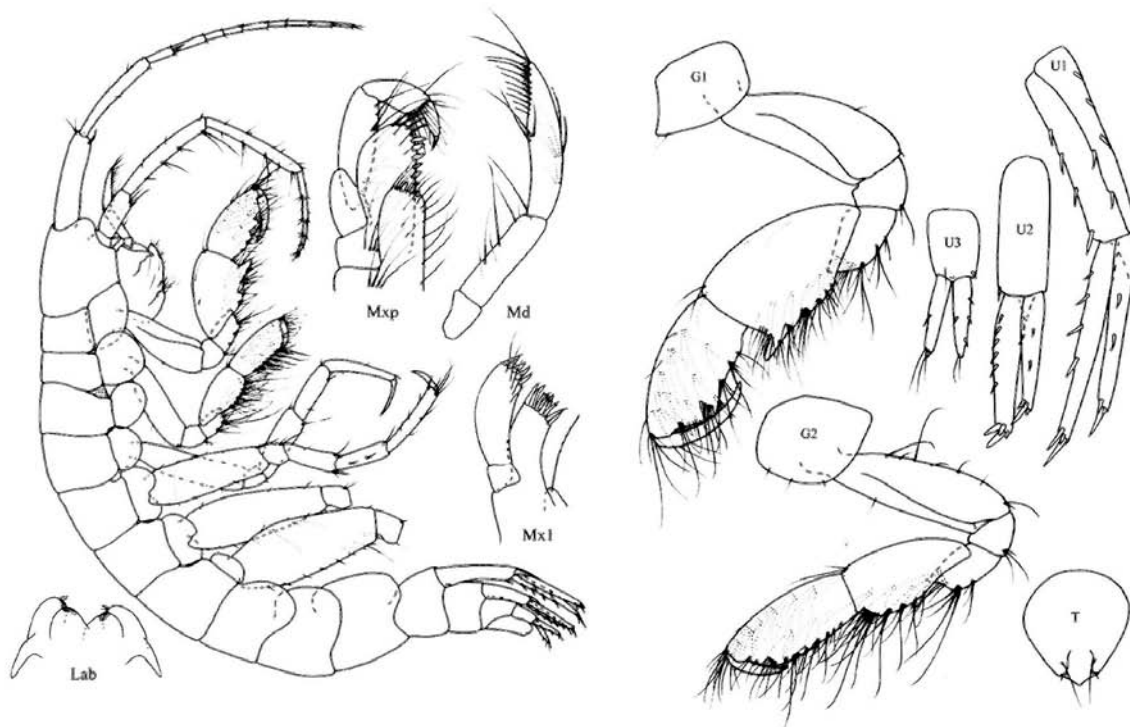
**Size:** 8 mm.

**Morphology:** (Family) Head anteroventral margin weakly recessed, moderately excavate. Pereopods 3-4 basis glandular, pereopod 7 very elongate. Gnathopod 1 enlarged in males and females. Uropod 3 with slender and robust setae. Telson dorsoventrally thickened. Species, male: Antennae 1 and 2 subequal in length, less than half body length. Antenna 1 peduncle article 3, one quarter length of article 1; flagellum shorter than peduncle; accessory flagellum composed of one rudimentary article. Mandible palp article 3 longer than article 2, terminally falcate. Maxilla 1 inner plate with a single, long, pectinate seta. Labium mandibular processes acute. Gnathopod 1 coxa produced anterodistally, subacute; basis robust; carpus enlarged, longer than propodus, the posterodistal corner produced into a spine. Gnathopod 2 carpus and propodus elongate, subequal in length. Pereopods 5-7 basis only weakly expanded. Epimera 1-3 rounded. Uropod 1 peduncle with inter-ramal

spine, about one third length of peduncle; inner ramus longer than outer and subequal in length with peduncle. Uropod 2 peduncle with short inter-ramal spine about one sixth length of peduncle; inner ramus longer than outer and subequal with peduncle. Uropod 3 peduncle longer than broad, rami subequal and only a little longer than peduncle, inner ramus with small second article. Telson with each dorsal crest bearing a fine seta.

**Biology:** Collected from samples of volcanic rocks (pillow lava and hyaloclastic rocks). The proximity of active venting was inferred from the occurrence of *Bathymodiolus azoricus* (living specimens and/or shell debris) in the samples. Previously known only by the type specimens (only females) collected by CHEVREUX (1909) from similar depths (1360 m) also in the Azores region.

**Distribution:** Mid-Atlantic Ridge: Lucky Strike.



1: Male; by A.A. Myers. G1 – gnathopod 1; G2 – gnathopod 2; Lab – labium; Md – mandible; Mx1 – maxilla; Mxp – maxilliped; T – telson; U1, U2, U3 – uropods 1-3.

#### References:

- CHEVREUX E. (1909) Bull. Inst. Océanogr. Monaco **150**: 1-7.  
 MYERS A.A. & M.R. CUNHA (2004) J. Mar. Biol. Ass. U.K. **84**: 1019-1025.

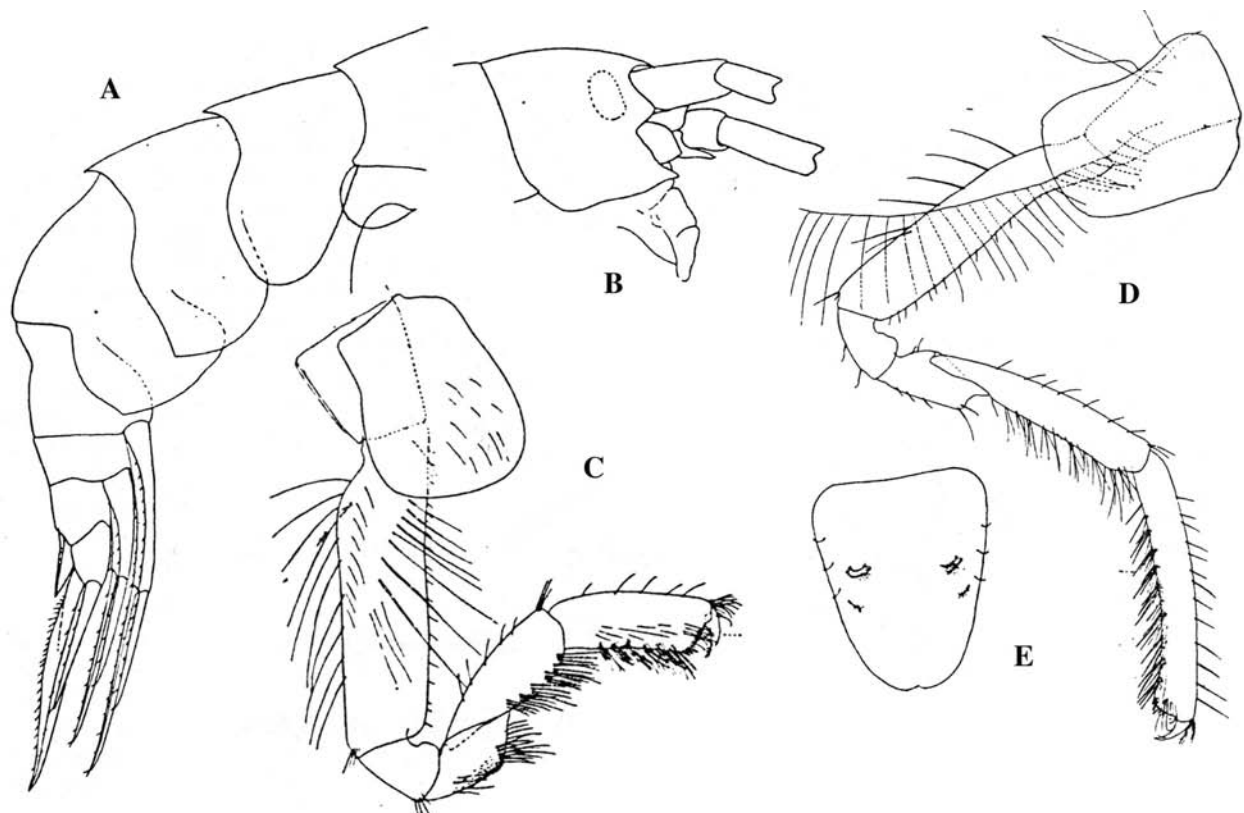
## *Oradarea longimana* (BOECK, 1871)

**Size:** Up to 11 mm.

**Morphology:** (Family) Lateral cephalic lobes small. Coxae of medium length or short. Antennae long; accessory flagellum vestigial or absent. Mouthparts basic. Gnathopods powerful or feeble, usually subchelate, occasionally simple. Telson of medium size, entire, acuminate, emarginate or notched. (Genus) Rostrum large. Accessory flagellum one-articulated. Antenna 2 longer than 1. Gnathopods diverse. Pereopods 3-7 ordinary. Epimeron 3 smooth. (Species) Accessory flagellum very short. Both gnathopods very slender; gnathopod 2 much longer than 1. Pereopods 3-4 alike in structure. Urosomite 1-2 dorsally produced backward. Epimeron 3 with lower posterior angle very obtuse and postero-lateral margin evenly convex. Uropod 3 peduncle one quarter of inner ramus and half of outer. Telson a little longer than wide, apex rounded with a very shallow central notch.

**Biology:** Frequently associated to other invertebrates. SHOEMAKER (1930) describes a collection from whelk egg cases, perhaps as a scavenger or predator of eggs. One of samples from the Juan de Fuca vent sites was taken from the decapod *Macroregonia macrochira* SAKAI. *Oradarea* is a genus attracted to baited traps, and it seems probable that these amphipods are scavengers that cue on exudates of egg capsules and possibly pre-moult decapods.

**Distribution:** Recorded from the North Atlantic (54 m depth) and the N Pacific coast of North America, and probably broadly extended along the northern Hemisphere. Present also at hydrothermal vent sites of the Juan de Fuca Ridge (Endeavour Segment, Lieutenant Obo vent, Dual Smoker; Explorer Segment, Upper Magic Mountain, Magic Mountain).



1A: Posterior part of the body; B: Head; C: Gnathopod 1; D: Gnathopod 2; E: Telson; from SHOEMAKER (1930).

### References:

- BOECK A. (1871) Forhandl. Vidensk.-Selskabet i Christiania **1870**: 83-280.  
SHAW P. (1989) Can. J. Zool. **67**(8): 1882-1890.  
SHOEMAKER C.R. (1930) Contr. Canad. Biol. Fisheries, new series **5**(10): 221-359.

Arthropoda, Crustacea, Amphipoda, Caprellidea, Caprellidae

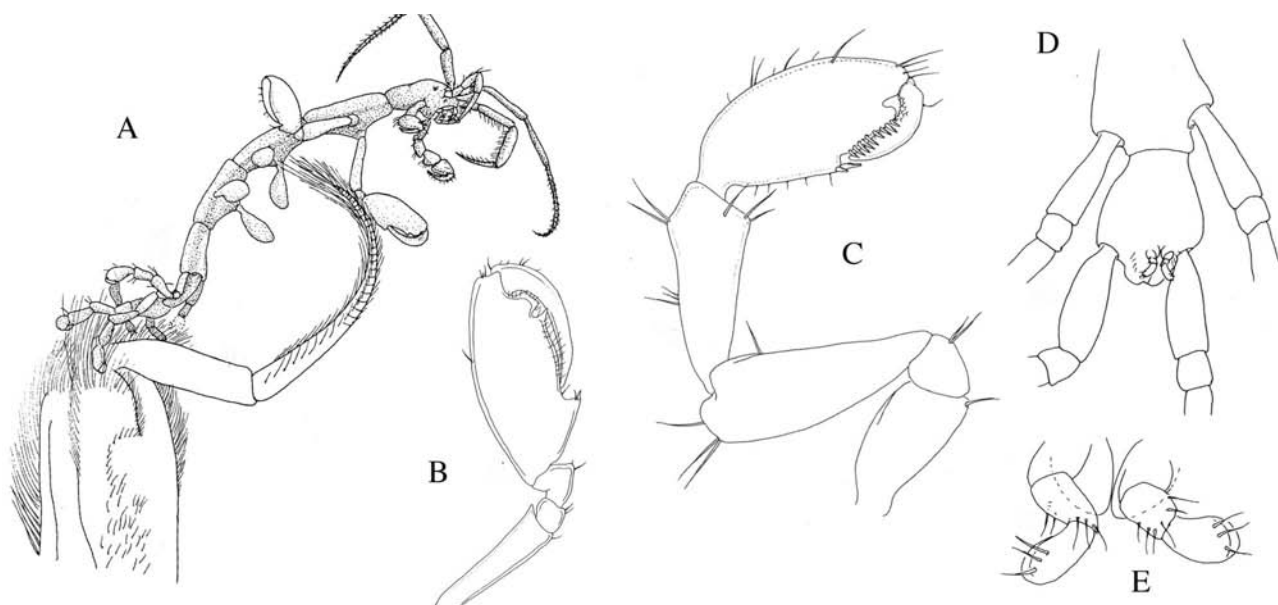
*Caprella bathytatos* MARTIN & PETTIT, 1998

**Size:** Largest male 14.9 mm; smallest juvenile 2.2 mm.

**Morphology:** (Family) Body slender, cylindrical. Eyes lateral. Gnathopods often different. Number of pereopods variable. (Genus) Mandible lacking palp. Antenna 2, flagellum two-articulate. Pereopods 3-4 lacking. Pereopods 5-7 normal. (Species) Head rounded, lacking spines or projectings. Eyes reduced. Pereon lacking any spines or projections. Gnathopod 2, propodus bears one blunt, rectangular tooth, separated by a U-shaped notch from a slightly more acute tooth, an acute proximal lobe, dactylus  $2/3$  length of propodus; gnathopod attached to body at midlength of pereonite 2. Each pereopod with grasping spines on propodus forming with the dactylus a mechanism for attachment to host setae.

**Biology:** It is the first caprellid found in association with the crab *Macroregonia macrochira*, or in the vicinity of marine hydrothermal vent. 30 individuals were sampled on a single crab.

**Distribution:** Juan de Fuca Ridge.



1A: Habitus of male, attached to maxilliped 3 of the majid crab; B: Gnathopod 2; C: Pereopod 7; D: Abdomen, male; E: Abdominal appendage; from MARTIN & PETTIT (1998).

