

Fig. 75. *Albunea speciosa* Dana, 1852: A, ♂, 9.0 mm cl, USNM 260868, neotype; B–J, ♂, 10.4 mm cl, USNM 287087. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible; mesial view. **F.** Left maxillule, lateral view. **G.** Right maxilla, lateral view. **H.** Left maxilliped I, lateral view. **I.** Right maxilliped II, lateral view. **J.** Left maxilliped III, lateral view. Scale = 1.6 mm (B, E, F), 2.2 mm (I), and 3.3 mm (A, C, D, G, H, J).

gins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins, and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface ru-

gose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 75D) with segment V approximately three times longer than wide, with long plumose setae on dorsal and ven-

tral margins; flagellum with five or six articles, long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of setae on dorsolateral margin. Segment III with long plumose setae on ventral margin. Segment II short, widening distally, with plumose setae on margins; antennal acicle long, thin, not exceeding distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins; lateral surface with acute spine dorsally, with low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 75E) incisor process with one tooth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment.

Maxillule (fig. 75F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 75G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 75H) epipod with plumose setae on distal margin and on distolateral surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments: proximal segment narrow, margins parallel, margins with plumose setae; distal segment spatulate, approximately as long as wide, broadest medially, margins with long plumose setae. Endopod flattened and elongate, reaching to distal end of proximal exopodal segment, with plumose setae on margins.

Maxilliped II (fig. 75I) dactylus evenly rounded, length equal to width, with thick simple setae distally. Propodus one-half wider than long, with plumose setae on dorsal margin and long simple setae on distal margin. Carpus not strongly produced dorsodistally, approximately two times longer than

wide, with long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel, with simple setae on ventrolateral margin and plumose setae on dorsolateral margin. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-fourth longer than merus, flagellum with one article.

Maxilliped III (fig. 75J) dactylus evenly rounded; with long plumose setae on margins and lateral surface. Propodus with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus slightly produced onto propodus; lateral surface with row of plumose setae ventromedially; plumose setae on margins. Merus unarmed, with plumose setae on margins. Basis-ischium incompletely fused, without crista dentata. Exopod two-segmented: proximal segment small; distal segment styliform, tapering, approximately one-third length of merus, with plumose setae on margins; without flagellum.

Pereopod I (fig. 76A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine, dorsal margin with few large and small spines posteriorly along distal third; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth with few scattered rows of long plumose setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with few short rows of setae; proximal quarter of mesial surface with decalcified window. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 76B) with dactylus smooth; with base to heel straight, heel smoothly rounded, heel to tip with rounded,

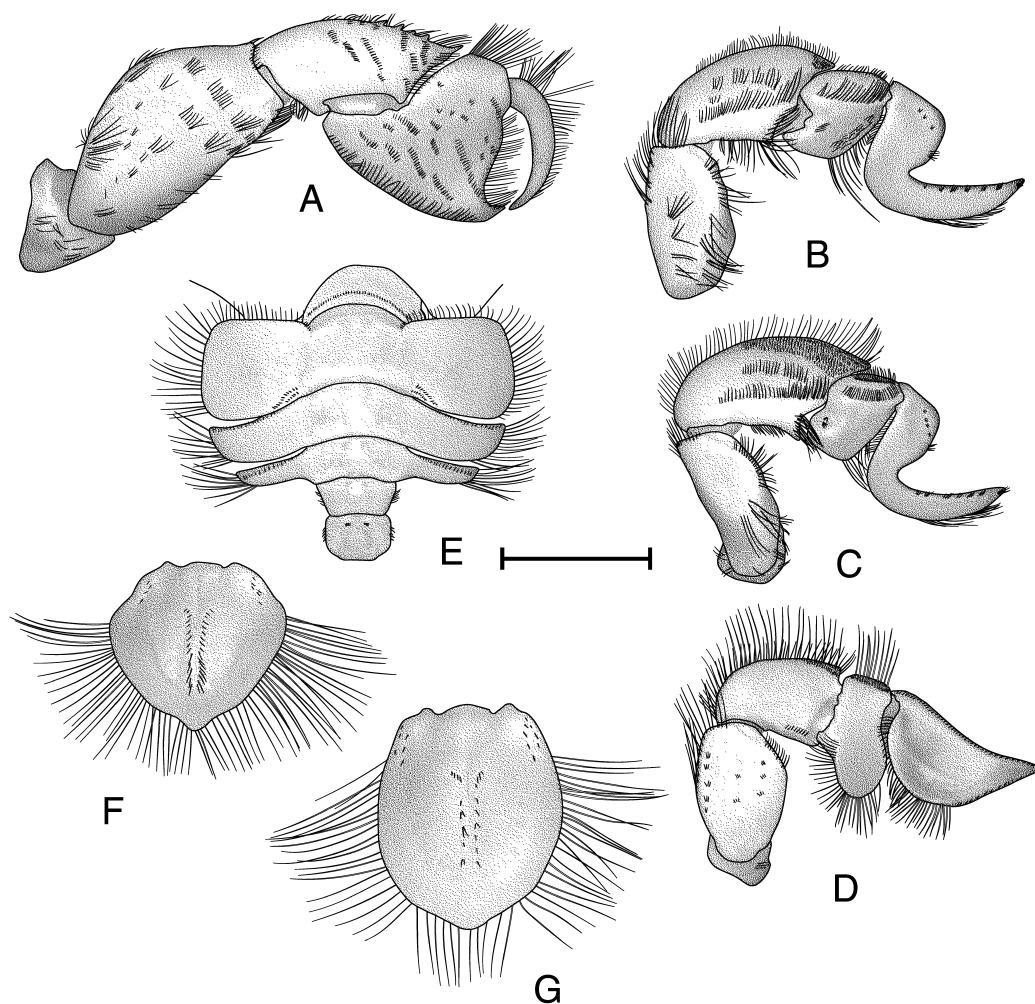


Fig. 76. *Albunea speciosa* Dana, 1852: A–E, ♂, 10.4 mm cl, USNM 287087; F, ♂, 9.0 mm cl, USNM 260868, neotype; G, ♀, 14 mm cl, USNM 287087. **A.** Right pereopod I, lateral view. **B.** Right pereopod II, lateral view. **C.** Right pereopod III, lateral view. **D.** Right pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.0 mm (F, G), 4.0 mm (A–D), and 4.2 mm (E).

broad indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae and patch of long plumose setae at base. Propodus with dorsal surface smooth, ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral sur-

face; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus; decalcified region just distal to junction with carpus. Carpus slightly produced dorsodistally; lateral surface nearly smooth, with irregular, interrupted row of rugae and submarginal elevated ridge ventrally,

rugae and ridge with long plumose setae; dorsodistal projection with mat of short setae on lateral surface; margins with long plumose setae; mesial surface smooth, with long plumose setae in scattered patches on surface and on margins. Merus with few scattered setae on lateral surface and margins; mesial surface nearly smooth, with few setae and decalcified area on proximal fourth near junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa with one small spine on anterior margin.

Pereopod III (fig. 76C) dactylus with base to heel straight, heel broadly rounded and low, heel to tip with broad, evenly rounded indent, tip acute, tip to base smoothly convex to straight; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventromesial margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae distally, simple setae on dorsal margin and long plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened; mesial surface with scattered long setae on and near distal margin, with decalcified window near junction with carpus. Carpus produced dorsodistally, exceeding proximal margin of propodus by approximately one-fourth length of propodus, pointed but not acute; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two longer rows of setae ventrally; mesial surface smooth, with long plumose setae on margins and scattered on surface. Merus smooth; dorsal and ventral margins unarmed, with long plumose setae; laterodistal margin with long plumose setae; mesial surface smooth, with decalcified window at junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial surface of coxa, surrounded with short plumose setae; male with small pore.

Pereopod IV (fig. 76D) dactylus with base to tip convex to concave, tip acute, tip to base straight distally, becoming convex prox-

imally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctae ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion exceeds ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae medially; lateral and mesial surfaces smooth. Carpus not produced dorsodistally; lateral and mesial surfaces smooth; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae. Merus with scattered short transverse rows of setae on lateral surface, dorsal and ventrodistal margins with long plumose setae; mesial surface with large decalcified window proximoventrally. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 76E) with somite I approximately as long as wide, widest posteriorly; dorsal surface with anterior margin straight; posterior margin straight, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; with tuft of setae at posterolateral angle, extending onto pleuron posteromesially; posterior margin with indistinct, punctate, submarginal groove laterally; pleura expanded and directed slightly anteriorly; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae. Somite III similar to somite II, but narrower, shorter, and lacking anterior submarginal ridge; small tuft of short thick setae on posterolateral angle; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II; anterolateral angle acute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with thick setae posterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margin with long plumose setae. Somite V wider

than somite IV; lateral margins with plumose setae; pleura absent. Somite VI subequal to somite V in width but longer; dorsal surface with short transverse rows of setae laterad of midline anteriorly; lateral margins with long plumose setae; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 76F) spatulate, length subequal to width, produced into short rounded tip distally; weakly calcified except for large triangular anterior plate; median longitudinal groove long, extending to distal end of calcified plate, lined with long thin, simple setae; calcified plate slightly elevated medially but without ridge. Telson of female (fig. 76G) ovate, longer than wide, broadly triangular, dorsal surface smooth, with median longitudinal groove anteriorly; with row of setose punctae lateral to midline from median of longitudinal groove to distal end of groove; margins with long plumose setae.

DISTRIBUTION: From Madagascar eastward to the Marques Islands and Hawaii, in 3.0–34 m depth.

MAXIMUM SIZE: Males: 10.4 mm cl; females, 14.0 mm cl.

TYPE SPECIMENS: USNM 260868 (neotype of *A. speciosa*, selected by Boyko, 1999); holotype and 18 paratypes of *A. madagascariensis* in the private collection of B. Thomassin and not deposited in MNHN as stated by Thomassin (1973).

TYPE LOCALITIES: “Kirk,” Oahu, Hawaii, USA (*A. speciosa*); Grand Récif de Tulear, Madagascar (*A. madagascariensis*).

REMARKS: This species was redescribed and all known aspects of its biology discussed by Boyko (1999). Discovery of specimens of *A. speciosa* in the southern Pacific islands supports a southwest to northeast dispersal pattern for this species from its presumed western Indo-Pacific origin towards Hawaii, the type locality and easternmost part of its range (see Boyko, 1999).

Because specimens of *Albunea speciosa* were identified from several localities outside of Hawaii, Boyko (1999) suggested that the similar *A. madagascariensis* might be a junior synonym. This synonymy was actually first suggested, but also not formally proposed, by Serène (1977) in a publication that escaped the notice of later authors. Subse-

quently, Boyko (2000a) reported the discovery of additional specimens of *A. speciosa* from the Marques Islands with identical banding patterns as seen in specimens of *A. madagascariensis*. In addition, it is herein reported that A. Milne Edwards’ (1862) specimen of “*Albunea symnista*” [sic] from Réunion is actually the oldest record of *A. speciosa* from outside Hawaii (this record was repeated by Hoffman, 1874). Unfortunately, Thomassin’s (1973) type specimens have never been deposited in any museum, and all attempts to obtain them have proved unsuccessful. In spite of this, it is clear from the morphological similarities between the two taxa (discussed in detail by Boyko, 1999), the discovery of similar banding patterns on individuals from widely separated localities, and the proximity of Réunion to Madagascar, that Thomassin’s (1973) *Albunea madagascariensis* is a junior synonym of *A. speciosa*.

Little is known about the biology of this species other than the few records of ovigerous females as herein reported from April, September, and October. The Japanese male has a large sperm ribbon between the gonopores of the fifth pereopods. Several *A. speciosa* specimens (QM W22285) were collected together with the holotype of *Albunea danai*, but it is not known if the two species are typically sympatric in Hawaii. The coloration of this species is off-white with whitish setae, both in life (from color transparencies) and in preservative.

The fusion of CG1 is a character that unites this species with two fossil taxa: *A. cuisiana* Beschin and De Angeli and *A. hahnae* Blow and Manning. This character is otherwise unknown in the genus *Albunea*, but fused CG1 elements are found in other albuneid genera of both subfamilies (e.g., *Lepidopa*, *Stemonopa*). It appears that *A. speciosa*, *A. cuisiana*, and *A. hahnae* form a clade that is sister to all the other species of *Albunea*. Because two of the three taxa in this clade are fossil, and therefore known from only limited characters, and because *A. speciosa* shares so many other characters with all other *Albunea* species, it is inadvisable to erect a genus at this time based on these three species alone. *Albunea speciosa* can easily be separated from all of the other Recent species of *Albunea* by the concave



Fig. 77. *Albunea hahnae* Blow and Manning, 1996: A, 16.6 mm cl, USNM 484530, holotype. A. Carapace, dorsal view. Scale = 5.3 mm.

shape of the lateral margins of the distal peduncular segments.

Albunea hahnae Blow and Manning, 1996

Figure 77

Albunea hahnae Blow and Manning, 1996: 4, pl. 1, fig. 2*.

MATERIAL EXAMINED: USA: South Carolina: USGS 26882, Santee Limestone, M. M. Berkeley Quarry, Berkeley Co., coll. unknown: 1 carapace, 16.6 mm cl, holotype (USNM 484530).

DIAGNOSIS: Carapace longer than wide, covered with crenulate grooves. Anterior margin with six or seven spines on either side of ocular sinus. Setal field with thick lateral elements and concave anterior margin. CG1 with fused posterior lateral elements; CG4 with two short medial elements between longer supralateral elements of CG4; CG5 present as two triangular elements; CG6 and CG7 fused; CG8 complete; CG11 present. Rostrum present.

DESCRIPTION: Carapace (fig. 77A) slightly longer than wide. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with several spines (six or seven visible) along length. Rostrum

as small acute tooth. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field narrow anteriorly and widening posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, medial fragment and curved posterior lateral elements united. Mesogastric region smooth; CG2 absent; CG3 broken into four short elements between posterior lateral elements of CG1; CG4 with two short medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epi-branchial region generally triangular, smooth; posterolateral margin with three short rows of setae. Metagastric region smooth; CG5 present as two triangular elements anteriorly displaced and overlapping CG4. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, united with lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as one long element. CG9 present as two short lateral grooves with gap at midline. CG10 present as two long lateral elements, with gap between fragments. CG11 present as short medial element. Post-CG11 element present.

DISTRIBUTION: Known only the type locality.

TYPE SPECIMEN: USNM 484530 (holotype).

TYPE LOCALITY: USGS 26882, Santee Limestone, M. M. Berkeley Quarry, Berkeley Co., South Carolina, USA.

REMARKS: Blow and Manning (1996) correctly noted that this taxon is most similar to *A. cuisiana*. Of the extant taxa, it is most similar to *A. speciosa*, but differs in a number of characters including length of distolateral submarginal groove and fusion of CG6 and CG7.

Albunea cuisiana Beschin and De Angeli, 1984

Figure 78

Albunea cuisiana Beschin and De Angeli, 1984: 97–99, pl. 1, figs. 1, 1a, pl. 2, figs. 1, 1b*. – De Angeli, 1998: 17–18, fig. 1(2).

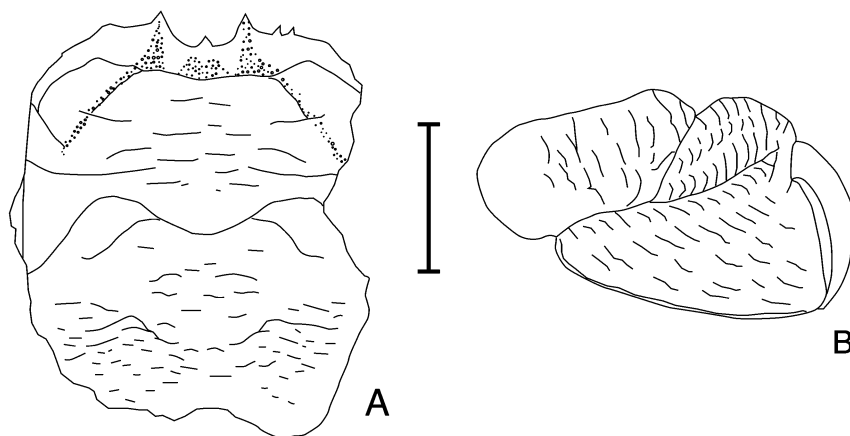


Fig. 78. *Albunea cuisiana* Beschin and De Angeli, 1984: A, 21.1 mm cl, MCSNV 10439, holotype; B, MCSNV, paratype. **A.** Carapace, dorsal view. **B.** Right pereopod I dactylus, propodus, and carpus, lateral view. Scale = 8.6 mm.

MATERIAL EXAMINED: **Italy:** Middle Eocene, Valle del Chiampo, Eastern Lessini, coll. unknown: 1 carapace, 21.1 mm cl, holotype (calco-mold of MCSNV 10439).

DIAGNOSIS: Carapace as long as wide, covered with crenulate grooves. Anterior margin with few spines on either side of ocular sinus. Setal field with thin lateral elements and produced anterior margin. CG1 with fused posterior lateral elements; CG4 with three or four short, anteriorly displaced, medial elements between longer supralateral elements; CG5 present as two medial elements; CG6 and CG7 fused; CG8 broken; CG11 present. Rostrum present. Pereopod I dactylus dorsal margin smooth; carpus dorsal margin smooth.

DESCRIPTION: Carapace (fig. 78A) approximately as wide as long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally with large spines along length. Rostrum as small acute tooth. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field narrow anteriorly and widening posteriorly; posterior lateral elements reduced to narrow bands of punctations. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced, lateral elements. Mesogastric region smooth; CG2 present as one or two short medial elements; CG3 broken into one to three short and two

long elements between posterior lateral elements of CG1; CG4 with two or three short, anteriorly displaced, medial elements between longer supralateral elements. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth. Metagastric region smooth; CG5 present as two medial elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, united with lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as one long and two short elements; short elements displaced slightly anteriorly. CG9 present as five short elements alternating between anterior and posterior displacement. CG10 present as two long lateral elements, with two short elements between. CG11 present as two short elements. Post-CG11 element(s) present. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex.

Pereopod I (fig. 78B) subchelate. Dactylus curved and tapering; lateral and mesial surfaces smooth. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine (broken); cutting edge lacking teeth. Carpus with dorsodistal angle apparently not produced into strong corneous-tipped spine; lateral surface

with transverse ridges on distal two-thirds of surface.

DISTRIBUTION: Known from the type locality as well as Cava "Lovara" and Cava "Boschetto" di Chiampo in Italy (De Angeli, 1998: 18).

TYPE SPECIMENS: MCSNV 10439 (holotype), De Angeli Collection (paratype), private collection (paratype).

TYPE LOCALITY: Middle Eocene, Valle del Chiampo, Eastern Lessini, Italy.

REMARKS: Because accurate generic placement of a species depends on a number of characters obtained from many morphological structures, it is always difficult to place fossil species, especially when they are known from fragmentary material. In the case of *Albunea cuisiana*, it is fortunate that the carapace is well preserved and that additional parts of the animal (part of pereopod I, part of abdomen) are known. I was able to directly examine a "calco-mold" of the holotype specimen carapace, but could not examine the pereopod I, abdomen, or other parts illustrated by Beschin and De Angeli (1984). Based on all available evidence this species appears to be closest to the fossil taxon *A. hahnae* Blow and Manning. It shares with that species a similar arrangement of CG6 and CG7 (fused) and numerous short grooves on the posterior hepatic region, many more than are typical of other species of *Albunea*. Both *A. cuisiana* and *A. hahnae* possess fused anterior and posterior elements of CG1, and a contiguous setal field paralleling this groove. This is marked contrast to all other species of *Albunea* (except *A. speciosa*) where CG1 is separated into distinct anterior and posterior elements.

Albunea galapagensis, new species

Figures 79, 80

Albunea lucasia: Ramos and Rios, 1995: 103, fig. 5 (not *Albunea lucasia* de Saussure, 1853).

MATERIAL EXAMINED: **Ecuador: Galápagos Islands:** Hard coral mud, off north Barranca, Academy Bay, Isla Santa Cruz, 5–10 fms (= 9.1–18.3 m), Feb. 21, 1964, coll. A. DeRoy, J. DeRoy and A. G. Smith: 1 ♀, 7.2 mm cl, paratype (CASIZ 109248); off the Barranca (Angemeyer's Houses), Academy Bay, Isla Santa Cruz, 9.1–18.3 m (5–10 fms),

Jan. 15, 1964, coll. A. G. Smith and J. DeRoy: 1 megalopa, 5.2 mm cl (CASIZ 109337); South Seymour Island, 10 fms (= 18.3 m), March 18, 1937, coll. W. A. Seaholm and F. E. Lewis on R/V "Stranger": 1 ♂, 14.3 mm cl, holotype (USNM 267793); South Seymour Island, 00°26'S, 90°19'W, 10 fms (= 18.3 m), March 18, 1937, coll. W. I. Seaholm on R/V "Stranger": 2 ♂, 7.3–8.3 mm cl, 1 ♀, 15.0 mm cl, allotype and paratypes (USNM 267796).

Mexico: Baja California Sur: Isla Espíritu Santo, Baja California Sur, 6–20 fms (= 11.0–36.6 m), March 31, 1939, coll. F. E. Lewis on R/V "Stranger": 1 ♂, 18.4 mm cl, 1 ♀, 15.0 mm cl, paratypes (USNM 267795); Sta. 37, La Vantana Bay, 24°08'15"N, 109°52'W, 13–15 fms (= 23.8–27.4 m), April 20, 1939, coll. F. E. Lewis on R/V "Stranger": 1 ♂, 15.5 mm cl, 3 ♀, 16.8–19.3 mm cl, paratypes (USNM 267797); **Guerero:** Sta. 3, Zihuatanejo, 18–26 fms (= 32.9–47.6 m), Jan. 30, 1939, coll. F. E. Lewis on R/V "Stranger": 2 ♀, unmeasurable (USNM 267794).

DIAGNOSIS: Carapace wider than long, covered with strongly setose grooves. Anterior margin with 8–14 spines on either side of ocular sinus. Setal field with thick lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 medial elements semicontiguous with supralateral elements; CG5 present as two convex, nearly united, elements; CG6 and CG7 separate; CG8 broken; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate subquadrate. Distal peduncular segments dorsoventrally flattened and subtriangular in shape, tapering at tip, separated along mesial margins, lateral margins convex except slightly concave at tip, mesial margins convex. Cornea at tip. Dactylus of pereopod II with heel produced and rounded. Dactylus of pereopod III with heel slightly produced and subquadrate. Dactylus of pereopod IV evenly sinuous from base to tip, with shallow indent. Telson of male subtriangular, elongated and tapering, length greater than width, distal tip narrow and subacute; thickly calcified and raised into ridge dorsomedially, median of ridge lined with long thin setae; lateral margins decalcified.

Telson of female similar to male, but with less tapered tip.

DESCRIPTION: Carapace (fig. 79A) wider than long. Anterior margin concave on either side of ocular sinus, becoming convex laterally, with 8–14 large spines ($n = 6$) on each side along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave. Frontal region smooth; setal field narrow anteriorly, broad posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, convex, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as one or two short medial elements; CG3 present as one semicontiguous, long, medial element between posterior lateral elements of CG1 (rarely broken into four shorter elements); CG4 medial elements semicontiguous with supralateral elements (rarely broken into four shorter elements). Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with three oblique rows of short setae. Metagastric region smooth; CG5 present as two convex, nearly united, elements (rarely broken into four shorter elements). CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 almost transverse, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two medial elements and two longer lateral elements. CG9 present as two short lateral grooves with narrow gap at midline. CG10 present as two long lateral elements. CG11 present as one or two short elements. Post-CG11 element present as one or two short lateral elements. Branchial region with numerous short and long transverse rows of setae in anterior three-fourths. Posterior margin deeply and evenly convex, with submarginal groove reaching halfway up margin of posterior concavity. Branchiostegite with long anterior, submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region mem-

branous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 79B) triangular with broad median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, teardrop-shaped, with broadly convex lateral and weakly convex mesial margins, cornea covering lateral portion of distal tip; lateral margins without notch; mesial margins separated at base; mesial and distolateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventrolateral oblique row of plumose setae extending from tuft to three-fourths length of peduncle.

Antennule (fig. 79C) with segment III narrow proximally, expanding distally to three times proximal width; plumose setae on dorsal and ventral margins and scattered on lateral surface; dorsal exopodal flagellum with 74–94 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two or three articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with long plumose setae on dorsal and ventral margins and scattered on lateral surface. Segment I as wide as long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 79D) with segment V approximately 2.5 times longer than wide, with long plumose setae on dorsal margin and scattered on distal half of lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and two rows of short setae on dorsolateral and ventrolateral surface. Segment III with long plumose setae on ventral margin; short simple setae on dorsal margin and scattered on surface. Segment II short, widening distally, rugose, with long plumose setae on dorsal and distoventral margins and short simple setae scattered on lateral surface; antennal acicle long, thin, and reaching distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventro-

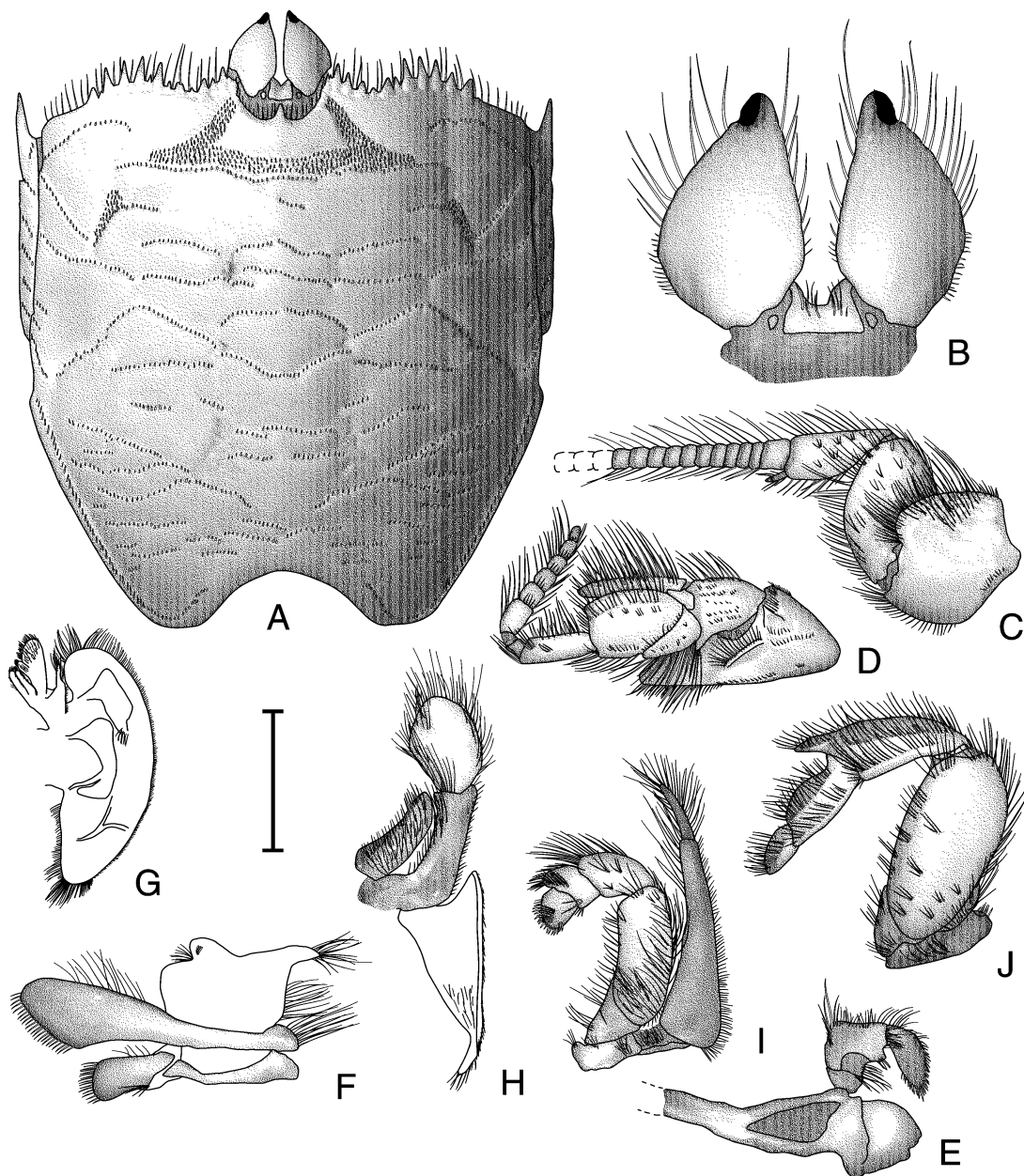


Fig. 79. *Albunea galapagensis*, n. sp.: A–J, ♀, 19.3 mm cl, USNM 267797, paratype. **A**. Carapace, branchiostegite, and ocular peduncles, dorsal view. **B**. Ocular peduncles, dorsal view. **C**. Left antennule, lateral view. **D**. Left antenna, lateral view. **E**. Left mandible, mesial view. **F**. Left maxillule, lateral view. **G**. Left maxilla, lateral view. **H**. Left maxilliped I, lateral view. **I**. Left maxilliped II, lateral view. **J**. Left maxilliped III, lateral view. Scale = 1.7 mm (B), 2.1 mm (F), 3.3 mm (E, I), 4.4 mm (C, D, H, J), 5.9 mm (A), and 6.7 mm (G).

laterally, with long plumose setae on distoventral margin, short plumose setae on distodorsal margin, and short simple setae in two short rows on surface rugae ventral to spine; lateral surface with distal, subdorsal, acute spine; low semicircular dorsolateral lobe ventrodistal to spine, margin of lobe with long plumose setae; segment with ventromesial antennal gland pore.

Mandible (fig. 79E) incisor process with two teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 79F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 79G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 79H) epipod with plumose setae on margins, distolateral surface and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesiodorsal surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 79I) dactylus evenly rounded, length subequal to width, with thick simple setae distally and in transverse row on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsodistal and ventrodistal angles. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin and in few patches on lateral surface. Merus approximately three times longer than wide, margins parallel;

with simple and plumose setae on margins. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-half longer than merus, flagellum with one elongate article, shorter than carpus.

Maxilliped III (fig. 79J) dactylus oblong, with rounded tip; long plumose setae on margins and in transverse row on distolateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus approximately one-fourth length of propodus; lateral surface with two transverse rows of long plumose setae; long plumose setae on dorsal margin. Merus inflated, unarmed, with plumose setae on dorsal margin and few scattered small areas on proximoventral half of lateral surface. Basis-ischium incompletely fused, with weak crista dentata of two or three teeth. Exopod two-segmented: proximal segment small; distal segment styliform, tapering, approximately one-fourth length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 80A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae; mesial surface with few scattered rows of short plumose setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal, distal, and distoventral margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with medial and subdorsal interrupted transverse rows of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, distal margin with long plumose setae; mesial surface with few scattered short setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

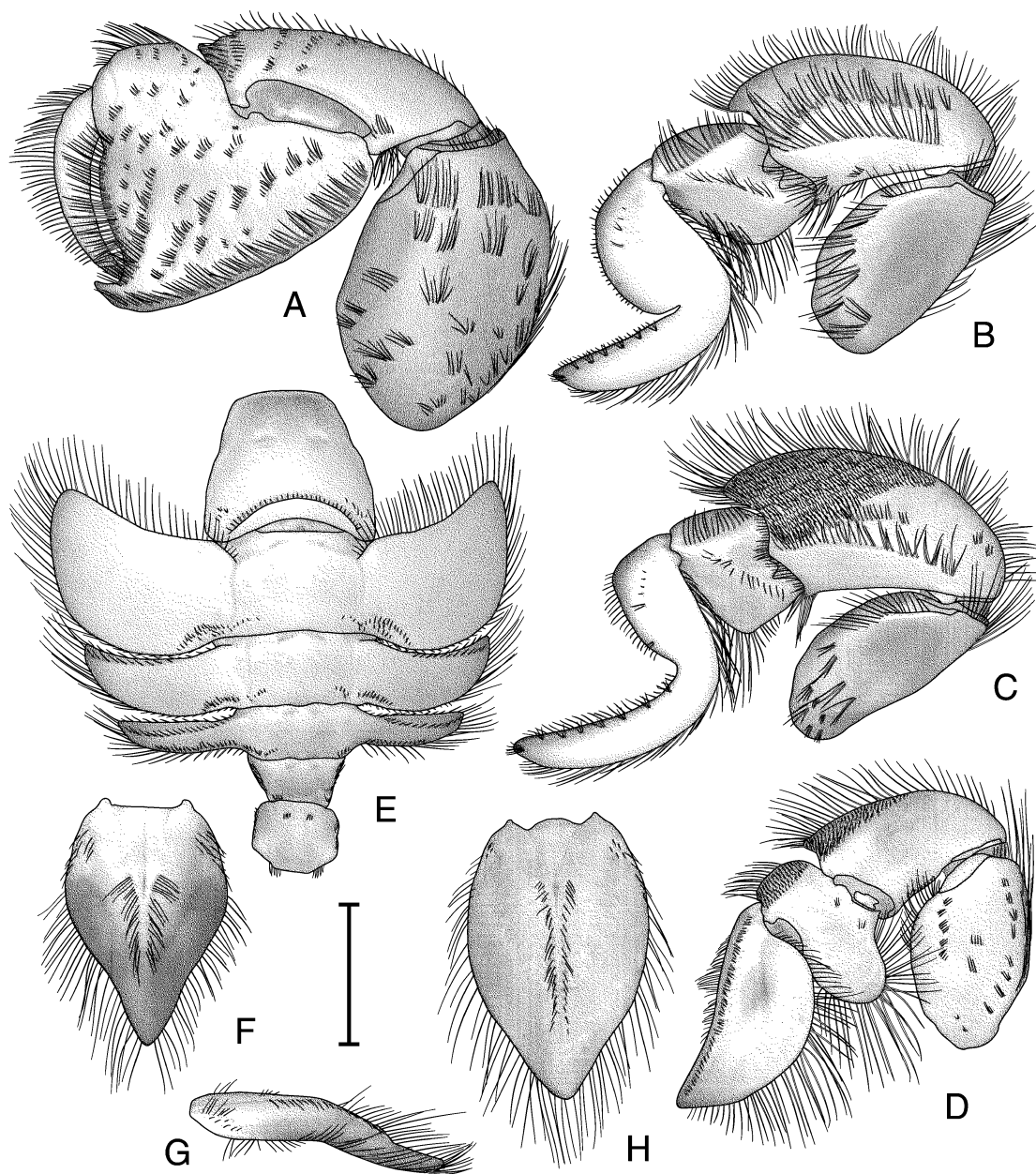


Fig. 80. *Albunea galapagensis*, n. sp.: A-E, H, ♀, 19.3 mm cl, USNM 267797, paratype; F, G, ♂, 15.5 mm cl, USNM 267797, paratype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I-VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♂, lateral view. **H.** Telson of ♀, dorsal view. Scale = 3.3 mm (F-H) and 4.4 mm (A-E).

Pereopod II (fig. 80B) dactylus smooth; base to heel slightly convex, heel low and rounded, heel to tip with narrow, acute indent, tip subacute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique rows of long plumose setae on distal margin of lateral surface and in midline; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and subacute dorsodistally, dorsal margin smooth; lateral surface smooth, dorsodistal region smooth, irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; dorsal and distoventral margins with long plumose setae; mesial surface smooth, with row of long plumose setae distally and subventrally and interrupted row of long plumose setae subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, long plumose setae on dorsodistal and ventral margins; mesial surface nearly smooth, with two long rows of long plumose setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 80C) dactylus with base to heel slightly convex, heel low and rounded, heel to tip with broadly concave indent, tip subacute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface

smooth, with long plumose setae in oblique medial row, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened; mesial surface smooth. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-fifth length of propodus; tip rounded, dorsolateral margin unarmed; lateral surface slightly rugose in dorsodistal half, with mat of short setae and two interrupted rows of long plumose setae ventrally in proximal half; mesial surface smooth, with long plumose setae on distal margin. Merus smooth, with large decalcified window covering nearly all of lateral surface medially; dorsal and ventral margins unarmed, dorsodistal and ventrodiscal margins with long plumose setae, few long plumose setae on lateral surface in proximal third; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, directly opposing other pore and surrounded with short plumose setae; male with minute pore.

Pereopod IV (fig. 80D) dactylus with base to tip slightly convex proximally, with indistinct heel and faintly concave indent, almost straight from indent to tip, tip subacute, tip to base convex; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge, with row of short setae; setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion exceeding ventral margin of dactylus, ventral margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral surface smooth, mesial surface smooth, with few patches of long plumose setae on distoventral area. Carpus slightly produced dorsodistally; ventral four-fifths of lateral surface and mesial surface smooth, dorsodistal one-fifth of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with few short simple setae; mesial surface decalcified medially. Merus with scattered short transverse and oblique rows of setae on lateral surface, dorsal and

ventrodistal margins with long plumose setae; proximoventral third of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 80E) somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved, with elevated submarginal row of short setae; few scattered short, simple setae distolateral to submarginal row; small transverse, decalcified windows laterad of segment median. Somite II dorsal surface with irregular submarginal, transverse ridge anteriorly; with small transverse, decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; anterolateral margins angled, anterior and lateral margins with long plumose setae, posterolateral angle rounded, posterior margin with short setae; postero-mesial angle with mat of short simple setae extending onto somite. Somite III similar to somite II, but narrower, shorter, anterior submarginal windows present; pleura thinner and shorter than on somite II, directed posterolaterally proximally and anterolaterally distally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally, with submarginal row of short setae. Somite IV similar to somite III, but thinner and shorter, anterior submarginal windows present; pleura thinner and shorter than on somite III, directed laterally; dorsal surface obliquely flattened anterolaterally; lateral and posterior margins with long plumose setae, anterior margin with short simple setae. Somite V wider than somite IV, anterior submarginal windows present; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V, anterior submarginal windows present; dorsal surface with two short transverse rows of setae laterad of midline and on posterior margin; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 80F, G) subtriangular, elongated, and tapering, length greater than width, distal tip narrow and subacute; thickly calcified medially, inflated dorsomedially; distal two-thirds with lateral decalcified region; median longitudinal groove extending

one-half length, row of long simple setae of either side of median groove beginning at median and continuing to distal margin of calcified area, converging distally; proximolateral angles with short simple setae; margins with long simple setae. Telson of female (fig. 80H) similar to male, but with less tapered distal tip and less pronounced lateral expansion, dorsal surface evenly calcified; median groove similar to male, but with shorter setae; proximolateral angle with few short simple setae, margins with long simple setae.

DISTRIBUTION: Known from the Galápagos Islands, Baja California Sur (Gulf side), and Guerrero, Mexico, in 9.1–47.6 m depth. Also from Colombia (Ramos and Rios, 1995).

MAXIMUM SIZE: Males: 18.4 mm cl; females: 19.3 mm cl.

TYPE SPECIMENS: USNM 267793 (holotype), CASIZ 109248 (paratype), USNM 267796 (allotype, 2 paratypes), USNM 267795 (paratype), USNM 267797 (3 paratypes).

TYPE LOCALITY: South Seymour Island, Galápagos Islands, Ecuador, 18.3 m.

ETYMOLOGY: This taxon is named after the type locality islands which served as Darwin's inspiration and have yielded so many important discoveries in the biological sciences.

REMARKS: The discovery of this species in both the Galápagos Islands and the Gulf of California demonstrates how much we have yet to learn about these highly diverse areas, in spite of many decades of intensive collecting. This species shares its distributional pattern with numerous other species of Galápagos anomurans that are also known from the Panamic province, such as the porcelain crabs *Petrolisthes haigae* Chace and *P. tonsorius* Haig, and possibly the sand crab, *Lepidopa wollebaeki*, if that species and *L. mexicana* are conspecific (see under *L. wollebaeki* and *L. mexicana*).

Albunea galapagensis belongs to the group of *Albunea* containing *A. microps* and *A. elioti*.

Albunea microps Miers, 1878

Figures 81, 82

Albunea microps White, 1847: 129* (nomen nudum). – Miers, 1878: 328–329, pl. 5, figs. 12,

13*. – Henderson, 1888: 40*. – Ortmann, 1896: 224–225 (list). – Ortmann, 1901: pl. 72, fig. 4, pl. 79, fig. 3. – Borradaile, 1904: 751*. – Gordon, 1938: 187, fig. 3c*. – Serène and Umali, 1965: 95–97, pl. 4, figs. 1–6, text-fig. 12c. – Thomassin, 1969: 140–143 (part), text-figs. 2, 3b. – Miyake, 1978: 154–155, fig. 60b. – Coêlho and Calado, 1987: 43, table 1. – Calado, 1997a: 17, 21–22. – Markham and Boyko, 1999: 5, 7*. – Boyko and Harvey, 1999: 383–386, 400 (list), 402 (key), figs. 1, 4*. – Boyko, 1999: 145 (list), fig. 1*. – Clark and Presswell, 2001: 154 (list).

Albunea [sp.] Gordon, 1938: 189–190, fig. 1d*.

Albunea symnista [sic]: Serène, 1977: 47. – Calado, 1995: 71–73, pl. 4, fig. i, pl. 5, fig. h, pl. 21, figs. a, b, pl. 22, figs. a–f* (not *Albunea symnista* (Linnaeus, 1758)).

not *Albunea microps*: Thomassin, 1969: 140–143 (part), pl. 2, figs. 1–9. – Calado, 1995: 46–49, pl. 4, fig. e, pl. 5, fig. d, pl. 12, figs. a–f (= *Albunea elioti* Benedict, 1904).

MATERIAL EXAMINED: Zanzibar: Dredged in muddy sand, around Bawi and Change Islands, off Zanzibar City, 6–16 fms (= 11.0–29.3 m), Feb. 27, 1957, coll. A. J. Ostheimer III: 1 ♀, 10.9 mm cl (ANSP CA4646); Sta. 650, dredged in shell and sponge, approximately 1.5 mi east of Puopu Island, 7–9 fms (= 12.8–16.5 m), Feb. 20, 1957, coll. A. J. Ostheimer III: 1 ♀, 12.8 mm cl (ANSP CA4647).

Oman: Muscat, 10–15 fms (= 18.3–27.4 m), coll. unknown: 1 ♂, 7.8 mm cl (BMNH 1901.4.20.10).

Seychelles: Mahé, July–Aug. 1972, coll. Mission Zoologique MRAC-ULB: 2 ♀, 6.0–10.2 mm cl (MRAC 53.604).

Maldives: Mahlosmadulu Atoll, 20 fms (= 36.6 m), pre-1900, coll. J. S. Gardiner: 2 ♀, 4.6–4.7 mm cl (UMZC).

Philippines: Sulu Archipelago: “Sooloo Islands, Eastern Seas,” coll. unknown: 1 ♂, 11.3 mm cl, holotype (BMNH 1937.6.7.3); Sta. 212, 06°54′N, 122°18′E, 10 fms (= 18.3 m), Jan. 30, 1875, coll. R/V “Challenger”: 1 ♂, 9.5 mm cl (ZMUC 2715 ex BMNH), 1 unsexable, unmeasurable specimen (MNHN-Hi 11 ex BMNH); south lagoon, Sibutu, 04°31′N, 119°22′E, 12 fms (= 21.9 m), Feb. 25–26, 1964, coll. B. R. Wilson on “Pele”: 1 ♀, 12.0 mm cl (WAM 10408); south lagoon, Sibutu, 04°31′N, 119°22′E, 13 fms (= 23.8 m), Feb. 25, 1964, coll. B. R. Wilson

on “Pele”: 1 ♂, 9.1 mm cl, 1 ♀, 10.1 mm cl (WAM 10409); south lagoon, Sibutu, 04°31′N, 119°22′E, 9–13 fms (= 16.5–23.8 m), Feb. 25–26, 1964, coll. B. R. Wilson on “Pele”: 1 ♂, 8.6 mm cl (WAM 10416); west of Pearl Bank, 9–12 fms (= 16.5–21.9 m), Feb. 21, 1964, coll. B. R. Wilson on “Pele”: 1 ♂, 4.9 mm cl (WAM 10412), 1 ♂, 10.2 mm cl (ZRC 1970.11.3.1); 2.5 mi and 358° from Malanipa Island, Basilan Straits, 15 fms (= 27.4 m), Feb. 12, 1964, coll. B. R. Wilson on “Pele”: 2 ♂, 8.2–10.8 mm cl, 1 oviger, 10.0 mm cl (WAM 10417).

India: Andaman Islands: Port Blair, coll. unknown: 2 ♂, 6.2–6.7 mm cl (BMNH 1956.1.14.20).

Indonesia: Corindon II, Sta. DR293, 02°37.7′S, 117°49.4′E, Makassar, 45.0 m, Nov. 10, 1980, coll. R/V “Coriolis”: 1 oviger, 12.1 mm cl (MNHN-Hi 201).

New Guinea: Sta. 549, east coast of Rouw Island, Aori Group, West Geelrinck Bay, Feb. 23, 1956, coll. A. F. Ostheimer on “Gloria Maris”: 1 ♂, 11.2 mm cl (RMNH 23641).

Australia: Queensland: Michaelmas Cay, Great Barrier Reef, north of Cairns, Sept. 14, 1963, coll. W. Goode: 1 ♂, 11.6 mm cl (WAM 23385); Cape Sandwich, north of Townsville, 10 fms (= 18.3 m), Nov. 1963, coll. W. Goode: 1 unsexable specimen, 10.4 mm cl (WAM 23388); Cairns Reef near Cooktown, Oct. 1, 1963, coll. W. Goode: 1 ♂, 11.4 mm cl (WAM 23400); Rudder Reef off Mossman, 16°11′S, 145°40′E, 30 m, Oct. 21, 1973, coll. R. J. Plant: 2 ♂, 6.6–11.0 mm cl, 4 ♀, 6.2–13.0 mm cl (MOV J14553), 1 ♀, 15.7 mm cl (MOV J40128 ex MOV J14553); Rudder Reef, 30 mi northeast of Mossman, 16°11′S, 145°40′E, 3.1 m, Oct. 21, 1973, coll. R. J. Plant: 1 ♂, 11.0 mm cl (MOV J44734); Rudder Reef, 30 mi northeast of Mossman, 16°11′S, 145°40′E, 3 m, Oct. 1973, coll. R. J. Plant: 2 ♂, 5.9–6.4 mm cl (MOV J44735); Michaelmas Reef, 16°35′S, 146°00′E, Jan. 1964, coll. D. Beckworth: 1 ♀, 12.9 mm cl (MOV J44727); north edge of reef around coral patches, 1.25 mi from east end of cay, Michaelmas Reef, 15 ft (= 4.5 m), Oct. 14, 1965, coll. Australian Museum Party: 2 ♂, 10.4–10.6 mm cl, 1 ♀, 10.2 mm cl (AM P19646); Lizard Island, near Cooktown, 4 m, May 26–June 4, 1975, coll. G. Anderson: 1 ♀, 12.3 mm cl

(AM P20648); Little Trunk Reef, 18°20'S, 146°46'E, 9.1–12.2 m, Nov. 5, 1990, coll. K. Lamprell: 1 ♂ 10.0 mm cl, 2 ♀, 10.2–11.7 mm cl (QM W17460).

