

Fig. 107. *Albunea lucasia* de Saussure, 1853: A–F, ♂, 17.5 mm cl, USNM 304306; G, oviger, 16.1 mm cl, USNM 304306. **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 (G), 4.4 mm (E, F), and 5.9 mm (A–D).

face with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 107B) dactylus smooth; base to heel slightly concave, heel produced but rounded, heel to tip with wide, subacute 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 mar-

gin 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 unarmed.

Pereopod III (fig. 107C) dactylus with base to heel concave, heel produced and narrowing, rounded at apex, 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 long simple setae on ventral margin; mesial surface with scattered long setae on and near distal margin and in oblique row on surface. 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 margins. Merus narrow, 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 in male; in female unarmed. Female with large gonopore

on anterior mesial margin of coxa; male without pore.

Pereopod IV (fig. 107D) 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 exceeding 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 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 ventrodial margins with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 107E) with somite I longer than wide, 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 proximally and anterolaterally distally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and

shorter; 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 broader than somite V; 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. 107F) ovate, slightly longer than wide, with broadly rounded tip and distally flattened apex; thickly calcified medially, inflated dorsally; distal half of dorsal surface with lateral decalcified region; median longitudinal groove extending one-half length, row of long simple setae on either side of median groove beginning at distal end and continuing almost to distal margin of calcified region; proximolateral angles with patch of short simple setae; margins with long simple setae. Telson of female (fig. 107G) 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-fourth length of those on male; proximolateral angle with patch of setae, margins with long simple setae.

DISTRIBUTION: Baja California Norte (Gulf side), Mexico, south to Ecuador, in up to 91.5 m depth.

MAXIMUM SIZE: Males: 19.2 mm cl; females: 22.4 mm cl.

TYPE SPECIMEN: ANSP 4102 (holotype).

TYPE LOCALITY: Mazatlan [Sinaloa], Mexico.

REMARKS: As shown by Boyko (2000b), ANSP 4102 is de Saussure's (1853) figured specimen and the holotype by monotypy. The holotype was also examined and cited by Stimpson (1857). de Saussure (1853) clearly named this species after his fellow carcinologist Pierre Hippolyte Lucas, but gave the spelling as "*Lucasia*" in two places, rather than the correct form of *lucasi*. As there is no evidence of printer's error or lapsus calami, *Albunea lucasia* is the incorrect original spelling that must be used for this taxon.

Calado (1995) saw no material of this species, but she redescribed it by repeating the brief text of de Saussure (1853), as well as his carapace drawing; she also incorrectly gave the type locality as "Cabo de San Lucas," probably due to a misinterpretation of the etymology of the specific name.

Haig (1980) stated that this species occurs southward to Peru, but he did not cite what material this was based on. I have seen no material or specific records in the literature from any locality south of Ecuador.

This species is the Pacific analogue of *A. paretii*.

Albunea catherinae, new species

Figures 108–110

Albunea symnista [sic]: Gibbes, 1850b: 187 (not *Albunea symmista* (Linnaeus, 1758)).

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). – Dörger, 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) (not *Albunea paretii* Guérin Méneville, 1853).

Albunea [sic] *gibbesii*: Arnold, 1901: 269, pl. 61, fig. 2 (not *Albunea gibbesii* Stimpson, 1859).

Albunea oxyophthalma [sic]: Benedict, 1904: 625, fig. 5* (not *Albunea oxyophthalma* Miers, 1878 = *Albunea paretii* Guérin Méneville, 1853).

Albunea gibbesii: Hay and Shore, 1918: 414, pl. 30, fig. 11. – Pearse et al., 1942: 185* (not *Albunea gibbesii* Stimpson, 1859).

Albunea oxyophthalma: Gordon, 1938: 187 (part), figs. 3d, 4d* (not *Albunea oxyophthalma* Miers, 1878 = *Albunea paretii* Guérin Méneville, 1853).

Albunea paretii [sic]: Kurata, 1970: 180–182 (not *Albunea paretii* Guérin Méneville, 1853).

MATERIAL EXAMINED: **USA: Virginia:** *Accomack Co.*: 37°31'12"N, 75°18'36"W, 26 m, March 22, 1976, coll. Virginia Institute of Marine Science: 1 ♂, 4.4 mm cl (USNM 179377); **North Carolina:** *Dare Co.*: Off Cape Hatteras, 35°20'35"N, 75°18'05"W, 16 fms (= 29.3 m), Oct. 19, 1884, coll. "Albatross": 1 ♂, 9.0 mm cl, paratype (YPM

21134); *Carteret Co.*: Sta. 2913, 34°29'N, 76°09'W, 20 fms (= 36.6 m), March 12, 1961, coll. R/V "Silver Bay": 1 ♂, 15.3 mm cl, paratype (USNM 260813); Morehead City, April 7, 1891, coll. "Fish Hawk": 1 ♂, 10.8 mm cl, paratype (USNM 29008); Sheepshead Shoal, Beaufort, July 4, 1941, coll. A. S. Pearse: 1 ♂, 16.1 mm cl, 2 ♀, 13.3–15.3 mm cl, paratypes (USNM 81025), 1 ♀, 17.5 mm cl, paratype (RMNH 14649 ex USNM 81025); Bird Shoal, Beaufort, June 11, 1941, coll. A. S. Pearse: 1 ♂, 17.0 mm cl, 2 ♀, 16.6–18.0 mm cl, paratypes (USNM 81026), 1 ♂, 15.3 mm cl, paratype (RMNH 14648 ex USNM 81026); Bird Shoal, Beaufort, Aug. 4, 1942, coll. A. S. Pearse: 1 ♀, 16.8 mm cl, paratype (USNM 81027); Ft. Macon, Beaufort, coll. E. Coues: 1 ♀, 10.7 mm cl, paratype (YPM 21135); Ft. Macon, Beaufort, Dec. 1871, coll. H. C. Yarrow: 1 ♀, 14.9 mm cl, paratype (YPM 21136); sandflat west of dining hall, Duke Marine Laboratory, Beaufort, May 12, 1972, coll. Duke Marine Laboratory: 1 ♂, 14.3 mm cl, 1 ♀, 14.3 mm cl, paratypes (ZMUC 2710); GOSNOLD 45, Vessel 03 Cruise 02, Sta. 1448, 34°30'N, 77°02'W, 15 m, May 18, 1964, coll. NMFS: 1 ♀, 8.4 mm cl, paratype (MCZ 19598); *Brunswick Co.*: 33°35'N, 78°05'W, 18 m, Feb. 11, 1977, coll. Texas Instruments 1C: 1 ♀, 11.0 mm cl, paratype (USNM 174227); 33°50'N, 78°24'W, 11 m, Feb. 9, 1977, coll. Texas Instruments 1A: 1 juvenile, 3.9 mm cl (USNM 174453); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1462, 33°30'N, 78°15'W, 20 m, May 19, 1964, coll. NMFS: 1 ♀, 15.4 mm cl, paratype (MCZ 19596); **South Carolina**: *Charleston Co.*: ASTERIAS 65–1, Sta. 2259, 32°57'N, 79°22'W, 9 m, May 20, 1965, coll. NMFS: 1 ♀, 7.7 mm cl, paratype (MCZ 19600); *Beaufort Co.*: ASTERIAS 65–1, Sta. 2295, 32°05'N, 80°38'W, 8 m, May 28, 1965, coll. NMFS: 1 oviger, 14.1 mm cl, paratype (MCZ 19601); **Georgia**: *Chatham Co.*: 31°41'06"N, 80°20'42"W, 28 m, July 29, 1981, coll. M. Dojiri; 1 first stage crab. 2.7 mm cl (USNM 225928); *Liberty Co.*: Sta. M2, North Beach, St. Catherines Island, May 17, 1995, coll. C. B. Boyko (AMNH St. Catherines Island Expedition): 1 ♂, 15.0 mm cl, holotype (AMNH 17194); Sta. M5, on exposed sand, sandbar offshore, North Beach, St. Catheri-

nes Island, May 16, 1998, coll. C. B. Boyko, J. Slapcinsky, A. and D. Harvey, and J. Williams (AMNH St. Catherines Island Expedition): 1 ♀, 18.1 mm cl, allotype (AMNH 17796); Sta. M5, sandbar offshore, North Beach, St. Catherines Island, Nov. 4, 1998, coll. C. B. Boyko (AMNH St. Catherines Island Expedition): 2 ♂, 10.8–15.5 mm cl, paratypes (AMNH 17887); *McIntosh Co.*: Off sea buoy, Sapelo Island, 44 ft (= 13.3 m), June 6, 1963, coll. M. Gray: 1 ♂, 15.5 mm cl, paratype (USNM 150671); east-southeast of sea buoy, Sapelo Island, 35 ft (= 10.6 m), Sept. 2, 1963, coll. M. Gray: 1 ♀, 12.0 mm cl, paratype (USNM 150672); **Florida**: West coast of Florida, pre-Nov. 1901, coll. J. W. Velie: 3 ♂, 8.6–16.2 mm cl (USNM 25186), 1 ♂, 12.9 mm cl (BMNH 1976.436 ex USNM 25186); "Florida," coll. unknown: 1 oviger, 20.0 mm cl (AMNH 159); *Nassau Co.*: Off Fernandina, 35 fms (= 64 m), April 1951, coll. R. Humes: 1 ♀, 19.9 mm cl, paratype (RMNH 24842); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1499, 30°40'N, 81°14'W, 16 m, May 22, 1964, coll. NMFS: 1 ♂, 9.3 mm cl, paratype (MCZ 19597); *Duval Co.*: 30°23'N, 81°15'W, 15 m, coll. Nov. 26, 1977, coll. Texas Instruments 6B: 1 ♀, 14.7 mm cl, paratype (USNM 174098); *St. Johns Co.*: GOSNOLD Cruise 2, Sta. 1509, 29°50'N, 81°14'W, 14 m, May 22, 1964, coll. NMFS: 1 ♂, 7.2 mm cl, 1 ♀, 7.4 mm cl, paratypes (MCZ 19599); *Volusia Co.*: Daytona, coll. N. S. Chamberlain: 1 ♂, 13.5 mm cl, paratype (USNM 65837 ex Boston Soc. Nat. Hist.); Ponce de Leon Inlet, July 13, 1937, coll. J. R. Preer: 1 ♀, 19.2 mm cl, paratype (USNM 79063); *Brevard Co.*: Indian River, northwest side of Sebastian Bridge, June 17, 1978, coll. E. Hillman: 1 ♂, 14.9 mm cl, paratype (HBOM 089:06083); Sebastian Inlet, April 13, 1972, coll. R. H. Gore: 1 ♂, 10.4 mm cl, paratype (HBOM 089:00250); Sta. 262/782, 27°49.8'N, 80°07.2'W, 29 m, Aug. 13, 1975, coll. R/V "Gosnold": 1 ♂, 8.7 mm cl, paratype (HBOM 089:02424); Sta. 346, 28°31.3'N, 80°12.7'W, 40 m, July 1, 1973, coll. R/V "Hernan Cortez": 1 ♀, 11.0 mm cl, paratype (HBOM 089:03167); *St. Lucie Co.*: North side, Dynamite Point, Ft. Pierce Inlet, March 18, 1972, coll. R.G.G.: 1 ♂, 9.3 mm cl, paratype (HBOM 089:00052); west

of Coon Island, Indian River, March 6, 1985, coll. Lee and Petry: 1 ♂, 10.9 mm cl, paratype (USNM 221757); inlet on rocks by Dynamite Point, Ft. Pierce, June 14, 1972, coll. R. Gore: 1 ♂, 11.0 mm cl, paratype (ANSP uncataloged); Hutchinson Island, Fort Pierce, June 18, 1992, coll. R. B. Manning: carapace fragments (USNM 256928); Sta. 229/406, 27°22.3'N, 80°14.5'W, 8 m, April 16, 1974, coll. R/V "Gosnold": 1 ♀, 10.2 mm cl, paratype (HBOM 089:00893); *Martin Co.*: 27°08'N, 80°06'30"W, 11 m, March 5, 1974, coll. R/V "Gosnold": 2 ♂, 8.7–11.9 mm cl, 2 ♀, 9.6–9.8 mm cl, 1 unsexable specimen, 8.8 mm cl (USNM 170055); Jupiter Island, June 25, 1973, coll. MER, KE, DSK: 12 ♂, 8.1–15.3 mm cl, 4 ♀, 8.3–15.5 mm cl, paratypes (HBOM 089:00521); Sta. 297, 27°08'N, 80°06.6'W, 15 m, March 5, 1974, coll. R/V "Gosnold": 1 unsexable specimen, 7.8 mm cl (HBOM 089:02419); Sta. 407, 27°15.5'N, 80°11.6'W, 9.5 m, April 16, 1974, coll. R. H. Gore on R/V "Gosnold": 1 ♂, 5.0 mm cl (HBOM 089:02421); Sta. 809, 27°30.1'N, 80°01.6'W, 12.6 m, Jan. 27, 1977, coll. R/V "Gosnold": 1 ♂, 8.4 mm cl, paratype (HBOM 089:03168); Sta. 222/266A, 27°09.2'N, 80°01.2'W, 29 m, Feb. 26, 1974, coll. R/V "Gosnold": 1 ♀, 10.9 mm cl, paratype (HBOM 089:00973); Sta. 237/500, 26°56.6'N, 80°03'W, 9 m, June 10, 1974, coll. R/V "Gosnold": 1 ♂, 12.2 mm cl, paratype (HBOM 089:02418); Sta. 223/292, 27°10.8'N, 80°06.8'W, 13 m, March 4, 1974, coll. R/V "Gosnold": 2 ♀, 7.7–8.8 mm cl, 1 unsexable specimen, 10.0 mm cl (HBOM 089:02420); Sta. 223/300, 27°03.8'N, 80°02.2'W, 19 m, March 5, 1974, coll. R/V "Gosnold": 1 ♂, 10.0 mm cl, 1 unsexable anterior half carapace (HBOM 089:02422); *Palm Beach Co.*: Off Palm Beach, 15 fms (= 27.4 m), Feb. 1950, coll. McGinty: 1 ♀, 6.1 mm cl (USNM 260816); *Collier Co.*: Marco, May 1884, coll. H. Hemphill: 1 ♂, 11.6 mm cl, 1 ♀, 16.0 mm cl (USNM 6988); Marco Beach, Sept. 12, 1960, coll. L. B. Holthuis on "Donna": 1 ♀, 11.4 mm cl, paratype (RMNH 15897); *Lee Co.*: Captiva Key, 1859, coll. G. Wurdemann: 1 ♀, 14.9 mm cl, paratype (MCZ 846); *Sarasota Co.*: Sarasota Bay, coll. unknown: 1 ♂, 7.9 mm cl, paratype (USNM 42198 ex Union College Collection); *Hillsborough Co.*: Egmont Key, 1868?, coll. W. T. Coons: 1 ♀, 11.3 mm cl, paratype (YPM 993); *Franklin Co.*: Alligator Point, Jan. 10, 1966, coll. J. Rudloe: 1 ♀, 15.4 mm cl, paratype (USNM 119330); Alligator Point, Nov. 25, 1968, coll. J. Rudloe: 1 ♀, 16.7 mm cl, paratype (USNM 125573); Alligator Point, Nov. 8, 1969, coll. J. Rudloe: 1 ♂, 11.2 mm cl (USNM 260817); *Okaloosa Co.*: 3 mi south of Destin, Oct. 24, 1979, coll. J. Martin on R/V "Oregon II": 1 ♂, 15.6 mm cl (USLZ 969); *Escambia Co.*: Pensacola, coll. J. E. Benedict: 1 ♂, 11.9 mm cl, paratype (USNM 29007); **Alabama**: *Mobile Co.*: 30°08'33"N, 88°06'27"W, 14 m, Jan. 20, 1980, coll. Interstate Electronics Corporation: 1 unsexable unmeasurable specimen (USNM 260821); 30°09'18"N, 88°06'36"W, 13 m, Jan. 19, 1980, coll. Interstate Electronics Corporation: 1 ♂, 5.9 mm cl (USNM 260822); 30°09'32.5"N, 88°04'32.4"W, 8 m, Jan. 19, 1980, coll. Interstate Electronics Corporation: fragments (USNM 260823); **Louisiana**: *Lafourche Parish*: 29°02'52"N, 90°09'46"W, 500 m north of platform, Bay Marchand Lease Area, 14 m, Aug. 30, 1978, coll. SWRI For BLM: 1 juvenile, 1.9 mm cl (USNM 186673); Sta. 14927, 28°41'N, 90°27'W, south of Timbalier Island, June 7, 1974, coll. T. C. Shirley on R/V "Oregon II": 1 ♂, 10.2 mm cl (USLZ 2024); *Terrebonne Parish*: Sta. OEI14, 28°47'54"N, 90°28'30"W, 19.8 m, July 13, 1973, coll. Gulf Coast Research Laboratory: 1 megalopa, 3.2 mm cl (USNM 260974); 28°51'34"N, 91°07'52"W, 500 m north of platform, Ship Shoal Lease Area, 5 m, Sept. 21, 1978, coll. SWRI for BLM: 1 juvenile, 2.7 mm cl (USNM 186674); *Vermilion Parish*: Trinity Shoal, 29°13'N, 92°11'W, June 28, 1968, coll. unknown: 1 juvenile, 3.1 mm cl (USLZ 40); *Cameron Parish*: 29°30'N, 93°27'W, south of Cameron, Aug. 5, 1981, coll. D. L. Felder et al.: 1 unsexable specimen, 13.3 mm cl (USLZ 2023); **Texas**: *Jefferson Co.*: Heald Banks, Sabine, Oct. 18, 1953, coll. W. G. Hewatt: 1 ♂, 5.1 mm cl, 1 ♀, 5.3 mm cl, paratypes (USNM 97661); Heald Banks, Sabine, Oct. 18, 1953, coll. W. G. Hewatt: 1 ♂, 6.4 mm cl, paratype (USNM 97662); Heald Banks, Sabine, Oct. 1953, coll. W. G. Hewatt: 1 ♀, 6.8 mm cl, paratype (USNM 97663); *Galveston Co.*: Sta. 10, off Galveston Beach, 2 fms (= 3.7 m), Sept. 24, 1968,

coll. D. Harper: 1 ♀, 3.9 mm cl (A&M 2-1573(A)); Sta. 6, off Galveston Beach, 6 fms (= 11.0 m), Oct. 23, 1968, coll. D. Harper: 1 megalopa, 2.4 mm cl (A&M 2-1573(B)); Sta. 3, off Galveston Beach, 4 fms (= 7.3 m), Aug. 4, 1968, coll. D. Harper: 1 megalopa, 2.6 mm cl (A&M 2-1573(C)); Sta. 7, off Galveston Beach, 5 fms (= 9.1 m), Aug. 21, 1968, coll. D. Harper: 1 megalopa, 2.2 mm cl (A&M 2-1573(D)); Sta. 2, off Galveston Beach, 3 fms (= 5.5 m), Sept. 24, 1968, coll. D. Harper: 1 megalopa, 2.8 mm cl (A&M 2-1573(E)); Sta. 6, off Galveston Beach, 6 fms (= 11.0 m), Sept. 24, 1968, coll. D. Harper: 1 megalopa, 3.0 mm cl (A&M 2-1573(F)); Sta. 3, off Galveston Beach, 4 fms (= 7.3 m), Aug. 4, 1968, coll. D. Harper: 1 megalopa, 2.4 mm cl (A&M 2-1573(G)); Sta. 7, off Galveston Beach, 5 fms (= 9.1 m), Oct. 23, 1968, coll. D. Harper: 3 megalopae, 2.1–2.7 mm cl (A&M 2-1573(H)); Sta. 3, off Galveston Beach, 4 fms (= 7.3 m), Oct. 17, 1968, coll. D. Harper: 1 megalopa, 3.2 mm cl (A&M 2-1573(I)); Sta. 4, off Galveston Beach, 5 fms (= 9.1 m), Aug. 4, 1968, coll. D. Harper: 2 megalopae, 2.1–2.5 mm cl (A&M 2-1573(J)); Sta. 9, off Galveston Beach, 3 fms (= 5.5 m), Oct. 23, 1968, coll. D. Harper: 1 ♂, 3.4 mm cl, 2 first stage crabs, 2.4–2.5 mm cl (A&M 2-1573(K)); Sta. 7, off Galveston Beach, 5 fms (= 9.1 m), Sept. 24, 1968, coll. D. Harper: 1 megalopa, 2.2 mm cl (A&M 2-1573(L)); Sta. 65A3–8, 3 mi off Galveston Harbor, 10 m, March 12, 1965, coll. W. E. Pequegnat on "Alaminos": 1 ♀, 6.0 mm cl (A&M 2-6794); Galveston, June–July, 1932, coll. Liberty Fish and Oyster Co.: 1 ♀, 13.8 mm cl, paratype (YPM 21132); *Brazoria Co.*: San Bernard River, east of San Bernard Refuge, Sept. 10, 1969, coll. Nesbitt: 1 ♀, 12.6 mm cl (A&M uncataloged); *Matagorda Co.*: Alligator Head, Matagorda Bay, coll. J. D. Mitchell: 1 ♀, 17.2 mm cl, 1 ♀, unmeasurable (USNM 22814); *Calhoun Co.*: Near Pass Cavallo, coll. J. D. Mitchell: 1 ♂, 14.1 mm cl (USNM 18902); *Aranas Co.*: Aransas Pass, Corpus Christi Bay, Nov. 20, 1936, coll. K.H.M.: 1 ♀, 17.5 mm cl (USNM 260818); *Nueces Co.*: Corpus Christi, Dec. 5, 1934, coll. Texas College of Arts and Industries: 1 ♂, 14.0 mm cl, paratype (USNM 77385); *Kenedy Co.*: Sta. 19, 26°49.9'N,

97°19.8'W, 5 fms (= 9.1 m), Oct. 11, 1988, coll. Ferrell: 2 ♂, 6.2–8.4 mm cl (A&M uncataloged); Sta. 33, 26°39.1'N, 97°15'W, 14 m, Oct. 12, 1988, coll. Ferrell: 1 ♂, 7.8 mm cl (A&M uncataloged).

Limited Data: "Florida or West Indies," coll. unknown: 1 ♂, 11.3 mm cl (AMNH 249).

Questionable Data: "West Indies," coll. unknown: 1 ♂, 16.0 mm cl (YPM 2701).

No Data: [?Florida], 4 ♀, 15.5–18.3 mm cl (USNM 260820).

