Zootaxa 1071: 19–38 (2005)
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ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

1071

Two new species of Ostracoda from hydrothermal vents of *Riftia pachyptila* aggregations on the East Pacific Rise (Halocypridina; Cladocopina)

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Abstract

Two new species of Ostracoda, *Archiconchoecia (Archiconchoecia) chavturi* (Halocypridina) and *Polycopetta pax* (Cladocopina), are described from two diffuse flow vent localities (Tica Site and *Riftia* Field Site) within *Riftia pachyptila* (Siboglinidae, Vestimentifera) aggregations on the East Pacific Rise, slightly north and west of 9°50' N, 104°17'W, depth 2500 m.

Key words: Ostracoda, Halocyprida, Halocypridina, Cladocopina, taxonomy, new species, *Archiconchoecia*, *Polycopetta*, vent

Introduction

Kornicker (1991:28–39) described several species of the halocyprid genus *Bathyconchoecia*, and reported specimens identified only to the subfamily Conchoecinae that had been collected in a plankton tow 3–4 m above the bottom (depth 2000 m) in the Guaymas Basin (Southern Trough). Unnamed Conchoecinae also have been reported from Rift Valley, East Pacific Rise (depth 2600 m), and unnamed Cladocopina have been reported from the National Geographic Site, East Pacific Rise (depth 2592 m) (Kornicker, 1991:41,42), and Halocypridae, Cylindroleberidae, and Polycopidae from the Guaymas Basin and East Pacific Rise (depth 2592–2600 m) (Berg and Van Dover, 1987:391). Those sites are all north of 20°N.

The two new species described and illustrated herein, the halocyprid *Archiconchoecia (Archiconchoecia) chavturi* and the cladocopid *Polycopetta pax* are from two vigorous diffuse flow vent sites (after Hessler et al., 1985), on the East Pacific Rise, slightly north and west of 9°50'N, 104°17'W (depth 2500 m). The animals were collected within *Riftia pachyptila* (Siboglinidae, Vestimentifera) aggregations growing on bare basalt.

Accepted by J. Olesen: 5 Sept. 2005; published: 28 Oct. 2005

Sampling device. Samples were collected with the quantitative 'Bushmaster jr.' collection device (Berquist et al., 2003:197–222; Urcuyo et al., 2003: 763–780).

Terminology. For terminology of anatomy of Halocypridae see Iles (1961) and for Cladocopina see Kornicker and Iliffe (1989).

Systematics

Superorder Myodocopa Sars, 1866
Order Halocyprida Dana. 1853
Suborder Halocypridina Dana, 1853
Family Halocypridae Dana, 1853
Subfamily Archiconchoecinae Poulsen 1969

Chavtur and Stovbun (2003:139–219) revised the subfamily Archiconchoecinae proposing six new genera. Including *Archiconchoecia,* the subfamily now contains seven genera. They also proposed two subgenera in the genus *Archiconchoecia*. Although handicapped by the absence of an adult male in the present collection, their keys were useful in identifying the female in the collection as a member of the genus *Archiconchoecia,* subgenus *Archiconchoecia*.

Archiconchoecia Müller, 1894

Type Species. *Archiconchoecia striata* Müller, 1894.

Archiconchoecia (Archiconchoecia) Müller, 1894

The present specimen is the first member of this diverse and widely distributed subgenus to be reported from a vigorous diffuse flow hydrothermal vent associated with *Riftia pachyptila* aggregations.

Archiconchoecia (Archiconchoecia) chavturi, new species

Figs. 1–8

Etymology. The species is named in honor of V. G. Chavtur, eminent specialist in the systematics and ecology of Ostracoda.

Holotype. USNM 1078583, adult female, carapace in alcohol, appendages on slide.

Paratypes. None.

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Type Locality. Tica Site, East Pacific Rise, 9°50.447'N, 104°17.493'W, 2500 m bottom depth, temperature up to 13°C. Alvin dive number 3851, sample number TC2b. Sample taken with a Bushmaster jr. from *Riftia pachyptila* aggregations with white and straight growing tubes.

Description of adult female (Figs. 1–8). Carapace oval in lateral view with greatest height just posterior to midlength (Figs. 1A, 2A) . In dorsal view valves widest near midlength (Fig. 2C). A small glandular opening on posterior edge of each valve dorsal to midheight; gland slightly lower on right valve (Fig. 1D). Glands present within infold of ventral, anteroventral, and posteroventral margins of each valve (Figs. 1B,C, 2D). Rostrum and incisure of each valve small (Fig. 1A–C,E). Right valve with indentation in dorsal margin near midlength prior to removal of body (Fig. 1A), but straight after removal of body (Fig. 1B). Posterior angular hinge structure on each valve well developed (Figs. 2B, 3A). Surface of valves without either striations or reticulations (possibly lost during preservation).

Central Adductor Muscle Scars: Ends of 5–8 muscles detached from valve in muscle area visible through valve and may have been attached to valve (Fig. 2C). Five scars forming J-shape present at base of usual location of central adductor attachments (Fig. 1B,C).

Carapace Size: Carapace length 0.60 mm, height 0.40 mm.

First Antenna: Interpreted to have 6 articles, but sutures not present between articles 1 and 2, and 2 and 3. Separation of articles 1 and 2 indicated by step in dorsal margin, and separation of articles 2 and 3 indicated by termination of internal muscle (Fig. 3D). Article 2 with slender terminal dorsal bristle with indistinct marginal spines (Figs. 2F, 3B–D). Article 5 with 4 long filament-like bristles. Article 6 with 2 long filament-like bristles (Figs. 2F, 3D) (1 filament-like bristle displaced on left limb (dashed in Fig. 3D)). Black proximal spots on limbs (Figs. 2F, 3B,D).

Second Antenna (Figs. 2A,E, 3B,C, 4): Protopod: ventral margin with small bare process between bases of exopod and endopod, closer to endopod (Fig. 4B,C); protopod of left limb with about 12 small black pigment spots. Exopod of right limb with 8 articles separated by sutures (exopod of left limb incomplete): article 1 with small dorsal spines (on right limb only) and short, slender, bare, medial terminal bristle (Fig. 4A,B); article 2 of right limb without bristle (all bristles broken off on left limb); natatory bristles on articles 3–7 with bases medial; article 8 with 2 short bristles (Fig. 4A,D). Endopod: article 1 without processes mammillaria; ventral margin with minute digitations and spines; dorsal margin with a- and b-bristles (indistinct spines observed only on one bristle) (Fig. 4B,C). Articles 2 and 3 fused, with total of 5 filament-like bristles of about same length; tips of filaments tapered. (The bristle of the 2nd exopodial article of the right limb was observed to be absent prior to dissection of the specimen, but whether or not it had broken off is unknown. Although 9 exopodial articles are the usual number, only 8 could be detected on the right limb when viewed under oil immersion with X100 objective lens.).

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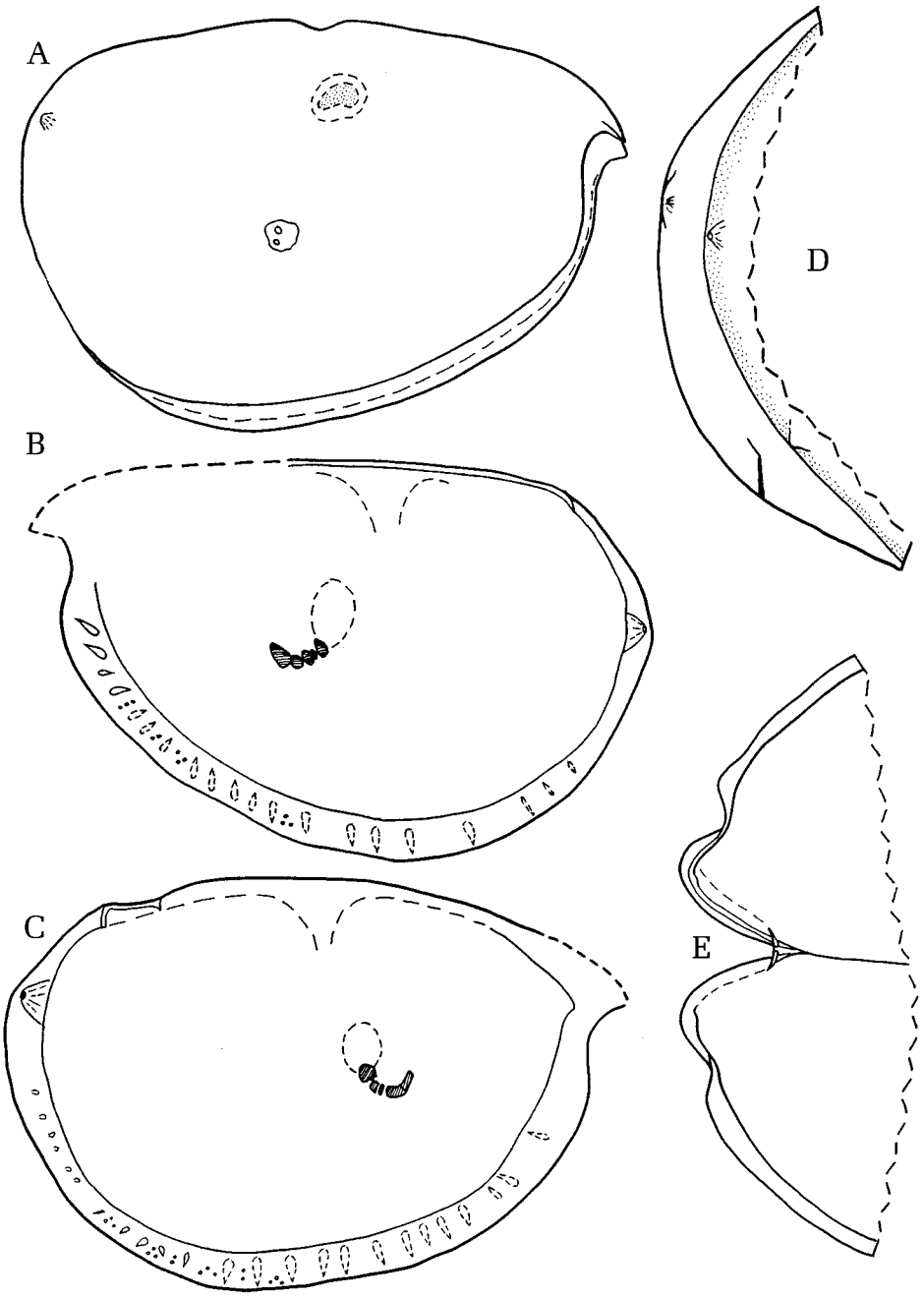