New Caledonia: Sta. DW 1390, 18°27.5'S, 163°08.7'E, 38 m, May 11, 1999, coll. "Alis" Campagne SURPRISES (B. Richer De Forges): 1 ♂, 9.7 mm cl (MNHN-Hi 261).

DIAGNOSIS: Carapace longer than wide, covered with strongly setose grooves. Anterior margin with 8–11 spines on either side of ocular sinus. Setal field with thick lateral elements and straight anterior margin. CG1 with separate posterior lateral elements; CG4 fragmented, median element displaced anteriorly; CG5 entire; CG6 and CG7 united; CG11 present. Rostrum present, exceeding posterior margin of ocular plate by approximately one-half length of ocular plate. Ocular plate subquadrate. Distal peduncular segments dorsoventrally flattened and oblong in shape, rounded at tip, approximated along distal two-thirds of mesial margins, lateral margins convex except at concave tip, mesial margins convex. Cornea on lateral margin at tip. Dactylus of pereopod II with heel produced and rounded. Dactylus of pereopod III with heel produced and rounded. Dactylus of pereopod IV evenly sinuous from base to tip, with shallow indent. Telson of male broadly triangular, inflated dorsally, broadly rounded at tip, strongly calcified proximally, large decalcified area on either side of thin medial calcified strip, long thin setae medially and along anterior margin of windows. Telson of female flattened, ovate, longitudinal row of short, thin setae medially.

DESCRIPTION: Carapace (fig. 81A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 8–11 large spines ($n = 5$) along length. Rostrum as small acute tooth, extending halfway across the ocular plate. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field broad anteriorly and posteriorly; posterior lateral elements lacking. CG1 parallel to anterior margin of carapace, faintly sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced, lateral elements. Mesogastric region smooth; CG2 present as one or two short me-

dial elements; CG3 broken into one to five short and one or two long elements between posterior lateral elements of CG1; CG4 with one short, anteriorly displaced, medial element and two longer lateral elements spaced approximately equally between longer supralateral elements of CG4. Hepatic region smooth with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with three short rows of setae. Metagastic region smooth; CG5 entire. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, almost reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as three long elements. CG9 present as two short lateral grooves with gap at midline. CG10 present as two long lateral fragments, with gap between fragments, short line anterior to CG11 may be posteriorly displaced medial fragment of CG10. CG11 present as one or two short elements. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching less than one-third up margin of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 81B, C) subquadrate, with shallow median indentation; median peduncular segments present as small ovate, calcified areas lateral to ocular plate. Distal peduncular segments irregularly oblong, with convex lateral and mesial margins, cornea located laterally on produced tip; mesial margins approximated along distal two-thirds; mesial and lateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angle and medial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 81D) with segment III narrow proximally, expanding distally to two times proximal width; with plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal fla-

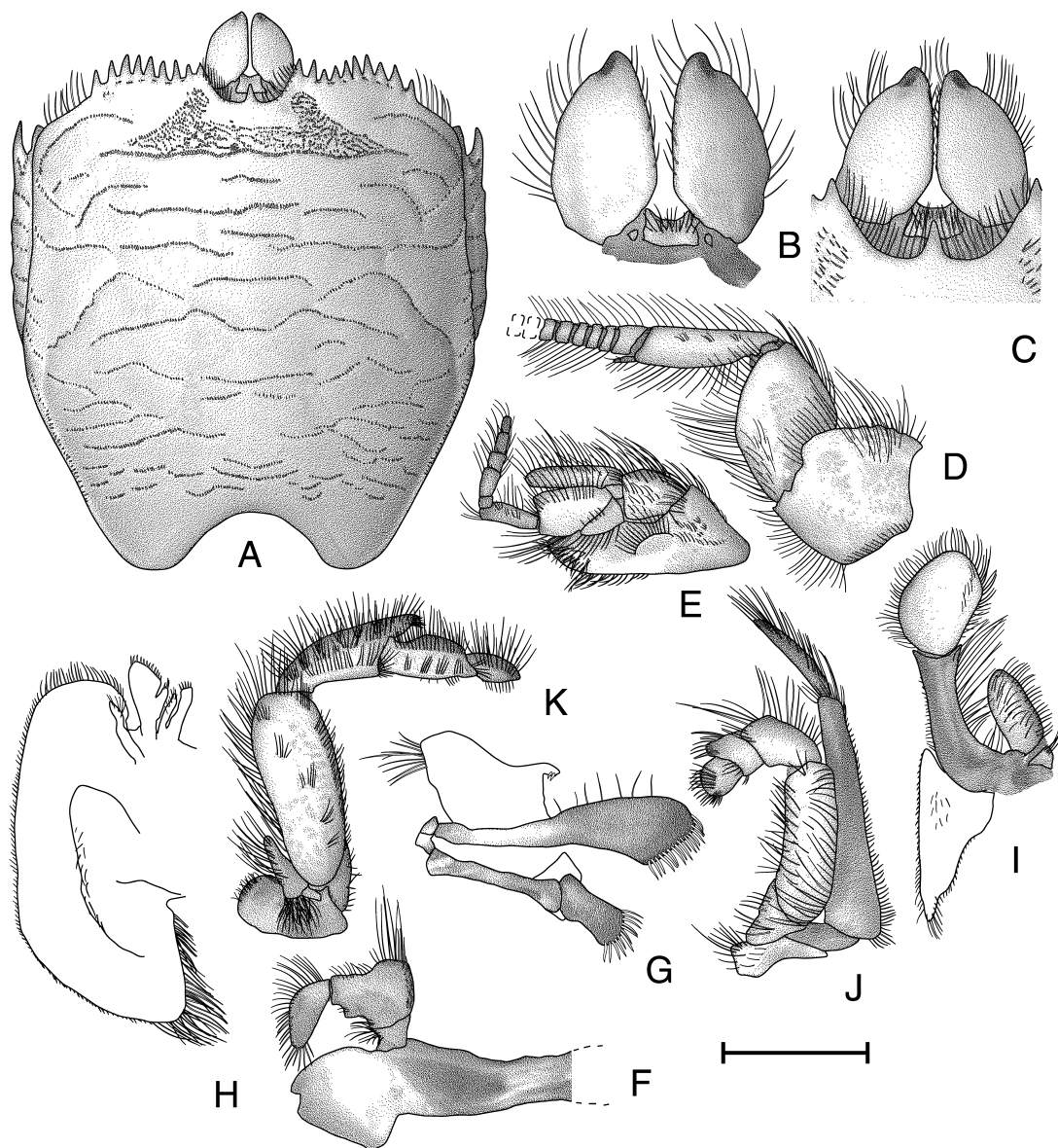


Fig. 81. *Albunea microps* Miers, 1878: A, C, oviger, 12.1 mm cl, MNHN Hi-201; B, D–K, ♂, 11.0 mm cl, MOV J44734. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Ocular peduncles, dorsal view. D. Left antennule, lateral view. E. Left antenna, lateral view. F. Right mandible, mesial view. G. Right maxillule, lateral view. H. Right maxilla, lateral view. I. Right maxilliped I, lateral view. J. Left maxilliped II, lateral view. K. Right maxilliped III, lateral view. Scale = 1.6 mm (C, G), 2.2 mm (B, F, J), 3.3 mm (D, E, H, I, K), and 4.4 mm (A).

gellum with 55–75 articles ($n = 5$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short, with two articles ($n = 5$) and plumose setae on dorsal and ventral margins. Segment II medially in-

flated from dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface rugose, with long plumose setae;

long plumose setae on dorsal and ventral margins.

Antenna (fig. 81E) with segment V approximately 2.5 times longer than wide, with long plumose setae on dorsal margin and scattered on lateral surface; flagellum with five or six articles ($n=5$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral and distal margins, and row of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and just exceeding distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and scattered on surface rugae behind spine; lateral surface with acute spine dorsally, low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 81F) incisor process with two teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 81G) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced, with two thick setae at distolateral margin.

Maxilla (fig. 81H) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 81I) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments: proximal segment narrow, margins parallel, margins with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching

two-thirds of distance to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 81J) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorso-distally, approximately two times longer than wide; long simple setae on dorsal and distal margins. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-third longer than merus, flagellum with one elongate article.

Maxilliped III (fig. 81K) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus slightly inflated medially, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-half length of propodus; lateral surface with two rows of plumose setae on surface; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of two or three teeth. Exopod two-segmented: proximal segment small; distal segment styliiform, tapering, approximately one-half length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 82A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin proximally rugose, with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with

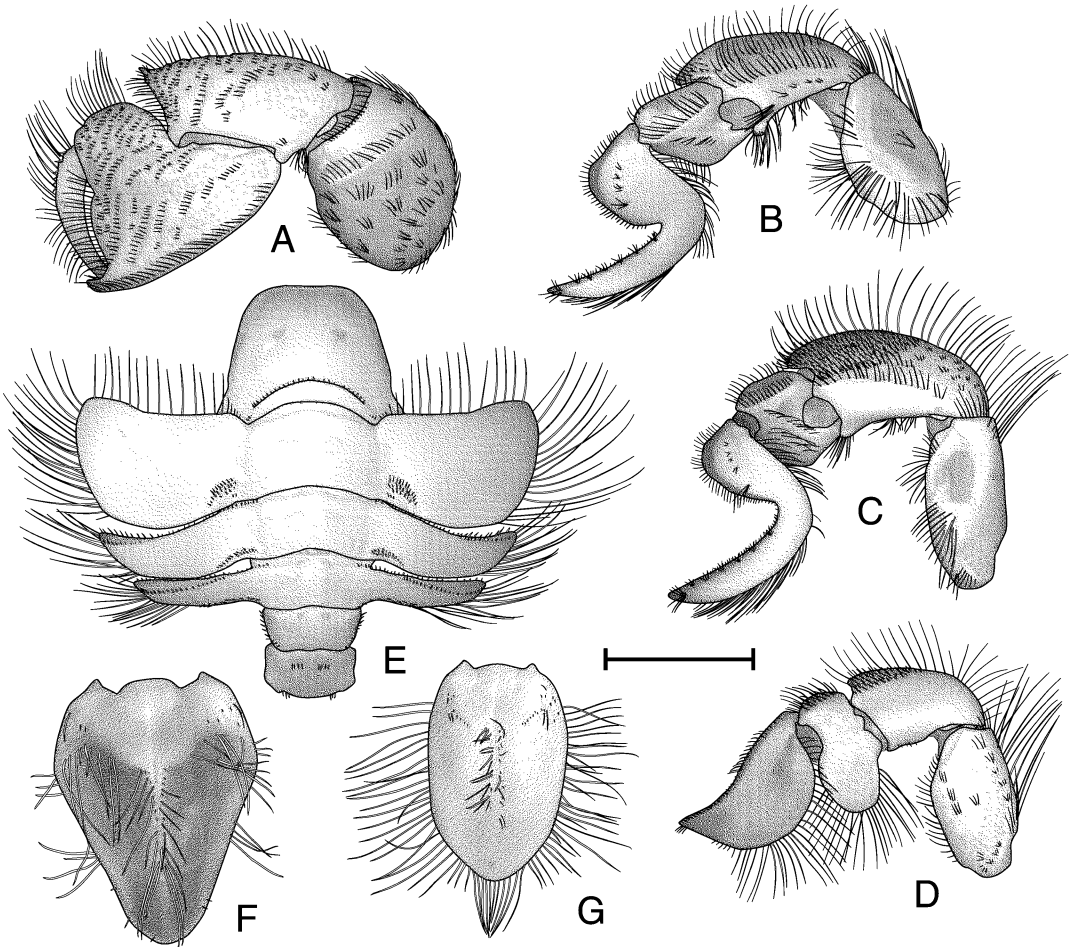


Fig. 82. *Albunea microps* Miers, 1878: A–D, ♂, 11.0 mm cl, WAM J44734; E, ♂, 10.4 mm, AM P19646; F, ♂, 11.3 mm cl, BMNH 1937.6.7.3, holotype; G, oviger, 12.1 mm cl, MNHN Hi-201. A. Left pereopod I, lateral view. B. Left pereopod II, lateral view. C. Left pereopod III, lateral view. D. Left pereopod IV, lateral view. E. Abdominal somites I–VI, dorsal view. F. Telson of ♂, dorsal view. G. Telson of ♀, dorsal view. Scale = 2.2 mm (F), 3.3 mm (E, G), and 4.4 mm (A–D).

small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial side with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 82B) dactylus smooth; base to heel slightly concave, heel smoothly rounded, slightly produced, heel to tip with wide, acute indent, tip acute, tip to base

broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margin with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae

on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus slightly produced and gently rounded dorsodistally, dorsal margin unarmed; lateral surface smooth, with setose mat on produced area and irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth, with row of long plumose setae subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered setae on surface and margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 82C) dactylus with base to heel straight, heel broadly rounded and low, heel to tip with broadly concave indent, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface with scattered long setae on and near distal margin, and in oblique row on surface. Carpus produced dorsodistally, only slightly exceeding proximal margin of propodus; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and row of setae ventrally; mesial surface smooth, with long plumose setae on margins. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa of male with small anteromesial spine; coxa of female unarmed. Female with large gonopore on anterior mesial margin of coxa, surround-

ed with short plumose setae; male without pore.

Pereopod IV (fig. 82D) dactylus with base to tip convex to concave, tip acute, tip to base convex; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral and mesial surfaces smooth. Carpus slightly produced dorsodistally; ventral three-fourths of lateral surface and mesial surface smooth, dorsodistal quarter of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface partially decalcified medially. Merus lateral surface with scattered short transverse rows of setae, dorsal and ventrodorsal margins with long plumose setae; proximoventral third of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 82E) with somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter; pleura thinner and shorter than on somite II, directed posterolaterally, with setae as in somite II; anterolateral angle acute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few short setae anterolaterally; pleura thinner and shorter

than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V; dorsal surface with short transverse rows of setae laterad of midline and posteriorly; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 82F) broadly triangular, longer than wide, with broadly rounded tip; proximal third thickly calcified, inflated dorsally; distal two-thirds with large decalcified windows laterad of thin medial calcified strip, margins of windows with long simple setae; median longitudinal groove extending one-half length; proximolateral angles with patch of short simple setae; margins with long simple setae. Telson of female (fig. 82G) flattened, ovate, and evenly calcified; median groove similar to male but flanked along distal half by long thin simple setae; proximolateral angle with patch of setae, margins with long simple setae.

DISTRIBUTION: From Zanzibar and Madagascar north to Oman and eastward to the Philippines and New Caledonia, in 3–45 m depth. Also reported from Japan (Miyake, 1978).

MAXIMUM SIZE: Males: 11.6 mm cl; females: 15.7 mm cl.

TYPE SPECIMEN: BMNH 1937.6.7.3 (holotype).

TYPE LOCALITY: “Sooloo Island” (= Sulu Archipelago, Philippines).

REMARKS: Although it is surprising that two of three specimens of the type series of *A. microps* reported by Henderson (1888) were transferred from BMNH to other museums, this was apparently common practice with much of the “Challenger” material (Lingwood, 1981).

Thomassin’s (1969) material of “*Albunea microps*” from Madagascar was a mixture of that species and *A. elioti*. This is clearly shown by his illustrations, as figures 2 and 3b are *A. microps*, while all of the figures on plate 2 are *A. elioti* (see also Boyko and Harvey, 1999). How many specimens of each taxon were present in Thomassin’s (1969) samples is unknown, as he did not deposit any specimens in the MNHN or any other

institution, and they cannot be examined. Thomassin’s (1969: text-fig. 12) distribution map is correct for the localities marked, but the species spans a wide geographic range between Madagascar and Samoa. The Japanese name for this species is “Togenashi-Kudahigegani” (Asakura, personal commun.).

It is obvious from the illustrations of Calado (1995) that the specimens she examined and cited as *A. “symnista”* are *A. microps*. This was confirmed by direct examination of those specimens. As discussed further under *A. symmysta*, this misidentification is probably the basis for Calado’s (1997a) subsequent description of *A. edsoni*, which is a synonym of *A. symmysta*. Calado (1995: pl. 21, fig. a) also omitted the setal field in the carapace drawing.

As with most albuneids, little is known of the biology of *A. microps*. Ovigerous females are known from February and November. This species is fairly common in the Philippines, as shown by the abundant material cited above and by the 65 specimens listed by Serène and Umali (1965). MOV J40128 is the type and only known host for the bopyrid isopod *Albunione australiana* Markham and Boyko, 1999.

This species was considered the senior synonym of *A. elioti* until Boyko and Harvey (1999) clearly showed the distinctiveness of both species. The shape of both the telson of the male and the distal peduncular segments can be used to tell the two species apart. The telson of the male of *A. microps* is heavily calcified and somewhat inflated proximally, but partially decalcified distally and narrowing to a produced tip. An oblique row of long setae is present just proximal to the demarcation line between the calcified and decalcified regions on each side of the median line. In *A. elioti*, the telson of the male is narrowly triangular, fully calcified, with short thick setae on a strong medial ridge, and lacks the oblique row of setae. The mesial margins of the distal peduncular segments are strongly convex in *A. elioti* but only slightly so in *A. microps*. In addition, the cornea of *A. elioti* is more posterolaterally displaced from the tip of the distal peduncular segment. *Albunea microps* is the sister species to *A. elioti* and typifies the “*microps*”

group" of *Albunea*, which also includes *A. elioti* and *A. galapagensis*.

Albunea elioti Benedict, 1904

Figures 83, 84

Albunea elioti Benedict, 1904: 623, fig. 2*. – Gordon, 1938: 187 (list). – Coêlho and Calado, 1987: table 1. – Boyko and Harvey, 1999: 386, 400 (list), 402 (key)*. – Boyko, 1999: 145 (list).

Albunea microps: Thomassin, 1969: 140–143 (part), pl. 2, figs. 1–9. – Calado, 1995: 46–49, pl. 4, fig. e, pl. 5, fig. d, pl. 12, figs. a–f (not *Albunea microps* Miers, 1878).

MATERIAL EXAMINED: **Madagascar:** Sta. 15/15, Tulear, 1976, coll. P. Galenon: 1 ♂, 10.4 mm cl (MNHN-Hi 88).

Seychelles: Sta. 4, 32 m, Sept. 2, 1980, coll. ORSTOM 1980–Reves 2: 1 ♀, 14.4 mm cl (MNHN-Hi 195).

Australia: Western Australia: Barrow Island, 3 ft (= 0.9 m), June 6, 1964, coll. W. H. Butler: 1 ♂, 12.0 mm cl (WAM 23394).

Caroline Islands: Sta. 137, Kapingamarangi Atoll, Polim Reef, flat region next to Tipongowakaram Pass, 01°02'00"N, 154°45'14"E, Aug. 12, 1954, coll. George Vanderbilt Foundation: 1 ♀, unmeasurable (USNM 104746).

Fiji: Viti [Levu] Island, coll. unknown: 1 ♀, 17.0 mm cl (ZMH K-5134 ex Museum Goddefroy 941).

Japan: Iko, Kuroshima Island, Yaeyama Islands, intertidal, April 28, 1998, coll. K. Nomura: 1 ♂, 16.65 mm cl (CBM-ZC 5334).

Tonga: South of Ohonua Harbor, Eua Island, Tongatabu Group, 21°20'15"S, 174°58'14"W, 0–5 ft (= 0–1.5 m), Nov. 2, 1993, coll. J. T. Williams et al.: 1 ♂, 16.5 mm cl (USNM 281472).

Samoa: "Samoa", coll. unknown: 1 ♀, 16.2 mm cl, holotype (USNM 26169).

DIAGNOSIS: Carapace wider than long, covered with strongly setose grooves. Anterior margin with seven to nine spines on either side of ocular sinus. Setal field with thick lateral elements and diffuse anterior margin. CG1 with separate posterior lateral elements; CG4 with one or two short medial elements and two longer lateral elements spaced approximately equally between longer supralateral elements of CG4; CG5 ranging from entire to four short elements; CG6 and CG7

almost united but separate; CG11 present. Rostrum present, exceeding posterior margin of ocular plate by approximately one-half length of ocular plate. Ocular plate subquadrate. Distal peduncular segments dorsoventrally flattened and oblong in shape, rounded at tip, separated along mesial margins, lateral margins sinuous, mesial margins convex. Cornea on lateral margin at tip. Dactylus of pereopod II with heel produced and rounded. Dactylus of pereopod III with heel produced and rounded. Dactylus of pereopod IV evenly sinuous from base to tip, with shallow indent. Telson of male elongate triangular with rounded tip; median area thickly calcified, marginal area weakly calcified, medial row of short thick simple setae. Telson of female similar to male but broader, flattened, evenly calcified, with medial row of thin setae.

DESCRIPTION: Carapace (fig. 83A) wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with seven to nine large spines ($n = 5$) along length. Rostrum as small acute tooth, extending halfway across ocular plate. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field broad anteriorly and posteriorly; posterior lateral elements broad and adjoining posterior lateral elements of CG1. CG1 parallel to anterior margin of carapace, faintly sinuous, strongly crenulate, divided into medial fragment and curved posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as one or two elements; CG3 broken into one to four long and short elements approximately equally spaced between posterior lateral elements of CG1; CG4 with one or two short medial elements and two longer lateral elements spaced approximately equally between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with three short rows of setae. Metagastric region smooth; CG5 ranging from entire to four short elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, almost reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as three long elements. CG9 present as two

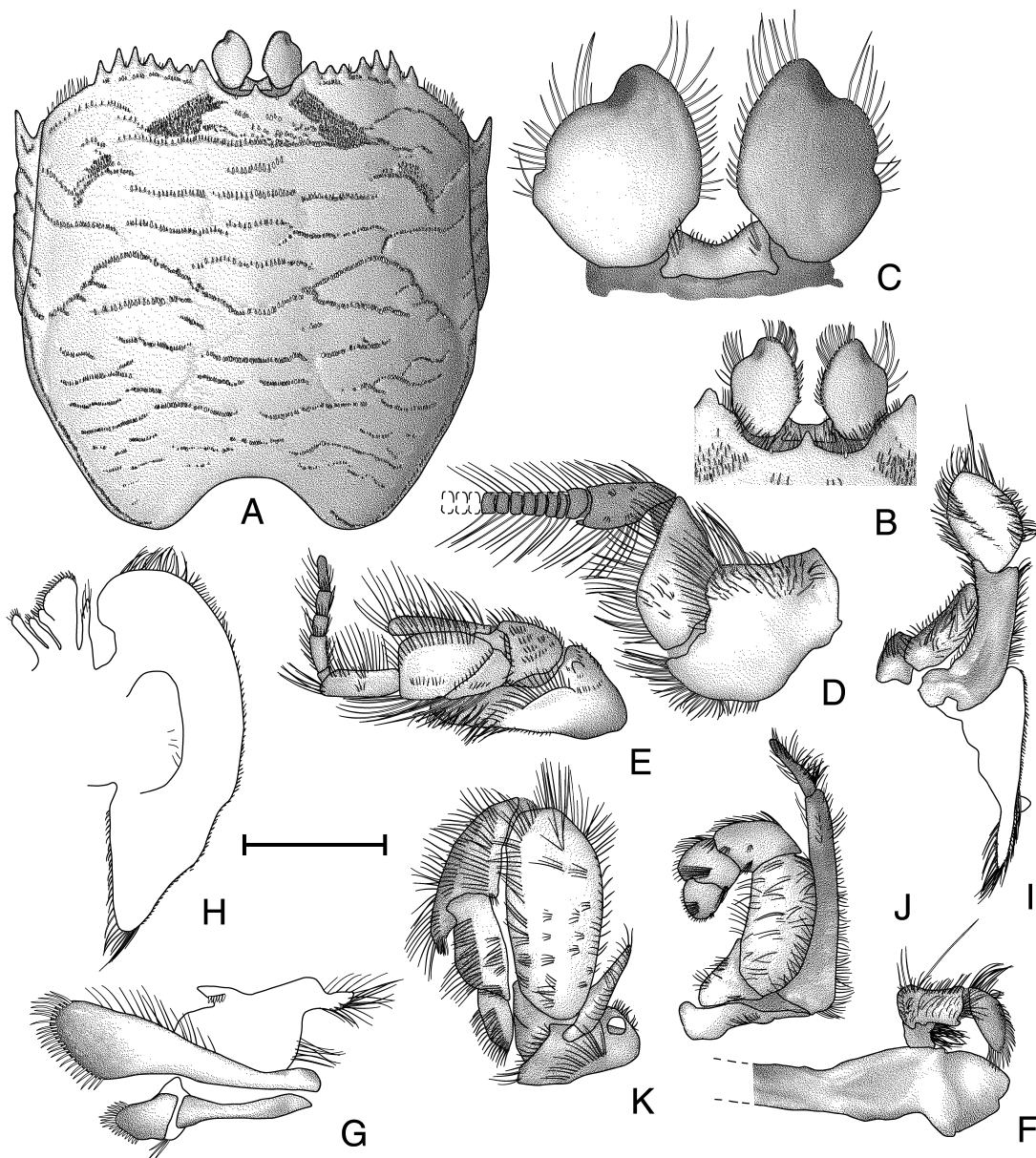


Fig. 83. *Albunea elioti* Benedict, 1904: A, B, ♀, 16.2 mm cl, USNM 26169, holotype; C–K, ♂, 16.5 mm cl, USNM 281472. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Ocular peduncles, dorsal view. D. Left antennule, lateral view. E. Left antenna, lateral view. F. Left mandible, mesial view. G. Left maxillule, lateral view. H. Left maxilla, lateral view. I. Left maxilliped I, lateral view. J. Left maxilliped II, lateral view. K. Left maxilliped III, lateral view. Scale = 1.6 mm (C), 2.2 mm (G), 3.3 mm (B, F, J), 4.4 mm (D, E, H, I, K), and 5.9 mm (A).

short lateral grooves with gap at midline. CG10 present as two long lateral fragments, with short gap between fragments. CG11 present. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching less than one-third up margin of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered short transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 83B, C) subrectangular with shallow median indentation; median peduncular segments bluntly diamond-shaped and located ventral to ocular plate and distal peduncular segments; not visible in dorsal view. Distal peduncular segments irregularly oblong, with convex lateral and mesial margins, two lateral notches present with oblong cornea located in distal notch; mesial margins widely separated along all of length; mesial and lateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angle and short row of plumose setae proximovenventral to cornea notch.

Antennule (fig. 83D) with segment III narrow proximally, expanding distally to two times proximal width; with plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 56–64 articles ($n = 3$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with one segment ($n = 4$) and plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I longer than wide, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 83E) with segment V approximately 2.5 times longer than wide, with long plumose setae on dorsal margin and scattered on lateral surface; flagellum with five articles ($n = 4$), long plumose setae on dorsal, ventral, and distal margins. Segment

IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin and in short row on surface. Segment II short, widening distally, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and just exceeding distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins; lateral surface with rounded spine dorsally, low semicircular dorsolateral lobe ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 83F) incisor process with one tooth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 83G) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin. Proximal endite with thick simple setae on distal margin and thin plumose setae on dorsal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with six thick setae at distolateral margin.

Maxilla (fig. 83H) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 83I) epipod with plumose setae on margins, distolateral surface and mesial surface (epipod shown curled in fig. 83I). Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching nearly to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 83J) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with

plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorso-distally, approximately two times longer than wide; long simple setae on dorsal and distal margins and in few small patches on surface. Merus approximately two times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-third longer than merus, flagellum with one elongate segment.

Maxilliped III (fig. 83K) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus slightly inflated medially, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-half length of propodus; lateral surface with two rows of plumose setae on surface; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of one or two teeth. Exopod two-segmented: proximal segment small; distal segment styliform, tapering, approximately one-half length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 84A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin proximally rugose, with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with few median rows of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with

few short rows of setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 84B) dactylus smooth; base to heel slightly concave, heel smoothly rounded, heel to tip with wide, acute indent, tip acute, tip to base broadly convex distally and slightly concave proximally; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margin with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus; small decalcified region just distal to junction with carpus. Carpus slightly produced and gently rounded dorsodistally, dorsal margin unarmed; lateral surface smooth, with setose mat on distodorsal quarter and irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth with scattered patches of long plumose setae in subdorsal and submarginal rows. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered setae on surface and margins; mesial surface nearly smooth, with few setae, and small decalcified area near junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 84C) dactylus with base to heel convex, heel broadly rounded and low, heel to tip with broadly concave indent, tip acute, tip to base smoothly convex distally to straight proximally; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long

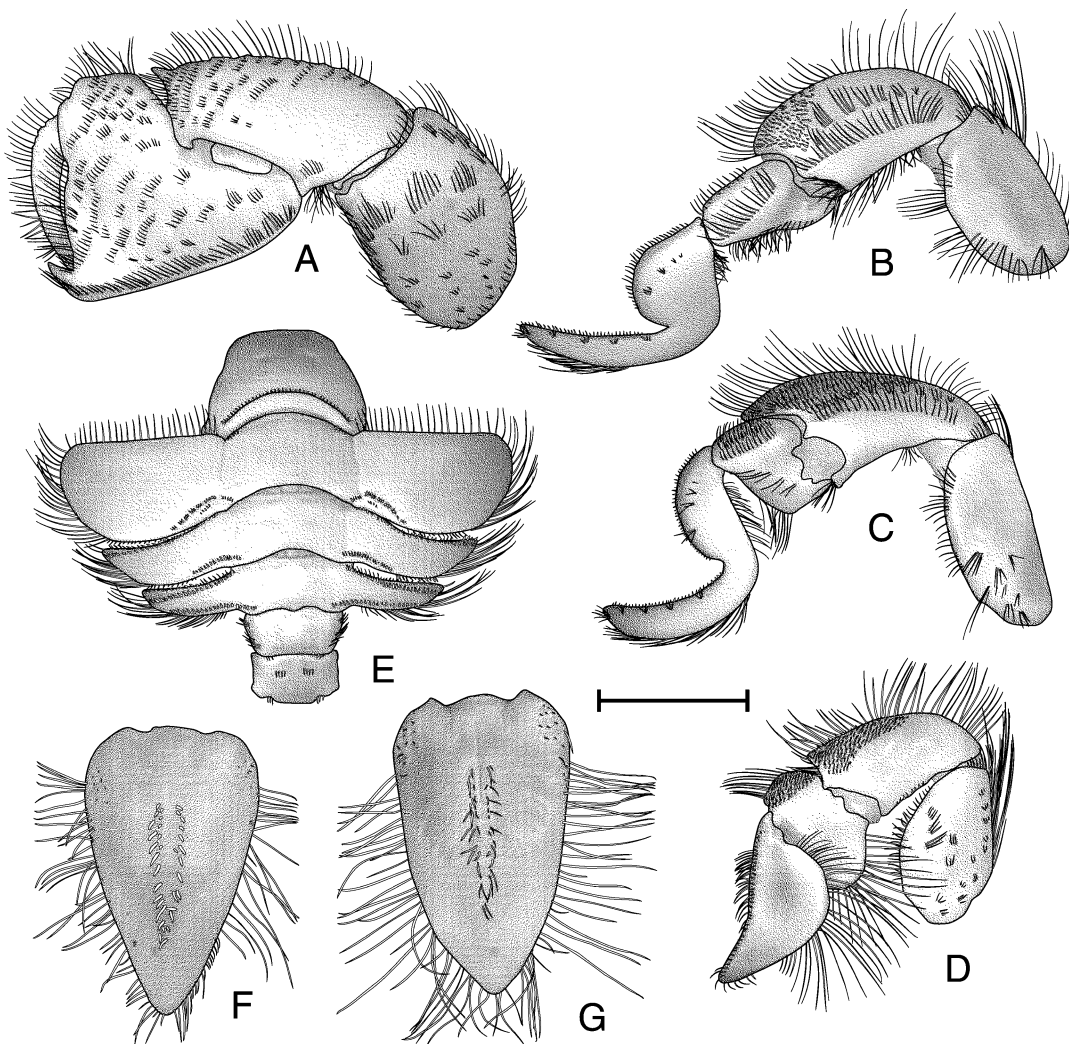


Fig. 84. *Albunea elioti* Benedict, 1904: A-D, ♂, 12.0 mm cl, WAM 23394; E, ♂, 10.4 mm cl, MNHN Hi-88; F, ♂, 16.5 mm cl, USNM 281472; G, ♀, 16.2 mm cl, USNM 26169, holotype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I-VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.3 mm (E-G) and 4.4 mm (A-D).

plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, with simple setae on dorsal margins; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface with scattered long setae on and near distal margin, with small decalcified window near junction with car-

pus. Carpus produced dorsodistally, exceeding proximal margin of propodus by approximately one-third length of propodus; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and row of setae ventrally; mesial surface smooth, with long plumose setae on margins. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; latero-

distal margin with long plumose setae; mesial surface smooth, with small decalcified window at junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 84D) dactylus with base to tip convex to concave, tip acute, tip to base convex; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion almost reaching ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral and mesial surfaces smooth. Carpus not produced dorsodistally; ventral three-fourths of lateral surface and mesial surface smooth, dorsodistal quarter of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae. Merus with scattered short transverse rows of setae on lateral surface, dorsal and ventrodistal margins with long plumose setae; proximoventral third of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 84E) with somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved with elevated submarginal row of short setae; with small transverse decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; with tuft of setae at posterolateral angle, extending onto pleura posteromesially; pleura expanded and directed slightly anterolaterally; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae. Somite III similar to somite II, but narrower, shorter; small tuft of

short thick setae on posterolateral angle; pleura thinner and shorter than on somite II, directed posterolaterally, with setae as in somite II; anterolateral angle acute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few thick setae posterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI subequal to somite V; dorsal surface with short transverse rows of setae laterad of midline, anteriorly and posteriorly; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 84F) elongate triangular, two times longer than wide, with pointed rounded tip; median area thickly calcified, with dorsodistally produced tip; marginal area weakly calcified, flattened and thin; median longitudinal groove extending one-half length, flanked on distal half by dense row of short thick simple setae continuing to produced tip; proximolateral angles each with patch of short simple setae; margins with long simple setae. Telson of female (fig. 84G) similar to male but broader, flattened, and evenly calcified; median groove similar but flanked along distal half by long thin simple setae; proximolateral angle with denser patch of setae than male.

DISTRIBUTION: Known from Madagascar and the Seychelles eastward to Samoa, in up to 32 m depth.

MAXIMUM SIZE: Males: 16.65 mm cl; females: 17.0 mm cl.

TYPE SPECIMEN: USNM 26169 (holotype).

TYPE LOCALITY: Samoa.

REMARKS: As previously noted, Thomassin's (1969) material of "*Albunea microps*" from Madagascar was a mixture of that species and *A. elioti*. This is clearly shown by his illustrations, as figures 2 and 3b are *A. microps*, while all of the figures on plate 2 are *A. elioti* (see also Boyko and Harvey, 1999). How many specimens of each taxon were present in Thomassin's (1969) samples is unknown, as he did not deposit any specimens in MNHN or any other institution, and they are unavailable for examination.

Calado's (1995) illustration of the carapace (as *A. microps*) is too slender and does not accurately depict the subquadrate shape typical of this species.

This species was considered a synonym of *A. microps* until Boyko and Harvey (1999) gave the distinguishing characters that separate the two species (see under *A. microps* for details). *Albunea microps* is the sister species to *A. elioti*.

***Albunea bulla*, new species**

Figures 85, 86

Albunea symnista [sic]: Gordon, 1938: 187 (part)*
(not *Albunea symmysta* (Linnaeus, 1758)).
?Albuneidae sp. DiSalvo et al., 1988: 458.

MATERIAL EXAMINED: **Taiwan:** Ma-Kung, Peng-Hui Island, Sept. 15, 1996, coll. unknown: 1 ♀, 17.4 mm cl, paratype (NTOU).

Australia: Queensland: Samovrez Reef, 8 m, Sept. 1974, coll. N. Coleman: 1 ♀, 19.3 mm cl, paratype (AM P20456); Cape Bowling Green, 16 fms (= 29.3 m), Nov. 23, 1962, coll. W. Goode on R/V "Dorothea": 1 ♂, 11.8 mm cl, 1 ♀, 17.9 mm cl, paratypes (WAM 23387); **New South Wales:** Off Richmond River mouth, off Ballina, 28°52'S, 153°34'E, 16 m, Oct. 6, 1962, coll. unknown: 1 ♂, 15.4 mm cl, holotype (AM P15353); Lord Howe Island, 31°33'S, 159°05'E, coll. unknown: 1 ♀, 18.9 mm cl, allotype (AM P1925).

New Caledonia: "New Caledonia," 1903, coll. A. Milne Edwards: 1 ♀, 19.4 mm cl (MNHN-Hi 150).

Fiji: Viti Island: 1 ♂, 7.5 mm cl, paratype (ZMH K-5137 ex Museum Goddefroy 2120).

Pitcairn Island: Sta. PIT-UI, Haul 13, 1 mi northwest of Pitcairn Island, 25°02'–04'S, 130°06'–07'W, 26–30 fms (= 47.6–54.9 m), Sept. 20, 1967, coll. National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 unsexable anterior half with pereopod I, 17.7 mm cl (USNM 304304).

DIAGNOSIS: Carapace wider than long, covered with strongly setose grooves. Anterior margin with 8–10 spines on either side of ocular sinus. Setal field with thin lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4

with three or four short medial elements between longer supralateral elements of CG4, CG5 two short, irregularly convex, transverse elements; CG6 and CG7 separate; CG8 present; CG11 present. Rostrum present, reaching posterior margin of ocular plate. Ocular plate subquadrate. Distal peduncular segments dorsoventrally flattened and oblong in shape, rounded at tip, approximated along mesial margins, lateral margins convex, mesial margins straight. Cornea on lateral margin at tip. Dactylus of pereopod II with heel produced and rounded. Dactylus of pereopod III with heel produced and rounded. Dactylus of pereopod IV evenly sinuous from base to tip, with shallow indent. Telson of male divided into buttonlike proximal two-thirds and mucronate, tapering, distal third; proximal two-thirds rounded, heavily calcified, dorsally inflated, row of long setae flanking distal half of telson, medial transverse row of long setae present; distal third of telson weakly calcified, sharply tapering distally with produced tip. Telson of female ovate, tapering slightly distally, tip slightly produced.

DESCRIPTION: Carapace (fig. 85A) wider than long. Anterior margin faintly concave on either side of ocular sinus, becoming convex laterally with 8–10 large spines ($n = 5$) on each side along length. Rostrum a small acute tooth, reaching proximal margin of ocular plate. Ocular sinus smoothly concave. Frontal region smooth; setal field broad anteriorly and narrow posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, convex, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as two or three short elements, anteriorly and posteriorly displaced; CG3 broken into three to six short curved elements between posterior lateral elements of CG1, medial two elements shortest; CG4 with three or four short medial elements between longer supralateral elements of CG4, medial one or two elements anteriorly displaced, lateral short elements posteriorly displaced. Hepatic region smooth, with oblique setose groove at median of lateral margin, nearly reaching posterior element of CG1. Epibranchial region

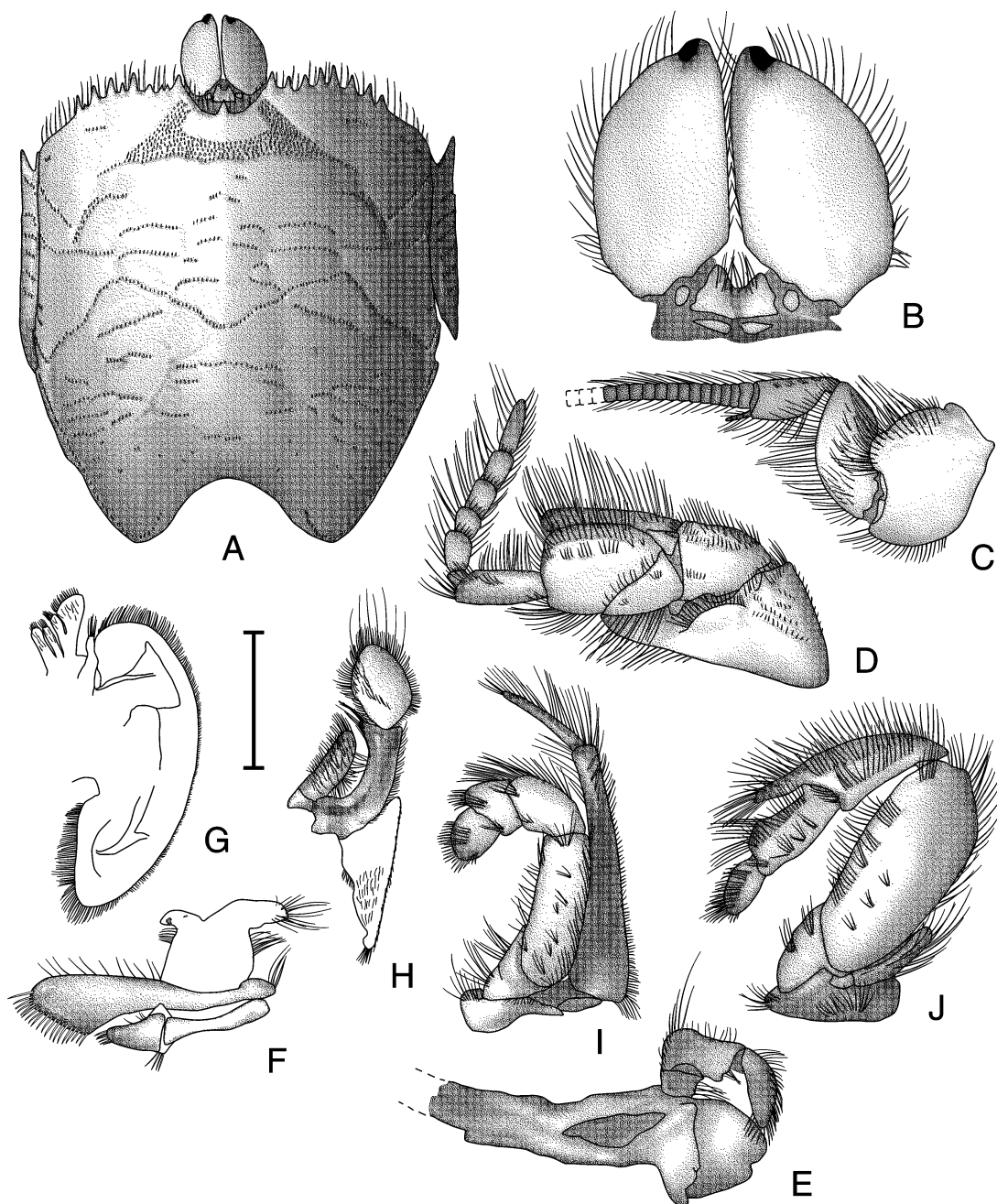


Fig. 85. *Albunea bulla*, n. sp.: A–J, ♀, 19.3 mm cl, AM P20456, paratype. **A.** Carapace, branchios-tegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible, mesial view. **F.** Left maxillule, lateral view. **G.** Left maxilla, lateral view. **H.** Left maxilliped I, lateral view. **I.** Left maxilliped II, lateral view. **J.** Left maxilliped III, lateral view. Scale = 2.2 mm (B), 3.0 mm (F), 3.3 mm (E, I), 4.4 mm (D, J), 6.0 mm (C), 6.7 mm (G, H), and 7.1 mm (A).

generally triangular, smooth; posterolateral margin with one or two oblique rows of short setae. Metagastric region smooth; CG5 present as two short, irregularly convex, transverse elements. CG6 strongly crenulate, strongly anteriorly concave medially, and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as one long medial element. CG9 present as two short lateral grooves with broad gap at midline. CG10 present as two short lateral elements. CG11 present as two or three short elements. Post-CG11 element absent. Branchial region with numerous short and long transverse rows of setae in anterior half. Posterior margin deeply and evenly convex, with submarginal groove reaching one-third up margin of posterior concavity. Branchiostegite with strong anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 85B) triangular with deep median indentation; median peduncular segments present as small ovate, calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with convex lateral and straight mesial margins, cornea covering lateral portion of distal tip; lateral margins with faint notch one-fourth distal from base; mesial margins approximated along length; lateral and mesial margins with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventromedial longitudinal row of plumose setae extending from tuft to three-fourths length of peduncle.

Antennule (fig. 85C) with segment III narrow proximally, expanding distally to three times proximal width; plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 67–77 articles ($n = 2$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with three or four articles ($n = 4$), plumose setae on dorsal and ventral margins. Segment II medially in-

flated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on mediolateral surface. Segment I wider than long, unarmed; dorsal quarter of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 85D) with segment V approximately 2.5 times longer than wide, with long plumose setae on dorsal and distal margins and scattered on lateral surface; flagellum with six articles ($n = 5$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and interrupted row of short setae on dorsolateral surface. Segment III with long plumose setae on ventral margin; short simple setae on dorsal margin and scattered on surface. Segment II short, widening distally, dorsally rugose, with plumose setae on margins and short simple setae scattered on lateral surface; antennal acicle long, thin, and reaching distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on dorsal and distoventral margins, and short simple setae on surface rugae behind spine; lateral surface with acute spine dorsodistally; low semicircular dorsolateral lobe ventrodistal to spine, margin of lobe with long plumose setae; segment with ventromesial antennal gland pore.

Mandible (fig. 85E) incisor process with two teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 85F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with five thick setae at distolateral margin and one thick seta in median of lobe.