**Reference:**

MARTIN J.W. & G. PETTIT (1998) Bull. Mar. Sci. **63**: 189-198.

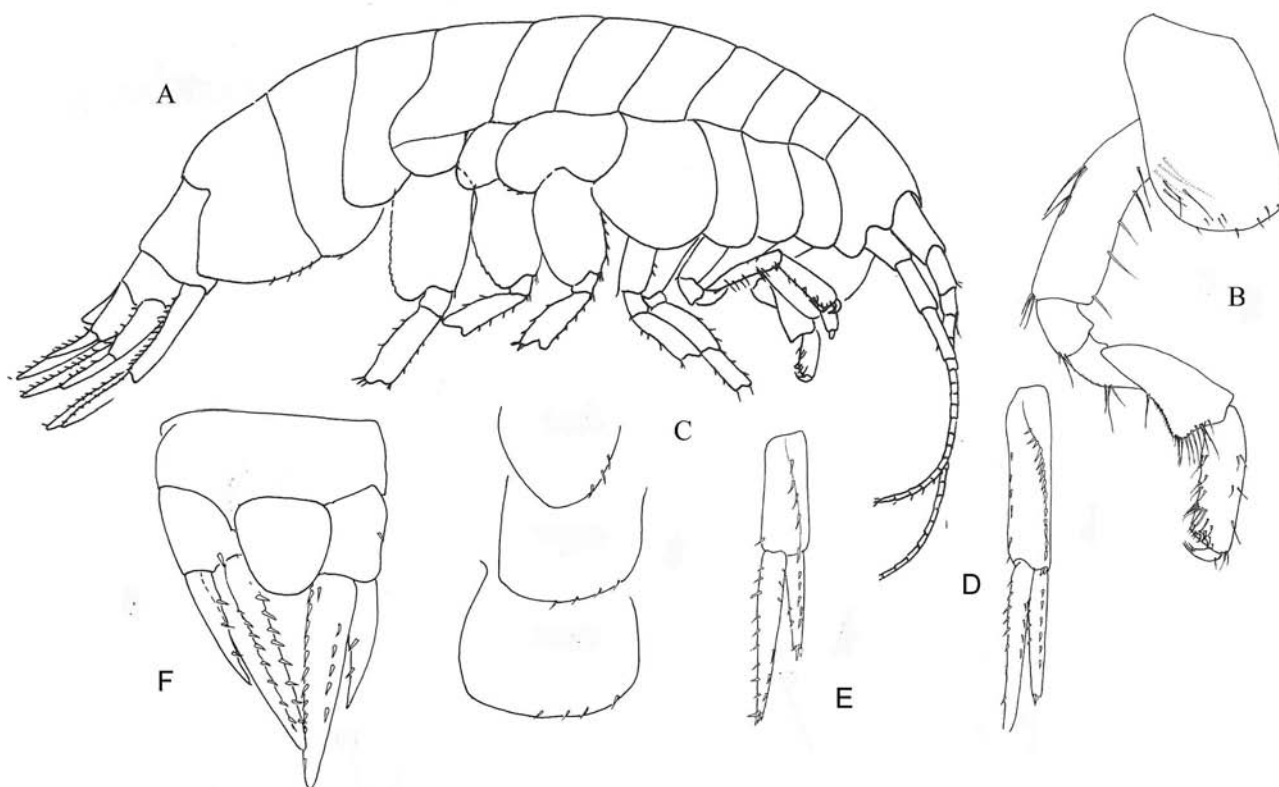
*Bouvierella curtirama* BELLAN-SANTINI & THURSTON, 1996

**Size:** 5 mm in adult female.

**Morphology:** (Family) Accessory flagellum 0-2-articulated. Gnathopods variable. (Genus) Body not toothed. Eyes absent. Coxal plates 1-4 ordinary. Epimeron 3 smooth. (Species) Head, rostrum moderate, lateral cephalic lobe rounded. Antenna 1 longer than antenna 2, flagellum with a number of articles variable with the size of the body, 8-46, 22 in the holotype. Antenna 2 flagellum variable about 7-37, 12 in holotype. Gnathopods weakly subchelate, dissimilar, second longer than first. Pereopods 3-7 ordinary, dactylus simple not prehensile. Epimeral plate 3 smooth. Telson rounded, without armament.

**Biology:** *B. curtirama* is abundant. This species lives in *Bathymodiolus azoricus* beds. Females maturing at a minimum body length of 3.5 mm and males at 2.4 mm.

**Distribution:** Mid-Atlantic Ridge: Lucky Strike, sites Sintra and Tour Eiffel sites.



1: A: Habitus; B: Gnathopod 1; C: Epimeral plates; D: Uropod 1; E: Uropod 2; F: Uropods 3 and telson; from BELLAN-SANTINI & THURSTON (1996).

**References:**

- BELLAN-SANTINI D. & M.H. THURSTON (1996) *J. Mar. Biol. Ass. U.K.* **30**: 685-702.  
SHEADER M., VAN DOVER C.L. & M.H. THURSTON (2004) *Mar. Biol.* **144**: 503-514.

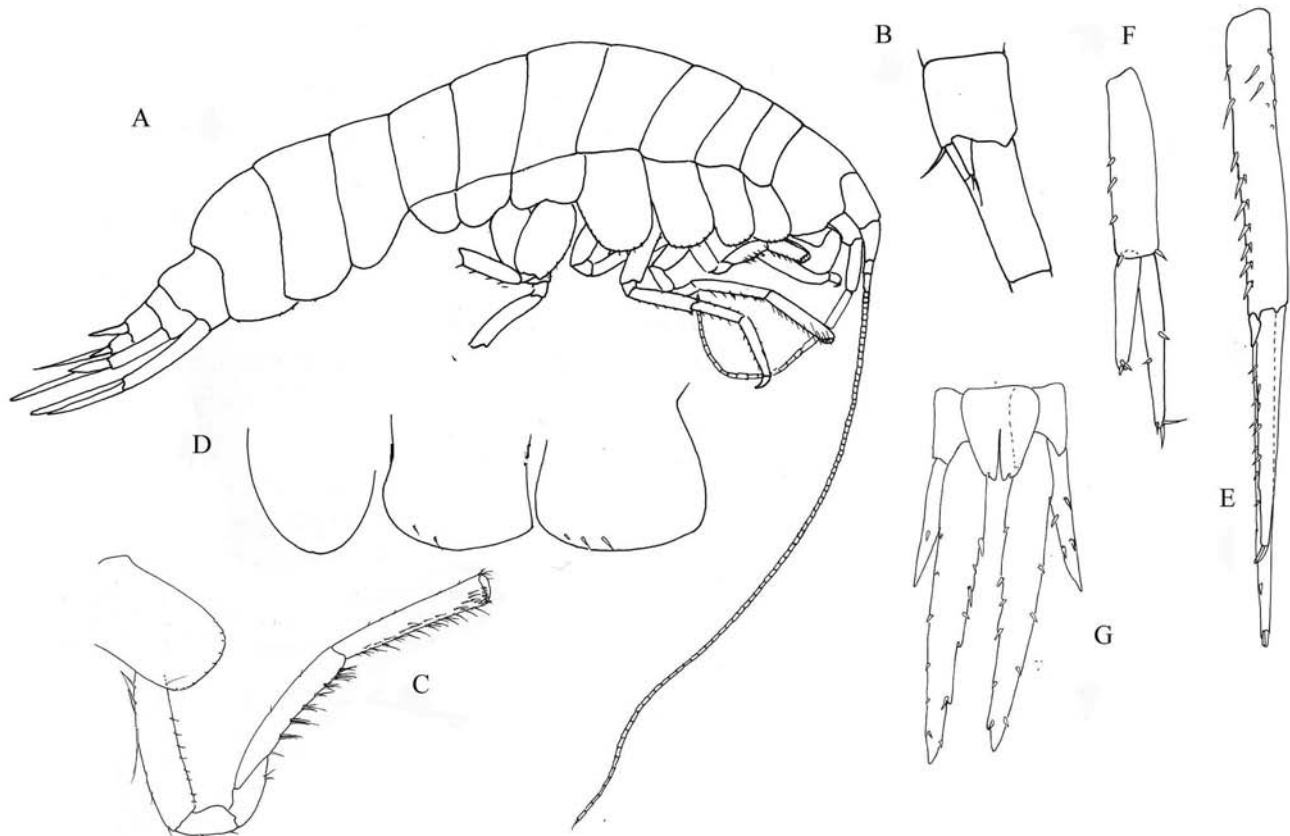
*Luckia striki* BELLAN-SANTINI & THURSTON, 1996

**Size:** 7 mm in adult female.

**Morphology:** (Family) Accessory flagellum 0-2-articulated. Gnathopods variable. (Genus) Body normally compressed. Rostrum short. Antenna 1 longer than antenna 2. Accessory flagellum one-articulated. Labrum entire, molar triturative. Gnathopods different in size. Epimeral plate 3 smooth. Outer rami of uropods 1-3 shorter than inner rami. Telson cleft without armament. (Species) Body smooth. Eyes absent. Rostrum short. Antenna 1 long as body length. Antenna 2 slightly longer than half of antenna 1. Gnathopods slender, linear. Telson triangular, cleft.

**Biology:** Collected in vent community among shrimps, gastropods, crabs, and limpets.

**Distribution:** Mid-Atlantic Ridge: Lucky Strike.



1: A: Habitus; B: Accessory flagellum; C: Gnathopod 2; D: Epimeral plates; E: Uropod 1; F: Uropod 2; G: Uropods 3 and telson; from BELLAN-SANTINI & THURSTON (1996).

**Reference:**

BELLAN-SANTINI D. & M. THURSTON (1996) J. Nat.Hist. **30**: 685-702.



*Bonnierella compar* MYERS & CUNHA, 2004

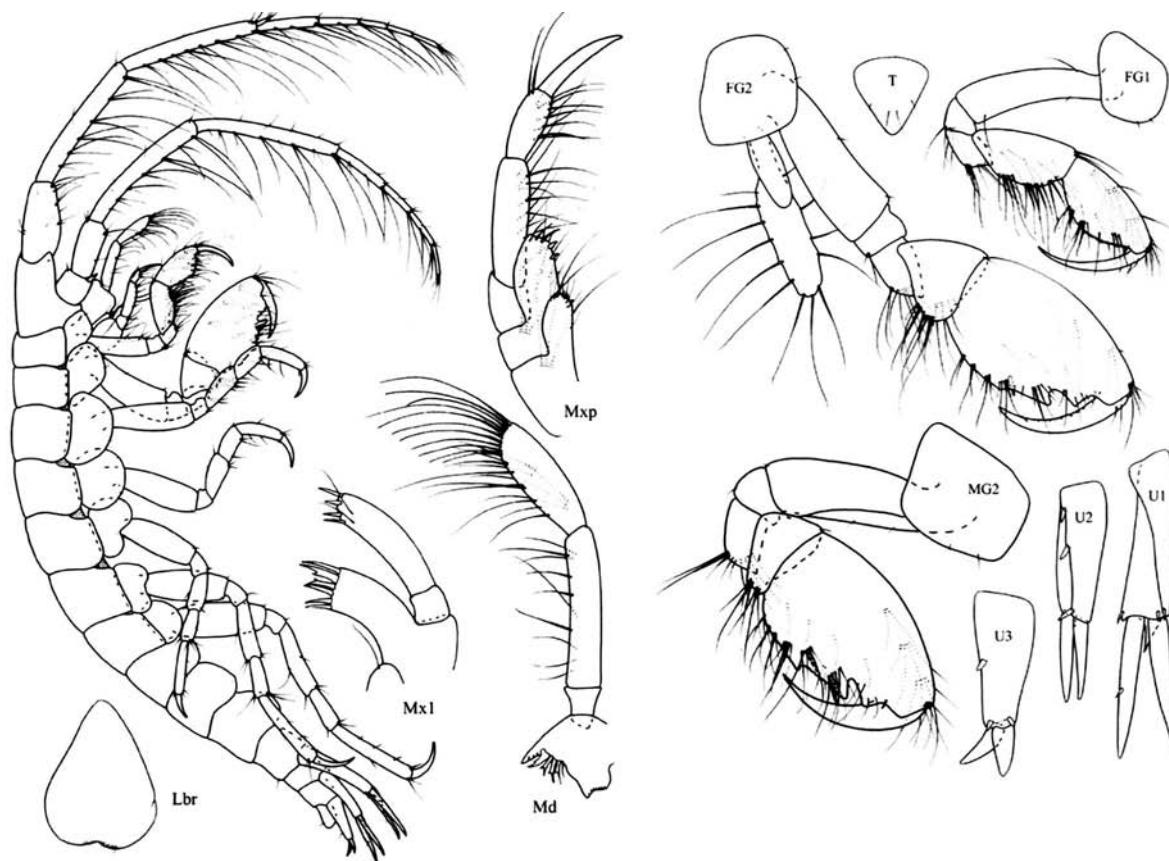
Size: 3 mm.

**Morphology:** Family: Head anteroventral margin moderately to strongly recessed and moderately excavate. Gnathopod 2 enlarged in males and females. Pereopods 3-4 basis glandular. Uropod 3 peduncle broad proximally, narrow distally, rami with tiny apical setae. Telson dorsoventrally thickened. Species: Head anteroventral margin strongly regressed. Eyes absent. Antenna 1 and 2 subequal in length, setose; accessory flagellum with one long and one rudimentary article. Maxilliped raptorial, with reduced plates and strong palp terminating in a dactyli-form palp article 4. Gnathopod 1 small, unornamented. Gnathopod 2 similar in both sexes, massive, with palmar excavation and with defining spine on posterior margin. Uropod 3

peduncle elongate, broad proximally, narrow distally, rami much less than half length of peduncle. Telson without cusps or spines.

**Biology:** Collected in the vicinity of active venting sites together with filter-feeding organisms (small sponges, hydrozoans and cirripeds). Some of the specimens of *B. compar* were found inside their tubes of fine pelagic sediments cemented with mucus, in some cases built around hydrozoan stalks. A previous record of the genus in hydrothermal vents is given by SHAW (1989) who collected a single specimen of *B. linearis* from a station at the Juan de Fuca Ridge.