FIGURE 1. *Archiconchoecia chavturi*, new species, adult female, holotype, length 0.60 mm: A, complete specimen from right side; B, right valve, iv; C, left valve, iv; D, lateral view of posterior end of carapace showing both valves (detail from 2A); E, ventral view of anterior of carapace with valves partly open. (iv = inside view.)

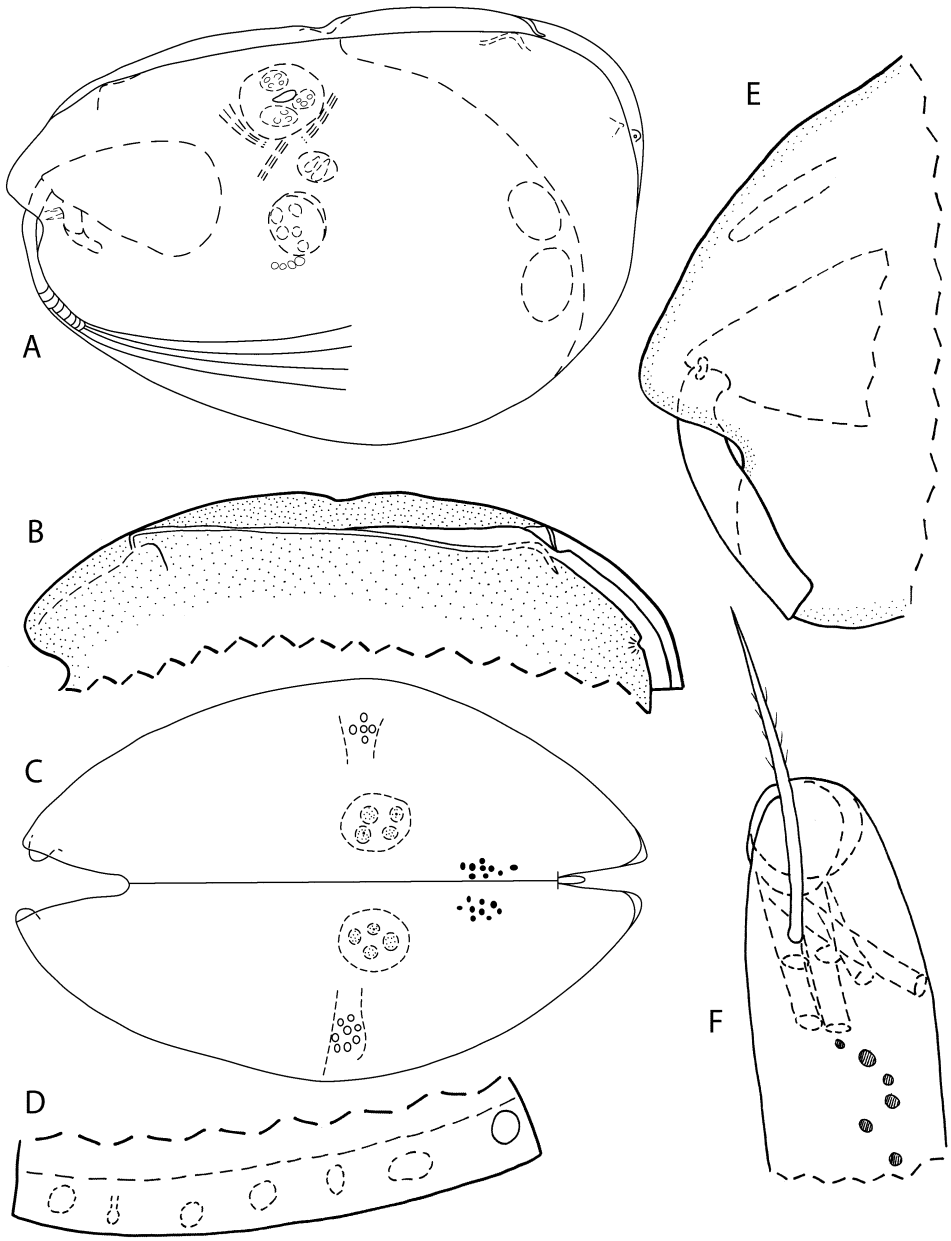

FIGURE 2. *Archiconchoecia chavturi*, new species, adult female, holotype: A, compete specimen from left side; B, dorsal part of complete specimen from left side; C, dorsal view of complete specimen, anterior to right, (Bellonci Organ projecting at right; black dots on 1st antennae); D, inside edge of ventral margin of left valve showing glandular openings; E, anterior of left valve showing elongate Bellonci Organ and part of left 2nd antenna; F, dorsal distal view of right 1st antenna (nabs). (nabs = not all bristles shown.)

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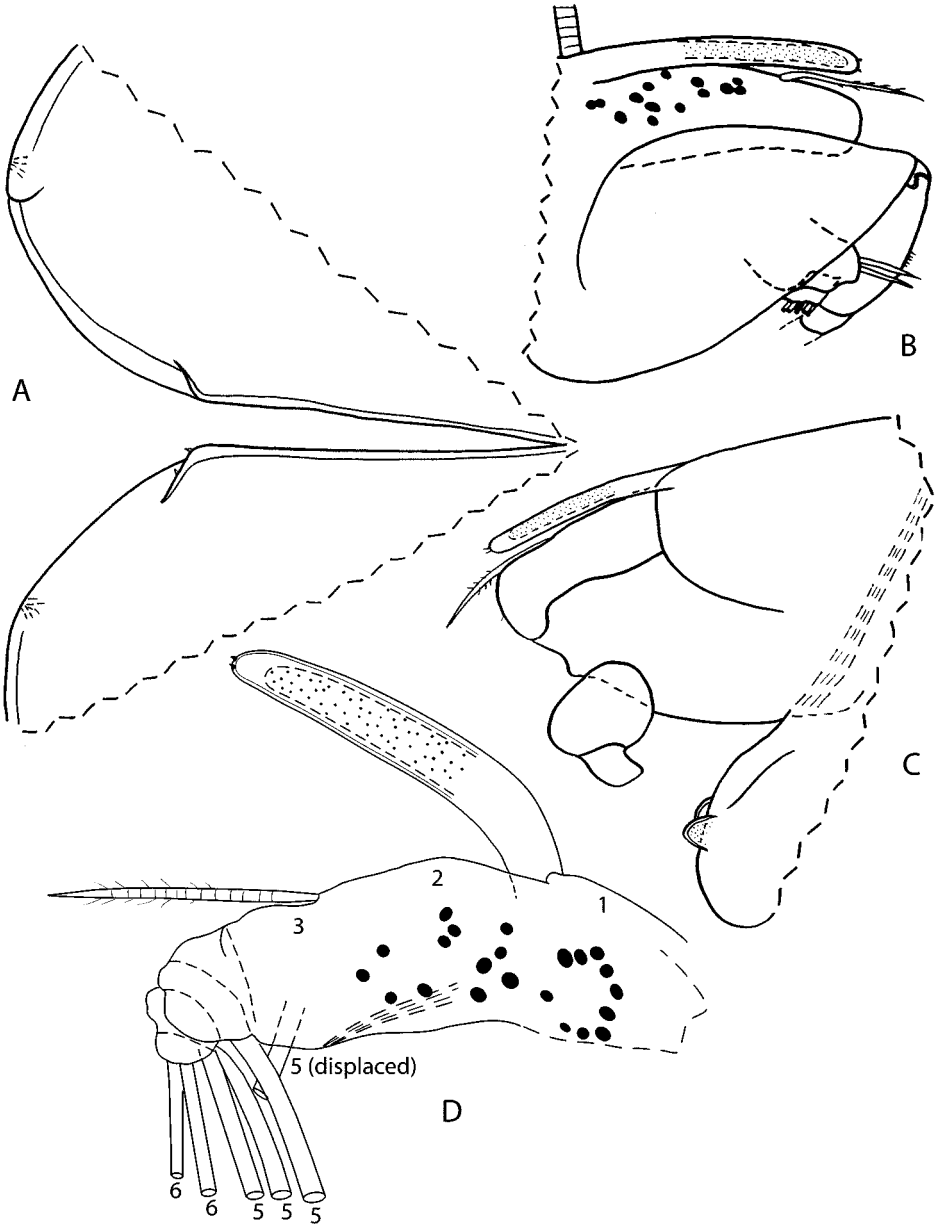

FIGURE 3. *Archiconchoecia chavturi*, new species, adult female, holotype: A, ventral view of dorsal posterior end of carapace with valve partly open; B, anterior of body from right side showing Bellonci Organ and parts of right 1st and 2nd antennae; C, anterior of body from left side showing Bellonci Organ, parts of left 1st and 2nd antenna and two processes on anterior of body; D, Bellonci Organ and left 1st antenna, lv.
(lv = lateral view.)