Maxilla (fig. 85G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 85H) epipod with plu-

mose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments: proximal segment narrow, margins parallel, with long plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesiodorsal surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds of distance to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 85I) dactylus evenly rounded, length subequal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsodistal and ventrodistal angles. Carpus not produced dorso-distally, approximately two times longer than wide; long simple setae on dorsal margin and in patches on dorsodistal and ventrodistal angles. Merus approximately three times longer than wide, margins parallel; with long simple and plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with plumose setae on margins. Exopod 1.7 times longer than merus, flagellum with one elongate article, approximately as long as carpus.

Maxilliped III (fig. 85J) dactylus oblong with rounded tip; long plumose setae on margins and in medial row on lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface and three or four short patches of long plumose setae submarginally ventrally; dorsal margin with long plumose setae. Carpus produced onto propodus approximately two-thirds length of propodus; lateral surface with two transverse rows of long plumose setae; long plumose setae on dorsal and distal margins. Merus inflated, unarmed, with long plumose setae on margins and few scattered small patches on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of four teeth. Exopod two-segmented: proximal segment small; distal segment styliform, bluntly rounded distally, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 86A) dactylus curved and

tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into rounded projection, small dorsally directed acute spine on distodorsal mesial margin; dorsal margin with short transverse grooves behind distal projection; dorsal and distal margins with short plumose setae; lateral surface with small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, distal and mediodorsal margins with long plumose setae; mesial side with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 86B) dactylus smooth; base to heel faintly convex, heel low and rounded, subquadrate, heel to tip with broad, subacute indent, tip subacute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced, tapered distally, and rounded dorso-distally, dorsal margin smooth; lateral surface smooth, produced area smooth, irregular, interrupted row of rugae and submarginal

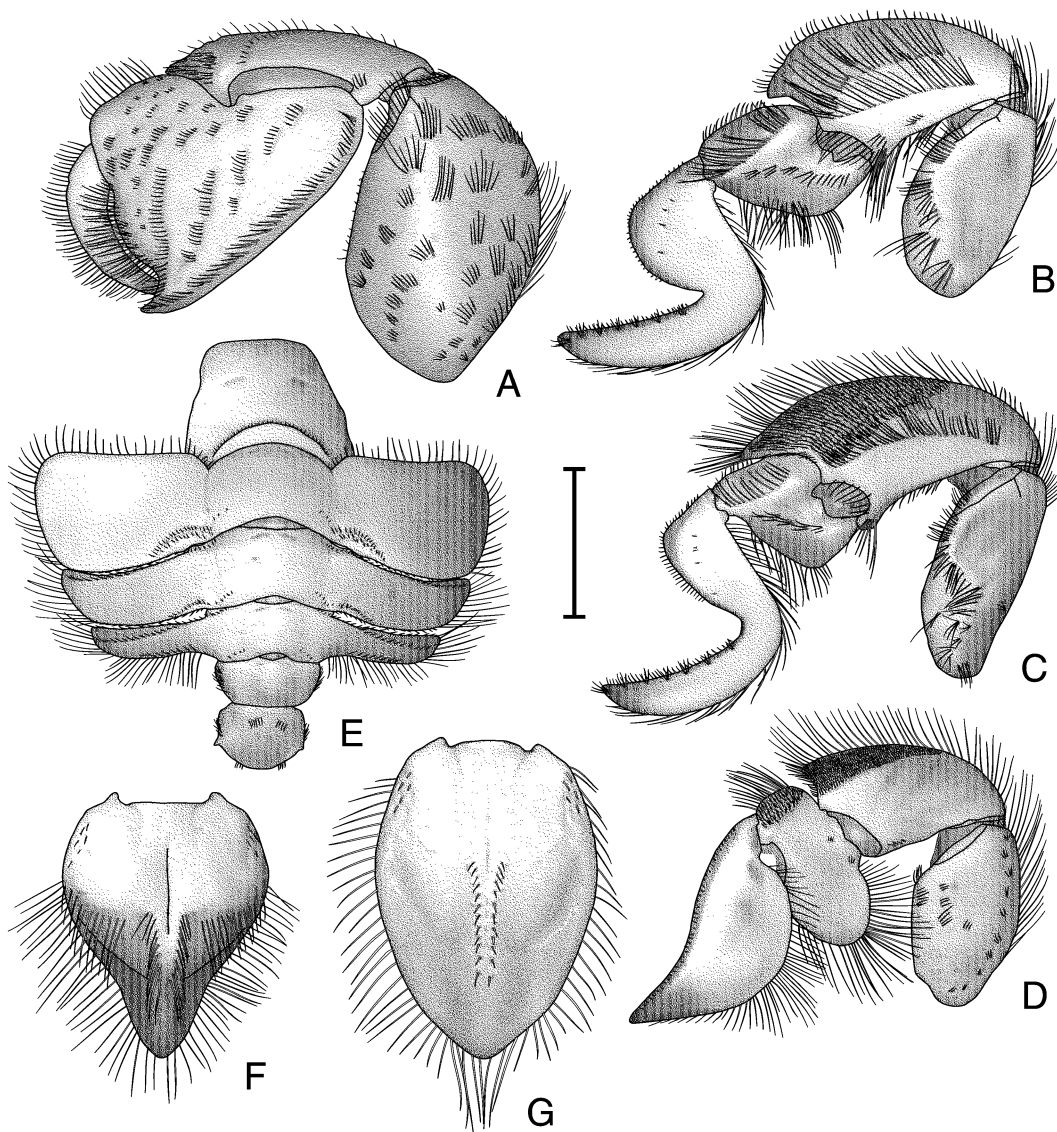


Fig. 86. *Albunea bulla*, n. sp.: A–E, G, ♀, 19.3 mm cl, AM P20456, paratype; F, ♂, 15.4 mm cl, AM P15353, holotype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.0 mm (F), 3.3 mm (G), and 6.0 mm (A–E).

elevated ridge ventrally, rugae and ridge with long plumose setae; dorsal margin with short plumose setae, ventral margin with long plumose setae; mesial surface smooth, with row of long plumose setae distally, ventrally, and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, long plumose setae on dorsodistal

and ventral margins, few scattered long plumose setae on surface; mesial surface nearly smooth with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 86C) dactylus with base to heel straight, heel low and subquadrate, heel to tip with broadly concave indent, tip

subacute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened, without setose mat; mesial surface smooth. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-half length of propodus; tip subacute, dorsal margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in short oblique row on distal surface. Merus smooth, narrow, and almost cylindrical, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, dorsodistal and ventral margins with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with small pore.

Pereopod IV (fig. 86D) dactylus with base to tip convex proximally, with indistinct heel and indent and almost straight from indent to tip, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion exceeding ventral margin of dactylus, ventral margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral surface smooth, mesial surface smooth, with distoventral area of few patches of long plumose setae. Carpus slightly produced dorsodistally;

ventral four-fifths of lateral surface and mesial surface smooth, dorsodistal one-fifth of lateral surface with mat of short simple setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially. Merus lateral surface with scattered short transverse rows of setae, dorsal margin with long plumose setae; proximoventral fourth of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 86E) somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with irregular, submarginal, transverse ridge anteriorly; with small, transverse, decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed laterally; anterolateral margins rounded, anterior and lateral margins with long plumose setae, posterolateral angle rounded, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter, anterior submarginal windows present; pleura thinner and shorter than on somite II, directed posterolaterally proximally and anterolaterally distally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally, with submarginal row of short setae. Somite IV similar to somite III, but thinner and shorter, anterior submarginal windows present; pleura thinner and shorter than on somite III, directed laterally; dorsal surface obliquely flattened anterolaterally; lateral and posterior margins with long plumose setae, anterior margin with short simple setae. Somite V wider than somite IV, anterior submarginal windows present; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V, anterior submarginal windows present; dorsal surface with two short transverse rows of setae laterad of midline and on posterior margin; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 86F) divided into a

subcircular (“buttonlike”) proximal two-thirds and mucronate tapering distal third; proximal two-thirds rounded, heavily calcified, dorsally inflated, with deep median groove and long plumose setae flanking distal third of groove to distal end of calcified region, proximolateral angles with few short simple setae, transverse row of long plumose setae present on either side of median groove approximately one-third proximal from distal margin of calcified region; distal third of telson weakly calcified, sharply tapering distally with produced tip; entire telson lined with long plumose setae on margins in distal two-thirds. Telson of female (fig. 86G) ovate, tapering slightly distally, tip slightly produced, dorsal surface evenly calcified; median groove present in medial two-thirds of dorsal surface, lined with short simple setae; proximolateral angle with few short simple setae, margins with long simple setae.

DISTRIBUTION: Known from Taiwan; Queensland, Australia; New Caledonia; and Fiji, in up to 29.3 m depth. Also provisionally from Pitcairn Island, in 47.6–54.9 m depth.

MAXIMUM SIZE: Males: 15.4 mm cl; females, 19.4 mm cl.

TYPE SPECIMENS: AM P15353 (holotype), AM P1925 (allotype), AM P20456 (paratype), NTOU (paratype), WAM 23387 (2 paratypes), ZMH K-5137 (paratype).

TYPE LOCALITY: Off Richmond River mouth, off Ballina, New South Wales, Australia, 28°52'S, 153°34'E, 16 m.

ETYMOLOGY: The specific name of this taxon is given for the distinctive buttonlike morphology of the telson of the males.

REMARKS: The Pitcairn specimen exists only as the carapace and anterior half of the animal with all appendages anterior to and including pereopod I. Given its poor condition, it is only provisionally referred to this species, although the characters of the extant structures are essentially identical. The single reference to an Easter Island albuneid (DiSalvo et al., 1988) may also be this taxon, as there are several crustacean species which are known from both Easter Island and Pitcairn Island (Boyko, in prep.). Despite repeated attempts to collect albuneids on Easter Island over a 3-week period in August 1999, I found no specimens.

This species belongs to the “*carabus*-group” of *Albunea* and is the sister taxon to the other two species in that group. The distinctive “buttonlike” morphology of the male telson separates it from both *A. carabus* and *A. danai*.

Albunea carabus (Linnaeus, 1758)

Figures 87, 88

Cancer Carabus Linnaeus, 1758: 632. – Linnaeus, 1767: 1052. – Houttuyn, 1769: 417. – de Villers, 1789: 156.

Cancer carabus: Statius Müller, 1775: 1126–1127. – Latreille, 1831: 56.—H. Milne Edwards, 1837a: 112.—H. Milne Edwards, 1840: 112. – Bolivar, 1875: 20–21.

Cancer (Pagurus) Carabus: Gmelin and Linné, 1790: 2984.

Cancer (Astacus) Carabus: Herbst, 1796: 67–68.

Albunea symnista [sic]: Rafinesque-Schmaltz, 1814: 20. – Lucas, 1849a: 27–28*. – Lucas, 1849b: pl. 3, fig. 2*. – Heller, 1863: 153 (part). – Barrois, 1888: 18–19, 75, 82, 89, 93–94. – Bolivar, 1892: 128 (list). – Ferrer Aledo, 1914: 68. – Miranda y Rivera, 1933a: 22. – Miranda y Rivera, 1933b: 1 (list). – Holthuis, 1954c: 34. – Holthuis, 1956: 228. – ICZN, 1958: 222 (not *Albunea symmista* (Linnaeus, 1758)).

cancer carabus: Lamarck, 1818: 224.

Albunea Guerinii Lucas, 1853: 45–47, pl. 1, fig. 9. – Bolivar, 1875: 20–21. – Carus, 1885: 496. – Rodriguez Femenias, 1887: 5. – de Buen, 1887: 425. – Bolivar, 1916: 251 (list). – de Buen, 1916: 359.

Albunaea [sic] *Guerini*: Stimpson, 1858: 230 (list).

Albunea sp. Larrinúa y Azcona, 1874: 46.

“*Albunea*?” Barceló y Combis, 1875: 63.

Albunea guerinii: Miers, 1878: 327–328. – Aharoni, 1937: 1136. – Aharoni, 1944: 41*.

Albunea carabus: Ortmann, 1896: 224 (list). – Ortmann, 1901: 1276. – Monod, 1933: 473 (part). – Gordon, 1938: 186, fig. 3b. – Bouvier, 1940: 179–181, figs. 132, 133. – Holthuis, 1954c: 34. – Piguet, 1955: 14. – Holthuis, 1956: 228. – Monod, 1956: 40–42, figs 10–14. – Holthuis and Gottlieb, 1958: 77, 116*. – ICZN, 1958: 222. – Figueira, 1960: 6. – Gauld, 1960: 66 (list). – Zariquiey Alvarez, 1961: 103–109, figs. 1–3. – Crosnier, 1967: 341*. – Pérès, 1967: 456. – Zariquiey Alvarez, 1968: 294–296, fig. 104. – Moncharmont, 1969: 434–439, figs. 1–3. – Rubió and Holthuis, 1976: 41–46*. – Kaestner, 1980: 336, fig. 13–26b. – Riedl, 1983: 488, pl. 179. – Beschin and De Angeli, 1984: 92, fig. 2. – Pretus, 1985–1989a: 258. – Pretus, 1985–1989b: fig. 92. – Coêlho and Calado,

1987: 42–43, table 1. – García Socias and Masuti Jaume, 1987: 79, 91 (list). – García Socias and Gracia, 1988: 55. – Seridji, 1988: 1293–1298, figs. 1–3. – Guillén Nieto, 1990: 165–167, fig. 64. – Brunet and Vicente, 1992: 168–169, figs. 1, 2. – García Raso et al., 1992: 131, 133, 258 (list). – Wirtz and Martins, 1993: 57–58. – Calado, 1995: 27–30, pl. 4, fig. a, pl. 5, fig. a, pl. 6, figs. a–f*. – González Pérez, 1995: 165, fig. 102. – Giacobbe and Spanò, 1996: 719–725, pl. 1. – Calado, 1997a: 17, 21–22. – Spanò et al., 1999: 617–620. – d’Udekem d’Acoz, 1999: 171. – Boyko, 1999: 161.

Albunea barbara (Lucas ms) Ortmann, 1896: 224 (list) (nomen nudum).

Albunea guerini: A. Milne Edwards and Bouvier, 1900: 275. – Ferrer y Galdiano, 1918: 413 (list).

Albunea symmista [sic]: Holthuis, 1954c: 34 (not *Albunea symmista* (Linnaeus, 1758)).

?*Albunea* sp. B Lebour, 1959: 129, fig. 15.

Albunea Carabus: Seridji, 1988: 1293, 1298.

Albunea aff. *carabus*: Fransen, 1991: 48, 77.

not *Hippa caerulea* Risso, 1816: 50–51. – Risso, 1827: 36–37 (= *Gnathia* sp. cf. *phalloniajopsis* Monod, 1925).

not *Hippa coerulea* [sic]: Risso, 1844: 94. – Hope, 1851: 12 (= *Gnathia* sp. cf. *phalloniajopsis* Monod, 1925).

not *Albunea guerinii*: Stebbing, 1914: 281 (= *Albunea gibbesii* Stimpson, 1859).

not *Albunea carabus*: Balss, 1916a: 37*. – Monod, 1933: 473 (part) (= *Albunea elegans* A. Milne Edwards and Bouvier, 1898).

not *Albunea guerinii*: Stebbing, 1917: 26 (= *Albunea* sp. indet.).

not *Albunea carabus*: Chace, 1966: 635 (= *Albunea gibbesii* Stimpson, 1859).

not *Albunea carabus*: Holthuis, 1977: 61–62 (= *Gnathia* sp. cf. *phalloniajopsis* Monod, 1925).

MATERIAL EXAMINED: Lebanon: Vicinity of Beirut, coll. M. E. Ericksen: 2 ♀, 16.3–16.6 mm cl (USNM 260973).

Israel: Nahr-Rubin, coll. unknown: 1 ♀, 14.7 mm cl (BMNH 1920.12.16.3); Haifa Bay, June 18, 1987, coll. unknown: 1 ♀, 16.5 mm cl (ZMTAU NS 24665).

Tunisia: Public beach, Raouad, Jan. 30, 1973, coll. J. Moncef and R. B. Manning: 1 ♂, 14.0 mm cl (USNM 256595).

Algeria: Between Lebon and Hussein, 36°44'N, 03°05'E, 2–7 m, June–July 1941, coll. H. Nouvel: 1 ♂, 4.4 mm cl (RMNH 34726); Oran, July 1881, coll. M. Deshayes on “Travailleur”: 2 ♂, 12.1–13.3 mm cl, 1 ♀, 18.6 mm cl (MNHN-Hi 10); Gulf of Oran, June 6, 1900, coll. P. Pallary: 1 ♀, 20.7

mm cl (MNHN-Hi 148); Cape Matifou, 1840–1842, M. Deshayes: 1 ♀, 15.5 mm cl, syntype of *A. guerinii* (MNHN-Hi 189); Cape Matifou, 1840–1842, coll. M. Deshayes: 1 ♂, 12.4 mm cl, syntype of *A. guerinii* (MNHN-Hi 190); Cape Matifou, 1840–1842, coll. M. Deshayes: 2 ♂, 13.5–16.0 mm cl, syntypes of *A. guerinii* (MNHN-Hi 9); Rade de Bône, 15–20 m, 1908, coll. E. Chevreux: 3 ♀, 13.9–18.1 mm cl (MNHN-Hi 1).

Spain: Off San Andres de Llanereras, near Arenys de Mar, Barcelona, 4–5 m, Aug. 8, 1973, coll. Tau-Tau: 1 ♂, 18.0 mm cl (RMNH 36273), 1 ♂, 19.5 mm cl (AMNH 18077 ex RMNH 36273); between San Pol de Mar and San Andres de Llanereras, near Arenys de Mar, Barcelona, 3–6 m, Nov. 22, 1972, March 1973, Aug. 3, 1973, coll. Tau-Tau: 1 ♂, 20.0 mm cl (RMNH 36274), 3 ♂, 19.1–21.0 mm cl (USNM 258373 ex RMNH 36274); between San Pol de Mar and San Andres de Llanereras, near Arenys de Mar, Barcelona, 3–6 m, Aug. 27, 1974, coll. Tau-Tau: 1 ♂, 20.3 mm cl (USNM 260867); Arenys de Mar, Barcelona, 3–7 m, June 11, 1971, coll. M. Rubio: 1 ♂, 18.6 mm cl (RMNH 28713); Canet de Mar, Barcelona, 5–7 m, June 23, 1972, coll. Tau-Tau: 1 ♂, 18.4 mm cl, 1 ♀, 23.5 mm cl (RMNH 28911); Canet de Mar, Barcelona, 5 m, Nov. 1972, coll. M. Rubio: 2 ♂, 18.1–19.2 mm cl (MNHN-Hi 85).

Portugal: Funchal Bay, Madeira, 10–15 m, March 31, 1958, coll. A. Figuera: 1 ♀, 17.7 mm cl (ZMUC 2712); Sta. 25, 36°59'N, 25°03'W, 10–18 m, May 28, 1981, coll. CANCAP V: 1 oviger, 10.0 mm cl, 1 juvenile, 4.0 mm cl (RMNH 36282).

Cape Verde: Sta. 7.068, west-southwest of Ilhéu Calheta do Visto, west of Boa Vista, 16°11'N, 22°59'W, 40 m, Aug. 27, 1986, coll. CANCAP: 1 ♀, 5.1 mm cl (RMNH 38605).

Ivory Coast: Sta. 17, Gulf of Guinée, 27 m, June 21, 1956, coll. “Calypso”: 8 ♂, 9.4–10.4 mm cl, 6 ♀, 8.3–10.5 mm cl (MNHN-Hi 111).

Ghana: Trawl 1, Agassil, coll. R. Bassindale: 1 ♀, 11.4 mm cl (BMNH 1957.12.4.1).

Togo: Côtes du Togo, 06°07'N, 01°34'E, 26 m, Oct. 5, 1963, coll. A. Crosnier: 1 ♂, 11.8 mm cl (MNHN-Hi 5). **Dahomey:** 06°16'N, 02°26'E, 22 M, Oct. 9, 1963, coll.

A. Crosnier: 1 unsexable, unmeasurable specimen (MNHN-Hi 2); 06°14'N, 02°26'E, 30 m, Oct. 9, 1963, coll. A. Crosnier: 1 ♀, 4.9 mm cl (MNHN-Hi 3); 06°09'20"N, 01°52'E, 35 m, Oct. 4, 1963, coll. A. Crosnier: 1 ♂, 11.2 mm cl (MNHN-Hi 4); 06°14'30"N, 01°48'E, 15 m, Oct. 4, 1963, coll. A. Crosnier: 1 juvenile, 3.3 mm cl (MNHN-Hi 6).

No Data: 4 ♂, 13.0–16.2 mm cl (MNHN-Hi 90); 3 ♂, 14.8–15.9 mm cl (MNHN-Hi 91).

DIAGNOSIS: Carapace wider than long, covered with lightly setose crenulate grooves. Anterior margin with 9–14 spines on either side of ocular sinus. Setal field with narrow lateral elements and straight anterior margin. CG1 with separate posterior lateral elements; CG4 with two short and two long medial elements between longer supralateral elements of CG4; CG5 present as two curved, oblique elements; CG6 and CG7 separate; CG8 broken; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular in shape, tapering at tip, approximated along mesial margins at base, lateral margins broadly convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced, subquadrate and rounded. Dactylus of pereopod III with heel produced, subquadrate and rounded. Dactylus of pereopod IV sinuous from base to tip, with low rounded heel and shallow indent. Telson of male broadly triangular, as long as wide, with broadly rounded tip; thickly calcified in proximal third and medial strip, inflated dorsally; distolateral two-thirds decalcified, median and transverse rows of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly truncate tip.

DESCRIPTION: Carapace (fig. 87A) wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 9–14 large spines ($n = 6$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave, with few small spinules. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior mar-

gin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 absent; CG3 broken into five to eight short elements between posterior lateral elements of CG1; CG4 with two short and two long medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin without rows of setae. Metagastric region smooth; CG5 present as two curved, oblique elements. CG6 strongly crenulate, strongly anteriorly concave medially, and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two short medial elements. CG9 present as two short elements with wide gap at midline. CG10 present as two long elements. CG11 present as two short elements. Post-CG11 element absent. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching halfway up margin of posterior concavity. Branchios-tegite with short anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 87B) triangular with deep median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with convex lateral and straight mesial margins, cornea covering lateral three-fourths of distal tip; lateral margins with notch just proximal to cornea; mesial margins approximated along length; mesial and lateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventromedial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 87C) with segment III narrow proximally, expanding distally to twice proximal width; with plumose setae on dor-

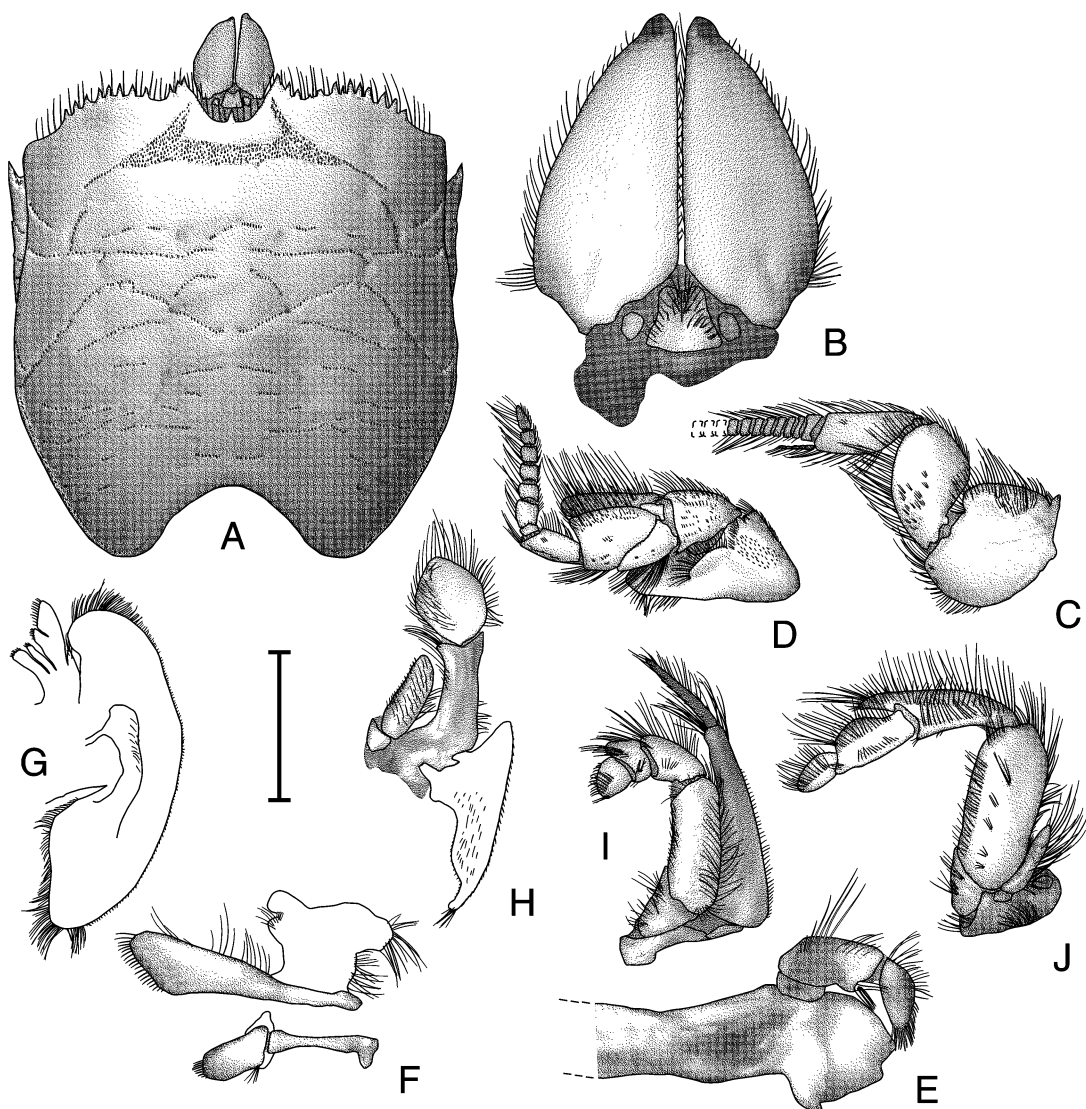


Fig. 87. *Albunea carabus* (Linnaeus, 1758): A, ♂, 21.0 mm cl, USNM 258373; B–J, ♂, 19.1 mm cl, USNM 258373. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 2.2 mm (B), 3.3 mm (E, F), 4.4 mm (I), 6.7 mm (C, D, G, H, J), and 8.5 mm (A).

sal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 86–108 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with three to five articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on

dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 87D) with segment V approximately two times longer than wide, with long plumose setae on dorsal and ventral

margins and scattered on lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of setae on dorsolateral surface. Segment III with long plumose setae on ventral margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and reaching to distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and scattered on surface rugae behind spine; lateral surface with acute spine dorsodistally (occasionally two spines), with low semicircular dorsolateral lobe ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 87E) incisor process with two teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 87F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 87G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 87H) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments: proximal segment narrow, margins parallel with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds of distance to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 87I) dactylus evenly

rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin and in short row on lateral surface. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-third longer than merus, flagellum with one elongate article, longer than carpus.

Maxilliped III (fig. 87J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-half length of propodus; lateral surface with two rows of plumose setae; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, without crista dentata. Exopod two-segmented: proximal segment small; distal segment styiform, tapering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 88A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with few rugae proximally and long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with short plumose setae; lateral surface with small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth, with medial trans-

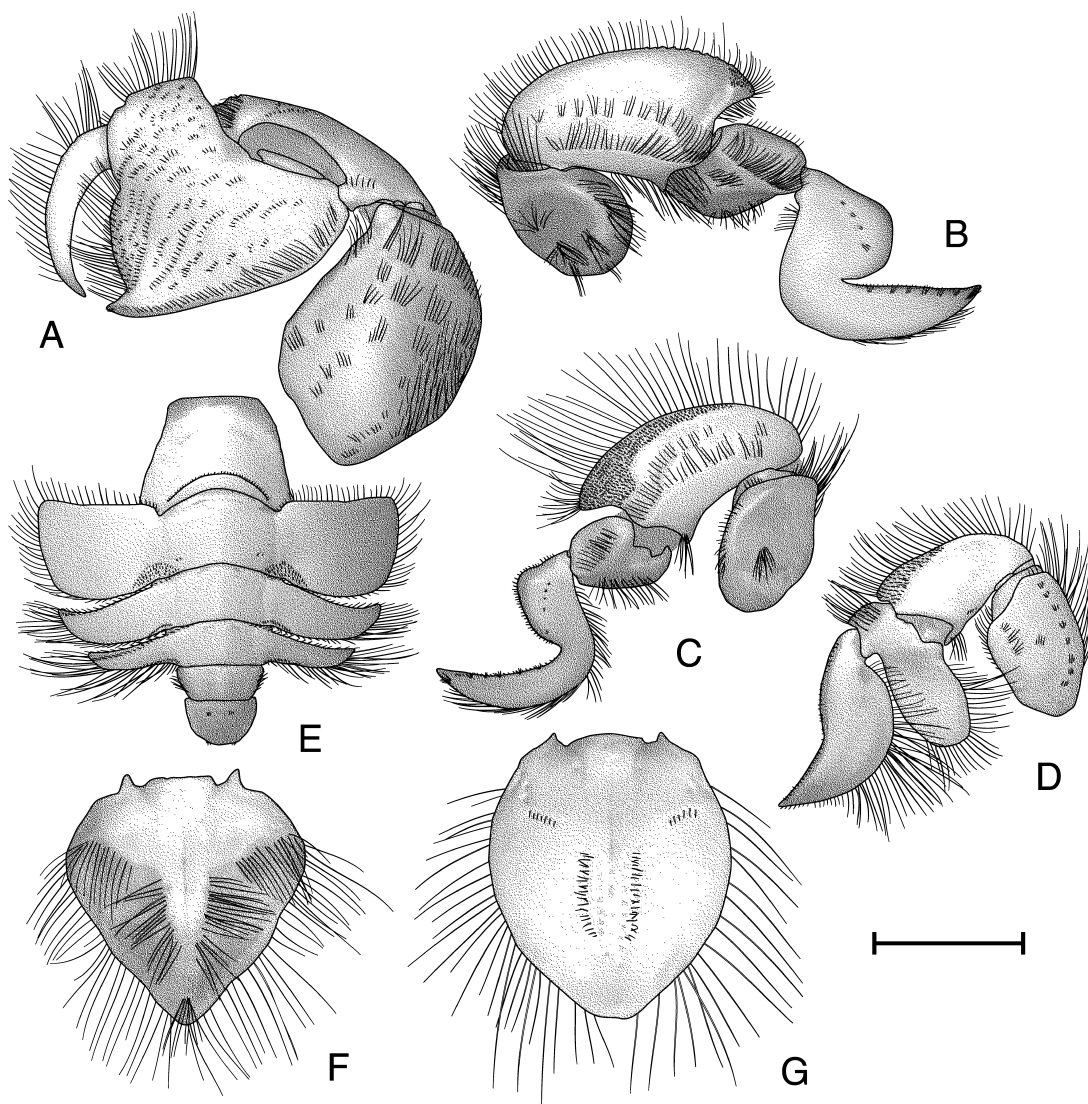


Fig. 88. *Albunea carabus* (Linnaeus, 1758): A, B, F, ♂, 19.1 mm cl, USNM 258373; C, D, ♂, 21.0 mm cl, USNM 258373; E, ♂, 19.1 mm cl, USNM 258373; G, ♀, 23.5 mm cl, RMNH 28911. **A.** Left pereopod I, lateral view. **B.** Right pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.3 mm (F, G), 6.7 mm (A, B), and 8.4 mm (C–E).

verse and subdorsal row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial side with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 88B) dactylus smooth; base to heel slightly concave, heel rounded

and not produced, heel to tip with narrow, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in roughly straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with

patch of long plumose setae at base. Propodal dorsal surface smooth, ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and rounded dorsodistally, dorsal margin smooth proximally, serrate distally; lateral surface smooth, with small setose mat at tip of produced area and irregular, broken row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth with row of long plumose setae distally, ventrally, and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered long plumose setae on surface and margins; mesial surface nearly smooth with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 88C) dactylus with base to heel slightly concave, heel rounded and not produced, heel to tip with broadly concave indent, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in roughly straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin; dorsolateral surface narrow, oblique, flattened; mesial surface smooth. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-half length of propodus; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in row on distal half of surface. Merus smooth, with

large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 88D) dactylus with base to tip convex proximally, concave distally, with shallow indent, tip acute, tip to base convex; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area smooth; lateral and mesial surfaces smooth. Carpus slightly produced dorsodistally; ventral three-fourths of lateral surface and mesial surface smooth, with few scattered setae, dorsodistal quarter of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially. Merus lateral surface with scattered short transverse rows of setae, dorsal and ventrodorsal margins with long plumose setae; proximoven-tral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 88E) with somite I length and width subequal, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; lateral margins angled, anterior and lateral margins with long plumose setae, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III

similar to somite II, but narrower, shorter; pleura thinner and shorter than on somite II, directed posterolaterally but with distal tips swept forward, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few short setae anterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally with distal tips slightly swept forward; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V; dorsal surface and distal margin with short transverse rows of setae laterad of midline; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods. Telson of male (fig. 88F) broadly triangular, as long as wide, with broadly rounded tip; thickly calcified in proximal third and medial strip, inflated dorsally; distolateral two-thirds decalcified; median longitudinal groove extending one-half length, rows of long simple setae demarcating juncture of calcified and decalcified regions and in tuft at distal end; proximolateral angles without setae; margins with long simple setae. Telson of female (fig. 88G) flattened, ovate, and evenly calcified with slightly truncate tip; median groove similar to male, row of short simple setae on either side of median groove from midpoint of telson continuing distally to three-fourths length of telson and in short transverse submarginal lateral rows approximately one-fourth distal from proximal margin; proximolateral angle without setae, margins with long simple setae.

DISTRIBUTION: From Lebanon westward through the Mediterranean and from the Azores and Madeira southward to Dahomey, in up to 40 m depth.

MAXIMUM SIZE: Males: 21.0 mm cl; females: 23.5 mm cl.

TYPE SPECIMENS: The type(s) of *Cancer carabus* are lost. MNHN-Hi 189 (syntype of *A. guerinii*), MNHN-Hi 190 (syntype of *A. guerinii*), MNHN-Hi 9 (2 syntypes of *A. guerinii*). Lucas (1849a, 1853) cited 16 total specimens (= syntypes) of *A. guerinii*. Only four specimens in the MNHN are labeled as

syntypes and possess the correct data. It may be that MNHN-Hi 90 and MNHN-Hi 91 are also syntypes of *A. guerinii*, but they have no data associated with them that would confirm this.

TYPE LOCALITIES: *Cancer carabus*: “M. Mediterraneo” (Linnaeus, 1758). As pointed out by Rubi  and Holthuis (1976), the collector of the type(s), Erik Brander, was stationed in Algeria, and this is probably where the type(s) came from, although it cannot be considered the type locality in the absence of a primary type specimen. *Albunea guerinii*: Algeria.

REMARKS: At least part of the difficulty early authors had in identifying this taxon as an *Albunea* was caused by Linnaeus’ (1758) placement of the species within *Cancer*. *Cancer Carabus* (Linnaean no. 48) was separated by eight intervening taxa from *Cancer Symmysta* (Linnaean no. 39), the only other albuneid described by Linnaeus (1758). These eight intermediate taxa were an assortment of anomurans, crayfish, and shrimp which, by themselves, offered no clue as to the relationships of *carabus* and *symmysta*. By 1767, Linnaeus had moved the two taxa closer together, to no. 68 and no. 70 on his list, and separated them by a galatheid. The “rostrum dentibus 2 parallelis mobilibus depressis” described by Linnaeus (1758) for this species is actually the ocular peduncles rather than the rostrum. This was probably the key morphological feature that caused confusion as to what sort of crustacean Linnaeus was referring to (Miers, 1878). Linnaeus (1758) cited this species as “Testa magnitudine extimi pollicis” (as long as the last joint of the thumb), and this has been extrapolated to a carapace length of approximately 17 mm (Rubi  and Holthuis, 1976), although larger specimens are known. Calado (1995) erroneously cited BMNH 1920.12.16.3 as the “hol tipo.” No Linnaean material of this species exists, no neotype has ever been designated, and no neotype is needed, as this species is the only albuneid in the Mediterranean and is only distantly related to the other albuneid species in the east Atlantic. The species has been called “Leeuw-Krab” (Houttuyn, 1769), “Kahn Krabbe” (Statius M ller, 1775), and “L w-

enkrebs" (Herbst, 1796), but no general common name has been adopted.

Lucas (1853), in describing *A. guerinii*, was the first to recognize and discuss the sexual dimorphism in telson shape within the genus. Zariquiey Alvarez's (1961: fig. 1) illustration of this species is one of the most accurate drawings published for any albuneid before 1999 (fig. 1C, herein), and his illustrations of the male and female telsons are another rare example of recognition of the sexual dimorphism present in this genus.

Brunet and Vicente (1992) incorrectly cited Monod as the first author to unequivocally assign this taxon to *Albunea*; that assignation was first indicated by Ortmann (1896). Ortmann (1896) also introduced the manuscript name "*Albunea barbara* Lucas" in synonymy with *A. carabus*. That name is both a nomen nudum and an unavailable name. The specimen cited from ANSP by Ortmann (1896) and identified as *A. barbara* Lucas is not extant (Boyko, personal obs.).

Holthuis's (1977) placement of *Hippa caerulea* Risso in synonymy with *A. carabus* is incorrect, as *Hippa caerulea* is actually a gnathiid isopod (see appendix 2).

Although there are repeated statements in the literature that this species is "muy raro" (Zariquiey Alvarez, 1968; Brunet and Vicente, 1992), it is likely more common in its preferred sand bottom habitats than current data suggest. The apparent rarity of this species in the eastern basin of the Mediterranean is likely due to limited collecting efforts rather than to unspecified "ecological factors" (see Spanò et al., 1999). The species is also probably more widely distributed in the eastern basin than current data indicate. In fact, *A. carabus* is occasionally washed ashore in large numbers, possibly due to mortality from freshwater runoff (Piguet, 1955). This is apparently the only species of albuneid in the Azores, but is only known from a few specimens from that location (Figueira, 1960).

Seridji (1988) described zoeal stages I, II, and III from plankton collected off Algeria. Seridji (1988) speculated that *A. carabus* might have the same number of zoeal stages (five) as *A. symmysta*, but as these two species are not particularly closely related and larval development in the genus is overall

poorly known, this seems a premature conclusion. The west African larvae reported by Lebour (1959) as "*Albunea* sp. B" resemble the early (stage II or III) zoeae of *A. carabus* in the shape of the posterior telson margin. The coloration of adults is: carapace dark purple with brownish areas, dorsal regions of pereopods and abdomen purple, antennular flagellae ringed with purple and yellowish brown (Rubió and Holthuis, 1976).

This species typifies the "*carabus*-group" of *Albunea*, which also includes *A. danai* and *A. bulla*. It is the sister species to *A. danai*.

Albunea asymmetrica (P. Müller, 1979)

Figure 89

Mioranina asymmetrica P. Müller, 1979: 278–279, pls. 9, 10*.

Albunea asymmetrica: P. Müller, 1984: 62, pl. 28, figs. 4–6*.

MATERIAL EXAMINED: **Hungary:** MGy–2–1, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 1 carapace fragment, 10.5 × 13.6 mm (l × w), holotype (plaster cast of HNHM); MGy–2–2, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 1 carapace fragment, 13.8 × 12.2 mm (l × w), paratype (plaster cast of HNHM; pl. 9, fig. 3 in P. Müller, 1979); MGy–2–2, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 1? merus, 13.0 × 8.0 mm (l × w), paratype (plaster cast of HNHM; pl. 9, fig. 2 in P. Müller, 1979); MGy–2–2, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 1 carapace fragment, 12.5 × 9.5 mm (l × w), paratype (plaster cast of HNHM; pl. 10, fig. 2 in P. Müller, 1979); MGy–2, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 1 carapace fragment, 20.2 × 10.1 mm (l × w), paratype (latex cast of HNHM; pl. 10, fig. 1 in P. Müller, 1979); MGy–2, Upper Badenian, Budapest, Gyakorlót, coll. P. Müller: 6 fragments (HNHM); MR8–16, Upper Badenian, Budapest-Rákos, Layer 8, coll. P. Müller: 2 fragments, 9.5 × 9.8 mm, 7.5 × 8.0 mm (l × w) (HNHM).

DIAGNOSIS: Carapace as long as wide, covered with crenulate grooves. Anterior margin with 10 spines on either side of ocular sinus. Setal field with thin lateral elements and straight anterior margin. CG1 with separate posterior lateral elements; CG4 with two

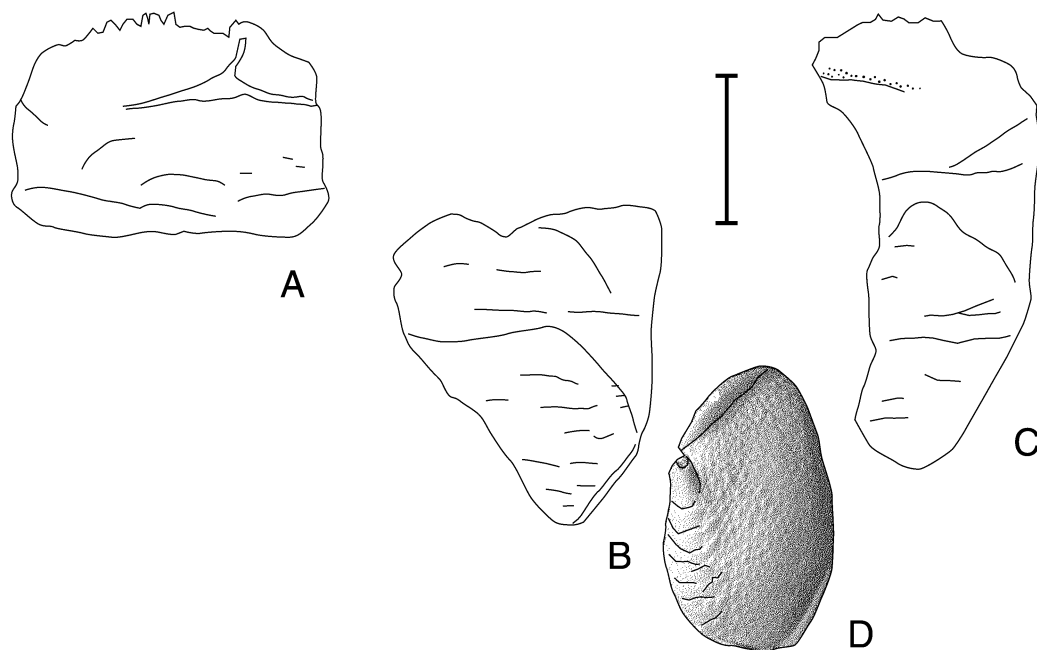


Fig. 89. *Albunea asymmetrica* (Müller, 1979): **A**. Anterolateral left quarter of carapace, 10.5×13.6 mm ($l \times w$), HNHN MGy-2-1, holotype. **B**. Posterolateral right quarter of carapace, 13.8×12.2 mm ($l \times w$), HNHN, paratype. **C**. Right half of carapace, 20.2×10.1 mm ($l \times w$), HNHN MGy-2, paratype. **D**. Anterior section of right branchiostegite, 12.5×9.5 mm ($l \times w$), HNHN. Scale = 6.7 mm (B–D) and 7.2 mm (A).

long medial elements between longer supralateral elements of CG4; CG5 unknown; CG6 and CG7 fused; CG8 unknown; CG11 unknown. Rostrum present.

DESCRIPTION: Carapace (fig. 89A–C) approximately as wide as long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally with 10 large spines ($n = 1$) along length. Rostrum as small acute tooth. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field narrow anteriorly and widening posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 presence unknown; CG3 present but composition unknown; CG4 with two long medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally

triangular, smooth. Metagastric region smooth; CG5 presence unknown. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region unknown; CG8 unknown. CG9 unknown. CG10 unknown. CG11 unknown. Branchial region with numerous short, transverse rows of setae. Branchiostegite (fig. 89D) with short anterior submarginal spine; anterior region with scattered rugae.

Pereopod I subchelate. Dactylus unknown. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed.

DISTRIBUTION: Known only from the Upper Badenian formation, Budapest, Hungary.

TYPE SPECIMENS: HNHN MGy-2-1 (holotype), HNHN MGy-2-2 (8 paratypes).

TYPE LOCALITY: MGy-2-1, Upper Badenian, Budapest, Gyakorlótűz, Hungary.

REMARKS: The species was first described

as the type of the “raninid” genus *Mioranina* P. Müller, 1979, illustrating once again the convergent morphology between raninids and albuneids. None of the material of this taxon is well preserved, especially when compared to other known albuneid fossils (e.g., Beschin and De Angeli, 1984). This material is quite similar to *A. carabus* in its carapace grooves, shortness of branchiostegite spine, and proportions of length and width. The number and size of the anterior carapace margin spines of *A. asymmetrica* are not appreciably different from *A. carabus*, contrary to the statements of P. Müller (1984). The relatively recent age (15 mybp, Tertiary: Miocene) of this fossil material also suggests that it may be conspecific with an extant taxon. Additional better preserved material is needed to determine if *A. asymmetrica* and *A. carabus* are synonymous or closely related species.

Albunea danai Boyko, 1999

Figures 90, 91

Albunea danai Boyko, 1999: 145 (list), 155–161, figs. 5, 6*.