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 concave anterior margin. CG1 with separate posterior lateral elements; CG4 with one long, anteriorly displaced, and two short, posteriorly displaced, medial elements between longer supralateral elements of CG4; CG5 present as two triangular elements with two shorter straight elements located posteromedially; 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 proximal half of mesial margins, lateral margins convex except slightly concave at tip, mesial margins sinuous. Cornea at tip. Dactylus of pereopod II with heel produced, tapered and acute. Dactylus of pereopod III with heel thin, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with subacute heel and deep indent. Telson of male broadly triangular, tip tapered and 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. 108A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 8–10 large spines ($n = 6$) 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 el-

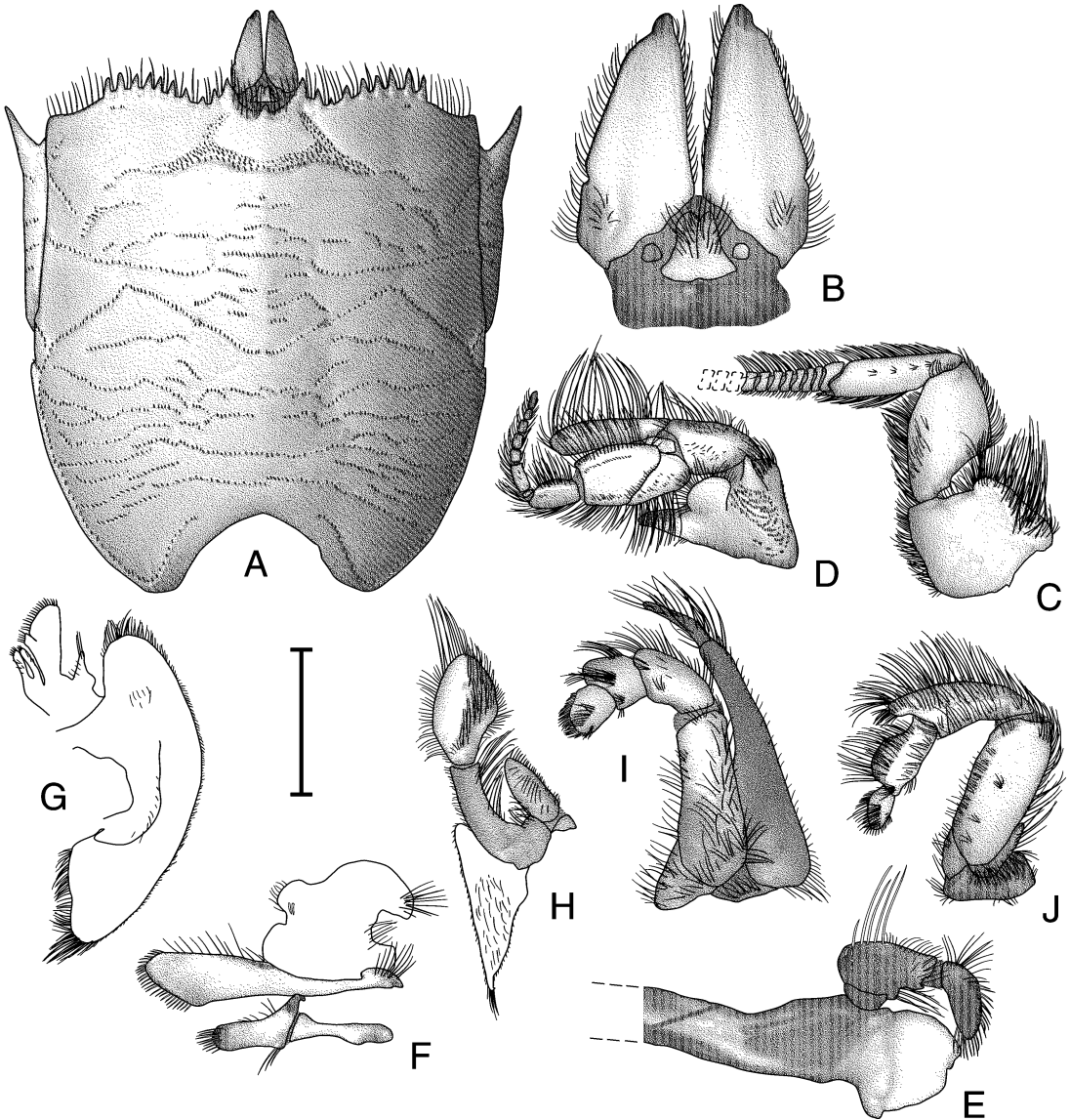


Fig. 108. *Albunea catherinae*, n. sp.: A, ♂, 15.0 mm cl, AMNH 17194, holotype; B–J, oviger, 20.0 mm cl, AMNH 159. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial 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 = 2.2 mm (B), 3.0 mm (F), 3.3 mm (E, I), 5.5 mm (A), 6.0 mm (D, G), and 6.7 mm (C, H, J).

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 me-

dial elements; CG3 broken into 6–11 short elements between posterior lateral elements of CG1; CG4 with one long, anteriorly displaced, and two short, posteriorly 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 with two shorter straight elements located posteromedially. 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 four short medial and two long lateral elements; median element displaced slightly anteriorly. CG9 present as two short lateral grooves with gap at midline. CG10 present as one or two long elements. 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 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. 108B) triangular with deep median indentation; median peduncular segments present as small ovate, calcified areas lateral to ocular plate. Distal peduncular segments elongate, subtriangular, 0.15–0.23 length of carapace, with convex lateral and straight 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 proximalateral dorsal and ventral angles, ventromedial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 108C) 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 94–132 articles ($n = 6$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with two or three 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, unarmed; lateral surface dorsal third rugose with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 108D) 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-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 ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 108E) 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. 108F) 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. 108G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 108H) 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. 108I) 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, 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-third longer than merus, flagellum with one elongate article, approximately as long as carpus.

Maxilliped III (fig. 108J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsolaterally 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 three or four 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. 109A) 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 se-

tose 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 and 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. 109B) 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, 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, 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

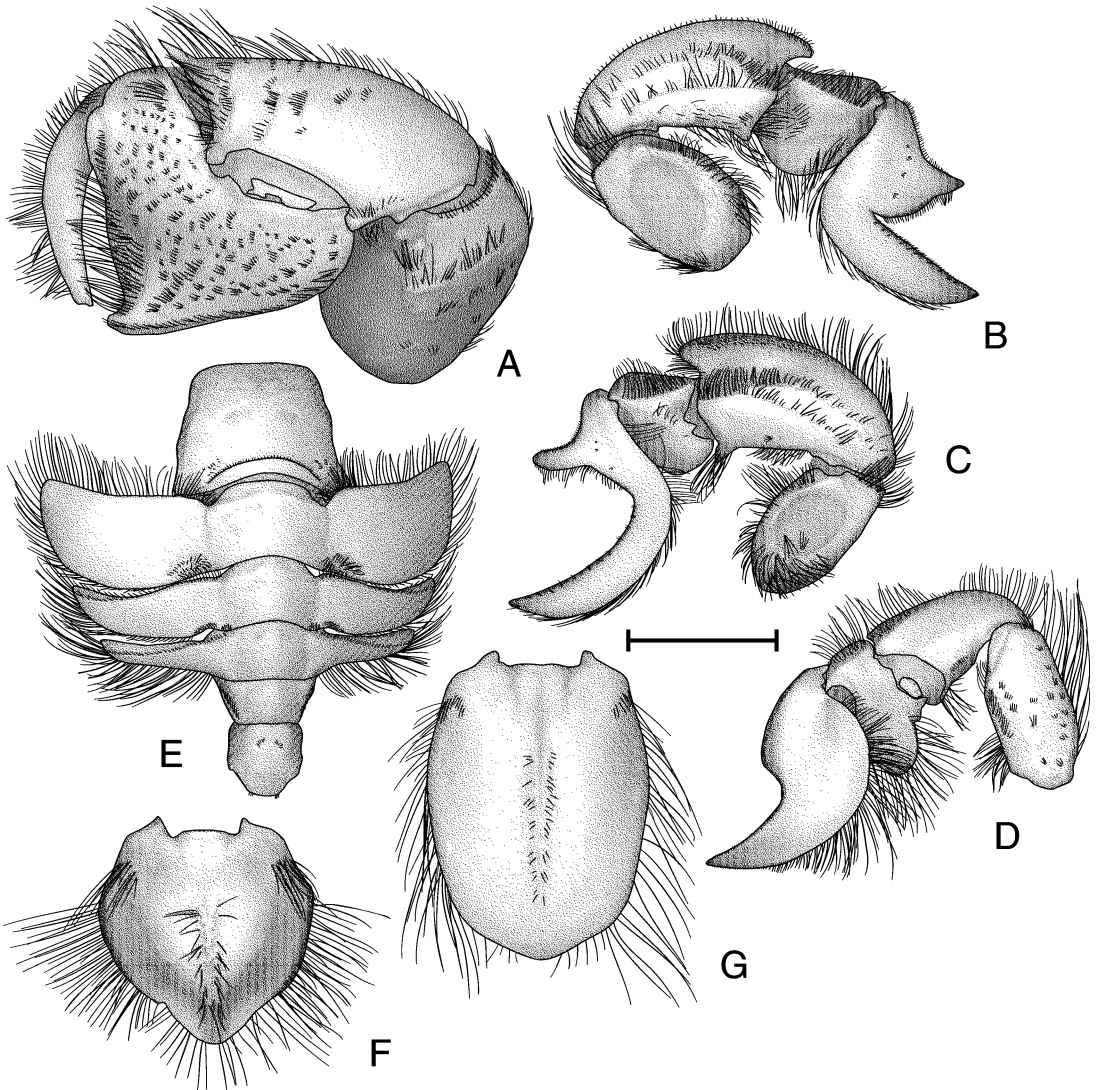


Fig. 109. *Albunea catherinae*, n. sp.: A-E, G, oviger, 20.0 mm cl, AMNH 159; F, ♂, 15.0 mm cl, AMNH 17194, holotype. A. Left pereopod I, lateral view. B. Right pereopod II, lateral view. C. Left pereopod III, lateral view. D. Left pereopod IV, lateral view. E. Abdominal somites I-VI, dorsal view. F. Telson of ♂, dorsal view. G. Telson of ♀, dorsal view. Scale = 3.3 mm (F, G), 6.0 mm (A), and 6.7 mm (B-E).

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. Both males and females coxa with spine on anterior margin.

Pereopod III (fig. 109C) 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 smooth. 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 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. Male coxa with spine on anterior margin; female coxa lacking spine. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male without pore.

Pereopod IV (fig. 109D) dactylus with base to tip convex proximally, with 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 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 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. 109E) 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 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 anterolaterally; 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. 109F) 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 continuing almost to distal margin of telson; proximolateral angles with patch of long simple setae; margins with long simple setae. Telson of female (fig. 109G) 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: From Virginia south to Palm Beach Co., Florida, then from Collier Co., Florida, through the Gulf of Mexico to southern Texas, in up to 64 m depth. Apparently absent from the Florida Keys.

MAXIMUM SIZE: Males: 17.6 mm cl; females: 19.9 mm cl.

TYPE SPECIMENS: AMNH 17194 (holotype), AMNH 17796 (allotype), AMNH 17887 (2 paratypes), ANSP uncat. (paratype), HBOM 089:00052 (paratype), HBOM 089:00250 (paratype), HBOM 089:00521 (16 paratypes), HBOM 089:00893 (paratype), HBOM 089:00973 (paratype), HBOM 089:02418 (paratype), HBOM 089:02424 (paratype), HBOM 089:03167 (paratype), HBOM 089:03168 (paratype), HBOM 089:06083 (paratype), MCZ 846 (paratype), MCZ 19596 (paratype), MCZ 19597 (paratype), MCZ 19598 (paratype), MCZ 19599 (2 paratypes), MCZ 19600 (paratype), MCZ 19601 (paratype), RMNH 14648 (paratype), RMNH 14649 (paratype), RMNH 15897 (paratype), RMNH 24842 (paratype), USNM 29007 (paratype), USNM 29008 (paratype), USNM 42198 (paratype), USNM 65837 (paratype), USNM 77385 (paratype), USNM 79063 (paratype), USNM 81025 (3 paratypes), USNM 81026 (3 paratypes), USNM 81027 (paratype), USNM 97661 (2 paratypes), USNM 97662 (paratype), USNM 97663 (paratype), USNM 119330 (paratype), USNM 125573 (paratype), USNM 150671 (paratype), USNM 150672 (paratype), USNM 174098 (paratype), USNM 174227 (paratype), USNM 221757 (paratype), USNM 260813 (paratype), YPM 993 (paratype), YPM 21132 (paratype), YPM 21134 (paratype), YPM 21135 (paratype), YPM 21136 (paratype), ZMUC 2710 (2 paratypes).

TYPE LOCALITY: North Beach, St. Catherines Island, Liberty Co., Georgia, USA.

ETYMOLOGY: The specific name of this taxon is given for two reasons. First, it is named after the Georgia barrier island, St. Catherines, which serves as the type locality for the species. This island was visited by the great American naturalist Thomas Say in the early 1800s, and it has been the site of seven years of personal field research on the biodiversity

of the local invertebrate fauna. Second, it is named after my niece, Catherine Elizabeth Boyko, whose detailed discussions of events and objects continue unabated until she is satisfied that they have been fully explained; an excellent quality should she someday choose the biological sciences as a profession.

REMARKS: Kurata (1970; as *A. paretii*) described the zoeal stage I hatched from an ovigerous female. He also indicated that this species has a total of six zoeal stages, and described stages II–VI based on larvae from the Georgia plankton. Ovigerous females are known from North Carolina in May and June (Williams, 1984). Williams' (1984) remark that that *A. gibbesii* "is occasionally found on exposed sandy shoals, especially at times of extreme low tides" likely refers to *A. catherinae*, n. sp., as *A. gibbesii* is rarely found in shallow water.

This species was confused with *A. paretii* for many years, and is indeed a member of the "*paretii*-group" of species. However, *A. catherinae*, n. sp. actually is more closely related to *A. steinitzi* from the western Indian Ocean than to the Central and South American *A. paretii*.

Albunea catherinae, n. sp. is easily distinguished from *A. paretii* by its smaller distal peduncular segment/carapace length ratio, and by the shapes of the dactyli of pereopods III and IV. A plot of distal peduncular segment length against carapace length for 68 specimens of *A. paretii* (5.0–27.4 mm cl) and 50 specimens of *A. catherinae* (6.8–22.1 mm cl) reveals that the two species have greatly differing distal peduncular segment/carapace length ratios, especially above 10 mm cl (fig. 110). Below that size, it is necessary to consider other factors, such as the shape of the dactyli of pereopods III and IV, in order to separate the species. *Albunea catherinae*, n. sp. can also be separated from *A. elegans* by the shapes of the dactyli of pereopods III and IV.

Albunea steinitzi Holthuis, 1958

Figures 111, 112

Albunea symnista [sic]: Cano, 1889a: 95, 104. – Cano, 1889b: 263 (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea symmysta: Nobili, 1906: 142–143*. –

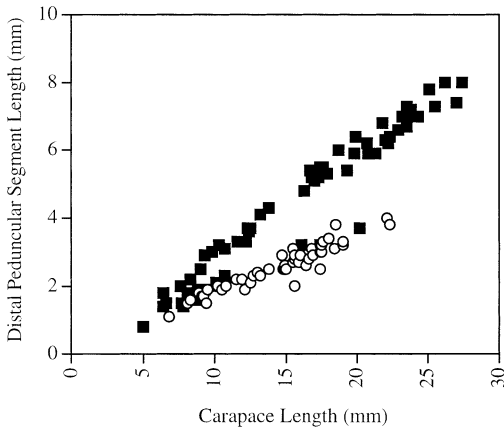


Fig. 110. Graph of length of distal peduncular segments plotted against carapace length for *Albunea paretii* and *Albunea catherinae*, n. sp. Data points are for 68 specimens of *A. paretii* (5.0–27.4 mm cl) and 50 specimens of *A. catherinae*, n. sp. (6.8–22.1 mm cl). ○, *Albunea catherinae*, n. sp. ■, *Albunea paretii*.

Ramadan, 1936: 3 (list) (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea steinitzi Holthuis, 1958: 42–44, fig. 1*.
– Lewinsohn, 1969: 175–177, 179, 185, 193*.
– Tirmizi, 1978: 94, figs. 1–8. – Coêlho and Calado, 1987: 43, table 1. – Hogarth, 1988: 1103. – Fransen et al., 1997: 79 (list). – Calado, 1995: 66–68, pl. 4, fig. h, pl. 5, fig. g, pl. 19, figs. a–d, pl. 20, figs. a–d*. – Calado, 1997a: 17, 22. – Boyko and Harvey, 1999: 391, 400 (list), 401 (key)*. – Boyko, 1999: 145 (list).

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

not *Albunea steinitzi*: Thomassin, 1969: 143–146, pl. 3, figs. 1–8, text-figs. 3c, 4 (? = *Albunea holthuisi* Boyko and Harvey, 1999).

MATERIAL EXAMINED: Pakistan: Open sand beach, northwest of Karachi, April 3, 1986, coll. unknown: 1 ♂, 9.9 mm cl (USNM 304308).

Oman: 16 mi west of Muscat, 1973, coll. F. Luiner: 1 ♂, 7.1 mm cl, 1 ♀, 15.4 mm cl (BMNH 1999.892–893).

Israel: Gulf of Aqabah, Eylath, Sept. 1952, coll. L. Fishelson and C. Lewinsohn: 1 ♀, 6.8 mm cl, holotype (RMNH 11847).

Djibouti: “dans le Sables a *Balanoglossus* pres la jetre de la factorie Mesnier,” Obock,

1904, coll. C. Gravier: 3 ♂, 6.8–10.8 mm cl (MNHN-Hi 18).

Eritrea: Abiad Bay, Entedebir Island, Dahlak Archipelago, March 25, 1962, coll. C. Lewinsohn: 1 ♂, 10.8 mm cl (ZMTAU E62/3614).

Tanzania: Dar es Salaam, coll. R. G. Hartnoll: 1 ♂, 7.9 mm cl (BMNH 1973.628).

DIAGNOSIS: Carapace wider than long, covered with lightly setose grooves. Anterior margin with 11–13 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 no 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 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 thin, projecting, acute. Dactylus of pereopod IV sinuous from base to tip, with slightly produced, rounded heel and shallow indent. Telson of male broadly triangular, tip broadly rounded and medially indented, 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 indented tip.

DESCRIPTION: Carapace (fig. 111A) slightly wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 11–13 large spines ($n = 4$) along length. Rostrum as small acute tooth, not reaching proximal margin of ocular plate. Ocular sinus smoothly concave, with one to 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 present as two short medial elements; CG3 broken into six short elements

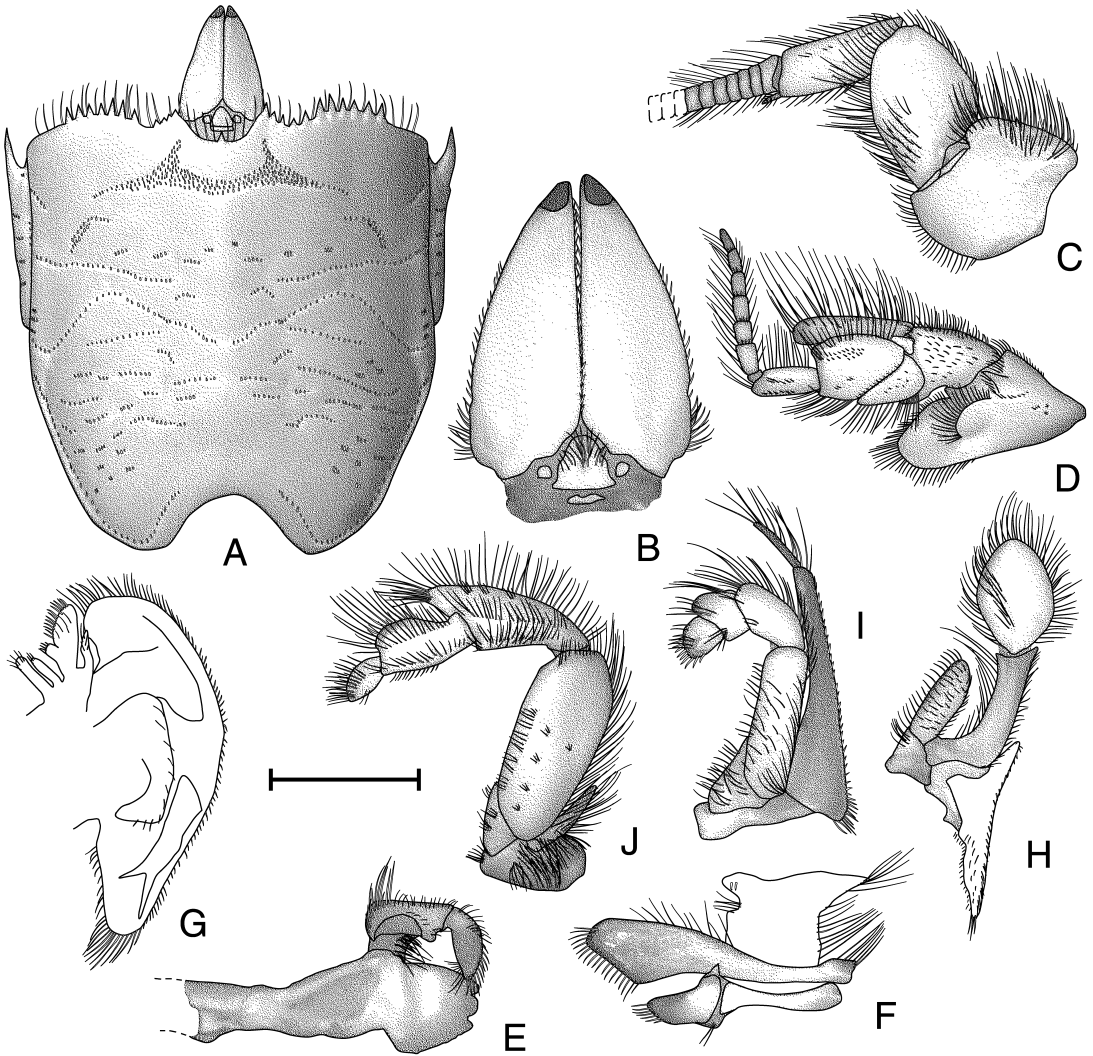


Fig. 111. *Albunea steintizi* Holthuis, 1958: A, ♂, 10.8 mm cl, ZMTAU E62/3614; B–J, ♂, 9.9 mm cl, USNM 304308. A. Carapace, branchiostegite, and ocular peduncles, dorsal view. B. Ocular peduncles, dorsal view. C. Left antennule, lateral view. D. Left antenna, lateral view. E. Left mandible, mesial view. 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, F), 2.2 mm (E, I), 3.3 mm (C, D, G, H, J), and 4.5 mm (A).

between posterior lateral elements of CG1; CG4 with no medial elements between longer supralateral elements. Hepatic region smooth, with oblique setose groove at median of lateral margin. Epibranchial region generally triangular, smooth; posterolateral margin three or four 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, not reaching lateral margins of median segment of CG6. Cardiac region smooth; CG8 present as two to four short medial and two long lateral elements; medial elements displaced slightly posteriorly. CG9 present as two short lateral grooves with gap at midline. CG10 present

as two short lateral elements. CG11 present 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 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. 111B) 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 margins, cornea covering distolateral tip; lateral margins with notch one-fourth distal from base; mesial margins approximated along entire length; mesial and lateral margins with short plumose setae; tuft of plumose setae at proximolateral dorsal and ventral angles, ventromedial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 111C) 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 94–112 articles ($n = 4$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum short with two or three articles ($n = 4$) 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 wider than long, small spine on dorsomedial margin; dorsal third of lateral surface rugose, with long plumose setae; long plumose setae on dorsal and ventral margins.

Antenna (fig. 111D) 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 ($n = 4$), long plumose setae on dorsal, ventral, and distal mar-

gins. Segment IV expanded distally, with long plumose setae on dorsal, ventral, and distal margins and row of setae on dorsolateral surface. Segment III with short plumose setae on dorsal margin and in short row on surface, 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-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 ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 111E) 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. 111F) 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. 111G) exopod evenly rounded, with plumose setae along distal margin. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 111H) 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. 111I) dactylus evenly rounded, length slightly greater than width, with thick simple setae distally and on dis-

tolateral 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 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, approximately as long as carpus.

Maxilliped III (fig. 111J) dactylus with rounded tip; long plumose setae on margins and lateral surface. Propodus dorsolaterally 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 and few small patches of plumose setae on surface; plumose setae on margins and in thick patch at dorsodistal tip. Merus inflated, unarmed, with plumose setae on margins and scattered on mediolateral 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-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 112A) 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, 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. 112B) dactylus smooth; base to heel concave, heel produced and subacute, 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 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 minute 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 distally and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with long plumose setae on distodorsal and ventral margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Both males and females coxa with spine on anterior margin.