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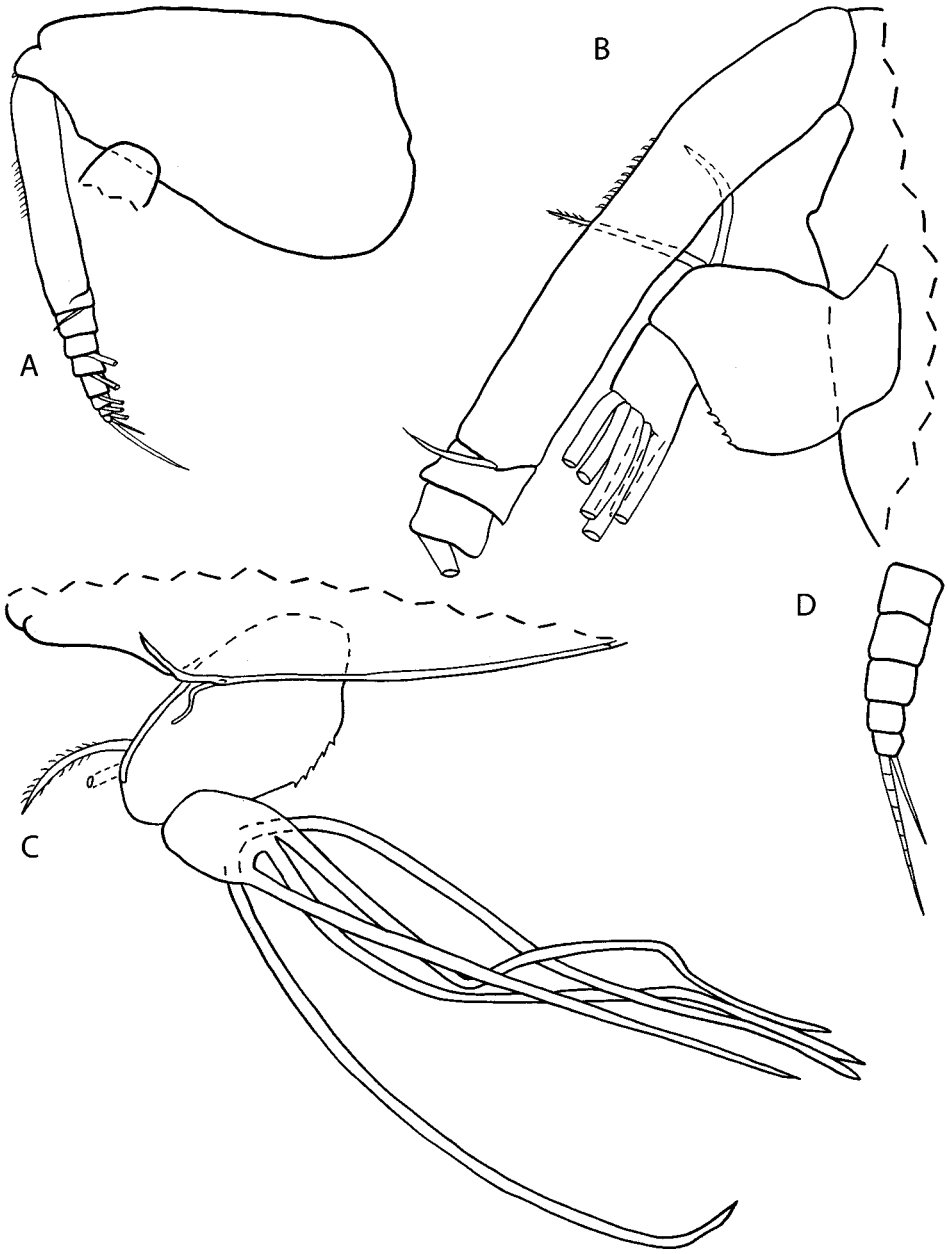

FIGURE 4. *Archiconchoecia chavturi*, new species, adult female, holotype: A, B, part right 2nd antenna, mv; C, D, endopod and exopod left 2nd antenna, lv (nabs).
(lv=lateral view; mv = medial view; nabs = not all bristles shown.)

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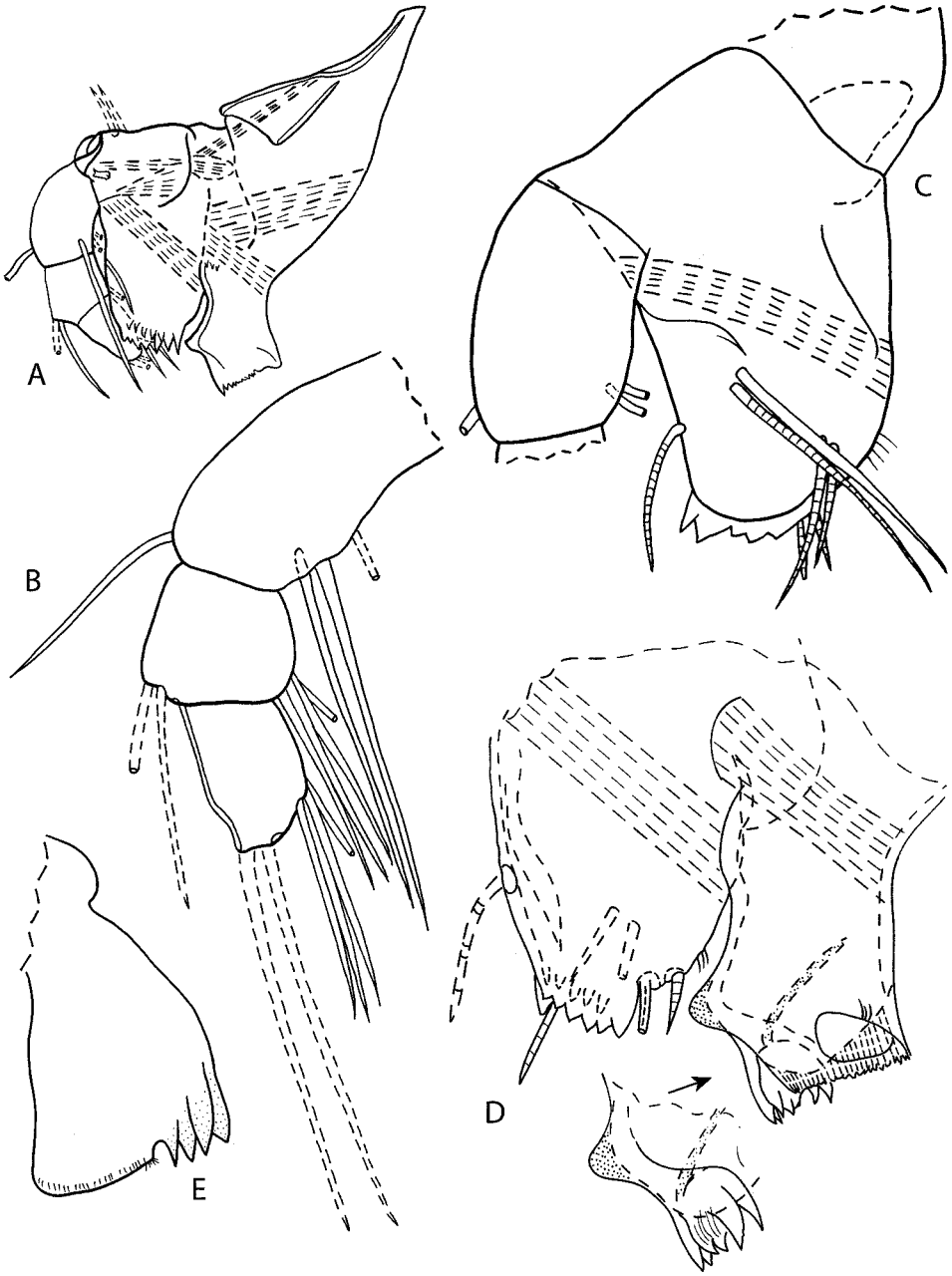

FIGURE 5. *Archiconchoecia chavturi*, new species, adult female, holotype: A, right mandible, mv; B, endopod left mandible, lv; C, part basis and endopod left mandible, lv; D, part coxa and basis right mandible, mv; E, coxa endite right mandible as seen through basis (indistinct), lv. (lv = lateral view; mv = medial view.)