**Distribution:** Mid-Atlantic Ridge: Lucky Strike.



1: By A. Myers. FG1, FG2 – female gnathopods 1 and 2; MG2 – male gnathopod 2; Lbr – labrum; Md – mandible; Mx1 – maxilla; Mxp – maxilliped; T – telson; U1, U2, U3 – uropods 1-3.

References:

MYERS A.A. & M.R. CUNHA (2004) J. Mar. Biol. Ass. U.K. **84**: 1019-1025.  
 SHAW P. (1989) Can. J. Zool. **67**: 1882-1890.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Ischyroceridae

*Bonnierella cf. linearis* BARNARD, 1964

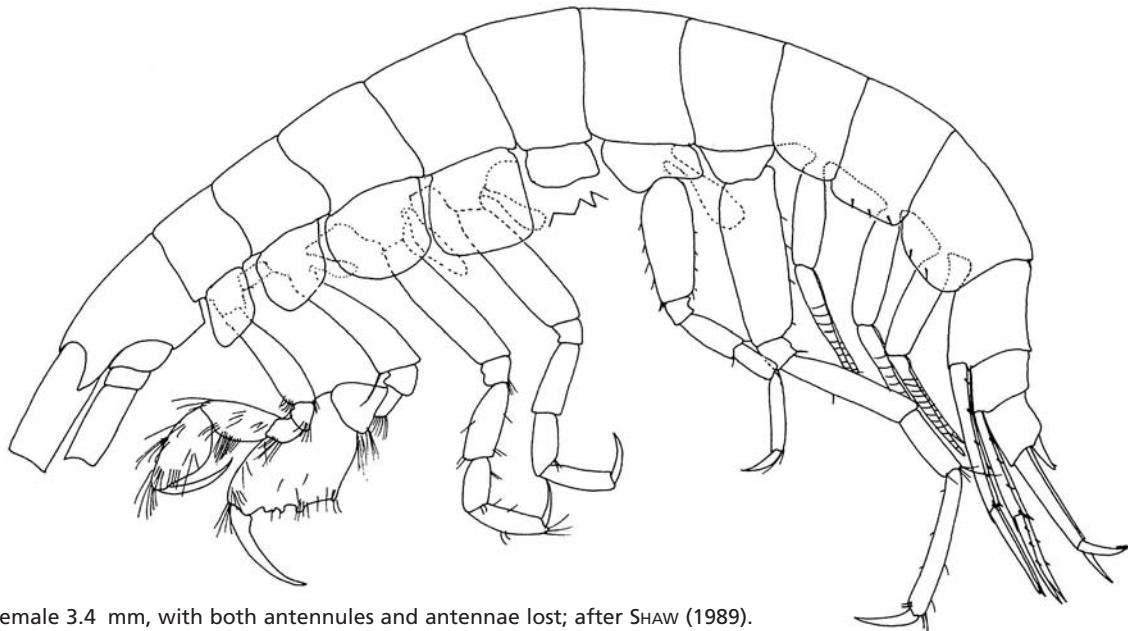
**Size:** Up to 4 mm.

**Morphology:** (Family) Head anteroventral margin moderately to strongly recessed and moderately excavate. Gnathopod 2 enlarged in males and females. Pereopods 3-4 basis glandular. Uropod 3 peduncle broad proximally, narrow distally, rami with tiny apical setae. Telson dorsoventrally thickened. (Species) Eyes absent. Lateral lobes of head produced and acute. Antennae nearly as long as body. Gnathopod 1, palm not ornated. Gnathopod 2, armed with three sharp cusps in male; with two blunt process in female defining cusps obsolete. Uropod 1, inner ramus lacking a marginal spine. Uropod 3 with outer ramus bearing 5 to 6 minute fringe-like spinules and a distal setule. Telson triangular, the narrow apex blunt. The single specimen known from hydrothermal vents, a female, differs slightly from the original description (BARNARD 1964) in the tuberosities of the palmar margin of gnathopod 2, minor differences in telson

setation, and number of spines in the mandibular spine row. But virtually all characters used to distinguish the present *Bonnierella* species are only present on the males, which makes the specific assignment of this specimen dubious.

**Biology:** Unknown. At hydrothermal vents, collected from washings of associated vent fauna (vestimentiferans and archaeogastropods).

**Distribution:** Off Peru, 10°13'S 80°05'W, 6324 m. Reported also from hydrothermal vents at Explorer Ridge, Juan de Fuca Ridge: site Gulati Gusher.



1: Female 3.4 mm, with both antennules and antennae lost; after SHAW (1989).

**References:**

- BARNARD J.L. (1964) Bull. Am. Mus. Nat. Hist. **127**(1): 1-46.  
SHAW P. (1989) Can. J. Zool. **67**(8): 1882-1890.

*Apotectonia heterostegos* BARNARD & INGRAM, 1990

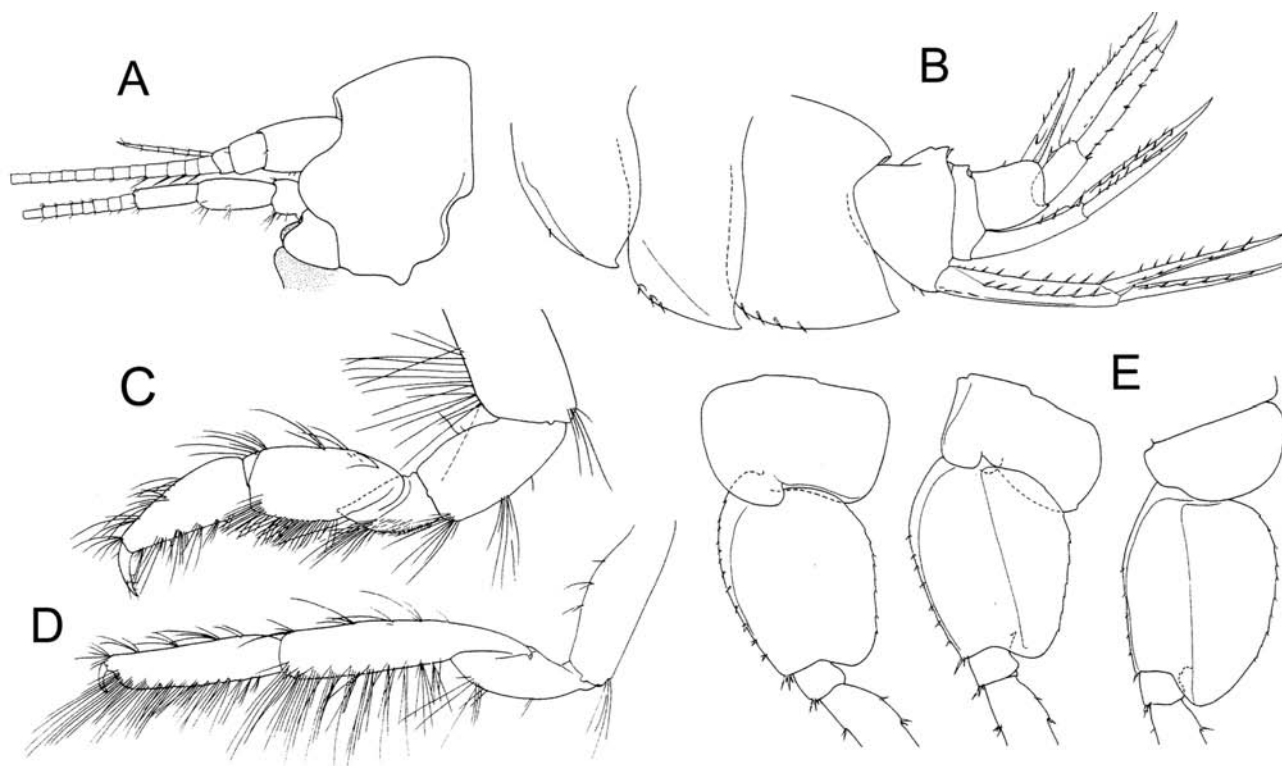
**Size:** Up to 18.3 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1, peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Dorsal process of urosomite 1 complexly toothed. Gnathopod 1 simple. (Species) Antenna 1, primary flagellum with basal spines. Urosomite 1 with 2 sharp dorsal teeth. Mandibular right lacinia mobilis tiny, bifid; left lacinia mobilis scarcely larger and

multitoothed; molar of both mandibles simple, pubescent. Inner plate of either maxilla 1-2 fully setose medially. Inner plate of maxilliped with strongly oblique apex. Gnathopod 1 simple and with reduced coxa. Basis of pereopods 5-7 rounded-attenuate. Oostegite present on coxa 1 of brooding females.

**Biology:** Largely unknown. Readily attracted to baited traps; some specimens sorted also from siboglinid washings.

**Distribution:** Galapagos Spreading Center, apparently endemic to the sites Garden of Eden and Rose Garden.



1: Female 18.3 mm. A: Head; B: Pleosome and urosome with attached uropods and telson; C: First gnathopod; D: Second gnathopod; E: Proximal portion of pereopods 5-7; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* 499: 1-80.

## *Cyclocaris tahitensis* STEBBING, 1888

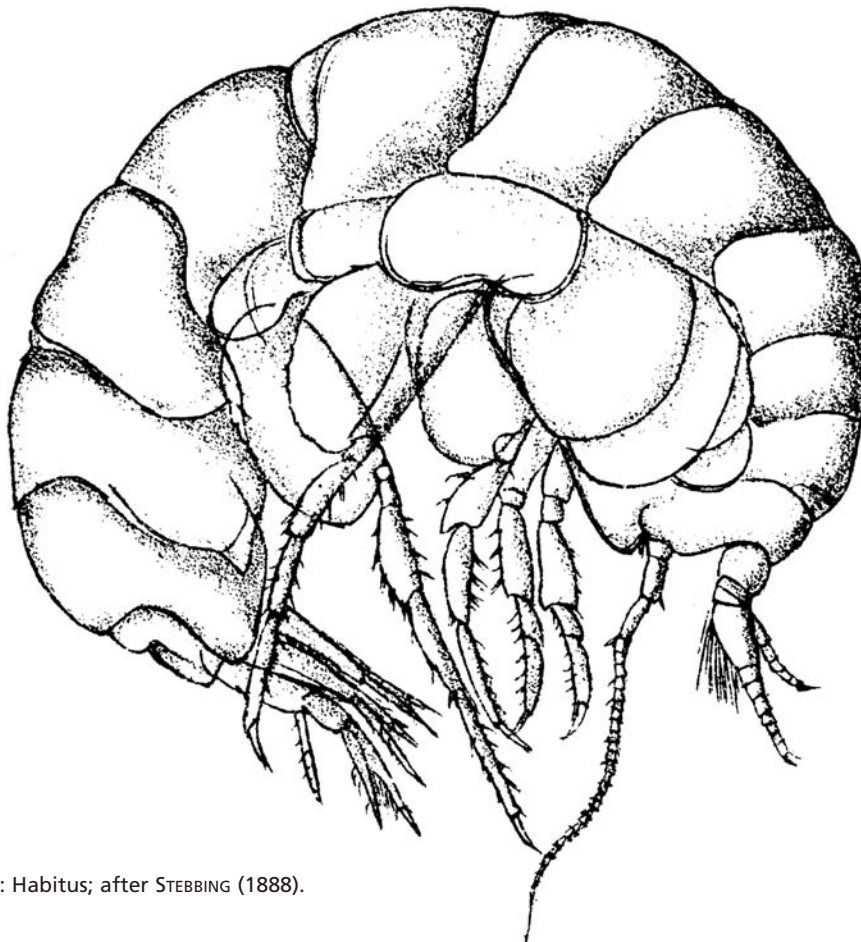
**Size:** Up to 15 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Head tall, horizontally short, weakly grotesque. Coxae 1-2 small, strongly shortened and partly covered by coxa<sub>3</sub>. Coxa 4 large excavate. Gnathopod 1 long, simple. Uropod 3 elongate. Telson elongate, deeply cleft. (Species) Base of primary flagellum of antenna 1 with callinophore. Body capable of coiling into a circle, bending its head round to the protection of the coxae of the third and fourth pereopods. Head extremely short,

lacking rostrum. Mandibular palp present. Coxa 1 much wider at distal margin than at insertion. Epimeron 3 with posterior angle rounded. Rami of uropod 1 about equal in length. Peduncle of uropod 2 shorter than rami.

**Biology:** Unknown. Originally described from volcanic mud bottoms around Tahiti and trapped also around Cape Verde on sandy bottoms, the only report of the species from hydrothermal vents could be accidental since the accompanying fauna was also not typically hydrothermal.

**Distribution:** Off Tahiti, 17°30'26"S, 149°33'45"W (STEBBING 1888). Off Cape Verde Islands, 1477 m. East Pacific Rise, Guaymas Basin.



1: Habitus; after STEBBING (1888).

### References:

- CHEVREUX E. (1935) Résult. Camp. Sci. Prince Albert Ier de Monaco **90**: 1-214.  
STEBBING T.R.R. (1888) Rep. Sci. Results Voyage H. M. S. Challenger Years 1873-1876, Zoology **29**: 1-1737.  
VINOGRADOV G.M. (1993) Zool. Zh. **72**(2): 40-53 [in Russian].

Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Euonyx mytilus* BARNARD & INGRAM, 1990

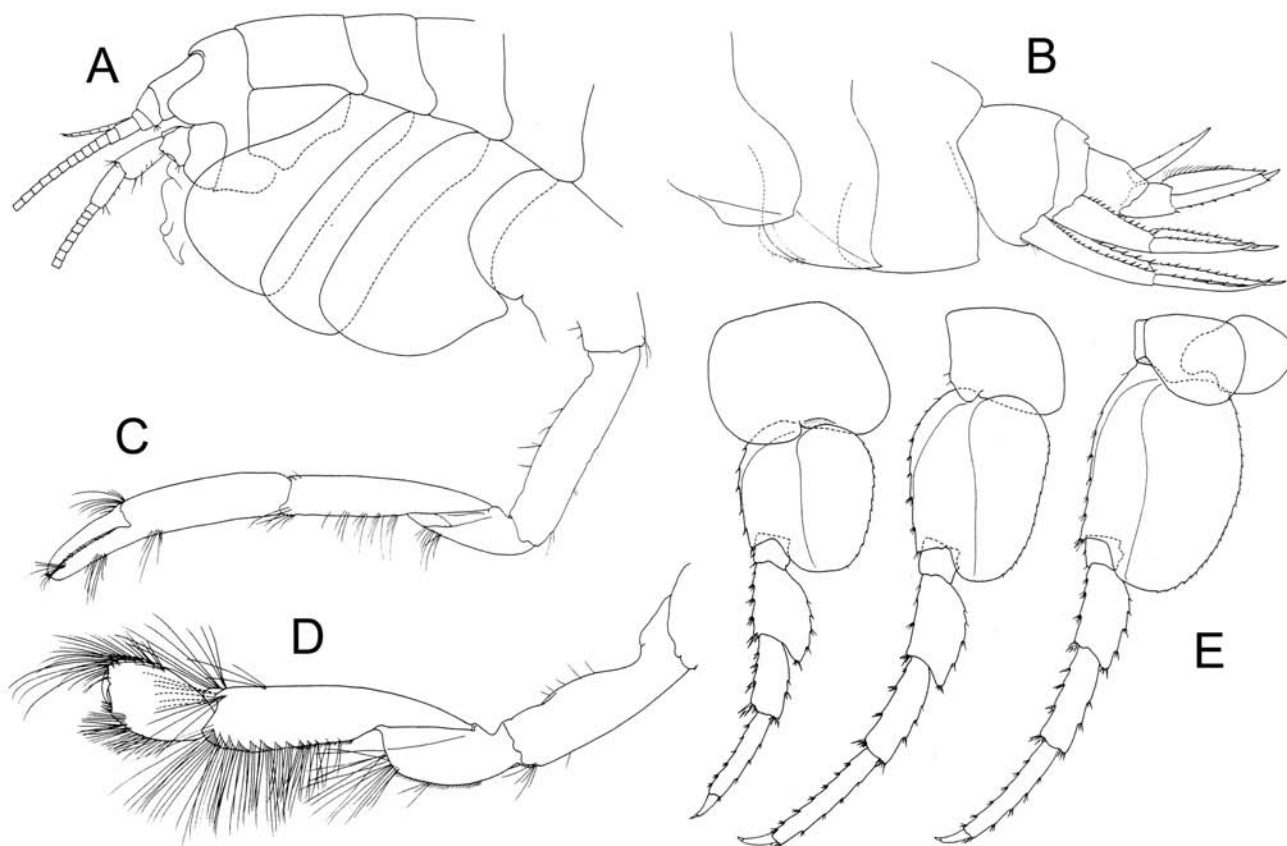
**Size:** Up to 20 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Mandible with palp attached strongly distal. Inner plate of maxilla 1 weakly setose. Coxa 1 strongly shortened. Gnathopod 1 elongate. Inner ramus of uropod 2 without notch. Uropod 3 ordinary. Telson elongate, deeply cleft. (Species) Body lacking any prominent dorsal tooth. Lateral cephalic lobes rounded.

Gnathopod 1 with propodus about 1.2 times as long as carpus. Palm of gnathopod 2 long. Epimeron 2 with a strong tooth. Epimeron 3 with tiny posteroventral tooth.

**Biology:** Members of this genus come readily to baited traps and some appear occasionally associated with echinoderms and deep-sea corals. *Euonyx mytilus* was sorted from washings of vent clams, trapped also with baited traps, and also caught directly with a slurp gun around vent fauna.

**Distribution:** East Pacific Rise, 13°N; Galapagos Spreading Center: Garden of Eden and Rose Garden.



1: Female 20.04 mm; A: anterior portion of body, lateral; B: pleosome and urosome with uropods and telson attached, lateral; C: First gnathopod; D: second gnathopod; E: fifth to seventh pereopods; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contr. Zool.* **499**: 1-80.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Hirondellea glutonis* BARNARD & INGRAM, 1990

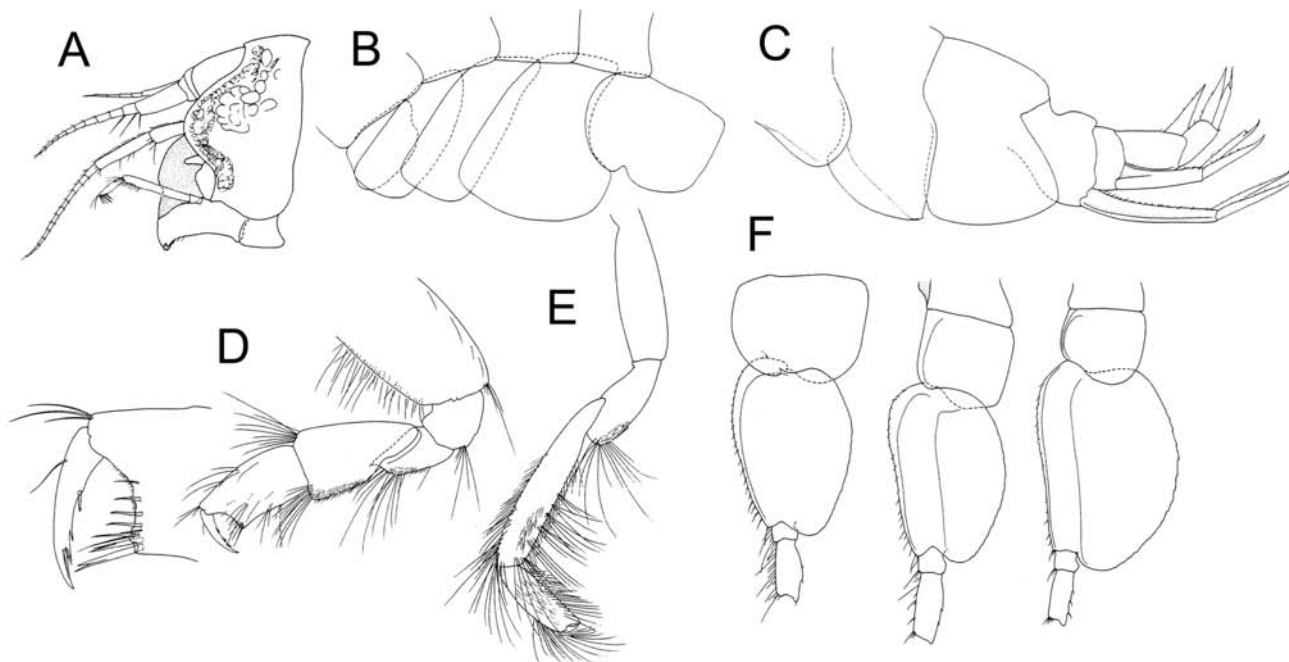
**Size:** Up to 12.6 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Mandible with incisor ordinary, molar simple, palp attached opposite molar. Coxa 1 strongly shortened. Gnathopod 1 short, subchelate, palm transverse. Gnathopod 2, propodus greatly

shorter than carpus, propodus minutely chelate. Telson elongate, cleft. (Species) Dactylus of gnathopod 1 scarcely overlapping palm. Epimera 3 rounded behind. Inner ramus of uropod 2 constricted. Telson weakly cleft.

**Biology:** Attracted by baited traps, but caught also directly with slurp gun on and around, or sorted from vent mussel and clam washings. Most specimens had the midgut densely packed with bait food, and with the sternites ventrally extended.

**Distribution:** Galapagos Spreading Center, East Pacific Rise.



1: Female 12.45 mm; A: head; B: Detail of coxal plates of anterior pereopods; C: Pleosome and urosome with attached uropods and telson; D: First gnathopod; E: Second gnathopod; F: Proximal portion of pereopods 5-7; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* **499**: 1-80.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Orchomene (Abyssorchomene) abyssorum* STEBBING, 1888

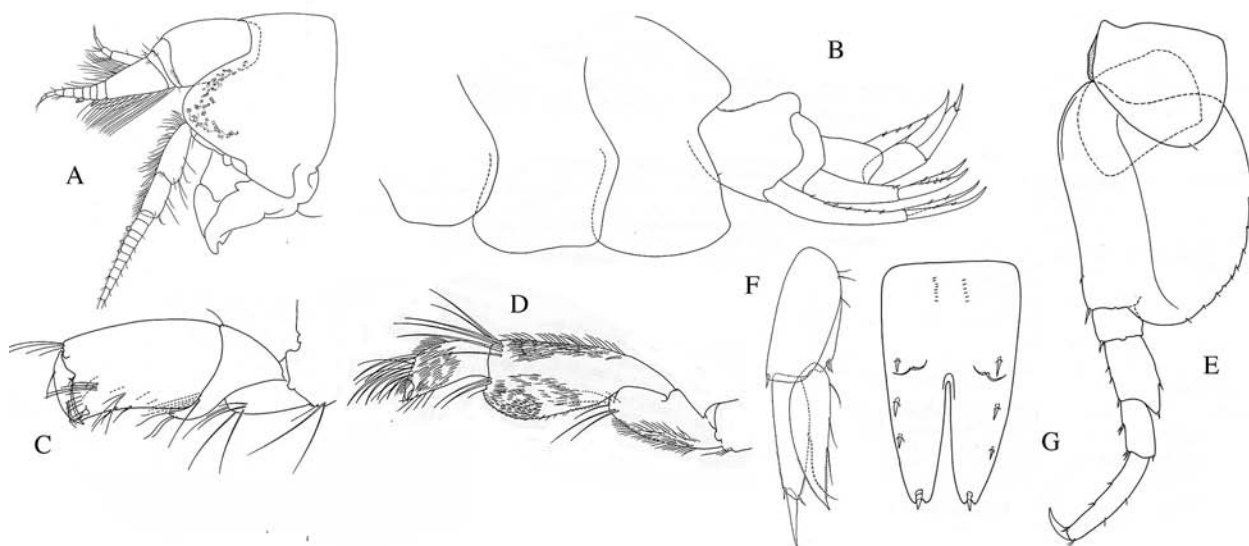
**Size:** 6.1 mm in adult male.

**Morphology:** (Family) Body compact. Peduncle of antenna 1 short and stout, articles 2-3 much shorter than 1 and partly telescoped. Article 3 of gnathopod 2 elongate. (Genus) Mouthparts forming quadrate bundle. Coxa 1 large and visible not tapering. Gnathopod 1 subchelate. Inner ramus of uropod 2 without notch. (Species) Lateral cephalic lobes broadly rounded. Eyes long, lunate, colorless in alcohol, glandular, ommatidia not evident. Peduncle of antenna 1 barely keeled. Carpus of gnathopod 1 short, posterior lobe narrow, well exceeding posterior tangential line between merus and propodus. Propodus of gnathopod 2 with palm short, chelate, not lunate, dactylus

short and covering 100% of palmar edge, palm defined thin spinule and bearing weak inner setal basket. Article 2 of pereopods 5-7 with sparse, weak posterior setule-notches. Epimeral plate 3 weakly sinuous posteriorly, produced into weak blunt tooth posteroventrally, smooth. Dorsal process of urosomite 1 hood-shaped, weakly over-vaulting urosomite 2. Telson cleft about 50% of its length.

**Biology:** Sampled in mussel and clam beds.

**Distribution:** Galapagos Spreading Center; worldwide abyssal distribution to 9000 m.



1A: Head; B: Pleon; C: Gnathopod 1; D: Gnathopod 2; E: Pereopod 7; F: Uropod 3; G: Telson; from BARNARD & INGRAM (1990).

**References:**

- BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* **499**: 1-80.  
THURSTON M.H. (1990) *Prog. Oceanogr.* **24**: 257-274.

*Orchomene (Abyssorchomene) distinctus* BIRSTEIN & VINOGRADOV, 1960

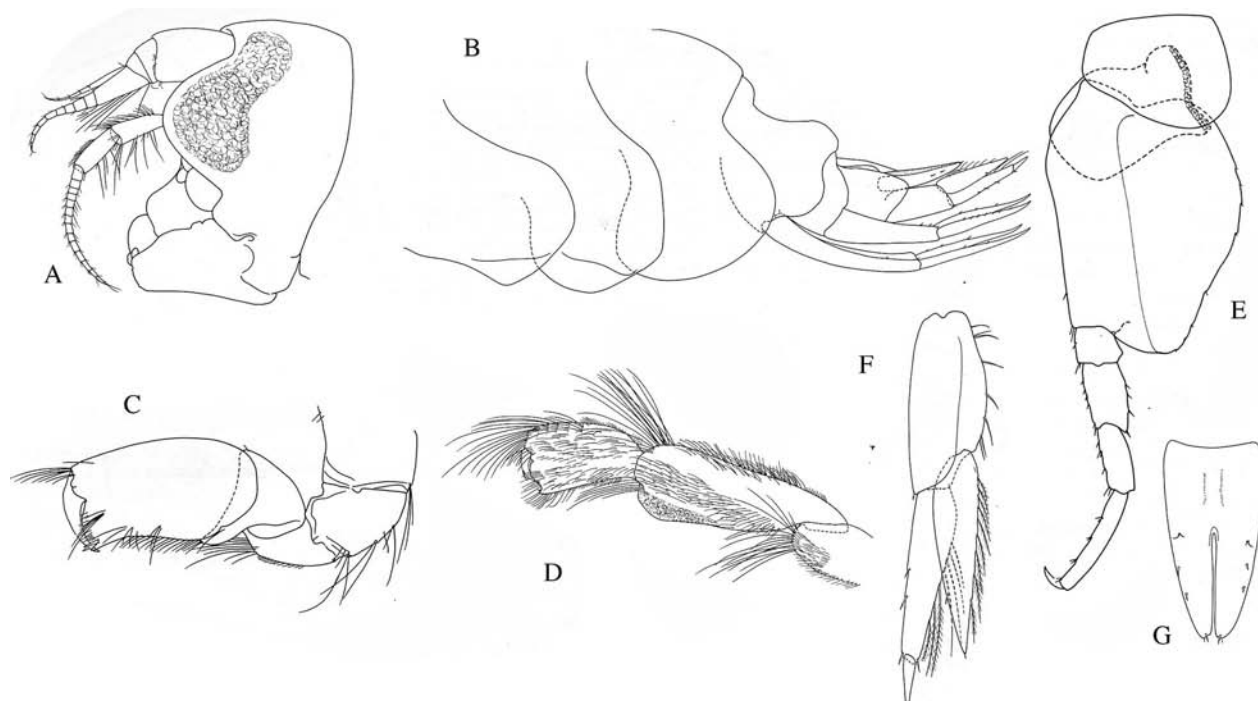
**Size:** 12 mm in adult male.