MATERIAL EXAMINED: **USA: Hawaii:** Halonu Blow Hole dive site, south shore, Oahu, 12.2–13.7 m, April 4, 1997, coll. R. Holcom: 1 ♂, 16.7 mm cl, holotype (QM W23105); Kailua, Oahu, March 1938, coll. unknown: 1 ♀, 16.8 mm cl, allotype (BPBM S11782); off Eaa Beach, near Pearl Harbour, 15 fms (= 27.4 m), July 5, 1964, coll. B. R. Wilson on “Pele”: 1 ♀, 10.8 mm cl, paratype (WAM 10422); off Waikiki, Oahu, 20 ft (= 6.1 m), May 30, 1948, coll. Allen and V. Smith: 1 ♀, 10.8 mm cl, paratype (AMNH 17716 ex BPBM S5348); off Sand Island, Oahu, 16–25 fms (= 29.3–45.7 m), July 17, 1959, coll. Pele Expedition: 1 ♂, 10.4 mm cl, paratype (AMNH 17717 ex BPBM S6776); off Honolulu, 15–22 fms (= 27.4–40.2 m), Feb.–March 1962, coll. T. Richert: 1 ♂, 16.4 mm cl, 1 ♀, 15.5 mm cl, paratypes (WAM 23390); Waikiki, Oahu, 75 ft (= 22.7 m), May 23, 1948, coll. Smith and Allen: 1 ♂, 11.6 mm cl, paratype (BPBM S5343); Kahana Bay, Oahu, 25–30 fms (= 45.7–54.9 m), July 25, 1959, coll. Pele Expedition: 1 ♂, 8.6 mm cl, paratype (BPBM S6775); Diamond Head, Oahu, 25–45 fms (= 45.7–82.3

m), Sept. 9, 1959, coll. Pele Expedition: 1 ♀, 13.0 mm cl, paratype (BPBM S6777); Kaneohe Bay, Oahu, 1924, coll. unknown: 1 ♂, 4.0 mm cl (BPBM S7806).

DIAGNOSIS: Carapace slightly longer than wide, covered with lightly setose grooves. Anterior margin with eight or nine spines. Setal field with narrow lateral elements and slightly concave anterior margin; posterior lateral elements not extending to posterior lateral elements of CG1. CG1 with separate posterior lateral elements; CG4 with two to four short medial elements; CG5 divided into two lateral elements, not nearly reaching margins of CG6; CG6 and CG7 separate, but almost approximate; CG8 with one or two posteriorly displaced median elements separated from lateral elements; CG11 absent. Rostrum present, not reaching proximal margin of ocular plate. Ocular plate subquadrate. Distal peduncular segments dorsoventrally flattened and elongate, pointed at tip, approximate along mesial margins; lateral margins convex; mesial margins straight proximally, convex distally. Cornea at lateral margin of tip. Antennule with 87–92 flagellar exopodal and three or four endopodal articles. Antenna with seven flagellar articles; acute spine on dorsolateral surface of peduncle segment I. Dactyli of pereopods II and III with heels low and smoothly rounded. Coxa of pereopod III of males with small pore. Telson of male triangular, dorsoventrally flattened laterally and distally, inflated medially. Telson of female flattened, rounded at tip.

DESCRIPTION: Carapace (fig. 90A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally with eight or nine large spines along length. Rostrum as small acute tooth, extending only one-half of the distance between distal margin of the ocular sinus and ocular plate. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field broad posteriorly, narrowing anteriorly, with narrow anterior lateral elements and slightly concave anterior margin; posterior lateral elements thin and not reaching to posterior lateral elements of CG1. CG1 parallel to anterior margin of carapace, faintly sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric re-

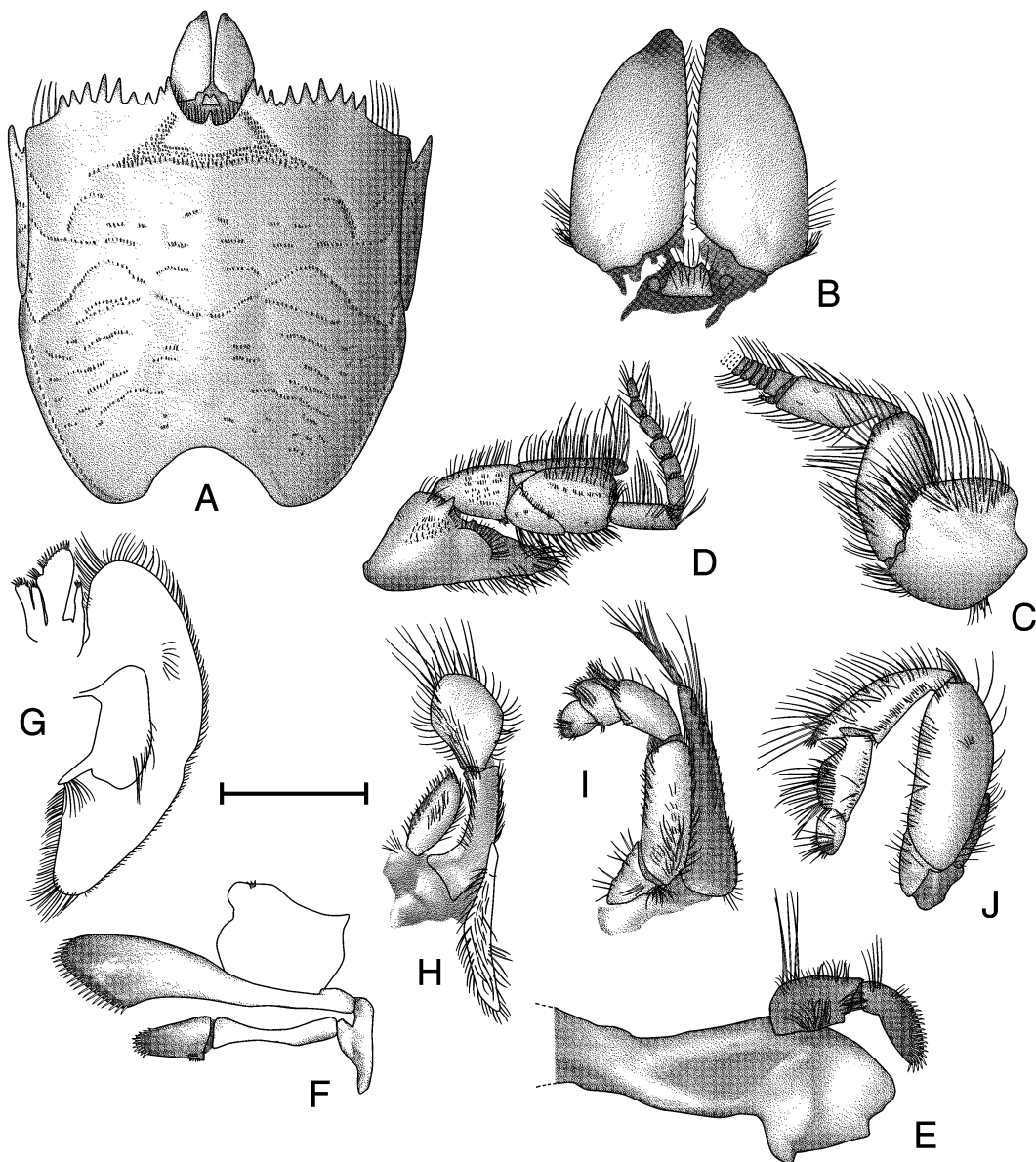


Fig. 90. *Albunea danai* Boyko, 1999: A, ♂, 16.7 mm cl, QM W23105, holotype; B–F, H–J, oviger, 10.8 mm cl, WAM 10422, paratype; G, ♂ 11.6 mm cl, BPBM S5343, paratype. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Right antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 1.2 mm (C, D, G, H, J), 1.6 mm (B, E, F), 2.2 mm (I), and 6.7 mm (A).

gion smooth; CG2 absent; CG3 broken into six short elements approximately equally spaced between posterior lateral elements of CG1; CG4 with two to four short medial el-

ements spaced approximately equally between longer lateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibran-

chial region generally triangular, smooth; posterolateral margin with two short rows of setae. Metagastric region smooth; CG5 divided into two short lateral elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. Cervical groove strongly concave at median and sloping out to irregularly convex lateral thirds; median and lateral thirds separated by short setae-free gap lateral to small depressions. CG7 oblique, almost reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two very short lateromedial elements displaced posteriorly from longer lateral elements. CG9 present as two short lateral grooves with gap at midline. CG10 present as two curved lateral fragments with gap between fragments approximately equal to length of single fragment. CG11 absent. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching approximately halfway up either side of posterior concavity. Branchiostegite with short anterior submarginal; anterior region with scattered, short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 90B) subquadrate with median indentation; median peduncular segments reduced to small rounded calcified area on either side of ocular plate. Distal peduncular segments elongate, with distally convex lateral margins, tapering to rounded distal cornea located in lateral notch; mesial margins approximated almost all of length; mesial and proximolateral margins of segment with sparse row of long plumose setae; tuft of plumose setae at proximolateral ventral angle.

Antennule (fig. 90C) with segment III narrow proximally, expanding distally to two times proximal width; with plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 87–92 articles, long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with three or four

articles and plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 90D) with segment V approximately two times longer than wide, with long plumose setae on dorsal margin and scattered on distal half of lateral surface; flagellum with seven articles, long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins and two rows of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin. Segment II short, widening distally, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin and exceeding distal margin of segment IV by one-fourth of length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally with long plumose setae on margins; lateral surface with acute spine dorsally, with low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 90E) incisor process with one tooth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment.

Maxillule (fig. 90F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced, with three thick setae at distolateral margin.

Maxilla (fig. 90G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 90H) epipod with plumose setae on margins, distolateral surface, and mesial surface (epipod shown curled). Endite tapered distally and subequal to first segment of exopod. Exopod with two seg-

ments; proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, approximately as long as wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 90I) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and long simple setae on dorsodistal margin. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal and distal margins. Merus approximately three times longer than wide, margins parallel; with simple setae on ventrolateral margin and plumose setae on dorsolateral margin. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-third longer than merus, with flagellum one-segmented. Maxilliped III (fig. 90J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus slightly produced onto propodus; lateral surface with row of plumose setae ventromedially; plumose setae on margins. Merus unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of approximately two teeth. Exopod two-segmented: proximal segment small; distal segment styliform, tapering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 91A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin

otherwise unarmed; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth, with few median rows of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial side with few short rows of setae; proximal quarter of mesial surface with decalcified window. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 91B) dactylus smooth; base to heel straight, heel smoothly rounded, heel to tip with wide, acute indent, tip acute, tip to base broadly convex distally and concave proximally; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margin with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus; decalcified region just distal to junction with carpus. Carpus slightly produced and gently rounded dorsodistally, dorsal margin unarmed; lateral surface smooth, with irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth, with long plumose setae in scattered patches on dorsal half of surface and on margins. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered setae on surface and margins; mesial surface nearly smooth, with few setae, decalcified area on proximal quarter near junction with basis-ischium. Basis-ischium incompletely fused and unarmed.

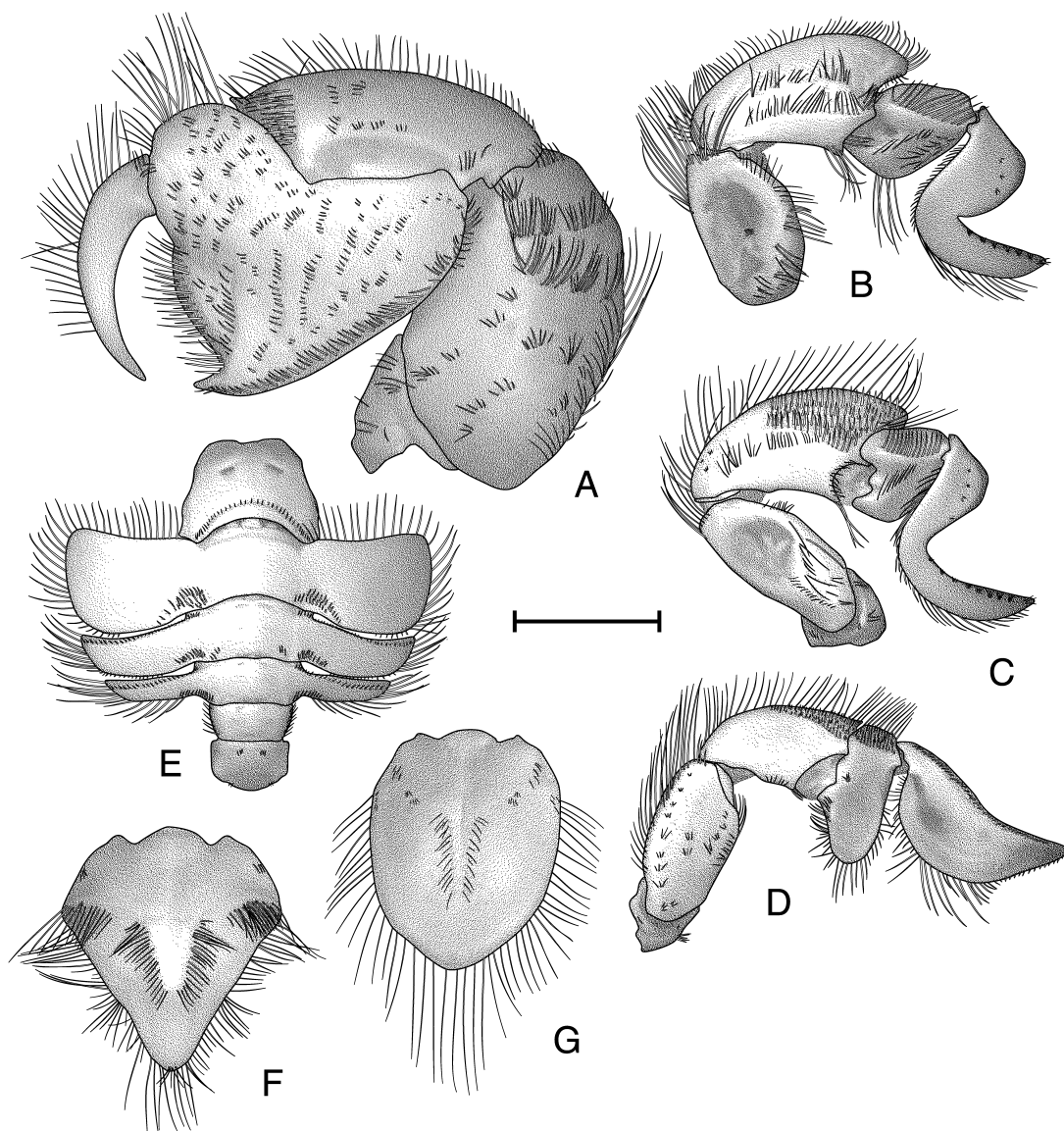


Fig. 91. *Albunea danai* Boyko, 1999: A, F, ♂, 16.7 mm cl, QM W23105, holotype; B–E, ♂, 11.6 mm cl, BPBM S5343, paratype; G, ♀, 16.8 mm cl, BPBM S11782, allotype. A. Left pereopod I, lateral view. B. Right pereopod II, lateral view. C. Right pereopod III, lateral view. D. Right pereopod IV, lateral view. E. Abdominal somites I–VI, dorsal view. F. Telson of ♂, dorsal view. G. Telson of ♀, dorsal view. Scale = 3.0 mm (F, G) and 4.4 mm (A–E).

Coxa with one small spine on anterior margin.

Pereopod III (fig. 91C) dactylus with base to heel straight, heel broadly rounded and low, heel to tip with broadly concave indent, tip acute, tip to base smoothly convex distally to straight proximally; lateral surface

smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at

junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae distally, simple setae on dorsal margins; dorsolateral surface narrow, oblique, flattened; mesial surface with scattered long setae on and near distal margin, with decalcified window near junction with carpus. Carpus produced dorsodistally, exceeding proximal margin of propodus by approximately one-third length of propodus, rounded; dorsolateral margin unarmed; lateral surface slightly rugose dorso-distally, with mat of short setae and row of setae ventrally; mesial surface smooth, with long plumose setae on margins and scattered on surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; latero-distal margin with long plumose setae; mesial surface smooth, with decalcified window at junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa with tubercle on anterior margin. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with small pore.

Pereopod IV (fig. 91D) dactylus with base to tip convex to concave, tip acute, tip to base straight distally, becoming convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion exceeds ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae medially; lateral and mesial surfaces smooth. Carpus not produced dorsodistally; ventral three-fourths of lateral surface and mesial surface smooth, dorsal fourth of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae. Merus with scattered, short, transverse rows of setae on lateral surface, dorsal and ventrodistal margins with long plumose setae; mesial surface with large decalcified window proximoventrally. Basis-

ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 91E) with somite I approximately as long as wide, widest posteriorly; dorsal surface with anterior margin straight; posterior margin straight with elevated submarginal row of short setae; with small transverse, decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; with tuft of setae at posterolateral angle, extending onto pleura posteromesially; pleura expanded and directed slightly anteriorly; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae. Somite III similar to somite II, but narrower, shorter, and lacking anterior submarginal ridge; small tuft of short thick setae on posterolateral angle; pleura thinner and shorter than on somite II, directed posterolaterally, with setae as in somite II; anterolateral angle acute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few thick setae posterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI subequal to somite V in length but wider; dorsal surface with short transverse rows of setae laterad of midline anteriorly and posteriorly; lateral margins with long plumose setae; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 91F) triangular, slightly longer than wide, with smoothly rounded tip; proximal half heavily calcified, distal half weakly calcified except for large median region; median longitudinal groove extending to distal end of calcified area, line with long, thin, simple setae; junction of proximal and distal regions demarcated by strong line of long setae laterally; calcified plate slightly elevated medially but without ridge. Telson of female (fig. 91G) ovate, longer than wide, rounded distally; dorsal surface smooth, with median longitudinal groove anteriorly; with

row of setose punctae lateral to midline from posterior end of longitudinal groove to three-fourths of length of telson; margins with long plumose setae.

DISTRIBUTION: Known only from Oahu, Hawaii, USA, 4.8–40.2 m depth.

MAXIMUM SIZE: Males: 16.7 mm cl; females: 16.8 mm cl.

TYPE SPECIMENS: QM W23105 (holotype), BPBM S11782 (allotype), WAM 10422 (paratype), AMNH 17716 (paratype), AMNH 17717 (paratype), WAM 23390 (2 paratypes), BPBM S5343 (paratype), BPBM S6775 (paratype), BPBM S6777 (paratype).

TYPE LOCALITY: Halonu Blow Hole dive site, south shore, Oahu, Hawaii, USA, 12.2–13.7 m.

REMARKS: The coloration of this species is brownish with reddish-brown setae in life (from color transparencies), and a uniform off-white to tan in preservative.

Based on all available data, this species appears to be a true Hawaiian endemic. However, this conclusion should be accepted cautiously, given the “endemic” label applied to *A. speciosa* prior to the findings of Boyko (1999). The holotype of *A. danai* was collected with specimens of *A. speciosa* (QM W22285) and the two species are sympatric in Hawaii in at least part of their bathymetric ranges.

This species belongs to the “*carabus*-group” and is the sister species to *A. carabus*, from the Mediterranean and western Africa, and shares with it a similar shape of the dactyli of pereopods II–IV and telson morphology. *Albunea carabus* can be easily separated from *A. danai* by its CG8 of four medial elements, more strongly crenulated CGs, more pronounced heel on the dactyli of pereopods II and III, and a less inflated merus of maxilliped III. *Albunea danai* can be distinguished from other Indo-West Pacific species, except *A. bulla*, by the triangular shape of the telson of the male, the rounded dactylus of pereopod III, and setal patterns on the carapace of both sexes. *Albunea danai* can be separated from *A. bulla*, which is the sister taxon to the clade containing *A. danai* and *A. carabus*, by the different pattern of carapace grooves and the distinctly “button-like” morphology of the telson of the males of *A. bulla*.

Albunea marquisiana Boyko, 2000

Figures 92, 93

Albunea sp. cf. *symnysta* [sic] Poupin, 1996b: 26, pl. 12, fig. c*. – Poupin, 1998: 39*.

Albunea sp. Tudge et al., 1999: 2–5, figs. 1–3*.

Albunea marquisiana Boyko, 2000a: 109–115, figs. 2, 3*.

MATERIAL EXAMINED: **Marquesas Islands:** Sta. TH X, Haul 1, Haava Straits between Île Tahuata and Île Hiva Oa, 09°52'S, 139°04'W, 40 fms (= 73 m), Oct. 1, 1967, coll. D. M. Devaney for National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 ♂, 10.2 mm cl, holotype (USNM 268577); Sta. DW 1279, Île Eiao, 07°59.4'S, 140°42.2'W, 23–70 m, Sept. 6, 1997, coll. MUSORSTOM 9 N/O “Alis” Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♀, 9.3 mm cl, allotype (MNHN-Hi 220); Sta. CP 1304, Île Nuku Hiva, 08°54.4'S, 140°13.9'W, 50–58 m, Sept. 10, 1997, coll. MUSORSTOM 9 N/O “Alis” Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 7.5 mm cl, paratype (AMNH 17819); Sta. D 85, Île Fatu Hiva, 10°29.4'S, 138°46.5'W, 100 m, Jan. 29, 1991, coll. J. Poupin: 8 ♂, 5.2–10.0 mm cl, 2 ♀, 5.6–6.9 mm cl, 5 anterior half carapaces, 4.2–7.0 mm cl (MNHN-Hi 243), 1 ♀, 6.4 mm cl, paratype (AMNH 17820); Sta. NH-VIII, Haul 5, Baie Hatuatua, Île Nuku Hiva, 08°51'S, 140°00'W, 26 fms (= 48 m), Sept. 18, 1967, coll. National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 ♀, 5.2 mm cl, paratype (USNM 260948); Sta. UP II, Haul 4, off west coast of Île Ua Pou, 40–45 fms (= 73–82 m), Sept. 23, 1967, coll. National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 ♂, 8.5 mm cl, paratype (USNM 260949); Sta. FH I, Haul 1, west coast of Île Fatu Hiva, 10°27–30'S, 138°40'W, 41–43 fms (= 75–79 m), Sept. 25, 1967, coll. National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 anterior third (USNM 260950); Sta. EO I, Haul 1, off northern coast of Île Eiao, 08°00'S, 140°50'W, 28–29 fms (= 51–53 m), Sept. 21, 1967, coll. National Geographic Society–Smithsonian-Bishop Museum Marquesas Expedition: 1 ♂, 7.9 mm cl, paratype (USNM 260952); Sta. TH IX, Haul 1, off Hana Moe

Noe, northwest coast of Île Tahuata, 09°54'S, 139°07'W, 37 fms (= 68 m), Oct. 1, 1967, coll. National Geographic Society-Smithsonian-Bishop Museum Marquesas Expedition: 1 ♂, 7.9 mm cl, 1 ♀, 8.4 mm cl, paratypes (USNM 268578); Sta. DW 1143, Île Ua Pou, 09°20.9'S, 140°02.7'W, 18–55 m, Aug. 22, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 4.5 mm cl, paratype (MNHN-Hi 221); Sta. DW 1162, Île Nuku Hiva, 08°56.2'S, 140°06.1'W, 45–64 m, Aug. 24, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 anterior half, 4.7 mm cl (MNHN-Hi 222); Sta. DW 1185, Île Nuku Hiva, 08°48.9'S, 140°03.4'W, 31–33 m, Aug. 26, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 7.6 mm cl, 1 anterior half, 9.5 mm cl (MNHN-Hi 222 bis); Sta. DW 1180, Île Nuku Hiva, 08°46.2'S, 140°04.6'W, 80–82 m, Aug. 26, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 10.2 mm cl, paratype (MNHN-Hi 223); Sta. CP 1187, Île Nuku Hiva, 08°49.2'S, 140°03.5'W, 25–30 m, Aug. 26, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 3 ♂, 8.9–10.8 mm cl, paratypes (MNHN-Hi 224); Sta. DW 1213, Île Hiva Oa, 09°50.3'S, 139°03.2'W, 18–20 m, Aug. 29, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♀, 5.3 mm cl (MNHN-Hi 225); Sta. DW 1214, Île Hiva Oa, 09°49.8'S, 139°03.1'W, 25–40 m, Aug. 29, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 anterior half, 7.1 mm cl (MNHN-Hi 226); Sta. DW 1217, Île Hiva Oa, 09°44.5'S, 138°49.9'W, 85–87 m, Aug. 30, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 5.1 mm cl, paratype (MNHN-Hi 227); Sta. DW 1241, Île Fatu Hiva, 10°27.8'S, 138°40.6'W, 85–130 m, Sept. 1, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 6.2 mm cl, paratype (MNHN-Hi 228); Sta. DW 1242, Île Fatu Hiva, 10°28.1'S, 138°41.1'W, 119–122 m, Sept. 1, 1997, coll. MUSOR-

STOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 7.2 mm cl, paratype (MNHN-Hi 229); Sta. DR 1245, Île Fatu Hiva, 10°29.2'S, 138°36.2'W, 85–130 m, Sept. 1, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 10.1 mm cl, 1 ♀, 9.4 mm cl, paratypes (MNHN-Hi 230); Sta. DW 1256, Île Ua Pou, 09°25.4'S, 140°07.9'W, 70–72 m, Sept. 3, 1997, MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 6 ♂, 5.2–8.7 mm cl, 2 ♀, 6.0–7.4 mm cl, 1 posterior half of oviger (MNHN-Hi 231); Sta. DW 1260, Île Ua Pou, 09°25.4'S, 140°07.3'W, 49–100 m, Sept. 3, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 2 ♂, 8.4–8.9 mm cl, 1 ♀, 9.7 mm cl, paratypes (MNHN-Hi 232); Sta. DW 1266, Île Eiao, 07°57.3'S, 140°42.6'W, 84 m, Sept. 4, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 5.6 mm cl, paratype (MNHN-Hi 233); Sta. DW 1279, Île Eiao, 07°59.4'S, 140°42.2'W, 23–70 m, Sept. 6, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 4 ♀, 3.5–8.1 mm cl, paratypes (MNHN-Hi 234); Sta. DW 1283, Île Mutu One, Hatutaa, 07°53.8'S, 140°34.5'W, 55–56 m, Sept. 7, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 5.4 mm cl, paratype (MNHN-Hi 235); Sta. DW 1292, 08°54.1'S, 139°37.8'W, Île Ua Huka, 95–100 m, Sept. 8, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 6.1 mm cl (MNHN-Hi 257); Sta. DW 1297, Île Ua Huka, 08°54.2'S, 139°37.4'W, 90–150 m, Sept. 8, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 1 ♂, 7.9 mm cl, paratype (MNHN-Hi 236), 1 ♀, 4.8 mm cl, paratype (MNHN-Hi 237); Sta. CP 1304, Île Nuku Hiva, 08°54.4'S, 140°13.9'W, 50–58 m, Sept. 10, 1997, coll. MUSORSTOM 9 N/O "Alis" Campagne (P. Bouchet, B. Dayrat, B. Richer De Forges): 3 ♂, 6.3–8.0 mm cl, paratypes (MNHN-Hi 238); Sta. 24, Côte NW Baie Haahue, Île Ua Huka, 08°53.6'S, 139°37'W, 9–25 m, Oct. 1997, coll. R. Von Cosel, J.

Tröndlé, and J. Tardy: 1 ♂, 4.3 mm cl, 4 ♀, 5.8–10.9 mm cl, 6 juveniles, 3.1–3.8 mm cl, 2 unsexable, unmeasurable specimens (MNHN-Hi 239); Sta. 29, Baie de Hane, Île Ua Huka, 08°55.7'S, 139°32.0'W, 7–11 m, Oct. 1997, coll. R. Von Cosel, J. Tröndlé, and J. Tardy: 2 ♀, 5.0–5.1 mm cl (MNHN-Hi 240); Sta. 34, Baie Haavei, Pointe Tenoni, Île Teuaua, Île Ua Huka, 08°56.8'S, 139°35.7'W, 10–15 m, Oct. 1997, coll. R. Von Cosel, J. Tröndlé, and J. Tardy: 1 ♂, 6.3 mm cl, paratype (MNHN-Hi 241); Sta. D 77, Île Eiao, 07°56.7'S, 139°30.8'W, 54 m, Jan. 21, 1991, coll. J. Poupin: 1 ♂, 10.0 mm cl, paratype (MNHN-Hi 242).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 8–10 spines on either side of ocular sinus. Setal field with narrow lateral elements and sinuous anterior margin. CG1 with separate posterior lateral elements; CG4 with two long lateral elements terminating above apex of CG6, occasionally with two short medial elements; CG5 broken into two short oblique elements; CG6 and CG7 separate; CG8 broken; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and subtriangular in shape, tapering at tip, approximated along mesial margins, lateral margins convex except slightly concave at tip, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced and subquadrate. Dactylus of pereopod III with heel slightly produced and acute. Dactylus of pereopod IV evenly sinuous from base to tip. Telson of male spatulate, tip rounded, dorsal surface inflated medially with strong medial ridge lined with short thick setae; lateral margins decalcified. Telson of female ovate.

DESCRIPTION: Carapace (fig. 92A) slightly wider than long. Anterior margin concave on either side of ocular sinus, becoming convex laterally, with 8–10 large spines along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field broad posteriorly, narrowing anteriorly, with narrow anterior lateral elements and sinuous anterior margin; posterior lateral elements not reaching to

posterior lateral elements of CG1. CG1 parallel to anterior margin of carapace, sinuous, slightly crenulate, divided into medial sinuous fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 absent; CG3 broken into four to six short elements; CG4 with two long lateral elements terminating above apex of CG6, occasionally with two short medial elements. Hepatic region smooth, with long setose groove at median of lateral margin. Epi-branchial region generally triangular, smooth. Metagastric region smooth; CG5 broken into two short oblique elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 present as two long oblique elements and separate from CG6. Cardiac region smooth; CG8 with two to four median elements and two slightly longer lateral elements. CG9 present as two short, widely separated elements. CG10 present as two straight lateral fragments, with gap between fragments greater than length of single fragment. CG11 present as two or three irregularly spaced short elements. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching approximately three-fourths up either side of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 92B) subquadrate, with shallow median indentation; median peduncular segments reduced to small rounded calcified area on either side of ocular plate. Distal peduncular segments elongate, with proximally convex and distally concave lateral margins, tapering to produced distal cornea; mesial margins approximated along entire length; mesial and ventral margins of segment with sparse row of long plumose setae; few small tufts of plumose setae on proximal quarter of segment.

Antennule (fig. 92C) with segment III subcylindrical; with plumose setae on dorsal and

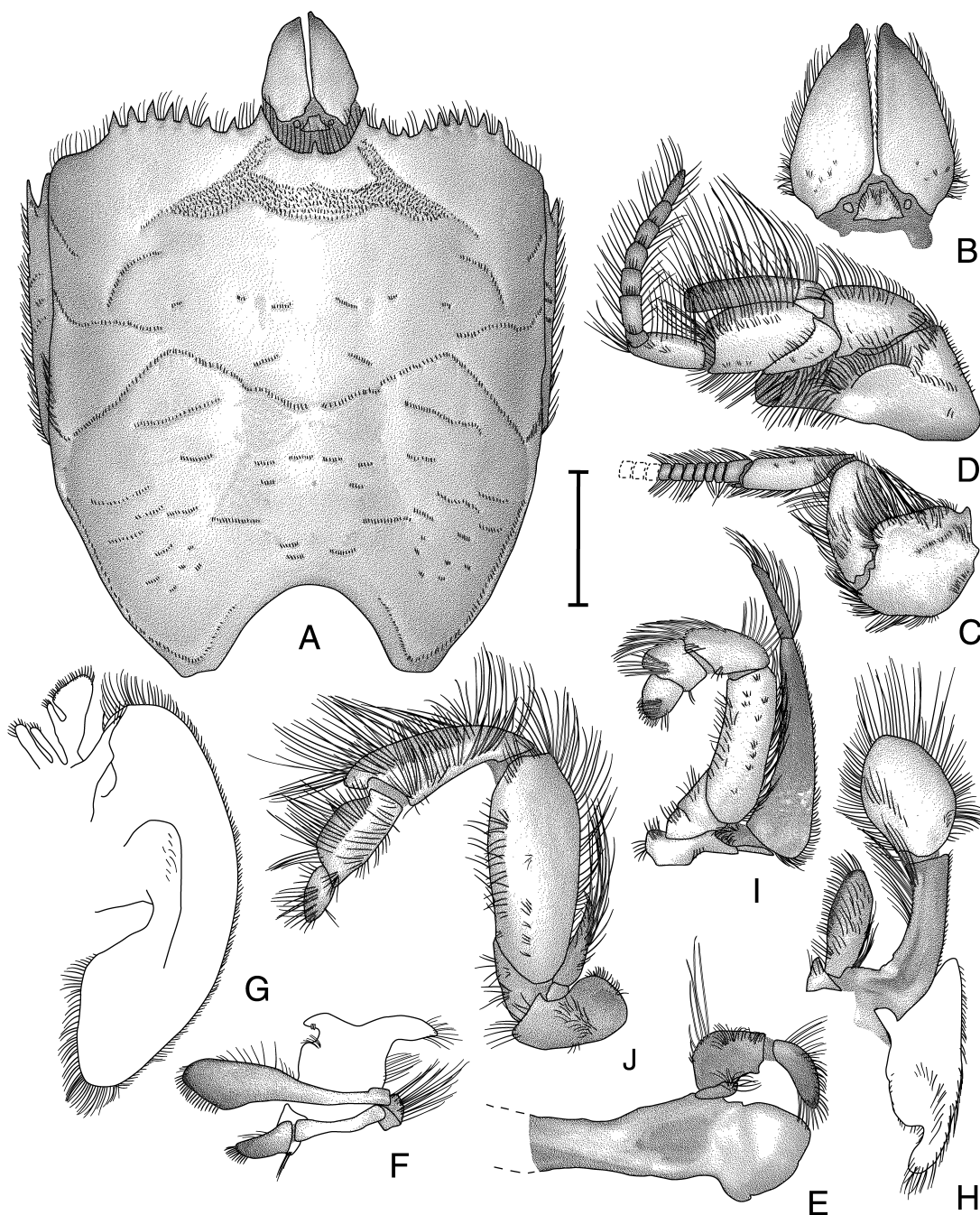


Fig. 92. *Albunea marquisiana* Boyko, 2000: A, ♂, 10.2 mm cl, USNM 268577, holotype; B–J, ♂, 7.9 mm cl, USNM 268578, paratype. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 1.6 mm (B, E, F, I), 2.2 mm (D, G, H, J), and 3.3 mm (A, C).

ventral margins; dorsal exopodal flagellum with 110–118 articles, long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with two articles and plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 92D) with segment V approximately two times longer than wide, with long plumose setae on dorsal margins; flagellum with seven articles, long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins and row of setae on dorsolateral margin. Segment III with long plumose setae on dorsal and ventral margins. Segment II short, widening distally, with plumose setae on margins; antennal acicle long, thin, truncate distally, slightly exceeding distal margin of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins; lateral surface with acute spine subdorsally, with low semicircular, dorsolateral lobe ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 92E) incisor process without teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment.

Maxillule (fig. 92F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin; plumose setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 92G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 92H) epipod with plumose setae on distal margin and on distolateral surface. Endite tapered distally and subequal to first segment of exopod. Exopod

with two segments; proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, approximately as long as wide, broadest medially, margins with long plumose setae. Endopod flattened and elongate, reaching to distal end of proximal exopodal segment, with plumose setae on margins.

Maxilliped II (fig. 92I) dactylus evenly rounded, length slightly greater than width, with thick simple setae distally. Propodus two times wider than long, with plumose setae on dorsal margin and long simple setae on distal margin. Carpus not strongly produced dorsodistally, approximately three times longer than wide, with long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel, with simple setae on ventrolateral margin and scattered on surface, plumose setae on dorsolateral margin. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-fourth longer than merus, flagellum with one elongate article.

Maxilliped III (fig. 92J) dactylus evenly rounded; with long plumose setae on margins and lateral surface. Propodus with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus slightly produced onto propodus; lateral surface with row of plumose setae ventromedially; plumose setae on margins. Merus unarmed, with plumose setae on margins and scattered on surface. Basis-ischium incompletely fused, with faint crista dentata of few small low teeth. Exopod two-segmented: proximal segment small; distal segment styliform, tapering, approximately one-third length of merus, with plumose setae on margins; without flagellum.

Pereopod I (fig. 93A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into small spine, dorsal margin smooth; dorsal

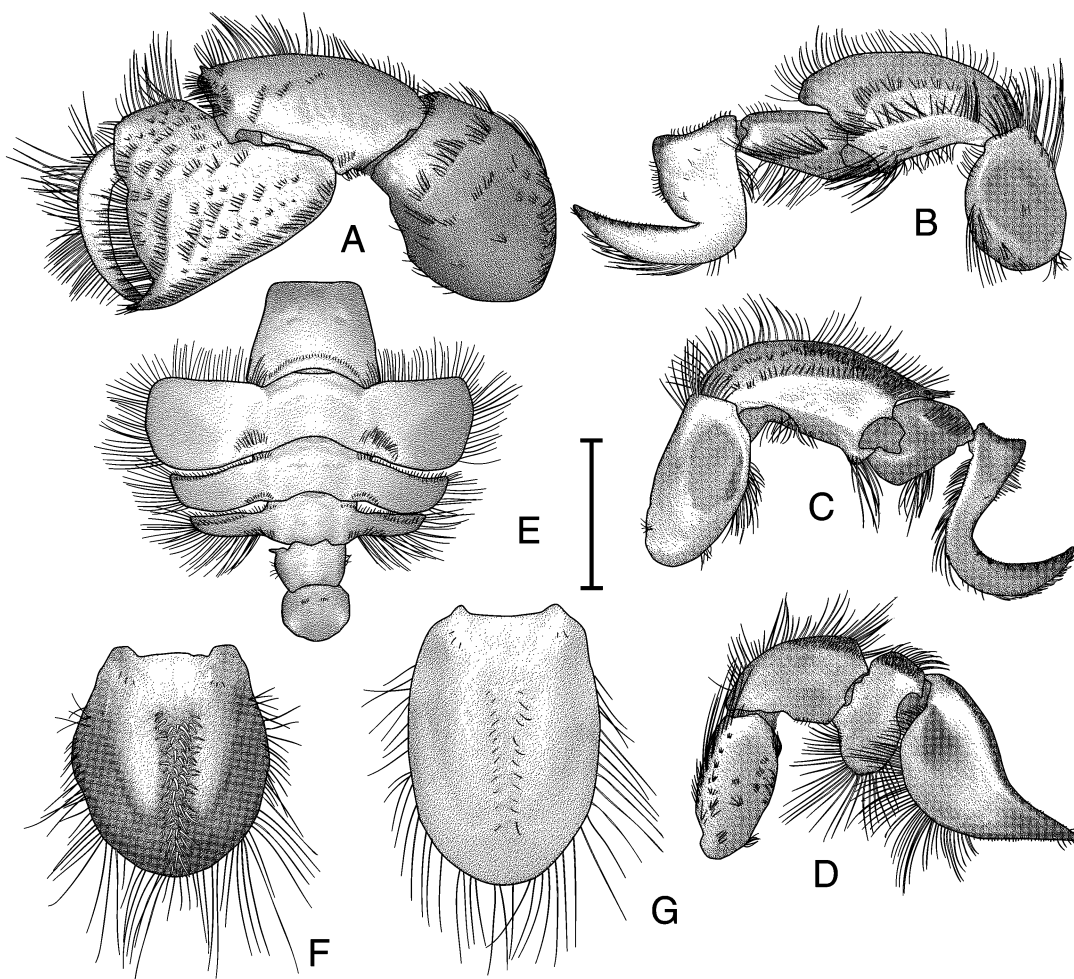


Fig. 93. *Albunea marquisiana* Boyko, 2000: A–F, ♂, 7.9 mm cl, USNM 268578, paratype; G, ♀, 5.2 mm cl, USNM 260948, paratype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Right pereopod III, lateral view. **D.** Right pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 1.1 mm (G), 1.6 mm (F), 3.3 mm (A–D), and 6.7 mm (E).

and distal margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with median row of long plumose setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with few short rows of setae; proximal fourth of mesial surface with decalcified window. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 93B) with dactylus smooth; with base to heel slightly concave, heel smoothly rounded and slightly produced, heel to tip with acute, narrow indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodus with

dorsal surface smooth, ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margin with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus; decalcified region just distal to junction with carpus. Carpus slightly produced dorsodistally; lateral surface nearly smooth, with irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth with long plumose setae in scattered patches on surface and on margins. Merus lateral surface with large decalcified area in median, few scattered setae on surface and margins and large patch of long simple setae at distolateral margin; mesial surface nearly smooth, with many median setae, with decalcified area on proximal fourth near junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa with one small tubercle on anterior margin.

Pereopod III (fig. 93C) dactylus with base to heel concave, heel broadly rounded and slightly produced, heel to tip with broad, evenly rounded indent, tip acute, tip to base smoothly convex to straight; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventromesial margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae distally, with simple setae on dorsal margins, and long plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened; mesial surface with scattered long setae on and near distal margin, with decalcified window near junction with carpus. Carpus produced dorsodistally, exceeding proximal margin of propodus by approximately one-fourth length of propodus, pointed but not acute; dorsolateral

margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two longer rows of setae ventrally; mesial surface smooth, with long plumose setae on margins and in transverse row on surface. Merus smooth, with large decalcified area near median of lateral surface; dorsal and ventral margins unarmed, with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth, with decalcified window at junction with basis-ischium. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial surface of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 93D) dactylus with base to tip convex to concave, tip acute, tip to base straight distally, becoming convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctae ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion not exceeding ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae medially and mat of short simple setae; lateral and mesial surfaces smooth, mesial surface with large decalcified area. Carpus not produced dorsodistally; lateral and mesial surfaces smooth; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae and small mat of short simple setae dorsally. Merus with scattered, short, transverse rows of setae on lateral surface, dorsal and ventrodiscal margins with long plumose setae; mesial surface with large decalcified window proximoventrally. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 93E) with somite I approximately as long as wide, widest posteriorly; dorsal surface with anterior margin straight; posterior margin concave, with elevated submarginal row of short setae; with small transverse, decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse, decalcified windows laterad

of segment median just anterior to submarginal ridge; with tuft of setae at posterolateral angle, extending onto pleura posteromesially; posterior margin with indistinct punctate submarginal groove laterally; pleura expanded and directed slightly anteriorly; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae. Somite III similar to somite II, but narrower, shorter, and lacking anterior submarginal ridge; small tuft of short thick setae on posterolateral angle; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II; anterolateral angle acute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with thick setae posterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margin with long plumose setae. Somite V subequal to somite IV; lateral margins with plumose setae; pleura absent. Somite VI subequal to somite V in width but longer; dorsal surface with short transverse rows of setae laterad of midline anteriorly; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males lacking pleopods.

Telson of male (fig. 93F) spatulate, with length greater than width, rounded distally; weakly calcified at margins of large calcified median plate; median longitudinal groove short, extending one-fourth length of telson; thick elevated ridge continuing from end of groove to distal end of telson, lined with dense row of thick simple setae. Telson of female (fig. 93G) ovate, longer than wide, dorsal surface smooth, with median longitudinal groove reaching almost to distal margin; with row of setose punctae lateral to midline along whole length of median groove except proximal fourth; margins with long plumose setae.

DISTRIBUTION: Known only from the Marques Islands, in 7–130 m depth.

MAXIMUM SIZE: Males: 10.8 mm cl; females: 10.9 mm cl.

TYPE SPECIMENS: USNM 268577 (holotype), MNHN-Hi 220 (allotype), AMNH 17819 (paratype), AMNH 17820 (paratype), USNM 260948 (paratype), USNM 260949 (paratype), USNM 260952 (paratype),

USNM 268578 (2 paratypes), MNHN-Hi 221 (paratype), MNHN-Hi 223 (paratype), MNHN-Hi 224 (3 paratypes), MNHN-Hi 227 (paratype), MNHN-Hi 228 (paratype), MNHN-Hi 229 (paratype), MNHN-Hi 230 (2 paratypes), MNHN-Hi 232 (3 paratypes), MNHN-Hi 233 (paratype), MNHN-Hi 234 (4 paratypes), MNHN-Hi 235 (paratype), MNHN-Hi 236 (paratype), MNHN-Hi 237 (paratype), MNHN-Hi 238 (3 paratypes), MNHN-Hi 241 (paratype), MNHN-Hi 242 (paratype).

TYPE LOCALITY: Haava Straits between Île Tahuata and Île Hiva Oa, Marques Islands, 09°52'S, 139°04'W, 73 m.

REMARKS: Juvenile specimens are virtually lacking in pigment and appear almost white. Adults are a uniform tan, with reddish-brown setae. Larger specimens show a markedly increased reddish tone on the carapace (especially the anterior region), ocular peduncles, antennae, and antennules (from preserved material and a color transparency made of a live specimen [MNHN-Hi 223]; see also Poupin, 1996b).

Little is known about the biology of this species. Ovigerous females, unfortunately, are only known from the posterior portion of a single specimen. Additionally, the morphology of the spermatozoa of this species has been studied by Tudge et al. (1999), based on one of the paratypes (MNHN-Hi 236).

Albunea marquisiana is most similar to *A. holthuisi* and *A. groeningi*. All three species share the distinctive thick median row of setae on the telson of the male, as well as a general similarity in the shape of the pereopodal dactyli and can be collectively considered to form the “*holthuisi*-group” of species. They can easily be separated by the number of elements of CG8 (one long median element in *A. holthuisi*, three or four short elements in *A. marquisiana* and *A. groeningi*), and CG11 (absent in *A. groeningi*, one in *A. holthuisi*, two or three in *A. marquisiana*), the relative thickness of the proximal blade of pereopod III (thicker in *A. marquisiana* and *A. groeningi*), and the distal margins of both the male and female telsons (truncate in *A. holthuisi*, smoothly rounded in *A. marquisiana*, indented in *A. groeningi*).

Albunea holthuisi Boyko and Harvey, 1999

Figures 94, 95

?*Albunea symnista* [sic]: Ward, 1942: 52 (list), 63 (not *Albunea symmysta* (Linnaeus, 1758)).

?*Albunea steinitzi*: Thomassin, 1969: 143–146, pl. 3, figs. 1–8, text-figs. 3c, 4 (not *Albunea steinitzi* Holthuis, 1958).

Albunea holthuisi Boyko and Harvey, 1999: 386–391, 400 (list), 401 (key), figs. 6, 7*.

MATERIAL EXAMINED: **Zanzibar:** Sta. 651, dredged grass and shell, 1.5 mi west-southwest of Ras Nungwa, 8 fms (= 14.6 m), Feb. 20, 1957, coll. A. J. Ostheimer III: 1 ♂, 7.7 mm cl, paratype (ANSP CA4644); Sta. 651, fine grass and shell, 1.5 mi west-southwest of Ras Nungwa, 8 fms (= 14.6 m), Feb. 20, 1957, coll. A. J. Ostheimer III: 1 ♀, 6.7 mm cl, paratype (ANSP CA4645).