Mandible (Figs. 5, 6A): Coxa: anterior margin with distal triangular process; terminal edge with about 6 triangular teeth lateral and partly anterior to dense rows of minute

triangular teeth (number of rows difficult to resolve) (Fig. 5A,D,E). Basis endite: distal edge with 6 small triangular teeth (posterior tooth slightly larger than others) and 1 larger tooth lateral to anterior triangular tooth; tube-shaped bristle and pointed bristle on edge proximal to posterior triangular tooth; a few hairs along edge proximal to pointed bristle; 1 long bristle on anterior margin of endite proximal to teeth (Fig. 5A,C,D); lateral side of endite distal to stout internal muscle with 2 long proximal and 2 short distal bristles (Fig. 5C). Dorsal edge of basis with 1 or 2 short bristles; medial side of basis near dorsal edge with 2 exopodial bristles (length uncertain) (Fig. 6A). Endopod (Figs. 5A,B, 6A): article 1 with 4 bristles (3 ventral, 1 dorsal); article 2 with 6 bristles (4 ventral, 2 dorsal); article 3 with 6 bristles (4 ventral, 2 terminal (dorsal terminal bristle claw-like)). (Several bristles on endopod broke off during dissection; these are dashed in Figs. 5A, 6A.) Limb without black spots.

Maxilla (Maxillula) (Fig. 6A–C): Precoxa endite with 5 stout bristles and 1 tubular bristle; coxa endite with 4 stout bristles and 1 tubular bristle. Basis with long spinous ventral bristle. Endopod: article 1 with 8 bristles; article 2 with bristles missing (bristles broken off during dissection).

Fifth Limb (Fig. 6A,D): Epipod (not shown in fig.) with 3 sets of plumose bristles, each set with about 5 bristles. Coxa with 3 endites: endite I with 2 short bristles (longest with marginal hairs); endite II with 2 long hirsute bristles; endite III with 2 claws and 4 bristles (3 long hirsute). Basis with 5 bristles (1 long hirsute) on or near ventral margin, and 1 long dorsal exopodial bristle. Endopod: article 1 with 2 or 3 bristles (1 or 2 ventral, 1 dorsal) near midlength; article 2 short with 3 terminal bristles.

Sixth Limb (Figs. 6E,F, 7A): Epipod with 3 sets of plumose bristles, each set with 4 to 6 bristles (Figs. 6E, 7A). Coxa without bristles. Basis with 1 distal ventral bristle, 1 dorsal bristle near midlength, and 1 terminal dorsal exopodial bristle (not observed on left limb). Endopod: article 1 with 1 dorsal bristle near midlength; article 2 with dorsal bristle near midlength and none or 1 ventral bristle near midlength; short 3rd article with 3 terminal bristles (middle bristle longest, ventral bristle shortest).

Seventh Limb (Figs. 6G, 7A): Short with 2 terminal bristles.

Furca (Fig. 7A,B,E,F): Each lamella with 6 claws (most claws missing from specimen when received), and 1 unpaired bristle.

Bellonci Organ (Figs. 2E, 3B–D): Elongate, reaching bend at tip of 1st antenna, with rounded tip bearing 2 minute spines.

Lips (Fig. 7C): With marginal spines.

Anterior of Body (Figs. 3C, 7C,D): With rounded process on each side.

Posterior of Body (Fig. 7A,B,E,F): Without spines or segments.

Spermatheca (Figs. 7A,B, 8): Sac with 2 lobes located adjacent to furca; right lobe larger; both lobes of studied specimen contain string-like sperm; more sperm present inside right lobe.

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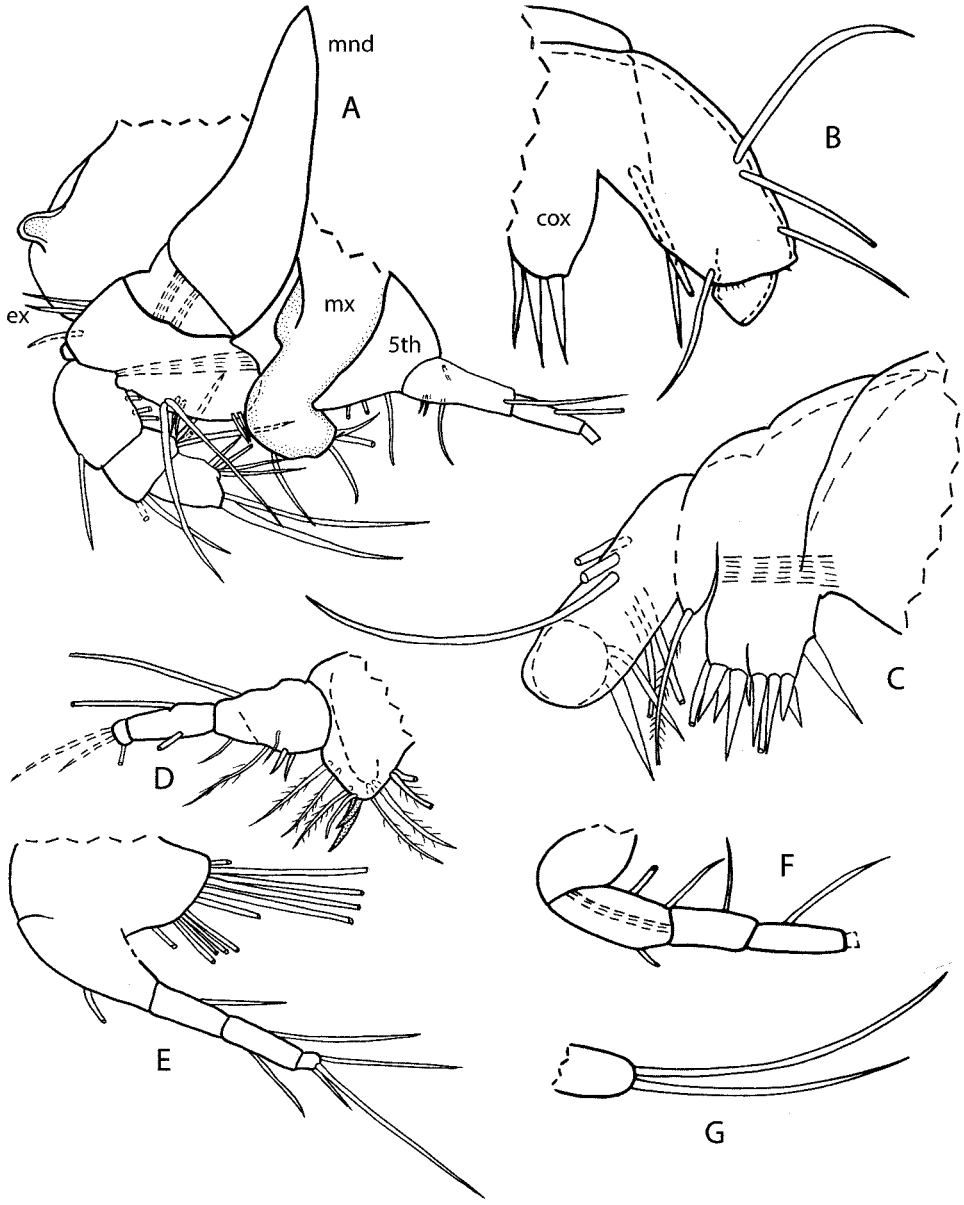

FIGURE 6. *Archiconchoecia chavturi*, new species, adult female, holotype: A, anterior of body showing left mandible, maxilla, and 5th limb, lv (nabs); B, C, maxillae (nabs); D, 5th limb; E, F, 6th limbs (nabs); G, 7th limb. (lv = lateral view; nabs = not all bristles shown.)

Eggs: Studied specimen with about 15 eggs of different diameters (Fig. 7A,B); largest egg closest to spermatheca.

Gut Content: Abundant appendage fragments, bristles, and bristle-like claws.