**Morphology:** (Family) Body compact. Peduncle of antenna 1 short and stout, articles 2-3 much shorter than 1 and partly telescoped. Article 3 of gnathopod 2 elongate. (Genus) Mouthparts forming quadrate bundle. Coxa 1 large and visible not tapering. Gnathopod 1 subchelate. Inner ramus of uropod 2 without notch. (Species) Lateral cephalic lobes broadly rounded. Eyes long, flask-shaped, very pale pink. Carpus of gnathopod 1 short, posterior lobe narrow, scarcely exceeding posterior tangential line between merus and propodus. Propodus of gnathopod 2 with palm elongate, transverse, sinuate, dactylus long but

covering only 60% of palmar edge, palm defined by cusp. Article 2 of pereopods 5-7 with sparse, very weak posterior setule-notches. Epimeral plate 3 broadly rounded posteroventrally, smooth. Dorsal process of urosomite 1 hood-shaped, weakly over-vaulting urosomite 2. Telson cleft about 53% of its length.

**Biology:** Sampled in sediments by slurp gun and in washings of siboglinid tubeworms.

**Distribution:** East Pacific Rise: 13°N; worldwide abyssal distribution to 4850 m.



1A: Head; B: Pleon; C: Gnathopod 1; D: Gnathopod 2; E: Pereopod 7; F: Uropod 3; G: Telson; from BARNARD & INGRAM (1990).

**References:**

- BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* **499**: 1-80.  
THURSTON M.H. (1990) *Prog. Oceanogr.* **24**: 257-274.



Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Tectoalopsis diabolus* BARNARD & INGRAM, 1990

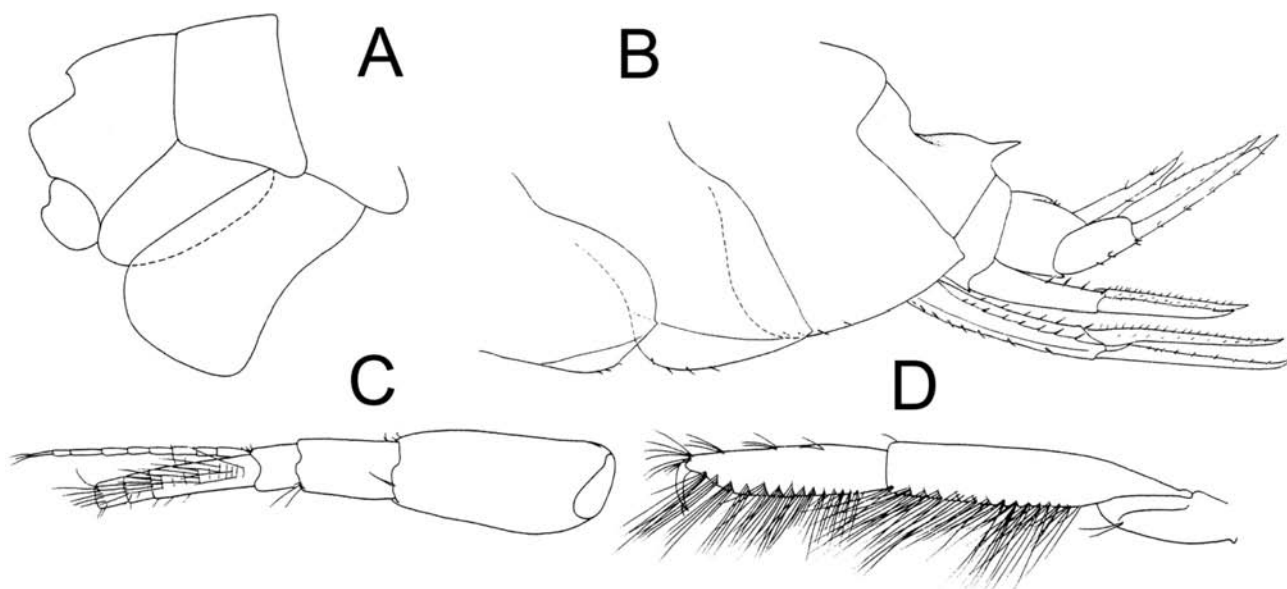
**Size:** Up to 23.4 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Mandible with molar large, conical, setulose; palp attached strongly distal of molar. Coxa 1 strongly shortened. Gnathopod strongly subchelate. Urosomite 1 carinate. Telson elongate deeply cleft. (Species) Mandibular incisor with two teeth; right lacinia mobilis very small, flake-like, much broader than long; left lacinia also broader than long, evenly serrate; molar conical,

densely setulose, tapering to tiny apical plaque with weak triturative surface. Inner plate of maxillae with medial setae. Gnathopod 1 not elongate and subchelate, with reduced coxa. Palm of gnathopod 2 long, strongly oblique. Teeth on epimera 2-3 weak. Epimeron 2 lacking facial spine. Keel of urosomite 1 simple. Urosomite 3 with erect dorsal keel.

**Biology:** Unknown. Collected with slurp gun or baited traps.

**Distribution:** East Pacific Rise: 13°N. Apparently endemic to this vent site.



1: Female 19.1 mm; A: Head; B: Pleosome and urosome with uropods and telson attached; C: Antennule; D: Second gnathopod; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* **499**: 1-80.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Tectoalopsis wegeneri* BARNARD & INGRAM, 1990

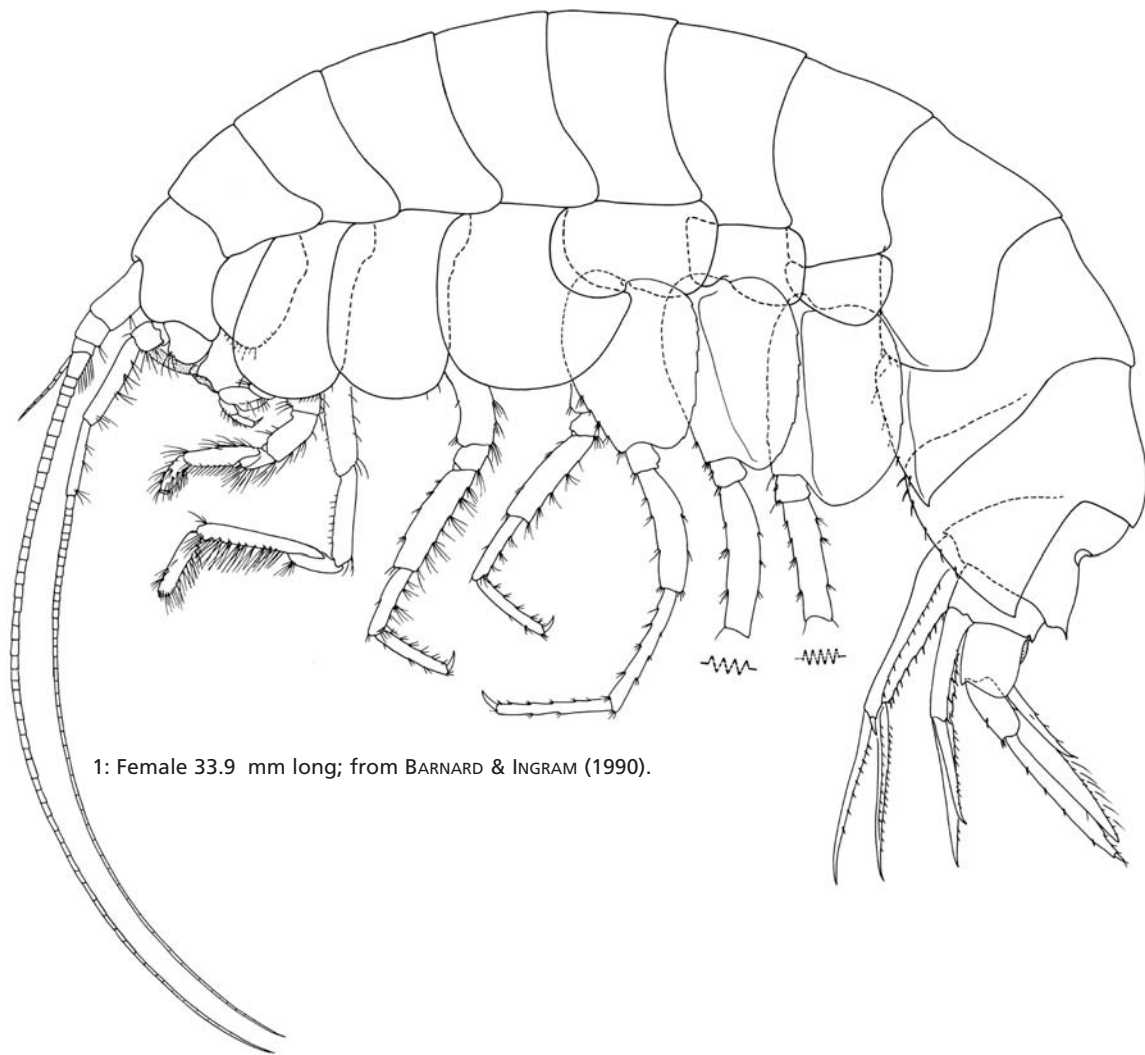
**Size:** Up to 33.9 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Mandible with molar large, conical, setulose; palp attached strongly distal of molar. Coxa 1 strongly shortened. Gnathopod 1 strongly subchelate. Urosomite 1 carinate. Telson elongate deeply cleft. (Species) Similar to the foregoing *T. diabolus* BARNARD & INGRAM, 1990 except for: (1) the wider peduncle of antenna 1; (2) the slightly less tapering coxa 1; (3) the less

adz-shaped coxa 2; (4) the slightly stouter lobe of coxa 4; (5) the slightly weaker gnathopods with shorter carpus and propodus on gnathopod 2; (6) the less oblique palm of gnathopod 2; (7) the more numerous and more widely spread spines on epimera 2-3; (8) the less stronger dorsal projection of urosomite 2 and dorsal keel of urosomite 3; and (9) the outer ramus of uropod 2 a bit longer.

**Biology:** Largely unknown. Collected with slurp gun around *Alvinella* polychaetes.

**Distribution:** East Pacific Rise: 13°N. Apparently endemic to this vent site.



1: Female 33.9 mm long; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithon. Contrib. Zool.* **499**: 1-80.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Lysianassidae

*Transtectonia torrentis* BARNARD & INGRAM, 1990

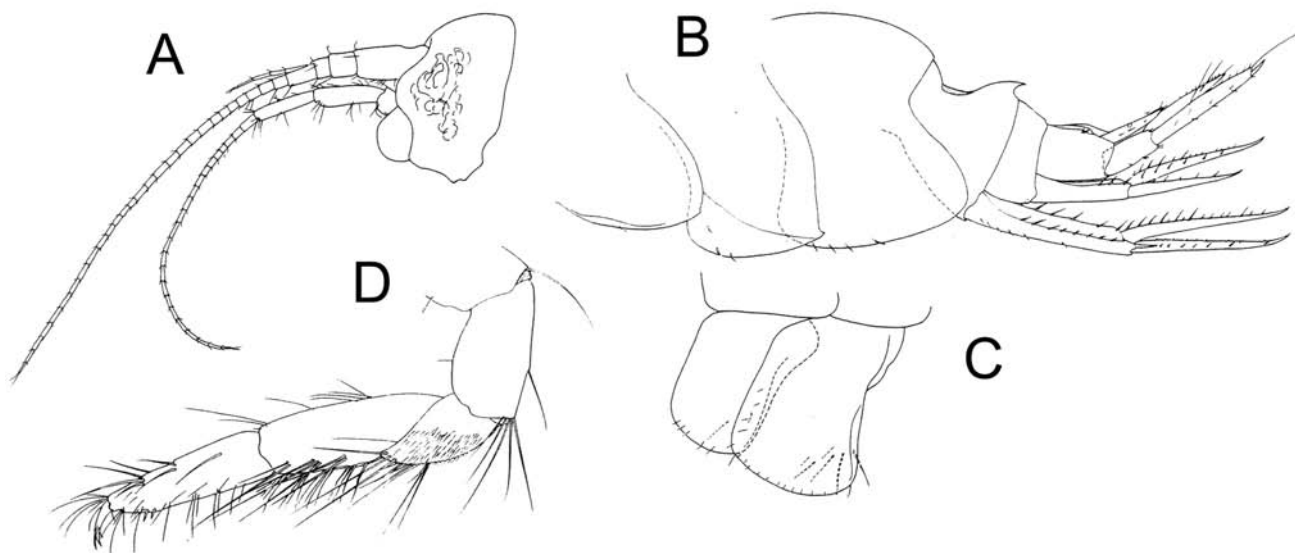
**Size:** Up to 21.2 mm.

**Morphology:** (Family) Body compact, robust. Coxae generally large. Antenna 1 peduncle article 1 large, inflated, articles 2-3 much shorter, often telescoped. Mouthparts very variable. Gnathopod 1 simple, subchelate or chelate. Gnathopod 2 characteristic for the family, slender and microchelate. Pereopods 5-7 basis usually broadly expanded. Telson variable. (Genus) Mandible with incisor strongly toothed, laciniae mobilis longer than broad, molar large, conical. Coxa 1 not shortened and no strongly covered by coxa 2. Pereopods 5-7 elongate, basis

strongly tapering. Urosomite 1 with a sharp dorsal tooth. Telsons elongate, deeply cleft. (Species) Antennae especially short. Inner plate of maxillae setose medially only along distal half. Gnathopod 1, palm strongly oblique. Epimeron 3 rounded behind with six spines narrowly spread.

**Biology:** Caught associated with worms and attracted to baited traps.

**Distribution:** East Pacific Rise: 13°N. This monotypic genus is apparently endemic to this vent site.



1: Female 10.6 mm; A: Head; B: Pleosome and urosome with uropods and telson attached; C: Coxal plates of first and second gnathopods; D: First gnathopod; from BARNARD & INGRAM (1990).