Pereopod III (fig. 112C) with 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 gen-

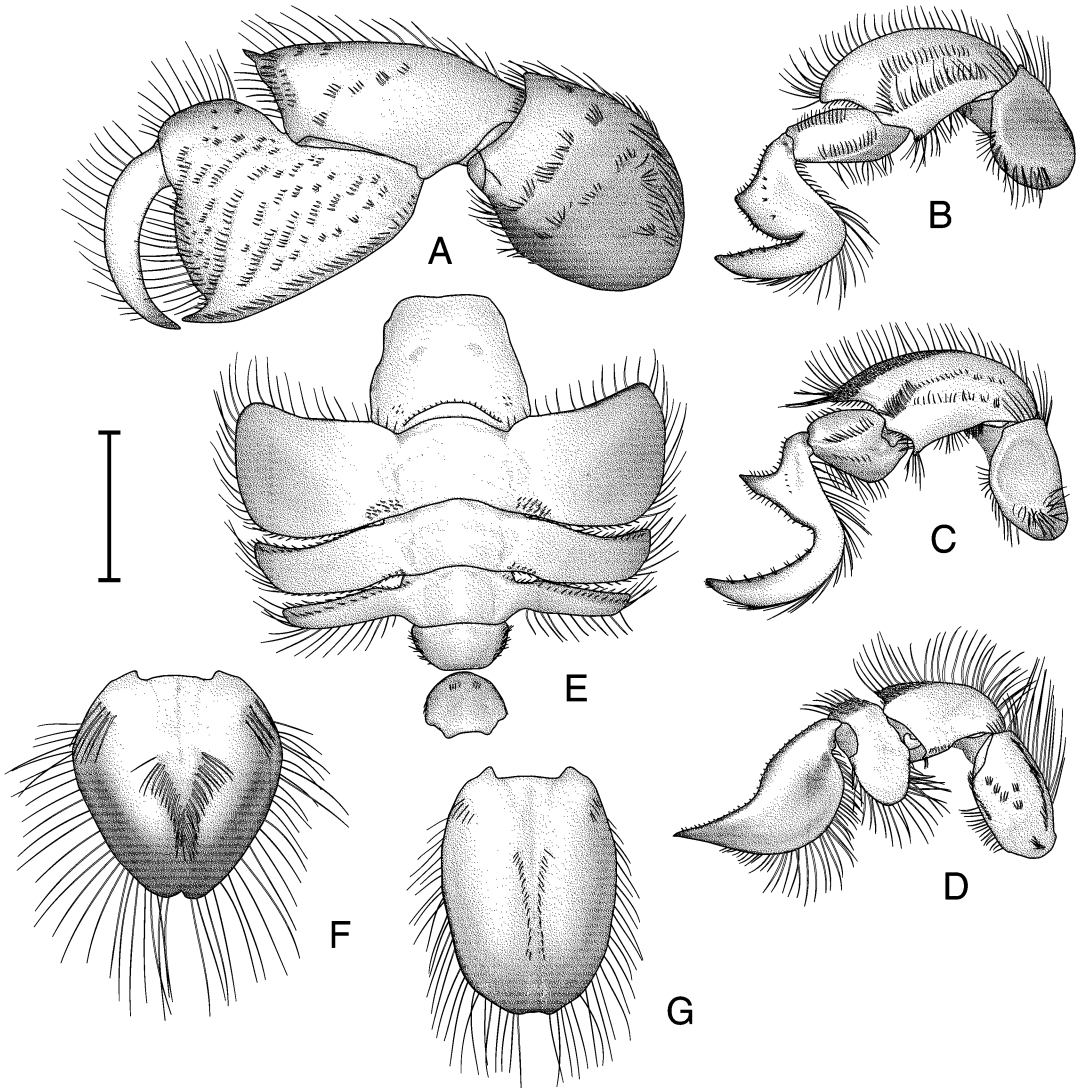


Fig. 112. *Albunea steintzi* Holthuis, 1958: A–F, ♂, 9.9 mm cl, USNM 304308; G, ♀, 15.4 mm cl, BMNH 1999.892–893. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of ♂, dorsal view. **G.** Telson of ♀, dorsal view. Scale = 2.2 mm (F), 3.3 mm (A, E, G), and 4.4 mm (B–D).

erally 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 on surface on ventral mar-

gin, simple setae on dorsal margin; dorsolateral surface narrow, oblique, flattened; mesial surface smooth. Carpus produced dorsodistally and pointed but not acute, 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 oblique medial row on distal half of surface. Merus smooth, with large decalcified window covering nearly half of lateral surface medially; distodorsal and ventral margins unarmed, with long plumose setae; few long setae on proximal lateral surface; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Male coxa with spine on anterior margin; female coxa lacking spine. Female with large gonopore on anterior mesial margin of coxa, surrounded with short plumose setae; male with smaller pore.

Pereopod IV (fig. 112D) dactylus with base to tip convex proximally, with shallow 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, 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 lateral surface with scattered short transverse rows of setae, dorsal and proximoventral margins with long plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 112E) 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, de-

calcified windows laterad of segment median just anterior to submarginal ridge; pleura expanded and directed anterolaterally; anterolateral margins angled, posterolateral 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 with submarginal row of short setae. 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 with submarginal row of short setae; margins with long plumose setae. Somite V wider than somite IV; lateral margins with short 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. 112F) broadly triangular, longer than wide, with broadly rounded, medially indented 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 continuing almost to distal margin of calcified region; proximolateral angles with patch of long simple setae; margins with long simple setae. Telson of female (fig. 112G) flattened, ovate, and evenly calcified with subquadrate and medially indented tip; median groove similar to male, setal row from midpoint of median groove to one-fourth proximal to tip; simple setae approximately one-fourth length of those on male; proximolateral angle with patch of short simple setae, margins with long simple setae.

DISTRIBUTION: From Pakistan into the Red Sea and southward to Tanzania; depth range unknown.

MAXIMUM SIZE: Males: 10.8 mm cl; females: 15.4 mm cl.

TYPE SPECIMENS: RMNH 11847 (holotype); the repository of the paratype is unknown.

TYPE LOCALITY: Eylath, Israel.

REMARKS: Thomassin's (1969: text-fig. 13) distribution map for this species is highly inaccurate, as he had no material of *A. steinitzi* from Madagascar, and the species apparently does not occur east of India. Tirmizi (1978) reported eggs still attached to a "molt" of this species, but ovigers are otherwise unknown.

This species is a member of the "*paretii*-group" of species and is closely related to *A. catherinae*, n. sp.

Albunea gibbesii Stimpson, 1859

Figures 113, 114

Albunaea [sic] *Gibbesi* Stimpson, 1858: 230 (nomen nudum).

Albunaea [sic] *Gibbesii* Stimpson, 1859: 78, pl. 1, fig. 6.

Albunea gibbesii: Miers, 1878: 329.—Benedict, 1904: 624–625, figs. 3, 4*. — Schmitt, 1935: 208–209, fig. 69*. — Gordon, 1938: 187, figs. 3e, 4b*. — Williams, 1965: 136–137, fig. 112*. — J. E. Randall, 1967: 723, 751. — Coêlho and Ramos, 1972: 176. — Young, 1978: 177. — Kaestner, 1980: 336. — Rodriguez, 1980: 239 (list). — Wenner and Read, 1982: 187. — Williams, 1984: 248–249, fig. 182*. — Calado, 1987: 96–105, pls. 6–8. — Coêlho and Calado, 1987: 42–43, table 1. — Manning, 1988: 626–627 (list). — Ruppert and Fox, 1988: 251, 404 (list). — Williams et al., 1989: 35. — Calado et al., 1990: 747, fig. 2c, d. — Calado, 1995: 32–35, pl. 4, fig. b, pl. 5, fig. b, pl. 7, figs. a–h, pl. 8, figs. a, b. — Calado, 1997a: 17. — Calado, 1998: 407.

Albunea gibbesi [sic]: Ortmann, 1896: 225 (list). — Ortmann, 1901: 1275. — Boschi, 1981: 715.

Albunea guerinii: Stebbing, 1914: 281 (not *Albunea guerinii* Lucas, 1853 = *A. carabus* (Linnaeus, 1758)).

Albunea carabus: Chace, 1966: 635 (not *Albunea carabus* (Linnaeus, 1758)).

Albunea sp. T. D. Cain, 1972: 80.

Albunea gibbesii [sic]: Boschi, 1981: 740.

?*Albunea gibbesii*: Kurata, 1970: 183–184, pl. 54. not *Albunea gibbesii*: Benedict, 1901: 139* (= *Albunea paretii* Guérin Méneville, 1853).

not *Albunaea* [sic] *gibbesii*: Arnold, 1901: 269, pl. 61, fig. 2. (= *Albunea catherinae*, n. sp.).

not *Albunea gibbesii*: Hay and Shore, 1918: 414, pl. 30, fig. 11. — Pearse et al., 1942: 185* (= *Albunea catherinae*, n. sp.).

MATERIAL EXAMINED: **Bermuda**: Paget Beach, July 1901, coll. T. G. Gosling: 1 ♀, 22.2 mm cl (MCZ 19594).

USA: North Carolina: GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1439, 34°58'N, 76°00'W, 18 m, May 18, 1964, coll. NMFS: 1 ♂, 5.9 mm cl (MCZ 19649); Sta. 2208, 34°35'N, 76°11'W, 18 fms (= 32.9 m), July 24, 1960, coll. R/V "Silver Bay": 1 ♂, 21.8 mm cl, 1 ♀, 22.0 mm cl (USNM 260808); Sta. 2615, off Cape Fear, 33°45'N, 77°25'W, Oct. 10, 1885, coll. "Albatross": 1 ♂, 9.7 mm cl (USNM 11265); 33°20'N, 77°40'W, 25 m, Feb. 11, 1977, coll. Texas Instruments: 1 unmeasurable ♂ (USNM 174234); 33°17'N, 77°31'W, 25 m, July 27, 1967, coll. I. E. Gray on R/V "Eastward": 3 ♂, 7.3–10.5 mm cl, 1 ♀, 19.1 mm cl, 1 unsexable specimen, 7.1 mm cl, 1 unsexable, unmeasurable specimen (USNM 267375); Sta. 5, S71–22, 34°05.4'N, 77°01.5'W to 34°06'N, 77°01.5'W, April 15, 1971, coll. C. L. Smith and CCNY Class: 1 ♀, 7.2 mm cl (AMNH 18080); **South Carolina**: 31°27'N, 79°46'W, 64 m, Nov. 22, 1977, coll. Texas Instruments: 1 ♂, 10.1 mm cl (USNM 174193); 31°34'N, 80°03'W, 38 m, Feb. 23, 1977, coll. Texas Instruments 4C: 1 ♀, 17.7 mm cl (USNM 174225); 32°01'N, 79°31'W, 46 m, Aug. 25, 1977, coll. Texas Instruments: carapace fragments (USNM 174235); 31°40'N, 80°16'W", 26 m, Aug. 27, 1977, coll. Texas Instruments 4D: 2 ♂, 15.4–17.7 mm cl (USNM 174238); 32°40'N, 78°47'W, 37 m, May 13, 1977, coll. Texas Instruments 2E: 1 ♂, 7.1 mm cl (USNM 174239); 32°49'30"N, 78°39'18"W, 34 m, Nov. 3, 1981, coll. South Carolina Marine Research: 1 ♂, 18.9 mm cl (USNM 221016); Sta. 1695, 33°57'N, 77°01'W, 19 fms (= 34.8 m), Feb. 29, 1960, coll. "Silver Bay": 1 ♂, 17.0 mm cl (USNM 267778); Blackfish Banks, off Charleston, March 1880, coll. R. E. Earll: 1 ♂, 20.4 mm cl (USNM 4115); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1480, 32°30'N, 79°46'W, 18 m, May 21, 1964, coll. NMFS: 1 ♂, 23.4 mm cl (MCZ 19646); ex *Dasyatis centroura* (Mitchill), Sta. 3655, 32°43'N, 78°34'W, Dec. 14, 1961, coll. "Silver Bay": 1 ♂, 15.7 mm cl, 3 ♀, 13.2–21.3 mm cl (RMNH 26626); **Georgia**: GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1758, 32°00'N, 79°45'W, 30 m, June 16, 1964, coll. NMFS: 1 ♀, 12.8 mm

cl (MCZ 19651); off sea buoy, Sapelo Island, 115 ft (= 34.8 m), May 6, 1963, coll. M. Gray: 1 ♀, 8.8 mm cl (USNM 150669); off sea buoy, Sapelo Island, 31°03'N, 80°28'30"W, 110 ft (= 33.3 m), June 12, 1963, coll. M. Gray: 1 ♂, 20.9 mm cl (USNM 150670); 31°05'N, 80°35'W, 25 m, Nov. 24, 1977, coll. Texas Instruments 5D: 1 ♂, 19.3 mm cl (USNM 174222); 31°05'N, 80°35'W, 25 m, Aug. 30, 1977, coll. Texas Instruments 5D: 1 ♀, 18.4 mm cl (USNM 174229); 31°01'N, 80°17'W, 40 m, April 24, 1977, coll. Texas Instruments: 1 ♂, 17.3 mm cl (USNM 174233); 31°05'N, 80°35'W, 25 m, Aug. 30, 1977, coll. Texas Instruments 5D: 1 ♂, 17.0 mm cl (USNM 174243); 31°01'N, 80°17'W, 40 m, Aug. 30, 1977, coll. Texas Instruments: 1 ♂, 15.8 mm cl (USNM 174244); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1754, 31°39'N, 79°45'W, 45 m, June 16, 1964, coll. NMFS: 1 oviger, 21.4 mm cl (MCZ 19647); **Florida:** "Florida," July 1899, coll. Smiths: 1 ♂, 22.4 mm cl (MNHN-Hi 8 ex USNM); "Florida," June 1859, G. Würdemann: 5 ♂, 15.8–22.6 mm cl (MCZ 869); "Florida?," 1 unsexable specimen, 23.7 mm cl (USNM 5227); *St. Johns Co.:* 30°23'N, 80°36'W, 35 m, Sept. 1, 1977, coll. Texas Instruments 6D: 1 ♂, 20.2 mm cl (USNM 174336); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1713, 30°11'N, 80°15'W, 73 m, June 13, 1964, coll. NMFS: 1 ♀, 6.8 mm cl (MCZ 19648); *Flagler Co.:* Sta. 201–1, 29°53.5'N, 80°38'W, 42 mi southeast of St. Augustine, 19 fms (= 34.8 m), March 27, 1940, coll. R/V "Pelican": 1 ♂, 17.6 mm cl (USNM 260807); *Volusia Co.:* 29°28'N, 80°57'W, 20 m, Nov. 27, 1977, coll. Texas Instruments 7B: 1 ♂, 21.7 mm cl (USNM 174244); GOSNOLD 45, Vessel 03, Cruise 02, Sta. 1691, 29°20'N, 80°29'W, 33 m, June 12, 1964, coll. NMFS: 1 ♂, 15.3 mm cl (MCZ 19650); Sta. 7409, 29°02'N, 80°26'W, 17 fms (= 31.1 m), Dec. 5, 1967, coll. R/V "Oregon": 2 ♂, 18.4–24.8 mm cl (USNM 260812); *Brevard Co.:* Sta. 19756, 28°11'N, 80°13'W, 35 m, March 26, 1976, coll. R/V "Oregon II": 1 ♀, 10.6 mm cl (HBOM 089: 02890); Sta. 3358, 28°23'N, 80°16'W, 15 fms (= 27.4 m), Sept. 20, 1960, coll. R/V "Silver Bay": 1 ♂, 21.2 mm cl (USNM 260805); *St. Lucie Co.:* Capron Shoal, off Hutchinson Island, 6.1–12.2 m, May 24, 1988, coll. J. E.

Miller and P. M. Mikkelsen: 1 ♂, 17.9 mm cl (HBOM 089:06469); Sta. 5099, 27°39.5'N, 80°08'W, 15 fms (= 27.4 m), Sept. 28, 1963, coll. R/V "Silver Bay": 1 ♂, 24.1 mm cl (USNM 260809); Sta. JV–1/038, 27°28'36"N, 80°28'36"W, 70 ft (= 21.2 m), Aug. 1, 1973, coll. R/V "Joie de Vivre": 1 anterior half of carapace (HBOM 089: 00906); *Broward Co.:* Second reef off Sea Ranch Lakes Villas, July 6, 1970, coll. R. H. Gore: 2 ♂, 11.6–17.8 mm cl (HBOM 089: 01930); *Monroe Co.:* 25°45'56"N, 82°09'21"W, 20 m, Nov. 8, 1980, coll. Continental Shelf Associates: 1 ♂, 18.4 mm cl (USNM 242663); 25°17'22"N, 82°09'00"W, 22.5 m, April 27, 1981, coll. Continental Shelf Associates: 1 ♀, 17.9 mm cl (USNM 242662); 25°45'56"N, 82°09'21"W, 19.6 m, April 28, 1981, coll. Continental Shelf Associates: 1 ♀, 20.4 mm cl (USNM 242661); back reef area with coarse sand bottom, 3 mi offshore of Rock Harbor between Rodriguez Key and Pickles Reef, Key Largo, 25°02'N, 80°26'W, 2 m, June 13, 1981, coll. H. Reichardt: 1 ♂, 17.9 mm cl (HBOM 089: 05105); Key West, May 1940, coll. J. R. Miller: 1 ♀, 19.6 mm cl (MCZ 11934); Key West, 1885, coll. H. Hemphill: 5 ♂, 7.6–10.9 mm cl, 5 ♀, 7.3–10.6 mm cl (USNM 14046); Key West, 1885, coll. H. Hemphill: 3 ♂, 9.0–10.5 mm cl, 3 ♀, 8.2–20.8 mm cl (USNM 14066), 1 ♀, 9.9 mm cl (BMNH 1937.6.1.2 ex USNM 14066); Key West, coll. unknown: 1 ♀, 9.9 mm cl (RMNH 14645); Key West, coll. unknown: 1 ♂, 10.5 mm cl (BMNH 1937.6.1.1 ex USNM 15786); ex fish no. 69, Dry Tortugas, June 5, 1925, coll. W. L. Schmitt: 2 ♀, 8.0–9.3 mm cl (USNM 65838); ex fish no. 70, Dry Tortugas, June 5, 1925, coll. W. L. Schmitt: 1 ♂, 8.5 mm cl, 1 ♀, 9.9 mm cl (USNM 65839); off Port Everglades, 8.5 fms (= 15.5 m), April 23, 1940, coll. J. S. Schwengel: 1 ♂, 15.1 mm cl, 1 ♀, 13.2 mm cl (ANSP 4438); *Okaloosa Co.:* Off Fort Walton, 14–15 fms (= 25.6–27.4 m), June 3–4, 1947, coll. F. Lyman: 1 ♂, 7.7 mm cl, 2 ♀, 7.7–11.3 mm cl, 1 oviger, 16.8 mm cl (USNM 260810); off Camp Walton, Jan. 27, 1939, coll. L. A. Burry: 1 ♀, 24.1 mm cl (USNM 260811); 25 mi south of Fort Walton, 19–22 fms (= 34.8–40.2 m), July 31, 1948, coll. L. A. Burry: 4 ♂, 6.0–10.6 mm cl, 1 ♀, 13.1 mm cl (AMNH 10247); 25 mi

east-southeast of Destin, 13–14 fms (= 23.8–25.6 m), July 30, 1948, coll. L. A. Burry: 1 ♂, 13.3 mm cl (AMNH 10248); 5 mi east of Destin, 40–70 ft (= 12.1–21.2 m), Summer 1972 or 1973, coll. M. Jervey: 1 ♀, 7.9 mm cl (USLZ 3590); *Escambia Co.*: Sta. 7814, off light, Pensacola, 12 fms (= 21.9 m), Jan. 18, 1913, coll. “Fish Hawk”: 3 ♂, 6.7–18.9 mm cl, 2 ♀, 6.3–12.5 mm cl (USNM 65848); Pensacola, July 1893, coll. J. E. Benedict: 1 ♂, 19.9 mm cl (USNM 17924); Pensacola, coll. S. Stearns: 1 ♂, 20.1 mm cl (USNM 4614); **Texas**: Heald Banks (Sabine), Jefferson Co., coll. Magnolia Field Research Lab: 1 ♂, 17.2 mm cl (USNM 97680).

Mexico: Veracruz: Boca del Rio, Aug. 9, 1949, coll. B. W. Halstead: 1 ♂, 19.4 mm cl (LACM-AHF uncataloged); **Campeche**: Sta. C-425, 19°47.5'N, 91°47.5'W, 24 fms (= 43.9 m), Aug. 19, 1951, coll. R/V “Combat”: 1 ♂, 20.6 mm cl (USNM 260806).

Dominican Republic: Barahona Bay, Santo Domingo, 1932–1933, coll. J. C. Armstrong: 1 juvenile, 4.3 mm cl (AMNH 10364).

Puerto Rico: Salinas Cove from Don Luis Cayo, June 27, 1915, coll. R. C. Osburn: 1 oviger, 9.0 mm cl (AMNH 2160).

Brazil: Cruise 58, Sta. BBC 1619 (17704), 01°24'N, 47°13'W”, 35–36 fms (= 64.0–65.8 m), May 13, 1975, coll. R/V “Oregon II”: 1 ♀, 11.4 mm cl (USNM 260862); São Sebastião, São Paulo, coll. H. Luederwaldt: 2 ♂, 15.6–19.1 mm cl, 1 ♀, 15.0 mm cl (USNM 104658), 1 ♂, 18.2 mm cl, 1 ♀, 20.5 mm cl (RMNH 15260 ex USNM 104658), 2 ♀, 17.4–17.9 mm cl (BMNH 1976.423 ex USNM 104658).

Ascension Island (St. Helena): “deep water,” James Bay, 1973, coll. A. Flagg: 1 ♀, 10.1 mm cl (USNM 151035).

DIAGNOSIS: Carapace wider than long, covered with strongly setose grooves. Anterior margin with 8–11 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 one or two short, anteriorly displaced medial elements between longer supralateral elements; CG5 present as two oblique triangular elements; CG6 and CG7 separate; CG8 complete; CG11 present. Rostrum present, overreaching 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 slightly produced, low and rounded. Dactylus of pereopod III with heel slightly projecting, rounded. Dactylus of pereopod IV sinuous from base to tip, with slight indent. Telson of male elongate, ovate, with strongly produced mucronate tip, dorsal surface with ovate, elevated, medial area and row of long thin setae. Telson of female flattened and ovate, tapered at tip, with longitudinal row of short, thin setae medially.

DESCRIPTION: Carapace (fig. 113A) wider than long. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally with seven to nine large and one or two small spines ($n = 4$) along length. Rostrum as small acute tooth, reaching and overlapping proximal margin of ocular plate. Ocular sinus smoothly concave with few low lateral tubercles in large specimens. 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 two short medial elements; CG3 broken into five or six short elements between posterior lateral elements of CG1; CG4 with one or two 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; posterolateral margin without 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, 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 gap at midline. CG10 present as two curved lateral elements. CG11 present as two or three short elements. Post-CG11

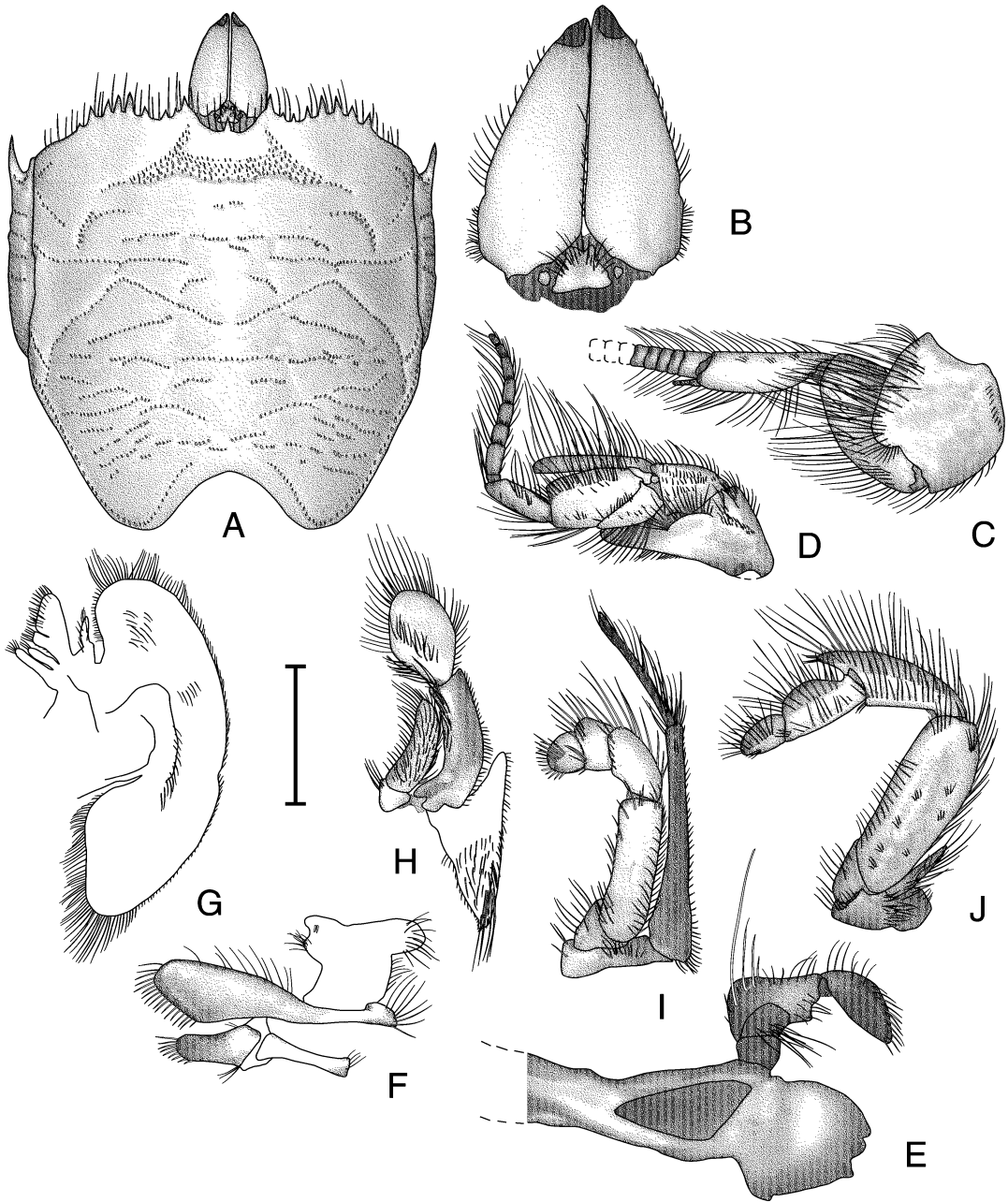


Fig. 113. *Albunea gibbesii* Stimpson, 1859: A–J, ♂, 10.6 mm cl, AMNH 10247. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Left antennule, lateral view. **D.** Left antenna, lateral view. **E.** Left mandible, mesial view. **F.** Left 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).

element absent. Branchial region with numerous short, transverse rows of setae in anterior two-thirds. Posterior margin deeply and evenly convex, with submarginal groove reaching 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. 113B) triangular with acute 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 notch one-third distal from base; mesial margins approximated along length; lateral and mesial margins with long plumose setae; tuft of plumose setae at proximalateral ventral angles and ventromedial oblique row of plumose setae extending from tuft to three-fourths length of segment.