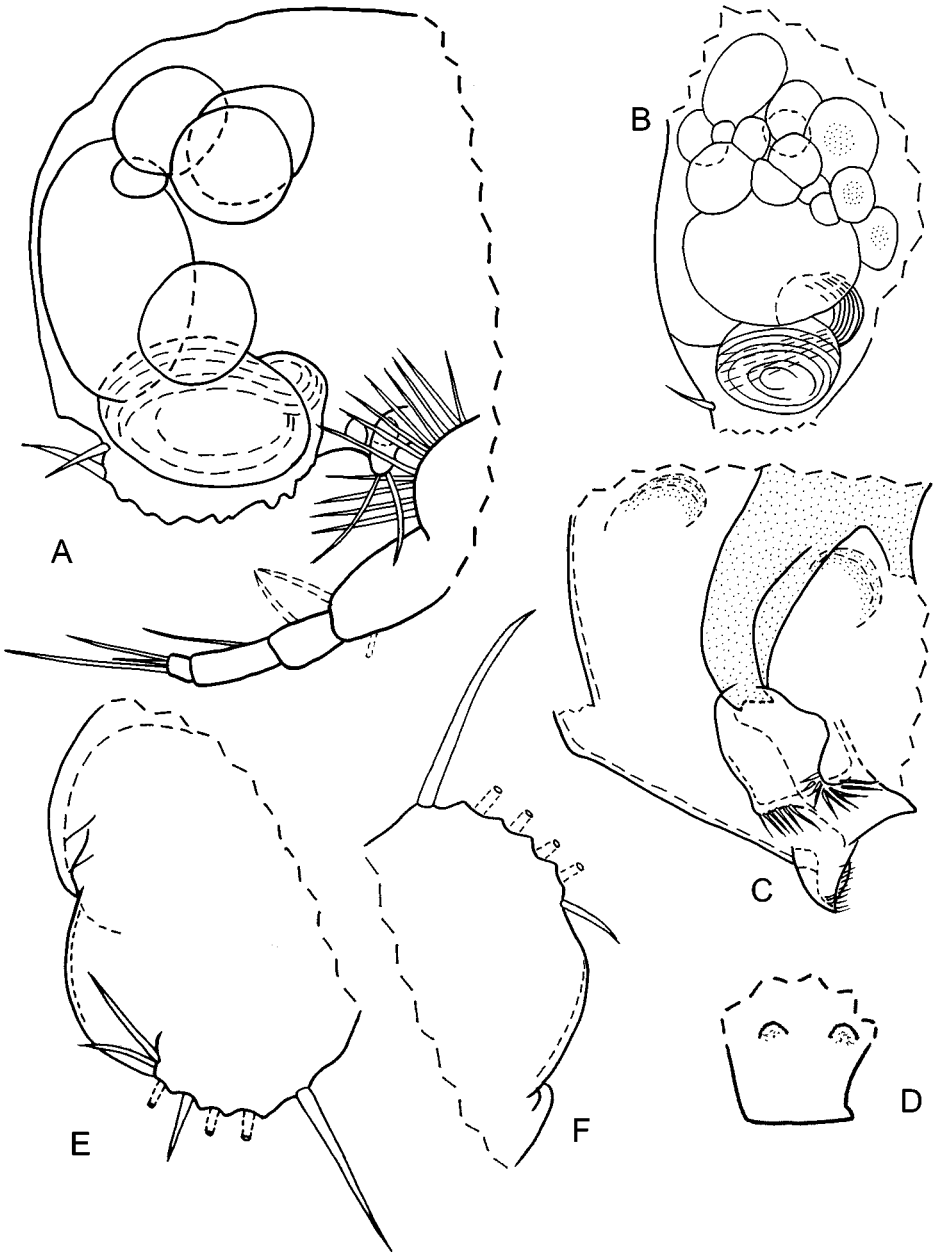

FIGURE 7. *Archiconchoecia chavturi*, new species, adult female, holotype: A, posterior of body from right side showing eggs, spermatheca, 6th and 7th limbs, and furca (not all furcal claws shown); B, eggs, spermatheca containing thread-like sperm, and proximal part of furca; C, posterior view of anterior of body compressed under cover slip showing upper and lower lips and two anterior processes; D, anterior view of body showing two anterior processes; E, F, right and left furcal lamellae (dashed claws missing from specimen).

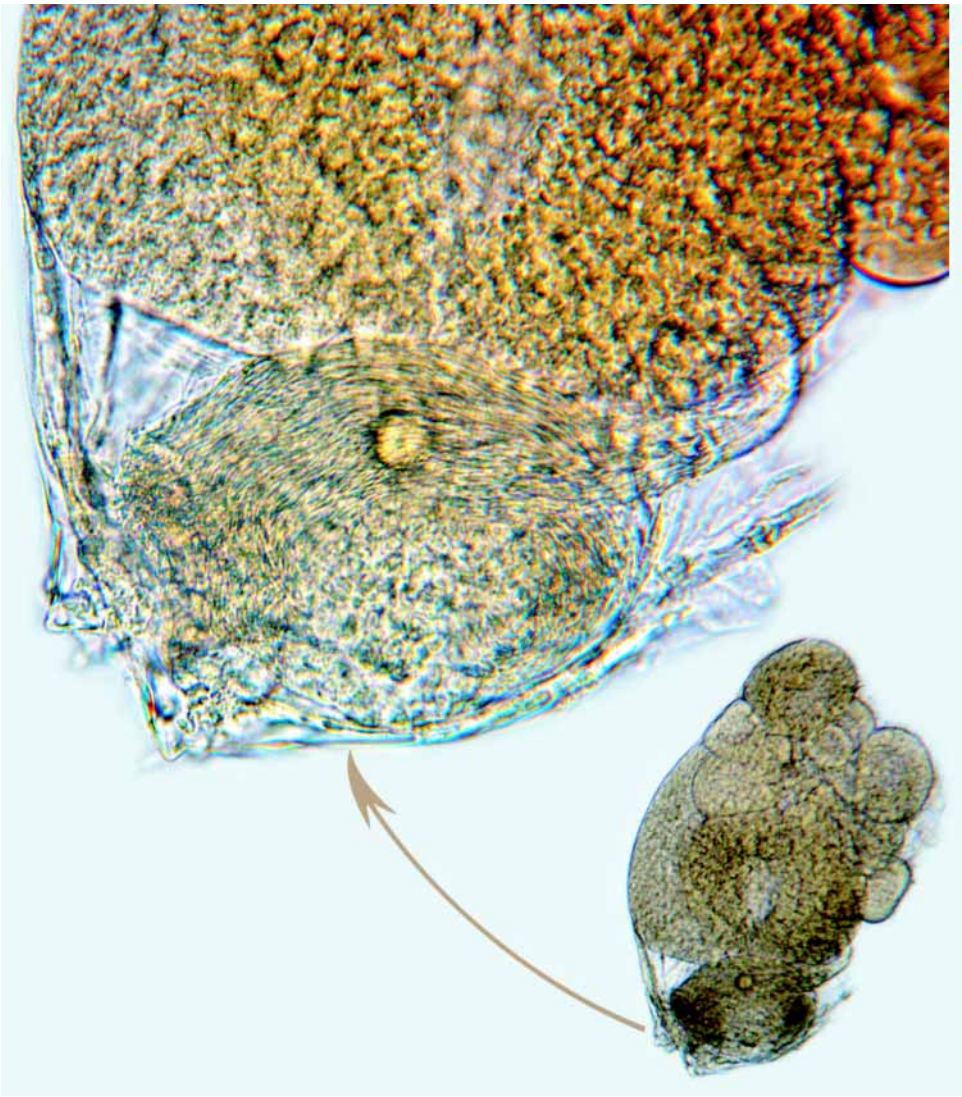

FIGURE 8. *Archiconchoecia chavturi*, new species, adult female, holotype: eggs and spermatheca on lower right and detail of spermatheca showing thread-like sperm on upper left.

Comparisons. In the "Key to Species of Subgenus *Archiconchoecia (Archiconchoecia)* (Adult Female and Male)" presented by Chavtur and Stovbun (2003:145), the female in the present collection keyed out to *A. (A.) propinqua* Chavtur and Stovbun, 2003. A difference between that species and *A. (A.) chavturi* is that the Bellonci Organ of *A. (A.) chavturi* has a rounded tip with 2 minute spines, whereas on *A. (A.) propinqua* the tip is bare and pointed; also, the organ extends farther over the bend at the distal end of the 1st antenna than that of *A. (A.) chavturi* (compare Fig. 3B with Chavtur and Stovbun, 2003: fig. 4D). In addition, the posterior shell glands appear to be

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much broader on *A. (A.) propinqua* than the glands of *A. (A.) chavturi* (compare Fig. 3A with Chavtur and Stovbun, 2003: Fig. 6A. B).

Taxonomic note. According to Diebel (1962:240), type specimens of *Archiconchoecia striata* Müller, 1894, type species of the genus, are at the Museum for Naturkunde, Berlin. In answer to a letter from the senior author asking to borrow a specimen, Dr. Charles Oliver Coleman, Curator of Crustacea at the museum, informed us (E-mail, 16 Nov 2004) that the material had been borrowed in 1962 and not returned, and that the museum was unable to recover the material after death of the borrower, and that the specimens are considered lost.

Suborder Cladocopina Sars, 1866
Superfamily Polycopoidea Sars, 1866
Family Polycopidae Sars, 1866
Subfamily Polycopinae Sars, 1866

***Polycopetta* Chavtur, 1981**

Members of the genus have not previously been reported from hydrothermal vents and at abyssal depth.

Type species. *Polycopetta monneroni* Chavtur, 1979 (by Chavtur, 1981:56).

***Polycopetta pax*, new species**

Figs. 9–13

Etymology. From the Latin *pax* (peace, tranquility).

Holotype. USNM 1078717, adult female; appendages on slide, separated valves in alcohol.

Paratypes. None.

Type Locality. *Riftia* Field Site, East Pacific Rise, 9°50.705'N, 104°17.493' W, slightly north of the Tica site, 2500 m bottom depth, temperature up to 20°C, Alvin dive number 3843, sample number RF2a, December 2002. Sample taken with Bushmaster jr. from *Riftia pachyptila* aggregation with curved and "rusty" tubes due to iron oxide.

Description of adult female (Figs. 9–13). Carapace oval with concavity in anterior margin (Fig. 9A). Ventral margin with about 25 small teeth and minute spines (or serrations) between teeth. (Valves of holotype were immersed in glycerine and are now decalcified and without surface ornamentation, but valves had surface reticulations prior to immersion.)

Central Adductor Muscle Scars (Fig. 9A): About 6 oval scars.

Carapace Size: Length 0.54 mm, height 0.47 mm.