**Reference:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contrib. Zool.* **499**: 1-80.

Arthropoda, Crustacea, Amphipoda, Gammaridea, Pandaliscidae

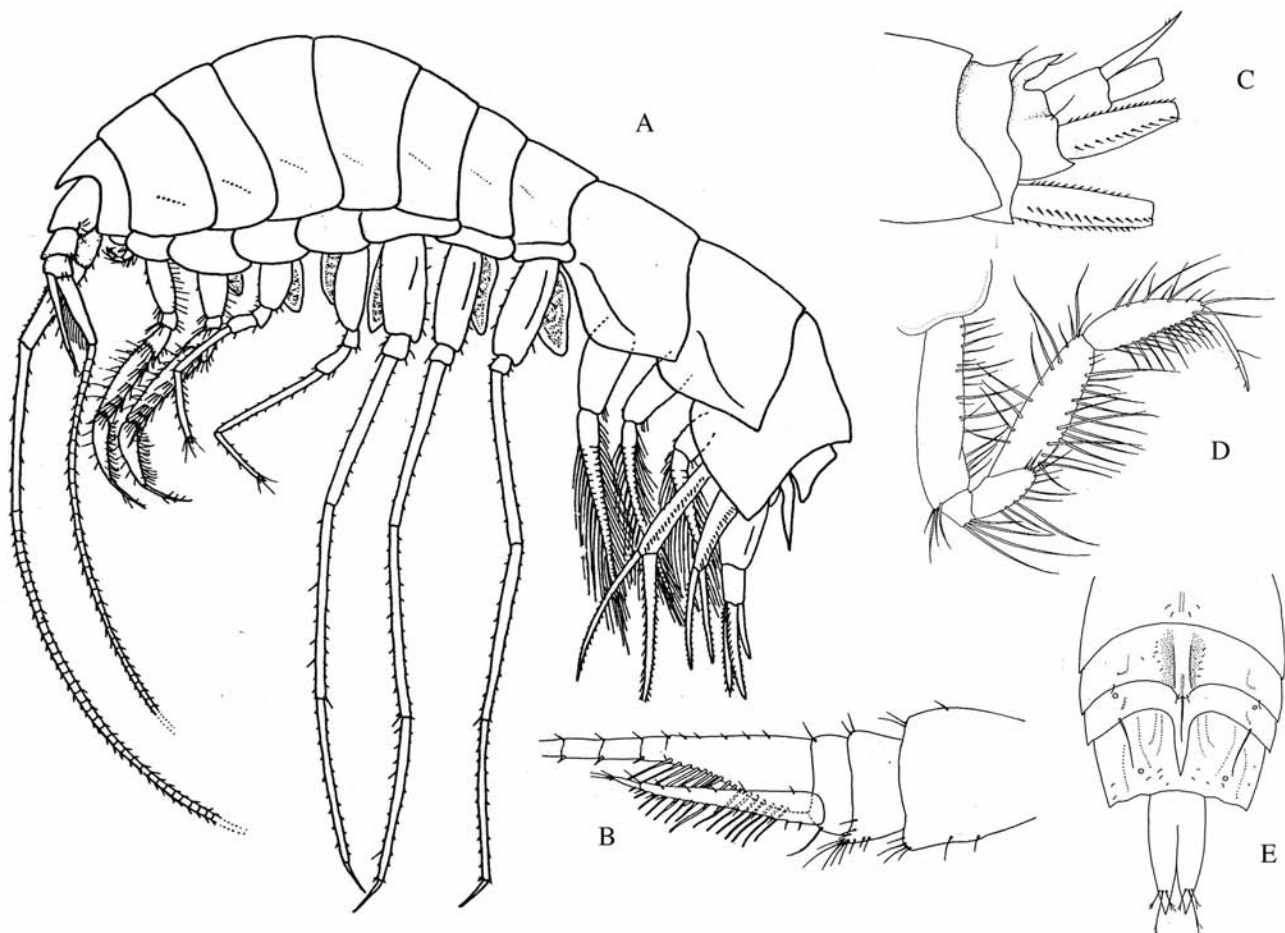
*Halice hesmonectes* MARTIN, FRANCE & VAN DOVER, 1993

**Size:** 5.3 mm in adult male.

**Morphology:** (Family) Body laterally compressed, coxae short. Accessory flagellum well developed, molar absent. (Genus) Rostrum well developed. Eyes absent. Gnathopods simple, slender. Pereopods simple. (Species) Teeth of urosomites 1-2 strong. Accessory flagellum biarticulate. Dactylus of pereopods 3-4 minute, constricted at mid length. Pereopods 5-7 extremely long. Telson cleft along 2/3 and terminating in acute tip.

**Biology:** In large monospecific swarms in the immediate vicinity of low temperature vent openings. 1000 ind. l<sup>-1</sup> estimated.

**Distribution:** East Pacific Rise: 9°N.



1A: Habitus; B: Accessory flagellum; C: Lateral view of urosome; D: Gnathopod 1; E: Dorsal view of urosome and telson; from MARTIN et al. (1993).

**Reference:**

MARTIN J., FRANCE S.C. & C.L. VAN DOVER (1993) Pacific Can. J. Zool. **71**: 1724-1732.

*Pardalisca endeavouri* SHAW, 1989

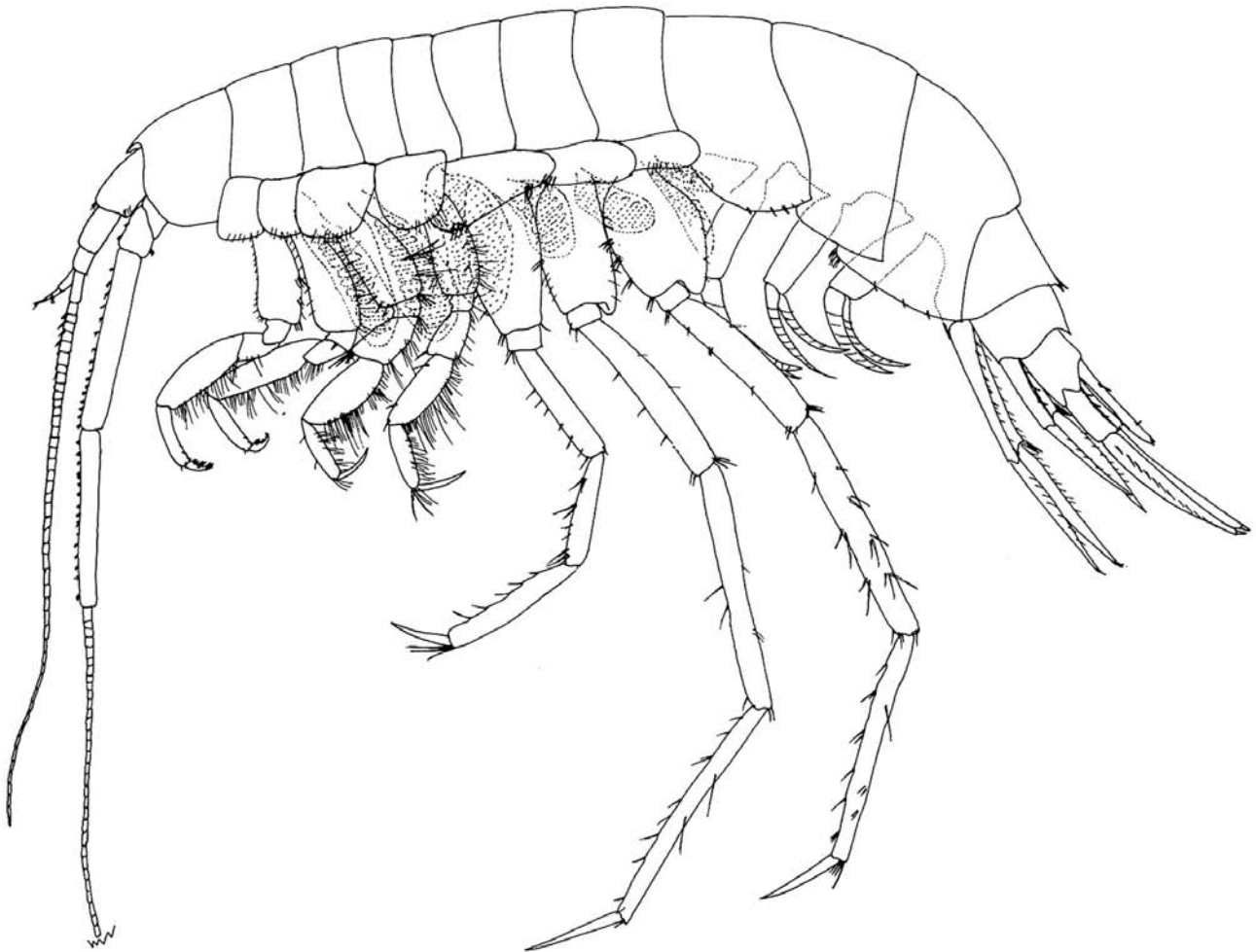
**Size:** 11.5 mm.

**Morphology:** (Family) Body laterally compressed, coxae short. Accessory flagellum well developed. Molar absent. Inner plate of maxilliped short to evanescent. (Genus) Rostrum small. Eyes absent. Mandible asymmetrical, incisor on left smooth, weakly toothed, on right strongly toothed. Palp of maxilla 1 apically expanded. Coxae 1-4 subquadrate. Gnathopods simple. Telson scarcely elongate, partly cleft. (Species) Body slender smooth. Antenna 2 with peduncle segments 3 and 4 elongate. Epimeron

3, posteroventral corner acute. Telson cleft to 80%, lobes widely separated, each apex tridentate, bearing paired marginal spines, in addition to paired penicillate setae on the upper face.

**Biology:** Unknown. Collected with slurp gun from the vicinity of siboglinids and archaeogastropods.

**Distribution:** Explorer Ridge: site Gulati Gusher.



1: Male 11.5 mm; after SHAW (1989).

**Reference:**

SHAW P. (1989) Can. J. Zool. **67**(8): 1882-1890.

## *Seba profundus* SHAW, 1989

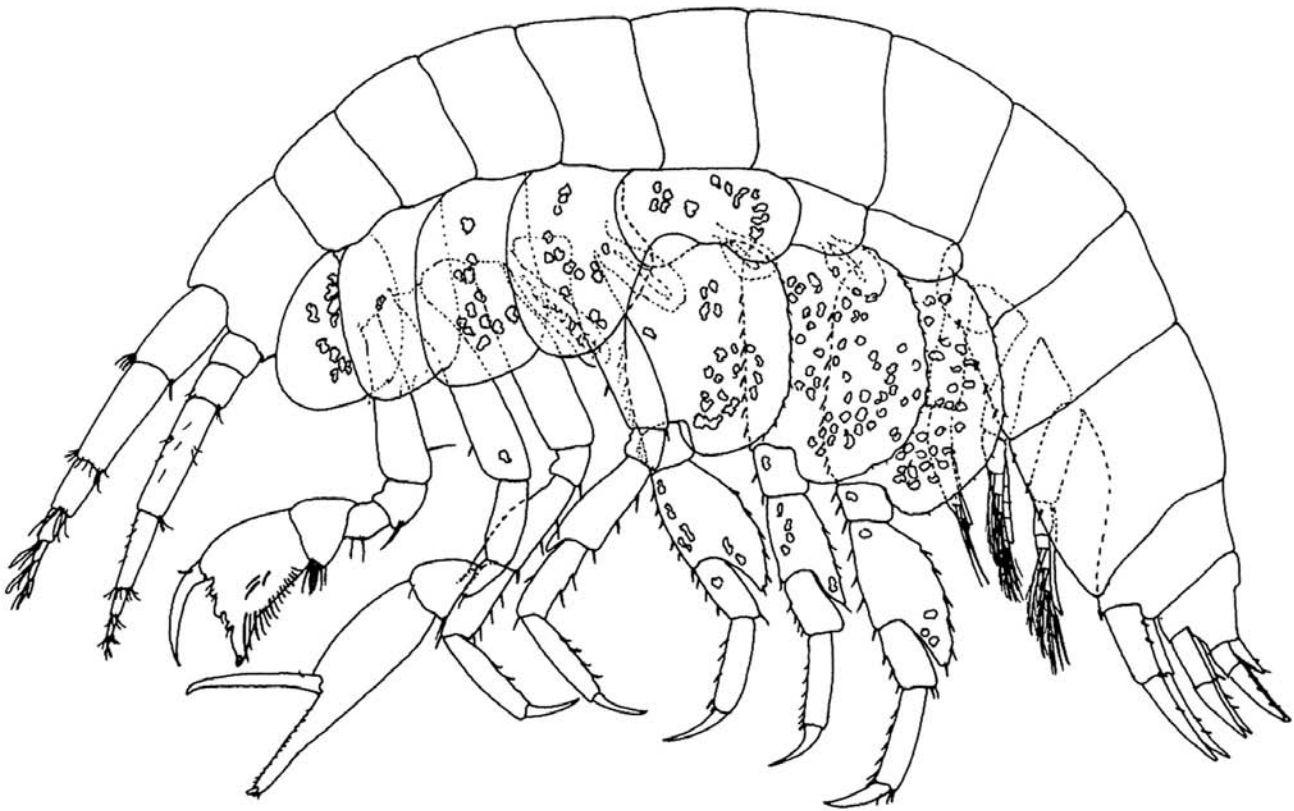
**Size:** Up to 3.5 mm.

**Morphology:** (Family) Urosomites 2-3 free or coalescent. Antenna 1, peduncle elongate, accessory flagellum two-articulate. Gnathopods 1-2 chelate or gnathopod 1 strongly subchelate. Gnathopod 1 larger than gnathopod 2. Uropod 3 uniramous. Telson entire. (Genus) Body slender. Urosomites 2-3 coalescent. Gnathopods diverse. Gnathopod 1 much the larger, subchelate or chelate. Gnathopod 2 strongly chelate. Telson linguiform. (Species) Body stout. Antennae subequal. Epimeron 3 lacking large posterodistal tooth. Gnathopod 1, subchelate, with posterodistal corner of propodus extending out from lon-

gitudinal axis of limb. Gnathopod 2 elongate, propodus slender. Basis of pereopods 5-7 evenly expanded, with convex anterior and posterior margins. Telson triangular, armed with two pairs of marginal setae.

**Biology:** Sorted from samples of associated vent fauna (the siboglinid *Ridgeia piscesiae* and archaeogastropods). Other members of the genus are typically associated either as a commensal or as inquiline with invertebrate hosts.

**Distribution:** Explorer Ridge: Crab Vent.



1: Male 3.4 mm; after SHAW (1989).

### Reference:

SHAW P. (1989) Can. J. Zool. **67**(8): 1882-1890.