Madagascar: Environs de Nosy Be, Côte southwest, 13°37.7'S, 47°49.6'E, 25 m, coll. unknown: 1 ♂, 8.1 mm cl, holotype (MNHN-Hi 202); Andilana, Nosy Be, Côte southwest, Sept. 1959, coll. A. Crosnier: 1 ♀, 8.1 mm, allotype (MNHN-Hi 203); voisinage de Nosy Be, Côte northwest, 13°38.3'S, 42°49.6'E, 34 m, coll. A. Crosnier: 1 ♂, 8.0 mm cl, paratype (MNHN-Hi 204); Sakatia, Envoy II, 1921, coll. G. Petit: 1 ♂, 6.7 mm cl (MNHN-Hi 19).

Seychelles: Sta. 5, 33 m, Sept. 4, 1980, coll. ORSTOM-Reves 2: 1 ♂, 9.2 mm cl (MNHN-Hi 249); Mahé, July–Aug. 1972, coll. Mission Zoologique MRAC-ULB: 1 ♀, 5.7 mm cl (MRAC 57.459).

Indonesia: Sta. 522, west side of Samberbaban Bay, Japen Island, Irian Jaya, Feb. 14, 1956, coll. C. T. Abbot on "Gloria Maris": 1 ♂, 11.3 mm cl, paratype (RMNH 23703); Corindon II, Sta. B255, Makassar, 01°56.5'S, 119°17.3'E, 13 m, Nov. 6, 1980, coll. R/V "Coriolis": 1 ♀, 7.1 mm cl, paratype (MNHN-Hi 205); Corindon II, Sta. B256, Makassar, 01°56.5'S, 119°17.2'E, 24 m, Nov. 6, 1980, coll. R/V "Coriolis": 1 ♂, 4.9 mm cl, 1 ♀, 5.4 mm cl (MNHN-Hi 206).

Malaysia: Juara Bay, Pulau Tioman, Pahang, May 26, 1985, coll. P.K.L. Ng: 1 ♂, 7.5 mm cl (ZRC 1989.3827).

Australia: Queensland: Little Trunk Reef, 18°20'S, 146°46'E, 9.1–12.2 m, Nov. 5, 1990, coll. K. Lamprell: 1 ♂, 9.6 mm cl (QM W24961).

DIAGNOSIS: Carapace slightly longer than wide, covered with lightly setose grooves. Anterior margin with 8–11 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with short element on either side of median with missing elements at midline and between median and laterals; CG5 present only as short lateral elements; CG6 and CG7 separate; CG8 complete; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and oblong in shape, tapering at tip, approximated along distal two-thirds of mesial margins, lateral margins convex except slightly concave at tip, mesial margins convex. Cornea at tip. Dactylus of pereopod II with heel slightly produced, low and rounded. Dactylus of pereopod III with heel slightly projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with slight indent. Telson of male spatulate, tip broadly truncate, dorsal surface with elevated, median, longitudinal ridge bearing short thick setae proximally and long thick setae distally. Telson of female flattened and spatulate, longitudinal row of short, thin setae medially.

DESCRIPTION: Carapace (fig. 94A) slightly wider than long. Anterior margin concave on either side of ocular sinus, becoming convex laterally, 8–11 large spines on concave region, ventral row of long plumose setae submarginally. Rostrum as small acute tooth, not reaching to proximal margin of ocular plate. Ocular sinus smoothly concave and unarmed. Frontal region smooth; setal field broad posteriorly, narrowing anteriorly, with narrow lateral elements and concave anterior margin. CG1 parallel to anterior margin of carapace, sinuous, slightly crenulate, divided into medial fragment and curved lateral elements that are displaced posteriorly. Mesogastric region smooth, CG2 short; CG3 broken into six short elements approximately equally spaced between posterior elements of CG1; CG4 fragmented into four elements with gap at midline and between median and lateral elements. Hepatic region smooth, with short setose groove at median of lateral margin. Epibranchial region generally triangular, smooth, posterolateral margin with short row

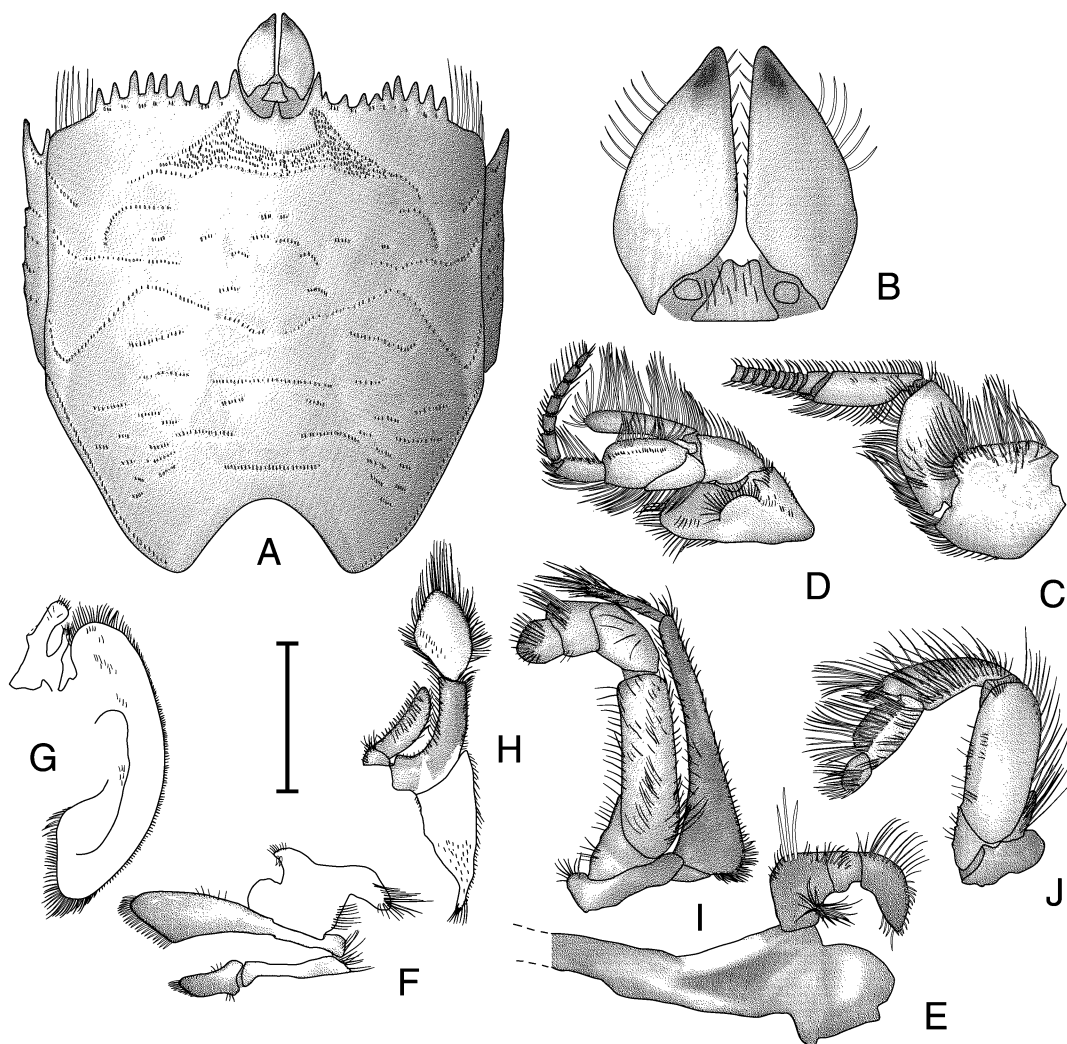


Fig. 94. *Albunea holthuisi* Boyko and Harvey, 1999: A, B, ♂, 8.1 mm cl, MNHN Hi-202, holotype; C, ♂, 7.7 mm cl, ANSP CA4644, paratype; D–J, ♂, 8.0 mm cl, MNHN Hi-204, paratype. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 1.1 mm (B), 1.6 mm (E, F, I), and 3.3 mm (A, C, D, G, H, J).

of setae. Metagastric region smooth; CG5 present only as short lateral elements directly posterior to median elements of CG4; CG6 slightly crenulate, strongly concave medially and sloping out to convex lateral thirds; CG7 transverse and separate from CG6. Cardiac region smooth; CG8 uninterrupted; CG9 present only as lateral short lines; CG10 present in two fragments, separated by length of sin-

gle fragment; CG11 present. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove interrupted medially. Branchiostegite with short anterior submarginal spine, anterior region with scattered short, transverse lines ventral to *linea anomurica*, with many short rows of setae and covered with long plumose setae ven-

trally, posterior region membranous, with numerous irregular fragments, and covered with long plumose setae.

Ocular plate (fig. 94B) triangular, with shallow median indentation; median peduncular segments present as small, ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, with distally convex lateral margins, tapering to rounded distolateral cornea, mesial margins approximated along entire length, mesial and ventral margins of segment with sparse row of long plumose setae, tuft of plumose setae at proximal lateral ventral angle, ventral surface with oblique row of long plumose setae from proximal lateral angle almost to distal mesial margin.

Antennule (fig. 94C) with segment III narrow proximally, expanding distally to twice proximal width; plumose setae on dorsal and ventral margins, dorsal exopodal flagellum with 76–104 articles, long plumose setae on dorsal and ventral margins, ventral endopodal flagellum short, with two or three articles, plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, plumose setae on dorsal and ventral margins and scattered on lateral surface. Segment I wider than long, unarmed, lateral surface with long plumose setae dorsally and on dorsal and ventral margins.

Antenna (fig. 94D) with segment V approximately three times longer than wide, long plumose setae on dorsal and ventral margins, flagellum with seven articles, long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, long plumose setae on dorsal, ventral, and distal margins and simple setae on dorsolateral margin. Segment III with long plumose setae on ventral margin. Segment II short, widening distally, plumose setae on margins, antennal acicle long, thin, exceeding base of segment V by approximately one-half length of segment V, long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventromesially, long plumose setae on margins; lateral surface with acute spine dorsally, with low, semicircular dorsolateral lobe ventrodistal to spine.

Mandible (fig. 94E) incisor process with one tooth; cutting edge with one tooth. Palp three-segmented, with plumose setae on mar-

gins and long, thick, simple setae arising from bend in second segment.

Maxillule (fig. 94F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under, notched proximally; internal lobe reduced with two thick setae at distolateral margin.

Maxilla (fig. 94G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 94H) with epipod with plumose setae on distal margin and on distolateral surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, slightly longer than wide, broadest medially, margins with long plumose setae. Endopod flattened and elongate, reaching to distal end of proximal exopodal segment, with plumose setae on margins.

Maxilliped II (fig. 94I) dactylus evenly rounded, length equal to width, with thick simple setae distally. Propodus 1.5 times wider than long, with plumose setae on dorsal margin and long simple setae on distal margin. Carpus not strongly produced dorsodistally, approximately two times longer than wide, with long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel, with simple setae on ventrolateral margin and plumose setae on dorsolateral margin. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-fourth longer than merus, flagellum with one article.

Maxilliped III (fig. 94J) dactylus rounded at tip, long plumose setae on margins and lateral surface. Propodus with longitudinal median row of plumose setae on lateral surface, margins with plumose setae. Carpus slightly produced onto propodus, lateral surface with row of plumose setae ventromedially; plumose setae on margins. Merus unarmed, plumose setae on margins. Basis incompletely fused with ischium; weak crista dentata of two or three teeth. Exopod two-segmented, proximal segment small, distal

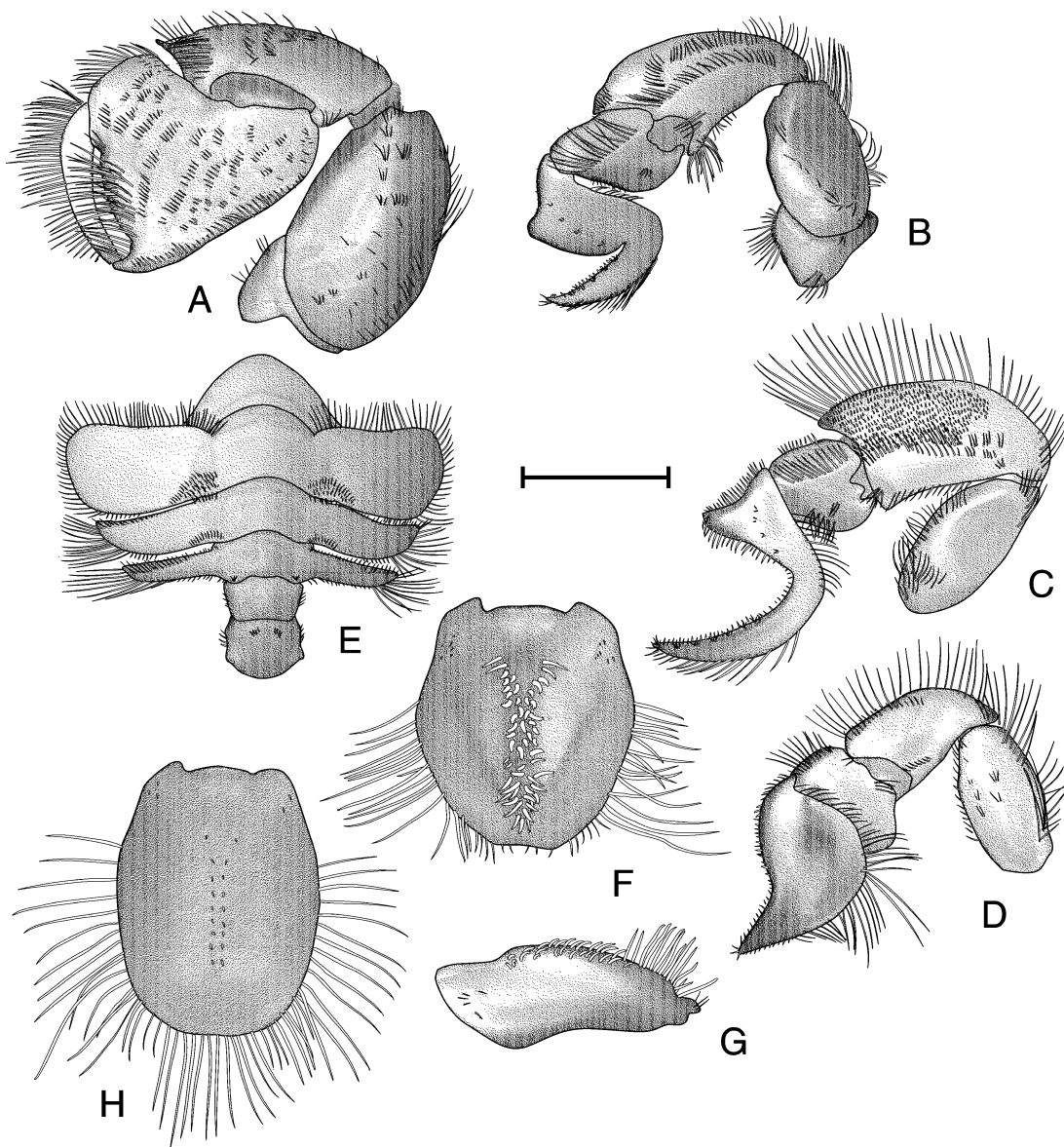


Fig. 95. *Albunea holthuisi* Boyko and Harvey, 1999: A, B, ♂, 8.0 mm cl, MNHN Hi-204, paratype; C, D, H, ♀, 8.1 mm cl, MNHN Hi-203, allotype; E–G, ♂, 8.1 mm cl, MNHN Hi-202, holotype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♂, lateral view. **H.** Telson of ♀, dorsal view. Scale = 1.7 mm (F, H) and 3.3 mm (A–E, G).

segment styliform, tapering, approximately one-third length of merus, plumose setae on margins; flagellum absent.

Pereopod I (fig. 95A) dactylus curved and tapering; lateral and mesial surfaces smooth;

dorsal margin with long plumose and short simple setae, short simple setae on ventral margin. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin dis-

tally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; lateral, mesial, and ventral margins with long setae. Carpus with dorsodistal angle produced into small corneous spine; dorsal and distal margins with long plumose setae; lateral surface with distal rugose area, few transverse setose ridges on distal two-thirds of surface; mesial surface smooth, with scattered rows of long plumose setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with few short rows of setae. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 95B) dactylus smooth; base to heel concave, heel with smoothly rounded low spur, heel to tip acutely indented and narrow, tip acute, tip to base broadly convex; lateral surface smooth, several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short plumose setae, patch of long plumose setae at base (not illustrated). Propodal dorsal surface smooth, ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus slightly produced, gently rounded; lateral surface nearly smooth, with irregular, broken row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae, margins with long plumose setae; mesial surface smooth, long plumose setae on margins and in scattered patches on surface. Merus with medial decalcified area on lateral surface, long plumose setae on lateral margins; mesial surface nearly smooth, with few setae. Basis-ischium incompletely fused and unarmed. Coxa with one small spine on anterior margin.

Pereopod III (fig. 95C) dactylus with base

to heel concave, heel produced in short, acute spur, heel to indent nearly straight, indent broadly concave, tip acute, tip to base smoothly convex to straight; lateral surface smooth, dorsodistal margin with tufts of short setae, ventromesial margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, plumose setae proximally at junction with propodus. Propodus weakly inflated; lateral surface smooth, long plumose setae distally, simple setae on margins, long plumose setae on ventral margin, dorsolateral surface narrow, oblique, flattened; mesial surface with scattered long setae on and near distal margin. Carpus produced dorsodistally, exceeding proximal margin of propodus by approximately one-third length of propodus, broadly rounded, dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, many short and two longer rows of setae ventrally; mesial surface smooth, long plumose setae on margins and scattered on surface. Merus smooth, dorsal and ventral margins unarmed, long plumose setae, distolateral margin with long plumose setae; lateral surface with decalcified area anteriorly; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa with one small spine on anterior margin. Female with large gonopore on median mesial surface of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 95D) dactylus with base to tip convex to straight, tip acute, tip to base convex distally, becoming broadly concave proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with median decalcified area, demarcated ventrally by longitudinal elevated ridge with row of long plumose setae, setose punctae ventral to decalcified window. Propodus expanded dorsally and ventrally, ventral expansion exceeds ventral margin of dactylus, margin with long plumose setae, dorsal expansion with row of long plumose setae medially; lateral and mesial surfaces smooth. Carpus not produced dorsodistally; lateral and mesial surfaces smooth, dorsal margin with short simple and long plumose setae, ventral margin with short plumose setae. Merus with scattered short, transverse rows

of setae on lateral surface, dorsal and ventrodistal margins with long plumose setae, slightly rugose ventrodistally, with short setae; mesial surface with large decalcified window proximoventrally. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 95E) with somite I approximately as wide as long, widest posteriorly; dorsal surface with anterior margin concave, posterior margin concave, with submarginal row of short setae, small transverse decalcified submedial windows. Somite II dorsal surface with submarginal transverse ridge anteriorly, tuft of setae at posterolateral angle, extending onto pleura posteromesially, posterior margin with indistinct punctate submarginal groove laterally; pleura expanded and directed slightly anteriorly, margins finely toothed, lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae. Somite III similar to somite II, but narrower, shorter, and lacking anterior submarginal ridge, small tuft of short thick setae on posterolateral angle; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II, anterolateral angle acute, dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with thick setae posterolaterally; pleura thinner and shorter than on somite III, directed laterally, dorsal surface obliquely flattened anterolaterally, margins with long plumose setae. Somite V wider than somite IV, lateral margins with plumose setae; pleura absent. Somite VI subequal to somite V in width but longer, dorsal surface with short oblique rows of setae laterad of midline anteriorly, lateral margins with long plumose setae; pleura absent.

Females with uniramous, paired pleopods on somites II–V, males lacking pleopods.

Telson of male (fig. 95F, G) spatulate, truncate posteriorly, weakly calcified, except for large triangular anterior plate, margins with long plumose setae; median longitudinal groove very short, restricted to anterior of calcified plate, calcified plate with thick elevated medial ridge (fig. 95G) covered with short thick simple setae, small tuft of setae at anterolateral margin. Telson of female (fig. 95H) ovate, longer than wide, slightly trun-

cate posteriorly, dorsal surface smooth, with median longitudinal groove anteriorly, row of setose punctae lateral to midline from median of longitudinal groove almost to posterior margin; margins with long plumose setae.

DISTRIBUTION: Madagascar, Zanzibar, and the Seychelles; also from Indonesia and Queensland, Australia, in 9.1–34.0 m depth.

MAXIMUM SIZE: Males: 11.3 mm cl; females 8.1 mm cl.

TYPE SPECIMENS: MNHN-Hi 202 (holotype), MNHN-Hi 203 (allotype), MNHN-Hi 204 (paratype), MNHN-Hi 205 (paratype), ANSP CA4644 (paratype), ANSP CA4645 (paratype), RMNH 23703 (paratype).

TYPE LOCALITY: Environs de Nosy Be, Côte southwest, Madagascar, 13°37.7'S, 47°49.6'E, 25 m.

REMARKS: As with all older records of *Albunea* species lacking descriptive information or illustrations, it is difficult to be certain what species Ward (1942) was dealing with from Mauritius. I have examined no specimens from that locality, and the only species known from nearby Réunion is *A. speciosa*, which no doubt Ward (1942) would have recognized as quite different from *A. symmysta*. *Albunea holthuisi* is the best candidate for Ward's (1942) record, as it superficially resembles *A. symmysta* and is known from nearby Madagascar and the Seychelles. The other taxa known from the vicinity of Mauritius (*A. elioti* and *A. microps*) are unlikely to have been confused with *A. symmysta* by an experienced carcinologist such as Ward.

As noted by Boyko and Harvey (1999), the record of "*Albunea steinitzi*" from Madagascar given by Thomassin (1969) is not that species. This record is tentatively placed in synonymy with *A. holthuisi*, which is also known from Madagascar, even though certain morphological details shown in Thomassin's (1969) drawings do not fit perfectly with this species. Thomassin's (1969) drawing of the habitus has a produced distal margin of the (presumably male) telson, while the indent of the dactylus of pereopod II is too broad. These may, however, be due to the relatively poor quality of Thomassin's (1969) drawings (see under *A. speciosa*). Thomassin's (1969) record may represent an undescribed species, but as his material is un-

available for examination (see under *A. speciosa*), no definite conclusions can be made at this time.

Although Boyko and Harvey (1999) indicated that this species is most similar to *A. steinitzi*, that relationship was based on the species described at that time. In fact, *A. holthuisi* typifies its own group of *Albunea* species, and it is actually the sister taxon to *A. groeningi*. It is also closely related to *A. marquisiana*.

***Albunea groeningi*, new species**

Figures 96, 97

Albunea symnista [sic]: Gordon, 1938: 187 (part)*. – Miyake, 1978: 152–154, figs. 59, 60a* (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea symmysta: Miyake et al., 1962: 125 (part; Toyama Bay material) (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea steinitzi: Serène and Umali, 1965: 97–102, pl. 1, fig. 2, pl. 2, fig. 2, pl. 3, figs. 3–4b, pl. 4, fig. 2, text-figs. 1b, 2b, 4b, 5c, 6c, c', 7a, 9b, c*. – Haig, 1974: 447 (list) (not *Albunea steinitzi* Holthuis, 1958).

?*Albunea symnista* [sic]: Kikuchi, 1932: 10 (? not *Albunea symmysta* (Linnaeus, 1758)).

MATERIAL EXAMINED: **Japan:** Mikawa-Is-shiki, Aichi Prefecture, Honshu, Sept. 1, 1941, coll. T. Sakai: 1 ♂, 9.4 mm cl, holotype (RMNH ex 32052), 1 ♀, 12.5 mm cl, allotype (RMNH 32052); Sakai, Tottori Prefecture, March 1, 1964, coll. T. Senda: 1 ♀, 16.4 mm cl (ZLKU 12836); Fushiki, Toyama Bay, Aug. 6–26, 1950, coll. Hori and Mori: 1 ♂, 8.7 mm cl, 1 ♀, 7.0 mm cl, paratypes (ZLKU 5125–5126); Mimase, Kochi City, Tosa Bay, Shikoku Island, Dec. 24, 1959, coll. K. Sakai: 1 ♀, 17.0 mm cl, paratype (ZLKU 7438); Tosa Bay, Shikoku Island, Feb. 19, 1960, coll. S. Nakayama: 1 ♂, 11.6 mm cl, paratype (ZLKU 7511).

Taiwan: “Formosa,” coll. M. Maki: 1 ♀, 13.8 mm cl, paratype (USNM 59074); Kao-hsiung, 25 m, June 7, 1992, coll. unknown: 2 ♂, 9.2–9.8 mm cl, 1 ♀, 11.2 mm cl, paratypes (NTOU); “Southern Taiwan,” 30 m, Jan. 1, 1992, coll. unknown: 1 ♂, 8.8 mm cl, 1 ♀, 9.2 mm cl, paratypes (NTOU); Tung-Shiao, Miao-Li County, Aug. 30, 1999, coll. unknown: 1 ♀, 8.4 mm cl (NTOU); Tan-Shui, Taipei County, June 20, 1999, coll. unknown: 1 ♂, 4.1 mm cl (NTOU).

Philippines: Busuanga, Palawan, May 10–30, 1963, coll. J. E. Norton and F. E. Dayrit: 1 ♂, 6.4 mm cl, paratype (NMCR 1151b); Calapan, Mindoro, Dec. 1932–Jan. 1933, coll. P. de Mesa: 1 ♀, 7.9 mm cl, paratype (MCZ 9625).

Singapore: Singapore, coll. unknown: 1 ♂, 9.6 mm cl, paratype (BMNH 1937.6.1.8); Morib Beach, Selengar, March 8, 1993, coll. A. Sasekumar: 1 oviger, 10.7 mm cl, paratype (ZRC 1995.571).

Malaysia: Bedok, Feb. 7, 1959, coll. P. Yeoh: 1 ♂, 10.8 mm cl (ZRC 2000.1799).

Vietnam: Sta. 51, off Nhatrang, 15 m, Jan. 14, 1960, coll. R/V “Gallardo”: 1 ♂, 3.8 mm cl (ZMUC 2717); Sta. 215, off Nhatrang, 16 m, March 7, 1960, coll. R/V “Gallardo”: 1 ♂, 3.0 mm cl (ZMUC 2718); Sta. 54, off Nhatrang, 14 m, Jan. 14, 1960, coll. R/V “Gallardo”: 1 ♀, 3.7 mm cl (ZMUC 2719); Sta. 220, off Nhatrang, 16 m, March 7, 1960, coll. R/V “Gallardo”: 1 unsexable, unmeasurable specimen (ZMUC 2721).

Australia: Western Australia: “North-west Australia,” coll. unknown: 1 ♂, 6.0 mm cl, paratype (BMNH 1932.11.30.65); Rosemary Island, Dampier Archipelago, 7 fms (= 12.8 m), Aug. 22, 1963, coll. F.R.V. Lancelin: 3 ♂, 9.2–11.4 mm cl, 2 ♀, 10.6–11.3 mm cl, paratypes (WAM 23386); Bernier Island, Shark Bay, May 16, 1960, coll. R. W. George: 1 ♀, 13.4 mm cl, paratype (WAM 23391); Shark Bay, Feb. 1963, coll. L. R. Thomas: 1 ♂, 12.9 mm cl, paratype (WAM 23395); North Island, 17–25 fms (= 31.1–45.7 m), May 1965, coll. R. Seabrook: 1 ♂, 12.9 mm cl, paratype (WAM 23396); Mission Bay, Napier Broome Bay, 1–3 m, Aug. 14, 1991, coll. L. Wharsh: 2 ♂, 6.4–8.3 mm cl, 1 ♀, 8.1 mm cl, paratype (WAM 20667); **Queensland:** Ball Bay, May 24, 1964, coll. Zoology Department of the University of Queensland: 2 ♂, 10.5–12.4 mm cl, 4 ♀, 7.8–15.4 mm cl, paratypes (WAM 23389); Rockhampton, Keppel Bay, 23°10'S, 150°55'E, 9 m, Sept. 6, 1967, coll. B. J. Smith: 1 unsexable, unmeasurable specimen (MOV J47044); Lucinda, Hinchinbrook Channel, 18°29'S, 146°16'E, Oct. 1969, coll. E. Gossner: 1 ♂, 11.0 mm cl, paratype (MOV J14552); Rudder Reef, 30 mi northeast of Mossman, 16°11'S, 145°40'E, Oct. 1973, coll. R. J. Plant: 1 ♂, 8.5 mm cl, para-

type (MOV J44728); Rockhampton, Keppel Bay, 23°10'S, 150°55'E, 9 m, Sept. 6, 1967, coll. B. J. Smith: 1 ♂, 14.1 mm cl, paratype (MOV J44732); Dunk Island, 17°57'S, 146°09'E, coll. E. J. Banfield: 2 ♂, 8.9–9.2 mm cl, paratypes (AM P5340); off North Head, Port Denison, 20°01'S, 148°15'E, coll. E. H. Rainford: 1 ♂, 14.4 mm cl, paratype (AM P7029); Queen's Beach, Bowen, coll. E. N. Rainworth: 1 ♂, 9.1 mm cl, paratype (QM W143); Kinkuna National Park, 20 km south of Bundaberg, 25°00'S, 152°30'E, April 1992, coll. M. Hines: 1 unsexable specimen, 12.5 mm cl (QM W18006); Weipa, July 1961, coll. G. Webster: 1 ♂, 9.1 mm cl, 1 ♀, 9.6 mm cl, paratypes (QM W2221); Bowen, Feb. 27, 1934, coll. unknown: 1 ♂, 11.6 mm cl, paratype (QM W489); Townsville, Oct. 7, 1938, coll. G. Coates: 1 ♀, 10.5 mm cl, paratype (QM W873); **Victoria**: Mud Island, Port Phillip Bay, April 1977, coll. R. Willington: 1 ♀, 13.9 mm cl, paratype (MOV J40194).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 8–11 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with two to six short, oblique medial elements (rarely absent) between longer supralateral elements of CG4; CG5 present as two short transverse elements; CG6 and CG7 separate; CG8 broken; CG11 absent. Rostrum present, reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and subtriangular in shape, tapering at tip, approximated at base of mesial margins, lateral margins convex except slightly concave at tip, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced and acute. Dactylus of pereopod III with heel thin, produced and acute. Dactylus of pereopod IV with produced, subquadrate heel. Telson of male elongate, ovate, tip rounded with medial indentation, dorsal surface inflated medially, with medial row of long thickened setae; lateral margins decalcified. Telson of female similar to male, evenly calcified.

DESCRIPTION: Carapace (fig. 96A) wider than long. Anterior margin concave on either side of ocular sinus, becoming convex lat-

erally with 8–11 large spines ($n = 6$) on each side along length. Rostrum as small acute tooth, reaching proximal margin of ocular plate. Ocular sinus smoothly concave. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, convex, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as none to two short elements; CG3 broken into four widely separated short elements between posterior lateral elements of CG1; CG4 with two to six short, oblique medial elements (rarely absent) between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with single oblique row of short setae. Metagastric region smooth; CG5 present as two short transverse elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 almost transverse, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two to four short medial elements and two longer lateral elements. CG9 present as two to four short lateral grooves with broad gap at midline. CG10 present as two long lateral elements. CG11 absent. Post-CG11 element absent. Branchial region with three to six short, oblique rows of setae in anterior half. Posterior margin deeply and evenly convex, with submarginal groove reaching two-thirds up margin of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered, short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 96B) triangular, with shallow median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with convex lateral and straight mesial mar-

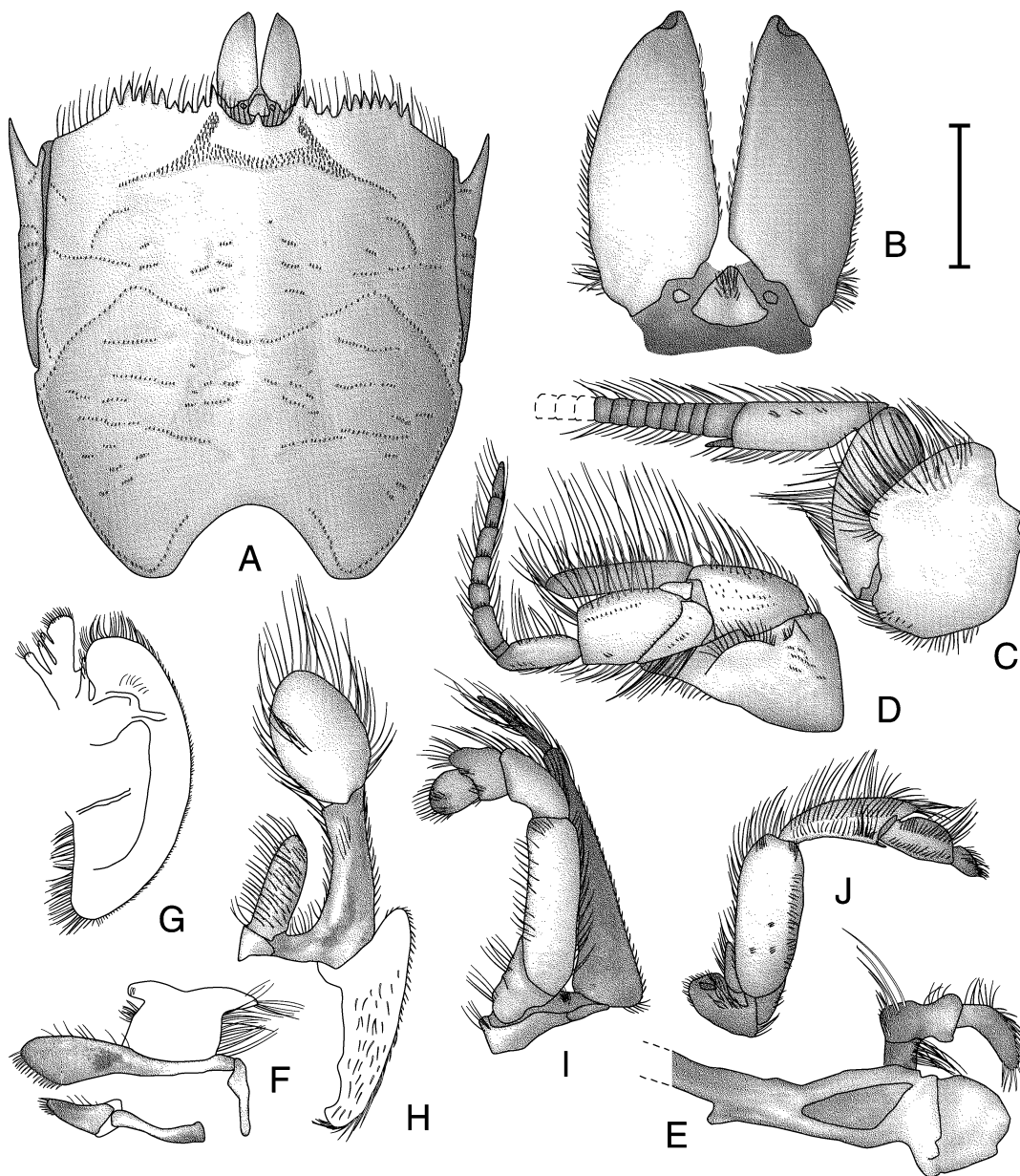


Fig. 96. *Albunea groeningi*, n. sp.: A–J, ♂, 9.2 mm cl, AM P5340, paratype. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible, mesial view. **F.** Left maxillule, lateral view. **G.** Left maxilla, lateral view. **H.** Left maxilliped I, lateral view. **I.** Left maxilliped II, lateral view. **J.** Right maxilliped III, lateral view. Scale = 1.1 mm (B), 1.6 mm (E, F, I), 2.2 mm (C, D, H), and 3.3 mm (A, G, J).

gins, cornea covering lateral portion of distal tip; lateral margin with faint notch one-fourth distal from base; mesial margins approximated at base; mesial margins with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventromedial oblique row of plumose setae extending from tuft to three-fourths length of segment.

Antennule (fig. 96C) with segment III narrow proximally, expanding distally to three times proximal width; plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 104–127 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins. Segment I wider than long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 96D) with segment V approximately two times longer than wide, with long plumose setae on dorsal and ventral margins and scattered on lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of short setae on dorsolateral surface. Segment III with long plumose setae on ventral margin; short simple setae on dorsal margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and short simple setae scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-third length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on dorsal and distoventral margins, and short simple setae in short row on surface rugae behind spine; lateral surface with acute spine dorsodistally; low semicircular dorsolateral lobe ventrodistal to spine, margin of lobe with long plumose setae; segment with ventromesial antennal gland pore.

Mandible (fig. 96E) incisor process with three teeth; cutting edge with one tooth. Palp

three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 96F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with two thick setae at distolateral margin.

Maxilla (fig. 96G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 96H) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments: proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 96I) dactylus evenly rounded, length subequal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsodistal and ventrodistal angles. Carpus not produced dorso-distally, approximately two times longer than wide; long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-half longer than merus, flagellum with one elongate article, approximately as long as carpus.

Maxilliped III (fig. 96J) dactylus oblong with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus approximately one-third length of

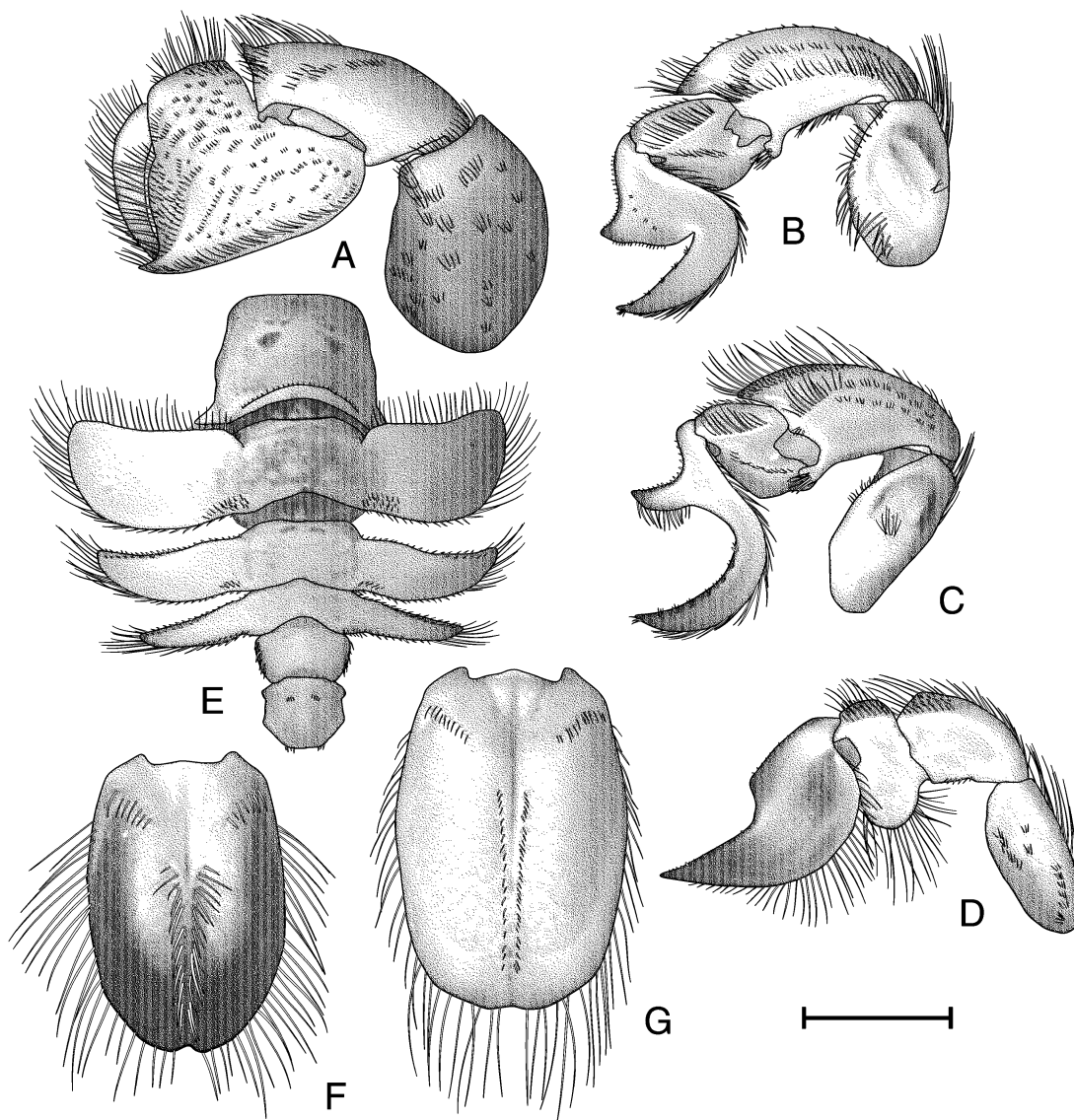


Fig. 97. *Albunea groeningi*, n. sp.: A–F, ♂, 9.2 mm cl, AM P5340, paratype; G, ♀, 13.9 mm cl, MOV J40194, paratype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 1.7 mm (F), 2.2 mm (G), and 3.3 mm (A–E).

propodus; lateral surface with two rows of plumose setae; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and few scattered small areas on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of one or two teeth. Exopod two-segmented: proximal segment small; distal segment styliform, taper-

ing, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 97A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, trans-

verse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, distal margin with long plumose setae; mesial surface with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 97B) dactylus smooth; base to heel strongly and smoothly concave, heel produced, broad and subacute, heel to tip with narrow, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and rounded dorsodistally, dorsal margin smooth; lateral surface smooth, produced area smooth, irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; dorsodistal margin with long plumose setae, proximodorsal and ventral margins with short plumose setae; mesial surface smooth, with row of long plumose setae distally and subdorsally. Merus with

large median decalcified window covering nearly all of lateral surface, long plumose setae on dorsodistal and ventral margins, few scattered long plumose setae on surface; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 97C) dactylus with base to heel deeply concave, heel narrow and acutely produced, heel to tip with broadly concave indent and small concave region at midpoint of proximal margin, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened, with sparse setose mat; mesial surface smooth. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-third length of propodus; tip subacute, dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in oblique row on surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, dorsodistal and ventrodorsal margins with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 97D) dactylus with base to tip straight proximally, with subquadrate heel and broadly rounded, strongly concave indent and almost straight from indent to tip, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial sur-

face with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, ventral margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral surface smooth, mesial surface smooth, with distoventral area of few patches of long plumose setae. Carpus slightly produced dorsodistally; ventral four-fifths of lateral surface and mesial surface smooth, dorsodistal one-fifth of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially. Merus with scattered short transverse rows of setae on lateral surface, dorsal margin with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 97E) somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with irregular, submarginal, transverse ridge anteriorly; with small transverse, decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; anterolateral margins angled, anterior and lateral margins with long plumose setae, posterolateral angle rounded, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter, anterior submarginal windows present; pleura thinner and shorter than on somite II, directed posterolaterally proximally and anterolaterally distally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally, with submarginal row of short setae. Somite IV similar to somite III, but thinner and shorter, anterior submarginal windows present; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface

obliquely flattened anterolaterally; lateral and posterior margins with long plumose setae, anterior margin with short simple setae. Somite V wider than somite IV, anterior submarginal windows present; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V, anterior submarginal windows present; dorsal surface with short transverse rows of setae laterad of midline and on posterior margin; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 97F) ovate and elongated, length greater than width, distal tip rounded, with median indentation; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region; median longitudinal groove extending one-half length, row of long, thick, simple setae of either side of median groove beginning at median and continuing to distal margin of calcified area; proximolateral angles with long simple setae; margins with long simple setae. Telson of female (fig. 97G) similar to male, but more truncate distally and with smaller median indentation, dorsal surface evenly calcified; median groove similar to male, but with shorter setae; proximolateral angle with few short simple setae, margins with long simple setae.

DISTRIBUTION: From southern Japan southward in a narrow band to Western Australia and Victoria, Australia, in up to 45.7 m depth.

MAXIMUM SIZE: Males: 14.4 mm cl; females: 17.0 mm cl.

TYPE SPECIMENS: RMNH ex 32052 (holotype), RMNH 32052 (allotype); AM P5340 (2 paratypes), AM P7029 (paratype), BMNH,1932.11.30.65 (paratype), BMNH 1937.6.1.8 (paratype), MCZ 9625 (paratype), MOV J14552 (paratype), MOV J40194 (paratype), MOV J44728 (paratype), MOV J44732 (paratype), NMCR 1151b (paratype), NTOU (3 paratypes), NTOU (2 paratypes), QM W143 (paratype), QM W489 (paratype), QM W873 (paratype), QM W2221 (2 paratypes), USNM 59074 (paratype), WAM 20667 (3 paratypes), WAM 23386 (5 paratypes), WAM 23389 (6 paratypes), WAM 23391 (paratype), WAM 23395 (paratype), WAM 23396 (paratype), ZLKU 5125–5126

(2 paratypes), ZLKU 7438 (paratype), ZLKU 7511 (paratype), ZRC 1995.571 (paratype).

TYPE LOCALITY: Mikawa-Isshiki, Aichi Prefecture, Honshu, Japan.

ETYMOLOGY: This species is named after Matt Groening, cartoonist and creator of the television program “The Simpsons,” to honor his extensive promotion of crustacean issues in the popular media. “The Simpsons” has exposed people to a diversity of crustacean species, including Lisa’s hermit crab, Patty and Selma’s hermit crab cleaning techniques, and, of course, “Pinchy” the lobster. The specific name is pronounced “gray-ning-i.”

REMARKS: This species is more common in the Philippines than indicated by the above material examined. Serène and Umali (1965) cited 54 specimens from various Philippine locations (as *A. steinitzi*). It is possible that some of Serène and Umali’s (1965) material is not this species, but the identification of their material is based on their descriptions and illustrations and a single specimen cited by them that was available for examination (NMCR 1151b). Curiously, Serène and Umali (1965) stated that all of their specimens were males. However, their “female” of *A. thurstoni* (pl. 5, fig. 1a) is clearly a male, so they may have been in error regarding other specimens as well. The record of Kikuchi (1932) from Toyama Bay, Japan, is probably this species, the only *Albunea* known with certainty from that location.

One ♀ specimen from Kaoasiung, Taiwan (NTOU) is host to an undescribed species of *Albunione* Markham and Boyko (Isopoda: Bopyridae).