Antennule (fig. 113C) 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 73–81 articles ($n = 4$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two or three articles ($n = 4$), 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. 113D) with segment V approximately three times longer than wide, with long plumose setae on dorsal and ventral margins and scattered on lateral surface; flagellum with six to eight 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 scattered 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 dorsal 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 ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible (fig. 113E) 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. 113F) 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. 113G) exopod evenly rounded, with plumose setae along distal margin and scattered on surface. Scaphognathite bluntly angled on posterior lobe, with plumose setae.

Maxilliped I (fig. 113H) 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. 113I) dactylus evenly rounded, length subequal 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 dorsodistal and ventrodistal angles. 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 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. 113J) 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; plumose setae on margins. Merus inflated, unarmed, with plumose setae on margins and scattered in short rows on 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-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 114A) 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, 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, dorsodistal margin with long plumose setae; mesial surface with few scat-

tered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 114B) dactylus smooth; base to heel slightly concave, heel produced, broad and rounded, 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 produced and rounded dorsodistally, dorsomedial margin with low teeth; produced area smooth, 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 row of long plumose setae distally and subdorsally. Merus with large median decalcified window covering nearly all of lateral surface, with long plumose setae on margins; mesial surface nearly smooth, with two long rows of setae. Basis-ischium incompletely fused and unarmed. Coxa with one small acute anterior spine.

Pereopod III (fig. 114C) dactylus with base to heel slightly concave, heel low and rounded, 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

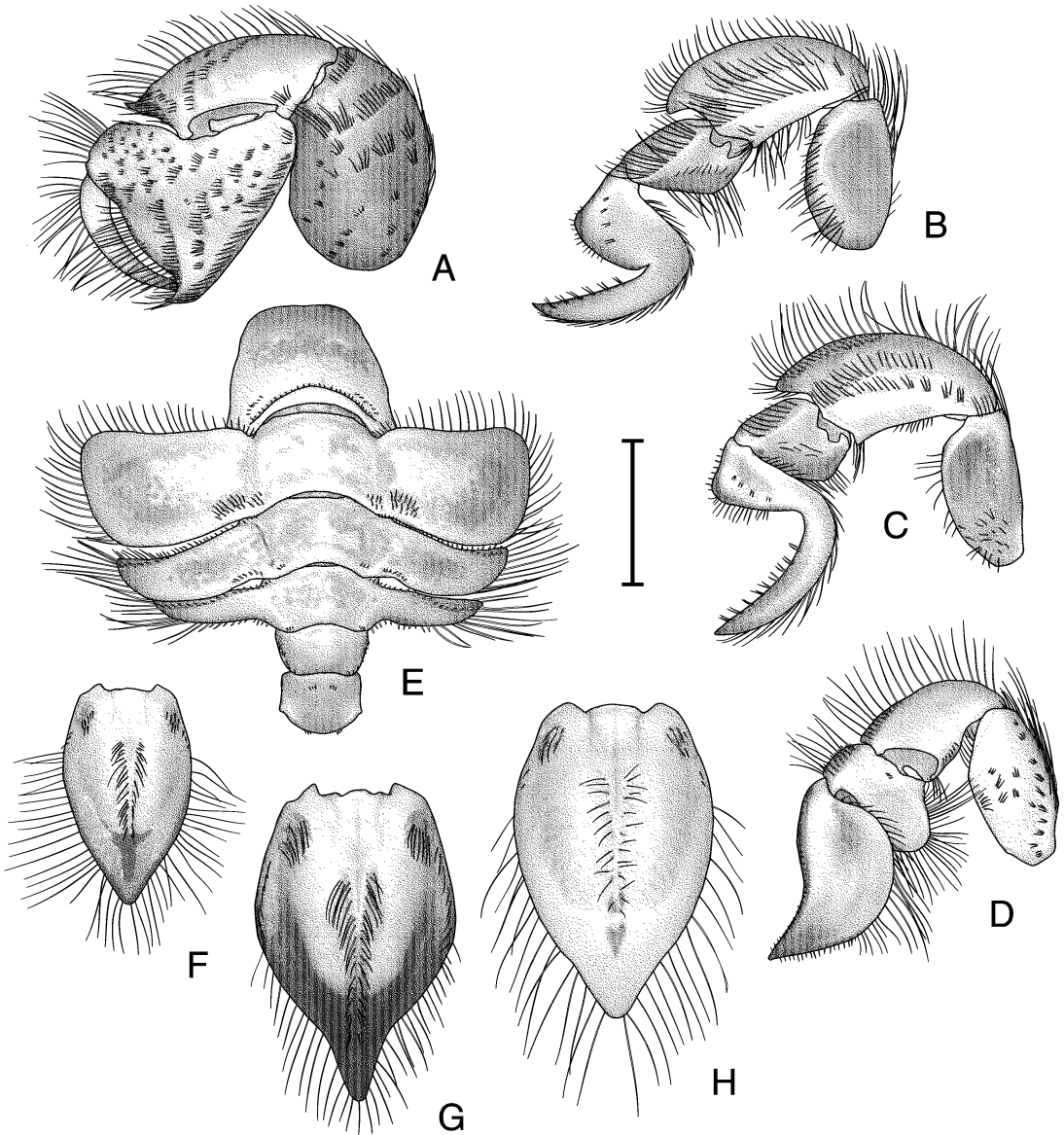


Fig. 114. *Albunea gibbesii* Stimpson, 1859: A–F, ♂, 10.6 mm cl, AMNH 10247; G, ♂, 15.1 mm cl, ANSP 4438; H, ♀, 12.8 mm cl, MCZ 19651. **A.** Left pereopod I, lateral view. **B.** Left pereopod II, lateral view. **C.** Left pereopod III, lateral view. **D.** Left pereopod IV, lateral view. **E.** Abdominal somites I–VI, dorsal view. **F.** Telson of immature ♂, dorsal view. **G.** Telson of mature ♂, dorsal view. **H.** Telson of ♀. Scale = 2.2 mm (H), 3.0 mm (F, G), 3.3 mm (C, E), and 4.4 mm (A, B, D).

smooth, with oblique row of long plumose setae, simple setae on dorsal margin, plumose setae on ventral margin; dorsolateral surface narrow, oblique, flattened, with long plumose setae on ventral margin; 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 dorsodistally and ventrally; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa with one small, acute, anterior spine. Female with large gonopore on medial mesial margin of coxa, surrounded with short plumose setae and opposing other coxa; male with minute pore.

Pereopod IV (fig. 114D) 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 not produced dorsodistally; ventral five-sixths of lateral surface and mesial surface smooth, dorsodistal sixth 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. 114E) somite I width subequal to length, 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; 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 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; 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 slightly broader than somite V; dorsal surface with short transverse rows of setae laterad of midline and at posterior margin; pleura absent.

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

Telson of immature male (fig. 114F) similar to female (see below) with even less concave distal margins and no produced tip. Telson of mature male (fig. 114G) elongate, oval, laterally produced, longer than wide, distal margin deeply concave on either side of strongly produced, decalcified, rounded tip; thickly calcified medially, inflated dorsally; distal two-thirds with lateral decalcified region; median longitudinal groove extending one-half length, dense row of long simple setae of either side of median groove beginning at median and continuing almost to distal margin of produced tip; proximolateral angles each with patch of long simple setae; margins with long simple setae becoming submarginal at point proximal to greatest width. Telson of female (fig. 114H) 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 inflated region with sparse simple setae shorter than those of male; proximolateral angle with few short setae, margins with long simple setae.

DISTRIBUTION: From Bermuda and Cape Lookout, North Carolina, south through the

Gulf of Mexico and Caribbean to São Paulo, Brazil; also Ascension Island; in 2.0–90.0 m depth (T. D. Cain, 1972).

MAXIMUM SIZE: Males: 24.8 mm cl; females: 24.1 mm cl.

TYPE SPECIMENS: Stimpson's (1859) type specimens were destroyed in the Great Chicago Fire. As this is a very distinctive species, no neotype is required.

TYPE LOCALITY: St. Augustine, Florida, USA.

REMARKS: Stimpson (1859) named this species after L. R. Gibbes and considered Gibbes' (1850b) record of *A. symnista* [sic] to be *A. gibbesii*. Ironically, Gibbes' (1850b) specimen (ANSP 4101a) is actually one of *A. paretii*. Williams (1984) also incorrectly included Gibbes' (1850b) record in the synonymy of *A. gibbesii*. Stimpson (1858) correctly formed the species name as "*Gibbesi*," but as he gave no description, that name is a nomen nudum. Stimpson's (1859) later spelling of this taxon as "*gibbesii*" is the incorrect original spelling and must be used for this species, as he listed it twice by that spelling and there is therefore no evidence of a lapsus calami or printer's error. Stimpson (1859) only illustrated the male telson of this species, but that was a distinctive enough structure to allow unambiguous identifications of this species by most subsequent authors.

The color of this species is light brown to orange-tan, with lighter carapace grooves, antennules with alternating light and dark flagellar articles (modified from Williams, 1984). Little is known about the biology of this species, outside of ovigerous females known from North Carolina in June (Williams, 1984). It remains to be seen if the single zoea IV described from the plankton off Georgia by Kurata (1970) is actually this species or *A. catherinae*, n. sp. The larval development of *A. gibbesii* is otherwise unknown. Williams' (1984) remark that this species "is occasionally found on exposed sandy shoals, especially at times of extreme low tides" more likely refers to *A. catherinae*, n. sp., as *A. gibbesii* is rarely found in shallow water. Given the depth (70–90 m), it is likely that the *Albunea* sp. cited by T. D. Cain (1972) is this species rather than the typically shallower water *A. catherinae*, n.

sp. *Albunea gibbesii* is a known prey item of the reef fish *Haemulon album* (Cuvier and Valenciennes) and *Trachinotus falcatus* (Linnaeus) in the West Indies (J. E. Randall, 1967).

This is the first record of this species in Bermuda, where it co-occurs with *A. paretii*. The specimen from Ascension Island (St. Helena) cited by Stebbing (1914) is conspecific with USNM 151035, as is evident from Stebbing's description of the telson as "drawn out subacutely" and the dactylus of pereopod III being "without the narrow linear lobe" (= acute heel). Although it may appear surprising that the specimens from Ascension Island are conspecific with ones from the western Atlantic, this island contains many taxa also known from the West Indian Province of the Western Atlantic Region (Briggs, 1974).

The drawings of this species given by Calado (1987) contain several errors in the pereopod II, female telson, antennal flagellae, and the carapace groove pattern (Calado, 1987: figs. 6, 7a) bears no resemblance to the actual pattern (fig. 113A, herein). These illustrations were repeated by Calado (1995).

This distinctive species appears to be the sister taxon to *A. thurstoni*, but as only two apparently immature male *A. thurstoni* are known, no definitive statement can be made about their relationships.

Albunea thurstoni Henderson, 1893

Figures 115, 116

Albunea Thurstoni Henderson, 1893: 338, 409–410, pl. 38, figs. 13–15*. – Nobili, 1906: 143. – Balss, 1916b: 2.

Albunea thurstoni: Ortmann, 1896: 224 (list). – Southwell, 1910: 183*. – Ramadan, 1936: 3 (list). – Gordon, 1938: 187, fig. 3a, i, k*. – Holthuis, 1958: 43–44, fig. 2*. – Serène and Umali, 1965: 99–102, pl. 1, fig. 3, pl. 2, fig. 3, pl. 3, fig. 2, pl. 4, fig. 3, pl. 5, figs. 1, 1a, text-figs. 8, 9a. – Lewinsohn, 1969: 177, 179, 193. – Coêlho and Calado, 1987: 43, table 1. – Calado, 1995: 81–83, pl. 4, fig. j, pl. 5, fig. i, pl. 25, figs. a–e*. – Calado, 1997a: 17. – Boyko and Harvey, 1999: 400 (list), 401 (key). – Boyko, 1999: 145 (list).

?*Albunea symmysta*: Nurul Huda et al., 1989: 88–89 (not *Albunea symmysta* (Linnaeus, 1758)). not *Albunea thurstoni*: Thomassin, 1969, 146–

149, pl. 4, figs. 1–8, text-figs. 3d, 5 (= *Albunea speciosa* Dana, 1852).

MATERIAL EXAMINED: **Yemen:** May–June 1977, coll. unknown: 1 ♀, 7.9 mm cl (USLZ 2264).

Oman: Muscat, 10–15 fms (= 18.3–27.4 m), coll. unknown: 2 ♀, 5.4–8.1 mm cl (BMNH 1901.4.20.11–12).

India: Cheval, Madras, coll. unknown: 1 ♂, 5.0 mm cl, 1 ♀, 6.8 mm cl, syntypes (BMNH 1894.11.3.4–5).

Australia: Sta. Bone-NW Shelf–39, 19°07.19'S, 120°30.22'E, off Kimberley, Western Australia, 50 m, July 1, 1999, coll. Y. Bone: 1 immature? ♂, 6.0 mm cl (MOV J47317).

Loyalty Islands: Sta. 1413, 20°55.3'S, 167°05.0'E, Baie du Santal, Lifou, 3–10 m, Nov. 18, 2000, coll. LIFOU 2000: 1 immature ♂: 6.5 mm cl (MNHN-Hi 263).

DIAGNOSIS: Carapace as long as wide, covered with strongly setose grooves. Anterior margin with 8–10 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 long, anteriorly displaced, medial elements between longer supralateral elements; CG5 present as two convex, triangular elements; CG6 and CG7 separate; CG8 complete; CG11 present. Rostrum present, overreaching posterior margin of ocular plate. Ocular plate triangular. Distal peduncular segments dorsoventrally flattened and oblong in shape, tapering at tip, approximated along mesial margins, lateral margin convex, mesial margin straight. Cornea at tip. Dactylus of pereopod II with heel slightly produced, low, and rounded. Dactylus of pereopod III with heel slightly projecting, rounded. Dactylus of pereopod IV sinuous from base to tip, with slight indent. Telson of female flattened and ovate, longitudinal row of short, thin setae medially.

DESCRIPTION: Carapace (fig. 115A) approximately as long as wide. Anterior margin slightly concave on either side of ocular sinus, becoming convex laterally, with 8–10 large and small spines ($n = 4$) along length. Rostrum as small acute tooth, overreaching reaching proximal margin of ocular plate. Ocular sinus smoothly concave and unarmed.

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 two short medial elements; CG3 broken into two or three short medial elements between posterior lateral elements of CG1; CG4 with one or two long, 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; posterolateral margin with two short rows of setae. Metagastric region smooth; CG5 present as two convex, 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 element. 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 five-sixths 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. 115B) 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 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 ven-

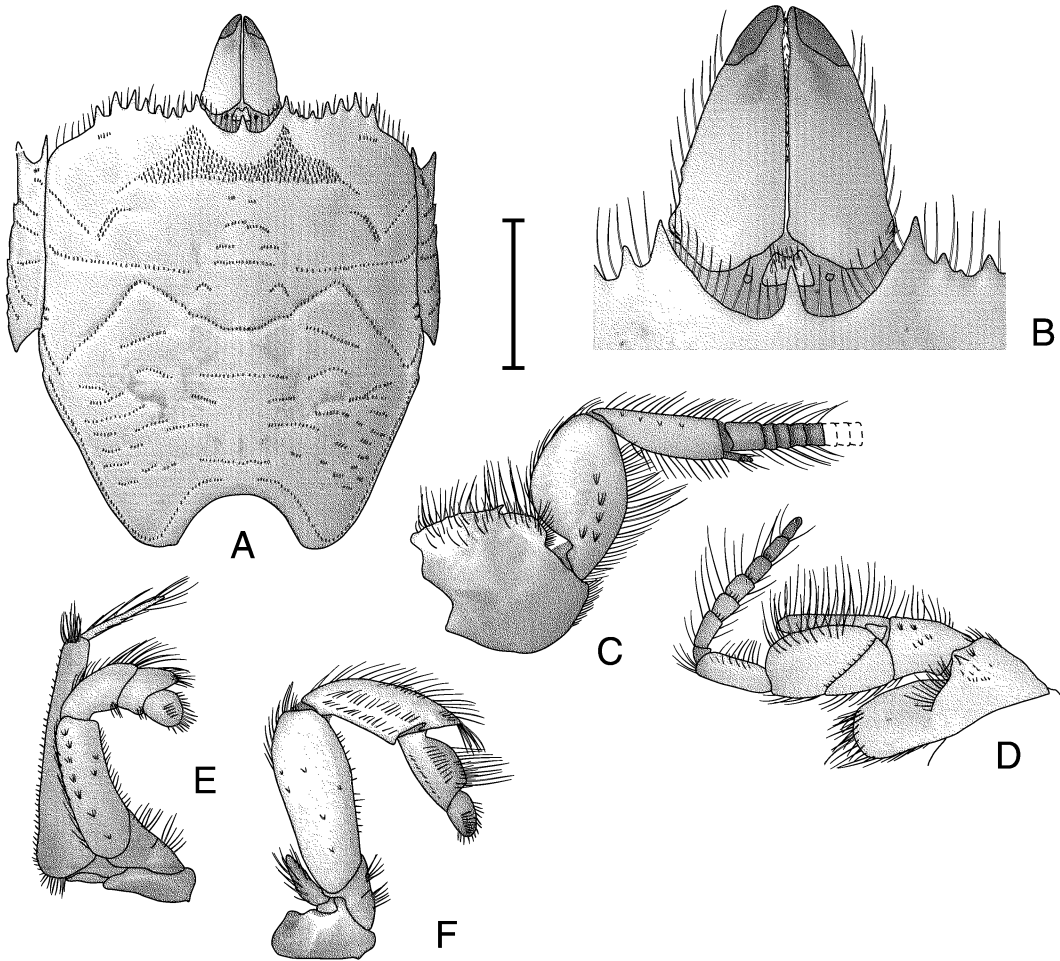


Fig. 115. *Albunea thurstoni* Henderson, 1893: A–F, ♀, 6.8 mm cl, BMNH 1894.11.3.4–5, syntype. **A.** Carapace, branchiostegite, and ocular peduncles, dorsal view. **B.** Ocular peduncles, dorsal view. **C.** Right antennule, lateral view. **D.** Left antenna, lateral view. **E.** Right maxilliped II, lateral view. **F.** Right maxilliped III, lateral view. Scale = 0.8 mm (B), 1.4 mm (C, E), 1.6 mm (D), and 2.2 mm (A, F).

tral angle and medial row of plumose setae extending from tuft to base of cornea.

Antennule (fig. 115C) with segment III narrow proximally, expanding distally to three times proximal width; with plumose setae on dorsal and ventral margins; dorsal exopodal flagellum with 66 articles ($n = 1$), long plumose setae on dorsal and ventral margins; ventral endopodal flagellum with two articles ($n = 4$), plumose setae on dorsal and ventral margins. Segment II medially inflated in dorsal view, with plumose setae on dorsal and ventral margins and in sparse 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. 115D) with segment V approximately three times longer than wide, with long plumose setae on dorsal margin and distoventral angle; flagellum with seven articles ($n = 4$), long plumose setae on dorsal, ventral, and distal margins. Segment IV expanded distally, with long plumose setae on dorsal and ventral margins. Segment III with long plumose setae on ventral margin,

short simple setae on dorsal margin. Segment II short, widening distally, rugose, with plumose setae on margins and 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 margins and scattered on surface rugae behind spine; lateral surface with acute spine dorsodistally, with low semicircular dorsolateral lobe ventrodorsal to spine; segment with ventromesial antennal gland pore.

Mandible, maxillule, maxilla, maxilliped I unknown.

Maxilliped II (fig. 115E) dactylus evenly rounded, length equal to width, with thick simple setae distally and on distolateral surface. Propodus two times wider than long, produced at dorsodistal angle, with plumose setae on dorsal margin and patch of long simple setae on dorsolateral and ventrolateral angles. Carpus not produced dorsodistally, approximately two times longer than wide; long simple setae on dorsal margin and on distoventral angle. 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. 115F) 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-third length of propodus; lateral surface with two rows of plumose setae; long plumose setae on margins. Merus cylindrical, unarmed, with plumose setae on distodorsal margin and sparsely 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 styliform, tapering, approximately one-third length of merus; with plumose setae on margins; without flagellum.

Pereopod I (fig. 116A) dactylus curved and tapering; lateral and mesial surfaces smooth; dorsal margin with long plumose

and short simple setae; ventral margin with short simple setae. Propodus 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 surface with few scattered setae; fully calcified. Basis-ischium incompletely fused, unarmed. Coxa unarmed.

Pereopod II (fig. 116B) dactylus smooth; base to heel slightly concave, heel subquadrate and rounded, heel to tip with wide, subacute 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 unarmed; 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 short plumose setae; mesial surface smooth,

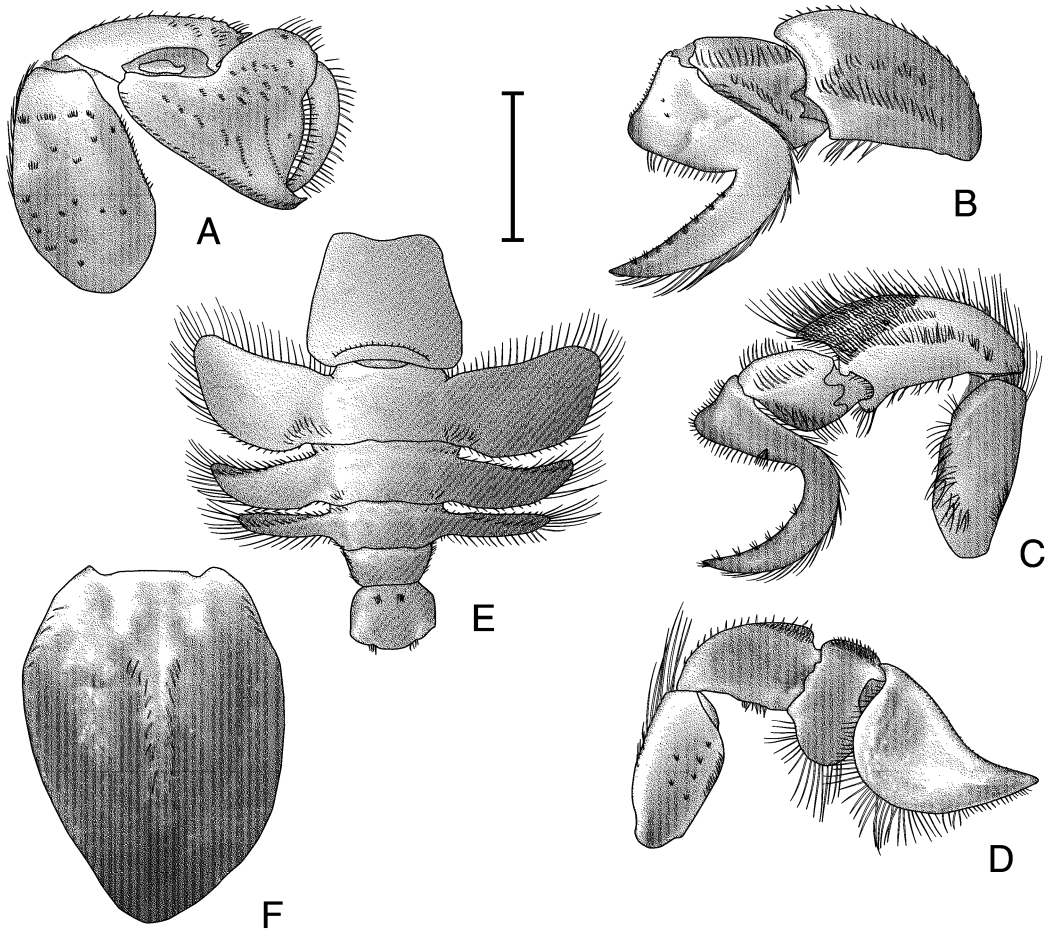


Fig. 116. *Albunea thurstoni* Henderson, 1893: A, B, D, F, ♀, 6.8 mm cl, BMNH 1894.11.3.4–5, syntype; C, E, ♀, 5.4 mm cl, BMNH 1901.4.20.11–12. A. Right pereopod I, lateral view. B. Left pereopod II, lateral view. C. Left pereopod III, lateral view. D. Right pereopod IV, lateral view. E. Abdominal somites I–VI, dorsal view. F. Telson of immature ♂, dorsal view. G. Telson of ♀, dorsal view. Scale = 0.8 mm (F), 1.8 mm (E), 2.2 mm (A, B, D), and 2.5 mm (C).