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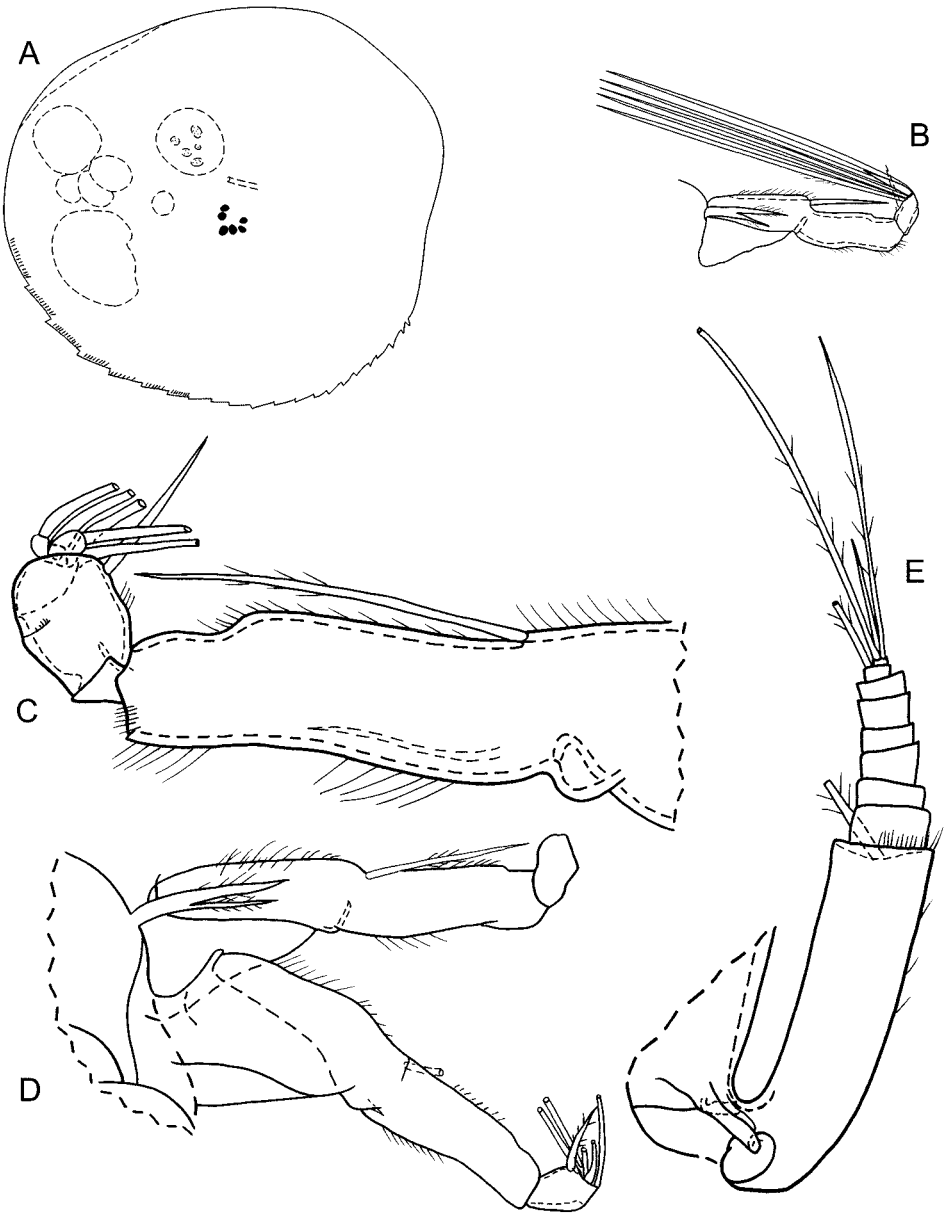

FIGURE 9. *Polycopetta pax*, new species, adult female, holotype, length 0.54 mm: A, complete specimen from right side, anterior to right; B, Bellonci Organ and left 1st antenna, mv; C, right 1st antenna, mv; D, Bellonci Organ and left 1st antenna (top, mv), and right 1st antenna (bottom, lv); E, left 2nd antenna, lv (nabs). (lv = lateral view; mv = medial view; nabs = not all bristles shown.)

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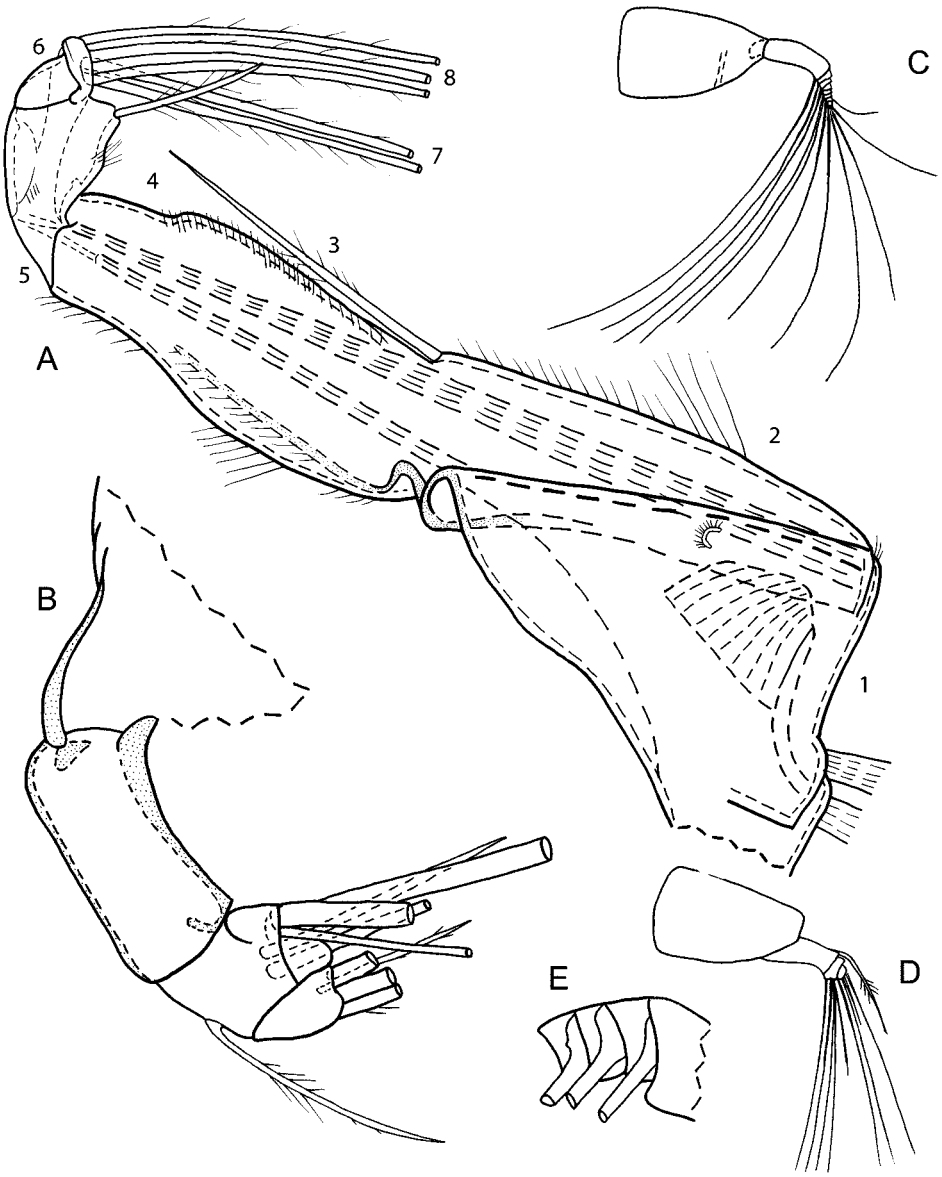

FIGURE 10. *Polycopetta pax*, new species, adult female, holotype: A, left 1st antenna, lv; B, endopod left 2nd antenna, lv; C, protopod and exopod right 2nd antenna, lv; D, protopod and endopod right 2nd antenna, lv; E, articles 1–4 exopod right 2nd antenna, mv. (lv = lateral view; mv = medial view.).

First Antenna (Figs. 9B–D, 10A): Article 1 strongly tapered and distally lateral to article 2, with small lateral sclerotized crescent (with anterior spines) near dorsal edge at about midlength. Ventral edges of articles 1 and 2 joined by peculiar, complex, sclerotized structure (Fig. 10A). Article 2 with dorsal spines and long terminal dorsal bristle with few hairs and not separated from article 3 by suture. Inferred articles 3 and 4 not separated by

sutures, but distal narrow part may represent article 4; article 3 with dorsal and ventral spines and with narrow spinous lateral ridge near ventral edge; article 4 with ventral spines. Inferred article 5 at right angle to article 4, and separated from it by suture; article 5 broad distally, with dorsal spines at midlength, and 1 short spinous dorsal bristle. Inferred article 6 short, bare, separated from article 5 by weak suture. Inferred article 7 small, with 2 long hirsute bristles. Inferred article 8 small, lateral to article 7, with 3 long hirsute bristles.

Second Antenna: Protopod bare (Fig. 10C,D). Exopod about ¾ length of protopod, with 9 articles (Figs. 9E, 10C); articles 1 to 8 with subequal, medial, natatory bristles about 3X length of stem; article 9 with 3 bristles (ventral bristle hirsute, about 2/3 length of bristle of article 1; dorsal bristles shorter (longer of these hirsute)). Medial bases of bristles of articles 1 to 8 with broad flange-like base (Fig. 10E). Article 1 with lateral spines along terminal margin. Endopod about ¾ length of exopod, with 3 articles without hairs or spines (Fig. 10B,D): article 1 without bristles; article 2 with 1 dorsal bristle with hairs near midlength, and 5 distal bristles (4 long, 1 shorter) with marginal hairs; article 3 with 4 bristles (3 long, 1 short) with marginal hairs, and with bare ventral lobe.