This species belongs to the “*holthuisi*-group” of species and is the sister-taxon to *A. holthuisi*.

Albunea symmysta (Linnaeus, 1758)

Figures 98, 99

Cancer Symmysta Linnaeus, 1758: 630. – Linnaeus, 1764: 453.

Cancer symnista [sic]: Linnaeus, 1767: 1053.

Cancer Gymnista [sic]: Houttuyn, 1769: 422.

Cancer gymnista [sic]: Statius Müller, 1775: 1128.

Hippa symnista [sic]: Fabricius, 1787: 329 (part). – Fabricius, 1793: 474.

Cancer Symnista [sic]: de Villers, 1789: 157–158

(part). – Gmelin and Linné, 1790: 2994. – Griffith and Pidgeon, 1833: 178.

Cancer dorsipes: Herbst, 1791: 5–8, pl. 22, fig. 2. – Herbst, 1796: 197–198, pl. 45, figs. 1–7 (not *Notopus dorsipes* (Fabricius, 1793)).

Albunea symnista [sic]: Weber, 1795: 94. – Fabricius, 1798: 397. – Herbst, 1804: 31 (list). – Latreille, 1806: 44. – Lamarck, 1818: 224. – Desmarest, 1823: 283, unnumbered pl., fig. 3. – Desmarest, 1825: 173, pl. 29, fig. 3. – Guérin Méneville, 1829: 12 (list), pl. 15, fig. 1. – Latreille, 1831: 56. – Brewster, 1832: 234. – H. Milne Edwards, 1837a: 111–112, explanation for pl. 42, pl. 42, fig. 3. – H. Milne Edwards, 1837b: 203–204, pl. 42, fig. 3. – H. Milne Edwards, 1840: 111–112. – White, 1847: 57. – de Haan, 1849: viii, pl. Q. – Lucas, 1853: 45–47, pl. 1, fig. 8. – Heller, 1863: 153 (part). – Heller, 1865: 72. – Chenu and Desmarest, 1877: 32. – Miers, 1878: 326–327. – Lucas, 1881: 54–55*. – Albert, 1883: 523–524, pl. 31, figs. 1, 6, 17. – de Man, 1887: 425. – F. Müller, 1890: 472. – Ortmann, 1892: 536. – Henderson, 1893: 338, 409*. – Stebbing, 1893: 152 (list). – Southwell, 1910: 183. – Boschma, 1931: 351, 354*. – Boschma, 1937: 204*. – Menon, 1937: 10–15, figs. 46–82. – Gordon, 1938: 187 (part), figs. 1e, 3f, 4c*. – Bouvier, 1940: 181, pl. 6, fig. 1. – Gravely, 1941: 75, 104, fig. 27–1. – Gurney, 1942: 263, fig. 110k. – Boschma, 1955: 14, 57, 65, 67*. – Sarojini, 1962: 191, fig. 1j. – Serène and Umali, 1965: 90–95 (part), pl. 1, fig. 1, pl. 2, fig. 1, pl. 3, fig. 1, 1a, pl. 4, fig. 1, text-figs. 1a, 2a, 3, 4a, 5a, b, 6a, b, b’*. – Thomassin, 1969: 138–140, pl. 1, text-fig. 3a. – Boonruang and Phasuk, 1975: 1–2, 8, 15, 17, fig. 4. – Anantaraman and Subramoniam, 1976: 192–199. – Naiyanetr, 1978: 333, fig. 1. – Naiyanetr, 1980: 22. – Panneerselvam and Subramoniam, 1983: 1–8, figs. 1–8. – Subramoniam, 1984: 78–94, figs. 1a, 2–14. – Coêlho and Calado, 1987: 43, table 1. – Seridji, 1988: 1298. – Subramoniam, 1993: 133, 152–155, 158, 197–198, figs. 14, 15. – Calado, 1997a: 17. – Naiyanetr, 1998: 51. – K. Sakai, 1999: 9, pl. 1, fig. d.

albunea symnista [sic]: Latreille, 1803: 172, pl. 51, fig. 4.

Albunea dorsipes: Herbst, 1804: 31 (list) (not *Notopus dorsipes* (Fabricius, 1793)).

Cancer lymnista [sic]: Froriep, 1806: 183 (list).

Albunea Symniste [sic]: Duméril, 1816: 431.

Albunaea [sic] *symnista* [sic]: Stimpson, 1858: 230 (list).

Albunea (symnista): Claus, 1885: 69, 108, pl. 6, fig. 52. – Claus, 1886: 69, 108, pl. 6, fig. 52.

Albunea symmysta: Ortmann, 1896: 224. – Ortmann, 1901: 1276, pl. 72, fig. 3, pl. 93, fig. 4, pl. 104, fig. 2. – Holthuis, 1956: 238. – ICZN,

- 1958: 234. – Subramoniam and Panneerselvam, 1985: 226–227. – Boyko and Harvey, 1999: 391, 396, 400 (list), 401 (key)*. – Boyko, 1999: 145 (list).
- Cancer symmysta*: Holthuis, 1956: 237–238. – ICZN, 1958: 213, 215, 233–234. – Melville and Smith, 1987: 298. *Albunea Symnista* [sic]: Seridji, 1988: 1298.
- Albunea symmysta* [sic]: Chace and Kensley, 1992: 446, fig. 2n.
- Cancer symnista* [sic]: Calado, 1995: 71.
- “*Albunea* sp. n.” Calado, 1995: 76–78, pl. 4, fig. 1, pl. 5, fig. 1, pl. 23, fig. a, pl. 24, figs. a–e*.
- Albunea symnestra* [sic]: Dexter, 1996: 12.
- Albunea symnista* [sic]: Fransen et al., 1997: 161*. – Richmond, 1997: 214, unnumbered fig. on p. 215.
- Albunea edsoni* Calado, 1997a: 18–21, figs. 1, 2* (NEW SYNONYMY).
- ?*Albunea oxyophthalma*: Southwell, 1910: 184 (not *Albunea oxyophthalma* Miers, 1878 = *A. paretii* Guérin Méneville, 1853).
- ?*Albunea* [sic] *symnista* [sic]: Menon, 1937: 10.
- ?*Albunea* [sp.] Menon, 1943: 331–332.
- ?*Albunea symnista* [sic]: Wang, 1989: 39. – Sun and Wang, 1996: 31 (list) (? = *Albunea* sp. indet.).
- not *Hippa symnista* [sic]: Fabricius, 1787: 329 (part) (= *Corystes cassivelaunus* (Pennant, 1777)).
- not *Cancer Symnista* [sic]: de Villers, 1789: 157–158 (part) (= *Corystes cassivelaunus* (Pennant, 1777)).
- not *Albunea symnista* [sic]: Rafinesque-Schmaltz, 1814: 20. – Lucas, 1849a: 27–28*. – Lucas, 1849b: pl. 3, fig. 2*. – Heller, 1863: 153 (part). – Barrois, 1888: 18–19, 75, 82, 89, 93–94. – Bolivar, 1892: 128 (list). – Ferrer Aledo, 1914: 68. – Miranda y Rivera, 1933a: 22. – Miranda y Rivera, 1933b: 1 (list) (= *Albunea carabus* (Linnaeus, 1758)).
- not *Albunea symnista* [sic]: Brullé, 1836–1844: 17. – Ozorio, 1888: 186 (= *Albunea elegans* A. Milne Edwards and Bouvier, 1898).
- not *Albunea symnista* [sic]: Gibbes, 1850a: 24* (= *Albunea paretii* Guérin Méneville, 1853).
- not *Albunea symnista* [sic]: Gibbes, 1850b: 187 (= *Albunea catherinae*, n. sp.).
- not *Albunea symnista* [sic]: A. Milne Edwards, 1862: F–12* (= *Albunea speciosa* Dana, 1852).
- not *Albanea* [sic] *symnista* [sic]: Hoffman, 1874: 42 (list) (= *Albunea speciosa* Dana, 1852).
- not *Albunea symnista* [sic]: Cano, 1889a: 95, 104. – Cano, 1889b: 263. (= *Albunea steinitzi* Holthuis, 1958).
- not *Albunea symmysta*: Nobili, 1906: 142–143*. – Ramadan, 1936: 3 (list) (= *Albunea steinitzi* Holthuis, 1958).
- not *Albunea symnista* [sic]: Rathbun, 1924: 29 (= *Albunea* sp. indet.).
- not *Albunea symnista* [sic]: Nakazawa, 1927: 1051, fig. 2025. – Nakazawa et al., 1949: 741, fig. 2144. – Nakazawa et al., 1951: 741, fig. 2144 (= ? *Paralbunea dayriti* (Serène and Umali, 1965)).
- not *Albunea symnista* [sic]: Kikuchi, 1932: 10 (= *Albunea? groeningi*, n. sp.).
- not *Albunea symnista* [sic]: T. Sakai, 1935: 61 (= *Albunea* sp. indet.).
- not *Albunea symnista* [sic]: Gordon, 1938: 187 (part)*. – Serène and Umali, 1965: 90–95 (part)*. – Miyake, 1991: 157, pl. 53, fig. 2. – Asakura, 1995: 376, fig. 21–285 (= *Albunea occultus*, n. sp.).
- not *Albunea symnista* [sic]: Gordon, 1938: 187 (part)*. – Miyake, 1978: 152–154, figs. 59, 60a* (= *Albunea groeningi*, n. sp.).
- not *Albunea symnista* [sic]: Gordon, 1938: 187 (part)* (= *Albunea bulla*, n. sp.).
- not *A. symnista* [sic]: Ward, 1942: 52 (list), 63 (= ? *Albunea holthuisi* Boyko and Harvey, 1999).
- not *Albunea symnista* [sic]: Barnard, 1950: 405–406. – Kensley, 1981: 35 (list) (= *Albunea* sp. indet.).
- not *Albunea symnista* [sic]: Kikuchi, 1959: 49 (list). – Kikuchi, 1961: 5 (list) (= *Albunea* sp. indet.).
- not *Albunea* [sic] *symnista* [sic]: Kikuchi, 1961: 5 (list) (= *Albunea* sp. indet.).
- not *Albunea symmysta*: Miyake, 1961: 12. – Miyake et al., 1962: 125 (part) (= ? *Paralbunea dayriti* (Serène and Umali, 1965)).
- not *Albunea symmysta*: Miyake et al., 1962: 125 (part, Toyama Bay material) (= *Albunea groeningi*, n. sp.).
- not *Albunea symmista* [sic]: Miyake, 1965: 651* (= *Albunea occultus*, n. sp.).
- not *Albunea symmista* [sic]: Miyake, 1965: fig. 1111 (= ? *Paralbunea dayriti* (Serène and Umali, 1965)).
- not *Albunea symnista* [sic]: Serène, 1977: 47. – Calado, 1995: 71–73, pl. 4, fig. i, pl. 5, fig. h, pl. 21, figs. a, b, pl. 22, figs. a–f* (= *Albunea microps* Miers, 1878).
- not *Albunea symmysta*: Kikuchi and Miyake, 1978: 31 (list) (= *Albunea* sp. indet.).
- not *Albunea symmysta*: Nurul Huda et al., 1989: 88–89 (= *Albunea? thurstoni* Henderson, 1893).

MATERIAL EXAMINED: **India**: “Indian Seas,” coll. unknown: 1 ♂, 13.6 mm cl, 2 ♀, 19.0–19.8 mm cl (BMNH 1883.25); “Ganjam,” coll. unknown: 1 ♀, 15.0 mm cl (BMNH 1889.6.17.151); Colachel, coll. un-

known: 1 ♂, 14.1 mm cl (BMNH 1903.4.6.210); Madras, coll. J. R. Henderson: 1 ♂, 16.2 mm cl, 7 ♀, 14.2–21.9 mm cl (BMNH 1892.7.15.125–132); Madras, coll. unknown: 3 ♀, 17.2–19.6 mm cl (BMNH 1903.4.6.211–212); [Madras], coll. unknown, 1 larva, 2.8 mm cl (BMNH 1949.12.2.544 ex Menon via Gurney); Madras, coll. Museum Wien: 1 ♂, 14.8 mm cl, neotype (ZMO F17538); Pondicherry, 1881, coll. M. Maindron: 1 ♀, 18.0 mm cl (MNHN-Hi 115); Pondicherry, 1881, coll. M. Maindron: 3 ♂, 12.5–13.4 mm cl (MNHN-Hi 116); Pondicherry, Jan. 1881, coll. M. Maindron: 2 ♀, 15.3–18.0 mm cl (MNHN-Hi 16); Pondicherry, Nov. 28, 1942, coll. unknown: 1 ♀, 19.5 mm cl (MNHN-Hi 15); Pondicherry, coll. M. Leschenault: 1 ♂, 17.4 mm cl, 1 ♀, 17.8 mm cl (MNHN-Hi 182); Pondicherry, coll. M. Leschenault: 1 ♀, 14.7 mm cl (MNHN-Hi 183); Pondicherry, coll. M. Leschenault: 1 ♀, 16.4 mm cl (MNHN-Hi 184); Pondicherry, coll. M. Leschenault: 1 ♂, 13.0 mm cl (MNHN-Hi 185); [Pondicherry], coll. M. Leschenault: 1 ♂, 14.1 mm cl (MNHN-Hi 186); Pondicherry, Aug. 1901, coll. M. Maindron: 25 ♂, 10.6–15.5 mm cl, 16 ♀, 11.0–20.8 mm cl (MNHN-Hi 196); Pondicherry, Bay of Bengal, 11°59'N, 79°50'E, 1901, coll. [M. Maindron]: 1 ♂, 14.6 mm cl (AM P5404); Pondicherry, 1901, coll. [M. Maindron]: 1 ♂, 15.5 mm cl (AM P5405 ex MNHN); Pondicherry, 1901, coll. [M. Maindron]: 1 ♂, 13.0 mm cl (AM P5406 ex MNHN).

Sri Lanka (Ceylon): “Ceylon,” coll. E. E. Green: 2 ♂, 15.3–15.9 mm cl, 1 ♀, 16.2 mm cl (BMNH 1904.11.28.4–6); “Beutkoffe, SW Ceylon,” Aug. 2, 1909, coll. G. Dürker: 1 ♀, 17.7 mm cl (ZMH K–32584).

Indonesia: Padang, Sumatra, Oct. 14, 1828–Nov. 10, 1829, coll. S. Müller: 2 ♀, 15.0–16.0 mm cl (RMNH 23029); Benkoelen, Sumatra, Nov. 1925, coll. H. C. Kellers: 1 ♀, 19.1 mm cl (USNM 68615); “Buitenzorg,” Java, June 1906, coll. H. Jensen: 16 ♂, 10.2–14.1 mm cl, 24 ♀, 11.2–19.2 mm cl (ZMUC 2713); “Moluccas,” 1841–1843, coll. E. A. Forsten: 1 ♂, 15.5 mm cl, 1 ♀, 13.5 mm cl (RMNH 23030); “Moluccas,” coll. unknown: 8+ unsexable specimens, 12.5–15.3 mm cl (RMNH 853).

Thailand: Phuket Island, July 1970, coll. unknown: 1 ♀, 19.4 mm cl (CASIZ 109242).

Philippines: Padada Beach, Gulf of Davao, Sept. 1939, coll. G. R. Oesch: 1 oviger, 12.9 mm cl (AMNH 10393); Morong, Bataan, March 1, 1999, coll. J. D. Williams: 2 ♂, 8.9–12.6 mm cl, 1 juvenile, 5.2 mm cl (AMNH 18092); Morong, Bataan, Feb. 20, 1999, coll. J. D. Williams: 1 molt, 7.1 mm cl (AMNH 18093); Levgayen Gulf, 500 ft (= 151.5 m), May 1909, coll. “Albatross”: 1 ♀, 14.8 mm cl (USNM 68613); Calapan, Mindoro, Jan. 6, 1933, coll. P. de Mesa: 1 ♂, 12.1 mm cl (MCZ 19654); Calapan, Mindoro, coll. P. de Mesa: 1 ♂, 8.2 mm cl (MCZ 9615).

Australia: Queensland: 15°28'S, 145°15'E, Cooktown, June 1, 1985, coll. S. W. Gunn: 1 ♂, 9.7 mm cl (MOV J44730); Cardwell, Port Douglas, Jan. 20, 1972, coll. E. M. Grant: 1 ♀, 15.1 mm cl (QM W3848); **New South Wales:** Lord Howe Island, coll. unknown: 1 ♀, 17.8 mm cl, holotype of *A. edsoni* (BMNH 1912.11.22.106).

Limited Data: Sta. 1679, Mission de l'Indochine, 1912, coll. A. Kreuff: 4 ♂, 12.2–13.2 mm cl, 2 ♀, 13.6–15.5 mm cl (MNHN-Hi 86); “Asia,” pre–1866, coll. L. de Jeude: 1 ♀, 18.7 mm cl (MOV J14551); “Asia,” coll. L. de Jeude: 1 ♂, 11.9 mm cl (MOV J44726); “Yanaon, Indes Orientales,” coll. unknown: 1 ♀, 18.6 mm cl (MNHN Hi 187).

No Data: 1 ♂, 12.4 mm cl (MNHN-Hi 17); 1 ♀, 17.0 mm cl (MOV J14554).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 11–17 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with two short, anteriorly displaced medial elements between longer supralateral elements of CG4; CG5 of two triangular elements; CG6 and CG7 separate; CG8 broken; CG11 absent. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular, tapering at tip, approximated along mesial margins at base, lateral margins broadly convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced, tapered, and

subacute. Dactylus of pereopod III with heel tapering, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with produced subacute heel and deep indent. Telson of male broadly triangular, laterally produced, length subequal to width, with broadly rounded tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region, median row of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly produced tip.

DESCRIPTION: Carapace (fig. 98A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 11–17 large spines ($n = 9$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave, with three or four small spinules. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 absent; CG3 broken into five or six short elements between posterior lateral elements of CG1, medial elements anteriorly displaced; CG4 with two short, anteriorly displaced medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin without rows of setae. Metagastric region smooth; CG5 present as two triangular elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two to four short medial elements. CG9 present as two short lateral grooves with gap at midline. CG10 absent. CG11 absent. Post-CG11 element absent. Branchial region with numerous short, transverse rows of setae in anterior half. Posterior margin deeply and evenly convex, with submarginal groove reaching two-thirds up margin of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered,

short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 98B) triangular, with deep median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with strongly convex lateral and straight mesial margins, cornea covering lateral portion of distal tip; lateral margins with notch one-fourth distal from base; mesial margins approximated at base, with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventromedial oblique row of plumose setae extending from tuft to three-fourths length of segment.

Antennule (fig. 98C) with segment III narrow proximally, expanding distally to two times proximal width; with plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 121–131 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with three to five articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, unarmed; dorsal third of lateral surface rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 98D) with segment V approximately two times longer than wide, with long plumose setae on dorsal and ventral margins and scattered on lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins and row of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-sixth length of segment IV, with long plumose setae on dor-

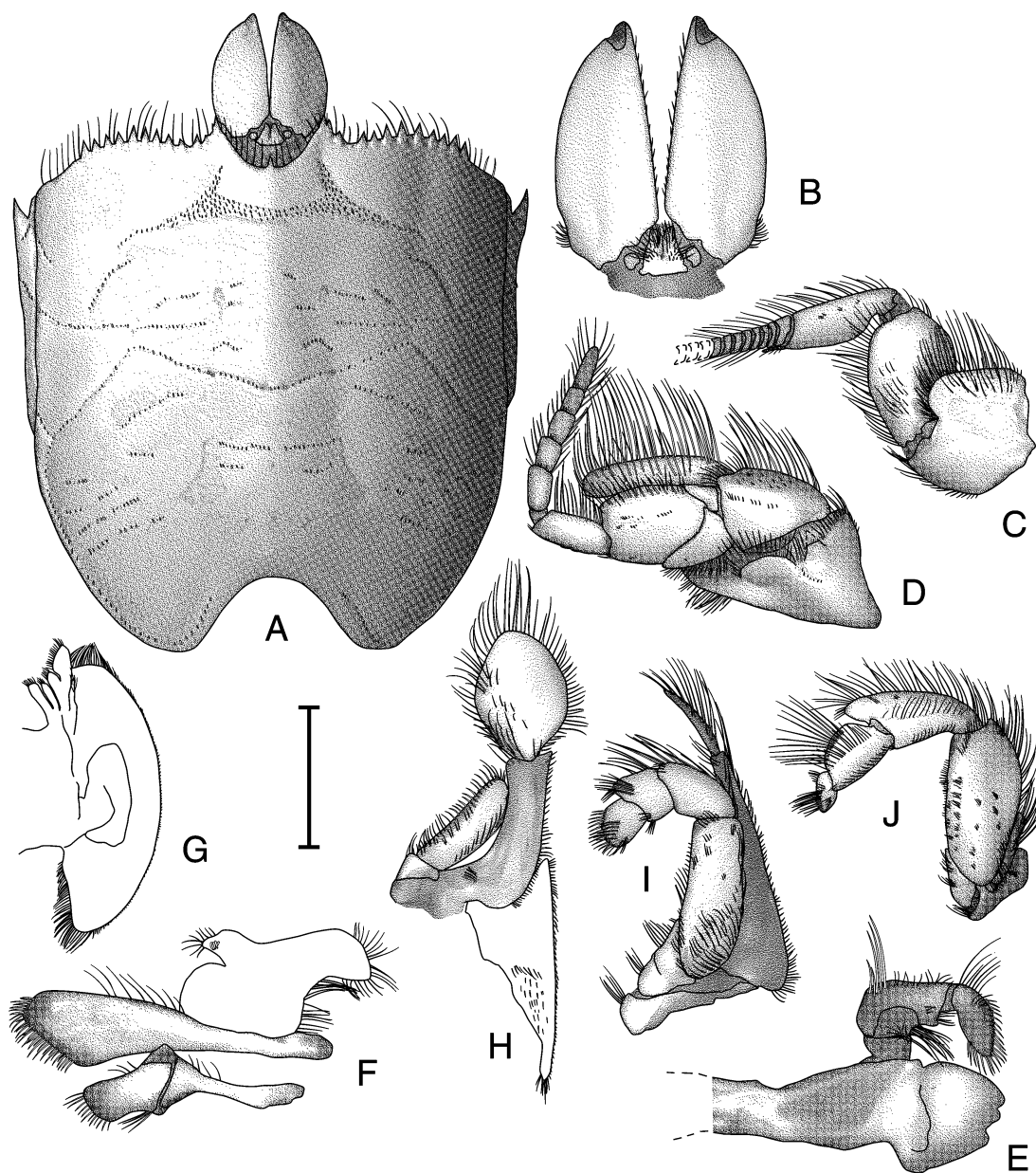


Fig. 98. *Albunea symmysta* (Linnaeus, 1758): A, ♀, 14.8 mm cl, USNM 68613; B–J, ♀, 16.9 mm cl, ZMUC 2713. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 2.2 mm (F), 3.0 mm (B, E), 3.3 mm (I), 4.4 mm (D, H), 5.0 mm (A), 5.9 mm (C), and 6.7 mm (G, J).

sal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and in short row on surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodistant to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 98E) incisor process with three teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 98F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with four thick setae at distolateral margin.

Maxilla (fig. 98G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 98H) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 98I) dactylus evenly rounded, length slightly greater than width, with thick simple setae distally and on distolateral surface. Propodus 1.5 times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsodistal and ventrodistant angles. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused with plumose setae on margins. Exo-

pod one-third longer than merus, flagellum with one elongate article, approximately as long as carpus.

Maxilliped III (fig. 98J) dactylus oblong with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-third length of propodus; lateral surface with two rows of plumose setae on surface; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of three or four teeth. Exopod two-segmented: proximal segment small; distal segment styliiform, tapering, approximately two-fifths length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 99A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial side with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 99B) dactylus smooth; base to heel slightly concave, heel produced, broad and subacute, heel to tip with narrow, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short se-

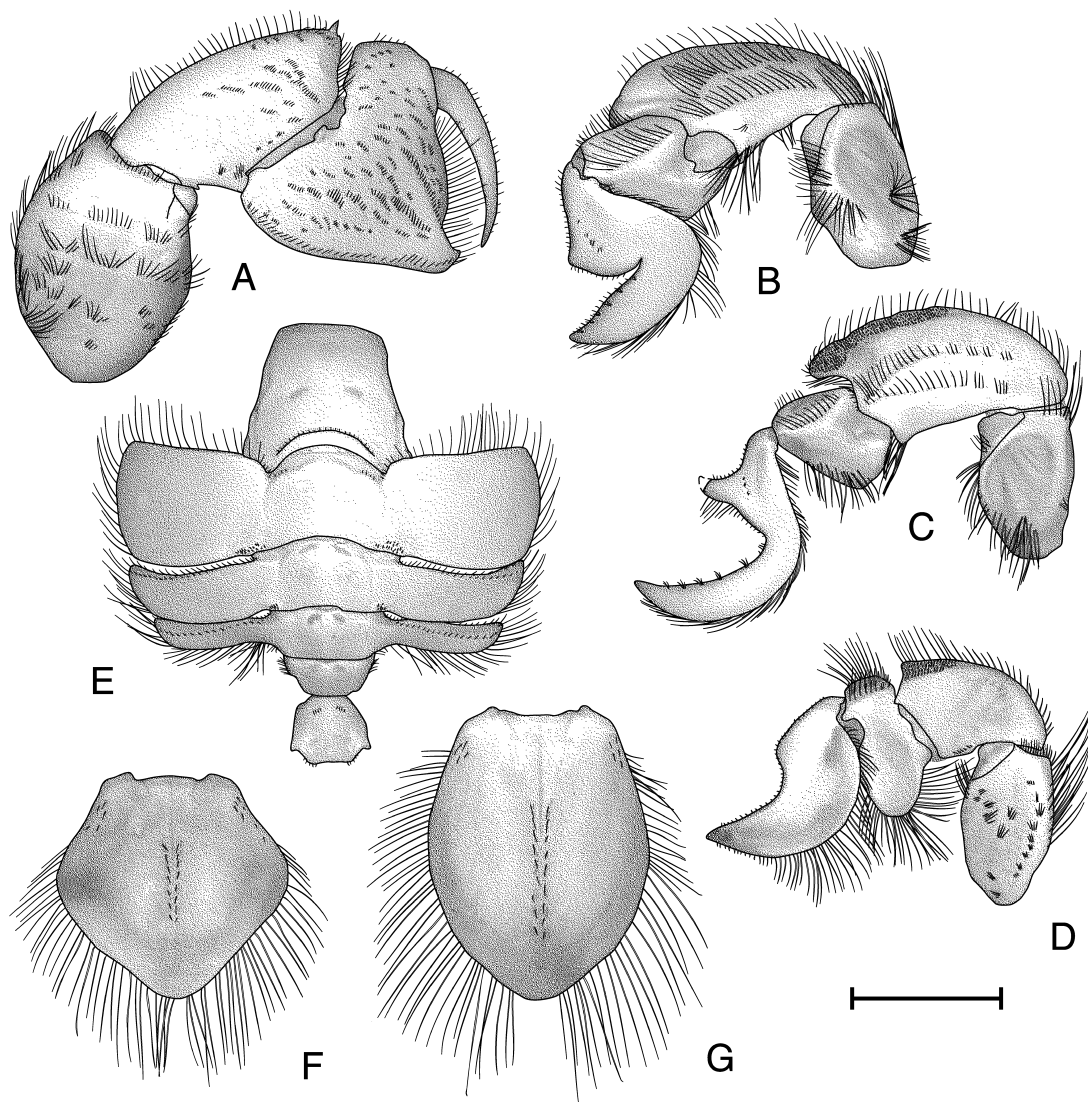


Fig. 99. *Albunea symmysta* (Linnaeus, 1758): A–E, ♀, 16.9 mm cl, ZMUC 2713; F, ♂, 14.1 mm cl, ZMUC 2713. **A.** Right pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.3 mm (F, G) and 5.9 mm (A–E).

tae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on

dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and rounded dorsodistally, dorsal margin smooth; lateral surface smooth, produced area smooth, irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae;

margins with short plumose setae; mesial surface smooth, with row of long plumose setae distally and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered long plumose setae on surface and margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 99C) dactylus with base to heel concave, heel narrow and acutely produced, heel to tip with broadly concave indent and small concave region at midpoint of proximal margin, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in roughly straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface smooth. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-third length of propodus; tip rounded, dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in oblique row on surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with tiny pore located more mesially.

Pereopod IV (fig. 99D) dactylus with base to tip convex proximally, with broadly rounded, strongly concave indent and almost straight from indent to tip, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with

long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, ventral margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral surface smooth, mesial surface smooth, with distoventral area of few patches of long plumose setae. Carpus slightly produced dorsodistally; ventral four-fifths of lateral surface and mesial surface smooth, dorsodistal fifth of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially. Merus with scattered, short, transverse rows of setae on lateral surface, dorsal and ventrodistal margins with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 99E) somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with irregular submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; anterolateral margins angled, anterior and lateral margins with long plumose setae, posterolateral angle rounded, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter, anterior submarginal windows present; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally, with submarginal row of short setae. Somite IV similar to somite III, but thinner and shorter, anterior submarginal windows present; dorsal surface with few short setae anterolaterally;

pleura thinner and shorter than on somite III, directed anterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV, anterior submarginal windows present; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V, anterior submarginal windows present; dorsal surface with short transverse rows of setae laterad of midline; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 99F) broadly triangular, laterally produced, length subequal to width, with broadly rounded tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region; median longitudinal groove extending one-half length, row of long simple setae of either side of median groove beginning at median and continuing almost to distal margin of calcified area; proximolateral angles with few long simple setae; margins with long simple setae. Telson of female (fig. 99G) flattened, ovate, and evenly calcified with slightly produced tip; median groove similar to male, setal row from midpoint of median groove to near distal margin of telson with simple setae subequal to those of male; proximolateral angle with few short setae, margins with long simple setae.

DISTRIBUTION: From the east coast of India throughout southeast Asia to the Philippines and Indonesia as far east as Java, in up to 151.5 m depth. Also Queensland and Lord Howe Island, Australia.

MAXIMUM SIZE: Males: 17.4 mm cl; females: 21.9 mm cl.

TYPE SPECIMENS: The type or types of *Cancer symmysta* are not extant and a neotype (♂, 14.8 mm cl) is herein designated as ZMO F17538. BMNH 1912.11.22.106 (holotype of *A. edsoni*).

TYPE LOCALITIES: “Asia” was the only locality information given by Linnaeus (1758) for *A. symmysta*; the neotype designated herein (ZMO F17538) was collected from Madras, India, which becomes the type locality of *A. symmysta*; Lord Howe Island, New South Wales, Australia (*A. edsoni*).

REMARKS: *Albunea symmysta* is no. 1565 on the “Official list of specific names in zo-

ology” (ICZN, 1958) and is the type of the genus *Albunea* by subsequent designation of Holthuis (1956). This species is called “Jakalan quai” or “buffalo cicada” in Thailand, terms also used for the genus *Hippa* (Boonruang and Phasuk, 1975).

Although Linnaeus (1758, 1767) gave the type locality as “Asia,” it should be noted that he also (1764) cited India as the “habitat” for this species, which is most likely where his specimens came from. Consequently, the neotype specimen (ZMO F17538) is selected from an Indian locality. A neotype is needed to stabilize the identity of this species, as there have been numerous instances of confusion between other albuneid taxa and *A. symmysta* (see synonymy list above). The so-called holotype of *Cancer dorsipes* “Herbst” (ZMB Herbst 2231), as cited by K. Sakai (1999), is merely Herbst’s (1804) specimen of *A. symmysta*. The species *dorsipes* was established in the genus *Hippa* by Fabricius in 1793.

The misspelling “*symnista*” was introduced by Linnaeus (1767) and unfortunately became the spelling used by most authors up to the present. It is hoped that the correct original spelling of this species will now be universally adopted.

Albunea symmysta is a model animal that has been used to study endocrinology, spermatophore formation, and breeding patterns (Panneerselvam and Subramoniam, 1983; Subramoniam, 1984; Subramoniam and Panneerselvam, 1985). Because of this, more is known about the biology of this species than any other albuneid, but not all published statements are accurate. As discussed for the family and genus, this species is neither blind nor a filter-feeder, as suggested by Subramoniam and Panneerselvam (1985).

This species breeds continuously along the Madras coast, with peaks in January and June, but the maximum percentage of ovigers is only 25% (Subramoniam and Panneerselvam, 1985). Sexual maturity of females was reported as 17 mm cl, and maximum size as 22 m cl (Subramoniam and Panneerselvam, 1985). However, an ovigerous ♀ of 12.9 mm cl is known from the Philippines (AMNH 10393). The larval stages were described by Menon (1937) from Indian plankton samples, and there appear to be five zoal stages.

There are 12 gills along each side in the stage IV zoea and 13 in stage V zoea vs. 10 in an adult. Menon (1943) incorrectly suggested that this showed evidence of recapitulation of ancestral characters in the larval stages.

The androgenic gland of *A. symmysta*, as described by Sarojini (1962), is distinctive and unlike that of the pagurid hermit crab he studied, but the apparent overall variability in this gland within a single species makes its utility in phylogenetic studies questionable.

Albunea symmysta has been well studied with regards to its parasites. One 12.3 mm cl ♀ from Java (ZMUC 2713) has an attached rhizocephalan parasite, *Sacculina anceps* Boschma, 1931. This parasite is one of only a few species of "*Sacculina*" not found on brachyurans and may not properly belong to this genus (but see Boschma, 1955). *Sacculina anceps* was described from six specimens found on specimens of *A. symmysta* (ZMUC 2713). A lectotype for *S. anceps* was selected by Boschma (1937) as "the best preserved of the two specimens of which longitudinal sections have been made". The specimen cited above is therefore a paralectotype of *S. anceps*. High levels of infection in Indian populations of *A. symmysta* by microphallid trematode metacercariae (Platyhelminthes) were reported by Anantaraman and Subramoniam (1976). The parasites were tentatively identified as *Microphallus* sp. and were found in the ovaries of female crabs, while male crabs were uninfected.

As *A. symmysta* is the only species known at present from either Sri Lanka or India, it seems likely that this is the taxon Southwell (1910: 184) collected from near Ceylon, in spite of his having also listed *A. symmysta* as a separate taxon (Southwell, 1910: 183).

It is difficult to know what species Serène and Umali (1965) were dealing with from the Philippines, but at least some of their material was true *A. symmysta*. This can be seen in their illustrations of the inflated distal peduncular segments (text-fig. 5a) and dactyli (text-fig. 3), which match well with *A. symmysta*. Some of their material is clearly not *A. symmysta*, however, as can be seen in their discussion of the variable shape of the dactylus of pereopod IV. These other specimens

are probably *A. occultus*, but need to be examined for confirmation.

Thomassin (1969) reported this species from Madagascar, but he had no specimens and relied on the personal communication of two individuals for his information. However, the species is otherwise not known to occur in Madagascar and probably does not occur west of India. Because of this and numerous other misidentifications in the literature, Thomassin's (1969: text-fig. 11) distribution map for this species is not accurate. The citation of Richmond (1997) appears to be based on the same incorrect data from Thomassin (1969) and not on actual specimens from east Africa.

The identities of the dry specimens cited by Fransen et al. (1997) were confirmed by examination of sketches kindly supplied by Dr. Fransen.

Calado (1997a) described the species *Albunea edsoni*, based on a single ♀ specimen from Australia, but this specimen is actually a large example of *A. symmysta*. The main diagnostic feature given by Calado (1997a) was "17 teeth on the right frontal edge and 16 on the left." As shown herein, the number of teeth on the frontal margin of *Albunea* species is only useful for separating species groups such as the "*microps*-group" from the "*symmysta*-group." It is not a valid means of identifying species. Although not explicitly stated by Calado (1997a), the probable reason she described this new species was because the specimen was not conspecific with the single specimen of "*A. symmysta*" she examined (Calado, 1995). I have examined that specimen (BMNH 1956.1.14.20) and, as can be seen from Calado's (1995: pl. 4, fig. i, pl. 5, fig. h, pl. 21, figs. a, b, pl. 22, figs. a-f) illustrations, it is actually a misidentified *A. microps*. Calado (1995, 1997a) apparently uncritically accepted the identification of this specimen on the label as written, and she incorrectly concluded that the Lord Howe Island specimen represented an undescribed species. This demonstrates the importance of studying large series of specimens in order to correctly understand intra-specific variation.

This species is closely related to *A. occultus* and these two species appear to be inter-

mediate in form between the “*holthuisi*-group” and the “*paretii*-group.”

***Albunea occultus*, new species**

Figures 100, 101

Albunea symnista [sic]: Gordon, 1938: 187 (part)*. – Serène and Umali, 1965: 90–95 (part)*. – Miyake, 1991: 157, pl. 53, fig. 2.—Asakura, 1995: 376, fig. 21–285 (not *Albunea symnista* (Linnaeus, 1758)).

Albunea symmista [sic]: Miyake, 1965: 651* (not *Albunea symnista* (Linnaeus, 1758)).

MATERIAL EXAMINED: **Japan:** Tosa-Shimizu, Tosa Bay, Shikoku Island, 4–7 m, May 1959, coll. K. Kurohara: 2 ♀, 8.5–15.3 mm cl, paratypes (ZLKU 7040–7041); Tosa Bay, Shikoku Island, July 6, 1959, coll. S. Nakayama: 1 ♂, 16.7 mm cl, 1 ♀, 18.1 mm cl, paratypes (ZLKU 7062–7063).

Taiwan: Taiwan Strait, south of Formosa Banks to the Penghu (Pescadores) Islands, 30–50 m, May 5, 1972, coll. commercial fishermen: 1 ♀, 23.0 mm cl, paratype (CASIZ 109246); Kaohsiung, 15 m, May 10, 1991, coll. unknown: 1 ♀, 24.0 mm cl, paratype (NTOU); Kaohsiung, 20 m, April 3, 1988, coll. unknown: 1 ♀, 25.3 mm cl, paratype (NTOU); “Taiwan,” May 17, 1992, coll. unknown: 1 ♀, 22.3 mm cl, paratype (NTOU); “southern Taiwan,” 5 m, Jan. 24, 1992, coll. unknown: 1 ♂, 19.7 mm cl, paratype (NTOU).

Philippines: Mindoro, coll. P. de Mesa: 1 ♂, 10.1 mm cl, paratype (MCZ 10261); Morong, Bataan, Feb. 28, 1999, coll. J. D. Williams: 1 juvenile, 4.0 mm cl, paratype (AMNH 18094); Nasasa Bay, Zambales Province, 5–18 fms (= 9.1–32.9 m), Jan. 30–Feb. 8, 1960, coll. F. G. Dayrit and J. E. Norton: 1 ♂, 6.7 mm cl, 1 ♀, 7.3 mm cl, paratypes (USNM 267779); south lagoon, Sibutu, Sulu Archipelago, 04°31'N, 119°22'E, 13 fms (= 23.8 m), Feb. 25–26, 1964, coll. B. R. Wilson on “Pele”: 1 ♂, 8.6 mm cl, paratype (WAM 10411).

Australia: **Western Australia:** Coral Bay, 1989, coll. C. Simpson: 1 ♀, 20.2 mm cl, paratype (WAM 20261); Sta. 3, northeast corner of North Pasco Island, 20°54'S, 115°19'E, Sept. 17, 1966, coll. WAM-USNM Barrow Island Expedition 1966: 1 ♂, 16.4 mm cl, paratype (WAM 23392); Sta.

05D06BT, northwest shelf, 19°29.7'S, 118°52.1'E, 38–39 m, Oct. 25, 1983, coll. CSIRO: 1 ♂, 12.9 mm cl, 3 ♀, 6.2–12.4 mm cl, paratypes (QM W22322); Sta. 05B07BT, northwest shelf, 19°30.9'S, 118°49.2'E, 38–39 m, Oct. 25, 1983, coll. CSIRO: 1 ♀, 17.7 mm cl, paratype (QM W22323); Sta. 05D02BT, northwest shelf, 19°29.4'S, 118°52.4'E, 37–38 m, Oct. 24, 1983, coll. CSIRO: 3 ♂, 6.1–14.0 mm cl, 3 ♀, 7.5–9.2 mm cl, paratypes (QM W22326); Sta. 04B09BT, northwest shelf, 19°28.4'S, 118°55.2'E, 39 m, Aug. 31, 1983, coll. CSIRO: 1 ♀, 7.7 mm cl, paratype (QM W22329); Sta. 05B12BT, northwest shelf, 19°03.6'S, 119°03.4'E, 82 m, Oct. 23, 1983, coll. CSIRO: 2 ♂, 6.3–10.3 mm cl, paratypes (QM W22338); Sta. 04B14S, northwest shelf, 19°43.9'S, 117°54.5'E, 52–53 m, Sept. 2, 1983, coll. CSIRO: 2 ♀, 5.6–6.2 mm cl, paratypes (QM W22340); “northwest Australia,” coll. unknown: 1 ♀, 10.4 mm cl, paratype (BMNH 1932.11.30.64); **Northern Territory:** Western shore, Darwin Harbour, Nov. 3, 1963, coll. unknown: 1 ♂, 18.6 mm cl, paratype (WAM 23393); Waigait, Darwin, Nov. 11, 1969, coll. O. J. Cameron: 2 ♂, 15.1–17.5 mm cl, 1 ♀, 18.1 mm cl, paratype (AM P19435); Mandora, Darwin, Nov. 22, 1972, coll. N. Coleman: 1 oviger, 23.7 mm cl, paratype (AM P19436); Mandora, Darwin, Nov. 21, 1972, coll. N. Coleman: 2 ♂, 14.0–17.5 mm cl, paratypes (AM P23809); Dudley Point, Darwin, Sept. 17, 1970, coll. O. J. and J. Cameron: 1 ♀, 21.0 mm cl, paratype (AM P19993); sand bar no. 1, Darwin, Nov. 14, 1970, coll. O. J. and J. Cameron: 1 ♂, 19.7 mm cl, holotype (AM P20486); **Queensland:** Michaelmas Cay, Great Barrier Reef, north of Cairns, Sept. 14, 1963, coll. W. Goode: 1 ♀, 11.1 mm cl, paratype (WAM 24510); Bowen, Feb. 27, 1934, coll. unknown: 1 ♂, 16.5 mm cl, paratype (QM W25188); Mornington Island, Gulf of Carpentaria, 16°29'S, 139°34'E, coll. unknown: 1 ♂, 9.1 mm cl, paratype (MOV J44733); off Cape Moreton, April 1964, coll. B. Harris: 1 ♀, 26.7 mm cl, paratype (QM W2380); **New South Wales:** Off Richmond River mouth, off Ballina, 28°52'S, 153°34'E, 16 m, Oct. 6, 1962, coll. unknown: 1 ♂, 17.3 mm cl, paratype (AM P15354); 3 mi off mouth of Clarence River, 15 fms (= 27.4 m), late 1968,

coll. J. J. Toyer: 1 ♀, 22.2 mm cl, allotype (AM P16778); within 2 km north of Clarence River bar, 8–9 fms (= 14.6–16.5 m), June 10, 1976, coll. A. E. Ford: 1 ♀, 25.0 mm cl, paratype (AM P24477).

Limited Data: "Océan Indien:" 1 ♀, 20.6 mm cl (MNHN-Hi 89).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 8–11 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with one or two short, concave, anteriorly displaced medial elements between longer supralateral elements of CG4; CG5 of two triangular elements; CG6 and CG7 separate; CG8 broken; CG11 present; posterior submarginal groove entire. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular, tapering at tip, approximated along mesial margins, lateral margins convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced, tapered, and subacute. Dactylus of pereopod III with heel tapering, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with low rounded heel and shallow indent. Telson of male broadly triangular, laterally produced, length subequal to width, with broadly rounded produced tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region, median row of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly produced tip.

DESCRIPTION: Carapace (fig. 100A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 8–11 large spines ($n = 6$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave, with one or two large spines and two or three small spinules. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral ele-

ments. Mesogastric region smooth; CG2 present as one to three small medial elements; CG3 broken into two short medial and two to four longer lateral elements between posterior lateral elements of CG1, medial elements anteriorly displaced; CG4 with one or two short, concave, anteriorly displaced medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin without rows of setae. Metagastric region smooth; CG5 present as two triangular elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as one long or two short lateral elements. CG9 present as two short lateral grooves with gap at midline. CG10 present as two short lateral elements. CG11 present as one long or two short medial elements. Post-CG11 element absent. Branchial region with numerous short, transverse rows of setae laterally. Posterior margin deeply and evenly convex, with submarginal groove reaching three-fourths up margin of posterior concavity to entire. Branchiostegite with short anterior submarginal spine; anterior region with scattered, short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 100B) triangular with deep median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with slightly convex lateral and straight mesial margins, cornea covering lateral portion of distal tip; lateral margins with notch one-fourth distal from base; mesial margins approximated at base, with long plumose setae; tuft of plumose setae at proximolateral ventral angles and ventromedial oblique row of plumose setae extending from tuft to three-fourths length of segment.