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 of male and female with small acute spine on anterior margin.

Pereopod III (fig. 116C) with dactylus with base to heel concave, heel produced and rounded, 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 tuft of short setae on 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 long simple setae on ventral margin; mesial surface with scattered long setae on and near distal margin and in oblique row on surface. Carpus produced dorsodistally, exceeding proximal margin of

propodus by one-fourth 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 margins. Merus narrow, smooth, with large decalcified window covering nearly half of lateral surface medially; dorsal and ventral margins unarmed; distodorsal and ventral margins with long plumose setae; mesial surface smooth. Basis-ischium incompletely fused and unarmed. Coxa of male and female with small acute spine on anterior margin. Female with large gonopore on anterior mesial margin of coxa; mature male unknown, but pore lacking on immature male

Pereopod IV (fig. 116D) 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 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 in ventral half, dorsal margin with long plumose setae, ventral margin with short plumose setae; proximoventral half of mesial surface with large decalcified window. Basis-ischium incompletely fused and unarmed. Coxa unarmed.

Abdomen (fig. 116E) with somite I wider than long, widest posteriorly; dorsal surface with anterior margin 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 posterolaterally proximally and anterolaterally distally, with setae as in somite II; anterolateral angle subacute; dorsal surface obliquely flattened anterolaterally. Somite IV similar to somite III, but thinner and shorter; 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 broader than somite V; 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; immature male with reduced pleopods; mature male unknown.

Telson of immature male (fig. 116F) elongate, not laterally produced, longer than wide, distal margin nearly straight towards rounded tip; thickly calcified in proximolateral two-thirds, inflated dorsolaterally; median longitudinal groove extending one-half length, sparse row of long simple setae of either side of median groove in median third of surface; proximolateral angles each with elongate patch of short simple setae; margins with long simple setae. Telson of female (fig. 116G) flattened, ovate, and evenly calcified, with slightly produced tip; median longitudinal groove extending one-half length, row of short simple setae from proximal end of median groove to near distal margin of telson; proximolateral angle with patch of setae, margins with long simple setae.

DISTRIBUTION: Known with certainty only from Yemen, Oman, India, Western Australia, and Loyalty Islands, in up to 50 m depth. This species probably also occurs in the Red Sea (Nobili, 1906).

MAXIMUM SIZE: Males: 6.5 mm cl; females: 8.1 mm cl.

TYPE SPECIMENS: BMNH 1894.11.3.4–5 (2 syntypes); the current repository of the additional three syntypes is unknown.

TYPE LOCALITY: Cheval Par, Madras, India.

REMARKS: This is a small species of *Albunea*, but the current maximum size for males is clearly an underestimate, as no mature males have been examined. The “female” *A. thurstoni* illustrated by Serène and Umali (1965: pl. 5, fig. 1a) is clearly a mature male, but those authors did not provide measurements of their specimens. The only two males examined lacked gonopores on either the third or fifth pereopods, but possessed reduced pleopods and a different telson morphology than female specimens.

Without direct examination of the specimens cited by Nurul Huda et al. (1989), it is not possible to ascertain its true identity. However, Nurul Huda et al. (1989) described that specimen as having an indistinct spur on the heel of the dactyl of pereopod III, and having a narrower and straighter “ischium” (probably refers to the merus) of maxilliped III than seen on *A. symmysta*. The only species known from the eastern Indian coast which could be easily confused with *A. symmysta*, and which has both those characters, is *A. thurstoni*.

There have been several misconceptions as to the range of this species. Thomassin’s (1969: text-fig. 14) distribution map of this species is inaccurate, as it contains his Madagascar material, which he later described as *A. madagascariensis* (= *A. speciosa*). Also, contrary to the unsupported statement of Calado (1995), this species does not occur in Hawaii, although it does have a broad range in the Indo-Pacific.

Judging by the number of specimens collected, *A. thurstoni* is one of the rarest albuneid species. It is probably not closely related to *A. microps*, as suggested by Henderson (1893), although these two species have a certain similarity in the crenulated appearance of the carapace grooves, but it may be the sister species to *A. gibbesii*. More information is needed about the morphology of *A. thurstoni*, especially the mature male telson, before any conclusions can be drawn.

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REFERENCES

- Abele, L. G. 1976. Comparative species composition and relative abundance of decapod crustaceans in marine habitats of Panamá. *Marine Biology* 38: 263–278.
- Abele, L. G., and I. E. Efford. 1972. A new species of *Lepidopa*, *L. dexterae*, (Anomura, Albuneidae), from the Caribbean coast of Panama. *Proceedings of the Biological Society of Washington* 84(58): 501–506.
- Agassiz, L. 1845a. Crustacea. *Nomenclator Zoologicus fasciculus* 4: 28 pp.
- Agassiz, L. 1845b. Crustacea. *Addenda et corrigenda recognoverunt Lucas, Menke, Milne Edwards et Strickland. Nomenclator Zoologicus fasciculus* 6/7: 11 pp.
- Aharoni, I. 1937. Données zoogéographiques sur la faune de la Palestine et des contrées adjacentes par rapport à celle de la péninsule Ibérique. *Comptes Rendus XII Congrès International de Zoologie* 12(2): 1132–1137.
- Aharoni, I. 1944. Animals hitherto unknown to or little known from Palestine. *Bulletin of the Zoological Society of Egypt* 6(Syria/Palestine suppl.): 40–41.
- Albert, F. 1883. Das Kaugerüst der Dekapoden. *Zeitschrift für Wissenschaftliche Zoologie* 39(3): 444–536, pls. 29–31.
- Álvarez, F., J. L. Villalobos, Y. Rojas, and R. Robles. 1999. Listas y comentarios sobre los crustáceos decápodos de Veracruz, Mexico. *Anales del Instituto de Biología Universidad Nacional Autónoma de México, ser. Zoología* 70(1): 1–27.
- Anantaraman, S., and T. Subramoniam. 1976. On a microphallid metacercaria occurring in the ovaries of the sand crabs *Emerita asiatica* and *Albunea symnista* on the Madras coast. *Proceedings of the Indian Academy of Sciences* 84B(5): 192–199.
- Anonymous. 1999. [“Pagure Chilien *Pagurus chilensis*.”] *Miscel•lània Zoològica* 21(2): cover illustration.
- Arnold, A. F. 1901. The sea-beach at ebb-tide. A guide to the study of the seaweeds and the lower animal life found between tide-marks. New York: Century Co. 490 pp., 85 pls.
- Asakura, A. 1995. Infraorder Anomura. In S. Nishimura (editor), *Guide to seashore animals of Japan with color pictures and keys* 2: 346–378, pls. 93–100. Osaka: Hoikusha.
- Báez, P. 1997. Key to the families of decapod crustacean larvae collected off northern Chile during an El Niño event. *Investigaciones Marinas* 25: 167–176.
- Bahamonde, N. 1971. Distribución geográfica de *Lepidopa chilensis* Lenz, 1902. *Noticiario Mensual Museo Nacional de Historia Natural* 15(174): 6–7.
- Baker, C. F. 1912. Notes on the Crustacea of Laguna Beach. *Annual Report of the Laguna Marine Laboratory* 1: 100–117, figs. 53–64.
- Balss, H. 1914. Ostasiatische Decapoden II. Die Natantia und Reptantia. In F. Doflein (editor),

- Beiträge zur Naturgeschichte Ostasiens II. Decapoden [part 7]. Abhandlungen Mathematisch-Physischen der Klasse Königlich Bayerischen Akademie der Wissenschaften II, suppl. (10): 101 pp., 1 pl.
- Balss, H. 1916a. Crustacea II: Decapoda Marrura und Anomura (außer Fam. Paguridae). Beiträge zur Kenntnis der Meeresfauna Westafrikas Band II: 11–46.
- Balss, H. 1916b. Expeditionen S. M. Schiff „Pola” in das Rote Meer Nördliche und Südliche Hälfte 1895/96–1897/98. Zoologische Ergebnisse XXXI. Die Decapoden des Roten Meeres II. Anomuren, Dromiaceen und Oxystomen. In Berichte der Kommission für Ozeanographische Forschungen im Roten Meere. Nördliche und Südliche Hälfte 1895/96–1897/98. Denkschriften der Kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Klasse 92: 1–12.
- Balss, H. 1927. Ordnung der Crustacea: Decapoda Latreille 1802 = Zehnfüsser. Handbuch der Zoologie 3(1)14: 840–1038.
- Balss, H. 1957. Decapoda VIII. Systematik. In A. Schellenberg and H.–E. Gruner (editors), Dr. H. G. Bronn's Klassen und Ordnungen des Tierreichs 5(1.7.12): 1505–1672. Leipzig: Akademische Verlagsgesellschaft.
- Barattini, L. P. 1957. Hallazgo de un interesante anomuro en las costas Uruguayas. Revista de la Sociedad Uruguayana de Entomología 2(1): 63–65.
- Barceló y Combis, F. 1875. Apuntes para la fauna Balear. Anales de la Sociedad Español de Historia Natural 4(1): 53–68.
- Barnard, K. H. 1950. Descriptive catalogue of South African decapod Crustacea. Annals of the South African Museum 38: 837 pp.
- Barrois, T. 1888. Catalogue des crustacés marins recueillis aux Açores durant les mois d'Août et Septembre 1887. Paris: Le Bigot. 110 pp., 4 pls.
- Benedict, J. E. 1901. The anomuran collections made by the Fish Hawk Expedition to Porto Rico. Bulletin of the United States Fish Commission 20(2): 129–148, pls. 3–6.
- Benedict, J. E. 1903. Revision of the Crustacea of the genus *Lepidopa*. Proceedings of the United States National Museum 26(1337): 889–895.
- Benedict, J. E. 1904. A new genus and two new species of crustaceans of the family Albuneidae from the Pacific Ocean; with remarks on the probable use of the antennule in *Albunea* and *Lepidopa*. Proceedings of the United States National Museum 27(1367): 621–625.
- Berg, C. 1900. Datos sobre algunos crustáceos nuevos para la fauna Argentina. Comunicaciones del Museo Nacional de Buenos Aires 1(7): 223–235.
- Beschin, C., and A. De Angeli. 1984. Nuove forme fossili di Anomura Hippidea: *Albunea cuisiana* sp. n. e *Albunea lutetiana* sp. n. Societa Venezia de Scienze Naturali Lavori 9(1): 93–105.
- Blow, W. C., and R. B. Manning. 1996. Preliminary descriptions of 25 new decapod crustaceans from the middle Eocene of the Carolinas, U.S.A. Tulane Studies in Geology and Paleontology 29(1): 1–26.
- Boas, J.E.V. 1880. Studier over decapodernes slægtskabsforhold. Videnskabernes Selskabs Skrifter, 6 Raekke, Naturvidenskabelig og Mathematisk 1(2): 23–210.
- Bolivar, I. 1875. El género *Albunea* Anales de la Sociedad Española de Historia Natural (Actas) 4(3): 20–21.
- Bolivar, I. 1892. Lista de la colección de crustáceos de España y Portugal del Museo de Historia Natural de Madrid. Anales de la Sociedad Española de Historia Natural (Actas) 21(3): 124–141.
- Bolivar, I. 1916. Los crustáceos de las Baleares. Boletín de la Real Sociedad Española de Historia Natural 16(5): 246–253.
- Boone, L. 1930. Scientific results of the cruises of the yachts “Eagle” and “Ara”, 1921–1928, William K. Vanderbilt, commanding. Crustacea: Anomura, Macrura, Schizopoda, Isopoda, Amphipoda, Mysidacea, Cirripedia, and Copepoda. Bulletin of the Vanderbilt Marine Museum 3: 221 pp., 83 pls.
- Boonruang, P., and B. Phasuk. 1975. Species composition and abundance distribution of anomuran sand crabs, and population bionomics of *Emerita emeritus* (L.) along the Indian Ocean coast of Thailand (Decapoda: Hippidae). Phuket Marine Biological Center Research Bulletin 8: 19 pp.
- Borradaile, L. A. 1904. Marine crustaceans. XIII. The Hippidea, Thalassinidea and Scyllaridea. In J. S. Gardiner (editor), The fauna and geography of the Maldives and Laccadive Archipelagoes 2: 750–754, pl. 58. Cambridge: Cambridge University Press.
- Bosc, L.A.G. [1801–1802]. Histoire naturelle des crustacés, contenant leur description et leurs moeurs; avec figures dessinées d'après nature. Paris. Vol. 1: 258 pp., 8 pls. [not seen].
- Boschi, E. E. 1979. Geographic distribution of Argentinian marine decapod crustaceans Bulletin of the Biological Society of Washington 3: 134–143.
- Boschi, E. E. 1981. Larvas de Crustacea Decapoda. In D. Boltovskoy (editor), Atlas del zooplancton del Atlantico sudoccidental y métodos

- de trabajo con zooplancton marino: 699–758. Argentina: INIDEP.
- Boschi, E. E. 1997. La carcinología Argentina: una reseña histórica. *Investigaciones Marinas* 25: 223–244.
- Boschi, E. E., C. E. Fischbach, and M. I. Iorio. 1992. Catálogo ilustrado de los crustáceos estomatópodos y decápodos marinos de Argentina. *Fronte Marítimo* 10, sec. A: 7–94.
- Boschi, E. E., B. Goldstein, and M. A. Scelzo. 1968. Metamorfosis del crustáceo *Blepharipoda doelloi* Schmitt de las aguas de la provincia de Buenos Aires (Decapoda, Anomura, Albuneidae). *Physis* 27(75): 291–311.
- Boschma, H. 1931. Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. LV. Rhizocephala. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening* 89: 297–380.
- Boschma, H. 1937. The species of the genus *Sacculina* (Crustacea Rhizocephala). *Zoologische Mededeelingen, Leiden* 19(3, 4): 187–328.
- Boschma, H. 1955. The described species of the family Sacculinidae. *Zoologische Verhandelingen, Leiden* 27: 76 pp.
- Bott, R. 1955. Dekapoden (Crustacea) aus El Salvador. 2. Litorale dekapoden, außer *Uca*. *Senckenbergiana Biologica* 36(1/2): 45–70.
- Bouvier, E.-L. 1898a. Sur le *Blepharipoda fauriana*, crustacé anomoure de la famille des hippidés. *Comptes Rendus des Séances de l'Académie des Sciences* 127(16): 566–567.
- Bouvier, E.-L. 1898b. Observations nouvelles sur les *Blepharopoda* Randall (*Albunhippa* Edw.). *Annales de la Société Entomologique de France* 67: 337–343.
- Bouvier, E.-L. 1940. Décapodes marcheurs. *Faune de France* 37: 404 pp., 14 pls.
- Bowen, M. A., P. O. Smyth, D. F. Boesch, and J. van Montfrans. 1979. Comparative biogeography of benthic macrocrustaceans of the middle Atlantic (U.S.A.) continental shelf. *Bulletin of the Biological Society of Washington* 3: 214–255.
- Boyko, C. B. 1999. The Albuneidae (Decapoda: Anomura: Hippoidea) of the Hawaiian Islands, with description of a new species. *Proceedings of the Biological Society of Washington* 112(1): 145–163.
- Boyko, C. B. 2000a. The Hippoidea (Decapoda, Anomura) of the Marques Islands, with description of a new species of *Albunea*. *Zoosystema* 22(1): 107–116.
- Boyko, C. B. 2000b. Type and other specimens of Crustacea (Arthropoda) described by de Saussure (1853) rediscovered in the Academy of Natural Sciences of Philadelphia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 150: 125–133.
- Boyko, C. B. 2000c. Phylogenetic systematics of the Albuneidae (Crustacea: Anomura: Hippoidea), with the description of a new family. Ph.D. dissertation, University of Rhode Island. vii + 914 pp.
- Boyko, C. B. 2001. The identity of *Hippa caerulea* Risso, 1816: an isopod in mole crab's disguise. *Crustaceana* 74(1): 115–122.
- Boyko, C. B., and A. W. Harvey. 1999. Crustacea Decapoda: Albuneidae and Hippidae of the tropical Indo-West Pacific region. In A. Crosnier (editor), *Résultats des Campagnes MUSORSTOM* [vol. 20]. *Mémoires du Muséum National d'Histoire Naturelle* 180: 379–406.
- Boyko, C. B., and P. M. Mikkelsen. 1999. Anatomy and occurrence of *Myrella pedroana* (Bivalvia: Galeommatoidea: Lasaeidae), branchial chamber 'parasite' of the spiny sand crab *Blepharipoda occidentalis* (Anomura: Albuneidae). *American Zoologist* 39(5): 121A.
- Boyko, C. B., and P. M. Mikkelsen. 2002. Anatomy and biology of *Myrella pedroana* (Mollusca: Bivalvia: Galeommatoidea), and its commensal relationship with *Blepharipoda occidentalis* (Crustacea: Anomura: Albuneidae). *Zoologischer Anzeiger* 241(2): 149–160.
- Brauer, F., and J. E. Bergenstamm. 1889. Die Zweiflügler des Kaiserlichen Museums zu Wien. IV. Vorarbeiten zu Einer Monographie der Muscaria Schizometopa (exclusive Anthomyidae). Pars I. *Denkschriften der Kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftliche Classe* 56(1): 69–180, 11 pls.
- Brazeiro, A. 1999. Community patterns in sandy beaches of Chile: richness, composition, distribution and abundance of species. *Revista Chilena de Historia Natural* 72(1): 93–105.
- Brewster, D. 1832. Crustaceology. In *The Edinburgh Encyclopaedia*, 1st American ed., vol. 7: 221–277, pl. 221. Philadelphia: Joseph and Edward Parker.
- Briggs, J. C. 1974. *Marine zoogeography*. New York: McGraw-Hill. 475 pp.
- Brullé, M. 1836–1844. Crustacés. In P. B. Webb and S. Berthelot (editors), *Histoire naturelle des Iles Canaries* 2(2), zoologie, entomologie: 13–18. Paris: Bèthune.
- Brunet, J., and J. Vicente. 1992. Troballa d'un crustaci decàpode rar a la Mediterrània. *Butlletí Centre d'Estudis de la Natura del Barcelonès Nord* 2(2): 168–170.
- Buchanan, J. B. 1957. The bottom fauna communities across the continental shelf off Accra, Ghana (Gold Coast). *Proceedings of the Zoological Society of London* 130(1): 1–56.
- Cain, A. J. 1990. Constantine Samuel Rafinesque Schmalz on classification. A translation of ear-

- ly works by Rafinesque with introduction and notes. *Tryonia* 20: 240 pp.
- Cain, T. D. 1972. Additional epifauna of a reef off North Carolina. *Journal of the Elisha Mitchell Scientific Society* 88(2): 79–82.
- Calado, T. C. dos S. 1987. Taxonomia, biogeografia e ecologia da superfamília Hippoidea na costa Brasileira (Crustacea, Decapoda). Mestrado Dissertação, Depto. Oceanografia, Universidade Federal de Pernambuco. 238 pp., 31 pls.
- Calado, T. C. dos S. 1990. Ocorrência de *Zygopa michaelis* Holthuis, 1960 (Decapoda, Anomura, Albuneidae) na costa Brasileira. *Trabajos Oceanograficos Universidade de Federal, Recife* 21: 253–260.
- Calado, T. C. dos S. 1995. Taxonomia e padrões biogeográficos da superfamília Hippoidea Latreille, 1817 (Crustacea, Decapoda, Anomura). Tese de Doutorado, Universidade Federal do Paraná. 483 pp., 130 pls.
- Calado, T. C. dos S. 1996. Descrição de *Paraleucolepidopa* gên. n. (Decapoda, Hippoidea, Albuneidae). Resumos do XXI Congresso Brasileiro de Zoologia 5 a 9 de Fevereiro de 1996 Porto Alegre, RS: 47.
- Calado, T. C. dos S. 1997a. *Albunea edsoni*, uma nova espécie da família Albuneidae para Lord Howe, Austrália (Crustacea, Anomura, Albuneidae). *Nauplius, Rio Grande* 5(2): 17–22.
- Calado, T. C. dos S. 1997b. Redescricao de *Paraleucolepidopa* Calado (1996) (Crustacea, Decapoda, Albuneidae). *Nauplius, Rio Grande* 5(2): 59–64.
- Calado, T. C. dos S. 1998. Malacostraca—Eucarida. Hippoidea. In P. S. Young (editor), *Catalogue of Crustacea of Brazil (série livros n. 6): 407–422*. Rio de Janeiro: Museu Nacional.
- Calado, T. C. dos S., P. A. Coêlho, and M. Ramos-Porto. 1990. Crustáceos decápodos da superfamília Hippoidea na costa Brasileira. Decapod crustaceans of the Hippoidea superfamily occurring at Brazilian litoral. *Arquivos de Biologia e Tecnologia* 33(4): 743–757.
- Caldwell, J. 1918. *Blepharipoda occidentalis* Randall. *Journal of Entomology and Zoology* 10(4): 71.
- Cano, G. 1889a. Crostacei brachiuri anomuri raccolti nei viaggio della «Vettor Pisani» intorno al globo. *Bollettino della Società dei Naturalist in Napoli, ser. 1, 3(1): 79–105*.
- Cano, G. 1889b. Viaggio della R. Corvetta Vettor Pisani attorno al globo—crostacei brachiuri ed anomuri. *Bollettino della Società dei Naturalist in Napoli, ser. 1, 3(2): 169–268*.
- Cano, G. 1893. Sviluppo dei dromidei. *Atti della Reale Accademia delle Scienze Fisiche e Matematiche, 2nd ser., 6(2): 23 pp., 2 pls*.
- Carlisle, J. G., Jr., J. W. Schott, and N. J. Abramson. 1960. The barred surfperch (*Amphistichus argenteus* Agassiz) in Southern California. State of California Department of Fish and Game Fish Bulletin 109: 79 pp.
- Carlton, J. T., and A. M. Kuris. 1975. Keys to decapod Crustacea. In R. I. Smith and J. T. Carlton (editors). *Light's manual: intertidal invertebrates of the central California coast, 3rd ed.: 385–412*. Berkeley: University of California Press. 716 pp.
- Carus, J. V. 1885. *Prodromus faunae Mediterraneae sive descriptio animalium maris Mediterranei incolarum quam comparata silva rerum quatenus innotuit adiectis locis et nominibus vulgaribus eorumque auctoribus in commodum zoologorum*. [Vol. I.] Coelenterata, Echinodermata, Vermes, Arthropoda. Stuttgart: E. Koch. 525 pp.
- Carvacho, A., and M. Saavedra. 1994. Sobre una colección de crustáceos de Chiloe Occidental, Chile. *Gayana Zoologia* 58(2): 169–179.
- Castro, A. L. de. 1967. Sobre ocorrência de *Blepharipoda doelloi* Schmitt, 1942 no litoral do Estado do Rio de Janeiro, Brasil (Decapoda Anomura, Albuneidae). *Boletim do Museu Nacional, nova sér., Zoologia* 257: 1–4, 2 pls.
- Chace, F. A., Jr. 1966. Decapod crustaceans from St. Helena Island, South Atlantic. *Proceedings of the United States National Museum* 118(3536): 622–662.
- Chace, F. A., Jr., and J. Haig. 1962. Comments on the proposed designation of a type-species for *Lepidopa* Stimpson, 1858. *Bulletin of Zoological Nomenclature* 19(6): 344.
- Chace, F. A., Jr., and B. Kensley. 1992. The cardiac notch in decapods. *Journal of Crustacean Biology* 12(3): 442–447.
- Chace, F. A., Jr., J. J. McDermott, P. A. McLaughlin, and R. B. Manning. 1986. Order Decapoda: (shrimps, lobsters and crabs). In W. Sterrer (editor), *Marine fauna and flora of Bermuda: 312–358*. New York: Wiley. 742 pp., 16 color pls.
- Chenu, D., and A.-G. Desmarest. 1877. *Encyclopédie d'histoire naturelle ou traité complet de cette science d'après les travaux des naturalistes les plus éminents de tous les pays et de toutes les époques Buffon, Dauberton, Lacépède, G. Cuvier, F. Cuvier, Geoffroy Saint-Hilaire, Latreille, De Jussieu, Brongniart, etc., etc. Ouvrage résumant les observations des auteurs anciens et comprenant toutes les découvertes modernes jusqu'à nos jours*. Paris: Maresco et Compagnie & Gustave Havard. 312 pp.
- Christiansen, M. E. 1969. Crustacea Decapoda Brachyura. *Marine Invertebrates of Scandinavia* 2: 143 pp.
- Clark, P. F., and B. Presswell. 2001. Adam White:

- the crustacean years. *Raffles Bulletin of Zoology* 49(1): 149–166.
- Claus, C. 1876. Untersuchungen zur Erforschung der Genealogischen Grundlage des Crustaceen-System. Wien. 124 pp., 19 pls.
- Claus, C. 1885. Neue beiträge zur morphologie der crustaceen. Wien: Alfred Hölder. 108 pp., 7 pls.
- Claus, C. 1886. Neue Beiträge zur Morphologie der Crustaceen. Arbeiten aus dem Zoologischen Institute der Universität Wien und der Zoologischen Station in Triest 6: 108 pp., 7 pls.
- Coelho, P. A. 1966. Nota sobre a biologia alguns Hippidea do litoral de Pernambuco. *Ciência e Cultura* 18(2): 243–244.
- Coelho, P. A., and T. C. dos S. Calado. 1987. Família Albuneidae: “Distribuição Geográfica.” *Anais da Sociedade Nordestina de Zoologia* 2(2): 39–51.
- Coelho, P. A., and M. de A. Ramos. 1972. A constituição e a distribuição da fauna de decápodos do litoral da América do sul entre as latitudes de 5°N e 39°S. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco* 13: 133–236.
- Crosnier, A. 1967. Remarques sur quelques crustacés décapodes benthiques ouest-Africains. Description de *Heteropanope acanthocarpus* et *Medaeus rectifrons* spp. nov. *Bulletin du Muséum National d’Histoire Naturelle*, 2e sér., 39(2): 320–344.
- Cunningham, R. O. 1871. Notes on the reptiles, Amphibia, fishes, Mollusca, and Crustacea obtained during the voyage of H.M.S. ‘Nassau’ in the years 1866–69. *Transactions of the Linnean Society of London* 27(4): 465–502, pls. 58, 59.
- Dana, J. D. 1852. Crustacea. U.S. Exploring Expedition. During the years 1838, 1839, 1840, 1841, 1842. Under the command of Charles Wilkes, U.S.N. Philadelphia: C. Sherman. 13(1): 685 pp.
- Dana, J. D. 1853. On the classification and geographical distribution of Crustacea from the report on Crustacea of the United States Exploring Expedition, under Captain Charles Wilkes, U.S.N., during the years 1838–1842: 1395–1592. Philadelphia: C. Sherman.
- Dana, J. D. 1855. United States Exploring Expedition. During the years 1838, 1839, 1840, 1841, 1842. Under the command of Charles Wilkes, U.S.N. Atlas. Crustacea. Philadelphia: C. Sherman. 27 pp., 96 pls.
- De Angeli, A. 1998. Gli Albuneidae (Crustacea, Hippoidea) del Terziario vicentino (Italia settentrionale). *Studi e Ricerche Associazione Amici del Museo Museo Civico “G. Zannato” Montecchio Maggiore* 6: 17–20.
- de Buen, O. 1887. Materiales para la fauna carcinológica de España. *Anales de la Sociedad Española de Historia Natural* 16(3): 405–434.
- de Buen, O. 1916. Los crustáceos de Baleares. *Boletín de la Real Sociedad Española de Historia Natural* 16(7): 355–367.
- de Haan, W. 1833–1850. Crustacea. In P. F. Von Siebold, *Fauna Japonica sive descriptio animalium, quae in itinere per Japoniam jussu et auspiciis superiorum, qui summum in India batava imperium tenent, suscepto, annis 1825–1830 collegit, notis, observationibus et adumbrationibus illustravit*. Amsterdam: J. Müller & Co. xvi + 244 pp., xxxi + circ. 2, pls. a–q, 1–55. *Lugduni-Batavorum* [Leiden]. [1975 Kodansha Ltd.: Tokyo facsimile ed., 400 copies].
- Deiss, W. A., and R. B. Manning. 1981. The fate of the invertebrate collections of the North Pacific Exploring Expedition 1853–1856. In *History in the service of systematics*: 79–85. London: Society for the Bibliography of Natural History.
- Del Solar, E. M., F. Blancas, and R. Mayta. 1970. *Catalogo de crustaceos del Peru*. Lima, Peru: [publisher unknown]. 53 pp.
- de Man, J. G. 1887. Bericht über die von Herrn Dr. J. Brock im indischen Archipel gesammelten Decapoden und Stomatopoden. *Archiv für Naturgeschichte* 53(1): 215–588, pls. 7–22.
- de Saussure, H. 1853. Description de quelques crustacés nouveaux de la côte occidentale du Mexique. *Revue et Magasin de Zoologie Pure et Appliquée*, sér. 2(5): 354–368, pls. 12, 13.
- Desmarest, A.-G. 1823. Malacostracés. *Dictionnaire des Sciences Naturelles* 28: 138–425; atlas 4: 58 unnumbered pls.
- Desmarest, A.-G. 1825. Considérations générales sur la classe des crustacés et description des espèces de ces animaux, qui vivent dans la mer, sur les côtes, ou dans les eaux douces de la France. Paris: F. G. Levrault. i–xix + 446 pp., 56 pls.
- de Villers, C. 1789. *Caroli Linnaei entomologia, faunae suecicae descriptionibus aucta*; DD. Scopoli, Geoffroy, De Geer, Fabricii, Schrank, &c. *Specibus vel in systemate nonenumeratis, vel nuperrime detectis, vel speciebus Galliae Australis locupletata, generum specierumque rariorum iconibus ornata*. Lugduni: Piestre et Delamolliere. Vol. 4: 556 + ccxiii pp., pl. 11.
- Dexter, D. M. 1972. Comparison of the community structures in a Pacific and an Atlantic Panamanian sandy beach. *Bulletin of Marine Science* 22(2): 449–462.
- Dexter, D. M. 1996. Tropical sandy beach communities of Phuket Island, Thailand. *Phuket Marine Biological Center Research Bulletin* 61: 1–28.
- DiSalvo, L. H., J. E. Randall, and A. Cea. 1988.

- Ecological reconnaissance of the Easter Island sublittoral marine environment. National Geographic Research 4(4): 451–473.
- Dörjes, J. 1977. Marine macrobenthic communities of the Sapelo Island, Georgia region. In B. C. Coull (editor), Ecology of marine benthos. Belle W. Baruch Library in Marine Science 6: 399–421.
- d'Udekem d'Acoz, C. 1999. Inventaire et distribution des crustacés décapodes de l'Atlantique nord-oriental, de la Méditerranée et des eaux continentales adjacentes au nord de 25°N. Museum National d'Histoire Naturelle Institut d'Écologie et de Gestion de la Biodiversité Service du Patrimoine Naturel 40: 348 pp.
- Dugan, J. E., D. M. Hubbard, and M. Lastra. 2000. Burrowing abilities and swash behavior of three crabs, *Emerita analoga* Stimpson, *Blepharipoda occidentalis* Randall, and *Lepidopa californica* Efford (Anomura, Hippoidea), of exposed sandy beaches. Journal of Experimental Marine Biology and Ecology 255(2): 229–245.
- Duméril, C. 1806. Zoologie analytique, ou méthode naturelle de classification des animaux, rendue plus facile à l'aide de tableaux synoptiques. Paris: H. L. Perronneau. 336+ pp.
- Duméril, C. 1816. *Albunea*. In Dictionnaire des sciences naturelles . . . Paris: Le Normant. 1: 431.
- Durufflé, M. 1889. Description d'une nouvelle espèce du genre *Blepharopoda*. Bulletin de la Société Philomathique 8(1), no. 2: 92–95.
- Edmondson, C. H. 1946. Reef and shore fauna of Hawaii. Bernice P. Bishop Special Publication 22: 381 pp.
- Efford, I. E. 1967. Neoteny in sand crabs of the genus *Emerita* (Anomura, Hippidae). Crustaceana 13(1): 81–93.
- Efford, I. E. 1969. *Leucolepidopa sunda* gen. nov., sp. nov. (Decapoda: Albuneidae), a new Indo-Pacific sand crab. Breviora 318: 9 pp.
- Efford, I. E. 1971. The species of sand crabs in the genus *Lepidopa* (Decapoda: Albuneidae). Zoologischer Anzeiger, Leipzig 186(1/2): 59–102.
- Efford, I. E., and J. Haig. 1968. Two new genera and three new species of crabs (Decapoda: Anomura: Albuneidae) from Australia. Australian Journal of Zoology 16(6): 897–914.
- Epelde-Aguirre, A., and M. T. Lopez. 1975. Zonación en el sustrato arenoso de Playa Blanca, Bahía de Coronel y observaciones sobre crustaceos poco frecuentes. Boletín de la Sociedad de Biología de Concepción 49: 161–170.
- Evans, A. C. 1967. Syntypes of Decapoda described by William Stimpson and James Dana in the collections of the British Museum (Natural History). Journal of Natural History 1: 399–411.
- Fabricius, J. C. 1775. Systema entomologiae, sistens, insectorum classes, ordines, genera, species, adiectis synonymis, locis, descriptionibus, observationibus. Flensburgi & Lipsiae. 832 pp.
- Fabricius, J. C. 1787. Mantissa insectorum sistens eorum species nuper detectus adiectis characteribus genericis differentiis specificis, emendationibus, observationibus. Hafniae. 1: 348 pp.
- Fabricius, J. C. 1793. Entomologia systematica emendata et aucta. Secundum. Classes, ordines, genera, species. Adiectis synonymis, locis, observationibus, descriptionibus. Hafniae: Chris. Gottl. Prof. 2: 519 pp.
- Fabricius, J. C. 1798. Entomologiae systematicae supplementum. Hafniae: Proet and Storch. 572 pp.
- Faulkes, Z., and D. H. Paul. 1993. Interjoint coordination and muscle activity in legs of digging sand crabs. Society for Neuroscience Abstracts 19(2): 1600.
- Faulkes, Z., and D. H. Paul. 1997a. A map of distal leg motor neurons in the thoracic ganglia of four decapod crustacean species. Brain, Behavior and Evolution 49(3): 162–178.
- Faulkes, Z., and D. H. Paul. 1997b. Digging in sand crabs (Decapoda, Anomura, Hippoidea): interleg coordination. Journal of Experimental Biology 200(4): 793–805.
- Faulkes, Z., and D. H. Paul. 1997c. Coordination between the legs and tail during digging and swimming in sand crabs. Journal of Comparative Physiology A 180(2): 161–169.
- Faulkes, Z., and D. H. Paul. 1997d. Erratum. Journal of Experimental Biology 200(9): ii.
- Faulkes, Z., D. H. Paul, and S. M. Pellis. 1991. Digging by the sand crab *Blepharipoda occidentalis*. Society for Neuroscience Abstracts 17(2): 1245.
- Fausto Filho, J. 1967. Segunda contribuição ao inventário dos crustáceos decápodos marinhos do nordeste Brasileiro. Arquivos da Estação de Biología Marinha da Universidade do Federal do Ceará 7(1): 11–14.
- Faxon, W. 1895. Reports on an exploration off the west coast of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the U.S. Fish Commission steamer "Albatross," during 1891, Lieut.-Commander Z. L. Tanner, U.S.N., commanding. XV. The stalk-eyed Crustacea. Memoirs of the Museum of Comparative Zoology 18: 292 pp., 67 pls.
- Ferrer Aledo, J. 1914. Artes de Pesca en Mahón. Mahón: Sintes Rotger. 71 pp.
- Ferrer y Galdiano, M. 1918. Algunos malacostrá-

- ceos de Marruecos. Boletín de la Real Sociedad Española de Historia Natural 18(9): 410–414.
- Fesquet, A.E.J. 1942. Acerca de las especies de *Blepharipoda* propuestas por el Dr. Waldo L. Schmitt. Revista Argentina de Zoogeografía 2(2): 111–113.
- Figueira, A.J.G. 1960. On a small collection of decapod crustaceans from the Azores. Bocagiana 6: 1–13.
- Fonseca, N. C. 1970. Lista de crustáceos del Perú (Decapoda y Stomatopoda) con datos de su distribución geográfica. Instituto del Mar del Perú 35: 95 pp.
- Forest, J. 1958. Les crustacés anomoures du Musée Royal du Congo Belge. Revue de Zoologie et de Botanique Africaines 58(1, 2): 144–168, 2 pls.
- Fox, R. S., and E. E. Ruppert. 1985. Shallow-water marine benthic macroinvertebrates of South Carolina: species identification, community composition and symbiotic associations. Belle W. Baruch Library in Marine Science 14: 328 pp.
- Fox, W. J. 1913. Dates of publication. In An index to the scientific contents of the Journal and Proceedings of the Academy of Natural Sciences of Philadelphia. xv + 720 pp.
- Fransen, C. H. J. M. 1991. Crustacea of the CANCAP and MAURITANIA expeditions. Leiden: Nationaal Natuurhistorisch Museum [100 copies printed]. 200 pp.
- Fransen, C. H. J. M., L. B. Holthuis, and J.P.H.M. Adema. 1997. Type-catalogue of the decapod Crustacea in the collections of the Nationaal Natuurhistorisch Museum, with appendices of pre-1900 collectors and material. Zoologische Verhandlungen, Leiden 311: 344 pp., 79 figs.
- Froriep, L. 1806. C. Dumeril's Analytische Zoologie. Weimar: Landes-Industrie-Comptoirs. 346 pp.
- García Mendes, E. 1945. Ocorrência de *Lepidopa* na costa Brasileira descrição de *Lepidopa fernandesi* sp. nov. Arquivos do Museu Paranaense 4: 117–125, pl. 13.
- García Raso, J. E., A. A. Luque, J. Templado, C. Salas, E. Hergueta, D. Moreno, and M. Calvo. 1992. Fauna y flora marinas del parque natural de Cabo de Gata-Níjar. Madrid: Mateu Cromo. 289 pp.
- García Socias, L. L., and F. Gracia. 1988. Nuevas aportaciones a la fauna de Crustacea Decapoda de las Islas Baleares. Bolletí de la Societat d'Història Natural de les Balears 32: 47–56.
- García Socias, L. L., and C. Massuti Jaume. 1987. Inventari bibliogràfic dels crustacis decàpodes de les Balears (Crustacea Decapoda). Bolletí de la Societat d'Història Natural de les Balears 31: 67–92.
- Gauld, D. T. 1960. An annotated check-list of the Crustacea of Ghana. III.—Decapoda Anomura. Journal of the West African Science Association 6(1): 64–67.
- Giacobbe, S., and N. Spanò. 1996. New records of *Albunea carabus* (L., 1758) (Decapoda, Anomura) in the Mediterranean Sea. Crustaceana 69(6): 719–726, 1 pl.
- Gibbes, L. R. 1850a. Catalogue of the Crustacea in the cabinet of the Academy of Natural Sciences of Philadelphia, August 20th, 1847, with notes on the most remarkable. Proceedings of the Academy of Natural Sciences of Philadelphia 5(2): 22–30.
- Gibbes, L. R. 1850b. On the carcinological collections of the United States, and an enumeration of species contained in them, with notes on the most remarkable, and descriptions of new species. Proceedings of the American Association for the Advancement of Science 3: 167–201.
- Glaessner, M. F. 1969. Decapoda. In R. C. Moore (editor), Treatise on invertebrate paleontology, part R, Arthropoda 4. Geological Society of America and University of Kansas. Vol. 2: 399–651.
- Gmelin, J. F., and C. Linné. 1790. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. 13th ed. 1(5): 2225–3020.
- Gomes, M. M. de A. 1965. Redescrção de "*Lepidopa venusta*" (Stimpson) e sua ocorrência no litoral sul do Brasil. Revista Brasileira de Biología 25(1): 97–103.
- Gomes Corrêa, M. M. 1968. Descrição de uma espécie nova do genero "*Lepidopa*" Stimpson, e sua ocorrência no litoral Brasileiro (Decapoda, Albuneidae). Revista Brasileira de Biología 28(1): 77–86.
- Gomes Corrêa, M. M., and I. N. da Silva Brum. 1980. Lista dos crustáceos decápodes e estomatópodes do extremo norte do Brasil, coletados pelo navio oceanográfico "Almirante Saldanha." Atas da Sociedade de Biología do Rio de Janeiro 21(1): 59–64.
- González Pérez, J. A. 1995. Catálogo de los crustáceos decápodos de las Islas Canarias. Gamas. Langostas. Cangrejos. Santa Cruz de Tenerife: Turquesa Ediciones. 284 pp.
- Gordon, I. 1938. A comparison of the two genera *Albunea* and *Lepidopa* (Crustacea, Anomura), with description of a new species from Singapore. Bulletin of the Raffles Museum 14: 186–197.
- Gore, R. H., and L. J. Becker. 1977. *Zygopa michaelis* Holthuis, 1960: a first record and range extension to the continental United States (De-

- capoda Anomura, Albuneidae). *Crustaceana* 33(2): 219–221.
- Gore, R. H., and C. L. Van Dover. 1981. Studies on decapod Crustacea from the Indian River region of Florida. XIX. Larval development in the laboratory of *Lepidopa richmondi* Benedict, 1903, with notes on larvae of American species in the genus (Anomura: Albuneidae). *Proceedings of the Biological Society of Washington* 93(4): 1016–1034.
- Gravelly, F. H. 1941. Shells and other animal remains found on the Madras Beach. I.—Groups other than snails, etc. (Mollusca Gastropoda). *Bulletin of the Madras Government Museum N.S., Natural History Section* 5(1): 112 pp.
- Griffith, E., and E. Pidgeon. 1833. The animal kingdom arranged in conformity with its organization, by the Baron Cuvier, with additional descriptions of all species hitherto named, and of many not before noticed. Vol. 13. The classes Annelida, Crustacea, and Arachnida, arranged by the Baron Cuvier [the last two by P. A. Latreille], with supplementary additions to each order. London: Whittaker, Treacher & Co. 540 pp., 60 pls.
- Guérin Méneville, F. E. 1829. *Iconographie du règne animal de G. Cuvier, ou représentation d'après nature de l'une des espèces les plus remarquables et souvent non encore figurées, de chaque genre d'animaux. Avec un texte descriptif mis au courant de la science. Crustacés.* Paris: Libraire de l'Académie Royale de Médecine. 48 pp., 35 pls.
- Guérin Méneville, F. E. 1853. *Mélanges et nouvelles. Revue et Magasin de Zoologie Pure et Appliquée*, 2nd sér., 5: 45–48, pl. 1, fig. 10.
- Guillén Nieto, J. E. 1990. *Catalogo de los crustaceos decapodos de la Provincia de Alicante.* Alicante: Instituto de Cultura «Juan Gil-Albert». 316 pp.
- Gurney, R. 1924. Decapod larvae. *Natural History Reports British Antarctic ("Terra Nova") Expedition, 1910. Zoology* 8: 37–202.
- Gurney, R. 1939. *Bibliography of the larvae of decapod Crustacea.* London: Ray Society. 123 pp.
- Gurney, R. 1942. *Larvae of decapod Crustacea.* London: Ray Society. 306 pp.
- Haig, J. 1955. Reports of the Lund University Chile Expedition 1948–49. 20. The Crustacea Anomura of Chile. *Lunds Universitets Årsskrift. N.F. Avd. 2*, 51(12): 68 pp.
- Haig, J. 1974. The anomuran crabs of Western Australia: their distribution in the Indian Ocean and adjacent seas. *Journal of the Marine Biological Association of India* 14(2): 443–451.
- Haig, J. 1980. Arthropoda: Crustacea superfamily Hippoidea: families Hippidae and Albuneidae (mole and sand crabs). *In* R. C. Brusca (editor), *Common intertidal invertebrates of the Gulf of California*, 2nd ed.: 286–291. Tucson: University of Arizona Press.
- Haig, J., and D. P. Abbott. 1980. Macrura and Anomura: the ghost shrimps, hermit crabs, and allies. *In* R. H. Morris, D. P. Abbott, and E. C. Haderlie (editors), *Intertidal invertebrates of California*: 581–593. Stanford, CA: Stanford University Press.
- Haig, J., T. S. Hopkins, and T. B. Scanland. 1970. The shallow water anomuran crab fauna of southwestern Baja California, Mexico. *Transactions of the San Diego Society of Natural History* 16(2): 13–32.
- Haig, J., and M. K. Wicksten. 1975. First records and range extensions of crabs in California waters. *Bulletin of the Southern California Academy of Sciences* 74(3): 100–104.
- Hay, W. P., and C. A. Shore. 1918. The decapod crustaceans of Beaufort, N.C., and the surrounding region. *Bulletin of the United States Bureau of Fisheries* 35: 369–475, pls. 25–39.
- Hayward, P. J., M. J. Issac, P. Makings, J. Moyse, E. Naylor, and G. Smaldon. 1995. Crustaceans (phylum Crustacea). *In* P. J. Hayward and J. S. Ryland (editors), *Handbook of the marine fauna of north-west Europe*. 800 pp. Oxford: Oxford University Press.
- Hedgpeth, J. W. 1961. *Common seashore life of southern California.* Healdsburg, CA: Naturegraph Co. 64 pp.
- Heller, C. 1863. *Die Crustaceen des Südlichen Europa. Crustacea Podophthalmia. Mit einer übersicht über die horizontale Verbreitung sämtlicher europäischer Arten.* Vienna: Wilhelm Braumüller. 336 pp., 10 pls.
- Heller, C. 1865. Crustaceen. *In* *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. Von Wüllerstorff-Urbair. Zoologischer Theil.* 2(3.1): 280 pp., 25 pls.
- Henderson, J. R. 1888. Report on the Anomura collected by H.M.S. Challenger during the years 1873–76. Report of the scientific results of the Voyage H.M.S. Challenger during the years 1873–76 under the command of Captain George S. Nares, R.N., F.R.S. and the late Captain Frank Tourle Thomson, R.N. *Zoology* 27(1): 228 pp., 21 pls.
- Henderson, J. R. 1893. A contribution to Indian carcinology. *Transactions of the Linnean Society of London*, 2nd ser., 5(10): 325–458, pls. 36–40.
- Hendrickx, M. E. 1992. Distribution and zoogeographic affinities of decapod crustaceans of the Gulf of California, Mexico. *Proceedings of the*