D. JAUME & D. BELLAN-SANTINI

Denisia 18 (2006): 403

Arthropoda, Crustacea, Amphipoda, Gammaridea, Stegocephalidae

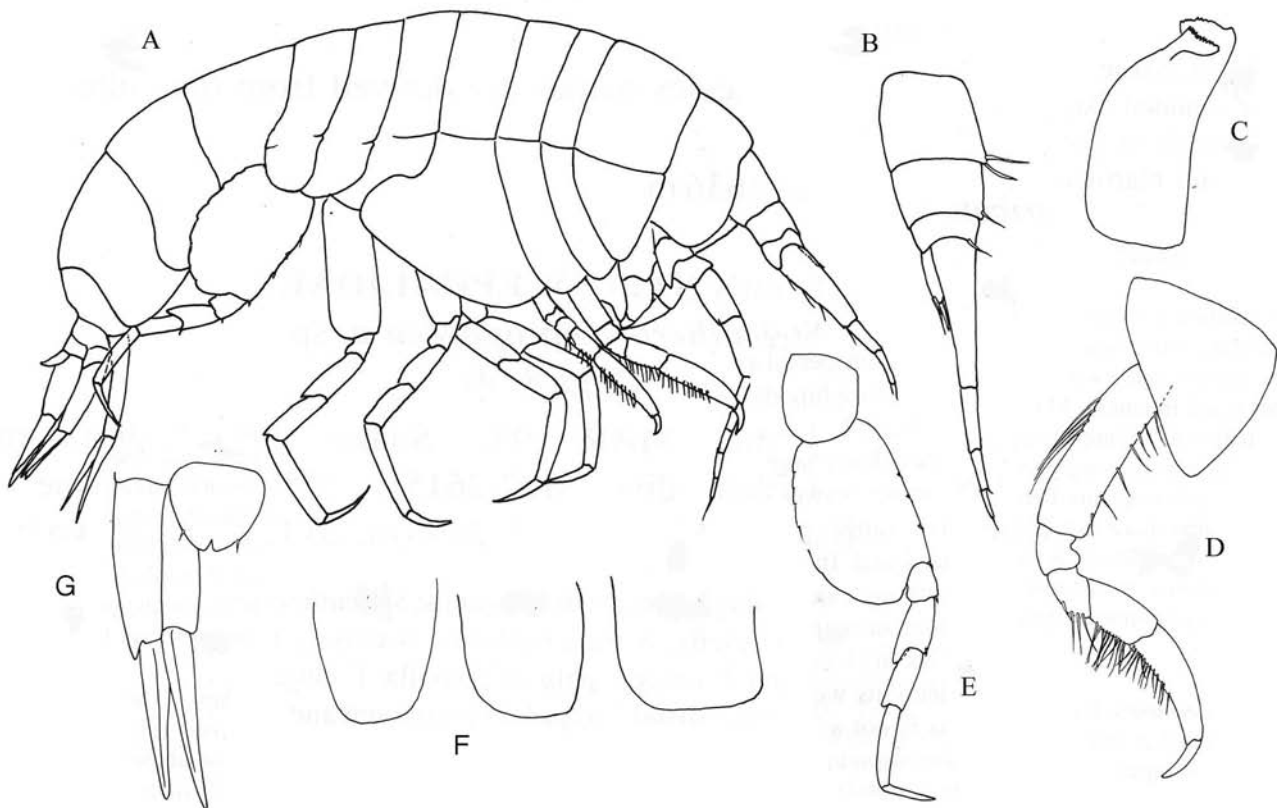
*Steleuthera ecoprophycea* BELLAN-SANTINI & THURSTON, 1996

**Size:** 3 mm in adult female.

**Morphology:** (Family) Body appears stout and globular. Coxae 1-4 forms lateral shield. Antennae very short. Mandible without molar and palp. Gnathopods feeble. (Genus) Accessory flagellum biarticulate. Mandibular incisor toothed. Pereopods 3-4 simple. Article 2 of pereopod 6 unexpanded. Pereopod 7 with 7 articles. (Species) Epimeron 3 with postero-distal corner prominent and without seta. Gnathopods 1-2 with propodus tapered distally. Basis of pereopod 7 serrulate. Telson broader than long, scarcely cleft.

**Biology:** Collected with shrimps *Rimicaris exoculata* and *Chorocaris chacei*, and in mussel washing.

**Distribution:** Mid Atlantic Ridge: Snake Pit.



1: A: Habitus; B: Antenna 1; C: Mandible; D: Gnathopod 1; E: Pereopod 7; F: Epimeral plates; G: Uropod 3 and telson; from BELLAN-SANTINI & THURSTON (1996).

**Reference:**

BELLAN-SANTINI D. & M. THURSTON (1996) J. Nat.Hist. **30**: 685-702.

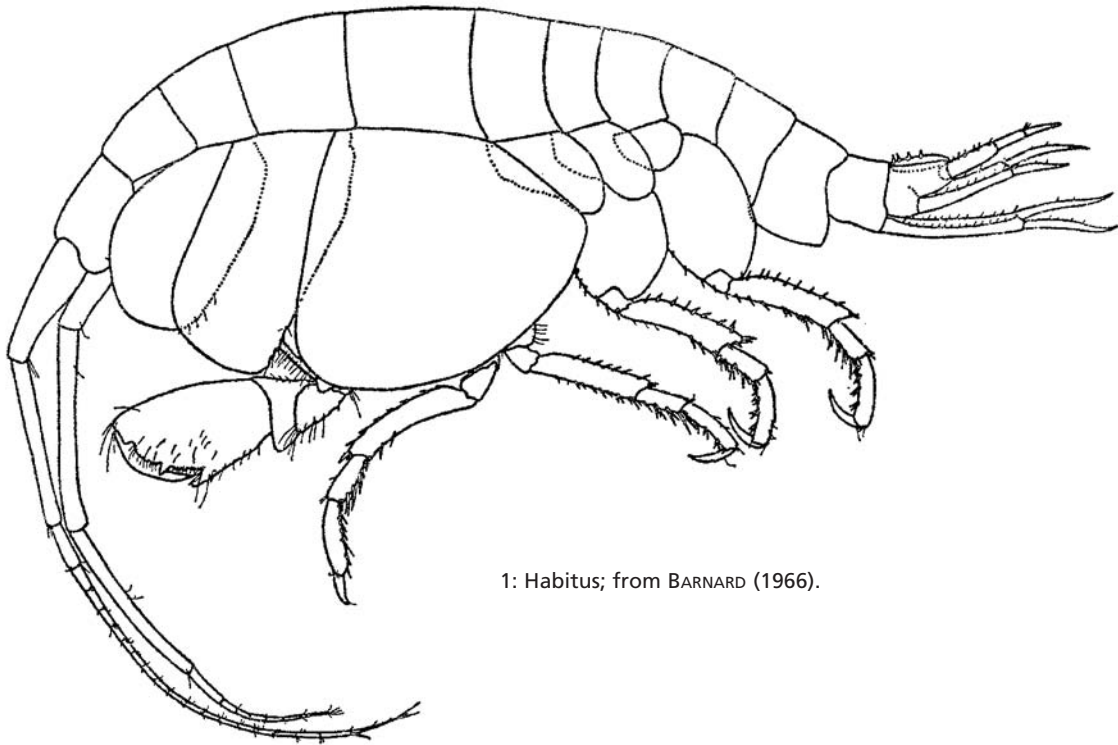
*Metopa (Prometopa) samsiluna* BARNARD, 1966

**Size:** 4.5 mm.

**Morphology:** (Family) Coxa 1 very small and partially covered by following coxae. Coxa 4 enlarged, shield-like, not posteriorly excavate. Uropod 3 uniramous. Telson entire. (Genus) Antenna 1 lacking nasiform process. Accessory flagellum absent or vestigial. Palp of mandible two- to three-articulate. Gnathopods 1-2 subchelate, different from each other in size and shape. Pereopod 5 with basis rectilinear. Pereopod 6-7 with expanded lobate basis. (Species) Eyes absent. Antennae very long. Accessory flagellum vestigial. Coxa 2 very broad. Gnathopod 1 short. Gnathopod 2 with a large medial tooth, defining corner with large tooth. Telson spinose.

**Biology:** Unknown.

**Distribution:** Originally described from the submarine canyons of off southern California (San Clemente Rift Valley, 32°44'N, 118°12'W, 1096-1620 m). Found also in the Gulf of California, in the Guaymas Basin.



1: Habitus; from BARNARD (1966).

**References:**

BARNARD J.L. (1966) Allan Hancock Pac. Exped. **27**(5): 1-166.  
VINOGRADOV G.M. (1993) Zool. Zh. **72**(2): 40-53 [in Russian].



Arthropoda, Crustacea, Amphipoda, Gammaridea, Stenothoidae

*Stenothoe menezgweni* BELLAN-SANTINI, 2005

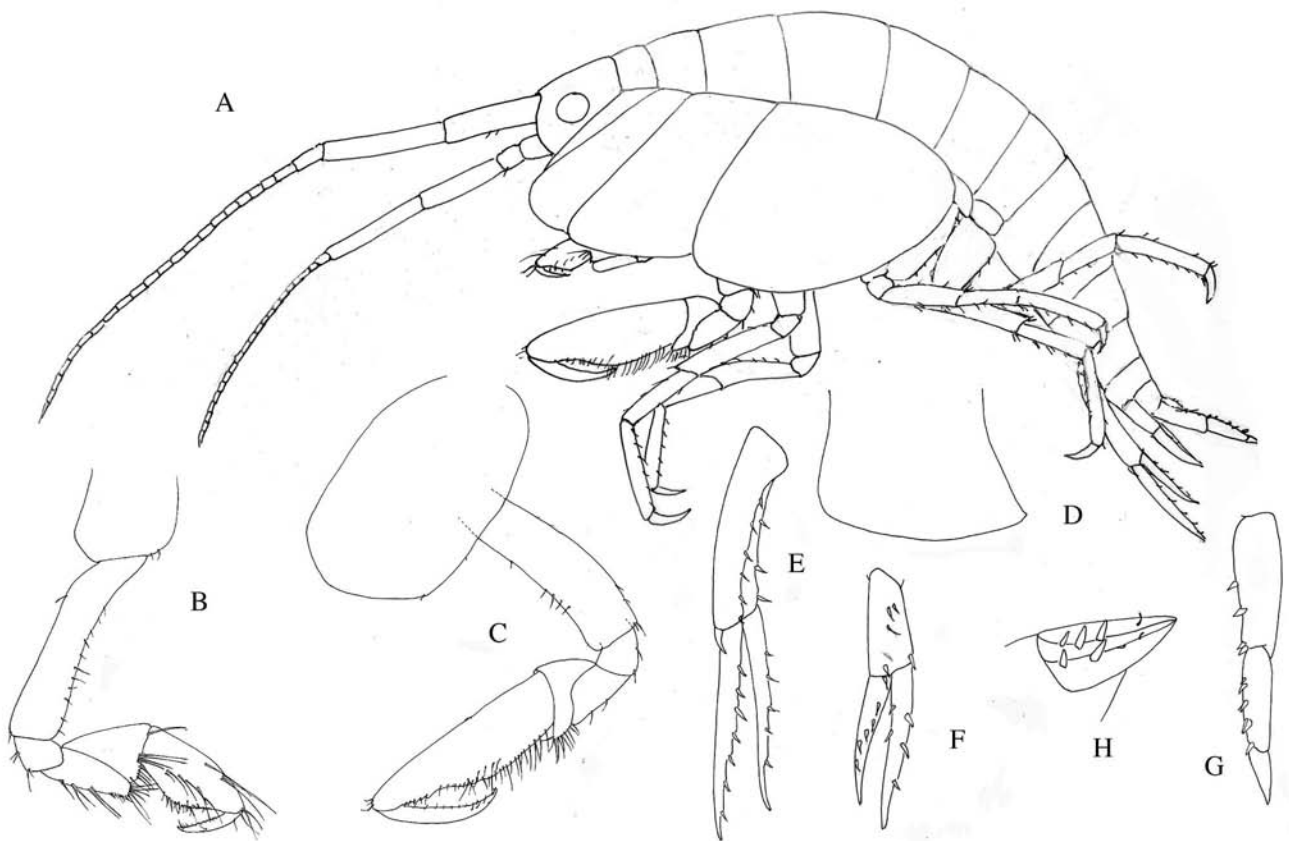
**Size:** 5 mm in adult female.

**Morphology:** (Family) Coxa 1 very small and partially covered by following coxae, coxa 4 enlarged, shield-like, not posteriorly excavate. Uropod 3 uniramous. Telson entire. (Genus) Antenna 1 lacking nasiform process on article 1, accessory flagellum absent or 1-articulated. Gnathopods 1-2 subchelate, very different from each other in size and shape. Gnathopod 1 small. Gnathopod 2 large. Pereopod 5 with recircular basis. Pereopods 6-7 with expanded and lobate basis.

Telson ordinary, flat. (Species) Antenna 1 with accessory flagellum reduced at a small scale. Eyes present. Gnathopod 1 small. Gnathopod 2 greatly enlarged, with the propodus long and narrow, palm excavate at the distal part dactylus as long as half propodus. Pereopods 6-7 slightly lobate. Telson entire.

**Biology:** Collected on hydrothermal site

**Distribution:** Mid-Atlantic Ridge: SW of Azores, Menez Gwen.



1A: Habitus; B: Gnathopod 1; C: Gnathopod 2; D: Epimeral plates; E: Uropod 1; F: Uropod 2; G: Uropods 3; H: Telson; from BELLAN-SANTINI (2005).

**Reference:**

BELLAN-SANTINI D. (2005) J. Nat. Hist. **39**(15): 1101-1110.