Antennule (fig. 100C) with segment III

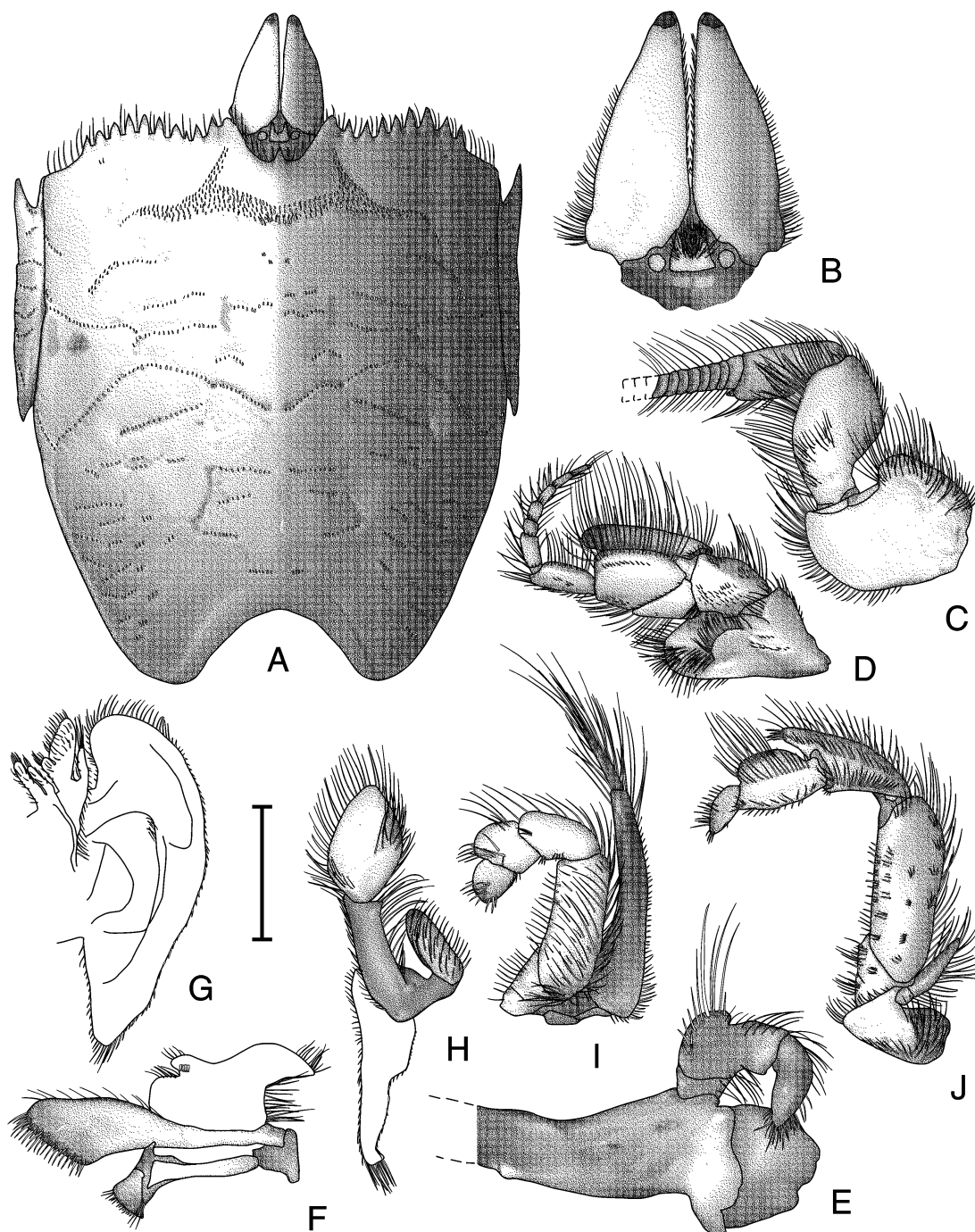


Fig. 100. *Albunea occultus*, n. sp.: A–J, ♀, 25.0 mm cl, AM P24477, paratype. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Right maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 3.3 mm (B, E, F), 4.4 mm (I), 6.7 mm (C, D, G, H, J), and 7.4 mm (A).

narrow proximally, expanding distally to 1.5 times proximal width; with plumose setae on dorsal and ventral margins; dorsal exopodal flagellum with 69–88 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two or three articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated from dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral quarter of surface. Segment I longer than wide, unarmed; dorsal third of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 100D) with segment V approximately two times longer than wide, with long plumose setae on dorsal and ventral margins and scattered on lateral surface; flagellum with seven or eight articles ($n = 6$; but QM 2380 with 10 articles on one side and eight on other), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal and ventral margins, and row of short setae on dorsolateral surface. Segment III with short plumose setae on dorsal margin, long plumose setae on ventral margin. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-seventh length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins, lobe, and in short row on surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 100E) incisor process with three teeth; cutting edge smooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 100F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal mar-

gin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with six thick setae at distolateral margin.

Maxilla (fig. 100G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 100H) epipod with plumose setae on margins and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel, with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins, proximolateral and mesio-medial surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 100I) dactylus evenly rounded, length slightly greater than width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsodistal and ventrodistal angles. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal and ventrodistal margins. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-third longer than merus, flagellum with one elongate article, approximately as long as carpus.

Maxilliped III (fig. 100J) dactylus oblong with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-third length of propodus; lateral surface with two rows of plumose setae; long plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered in short patches on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of three or four teeth. Exopod two-segmented: proximal segment small; distal segment styliiform, ta-

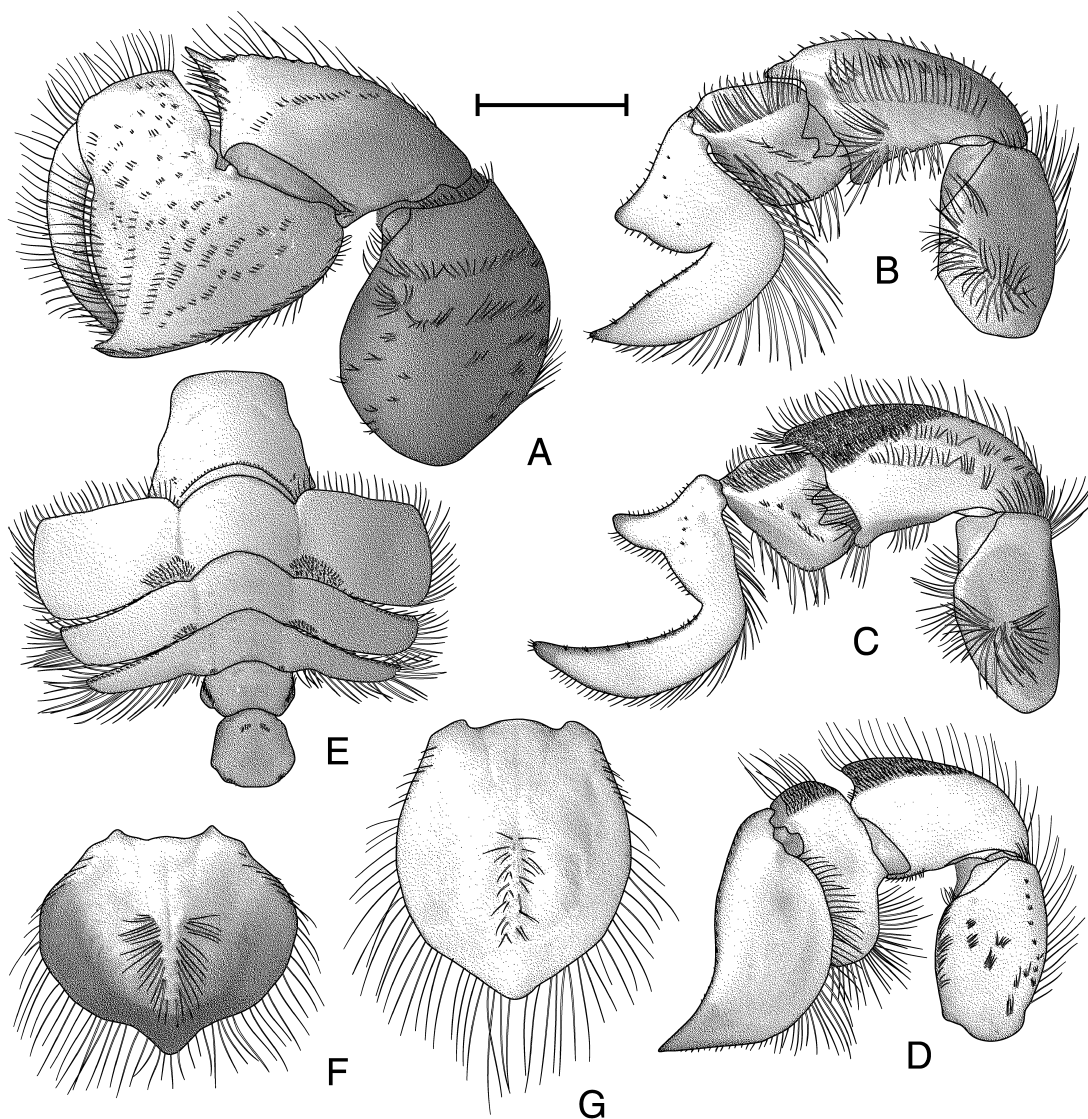


Fig. 101. *Albunea occultus*, n. sp.: A–E, ♀, 25.0 mm cl, AM P24477, paratype; F, ♂, 17.5 mm cl, AM P23809, paratype; G, ♀, 21.0 mm cl, AM P19993, paratype. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.3 mm (F, G), 6.7 mm (B–D), 7.4 mm (E), and 8.0 mm (A).

pering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 101A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose setae; ventral margin with short simple setae. Propodal lateral surface with numerous short,

transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short trans-

verse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with subdorsal and medial transverse rows of long plumose setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, proximodorsal margin with long plumose setae; mesial surface with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 101B) dactylus smooth; base to heel slightly concave, heel produced, broad and rounded at tip, heel to tip with narrow, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae, with patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and rounded dorsodistally, dorsal margin smooth; lateral surface smooth, produced area smooth, irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; dorsal margin with short plumose setae, ventral margin with long plumose setae; mesial surface dorsal margin with numerous low, rounded spines, surface smooth, with row of long plumose setae distally and in oblique interrupted row. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered tufts of long plumose setae on surface and on distodorsal margin; mesial surface nearly smooth, with two long rows of setae. Basis-ischium in-

completely fused and unarmed. Coxa unarmed.

Pereopod III (fig. 101C) dactylus with base to heel concave, heel narrow and acutely produced, heel to tip with concave area at base of heel and broadly concave indent, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface smooth, with few scattered setae. Carpus produced dorsodistally, exceeding proximal margin of propodus by one-third length of propodus; tip rounded, dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in transverse row on surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae on distodorsal and mediolateral margins; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa unarmed. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with tiny pore located more mesially.

Pereopod IV (fig. 101D) dactylus with base to tip convex proximally, concave distally, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, ventral margin with long plumose

setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral surface smooth, mesial surface smooth, with distoventral area of few patches of long plumose setae. Carpus slightly produced and subacute dorsodistally; ventral four-fifths of lateral surface and mesial surface smooth, dorsodistal one-fifth of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially, distal margin with long plumose setae. Merus with scattered, short, transverse rows of short simple setae on lateral surface, dorsal and medioventral margins with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 101E) somite I wider than long, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with irregular submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed laterally; anterolateral margins angled, anterior and lateral margins with long plumose setae, posterolateral angle rounded, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter, anterior submarginal windows present; pleura thinner and shorter than on somite II, directed posterolaterally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally, with submarginal row of short setae. Somite IV similar to somite III, but thinner and shorter, anterior submarginal windows present; dorsal surface with few short setae anterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV, anterior submarginal windows present; lateral margins with plumose setae; pleura absent. Somite VI slightly

broader than somite V, anterior submarginal windows present; dorsal surface with short transverse rows of setae laterad of midline; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 101F) broadly triangular, laterally produced, length subequal to width, with broadly rounded produced tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region; median longitudinal groove extending one-half of length, row of long simple setae of either side of median groove beginning at median and continuing almost to distal margin of calcified area; proximolateral angles with few long simple setae; margins with long simple setae. Telson of female (fig. 101G) flattened, ovate, and evenly calcified with slightly produced rounded tip; median groove similar to male, setal row from midpoint of median groove to near distal margin of telson with simple setae approximately one-half size of those of male; proximolateral angle with few short setae, margins with long simple setae.

DISTRIBUTION: From southern Japan southward to the eastern and western coasts of Australia, in up to 82 m depth.

MAXIMUM SIZE: Males: 19.7 mm cl; females: 26.7 mm cl.

TYPE SPECIMENS: AM P20486 (holotype), AM P16778 (allotype), AM P15354 (paratype), AM P19435 (3 paratypes), AM P19436 (paratype), AM P19993 (paratype), AM P23809 (2 paratypes), AM P24477 (paratype), AMNH 18094 (paratype), BMNH 1932.11.30.64 (paratype), CASIZ 109246 (paratype), MCZ 10261 (paratype), MOV J44733 (paratype), NTOU (paratype), NTOU (paratype), NTOU (paratype), QM W2380 (paratype), QM W22322 (4 paratypes), QM W22323 (paratype), QM W22326 (6 paratypes), QM W22338 (2 paratypes), QM W22329 (paratype), QM W22340 (2 paratypes), QM W25188 (paratype), USNM 267779 (2 paratypes), WAM 10411 (paratype), WAM 20261 (paratype), WAM 23392 (paratype), WAM 23393 (paratype), WAM 24510 (paratype), ZLKU 7040–7041 (2 paratypes), ZLKU 7062–7063 (2 paratypes).

TYPE LOCALITY: Sand bar no. 1, Darwin, Northern Territory, Australia.

ETYMOLOGY: The specific name of this taxon is derived from the Latin word meaning "hidden," and refers to the confusion of this species with *A. symmysta* both in the literature and in museum collections.

REMARKS: The specimen illustrated by Asakura (1995) offers a rare example of a record that can be confirmed based on a photograph alone. Asakura's (1995) specimen clearly has an entire posterior submarginal groove on the carapace. Of the three species of *Albunea* known from Japan (*A. symmysta*, *A. groeningi*, *A. occultus*), only *A. occultus* possesses this diagnostic character.

It is difficult to know what species Serène and Umali (1965) were dealing with from the Philippines, but at least some of their material was probably *A. occultus*, based on their comments regarding the shape of the dactyli of pereopod IV. Their material also likely contained *A. symmysta*, but all of it needs to be examined for confirmation.

This species is most closely related to *A. symmysta*.

Albunea elegans

A. Milne Edwards and Bouvier, 1898

Figures 102, 103

Albunea symnista [sic]: Brullé, 1836–1844: 17. – Ozorio, 1888: 186 (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea elegans A. Milne Edwards and Bouvier, 1898: 236–238.—A. Milne Edwards and Bouvier, 1900: 273–275, pl. 28, figs. 22–25. – Gordon, 1938: 187 (list). – Bouvier, 1940: 181. – Balss, 1957: 1598.

Albunea carabus: Balss, 1916a: 37*. – Monod, 1933: 473 (part) (not *Albunea carabus* (Linnaeus, 1758)).

Albunea paretii: Monod, 1956: 37–40, figs. 2–9. – Buchanan, 1957: 56. – Sourie, 1957: 13, 31, 78. – Forest, 1958: 147 (list). – Gauld, 1960: 66 (list). – Rossignol, 1962: 124. – Fransen, 1991: 56, 77 (unjustified emendation) (not *Albunea paretii* Guérin Méneville, 1853).

Albunea paretii: Rossignol, 1957: 97, fig. 12. – Holthuis and Manning, 1970: 251–252*. – Kaestner, 1980: 336 (part). – Türkay, 1982: 98, 101, 110. – d'Udekem d'Acoz, 1999: 171 (part) (not *Albunea paretii* Guérin Méneville, 1853).

?*Albunea* sp. A Lebour, 1959: 129, fig. 14.

MATERIAL EXAMINED: **Portugal:** **Cape**

Verde Islands: La Praya, 10–30 m, 1883, coll. "Talisman": 2 ♂, 12.3–13.1 mm cl, 4 ♀, 13.4–18.4 mm cl, syntypes (MNHN-Hi 7); Sta. 7.V06, 16°10'N, 22°57'W, west coast, Boa Vista, Aug. 27–28, 1986, coll. CANCAP: 3 ♀, 14.5–19.6 mm cl (RMNH 38604), 2 ♀, 17.9–19.4 mm cl (AMNH 18078 ex RMNH 38604); Plage de Mindolo, Île de São Vicente, May 15, 1950, coll. J. Cadenat: 1 ♂, 12.7 mm cl (MNHN-Hi 12); Sta. 38, 7 m, coll.? "Calypso": 1 ♀, 12.5 mm cl (MNHN-Hi 181).

Senegal: Virage, Cape Vert, Dakar, April 12, 1982, coll. F. C. Roest: 5 ♂, 8.6–10.8 mm cl, 2 ♀, 11.7–12.9 mm cl (RMNH 35926), 2 ♂, 9.8 mm cl, 1 ♀, 13.8 mm cl (AMNH 18079 ex RMNH 35926).

Liberia: Sta. 289, Net 70B, 03°04'45"N, 16°62'W, 0–132 m, Aug. 23–24, 1927, coll. R/V "Discovery": 1 zoea? V larva, 6.0 mm (BMNH 1951.2.17.2355); Sta. 295, Net TYF, 05°30'30"N, 17°45'W, 2500–2700 m (see below), Aug. 25, 1927, coll. "Discovery": 1 zoea? V larva, 7.0 mm (BMNH 1951.2.17.2356).

Ghana: Manford, Gold Coast, coll. C. Hupfer: 1 ♂, 19.1 mm cl (ZMH K–5136).

Ivory Coast: Grand Bassam, 1901, coll. V. Mayet: 2 ♀, 14.5–18.9 mm cl (MNHN-Hi 13).

Dahomey: Chenal de Cotonou, near Cotonou, July 19, 1963, coll. H. Hoestlandt: 3 ♀, 6.2–7.4 mm cl (RMNH 20957).

Nigeria: West Mole, Lagos, June 16, 1963, coll. A. R. Longhurst: 2 unsexable, unmeasurable specimens (RMNH 20959); Sta. 224, Lagos, May 9, 1965, coll. "Pillsbury": 1 ♂, 11.5 mm cl (RMNH 22664).

Gabon: Sta. 277, 01°44'S, 08°38'E, 0–88 m, Aug. 7, 1927, coll. R/V "Discovery": 1 zoea? V larva, 5.9 mm (BMNH 1951.2.17.2354).

Congo: Baie de Pointe-Noire, Jan. 1969, coll. unknown: 1 ♂, 11.9 mm cl (MNHN-Hi 14).

Zaire: Sta. 276, Net 100B, 05°54'S, 11°19'E, 0–110 m, Aug. 5, 1927, coll. R/V "Discovery": 2 zoea? V larvae, 6.5–6.7 mm (BMNH 1951.2.17.2353).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 10–12 spines on either side of ocular sinus. Setal field with narrow lateral

elements and straight anterior margin. CG1 with separate posterior lateral elements; CG4 with two to four short, anteriorly displaced medial elements between longer supralateral elements of CG4; CG5 of two oblique triangular elements; CG6 and CG7 fused; CG8 broken; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular in shape, tapering at tip, approximated along mesial margins, lateral margins convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced, tapered, and acute. Dactylus of pereopod III with heel broad, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with low rounded heel and shallow indent. Telson of male broadly triangular, tip broadly rounded, thickly calcified medially, inflated dorsally, distal two-thirds with lateral decalcified region, median row of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly produced tip.

DESCRIPTION: Carapace (fig. 102A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally with 10–12 large spines ($n = 6$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave, surface smooth or with one small spinule. Frontal region smooth; setal field narrow anteriorly, widening posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as two short medial elements; CG3 broken into six to eight short elements between posterior lateral elements of CG1; CG4 with two to four short, anteriorly displaced medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with two or three tiny rows of setae. Metagastric region smooth; CG5 present as two oblique, triangular elements. CG6 strongly crenulate, strongly anteriorly concave medially and

sloping out to anteriorly convex lateral thirds. CG7 oblique, reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two short medial and two short lateral elements. CG9 present as two short lateral grooves with gap at midline. CG10 present as two short elements. CG11 present as one or two short medial elements. Post-CG11 element absent. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching two-thirds up margin of posterior concavity. Branchiostegite with strong anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 102B) triangular with shallow median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, 0.27–0.32 length of carapace, with convex lateral and straight mesial margins, cornea covering distal tip; lateral margins with notch one-third distal from base; mesial margins approximated at base; mesial and lateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angle and ventromedial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 102C) with segment III narrow proximally, expanding distally to twice proximal width; with plumose setae on dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 100–120 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with two articles ($n = 6$) and plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Segment I wider than long, with small dorsodistal spine; dorsal third of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 102D) with segment V ap-

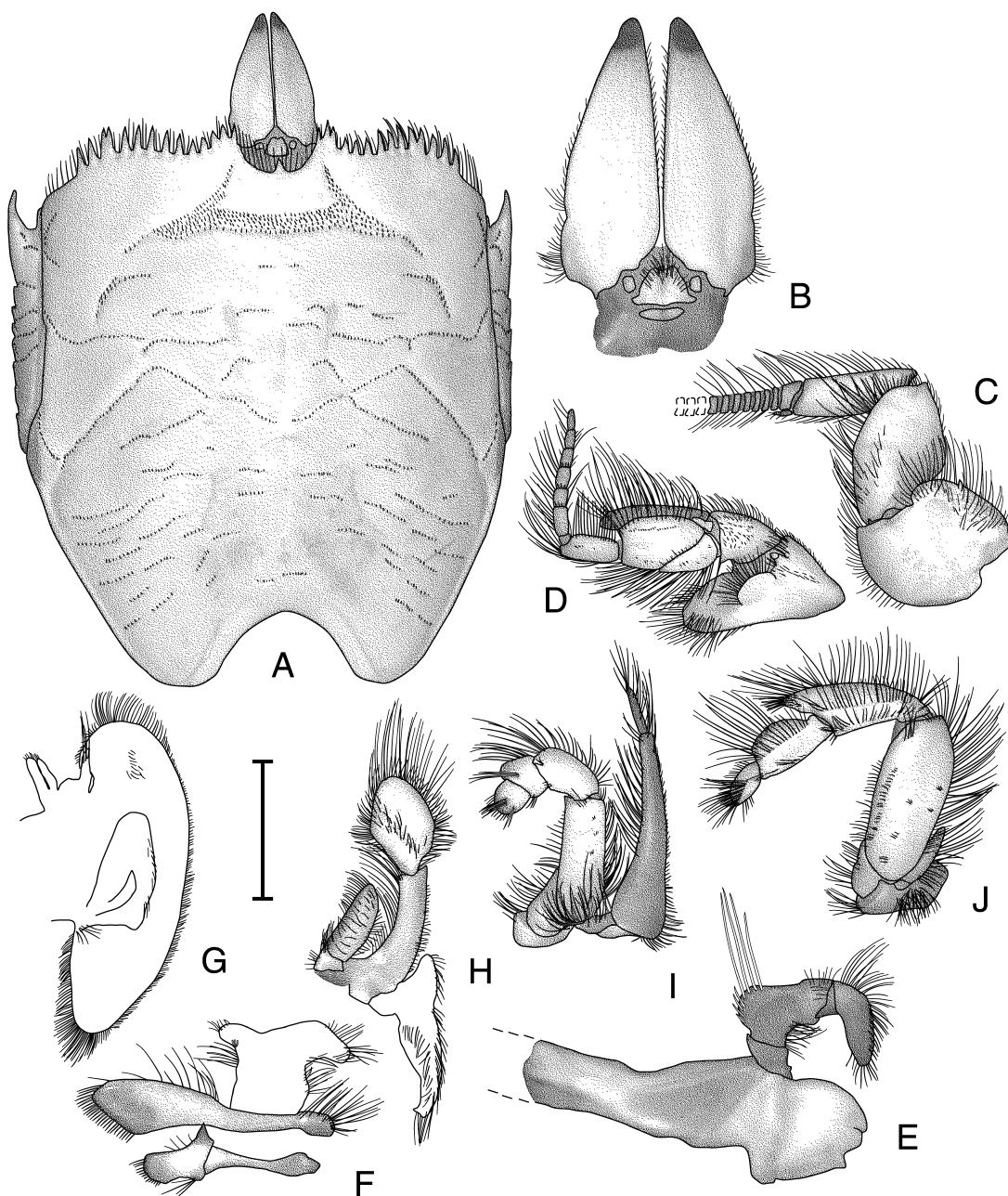


Fig. 102. *Albunea elegans* A. Milne Edwards and Bouvier, 1898: A–J, ♂, 10.4 mm cl, AMNH 18079. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible, mesial view. **F.** Left maxillule, lateral view. **G.** Left maxilla, lateral view. **H.** Left maxilliped I, lateral view. **I.** Left maxilliped II, lateral view. **J.** Left maxilliped III, lateral view. Scale = 1.6 mm (B, E, F), 2.2 mm (I), and 3.3 mm (A, C, D, G, H, J).

proximately two times longer than wide, with long plumose setae on dorsal and ventral margins and scattered on lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-third length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and scattered in line of surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 102E) incisor process with two teeth; cutting edge with one tooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 102F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 102G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 102H) epipod with plumose setae on margins, distolateral surface and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment;

plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 102I) dactylus evenly rounded, length slightly greater than width, with thick simple setae distally and on distolateral surface. Propodus 1.5 times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused with plumose setae on margins. Exopod one-half longer than merus, flagellum with one elongate article, approximately as long as carpus is wide.

Maxilliped III (fig. 102J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsodistally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-fourth length of propodus; lateral surface with two rows of plumose setae on surface, plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of two teeth. Exopod two-segmented: proximal segment small; distal segment styloform, tapering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 103A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with few short, transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with

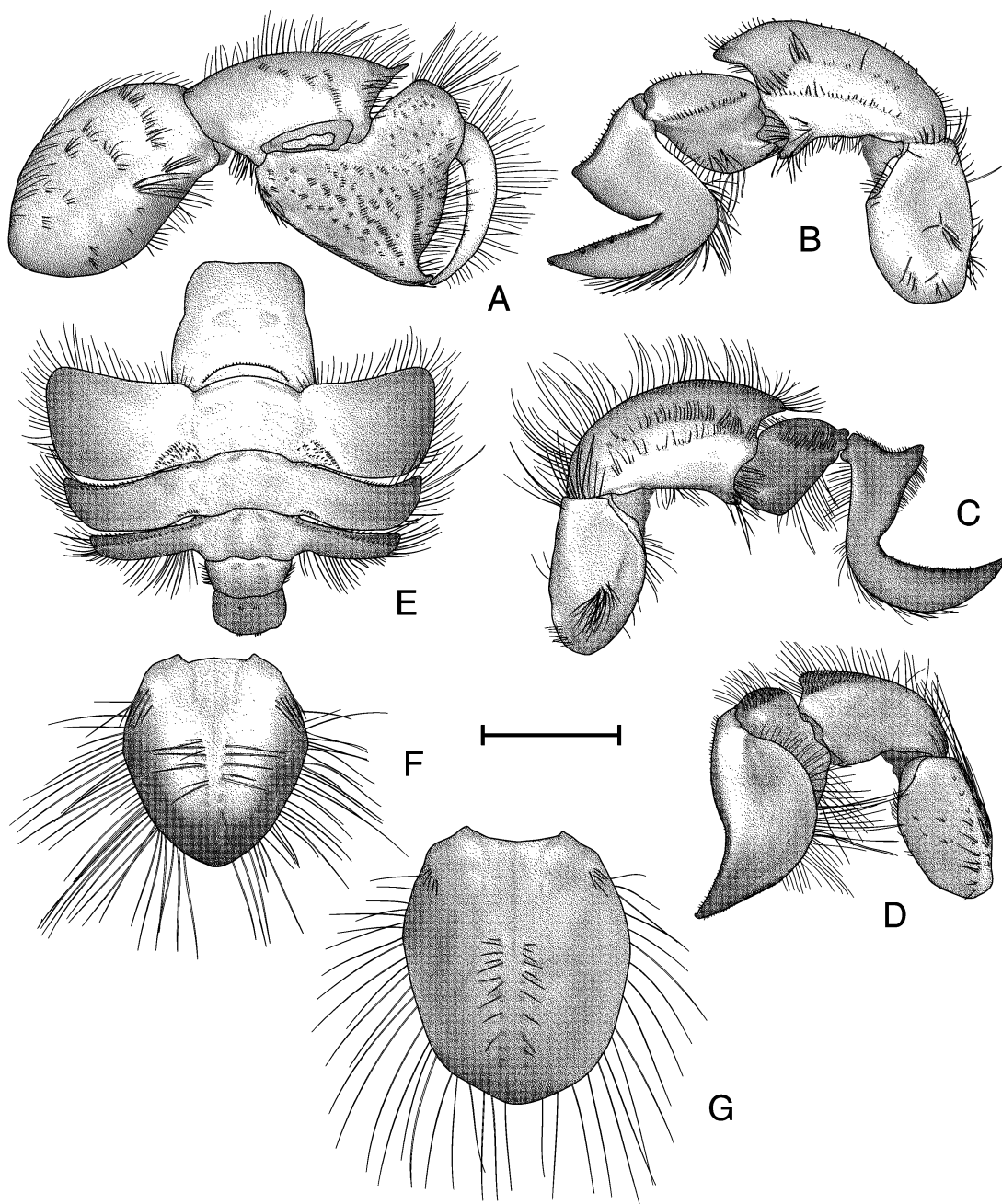


Fig. 103. *Albunea elegans* A. Milne Edwards and Bouvier, 1898: A–F, ♂, 10.4 mm cl, AMNH 18079; G, ♀, 13.8 mm cl, AMNH 18079. **A.** Right pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Right pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 2.2 mm (F, G), 3.3 mm (B, D, E), and 4.4 mm (A, C).

small distal rugose area, few transverse setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa of male with anterior spine; coxa of female unarmed.

Pereopod II (fig. 103B) dactylus smooth; base to heel concave, heel produced and acute, heel to tip with narrow, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae and patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus strongly produced and rounded dorsodistally, dorsal margin smooth; lateral surface smooth, with small setose mat at tip of produced area and irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with short plumose setae; mesial surface smooth with row of long plumose setae distally and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered long plumose setae on surface and margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Male coxa with anterior margin spine; female coxa without spine.

Pereopod III (fig. 103C) dactylus with base to heel concave, heel acutely produced, heel to tip with broadly concave indent and

sinuous proximal half of margin, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface smooth. Carpus produced dorsodistally, only slightly exceeding proximal margin of propodus; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with thin mat of short setae and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on distal margin and in oblique row on surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed but with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Male coxa with spine on anterior margin; female lacking spine. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with small pore.

Pereopod IV (fig. 103D) dactylus with base to tip convex proximally, concave distally, indent smoothly joined with margin, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion not reaching ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral and mesial surfaces smooth. Carpus slightly produced dorsodistally; ventral three-fourth of lateral surface and mesial

surface smooth, dorsodistal quarter of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface decalcified medially. Merus with scattered short transverse rows of setae on lateral surface, dorsal and ventrodiscal margins with long plumose setae; proximoven-tral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Male coxa with spine on anterior margin; female coxa unarmed.

Abdomen (fig. 103E) with somite I length and width subequal, widest posteriorly; dorsal surface with anterior margin straight; posterior margin curved with elevated submarginal row of short setae; small transverse, decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse, decalcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae; postero-mesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few short setae anterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V; dorsal surface with short transverse rows of setae laterad of midline; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 103F) broadly triangular, slightly longer than wide, with broadly rounded tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region; median longitudinal groove extending one-half length, row of long simple setae of either side of median groove beginning at distal end and continu-

ing almost to distal margin of telson; proximolateral angles with patch of long simple setae; margins with long simple setae. Telson of female (fig. 103G) flattened, ovate, and evenly calcified with slightly produced tip; median groove similar to male, setal row from midpoint of median groove to near distal margin of telson with simple setae approximately one-fourth length of those on male; proximolateral angle with patch of setae, margins with long simple setae.

DISTRIBUTION: Cape Verde Islands and Senegal southward to Pointe-Noire, Congo, in up to 30 m depth.

MAXIMUM SIZE: Males: 19.1 mm cl; females: 19.6 mm cl.

TYPE SPECIMENS: MNHN-Hi 7 (6 syntypes).

TYPE LOCALITY: La Praya, Cape Verde Islands, Portugal, 10–30 m depth.

REMARKS: A. Milne Edwards and Bouvier (1898) erroneously cited this species as having a maxilliped III with one pleurobranch, two arthrobranchs, and lacking an epipod, and also pereopod V having two arthrobranchs. These authors subsequently (1900) correctly stated that there are no arthrobranchs on pereopod V, but they repeated the inaccuracies regarding maxilliped III. This error became propagated through time, as Balss (1957) repeated A. Milne Edwards and Bouvier's (1900) incorrect statements and applied them to the genus as a whole in his monumental treatise on the Decapoda.

The west African larvae reported by Lebour (1959) as "*Albunea* sp. A" strongly resemble the late stage (V or VI) zoeae of *A. catherinae*, n. sp., a closely related species (Kurata, 1970). This suggests that these larvae are *A. elegans*, rather than the sympatric, but more distantly related, *A. carabus*. Several lots of larval specimens, probably stage V zoeae collected by R/V "Discovery" from east African localities, are referred to this species as they are extremely similar to the described larvae of *A. paretii*, another taxon closely related to *A. elegans*. The collection depth of 2500–2700 m for a putative larvae of this species from off Liberia (BMNH 1951.2.17.2356) is a suspect depth for any albuneid larvae, as the deepest living adults are known in no more than 225 m of water.

Although this species is similar to *A. par-*

etii, and for many years was confused with that western Atlantic species, it is not as closely related to *A. paretii*, as is the Pacific *A. lucasia*. *Albunea elegans* is easily distinguished from *A. catherinae*, n. sp. by the shapes of the dactyli of pereopods III and IV. It can be separated from *A. paretii* by the longer length of the branchiostegite spine, broken CG8, and the different shape of the dactylus of pereopod III.

Albunea paretii Guérin Méneville, 1853

Figures 104, 105

- Albunea oxyophthalmus* White, 1847: 57 (nomen nudum)*.
- Albunea symnista* [sic]: Gibbes, 1850a: 24* (not *Albunea symmysta* (Linnaeus, 1758)).
- Albunea Paretii* Guérin Méneville, 1853: 47–48, pl. 1, fig. 10*. – Bolivar, 1875: 21. – Seridji, 1988: 1298.
- Albunaea* [sic] *oxyophthalma*: Stimpson, 1858: 230 (list).
- Albunaea* [sic] *Paretii*: Stimpson, 1858: 230. – Stimpson, 1859: 78 (list).
- Albunea oxyophthalma* Miers, 1878: 329–330, pl. 5, figs. 14, 15*. – Rathbun, 1897: 42*. – Benedict, 1901: 139. – Verrill, 1901: 61–62, pl. 8, fig. 1*. – Verrill, 1908: 438, pl. 28, fig. 1*. – Gordon, 1938: 187 (part)*. – Monod, 1939: 560–561, fig. 5*. – Bouvier, 1940: 181. – Snodgrass, 1952: fig. 11a, d.
- Albunea paretii*: Miers, 1878: 330. – Rodrigues da Costa, 1962: 6–7, pl. 1, figs. 5–7, pl. 3, figs. 1–3. – Williams, 1965: 137–138 (part)*. – Coêlho, 1966: 244. – Fausto Filho, 1967: 12–13. – Coêlho and Ramos, 1972: 176 (part). – Gomes Corrêa and da Silva Brum, 1980: 60. – Kaestner, 1980: 336 (part). – Markham and McDermott, 1981: 1271. – Williams, 1984: 249–250 (part)*. – Chace et al., 1986: 338–339, fig. 112. – Calado, 1987: 106–118, pls. 9–12*. – Coêlho and Calado, 1987: 42–43, table 1. – Markham, 1988: 30. – Calado et al., 1990: 747 (part), fig. 2a, b*. – Hernández and Bolaños, 1995: 77. – Calado, 1995: 51–55, pl. 4, fig. f, pl. 5, fig. e, pl. 13, fig. a, pl. 14, figs. a, b, pl. 15, figs. a–e, pl. 16, figs. a–c*. – Calado, 1997a: 17. – Spivak, 1997: 74 (list). – Calado, 1998: 407. – Markham and Boyko, 1999: 4*. – d'Udekem d'Acoz, 1999: 171 (part). – Amaral et al. in Nucci et al., 2001: 479. – Morgado et al. in Nucci et al., 2001: 479.
- Albunea paretii* [sic]: Ortmann, 1896: 225 (list). – Ortmann, 1901: 1275. – Moreira, 1901: 30, 88 (list). – Boschi, 1981: 715, 740.
- Albunea gibbesii*: Benedict, 1901: 139* (not *Albunea gibbesii* Stimpson, 1859).
- Albunea axyophthalma* [sic]: Moreira, 1901: 88 (list).
- Albunea oxycephala* [sic]: Verrill, 1901: 18–19* (error for *Albunea oxyophthalma* Miers, 1878).
- Albunea paretii* [sic]: Castro, 1967: 2.
- Albunea* sp. Abele, 1976: 266–267*.
- Albunea* sp. Bowen et al., 1979: 253.
- Albunea paretii* [sic]: Rodriguez, 1980: 239 (list).
- ?*Albunea Paretii*: Boas, 1880: 140, figs. 34, 61, 91, 119, 144, 195.
- ?*Albunea* sp. Gurney, 1924: 187, fig. 73*.
- ?*Albunea* sp. A Gurney, 1942: 263–266, fig. 110e–h.
- not *Albunea paretii*: Kingsley, 1880: 409–410. – Williams, 1965: 137–138 (part), figs. 112, 113*. – Kurata, 1970: 182, pls. 52, 53. – Coêlho and Ramos, 1972: 176 (part). – Dörjes, 1977: 416. – Young, 1978: 177. – Kaestner, 1980: 336 (part). – Wenner and Read, 1982: 188. – Williams, 1984: 249–250 (part), figs. 182, 183*. – Fox and Ruppert, 1985: 259 (list). – Martin and Abele, 1986: 611, figs. 1b, 2d, 3b, 4b, 5b, 6b, 8b, 9b, c, 10b, 12b, 14b, 15b, 17b. – Manning, 1988: 626–628*. – Ruppert and Fox, 1988: 250, 404, fig. 227. – Williams et al., 1989: 35. – Calado et al., 1990: 747 (part), fig. 2a, b* (= *Albunea catherinae*, n. sp.).
- not *Albunea oxyophthalma* [sic]: Benedict, 1904: 625, fig. 5* (= *Albunea catherinae*, n. sp.).
- not *Albunea oxyophthalma*: Southwell, 1910: 184 (= *Albunea? symmysta* (Linnaeus, 1758)).
- not *Albunea oxyophthalma*: Gordon, 1938: 187 (part), figs. 3d, 4d* (= *Albunea catherinae*, n. sp.).
- not *Albunea paretii*: Monod, 1956: 37–40, figs. 2–9. – Buchanan, 1957: 56. – Sourie, 1957: 13, 31, 78. – Forest, 1958: 147 (list). – Gauld, 1960: 66 (list). – Rossignol, 1962: 124. – Fransen, 1991: 56, 77 (unjustified emendation) (= *Albunea elegans* A. Milne Edwards and Bouvier, 1898).
- not *Albunea paretii*: Rossignol, 1957: 97, fig. 12. – Holthuis and Manning, 1970: 251–252*. – Kaestner, 1980: 336 (part). – Türkay, 1982: 98, 101, 110. – d'Udekem d'Acoz, 1999: 171 (part) (= *Albunea elegans* A. Milne Edwards and Bouvier, 1898).
- not *Albunea paretii* [sic]: Kurata, 1970: 180–182 (= *Albunea catherinae*, n. sp.).

MATERIAL EXAMINED: **Bermuda:** Hungry Bay, July–Sept. 1901, coll. F. G. Gosling: 1 ♂, 16.4 mm cl, 3 ♀, 15.9–16.8 mm cl (USNM 42197), 1 ♀, 14.5 mm cl (RMNH 14647 ex USNM 42197); Castle Island, Aug. 15, 1975, coll. M. L. Jones: 1 oviger, 13.3

mm cl (USNM 264760); outside Hungry Bay, 15–20 ft (= 4.5–6.1 m), April 25, 1970, coll. J. Lightbourn: 1 ♂, 13.6 mm cl, 2 ♀, 18.8–21.0 mm cl (USNM 267776); Paget Beach, July 1901, coll. T. G. Gosling: 1 ♀, 20.0 mm cl (MCZ 19595); sandy beach between tides, Hungry Bay, Paget Parish, 1901, coll. T. G. Gosling: 1 ♀, 18.8 mm cl (YPM 21138).

USA: Florida: “Florida,” July 1859, coll. Capt. Woodbury: 1 ♀, 18.0 mm cl (MCZ 13243); south of Key West, 20 fms (= 36.6 m), April 12, 1940, coll. J. S. Schwengel: 1 ♂, 15.3 mm cl (ANSP 4327).

Bahamas: Sta. 62, Long Bay, April 20, 1937, coll. Smithsonian-Hartford Expedition: 1 ♂, 15.1 mm cl (USNM 104655); at and around tip of Pitts Town Point, northwestern tip of island, Crooked Island, June 1, 1962, coll. J. Tyler: 1 ♂, 14.7 mm cl, 1 ♀, 16.7 mm cl (USNM 260819); Andros Island, March–April 1908, coll. B. E. Dahlgren and H. Müller: 1 ♀, 10.8 mm cl (AMNH 5464).

Cuba: Sta. R55, Corrientes Bay, April 8, 1937, coll. Smithsonian-Roebling Expedition to Cuba: 1 ♂, 9.9 mm cl (USNM 260945); Matanzas Bay, 2 m, coll. M. Ward: 2 ♂, 9.3–9.7 mm cl, 1 oviger, 15.2 mm cl (AM P45217).

Cayman Islands: 1 mi north of low point, west beach, Grand Cayman, coll. unknown: 1 ♂, 5.9 mm cl, 1 ♀, 8.3 mm cl (ANSP uncataloged).

Jamaica: Kingston Harbor, 1893, coll. R. P. Bigelow: 3 ♀, 17.7–19.5 mm cl (USNM 17990), 1 ♀, 17.9 mm cl (BMNH 1937.6.1.3 ex USNM 17990); Rio Bueno Bay, Aug. 1972, coll. E. A. Norse: 1 intersex, 16.8 mm cl (LACM-AHF 1653–01).

Dominican Republic: Barahona Bay, Santo Domingo, 1932–1933, coll. J. C. Armstrong: 1 ♂, 11.0 mm cl (AMNH 10356); Porto Plata, Santo Domingo, 27–30 ft (= 8.2–9.1 m), July 1937, coll. W. J. Clench: 1 ♀, 11.9 mm cl (MCZ 9868).

Puerto Rico: 1 km north of Mayaguez, July 26, 1974, coll. A. Williams: 2 ♂, 15.1–15.3 mm cl, 1 ♀, 19.7 mm cl (USNM 267777); Sta. 6053, off Moon Castle, San Juan Harbor, 4–7.5 fms (= 7.3–13.7 m), Jan. 15, 1899, coll. “Fish Hawk”: 2 unmeasurable juveniles (USNM 29011); San Juan,

coll. P. A. del Valle: 1 ♀, 13.9 mm cl (USNM 84351).

U.S. Virgin Islands: Magens Bay, St. Thomas, Aug. 8, 1971, coll. W. E. Rainey: 1 ♀, 22.4 mm cl (USNM 154546); St. Thomas, coll. A. H. Riise: 2 ♀, 20.4–21.8 mm cl (ZMUC 2711); St. Thomas, coll. A. H. Riise: 2 ♀, 14.9–15.5 mm cl (ZMUC 2714); Drift Bay, Water Island, St. Thomas, July 13, 1915, coll. C. R. Shoemaker: 1 ♂, 14.1 mm cl (USNM 68611).

St. Maarten: Great Bay, June 24, 1955, coll. P. W. Hummelinck: 1 ♂, 17.2 mm cl (RMNH 23628).

St. Eustatius: Orange Baai, July 28, 1957, coll. P. A. Van den Heuvel: 1 ♀, 24.0 mm cl (RMNH 11239); Orange Baai, Sept. 24, 1957, coll. P. A. Van den Heuvel: 1 ♀, 24.9 mm cl (RMNH 11437); Zeelandia Baai, Sept. 17, 1957, coll. P. A. Van den Heuvel: 3 ♀, 19.8–25.5 mm cl (RMNH 11438); Zeelandia Baai, Jan. 4, 1958, coll. P. A. Van den Heuvel: 1 ♀, 21.8 mm cl (RMNH 12209); 1957, coll. P. A. Van den Heuvel: 1 ♂, 16.9 mm cl, 2 ♀, 23.2 mm cl, 1 ♀, unmeasurable (RMNH 12210).

St. Kitts-Nevis: Sta. 67–58, Charlestown, Nevis, 2–3 fms (= 3.7–5.5 m), April 16, 1958, coll. Smithsonian-Bredin Caribbean Expedition: 1 ♂, 9.6 mm cl (USNM 260860).

Antigua and Barbuda: Sta. 92–58, between Bird and Green Islands, NonSuch Bay, Antigua, 3–4 fms (= 5.5–7.3 m), April 23–24, 1958, coll. Smithsonian-Bredin Caribbean Expedition: 1 ♀, 8.9 mm cl (USNM 260944).

Guadeloupe: Entre Basse Terre et la Rivière des Pères, 15–20 m, Feb. 11, 1936, coll. R. Lami: 1 ♀, 5.0 mm cl (MNHN-Hi 198); Basse Terre, vers Vieux Fort, Feb. 20, 1936, coll. R. Lami: 1 ♂, 6.6 mm cl (MNHN-Hi 199).

St. Lucia: “St. Lucia,” June 16, 1880, coll. J. Semper: 1 ♀, 24.1 mm cl (MCZ 13261).

Barbados: “Barbados,” coll. C. T. Trenchman: 1 ♂, 12.6 mm cl (BMNH 1921.6.9.5).

Trinidad and Tobago: Sta. 4019, Gulf of Apria, near San Fernando, Trinidad, 4.5 m, May 2, 1952, coll. Shell Expedition to the

Gulf of Paria: 1 juvenile, 2.4 mm cl, 1 unsexable specimen, 7.6 mm cl (RMNH 9097).

Netherlands Antilles: Sint Michiels Baai, Curaçao, 4 m, Jan. 1957, coll. L. B. Holthuis: 1 ♂, 11.8 mm cl, 3 ♀, 6.1–11.7 mm cl. 1 ♀, unmeasurable (RMNH 14646), 1 ♂, 11.5 mm cl, 1 ♀, 11.5 mm cl (AMNH 18089 ex RMNH 14646).

Honduras: Ved Roman River, 1875, coll. P. Andersen: 1 ♂, 7.7 mm cl (ZMO F17537).

Panama: Sta. 258–7, Devil's Beach, July 15, 1978, coll. M. L. Jones: 1 oviger, 16.4 mm cl (USNM 260978); Shimmey Beach, Ft. Sherman, Jan. 23, 1971, coll. L. G. Abele: 2 ♂, 12.0–13.5 mm cl (USNM acc. 300691).