- San Diego Society of Natural History 20: 12 pp.
- Hendrickx, M. E., and A. W. Harvey. 1999. Checklist of anomuran crabs (Crustacea: Decapoda) from the eastern tropical Pacific. *Belgian Journal of Zoology* 129(2): 363–389.
- Herbst, J.F.W. 1785. Versuch einer Naturgeschichte der Krabben und Krebse nebst einer systematischen Beschreibung ihrer verschiedenen Arten 1(6): 183–206, pls. 10–13. Berlin und Stralsund: G. A. Lange.
- Herbst, J.F.W. 1791–1796. Versuch einer Naturgeschichte Krabben und Krebse nebst einer systematischen Beschreibung ihrer verschiedenen Arten 2. Berlin und Stralsund: G. A. Lange. 226 pp., pls. 22–46.
- Herbst, J.F.W. 1804. Versuch einer Naturgeschichte Krabben und Krebse &c.&c. 3(4). Berlin und Stralsund: G. A. Lange. 49 pp., pls. 59–62.
- Hernández, G., and J. Bolaños. 1995. Additions to the decapod crustacean fauna of northeastern Venezuelan islands, with the description of the male of *Pinnotheres moseri* Rathbun, 1918 (Decapoda: Brachyura: Pinnotheridae). *Nauplius, Rio Grande* 3: 75–81.
- Hill, G. W. 1979. Biogenic sedimentary structures produced by the mole crab *Lepdiopa websteri* Benedict. *Texas Journal of Science* 31(1): 43–51.
- Hoffmann, C. K. 1874. Crustacés et échinodermes de Madagascar et de l'île de la Réunion. In F. P. L. Pollen and D. C. Van Dam (editors), *Recherches sur la faune de Madagascar et de ses dépendances d'après le découvertes* 5: 1–58, 10 pls. Leyde: J. K. Steenhoff.
- Hogarth, P. J. 1988. Anomuran Crustacea (Paguridea, Porcellanidae, and Hippidea) from Oman, principally from Dhofar province, southern Oman. *Journal of Natural History* 22(4): 1095–1110.
- Holmes, S. J. 1900. Synopsis of the California stalk-eyed Crustacea. *Occasional Papers of the California Academy of Sciences* 7: 262 pp., 4 pls.
- Holthuis, L. B. 1954a. On a collection of decapod Crustacea from the Republic of El Salvador (Central America). *Zoologische Verhandelingen* 23: 43 pp., 2 pls.
- Holthuis, L. B. 1954b. Observaciones sobre los crustaceos decapodos de la Republica de El Salvador. *Comunicaciones Instituto Tropical de Investigaciones Ciencias* 3(4): 159–166.
- Holthuis, L. B. 1954c. C.S. Rafinesque as a carcinologist, an annotated compilation of the information on Crustacea contained in the works of that author. *Zoologische Verhandelingen* 25: 43 pp., 2 pls.
- Holthuis, L. B. 1956. Proposed suppression under the plenary powers (a) of certain names given by C.S. Rafinesque to genera and species of the orders Decapoda and Stomatopoda (class Crustacea) and (b) of certain specific names currently regarded as senior subjective synonyms of the names of the type species of the genera “*Homola*” and “*Lissa*”, both of Leach, 1815, belonging to the foregoing class. *Bulletin of Zoological Nomenclature* 12(9): 227–239.
- Holthuis, L. B. 1958. Crustacea Decapoda from the northern Red Sea (Gulf of Aqaba and Sinai Peninsula) II. Hippidea and Brachyura (Dromiacea, Oxystomata, and Grapsoidea). *Israel Sea Fisheries Research Station Bulletin* 17(9): 41–54.
- Holthuis, L. B. 1961. Notes on American Albu-neidae (Crustacea Decapoda, Anomura) with the description of a new genus and species. *Proceedings Koninklijke Nederlandse Akademie van Wetenschapen, ser. C, Biological and Medical Sciences* 64(1): 21–36.
- Holthuis, L. B. 1962. *Lepidopa* Stimpson, 1858 (class Crustacea, order Decapoda): proposed use of the plenary powers to designate a type-species. *Z.N.(S.)* 1495. *Bulletin of Zoological Nomenclature* 19(2): 125–128, pl. 4.
- Holthuis, L. B. 1977. The Mediterranean decapod and stomatopod Crustacea in A. Risso's published works and manuscripts. *Annales du Muséum d'Histoire Naturelle de Nice* 5: 37–88.
- Holthuis, L. B., and E. Gottlieb. 1958. An annotated list of the decapod Crustacea of the Mediterranean coast of Israel, with an appendix listing the Decapoda of the eastern Mediterranean. *Bulletin of the Research Council of Israel, sect. B, Zoology* 7B(1, 2): 126 pp., 3 pls.
- Holthuis, L. B., and R. B. Manning. 1970. The R/V Pillsbury Deep-Sea Biological Expedition to the Gulf of Guinea, 1964–65. 12—The Porcellanidae, Hippidae, and Albu-neidae (Crustacea, Decapoda). *Studies in Tropical Oceanography* 4(2): 241–255.
- Holthuis, L. B., and T. Sakai. 1970. Ph. F. Von Siebold and Fauna Japonica. A history of early Japanese zoology. Tokyo: Academic Press of Japan. 323 pp., 32 pls.
- Hope, G. 1851. *Catalogo dei crostacei Italiani e di molti altri del Mediterraneo*. Napoli: Fr. Az-zolino. 48 pp., 1 pl.
- Houttuyn, F. 1769. *Natuurlyke historie of uitvoerige beschryving der dieren, planten en mineralen, volgens het samenstel van den heer Linnaeus. Vervolg en besluit der insekten*. Amsterdam. 1(13): 534 pp., pls. 99–106.
- Howard, J. D. 1968. X-ray radiography for examination of burrowing in sediments by marine

- invertebrate organisms. *Sedimentology* 11: 249–258.
- Hu, C.-H., and H.-J. Tao. 1996. Crustacean fossils of Taiwan. Taipei: Ta-Jen Printers. 229 pp.
- ICZN [International Commission on Zoological Nomenclature]. 1958. Opinion 522. Suppression under the Plenary Powers (i) of certain names published by C. S. Rafinesque for genera and species of the orders Decapoda and Stomatopoda (class Crustacea) in the period 1814–1818 and (ii) of certain specific names currently regarded as senior synonyms of the names of the type species of *Homola* Leach, 1815, and *Lissa* Leach, 1815, respectively, both being genera assigned to the first of the forgoing orders. Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature 19(9): 209–248.
- ICZN [International Commission on Zoological Nomenclature]. 1964. Opinion 693. *Lepidopa* Stimpson, 1858 (Crustacea, Decapoda): designation of a type-species under the plenary powers. *Bulletin of Zoological Nomenclature* 21(1): 28–30.
- ICZN [International Commission on Zoological Nomenclature]. 1985. International Code of Zoological Nomenclature, 3rd ed. Huddersfield, England: H. Charlesworth and Co. 338 pp.
- Igarashi, T. 1970. A list of marine decapod crustaceans from Hokkaido, deposited at the Fisheries Museum, Faculty of Fisheries, Hokkaido University II. Anomura. The Fisheries Museum, Faculty of Fisheries, Hokkaido University, contribution 12: 15 pp., 9 pls.
- Johnson, M. E., and H. J. Snook. 1927. Seashore animals of the Pacific coast. New York: Mac-Millan Co. 659 pp., 11 pls.
- Johnson, M. W., and W. M. Lewis. 1942. Pelagic larval stages of the sand crabs *Emerita analoga* (Stimpson), *Blepharipoda occidentalis* Randall, and *Lepidopa myops* Stimpson. *Biological Bulletin (Woods Hole)* 83(1): 67–87.
- Jones, D. S., and G. J. Morgan. 1993. An annotated checklist of Crustacea from Rottneest Island, Western Australia. In F. E. Wells, D. I. Walker, H. Kirkman, and R. Lethbridge (editors), *The marine flora and fauna of Rottneest Island, Western Australia*, vol. 1: 135–162. Perth: Western Australian Museum.
- Kaestner, A. 1980. *Invertebrate zoology*, vol. III. Translated and adapted by H. W. Levi and L. R. Levi. Reprint edition. Huntington, NY: Robert E. Krieger. 523 pp.
- Kamita, T. 1957. Studies on the decapod crustaceans of Corea, part II, hermit-crabs (4). *Science Report of Shimoda University* 7: 91–109, figs. 37–49.
- Kamita, T. 1958. Studies on the decapod crustaceans of Corea, part II, hermit-crabs (5). *Science Report of Shimoda University* 8: 59–75, figs. 45–50.
- Kensley, B. 1981. On the zoogeography of southern African decapod Crustacea, with a distributional checklist of the species. *Smithsonian Contributions to Zoology* 338: 64 pp.
- Kikuchi, K. 1932. [A list of organisms found in the Toyama Bay, Honshū, Japan.] *Toyama Kyōiku* 227: 23 pp. [in Japanese].
- Kikuchi, K. 1959. Decapod crustaceans of Sado Island and adjacent waters. *Bulletin of the Biological Society of Hiroshima University* 10(26): 49–51.
- Kikuchi, K. 1961. Decapod crustaceans of Sado Island and adjacent waters, part II. *Reports of the Sado Museum* 8: 1–5.
- Kikuchi, T., and S. Miyake (editors). 1978. Fauna and flora of the sea around the Amakusa Marine Biological Laboratory. Decapod Crustacea [revised ed.]. Amakusa Marine Biological Laboratory, Amakusa, Japan: Kyushu University. 52 pp.
- Kim, H. S. 1963. On the distribution of anomuran decapods of Korea. *Journal of Sung Kyun Kwan University* 8: 287–311.
- Kim, H. S. 1964. A study on the geographical distribution of anomuran decapods of Korea with consideration of its oceanographic conditions. *Journal of Sung Kyun Kwan University* 8(suppl.): 15 pp., 1 pl.
- Kim, H. S. 1970. A checklist of the Anomura and Brachyura (Crustacea, Decapoda) of Korea. *Seoul National University Journal, Biology and Agriculture Series B* 21: 1–34, pls. 1–5.
- Kim, H. S. 1973. Anomura, Brachyura. In *Illustrated encyclopedia of fauna & flora of Korea*. Vol. 14: 697 pp., 112 pls. [in Korean].
- Kim, H. S. 1977. A fauna-list of the decapod crustaceans of Korea. In *Commemoration papers for Professor M. J. Lee*: 199–208. [in Korean].
- Kingsley, J. S. 1880. On a collection of Crustacea from Virginia, North Carolina, and Florida, with a revision of the genera of Crangonidae and Palaemonidae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 31: 383–427, pl. 14.
- Knight, M. D. 1968a. The larval development of *Blepharipoda occidentalis* Randall and *B. spinimana* (Philippi) (Decapoda, Albuneidae). *Proceedings of the California Academy of Sciences*, 4th ser., 35(16): 337–370.
- Knight, M. D. 1968b. The larval development of *Blepharipoda occidentalis* Randall and *B. spinimana* (Philippi) (Decapoda, Albuneidae). *Contributions of the Scripps Institute of Oceanography* 38(1): 63–95 [identical to Knight, 1968a].

- Knight, M. D. 1970. The larval development of *Lepidopa myops* Stimpson, (Decapoda, Albuneidae) reared in the laboratory, and the zoeal stages of another species of the genus from California and the Pacific coast of Baja California, Mexico. *Crustaceana* 19(2): 125–156.
- Kobyakova, Z. I. 1955. Decapoda. In E. N. Pavlovskii, Atlas bespozvonochnykh dal'nevostochnykh morei SSSR. Moskova-Leningrad: Izdatel'stvo Akademii Nauk SSSR. 240 pp., 66 pls. [Translated: 1966. Atlas of the invertebrates of the far eastern seas of the USSR. Jerusalem: Israel Program for Scientific Translation. 457 pp.]
- Konishi, K. 1987. Larval development of the spiny sand crab *Lophomastix japonica* (Durafflé, 1889) (Crustacea, Anomura, Albuneidae) under laboratory conditions. *Publications of the Seto Marine Biological Laboratory* 32(1/3): 123–139.
- Kurata, H. 1964. Larvae of decapod Crustacea of Hokkaido[.] 10. Albuneidae (Anomura). *Bulletin of the Hokkaido Regional Fisheries Research Laboratory* 30: 11–14.
- Kurata, H. 1970. Studies on the life histories of decapod Crustacea of Georgia. Sapelo Island, GA: University of Georgia Marine Institute. 274 pp., 105 pls.
- Lamarck, C. de. 1801. Système des animaux sans vertèbres, ou tableau général des classes, des ordres et des genres de ces animaux; présentant leurs caractères et leur distribution, d'après la consideration de leurs rapports naturels et de leur organisation, et suivant l'arrangement établi dans les galeries du Muséum d'Hist. Naturelle, parmi leurs dépouilles conservées. Paris: Chez Deterville. viii + 432 pp.
- Lamarck, C. de. 1818. Histoire naturelle des animaux sans vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une introduction offrant la détermination des caractères essentiels de l'animal, sa distinction du végétal et des autres corps naturels, enfin, l'exposition des principes fondamentaux de la zoologie. [Vol. 5.] Paris: Deterville & Verndiere. 612 pp.
- Larrinúa y Azcona, D. A. 1874. D. Ignacio Bolívar, presenta un ejemplar de crustáceo del género *Albunea* Fab . . . *Anales de la Sociedad Española de Historia Natural (Actas)* 3(3): 46.
- Latreille, P. A. 1802. Histoire naturelle, générale et particulière, des crustacés et des insectes. Paris: F. Dufart. Vol. 3: 591 pp., pls. 43–57.
- Latreille, P. A. 1806. Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. Paris and Argentina: Amand Koenig. Vol. 1: 303 pp., 16 pls.
- Latreille, P. A. 1817. Les crustacés, les arachnides et les insectes. In G. Cuvier. Le règne animal distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux, et d'introduction à l'anatomie comparée. Paris: Deterville. Vol. 3: xxix + 653 pp.
- Latreille, P. A. 1825. Familles naturelles du règne animal, exposées succinctement et dans un ordre analytique, avec l'indication de leurs genres. Paris: J.-B. Baillière. 570 pp.
- Latreille, P. A. 1831. The animal kingdom arranged in conformity with its organization, by the Baron Cuvier, perpetual secretary to the Royal Academy of Sciences, etc. The Crustacea, arachnides and Insecta. Vol. 3. Translated by H. M'Murtrie. New York: G. & C. & H. Carvill. 575 pp., 3 pls.
- Leach, W. E. 1813. Crustaceology. In Brewster's Edinburgh encyclopaedia. Edinburgh. Vol. 7: 221–277, pl. 221 [not seen].
- Leach, W. E. 1814. Crustaceology. In Brewster's Edinburgh encyclopaedia, vol. 7: 383–437 [not seen].
- Leach, W. E. 1815. A tabular view of the external characters of four classes of animals which Linné arranged under Insecta. *Transactions of the Linnean Society of London* 11: 306–400.
- Lebour, M. V. 1959. The larval decapod Crustacea of tropical west Africa. *Atlantide Report* 5: 119–143.
- Lemaitre, R., and R. Alvarez León. 1993. Crustáceos decapodos del Pacífico Colombiano: lista de especies y consideraciones zoogeográficas. *Anales del Instituto de Investigaciones Marinas de Punta Betín* 21: 33–76.
- Lenz, H. 1902. Die Crustaceen der Sammlung Plate (Decapoda und Stomatopoda). *Zoologische Jahrbücher, suppl.* 5(3): 731–772.
- Lewinsohn, C. 1969. The Second Israel South Red Sea Expedition, 1965, report no. 6. Die anomuren des Roten Meeres (Crustacea Decapoda: Paguridea, Galatheaidea, Hippidea). *Zoologische Verhandlungen* 104: 213 pp., 2 pls.
- Lingwood, P. F. 1981. The dispersal of the collections of H.M.S. *Challenger*; an example of the importance of historical research in tracing a systematically important collection. In *History in the service of systematics*: 71–77. London: Society for the Bibliography of Natural History.
- Linnaeus, C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, Locis, Holmiæ: Laur. Salvii.* 824 pp.
- Linnaeus, C. 1764. *Museum S.R.M. Ludovicae Ulricaë Reginaë suecorum, gothorum, vanda-*

- lorumque &c. &c. &c. In quo animalia rariora, exotica, imprimis Insecta & Conchilia describuntur & determinantur prodromi instar. Holmiae: Laurentii Salvii. 722 pp.
- Linnaeus, C. 1767. *Systema naturae* [12th ed., rev.]. Holmiae: Laurentii Salvii. Vol. I, part II: 533–1327.
- Lucas, H. 1849a. Histoire naturelle des animaux articulés. Première partie. Crustacés, arachnides, myriapodes et hexapodes. In *Exploration scientifique de l'Algérie pendant les années 1840, 1841, 1842*. Paris: Imprimerie Nationale. Vol. 1, 403 pp.
- Lucas, H. 1849b. Histoire naturelle des animaux articulés. Atlas. In *Exploration scientifique de l'Algérie pendant les années 1840, 1841, 1842*. Paris: Imprimerie Nationale. Vol. 4, 8 pls.
- Lucas, H. 1853. Mélanges et nouvelles. *Revue et Magasin de Zoologie Pure et Appliquée*, 2nd sér., 5: 45–47, pl. 1, figs. 8, 9.
- Lucas, H. 1881. Un crustacé de la section des décapodes anomoures. *Bulletin de la Société Entomologique de France*, sér. 6, 2e partie: 54–55.
- Luke, S. R. 1977. Catalog of the benthic invertebrate collections of the Scripps Institution of Oceanography. I—Decapod Crustacea and Stomatopoda. SIO Reference Series 77–9: 72 pp.
- MacGinitie, G. E. 1938. Movements and mating habits of the sand crab, *Emerita analoga*. *American Midland Naturalist* 19(2): 471–481.
- MacGinitie, G. E., and N. MacGinitie. 1949. *Natural history of marine animals*. New York, London, and Toronto: McGraw-Hill. 473 pp.
- MacLeay, W. S. 1838. On the brachyurous decapod Crustacea. Brought from the Cape by Dr. Smith. 1862. In Smith, A. *Illustrations of the zoology of South Africa; consisting chiefly of figures and descriptions of the objects of natural history collected during an expedition into the interior of South Africa, in the years 1834, 1835, and 1836; fitted out by 'The Cape of Good Hope Association for Exploring Central Africa:' together with a summary of African zoology, and an inquiry into the geographical ranges of species in that quarter of the globe*. Published under the authority of the Lords Commissioners of Her Majesty's Treasury, Invertebratae: 53–71, pls. 2, 3. London: Smith, Elder and Co. [not seen].
- Maitland, D. P. 1986. Crabs that breathe air with their legs—*Scopimera* and *Dotilla*. *Nature* (London) 319(6053): 493–495.
- Makarov, V. V. 1938. *Rakoobraznye* [Crustacea] [vol. X, no. 3]. *Zoologicheskii Institut Akademii Nauk SSSR*, n.s. 16: 283 pp., 5 pls. [1962 edition published for the National Science Foundation, Washington, D.C., by the Israel Program for Scientific Translations.]
- Manning, R. B. 1988. Notes on albuneid crabs (Crustacea: Decapoda: Albuneidae) from the central east coast of Florida. *Proceedings of the Biological Society of Washington* 101(3): 626–632.
- Markham, J. C. 1988. Descriptions and revisions of some species of Isopoda Bopyridae of the north western Atlantic Ocean. *Zoologische Verhandelingen* 246: 63 pp.
- Markham, J. C., and C. B. Boyko. 1999. A new genus for *Ione indecora* Markham, 1988, a second record for that species and a new congeneric species from Australia (Crustacea: Isopoda: Bopyridae: Ioninae). *American Museum Novitates* 3258: 1–7.
- Markham, J. C., and J. J. McDermott. 1981. A tabulation of the Crustacea Decapoda of Bermuda. *Proceedings of the Biological Society of Washington* 93(4): 1266–1276.
- Martin, J. W., and L. G. Abele. 1986. Phylogenetic relationships of the genus *Aegla* (Decapoda: Anomura: Aegliidae), with comments on anomuran phylogeny. *Journal of Crustacean Biology* 6(3): 576–616.
- Martin, J. W., and G. E. Davis. 2001. An updated classification of the Recent Crustacea. *Natural History Museum of Los Angeles County Science Series* 39: 1–124.
- McLaughlin, P. A. 1980. *Comparative morphology of Recent Crustacea*. San Francisco: Freeman Press. 177 pp.
- McLaughlin, P. A. 1983. A review of the phylogenetic position of the Lomidae (Crustacea: Decapoda: Anomala). *Journal of Crustacean Biology* 3(3): 431–437.
- McLaughlin, P. A., and M. de Saint Laurent. 1998. A new genus for four species of hermit crabs formerly assigned to the genus *Pagurus* Fabricius (Decapoda: Anomura: Paguridae). *Proceedings of the Biological Society of Washington* 111(1): 158–187.
- McLaughlin, P. A., and R. Lemaitre. 1997. Carcinization in the Anomura—fact or fiction? I. Evidence from adult morphology. *Contributions to Zoology* 67(2): 79–123.
- Melville, R. V., and J. D. D. Smith (editors). 1987. *Official lists and indexes of names and works in zoology*. London: International Trust for Zoological Nomenclature. 366 pp.
- Menon, M. K. 1937. Decapod larvae from the Madras plankton. *Bulletin of the Madras Government Museum, new ser., Natural History Section* 3(5): 1–56, 3 pls.
- Menon, M. K. 1943. A probable instance of recapitulation in decapod larvae. *Current Science* 12(12): 331–332.

- Miers, E. J. 1878. Revision of the Hippidea. *Journal of the Linnean Society, Zoology* 14(76): 312–336, pl. 5.
- Milne Edwards, A. 1862. Annexe F, Faune carcinologique de l'île de la Réunion. *In* L. Mailhard. Notes sur l'île de la Réunion: 16 pp., pls. 17–19. Paris: Palais-Royal.
- Milne Edwards, A., and E.-L. Bouvier. 1898. Crustacés nouveaux provenant des campagnes du Travailleur et du Talisman. Paguridés (fin). *Bulletin du Muséum d'Histoire Naturelle (Paris)* 4(5): 234–238.
- Milne Edwards, A., and E.-L. Bouvier. 1900. Crustacés décapodes première partie brachyures et anomoures. *In* Expéditions scientifiques du Travailleur et du Talisman pendant les années 1880, 1881, 1882, 1883: 396 pp., 32 pls. Paris: Libraires de l'Académie de Médecine.
- Milne Edwards, H. 1836–1849 [including 1837a]. [Vol. 9]. Les crustacés (texte et atlas). *In* G. Cuvier, Le Règne Animal Distribue d'après son Organisation, pour servir de base à l'Histoire Naturelle des Animaux, et d'Introduction à l'Anatomie Comparée. Paris: Fortin, Masson et Cie. 278 pp., 80 pls. + explanations. [published in parts].
- Milne Edwards, H. 1837b. Histoire naturelle des crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux. Paris: Librairie Encyclopédique de Roret. 532 pp., 42 pls.
- Milne Edwards, H., and H. Lucas. 1841. Description des crustacés nouveaux ou peu connus conservés dans la collection du Muséum d'Histoire Naturelle. *Archives du Muséum d'Histoire Naturelle, Paris* 2: 461–483, pls. 24–28.
- Miranda y Rivera, A. 1933a. Ensayo de un catálogo de los crustáceos decápodos marinos de España y Marruecos Español. *Notas y Resúmenes Instituto Español de Oceanografía, ser. II*, 67: 1–72.
- Miranda y Rivera, A. 1933b. Notas carcinológicas. *Notas y Resúmenes Instituto Español de Oceanografía, ser. II*, 68: 1–9, 2 pls.
- Miyake, S. 1957. Anomuran decapod fauna of Hokkaido, Japan. *Journal of the Faculty of Science, Hokkaido University* 6: 85–92.
- Miyake, S. 1960. Arthropoda Crustacea Decapoda Anomura. *In* Y. Okada and T. Uchida (editors), *Encyclopaedia zoologica illustrated in colours* 4: 89–97, pls. 44–48. Tokyo: Hokuryukan.
- Miyake, S. 1961. Fauna and flora of the sea around the Amakusa Marine Biological Laboratory. Part II. Decapod Crustacea. Amakusa, Japan: Amakusa Marine Biological Laboratory. 30 pp.
- Miyake, S. 1965. Anomura. *In* *New illustrated encyclopedia of the fauna of Japan* 2: 630–652, figs. 1032–1115. Tokyo: Hokuryukan.
- Miyake, S. 1978. The crustacean Anomura of Sagami Bay. Tokyo: Biology Laboratory, Imperial Household. 200 pp., 4 pls.
- Miyake, S. 1991. Japanese crustacean decapods and stomatopods in color, vol. I. Osaka: Hoikusa. 261 pp.
- Miyake, S., K. Sakai, and S. Nishikawa. 1962. A fauna-list of the decapod Crustacea from the coasts washed by the Tsushima warm current. *Records of Oceanographic Works in Japan (spec. no.)* 6: 121–131.
- Molina, I. 1810. All' altezza imperiale di Eugenio Napoleone figlio di Napoleone Augusto arcicancelliere dell'impero Francese, vicere d'Italia, Principe di Venezia, duca di Francfort. Gio: Ignazio Molina. 306 pp.
- Moncharmont, U. 1969. Sulla presenza di *Albunea carabus* (L., 1758) nel Mediterraneo (Crustacea, Decapoda, Anomura). *Publicazioni della Stazione Zoologica di Napoli* 37(3): 434–440.
- Monod, T. 1925. Liste critique des Gnathiidés Méditerranéens. *Bulletin Société d'Étude des Sciences Naturelles d'Elbeuf* 43: 1–7.
- Monod, T. 1926. Les Gnathiidae essai monographique (morphologie, biologie, systématique). *Mémoires de la Société des Sciences Naturelles du Maroc* 13: 1–668, 1 pl.
- Monod, T. 1933 [1932]. Sur quelques crustacés de l'Afrique occidentale (liste des décapodes mauritaniens et des xanthidés ouest-Africains). *Bulletin du Comité d'Études Historiques et Scientifiques de l'Afrique Occidentale Française* 15(2, 3): 456–548.
- Monod, T. 1939. Sur quelques crustacés de la Guadeloupe (Mission P. Allorge, 1936). *Bulletin du Muséum National d'Histoire Naturelle, 2nd sér.*, 11(6): 557–568.
- Monod, T. 1956. Hippidea et Brachyura ouest-Africains. *Mémoires de l'Institut Français d'Afrique Noire* 45: 1–674, 884 figs.
- Moosa, M. K. 1984. Report on the Corindon Cruises. *Marine Research in Indonesia* 24: 1–6.
- Moran, D. A. 1984. Additions to the known anomuran fauna of El Salvador, Central America (Crustacea: Decapoda). *Journal of Crustacean Biology* 4(1): 72–84.
- Moran, D. A., and A. I. Dittel. 1993. Anomuran and brachyuran crabs of Costa Rica: annotated list of species. *Revista de Biología Tropical* 41(3): 599–617.
- Moreira, C. 1901. Crustaceos do Brazil. *Archivos do Museu Nacional do Rio de Janeiro* 11: 1–151, 5 pls.
- Müller, F. 1890. Zur Crustaceenfauna von Trin-