Mandible: Coxa endite bifurcate distally (Fig. 11B). Basis with 1 lateral bristle with long spines at midlength near base of exopod and 4 stout ventral bristles with long spines along distal ½. Endopod with 2 articles: article 1 with 3 ventral bristles (1 slender proximal bristle (bare or with few indistinct marginal hairs) with base slightly lateral to bases of 2 stouter spinous bristles), 2 long dorsal terminal bristles, and few long proximal ventral and distal dorsal hairs. Article 2 with 2 long terminal bristles with long spines at midlength (dorsal of the 2 bristles also with long spines at tip). Exopod interpreted to have 2 articles, but without suture separating articles (Fig. 11A,B): article 1 broad and with 1 terminal bare bristle; article 2 with proximal spines and funnel-like tip.

Maxilla (Maxillula): Precoxa endite with 5 bristles (Fig. 12A,D). Coxa with 2 endites (II, III) (Fig. 11C): proximal endite with 3 terminal bristles; distal endite with 2 terminal bristles. Ventral margin of coxa with 2 or 3 long bristles (Figs.11C, 12A). Basis: ventral margin with 2 long terminal bristles; dorsal half of basis with long backward projection; medial side of basis with long hairs near dorsal end of terminal margin (Fig. 11C). Endopod with 3 articles (Figs. 11C, 12A): article 1 with long distal ventral bristle; article 2 with 2 dorsal bristles and 1 ventral bristle adjacent and proximal to short triangular process; article 3 with 4 long bristles (not shown). Exopod with proximal end set well back from suture separating basis and article 1 of endopod (Figs. 11C, 12A,B); distal end with 8 long bristles (Fig.12C); dorsal margin with rows of hairs. Groups of intrinsic muscles present with insertions at proximal end of backward extension of basis (Figs. 11C, 12A); dorsal group extends into exopod, the other into endopod. Endopod of holotype at right angle to coxa.

Fifth Limb (Fig. 12E): Epipod with about 12 bristles. Precoxa and coxa not separated by suture, but indentation in dorsal margin indicates place of separation. Precoxa with

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short distal bristle. Coxa with long hairs, short proximal bristle, and terminal, spinous, triangular process. Basis: dorsal margin with 3 long hirsute bristles and few marginal spines; ventral margin with 2 distal bristles (1 long, 1 short), 1 long terminal bristle, and marginal spines. Exopod well-developed, with 4 terminal spinous bristles (3 long, 1 short). Endopod with 1 narrow article with short spinous terminal bristle and short adjacent terminal spine.

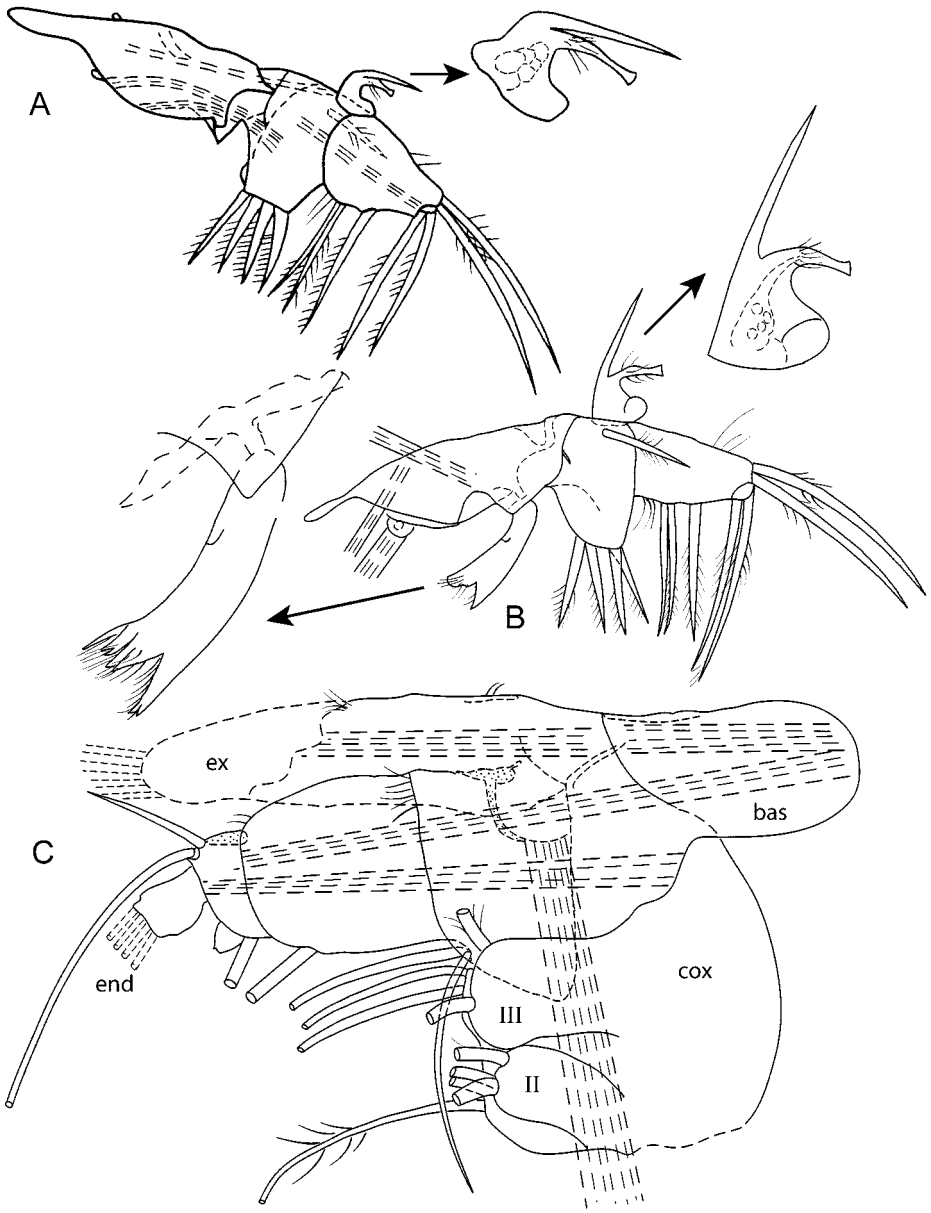

FIGURE 11. *Polycopetta pax*, new species, adult female, holotype: A, right mandible (coxale endite missing) lv; B, left mandible, mv; C, right maxilla, mv. (lv = lateral view; mv = medial view.)

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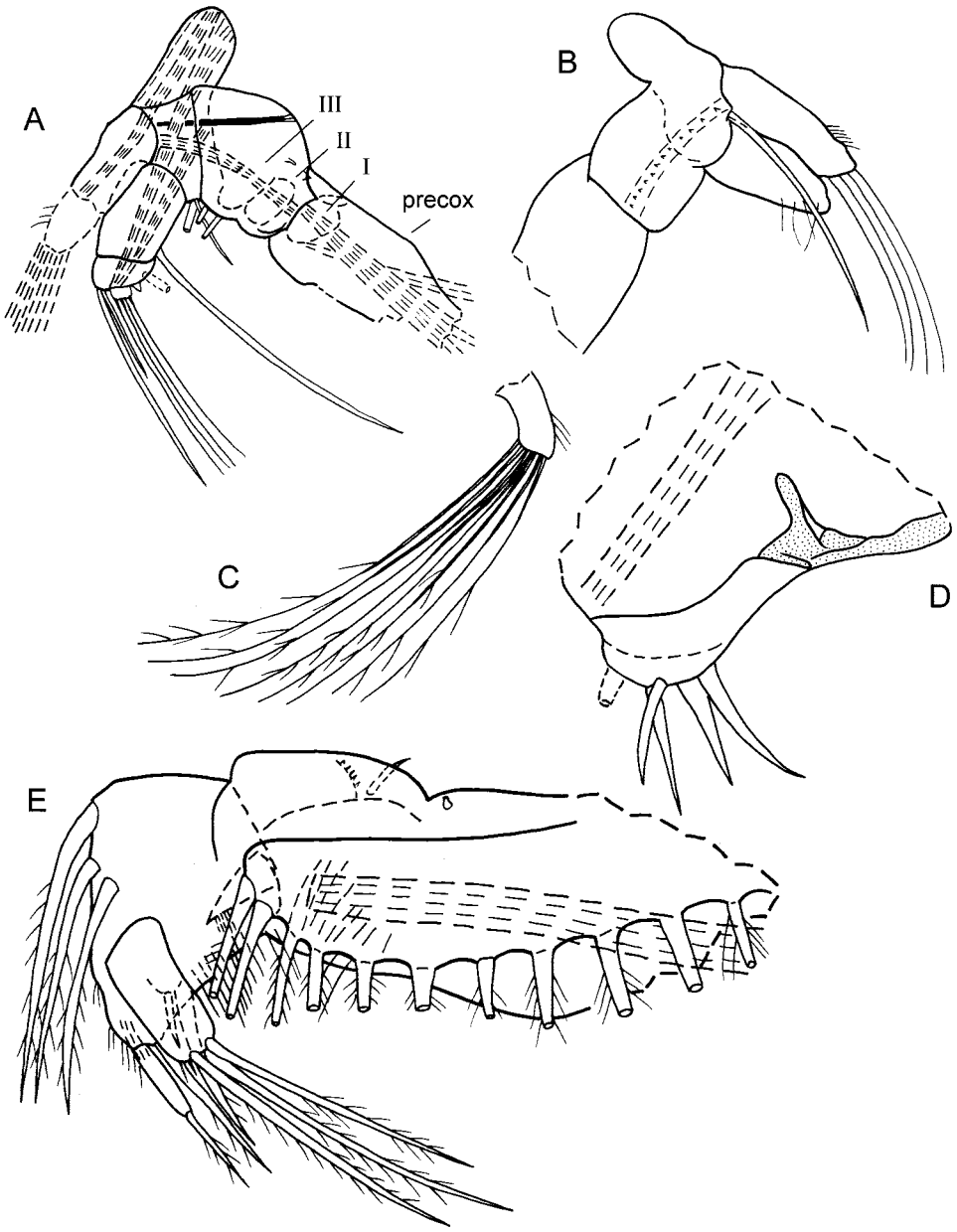