Colombia: Sta. 103, Sample 405, Humboldt Bay, May 18, 1941, coll. J. C. Armstrong ("Askoy" Expedition): 1 ♀, 18.2 mm cl (AMNH 18091); west coast of Santa Catalina Island, north of Fort Aury, Providencia Island Group, Aug. 12, 1969, coll. C. R. Gilbert, J. C. Tyler, and S. Anderson: 1 ♀, 17.5 mm cl (USNM 260942); beach in front of Santa Mar Hotel, Santa Marta, Oct. 14, 1977, coll. M. L. Jones: 1 juvenile, 3.2 mm cl (USNM 260946); 5 mi northwest of Galena Point Light, 12 fms (= 21.9 m), April 25, 1939, coll. R/V "Velero III": 1 ♂, 3.8 mm cl (LACM-AHF A48–39).

Venezuela: Sta. 9, Isla de Margarita, Feb. 16, 1977, coll. unknown: 1 ♂, 8.7 mm cl, 2 ♀, 7.0–8.7 mm cl, 1 megalopa, 3.3 mm cl, 4 first stage crabs, 2.6–3.3 mm cl (USNM 260941); Sta. M–10–1, 1.5 m offshore, Isla Cubagua, west of Punta Brazil, Isla de Margarita, Feb. 16, 1977, coll. M. L. Jones: 1 juvenile, 2.8 mm cl (USNM 260943); Sta. M–4–1, 1.5 m offshore, approximately 5 km west of Guayacancito, Isla de Margarita, Feb. 13, 1977, coll. M. L. Jones: 1 juvenile, 3.1 mm cl (USNM 260947).

French Guiana: Cayenne, coll. unknown: 1 ♂, 15.6 mm cl, syntype of *A. oxyophthalma* (BMNH 57.45).

Brazil: "Brazil," coll. unknown: 1 ♀, 19.9 mm cl, syntype of *A. oxyophthalma* (BMNH 64.7); "Brazil," coll. unknown: 1 ♂, 14.4 mm cl (UFES 1307); "Brazil," coll. Banco Calipso: 1 ♀, 4.5 mm cl (MNRJ 8164); **Amapá:** Pesca Norte Island, 04°03'N, 49°32.6'W, coll. S. Buitone: 1 juvenile, 3.9 mm cl (MNRJ 5408); **Pará:** Sta. 2092, off the mouth of the Amazon River, 00°23'N,

47°05'W, 21 fms (= 38.4 m), Nov. 19, 1957, coll. R/V "Oregon": 1 ♂, 18.9 mm cl (USNM 101666); 00°08'S, 46°14'W, 24 m, March 2, 1963, coll. R/V "Oregon": 2 ♂, 15.3–15.9 mm cl, 1 ♀, 16.5 mm cl (RMNH 23336); **Maranhão:** Cruise 84, Sta. 23255, 00°34'N, 46°40'W, 45.7 m, Nov. 28, 1977, coll. D. Sutherland on R/V "Oregon": 1 ♀, 19.8 mm cl (HBOM 089:05495); Sta. 4220, 00°01'N, 45°48'W, 30 fms (= 54.9 m), March 8, 1963, coll. R/V "Oregon": 1 ♂, 15.7 mm cl, 1 ♀, 19.2 mm cl (USNM 260814); Sta. 2091, 00°33'N, 47°03'W, 20 fms (= 36.6 m), Nov. 18, 1957, coll. R/V "Oregon": 1 ♂, 16.4 mm cl (USNM 260815); Cruise 58, Sta. BBC 1617 (17700), 01°21'N, 47°32'W, 31–33 fms (= 56.7–60.4 m), May 12, 1975, coll. R/V "Oregon II": 1 ♂, 12.9 mm cl (USNM 260859); Cruise 58, Sta. BBC 1628, 00°54'N, 46°42'W, 38–43 fms (= 69.5–78.6 m), May 15, 1975, coll. R/V "Oregon II": 1 ♂, 12.6 mm cl (USNM 260861); **Espírito Santo:** Praia dos Castelhamos, Anchieta, Nov. 21, 1971, coll. A. L. Castro: 1 ♀, 23.1 mm cl (MNRJ 1534); **Rio de Janeiro:** Prainha, Arraial de Cabo, Cabo Frio, Feb. 1985, coll. G. Nunan: 1 ♂, 18.4 mm cl (MNRJ 1530); Itaipu, June 6, 1959, coll. A. Coêlho, R. Arlé, and J. Becker: 1 ♀, 25.8 mm cl (MNRJ 1531); Praia dos Anjos, Arraial do Cabo, Feb. 1967, coll. J. Jurberg: 1 ♀, 22.0 mm cl (MNRJ 1532); Rio de Janeiro, coll. unknown: 1 ♂, 19.8 mm cl, 1 ♀, 9.1 mm cl (MNRJ 1533); Sta. 39, 6 mi off mouth of Rio de Janeiro River, coll. "Terra Nova": 2 larvae, 4.7–4.8 mm (BMNH 1926.5.31.354–356); Rio De Janeiro, coll. S. Krøyer: 1 ♀, 18.2 mm cl (ZMUC 2716); Angra dos Reis, July 20, 1966, coll. unknown: 1 ♂, 7.3 mm cl (MNRJ 3855); Angra dos Reis, July 15, 1966, coll. unknown: 1 ♀, 7.1 mm cl (MNRJ 3859); Angra dos Reis, July 7, 1966, coll. unknown: 1 ♂, 7.9 mm cl, 2 ♀, 4.9–8.3 mm cl (MNRJ 3861); Angra dos Reis, July 19, 1966, coll. unknown: 3 ♀, 6.1–7.7 mm cl (MNRJ 3862); Praia do Forte, Cabo Frio, Aug. 24, 1986, coll. C. E. Ribeiro: 1 ♂, 22.3 mm cl (MNRJ 3864); **São Paulo:** São Sebastião, Dec. 12, 1989, coll. unknown: 1 ♂, 9.8 mm cl (AMNH 18090); Flamengo Cove, Ubatuba, Jan. 24, 1962, coll. L. Forneris: 1 ♀, 3.9 mm cl (RMNH 20958).

Limited Data: "St. Croix" (locality added

at later date): 1 ♀, 20.7 mm cl, holotype of *A. paretii* (ANSP 4101a); "Antilles" (locality may be inferred): 1 ♀, 21.9 mm cl (ANSP 4101b); "West Indies," 1 ♀, 12.1 mm cl (BMNH 1999.891).

No Data: 1 ♂, 16.2 mm cl (ANSP 4763); 1 ♀, 16.5 mm cl (USNM 42199); 1 ♀, 23.0 mm cl (BMNH 1998.92).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 10–13 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with one long (rarely two short), anteriorly displaced, medial element between longer supralateral elements of CG4; CG5 of two triangular elements; CG6 and CG7 separate; CG8 entire; CG11 present. Rostrum present, not reaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular in shape, tapering at tip, approximated along mesial margins, lateral margins slightly convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced, tapered, and subacute. Dactylus of pereopod III with heel broad, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with low rounded heel and shallow indent. Telson of male ovate, slightly longer than wide, with broadly rounded tip, thickly calcified medially, inflated dorsally, distal two-thirds with lateral decalcified region, median row of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly produced tip.

DESCRIPTION: Carapace (fig. 104A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 10–13 large spines ($n = 6$) along length. Rostrum as small acute tooth, reaching to proximal margin of ocular plate. Ocular sinus smoothly concave and unarmed except in largest specimens where lateral margins possess few additional small spines. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Me-

sogastric region smooth; CG2 present as short medial element; CG3 broken into one to three short elements and two long elements between posterior lateral elements of CG1; CG4 with one long (rarely two short), anteriorly displaced, medial element between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with three short rows of setae. Metagastric region smooth; CG5 present as two triangular elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, almost reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as three long elements; posterior element displaced slightly posteriorly. CG9 present as two short lateral grooves with gap at midline. CG10 present as two long lateral elements, with gap between fragments. CG11 present as short medial element. Post-CG11 element present. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching two-thirds to three-fourths up margin of posterior concavity. Branchiostegite with short anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 104B) triangular, with shallow median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, 0.20–0.36 length of carapace, with straight lateral and mesial margins, cornea covering distal tip; mesial margins approximated along proximal two-thirds; mesial and lateral margins with long plumose setae; tuft of plumose setae at proximolateral ventral angle and medial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 104C) with segment III narrow proximally, expanding distally to two times proximal width; with plumose setae on

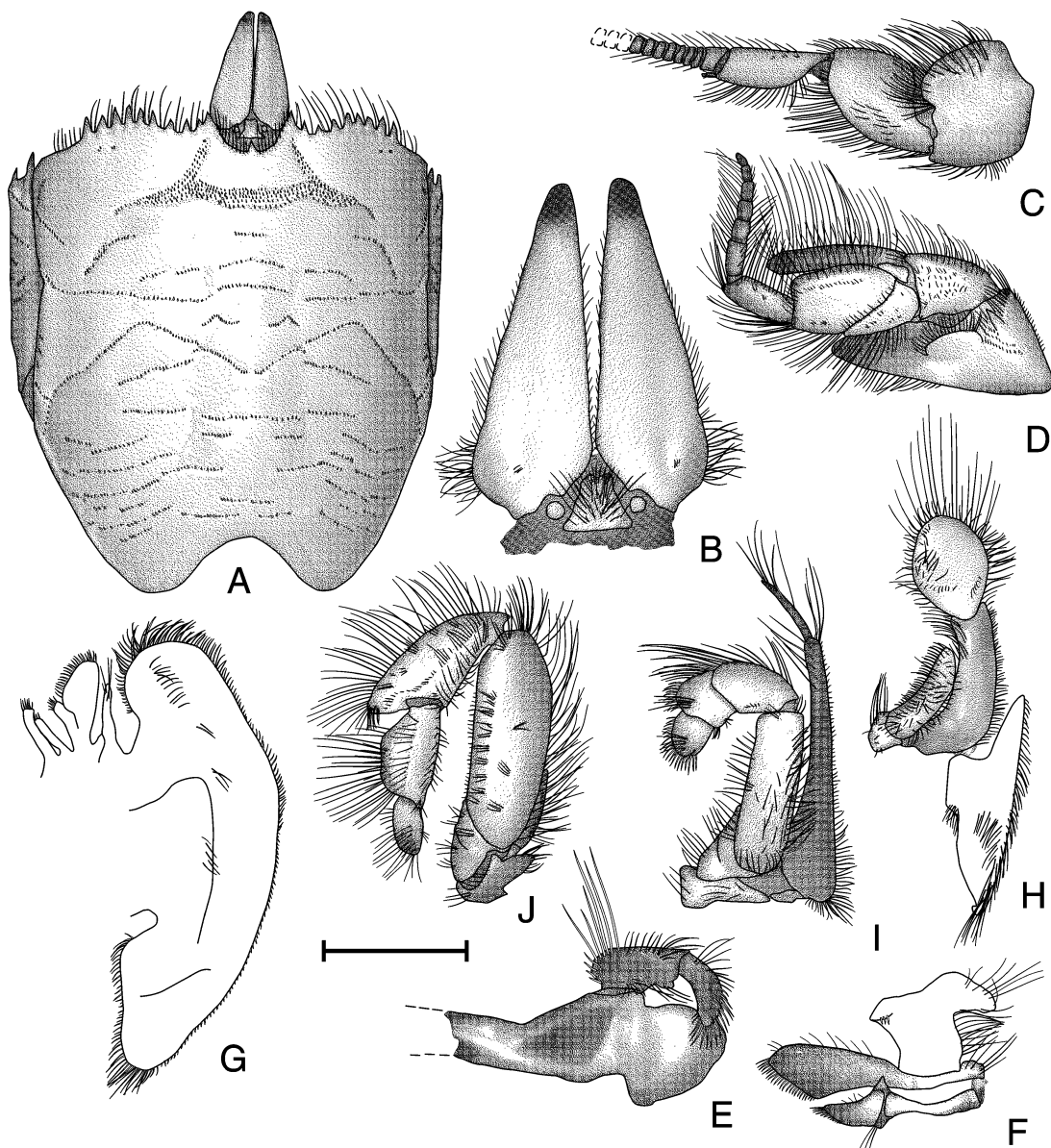


Fig. 104. *Albunea paretii* Guérin Méneville, 1853: A–D, H–J, ♀, 11.5 mm cl, AMNH 18089; E–G, ♀, 7.0 mm cl, USNM 260941. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible, mesial view. **F.** Left maxillule, lateral view. **G.** Left maxilla, lateral view. **H.** Left maxilliped I, lateral view. **I.** Left maxilliped II, lateral view. **J.** Left maxilliped III, lateral view. Scale = 1.6 mm (B, E, F), 2.2 mm (G, I), 3.3 mm (D, H, J), and 4.4 mm (A, C).

dorsal and ventral margins and sparsely scattered on lateral surface; dorsal exopodal flagellum with 78–97 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with three

or four articles ($n = 6$) and plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and scattered on ventrolateral third of surface. Seg-

ment I wider than long, unarmed; dorsal third of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 104D) with segment V approximately three times longer than wide, with long plumose setae on dorsal margin and scattered on lateral surface; flagellum with seven articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins, and row of setae on dorsolateral surface. Segment III with long plumose setae on dorsal and ventral margin and in short row on surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-fifth length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and scattered on surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodistal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 104E) incisor process with two teeth; cutting edge smooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 104F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 104G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 104H) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, margins parallel with plumose setae; distal segment spatulate, longer than wide,

broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 104I) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus 1.5 times wider than long, slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-fourth longer than merus, flagellum with one elongate article.

Maxilliped III (fig. 104J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-fourth length of propodus; lateral surface with two rows of plumose setae on surface; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of two or three teeth. Exopod two-segmented: proximal segment small; distal segment styliiform, tapering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 105A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dor-

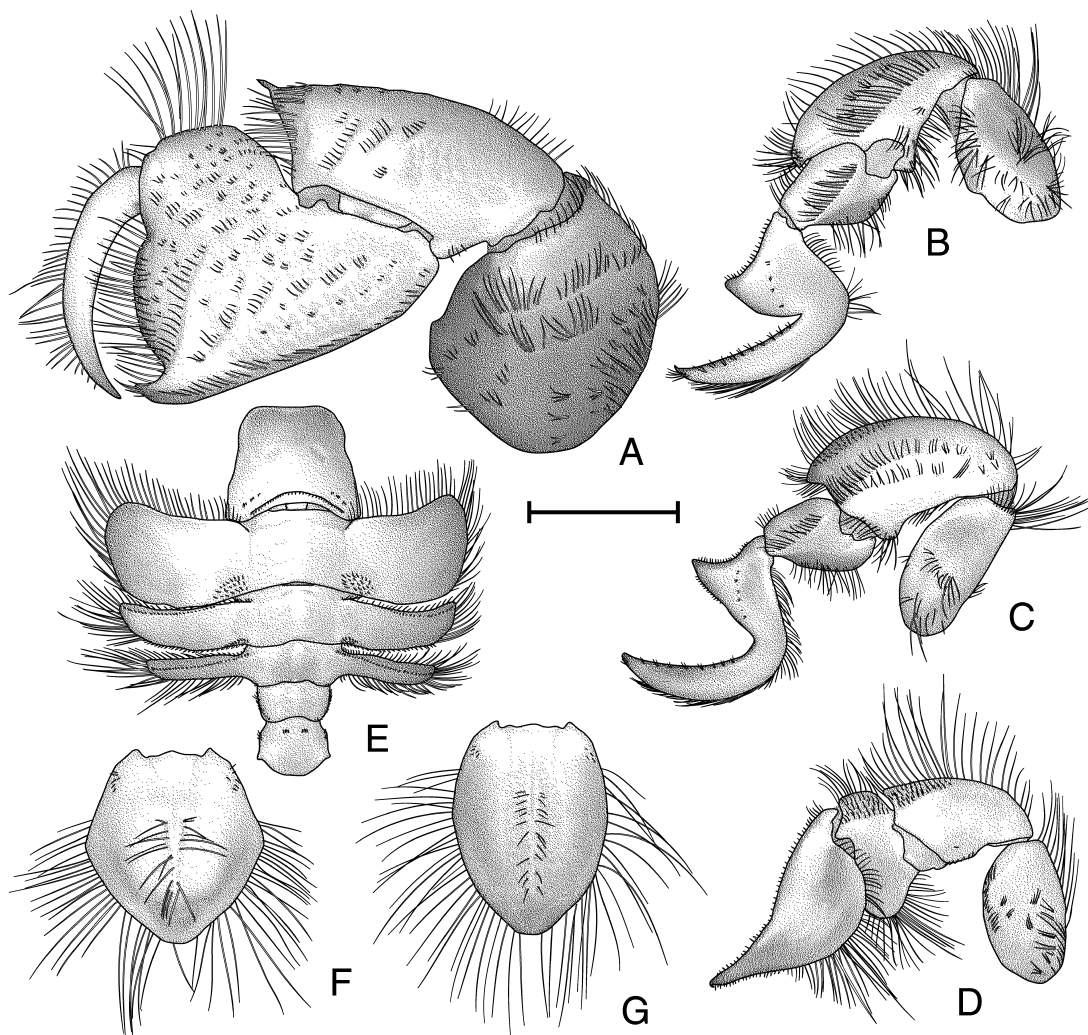


Fig. 105. *Albunea paretii* Guérin Méneville, 1853: A–E, G, ♀, 11.5 mm cl, AMNH 18089; F, ♂, 11.5 mm cl, AMNH 18089. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 3.0 mm (F, G), 3.3 mm (A), and 4.4 mm (B–E).

sal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, with few transverse setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial surface with few scattered setae; fully calcified.

Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 105B) dactylus smooth; base to heel concave, heel produced but subacute, heel to tip with wide, acute indent, tip acute, tip to base broadly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, several widely spaced submarginal tufts of short setae dorsodistally; mesial surface smooth, ventral margin with

long plumose setae, dorsal margin with short simple setae and patch of long plumose setae at base. Propodal dorsal surface smooth, with ventral margin inflated and rounded; oblique row of long plumose setae on distal margin of lateral surface; distal and ventral margins with long plumose setae; dorsolateral surface as narrow, oblique, flattened shelf, with short setae on dorsal margin and long plumose setae on ventral margin; mesial surface with elevated, curved, setose ridge from ventral junction with dactylus almost to ventral proximal junction with carpus. Carpus slightly produced and gently rounded dorsodistally, dorsal margin with few low spines on distal two-thirds; lateral surface smooth, with setose mat at tip of produced area and irregular, interrupted row of rugae and submarginal elevated ridge ventrally, rugae and ridge with long plumose setae; margins with long plumose setae; mesial surface smooth, with row of long plumose setae subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with few scattered long plumose setae on surface and margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa with small low tubercle on anterior margin.

Pereopod III (fig. 105C) dactylus with base to heel concave, heel acutely produced, heel to tip with broadly concave indent and small concave region at midpoint of proximal margin, tip acute, tip to base smoothly convex; lateral surface smooth, with several small tufts of short setae in generally straight line across medioproximal surface, dorsodistal margin with tufts of short setae; ventral margin with long plumose setae, dorsal margin with short simple and plumose setae; mesial surface smooth, with plumose setae proximally at junction with propodus. Propodus not inflated dorsoventrally; lateral surface smooth, with long plumose setae in oblique row, simple setae on dorsal margin; dorsolateral surface narrow, oblique, flattened, with setose mat; mesial surface with scattered long setae on and near distal margin and in oblique row on surface. Carpus produced dorsodistally, only slightly exceeding proximal margin of propodus; dorsolateral margin unarmed; lateral surface slightly rugose dorsodistally, with mat of short setae

and two interrupted rows of setae ventrally; mesial surface smooth, with long plumose setae on margins. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed, with long plumose setae; distolateral margin with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa with low tubercle on anterior margin. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with small depression in analogous position (not true pore).

Pereopod IV (fig. 105D) dactylus with base to tip convex proximally to concave distally, tip acute, tip to base concave distally to convex proximally; lateral surface smooth, ventral margin with long plumose setae, dorsal margin with short simple setae; mesial surface with dorsal decalcified region, demarcated ventrally by longitudinal elevated ridge with row of short setae; with setose punctations ventral to decalcified window. Propodus expanded dorsally and ventrally; ventral expansion reaching ventral margin of dactylus, margin with long plumose setae; dorsal expansion with row of long plumose setae dorsally, oblique area with mat of short simple setae; lateral and mesial surfaces smooth. Carpus slightly produced dorsodistally; ventral three-fourth of lateral surface and mesial surface smooth, dorsodistal quarter of lateral surface with mat of short setae; dorsal margin with short simple and long plumose setae; ventral margin with short simple setae; mesial surface faintly decalcified medially. Merus with scattered, short, transverse rows of setae on lateral surface, dorsal and ventrodorsal margins with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 105E) with somite I length and width subequal, widest posteriorly; dorsal surface with anterior margin slightly concave; posterior margin curved, with elevated submarginal row of short setae; small transverse decalcified windows laterad of segment median. Somite II dorsal surface with submarginal transverse ridge anteriorly; with small transverse decalcified windows laterad

of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; lateral margins rounded, anterior and lateral margins with long plumose setae, posterior margin with short setae; posteromesial angle with mat of short simple setae. Somite III similar to somite II, but narrower, shorter; pleura thinner and shorter than on somite II, directed anterolaterally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; dorsal surface with few short setae anterolaterally; pleura thinner and shorter than on somite III, directed posterolaterally; dorsal surface obliquely flattened anterolaterally; margins with long plumose setae. Somite V wider than somite IV; lateral margins with plumose setae; pleura absent. Somite VI slightly broader than somite V; dorsal surface with short transverse rows of setae laterad of midline; pleura absent.

Females with uniramous, paired pleopods on somites II–V; males without pleopods.

Telson of male (fig. 105F) broadly triangular, slightly longer than wide, with broadly rounded tip; thickly calcified medially, inflated dorsally; distal half with lateral decalcified region; median longitudinal groove extending one-half length, row of long simple setae of either side of median groove beginning at distal end and continuing almost to distal margin of telson; proximolateral angles with patch of short simple setae; margins with long simple setae. Telson of female (fig. 105G) flattened, ovate, and evenly calcified with slightly produced tip; median groove similar to male, setal row from end of median groove to near distal margin of telson with simple setae approximately one-half length of those on male; proximolateral angle with patch of setae, margins with long simple setae.

DISTRIBUTION: Bermuda and the Florida Keys south throughout the Caribbean and Central America to Rio Grande do Sul, Brazil (Calado, 1987), in 0–101 m depth (Calado, 1987).

MAXIMUM SIZE: Males: 22.3 mm cl; females: 25.8 mm cl.

TYPE SPECIMENS: ANSP 4101a (holotype of *A. paretii*); BMNH 57.45 (syntype of *A.*

oxyophthalma); BMNH 64.7 (syntype of *A. oxyophthalma*); the repository of an additional syntype of *A. oxyophthalma* cited by both White (1847) and Miers (1878) from St. Christophers is unknown.

TYPE LOCALITIES: *Albunea paretii*: “Mer de Gênes” or “Mediterranea?” (incorrect localities). *Albunea oxyophthalma*: St. Christophers, Cayenne [French Guiana], and Brazil.

REMARKS: ANSP 4101a is clearly Guérin Méneville’s (1853) figured specimen and is the holotype by monotypy (see also Boyko, 2000b). Kingsley (1880) stated that Guérin Méneville’s type was not in the ANSP, but he was likely misled by the poor labeling of the specimen. The locality data “Antilles” was added to ANSP 4101a at a later date and may have come from Stimpson’s (1858) locality data for the species as “Antillarum?” The name *A. oxyophthalma* is a nomen nudum from both White (1847, as *A. oxyophthalmus*) and Stimpson (1858).

Much of the difficulty in recognizing the identity of this species was caused by Guérin Méneville’s (1853) uncertainty as to the type locality. Guérin Méneville (1853) was told that his specimen came from Genoa (Italy), which he thought likely, but he also was aware that the ship which brought him the specimen had been to the Americas, and he mentioned this possibility as well. The latter is the correct locality, and the specimen was likely collected in the Caribbean or South America.

It has been asserted by some authors (e.g., Monod, 1956) that the correct spelling of this specific name should be “*paretoi*,” as the species was named after the Marquis Pareto. However, Guérin Méneville (1853) gave the spelling as “*paretii*” twice, so there is no evidence of a lapsus calami or printer’s error, and *A. paretii* is therefore the incorrect original spelling and the one which must be used for the species.

Gurney’s (1942) Bermuda larvae are more likely to be *A. paretii* rather than *A. gibbesii*, as the latter species has only just been confirmed from Bermuda (herein) and is evidently much rarer there. The same can be said of Gurney’s (1924) larvae from off Rio de Janeiro, Brazil, where the common species is also *A. paretii*. The larvae of “*Albu-*

nea sp.” reported by Bowen et al. (1979) were also probably this species, rather than the less common *A. gibbesii*.

The specimen from Rio Bueno Bay, Jamaica (LACM-AHF 1653-01) is the type host of the bopyrid isopod *Albunione indecora* (Markham, 1988), which occurs in the branchial chamber. This host specimen is a true intersex/feminized male, with large pleopods and well-developed gonopores on the fifth pereopods. This parasite is also known from the same host species in the Bahamas (ex AMNH 5464) (Markham and Boyko, 1999).

The drawings of this species given by Calado (1987: figs. 9, 10a) are inaccurate in that the carapace grooves are highly stylized and, moreover, very different between the two illustrations. The branchiostegite was drawn in Calado's figure 9 as if it were fused to the carapace and were spinose on the margins, neither of which is true. These illustrations were repeated by Calado (1995). All of the material listed by Calado (1995) was from Brazil and, although not examined, undoubtedly belongs to this species rather than to the northern *A. catherinae*, n. sp.

Although previous authors (e.g., Monod, 1956) indicated that morphology-based separation of the trans-Atlantic *A. paretii* complex into component species was not possible, it is now evident that this is not correct. The Caribbean and South American specimens are all true *A. paretii*, while those from North America are almost all *A. catherinae*, n. sp. The African material is all *A. elegans*. It is not known how far south along the western Gulf of Mexico, if at all, *A. catherinae*, n. sp. ranges.

This species typifies the “*paretii*-group” of *Albunea*, which also includes *A. lucasia*, *A. elegans*, *A. steinitzi*, and *A. catherinae*, n. sp. All these species share a similar morphology of the male telson, and all have acute heels on the dactyli of pereopod III. *Albunea paretii* is the Atlantic analogue of *A. lucasia*. *Albunea paretii* is easily distinguished from *A. catherinae*, n. sp. by the distal ocular peduncle/carapace length ratio and by the shapes of the dactyli of pereopods III and IV (see under *A. catherinae* for specifics). It can be separated from *A. elegans* by the shortness of the branchiostegite spine,

unbroken CG8, and the different shape of the dactyli of pereopod III.

Albunea lucasia de Saussure, 1853

Figures 106, 107

Albuminea [sic] *Lucasia* de Saussure, 1853: 367, pl. 12, fig. 4*.

Albunea lucasii [sic]: Stimpson, 1857: 485*. – Miers, 1878: 330–331. – Steinbeck and Ricketts, 1941: 459.

Albunaea [sic] *Lucasii* [sic]: Stimpson, 1858: 230 (list).

Albunea lucasia: Ortmann, 1896: 225 (list). – Ortmann, 1901: 1275. – Gordon, 1938: 187 (list). – Bott, 1955: 50–51, pl. 4, fig. 4a, b. – Schuster-Dieterichs, 1956: 29, 34, 37, 40, 51. – Dexter, 1972: 455*. – Abele, 1976: 266–267*. – Haig, 1980: 289, fig. 19.5. – Moran, 1984: 79, fig. 6. – Coêlho and Calado, 1987: 42–43, table 1. – Lemaitre and Alvarez León, 1993: 49 (list). – Hendrickx, 1992: 9 (list). – Calado, 1995: 38–39, pl. 4, fig. c, pl. 9, fig. a. – Calado, 1997a: 17. – Hendrickx and Harvey, 1999: 366 (list).

Albunea lucasi [sic]: Prahel et al., 1979: 55. – Prahel, 1986: 97.

Albumienea [sic] *lucasia*: Calado, 1995: 38.

not *Albunea lucasia*: Ramos and Rios, 1995: 103, fig. 5 (= *Albunea galapagensis*, n. sp.).

MATERIAL EXAMINED: **Mexico:** “Mexico,” 1 ♂, 13.1 mm cl (ANSP 4102a); “Mexico,” 1926, coll. Sec. Agriculture y Fomento: 1 ♂, 19.2 mm cl (USNM 62387); “Isla Grande,” 10 fms (= 18.3 m), April 8, 1937, coll. W. Williams and F. E. Lewis on R/V “Stranger”: 1 ♂, 8.5 mm cl (USNM 260983); Sta. 963–39, “White Friars Rocks,” May 7, 1939, coll. R/V “Velero III”: 1 ♂, 10.5 mm cl, 3 ♀, 5.9–7.1 mm cl (USNM 260982); **Baja California Norte:** Punta Gorda, 14 fms (= 25.6 m), April 24, 1937, coll. W. Williams and F. E. Lewis on R/V “Stranger”: 2 ♀, 9.8–15.6 mm cl (USNM 267775); **Baja California Sur:** Cabo San Lucas, south of Santa Rosalita, March 24, 1940, coll. E. Ricketts: 1 ♀, 5.5 mm cl (USNM 267772); Bahia de la Ventana, 5–10 fms (= 9.1–18.3 m), April 21, 1937, coll. W. Williams and F. E. Lewis on R/V “Stranger”: 1 ♀, 6.7 mm cl (USNM 267773); Bahia Salinas, Isla Carmen, 20 fms (= 36.6 m), Dec. 19, 1931, coll. S. A. Glassell: 1 juvenile, 4.5 mm cl (USNM 260997); **Sonora:** Puerto Peñasco, May 3, 1935, coll. S. A. Glassell: 1 ♂, 8.1 mm cl (USNM 267768); north Tiburón Island, 20

fms (= 36.6 m), Jan. 1, 1932, coll. S. A. Glassell: 1 unsexable specimen, 5.1 mm cl (USNM 267771); Guaymas, Feb. 1951, coll. unknown: 1 ♂, 18.1 mm cl, 1 ♀, 22.4 mm cl (CASIZ 109241); Bahia Boco-chibampo, Guaymas, Nov. 1952, coll. J. P. Strohbeen: 1 ♀, 20.3 mm cl (CASIZ 109245); Bahia Soldado, Guaymas, Nov. 27, 1955, coll. L. O. Miles: 1 ♂, 13.5 mm cl, 1 ♀, 11.8 mm cl (CASIZ 109247); Punta Cholla, May 13, 1941, coll. S. A. Glassell: 1 ♀, 9.0 mm cl (USNM 260994); **Sinaloa**: Mazatlan, 1 ♀, 19.7 mm cl, holotype (ANSP 4102); **Jalisco**: Bahia Tenacatita Bay, 8–10 fms (= 14.6–18.3 m), Feb. 17, 1938, coll. S. A. Glassell: 2 ♂, 4.4–4.5 mm cl, 1 ♀, 5.7 mm cl (USNM 267770); Bahia Tenacatita, 19°18'N, 104°51'W, 7 fms (= 12.8 m), April 11, 1937, coll. F. E. Lewis on R/V "Stranger": 1 ♂, 10.8 mm cl, 4 ♀, 8.1–9.2 mm cl, 1 oviger, 12.2 mm cl (USNM 260998); Puerto Vallarta, 10 fms (= 18.3 m), April 13, 1937, coll. W. Williams and F. E. Lewis on R/V "Stranger": 1 ♀, 10.5 mm cl (USNM 304300); Puerto Vallarta, 10 fms (= 18.3 m), April 13, 1937, coll. W. Williams and F. E. Lewis on R/V "Stranger": 1 ♀, 12.9 mm cl (USNM 260992); Bahia Chamela, 8 fms (= 14.6 m), Feb. 17, 1938, coll. S. A. Glassell: 1 ♂, 6.7 mm cl (USNM 260990); **Guerrero**: Zihuatanejo, 20 fms (= 36.6 m), Feb. 24, 1938, coll. S. A. Glassell: 1 juvenile, 3.3 mm cl (USNM 267774); Zihuatanejo, 12 fms (= 21.9 m), Feb. 24, 1938, coll. S. A. Glassell: 1 ♀, 7.2 mm cl (USNM 260984); Bahia Dulce, 20 fms (= 36.6 m), April 5, 1937, coll. W. Williams and F. E. Lewis on R/V "Stranger": 2 ♂, 8.5–11.3 mm cl (USNM 260985); **Oaxaca**: Guatulco, 50 fms (= 91.5 m), March 7, 1938, coll. S. A. Glassell: 1 ♀, 9.7 mm cl (USNM 267769); Sta. 22, Puerto Guatulco, 3–30 fms (= 5.5–54.9 m), March 15, 1939, coll. F. E. Lewis on R/V "Stranger": 1 ♀, 12.6 mm cl (USNM 260995); Sta. 21, Bahia Chipequa, Gulf of Tehuantepec, 7–18 fms (= 12.8–32.9 m), March 15, 1939, coll. R/V "Stranger": 1 ♂, 9.1 mm cl, 1 ♀, 11.1 mm cl (USNM 260996).

Guatemala: "Guatemala," coll. Paessler: 2 ♂, 7.9–8.0 mm cl, 2 ♀, 8.0–14.0 mm cl (ZMH K-5131); San Jose, 10–12 fms (= 18.3–21.9 m), Feb. 2, 1939, coll. F. E. Lewis: 1 ♀, 8.2 mm cl (USNM 260993).

Costa Rica: Gulf of Nicoya, July 6, 1981, coll. unknown: 1 ♂, 5.6 mm cl (USNM 267767).

Panama: Chame Point, June–July 1912, coll. R. Tweedie: 1 ♂, 11.8 mm cl, 1 ♀, 14.2 mm cl (USNM 66048); Sta. 183–6, Culebra Island, March 10, 1974, coll. NMNH-STRI Panama Survey: 1 ♂, 18.9 mm cl (USNM 260986); Sta. 253–3–1, Culebra Beach, Feb. 7, 1978, coll. H. W. Kaufman: 1 juvenile, 2.3 mm cl (USNM 260991); Sta. 183–6B, Culebra Island, March 10, 1974, coll. M. L. Jones and H. W. Kaufmann: 1 juvenile, 3.1 mm cl (USNM 304299); Sta. 263–2, Whorehouse Reef, 1 m, July 20, 1978, coll. M. L. Jones: 3 ♂, 6.7–7.9 mm cl, 1 ♀, 8.8 mm cl (USNM 260999); Sta. 182–1, Pilot House Beach, 4 ft (= 1.2 m), March 9, 1974, coll. M. L. Jones and H. W. Kaufmann: 1 juvenile, 3.6 mm cl (USNM 260981); Sta. 182–5, Pilot House Beach, 60 ft (= 18.2 m), March 9, 1974, coll. M. L. Jones and H. W. Kaufmann: 1 juvenile, 4.5 mm cl (USNM 260989); Ft. Amador, Naos Island, June 1969, coll. D. Dexter: 1 ♂, unmeasurable, 1 ♀, 7.9 mm cl (USNM 260988); Pilot House Beach, Naos Island, Jan. 28, 1971, coll. T. A. Biffar: 1 ♂, 17.5 mm cl, 1 oviger, 16.1 mm (USNM 304306); Ft. Amador, Boy Scout Islands, beyond Naos Island, July 2, 1969, coll. L. G. Abele: 4 ♀, 6.2–15.5 mm cl (USNM 304307); Isla Gobernadoro, north of Panama City, 50 ft (= 15.2 m), coll. unknown: 1 ♂, 12.1 mm cl, 1 carapace, 12.1 mm cl (Feldmann Collection).

Ecuador: Sta. 15, La Libertad, 5–12 fms (= 9.1–21.9 m), Feb. 21, 1939, coll. F. E. Lewis on R/V "Stranger": 2 ♂, 7.2–10.3 mm cl, 2 ♀, 7.6–7.9 mm cl, 1 anterior half, 8.4 mm cl (USNM 260987).

No Data: 1 ♀, 21.5 mm cl (MNHN-Hi 188).

DIAGNOSIS: Carapace longer than wide, covered with lightly setose grooves. Anterior margin with 9–13 spines on either side of ocular sinus. Setal field with narrow lateral elements and concave anterior margin. CG1 with separate posterior lateral elements; CG4 with two to four short, anteriorly displaced, medial elements between longer supralateral elements of CG4; CG5 of two convex elements; CG6 and CG7 separate; CG8 broken; CG11 present. Rostrum present, not reaching

posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and triangular in shape, tapering at tip, approximated along mesial margins, lateral margins convex, mesial margins straight. Cornea at tip. Dactylus of pereopod II with heel produced and rounded. Dactylus of pereopod III with heel broad, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with low rounded heel and shallow indent. Telson of male ovate, slightly longer than wide, with broadly rounded tip, thickly calcified medially, inflated dorsally, distal two-thirds with lateral decalcified region, median row of thin setae. Telson of female flattened, ovate, and evenly calcified with slightly produced tip.

DESCRIPTION: Carapace (fig. 106A) slightly longer than wide. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 9–13 large spines ($n = 6$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave and unarmed, except in largest specimens which possess one or two small spines. Frontal region smooth; setal field narrow anteriorly and posteriorly; posterior lateral elements reduced to narrow bands of setae. CG1 parallel to anterior margin of carapace, sinuous, strongly crenulate, divided into medial fragment and curved, posteriorly displaced lateral elements. Mesogastric region smooth; CG2 present as one or two short medial elements; CG3 broken into one or two long, anteriorly displaced, medial elements and two long lateral elements between posterior lateral elements of CG1; CG4 with two to four short, anteriorly displaced, medial elements between longer supralateral elements of CG4. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin with two short rows of setae. Metagastric region smooth; CG5 present as two convex elements. CG6 strongly crenulate, strongly anteriorly concave medially and sloping out to anteriorly convex lateral thirds. CG7 oblique, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as one to three long elements, medial element anteriorly dis-

placed. CG9 present as two short lateral grooves with gap at midline. CG10 present as two long curved lateral elements, with gap between fragments. CG11 present as long medial element. Post-CG11 element absent. Branchial region with numerous short, transverse rows of setae. Posterior margin deeply and evenly convex, with submarginal groove reaching four-fifths up margin of posterior concavity. Branchiostegite with strong anterior submarginal spine; anterior region with scattered short, transverse lines ventral to *linea anomurica*; with many short rows of setae and sparsely covered with long plumose setae ventrally; posterior region membranous, with numerous irregular fragments and sparsely covered with long plumose setae.

Ocular plate (fig. 106B) triangular, with shallow median indentation; median peduncular segments present as small ovate calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, with slightly convex lateral and straight mesial margins, cornea covering distolateral tip; mesial margins approximated along length; mesial and lateral margins with short plumose setae; tuft of plumose setae at proximolateral ventral angle and medial row of plumose setae extending from tuft along proximal two-thirds of segment.

Antennule (fig. 106C) with segment III narrow proximally, expanding distally to twice proximal width; with plumose setae on dorsal and ventral margins; dorsal exopodal flagellum with 101–139 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two to four articles ($n = 6$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and in transverse medial row on lateral surface. Segment I as long as wide, with short acute spine on dorsal margin; dorsal third of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 106D) with segment V approximately three times longer than wide, with long plumose setae on dorsal margin and scattered on lateral surface; flagellum with seven or eight articles ($n = 6$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with

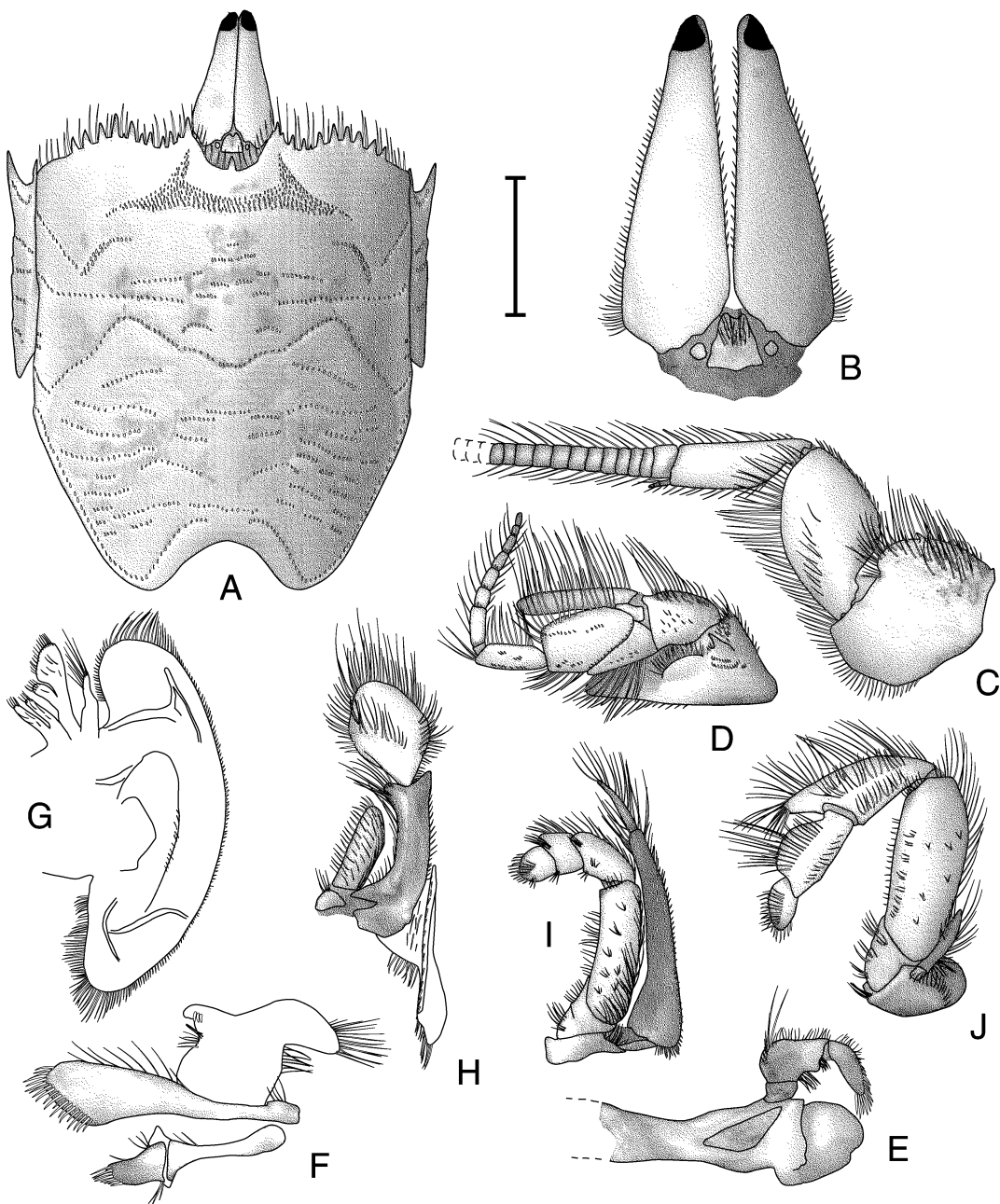


Fig. 106. *Albunea lucasia* de Saussure, 1853: A, B, D–J, ♂, 17.5 mm cl, USNM 304306; C, oviger, 16.1 mm cl, USNM 304306. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. F. Left maxillule, lateral view. G. Left maxilla, lateral view. H. Left maxilliped I, lateral view. I. Left maxilliped II, lateral view. J. Left maxilliped III, lateral view. Scale = 2.2 mm (B, F), 3.3 mm (A, E, D), and 4.4 mm (C, D, G, H, J).

long plumose setae on dorsal, ventral, and distal margins, and short scattered setae on lateral surface. Segment III with long plumose setae on ventral margin, short simple setae on dorsal margin and scattered on lateral surface. Segment II short, widening distally, rugose, with plumose setae on margins and scattered on lateral surface; antennal acicle long, thin, and exceeding distal margin of segment IV by one-fourth length of segment IV, with long plumose setae on dorsal margin. Segment I rounded proximally, flattened ventrolaterally, with long plumose setae on margins and scattered on surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodistant to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 106E) incisor process with two teeth; cutting edge smooth. Palp three-segmented, with plumose setae on margins and long, thick, simple setae arising from bend in second segment and on distal margin of terminal segment.

Maxillule (fig. 106F) distal endite proximally narrow, widening to inflated distal end, with thick simple setae on distal margin and thin simple setae on dorsal margin. Proximal endite with thick simple setae on distal margin. Endopodal external lobe truncate distally and curled under; internal lobe reduced with three thick setae at distolateral margin.

Maxilla (fig. 106G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 106H) epipod with plumose setae on margins, distolateral surface, and mesial surface. Endite tapered distally and subequal to first segment of exopod. Exopod with two segments; proximal segment narrow, parallel margins with plumose setae; distal segment spatulate, longer than wide, broadest medially, margins and mesioventral surface with long plumose setae. Endopod flattened and elongate, reaching two-thirds to distal end of proximal exopodal segment; plumose setae on margins and median of lateral surface.

Maxilliped II (fig. 106I) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus 1.5 times wider than long,

slightly produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on lateral surface and ventrolateral angle. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin. Merus approximately three times longer than wide, margins parallel; with simple and plumose setae on margins and scattered on surface. Basis-ischium incompletely fused, with plumose setae on margins. Exopod one-half longer than merus, flagellum with one elongate article.

Maxilliped III (fig. 106J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsally inflated, with longitudinal median row of plumose setae on lateral surface; margins with plumose setae. Carpus produced onto propodus almost one-third length of propodus; lateral surface with two rows of plumose setae on surface; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered on lateral surface. Basis-ischium incompletely fused, with weak crista dentata of three or four teeth. Exopod two-segmented: proximal segment small; distal segment styliiform, tapering, approximately two-fifths length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 107A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose and short simple setae; ventral margin with short simple setae. Propodal lateral surface with numerous short, transverse rows of setose rugae; dorsal margin unarmed; ventral margin distally produced into acute spine; cutting edge lacking teeth, lined with long plumose setae; dorsal margin with long plumose setae, ventral margin with short simple setae. Carpus with dorsodistal angle produced into strong corneous-tipped spine; dorsal margin with short transverse grooves behind spine; dorsal and distal margins with long plumose setae; lateral surface with small distal rugose area, with few transverse, setose ridges on distal half of surface; mesial surface smooth, with medial transverse row of setae, margins with long plumose setae. Merus unarmed; lateral surface with scattered transverse rows of long plumose setae, margins with long plumose setae; mesial sur-