D. BELLAN-SANTINI

Denisia **18** (2006): 406

Arthropoda, Crustacea, Amphipoda, Gammaridea, Stenothoidae

*Torometopa saldanhae* BELLAN-SANTINI, 2005

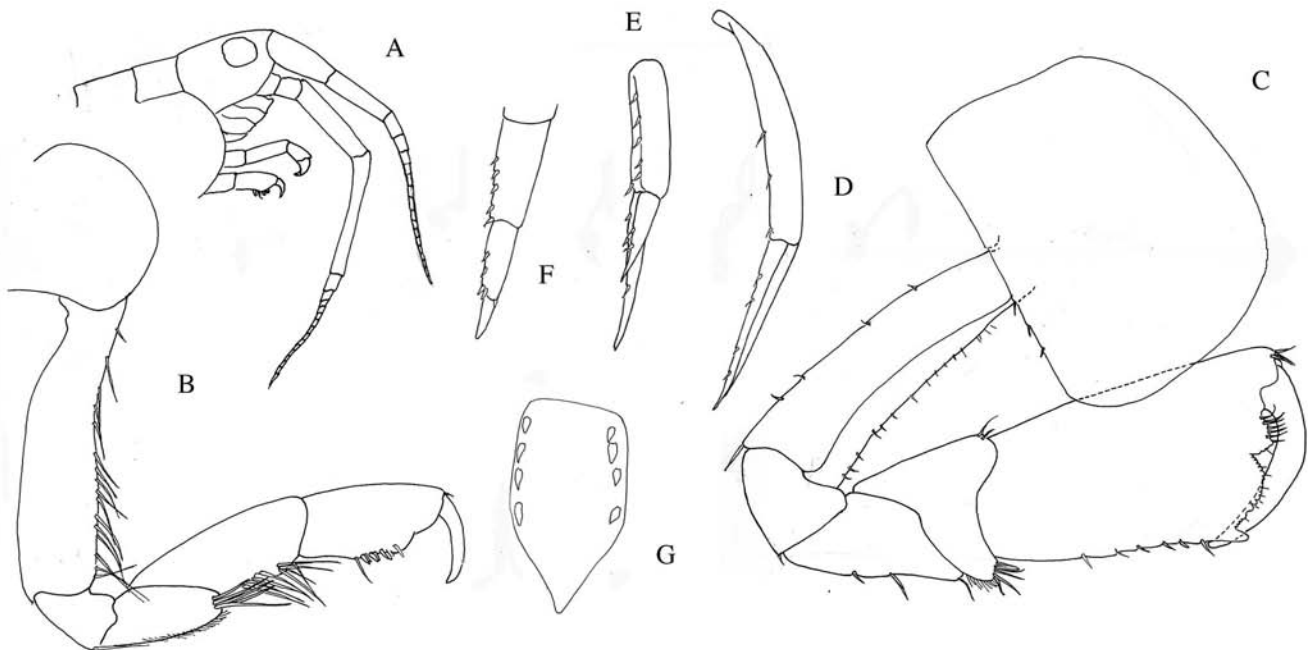
**Size:** 4 mm in adult male.

**Morphology:** (Family) Coxa 1 very small and partially covered by following coxae, coxa 4 enlarged, shield-like, not posteriorly excavate. Uropod 3 uniramous. Telson entire. (Genus) Antenna 1 lacking nasiform process on article 1, accessory flagellum zero- to two-articulated. Gnathopods 1-2 different from each other in size and shape. Gnathopod 1 small, almost simple or weakly subchelate. Gnathopod 2 large. Pereopod 5, basis not lobate in the middle of the article but with a poster-distal lobe expanded to the end of ischium. Pereopods 6-7 with expanded and lobate article 2. Telson ordinary, flat. (Species) Antenna 1 without accessory flagellum. Eyes present of moderate size. Gnathopod 1 subchelate, feeble, propodus with a short and oblique palm, defined by a spine. Gnathopod 2 large, propodus distally expanded with palm transverse,

strongly indented, limited at the distal corner by a tooth, posterior margin fringed with six small spines, dactylus as long as the palm, margin smooth. Pereopods 6-7 with expanded and lobate basis, more expanded in pereopod 7. Telson entire, longer than wide, distal triangular.

**Biology:** Collected a few meters away from the fluid emission among sponges or dead mussels, and out of the active hydrothermal areas amongst gorgonians. This species is present within hydrothermal sites and in the bathyal environment, can be regarded as an opportunist amongst hydrothermal communities.

**Distribution:** Mid-Atlantic Ridge: Menez Gwen, Lucky Strike, Rainbow.



1A: Habitus; B: Gnathopod 1; C: Gnathopod 2; D: Uropod 1; E: Uropod 2; F: Uropod 3; G: Telson; from BELLAN-SANTINI (2005).

**Reference:**

BELLAN-SANTINI D. (2005) J. Nat. Hist. **39**(15): 1101-1110.

D. BELLAN-SANTINI

Denisia 18 (2006): 407

Arthropoda, Crustacea, Amphipoda, Lysianassoidea, Uristidae

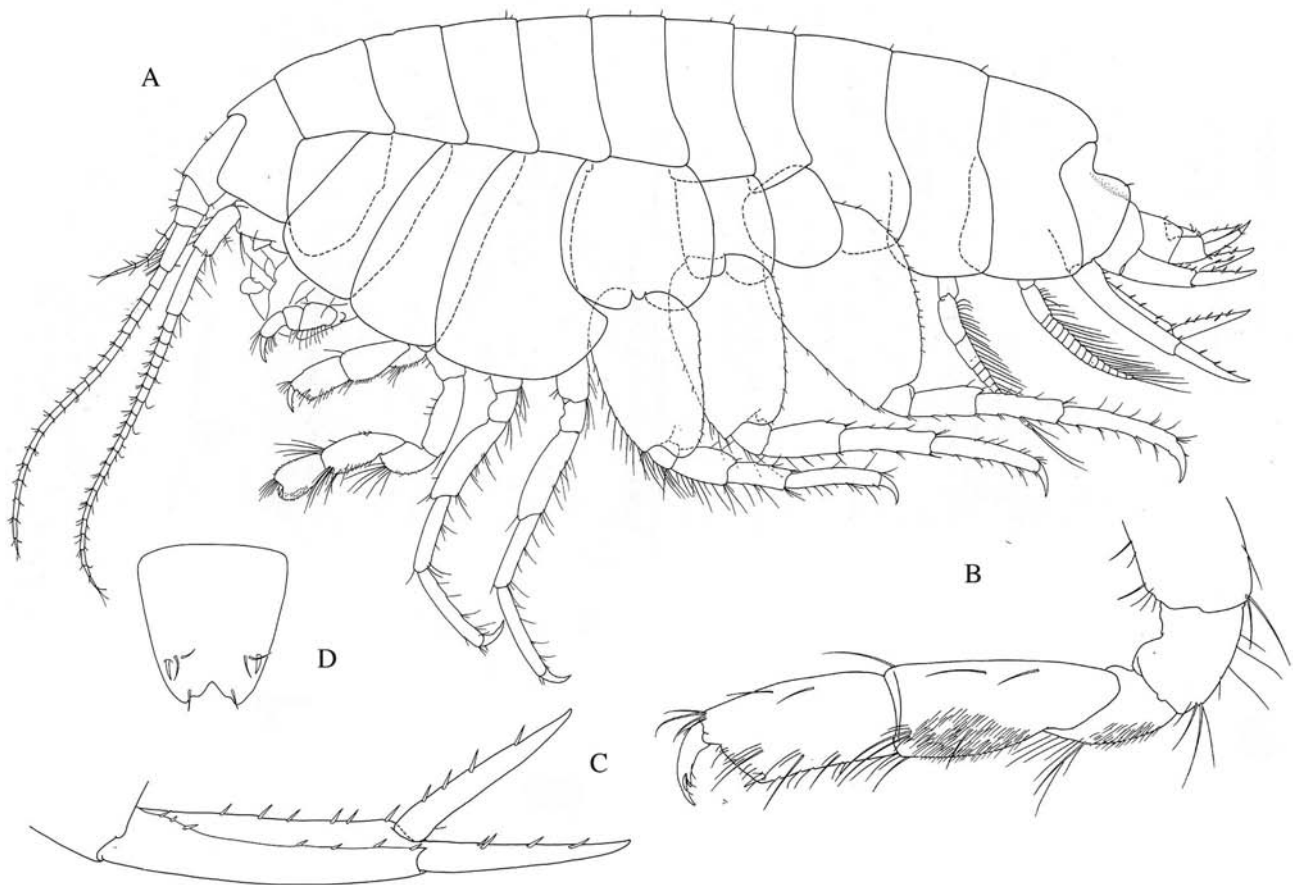
*Ventiella sulfuris* BARNARD & INGRAM, 1990

**Size:** 6.4 mm in adult female.

**Morphology:** (Family) Body compact. Peduncle of antenna 1 short and stout, articles 2-3 much shorter than 1 and partly telescoped. Article 3 of gnathopod 2 elongate. (Genus) Mouthparts forming quadrate bundle, labrum dominant, molar triturative. Eyes absent. Coxa 1 strongly shortened partly covered by coxa 2. Gnathopod 1 short, poorly subchelate. Inner ramus of uropod 2 without notch. Telson short weakly cleft. (Species) Monotypic.

**Biology:** Collected from worms and clams washings as well as crab trap wash. Very abundant. *Ventiella sulfuris* is the most frequent species in Eastern Pacific and represents up to 98% of the catches.

**Distribution:** Galapagos Spreading Center; East Pacific Rise.



1A: Habitus; B: Gnathopod 1; C: Uropod 3; D: Telson; from BARNARD & INGRAM (1990).

**References:**

BARNARD J.L. & C. INGRAM (1990) *Smithson. Contr. Zool.* **499**: 1-80.  
VINOGRADOV G.M. 1993. *Zool. Zh.* **72**(2): 40-53 [in Russian].

*Thysanoessa parva* HANSEN, 1905

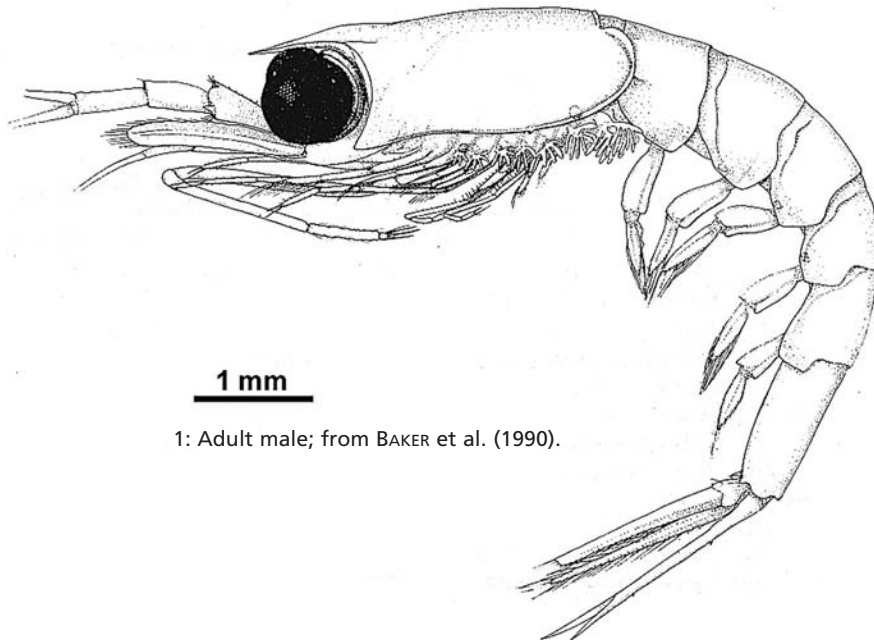
**Size:** Max. length 9-10.5 mm.

**Morphology:** Rostrum acute, ending beyond the eyes. Eyes large, with a transverse constriction between two lobes, the upper one being smaller than the lower. Carapace with a lateral small denticle on its inferior margin, posterior to its mid-point. Thoracopods almost uniform in structure, although the second pair is elongated; their setae are provided with setules visible only at high magnifications. The eighth pair is rudimentary. The seventh pair has well developed exopodites; endopodites are absent in males and short in females. Sixth abdominal segment shorter than the sum of lengths of the two preceding segments. Photophores are present on the eye stalks, at the bases of the thoracopods 3 and 7 and on the mid ventral part of abdominal segments 1-4.

**Biology:** It is interesting to note the great abundance of specimens in almost all samples from the hydrothermal vent field Rainbow (Mid-Atlantic Ridge). Indeed, a total of 700 specimens were caught in the different traps (KHRIPOUNOFF et al. 2001). They were regularly present from September to January and more markedly in October and November at different distances from the vents. They were always absent in traps from February to June, except for traps laid far off vent sites (2 km).

Curiously, all the specimens were juveniles. Chemical analysis of the composition of particles from the stomach content has been done by EDS X-ray microanalysis. A comparison between *T. parva* specimens and specimens of the related species *T. gregaria* indicate that probably the *T. parva* population is more or less linked with the particle flux. Indeed, a peak of the Fe element is obvious and might be related with the high concentration of iron (7%) in the vent particles (KHRIPOUNOFF et al. 2001) that does not exist in *T. gregaria* (unpublished data). However, studies of *T. parva* specimens caught far from the vents have yet to verify this hypothesis. Curiously, there were no euphausiaceans in traps laid in the South Atlantic (Gulf of Guinea) and in the Pacific (East Pacific Rise: 13°N) (M. Segonzac, pers. comm.).

**Distribution:** It is a rare meso-bathypelagic species. In the Atlantic, it has been recorded off Portugal and Africa, from the latitude of Gibraltar to near Cap Town; on the western side, it is mentioned near the Bermuda Islands. In the Pacific, it is known in scattered areas: east of south Japan, off California and east of New Zealand. In the Indian Ocean, it exists west of Sumatra. Mid-Atlantic Ridge: Rainbow.



1: Adult male; from BAKER et al. (1990).

#### References:

- BAKER A. DE C., BODEN B.P. & E. BRINTON (1990) A Practical Guide of the Euphausiids of the World. Nat. Hist. Mus. Publ., London: 1-96.  
 BRINTON E. (1962) Bull. Scripps Inst. Oceanogr. **8**: 51-270.  
 KHRIPOUNOFF A., VANGRIESHEIM A., CRASSOUS P., SEGONZAC M., COLACO A., DESBRUYÈRES D. & R. BARTHELEMY (2001) J. Mar. Res. **59**: 633-656.  
 MAUCLINE J. & L.R. FISHER (1969) Adv. Mar. Biol. **7**: 1-454.

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Denisia](#)

Jahr/Year: 2006

Band/Volume: [0018](#)

Autor(en)/Author(s): Bellan-Santini Denise

Artikel/Article: [Arthropoda, Crustacea, Amphipoda 382-409](#)