FIGURE 12. *Polycopetta pax*, new species, adult female, holotype: A, left maxilla, lv (nabs); B, right maxilla drawn on body, lv (nabs); C, exopod right maxilla, lv; D, precoxal endite I of maxilla, anterior to left; E, 5th limb. (lv = lateral view; nabs = not all bristles shown.)

Furca (Fig. 13A): When holotype received all long claws missing from furca; 2 small unringed spine-like bristles present at posterior end of ventral margin of right lamella. Number of processes along ventral margin of each lamella indicates 6 long claws had been present.

Bellonci Organ (Fig. 9B,D): Spinous bristle divided at midlength.

Upper Lip (Fig. 13B): With few spines.

Gut Content: Brown particles, some round or disc-like, and a few fragments of tubular structures.

Eggs (Figs. 9A, 13A): Holotype with several unextruded eggs.

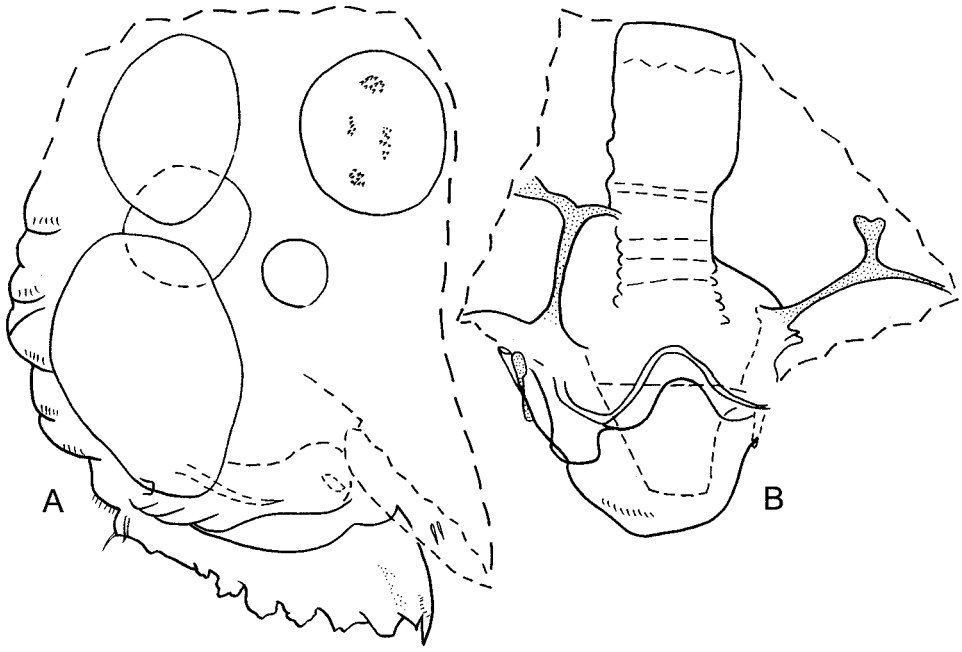

FIGURE 13. *Polycopetta pax*, new species, adult female, holotype: A, posterior of body from right side showing unextruded eggs (claws of furca missing); B, upper lip and esophagus.

Comparisons. Three species of *Polycopetta* have been described previously: *P. monneroni* Chavtur 1979 and *P. curva* Chavtur 1979 from the vicinities of Japan and the Commander Islands at depths of 60 to 70 m (Chavtur, 1981: 56), and *P. bransfieldensis* (Hartmann, 1987) [transferred from *Polycope* by Chavtur, 1981] from Bransfield Strait, Antarctica, at a maximum depth of 420 m (Hartmann, 1987:138–140). The Bellonci Organ of the new species *P. pax* differs from that of *P. monneroni* in being divided at midlength rather than distal to midlength. The carapace of *P. pax* differs from that of *P. curva* and *P. bransfieldensis* in having about 25 small teeth along the ventral margin of each valve compared to about 11 teeth along the anteroventral margin of *P. curva*, and 9 teeth along the anteroventral margin of *P. bransfieldensis*. Having only a female *P. pax* in the present collection, male characters could not be compared with males of the two species described by Chavtur (1979:97).

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Acknowledgments

We wish to thank Monika Bright and Sabine Gollner, Department of Marine Biology, Faculty of Life Sciences, University of Vienna, Austria, for sending the vent specimens and station data upon which this report is based. We thank B. Govenar, N. LeBris, S. Gollner, J. Glanville, A. Aperghis, S. Hourdez, and C.R. Fisher, C.R. for additional station data. In addition, we thank Megan Bluhm and Molly Kelly Ryan (Smithsonian Institution) for inking camera-lucida illustrations, and Christine Meyers for photography.

Literature cited

Berg, Jr. C.J. & Van Dover, C.L. (1987) Benthopelagic macrozooplankton communities at and near deep-sea hydrothermal vents in the Eastern Pacific Ocean and the Gulf of California. *Deep-Sea Research,* 34(3), 379–401.

Bergquist, D.C, Ward T., Cordes, E.E., McNelis, T., Howlett, S., Kosoff, R., Hourdez, S., Carney, R. & Fisher, C.R. (2003) Community structure of vestimentiferan-generated habitat islands from Gulf of Mexico cold seeps. *Journal of Experimental Marine Biology and Ecology,* 289, 197–222.

Chavtur, V.G. (1979) [New data on ostracodes of the Polycopidae Family (Ostracoda-Cladocopa) from far-E astern Seas.] *In:* Investigations of pelagic and bottom organisms from the Far-Eastern Seas. *Transactions of the Institute of Marine Biology, Far East Science Center, Academy of Sciences of the U.S.S.R.* (Vladivostok), pp. 91–105. [In Russian; translated by Dr. Ervin G. Otvos.]

Chavtur, V.G. (1981) [On the systematic position of the Modern Ostracoda in the Family Polycopidae (Ostracoda, Cladocopina).] *Trudy Instituta Okeanologii, Akademiya Nauk SSSR,*115, 53–61, Mosca 1981.

Chavtur, V.G. & Stovbun, G.G. (2003) Revision of pelagic ostracods of the subfamily Archiconchoecinae. *Publication of the Seto Marine Biological Laboratory,* 39(4/6), 139–219.

Dana, J.D. (1853) Tribe III: Cyproidea = Ostracoda. *In:* Crustacea. *United States Exploring Expedition during the Years 1838, 1839, 1840, 1841, 1842, under the Command of Charles Wilkes, U.S.N., with Atlas of 96 plates,* 13(2), 1277–1304, plates 90, 91. C. Sherman, Philadelphia.

Hartmann, G. (1987) Antarktische benthische Ostracoden II. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut,* 84, 115–156.

Hessler, R.R, Smithey, W.M., Jr. & Keller, C.H. (1985) Spatial and temporal variation of giant clams, tubeworms and mussels at deep-sea hydrothermal vents. *Bulletin of the Biological Society of Washington,* 6, 411–428.

Iles, E.J. (1961) The appendages of the Halocyprididae. *Discovery Reports,* 31, 299–326.

Kornicker, L.S. (1991) Myodocopid Ostracoda of Hydrothermal Vents in the Eastern Pacific Ocean. *Smithsonian Contributions to Zoology,* 516, 1–46.

Kornicker, L.S. & Iliffe, T.M. (1989) Ostracoda (Myodocopina, Cladocopina, Halocypridina) from Anchialine Caves in Bermuda. *Smithsonian Contributions to Zoology,* 475, 1–88.

Müller, G.W. (1894) Die Ostracoden des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. *Fauna und Flora des Golfes von Neapel,* 21, 1–404.

Poulsen, E.M. (1969) Ostracoda-Myodocopa, 3a: Halocypriformes-Thaumatocypridae and Halocypridae. *Dana Reports,* 75, 1–100.

Sars, G.O. (1866) Oversigt af Norges marine Ostracoder. *Forhandlinger i Videnskabs-Selskabet I Christiania,* 8, 1–130. [Preprint, 1865.]

Urcuyo, I.A., Massoth, G.J., Julian, D. & Fisher, C.R. (2003) Habitat, growth and physiological ecology of a basaltic community of *Ridgeia piscesae* from the Juan de Fuca Ridge. *Deep-Sea Research I,* 50, 763–780.