- comali. Verhandlungen der Naturforschenden Gesellschaft in Basel 8: 470–485, pls. 4, 5.
- Müller, P. 1979. Decapoda (Crustacea) fauna a budapesti miocénból (5). Földtani Közlemények 108(3): 272–312, 32 pls.
- Müller, P. 1984. Decapod Crustacea of the Badenian. *Geologica Hungarica*, ser. Palaeontologica 42: 317 pp., 97 pls.
- Naiyanetr, P. 1978. Sand crabs of Thailand (Decapoda, Anomura: Hippidae and Albuneidae). Reports on Scientific Research Faculty of Science Chulalongkorn University 3: 330–338.
- Naiyanetr, P. 1980. Crustacean fauna of Thailand. Bangkok: Chulalongkorn University. 73 pp.
- Naiyanetr, P. 1998. Checklist of crustacean fauna in Thailand. Bangkok: Office of Environmental Policy and Planning. 161 pp.
- Nakazawa, K. 1927. Anomura. In *Illustrated encyclopedia of the fauna of Japan*: 1035–1051, figs. 1993–2025. Tokyo: Hokuryukan [in Japanese].
- Nakazawa, K., I. Kubo, and S. Miyake. 1949. Macrura and Anomura. In *Illustrated encyclopedia of the fauna of Japan (exclusive of insects)*, rev. ed.: 731–756, figs. 2115–2178. Tokyo: Hokuryukan [in Japanese].
- Nakazawa, K., I. Kubo, and S. Miyake. 1951. Macrura and Anomura. In *Illustrated encyclopedia of the fauna of Japan (exclusive of insects)*, rev. ed.: 731–756, figs. 2115–2178. Tokyo: Hokuryukan [in Japanese; later printing with different publication date but otherwise identical to 1949 edition].
- Ng, P.K.L. 1999. [Review of] C.-H. Hu & H. J. Tao, 1996. Crustacean fossils of Taiwan. *Crustaceana* 72(2): 237–239.
- Nishimura, S. 1939. [On crabs and shrimps found in the vicinity of Hokkaidô and the Kuril Islands.] *Suisan-Kenkyû-shi* 34: 382–385 [in Japanese].
- Nobili, G. 1906. Faune carcinologique de la Mer Rouge décapodes et stomatopodes. *Annales des Sciences Naturelles Zoologie* 4: 1–347, pls. 1–11.
- Nucci, P. R., A. Turra, and E. H. Morgado. 2001. Diversity and distribution of crustaceans from 13 sheltered sandy beaches along São Sebastião channel, south-eastern Brazil. *Journal of the Marine Biological Association of the United Kingdom* 81: 475–484.
- Nurul Huda, K. M., Q. Banu, and B. Ahmed. 1989. Notes on stomatopod and decapod Crustacea from Chittagong coast of Bangladesh. *Pakistan Journal of Zoology* 21(1): 83–91.
- Ortmann, A. E. 1892. Die Decapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Herrn Dr. Döderlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und z. Z. im Strassburger Museum aufbewahrten Formen. V. theil. Die abtheilungen Hippidea, Dromiidea und Oxystomata. *Zoologische Jahrbücher* 6(4): 532–588, 26 pls.
- Ortmann, A. E. 1896. Die geographische Verbreitung der Decapodengruppe der Hippidea. *Zoologische Jahrbücher Abteilung für Systematik, Geographie und Biologie der Tiere* 9(2): 219–243.
- Ortmann, A. E. 1901. Crustacea (Zweite Hälfte: Malacostraca). Die Klassen und Ordnungen der Arthropoden wissenschaftlich dargestellt in Wort und Bild von Dr. A. Gerstaecker weiland Professor an der Universität zu Greifswald. Fünfter Band. II. Abteilung: 1319 pp., 128 pls.
- Ozorio, B. 1888. Liste des crustacés des possessions Portugaises d’Afrique occidentale dans les collections du Muséum d’Histoire Naturelle de Lisbonne. *Jornal de Sciencias Mathematicas Physicas e Naturaes, Academia Real das Sciencias de Lisboa* 12(47): 186–191.
- Panneerselvam, M., and T. Sunbramoniam. 1983. Neurosecretory cell types and their activity during reproduction in the anomuran crab, *Albunea symnista* (Crustacea: Albuneidae). *Journal of Reproductive Biology and Comparative Endocrinology* 3(2): 1–10.
- Paul, D. H. 1981a. Homologies between body movements and muscular contactions in the locomotion of two decapods of different families. *Journal of Experimental Biology* 94: 159–168.
- Paul, D. H. 1981b. Homologies between neuromuscular systems serving different functions in two decapods of different families. *Journal of Experimental Biology* 94: 169–187.
- Pearse, A. S., H. J. Humm, and G. W. Wharton. 1942. Ecology of sand beaches at Beaufort, N.C. *Ecological Monographs* 12(2): 135–190.
- Pennant, T. 1777. *British zoology*, 4th ed. Vol. 4: 136 pp. [not seen].
- Pérés, J. M. 1967. The Mediterranean benthos. *Oceanography and Marine Biology Annual Review* 5: 449–533.
- Philippi, R. A. 1857. *Abrote*, ein neues Geschlecht der Crustaceen, aus der Familie der Hippaceen. *Archiv für Naturgeschichte* 23(1): 124–129, pl. 8.
- Piguet, P. 1955. Des échantillons d’un petit crustacé décapode anomoure *Albunea carabus* L. *Bulletin de la Société d’Histoire Naturelle de l’Afrique Nord* 46: 14.
- Porter, C. E. 1911. Répartition géographique d’un crustacé décapode (*Blepharipoda occidentalis*). *Bulletin du Muséum National d’Histoire Naturelle* 17(1): 17.
- Porter, C. E. 1915a. Materiales para la fauna carcinológica de Chile. XI. Los Hippidea. *Revista Chilena de Historia Natural* 19(3–6): 76–86.

- Porter, C. E. 1915b. Los Hippidea de Chile. *Boletín del Museo Nacional* 8: 12–20.
- Porter, C. E. 1916. La «*Blepharipoda occidentalis*» de Mar del Plata. *Physis* 2(11): 279–282.
- Porter, C. E. 1936a. Carcinología Chilena. Enumeración metódica de los crustáceos podoftalmos de la Bahía de Talcahuano. *Comunicaciones del Museo de Concepcion* 1(8): 150–154.
- Porter, C. E. 1936b. Carcinología Chilena XXVI. Sobre algunos decapodos raros o poco conocidos. *Revista Chilena de Historia Natural* 40: 252–259, pls. 17, 18.
- Porter, C. E. 1936c. Carcinología Chilena XXVII. Enumeración metódica de los crustáceos podoftalmos de la Bahía de Talcahuano. *Revista Chilena de Historia Natural* 40: 336–339.
- Porter, C. E. 1940a. Algunos crustáceos de la costa de Antofagasta. *Revista Universitaria, Universidad Católica de Chile* 25(3): 311–313.
- Porter, C. E. 1940b. Algunos crustáceos de la costa de Antofagasta. *Revista Chilena de Historia Natural* 44: 145–147.
- Porter, C. E. 1941. Algunos crustáceos de la costa de Antofagasta. *Boletín del Museo de Historia Natural “Javier Prado”* 5(19): 458–460.
- Poupin, J. 1996a. Crustacea Decapoda of French Polynesia (Astacidea, Palinuridea, Anomura, Brachyura). *Atoll Research Bulletin* 442: 114 pp.
- Poupin, J. 1996b. Atlas des crustacés marins profonds de Polynésie Française récoltes du navire Marara (1986/1996). Monthéry Cedex, France: Service Mixte de Surveillance Radiologique et Biologique. 59 pp.
- Poupin, J. 1998. Crustacea Decapoda and Stomatopoda of French Polynesia. *Atoll Research Bulletin* 451: 62 pp.
- Powar, C. B. 1969. Musculature of the eyestalk in Crustacea. *Acta Zoologica* 50(1, 2): 127–141.
- Prahl, H. von. 1986. Crustáceos decapodos, asociados a diferentes habitats en la Ensenada de Utria, Choco, Colombia. *Actualidades Biológicas* 15(57): 95–99, 1 fig.
- Prahl, H. von, F. Guhl, and M. Grögl. 1979. Gorgona. Bogota, Colombia: Futura Grupo Editorial. 279 pp.
- Pretus, J.L.I. 1985–1989a. Els crustàces. In J. M. Vidal Hernández (editor), *Invertebrates artrópodes. Enciclopèdia de Menorca* 5. Obra Cultural de Menorca, Maó: 241–260, figs. 58–88.
- Pretus, J.L.I. 1985–1989b. Els crustàces. In J. M. Vidal Hernández (editor), *Invertebrates artrópodes. Enciclopèdia de Menorca* 6. Obra Cultural de Menorca, Maó: 261–273, pls. 89–104.
- Rafinesque-Schmaltz, C. S. 1814. *Précis des découvertes et travaux somiologiques entre 1800 et 1814*. Palermo: Royale Typographie Militaire. 55 pp.
- Rafinesque-Schmaltz, C. S. 1815. *Analyse de la nature ou tableau de l’univers et des corps organisés*. Palermo. 224 pp. [original not seen; see A. J. Cain, 1990].
- Ramadan, M. M. 1936. Report on a collection of Stomatopoda and Decapoda from Ghardaga, Red Sea. *Bulletin of the Faculty of Science, Egyptian University* 6: 43 pp., 2 pls.
- Ramos, G. E., and R. Rios. 1995. Los “reculambai” o “canchunchos” (Crustacea: Decapoda: Hippoidea: Hippidae y Albuneidae) de la costa del Pacífico de Colombia. In J. R. Cantera and J. D. Restrepo (editors), *Delta del Rio San Juan, Bahías de Malaga y Buenaventura, Pacífico Colombiano*, [vol. 2]: 92–108. Colombia: Colciencias.
- Randall, J. E. 1967. Food habits of reef fishes of the West Indies. *Studies in Tropical Oceanography* 5: 665–847.
- Randall, J. W. 1840. Catalogue of the Crustacea brought by Thomas Nuttall and J. K. Townsend, from the west coast of North America and the Sandwich Islands, with descriptions of such species as are apparently new, among which are included several species of different localities, previously existing in the collection of the Academy. *Journal of the Academy of Natural Sciences of Philadelphia* 8(1): 106–147, pls. 3–7.
- Rathbun, M. J. 1897. List of the decapod crustacea of Jamaica. *Annals of the Institute of Jamaica* 1(1): 46 pp.
- Rathbun, M. J. 1904. Decapod crustaceans of the northwest coast of North America. *Harriman Alaska Expedition* 10: 190 pp., 10 pls.
- Rathbun, M. J. 1911. The stalk-eyed Crustacea of Peru and the adjacent coast. *Proceedings of the United States National Museum* 38(1766): 531–620, pls. 36–56.
- Rathbun, M. J. 1924. Results of Dr. E. Mjöberg’s Swedish scientific expeditions to Australia 1910–1913. 37. Brachyura, Albuneidae and Porcellanidae. *Arkiv für Zoologi* 16(23): 33 pp., 1 pl.
- Rathbun, M. J. 1926. The fossil stalk-eyed Crustacea of the Pacific slope of North America. *Bulletin of the United States National Museum* 138: 155 pp., 39 pls.
- Reames, R. C., R. W. Heard, and T. S. Hopkins. 1982. Records of *Zygopa michaelis* Holthuis, 1960 (Decapoda: Anomura: Albuneidae) from the Gulf of Mexico. *Gulf Research Reports* 7(2): 171–173.
- Richmond, M. D. 1997. Infraorder Anomura[:] mole crabs, squat lobsters and porcelain crabs. In M. D. Richmond (editor), *A guide to the*

- seashores of eastern Africa and the western Indian Ocean islands: 214, 8 unnumbered figs. on p. 215. Stockholm: Sida.
- Ricketts, E. F., and J. Calvin. 1948. *Between Pacific tides*, revised ed. Stanford, CA: Stanford University Press. 365 pp.
- Riedl, R. 1983. Decapoda. In R. Riedl (editor), *Fauna und Flora des Mittelmeeres ein systematischer Meeresführer für Biologen und Naturfreunde*: 466–505, pls. 171–187, color plate 10. Hamburg and Berlin: Verlag Paul Parey.
- Rios, R., G. E. Ramos, and H. von Prael. 1990. Sand crabs (Crustacea: Decapoda: Albuneidae) from the Pacific coast of Colombia. *Boletín Ecotropica* 22: 27–32.
- Risso, A. 1816. *Histoire naturelle des crustacés des environs de Nice*. Paris: Librairie Greque-Latine-Allemande. 175 pp., 3 pls.
- Risso, A. 1827. *Histoire naturelle des principales productions de l'Europe méridionale et particulièrement de celles des environs de Nice et des Alpes maritimes*. Paris: F.-G. Levrault. 403 pp., 10 pls.
- Risso, A. 1844. Crustacés. In *Nouveau guide des étrangers a Nice* [2nd ed.]: 93–99. Nice: Société Typographique.
- Rodrigues da Costa, H. 1962. *Notas sobre os Hippidae da costa Brasileira*. Centro de Estudos Zoológicos 14: 12 pp., 3 pls.
- Rodriguez, G. 1980. *Los crustaceos decapodos de Venezuela*. Caracas: Instituto Venezolano de Investigaciones Cientificas. 494 pp.
- Rodriguez Femenias, J. J. 1887. *Historia natural de las Balears*. Zoolojía. Adicones á la Fauna Balear (segunda recopilacion). Imprenta Fàbreges Maó. 6 pp.
- Rosini, A., E. Severino Rodrigues, and R.J.A. Fuentes Rosini. 1994. *Observações sobre os Hippoidea (Crustacea, Decapoda) na Praia de Pernambuco, Guarujá, São Paulo*. *Boletim do Instituto de Pesca* 21(único): 103–109.
- Rossignol, M. 1957. Crustacés décapodes marins de la région de Pointe-Noire. In J. Collignon, M. Rossignol, and C. Roux, *Mollusques, crustacés, poissons marins des côtes d'A.E.F. en collection au Centre d'Océanographie de l'Institut d'Études Centrafricaines de Pointe-Noire*: 71–136. Paris: Office de la Recherche Scientifique et Technique Outre-mer.
- Rossignol, M. 1962. *Catalogue des crustacés décapodes brachyours, anomours et macroures littoraux en collection au Centre d'Océanographie de Pointe-Noire*. *Travaux du Centre Océanographique de Pointe-Noire* 2: 111–138.
- Roux, P. 1828–1830. *Crustacés de la Méditerranée et de son Littoral*. Paris & Marseille. iv + 176 unnumbered pp. [published in 9 parts: parts 1, 2, pls. 1–10 (1828); part 3, pls. 11–15 (1829); parts 4–9, pls. 16–45 (1830)].
- Rubió, M., and L. B. Holthuis. 1976. New records of *Albunea carabus* (L.) from Spanish waters (Decapoda Anomura, Hippidea). *Thalassia Jugoslavica* 8(1): 41–47.
- Ruppert, E., and R. Fox. 1988. *Seashore animals of the southeast: a guide to common shallow-water invertebrates of the southeastern Atlantic coast*. Columbia, SC: University of South Carolina Press. 429 pp., 101 color figs.
- Sabrosky, C. W., and P. H. Arnaud, Jr. 1965. Family Tachinidae (Larvaevoridae). In A. Stone, C. W. Sabrosky, W. W. Wirth, R. H. Foote, and J. R. Coulson, *A catalog of the Diptera of America north of Mexico*. United States Department of Agriculture Handbook 276: 961–1108.
- Sakai, K. 1999. J.F.W. Herbst-Collection of decapod Crustacea of the Berlin Zoological Museum, with remarks on certain species. *Naturalists, Tokushima Biological Laboratory* 6: 45 pp., 21 pls.
- Sakai, T. 1935. [A list of the aquatic animals found in the vicinity of Shimoda.] In [The first report of the floral and faunal list in the vicinity of Shimoda]. *Tôkyô Bunrika Daigaku fuzoku Shimoda-rinkai-jikkensho Hôkoku* [Report of Shimoda Marine Biological Station, Tokyo Bunrika Daigaku] 1: 23–89 [in Japanese].
- Sakai, T. 1965. *The crabs of Sagami Bay*. Tokyo: Maruzen Co. xvi + 206 pp. (English text) + 100 pls. + 92 pp. (Japanese text) + 11 pp. (bibliography) + 32 pp. (index).
- Salva, E. W., and R. M. Feldmann. 2001. Re-evaluation of the family Atelecyclidae (Decapoda: Brachyura). *Kirtlandia* 52: 9–62.
- Samouelle, G. 1819. *The entomologist's useful compendium*. 1st ed. 496 pp. [not seen].
- Sanchez, R., S. G., and P. G. Aguilar F. 1975. *Notas sobre crustaceos del mar Peruano—I: Desarrollo larvario de Lepidopa chilensis Lenz (Decapoda, Anomura: Albuneidae)*. *Anales Científicos* 13(1, 2): 1–11.
- Sandifer, P. A. 1973. Distribution and abundance of decapod crustacean larvae in the York River Estuary and adjacent lower Chesapeake [sic] Bay, Virginia, 1968–1969. *Chesapeake Science* 14(4): 235–257.
- Sandifer, P. A., and W. A. Van Engel. 1972. *Lepidopa* larvae (Crustacea, Decapoda, Albuneidae) from Virginia plankton. *Journal of the Elisha Mitchell Scientific Society* 88(4): 220–225.
- Sarojini, S. 1962. The androgenic organ in some Indian Crustacea I. *Journal of the Zoological Society of India* 13(2): 188–193.
- Schmitt, W. L. 1921. *The marine decapod Crustacea of California with special reference to the decapod Crustacea collected by the United*

- States Bureau of Fisheries steamer "Albatross" in connection with the biological survey of San Francisco Bay during the years 1912–1913. University of California Publications in Zoology 23: 470 pp., 60 pls.
- Schmitt, W. L. 1924. Report on the Macrura, Anomura and Stomatopoda collected by the Barbados-Antigua Expedition from the University of Iowa in 1918. University of Iowa Studies in Natural History 10(4): 65–99, 5 pls.
- Schmitt, W. L. 1935. Crustacea Macrura and Anomura of Porto Rico and the Virgin Islands. Scientific Survey of Porto Rico and the Virgin Islands 15(2): 125–227.
- Schmitt, W. L. 1942. A new species of sand bug, *Blepharipoda doelloi*, from Argentina. Smithsonian Miscellaneous Collections 101(18): 10 pp., 1 pl.
- Schram, F. R. 1986. Crustacea. New York: Oxford University Press. 606 pp.
- Schuster-Dieterichs, O. 1956. Die Makrofauna am sandigen Brandungsstrand von El Salvador (mittelamerikanische Pazifikküste). Senckenbergiana Biologica 37(1/2): 1–56.
- Schweitzer, C. E., and C. B. Boyko. 2000. First report of the genus *Lophomastix* Benedict, 1904 (Crustacea: Decapoda: Albuneidae) in the fossil record and a reappraisal of the status of *Blepharipoda brucei* Rathbun, 1926. Journal of Paleontology 74(4): 631–635.
- Seilacher, A. 1961. Krebse im Brandungssand. Natur und Volk 91(7): 257–264.
- Serène, R. 1973. A new species of Decapoda Hippidea: *Albunea mariellae* nov. sp. from the Banda Sea. Crustaceana 24(3): 261–264, 2 pls.
- Serène, R. 1977. Crustacés hippidés et brachyours des îles Séchelles. Revue de Zoologie Africaine 91(1): 45–68.
- Serène, R. 1979. Description of *Paralbunea manihinei* gen. and spec. nov. (Decapoda, Hippidea, Albuneidae). Crustaceana, suppl. 5: 95–99, 1 pl.
- Serène, R., and A. F. Umali. 1965. A review of Philippine Albuneidae, with descriptions of two new species. Philippine Journal of Science 94(1): 87–116, 6 pls.
- Seridji, R. 1988. Some planktonic larval stages of *Albunea carabus* (L., 1758) (Crustacea, Decapoda, Anomura). Journal of Natural History 22(5): 1293–1300.
- Shen, C. J. 1949. Notes on the genera *Blepharipoda* and *Lophomastix* of the family Albuneidae (Crustacea Anomura) with description of a new species, *B. liberata*, from China. Contributions from the Institute of Zoology, National Academy of Peiping 5(4): 153–170, pls. 14–17.
- Sivertsen, E. 1934. The Norwegian Zoological Expedition to the Galapagos Islands 1925, conducted by Alf Wollebaek[.] VII. Littoral Crustacea Decapoda from the Galapagos Islands. Nyt Magazin for Naturvidenskaberne 74: 23 pp., 4 pls.
- Smith, J. C. 1993. Georges Cuvier: an annotated bibliography of his published works. Washington, D.C., and London: Smithsonian Institution Press. 251 pp.
- Smith, R. I., F. A. Pitelka, D. P. Abbott, and F. M. Weesner. 1954. Intertidal invertebrates of the central California coast. S. F. Light's "Laboratory and field text in invertebrate zoology." Berkeley: University of California Press. 446 pp.
- Snodgrass, R. E. 1952. The sand crab *Emerita talpoida* (Say) and some of its relatives. Smithsonian Miscellaneous Collections 117(8): 34 pp.
- Sourie, R. 1957. Étude écologique des plages de la côte Sénégalaise aux environs de Dakar (macrofaune). Annales de l'École Supérieure des Sciences, Dakar 3: 110 pp.
- Southwell, T. 1910. Notes on the habitaculum of two species of pagurids; a description of one new species; and a list of the Anomura recorded to date from Ceylon waters. Ceylon Marine Biological Reports 4(9): 179–184, pl. 1, figs. 14–18.
- Spanò, N., P. Rinelli, and S. Ragonese. 1999. The first find of *Albunea carabus* (Decapoda: Anomura) on the southern Sicilian coasts (Strait of Sicily, Mediterranean Sea). In F. R. Schram and J. C. von Vaupel Klein (editors), Crustaceans and the biodiversity crisis: Proceedings of the Fourth International Crustacean Congress, Amsterdam, the Netherlands, July 20–24, 1998: 617–621. Leiden: Köln. Boston: Brill.
- Spivak, E. D. 1997. Los crustáceos decápodos del Atlántico sudoccidental (25°–55°S): distribución y ciclos de vida. Investigaciones Marinas 25: 69–91.
- Springthorpe, R. T., and J. K. Lowry. 1994. Catalogue of crustacean type specimens in the Australian Museum: Malacostraca. Technical Reports of the Australian Museum 11: 134 pp.
- Stammer, H.-J. 1936. Ein neuer Höhlenschizopode, *Troglomysis vjetrenicensis* n. g. n. sp. Zoologische Jahrbücher Abteilung für Systematik, Geographie und Biologie der Tiere 68(1): 53–104.
- Statius Müller, P. L. 1775. Des Ritters Carl von Linné Königlich Schwedischen Leibarztes u. u. vollständiges Natursystem nach der zwölften lateinischen Ausgabe und nach Anleitung des holländischen Houttuynischen Werks mit einer ausführlichen Erklärung ausgefertigt. Nürn-

- berg: Gabriel Nicolaus Raspe. Vol. 5(2): 761–1066, pls. 23–36.
- Stebbing, T.R.R. 1893. A history of Crustacea Recent Malacostraca. New York: D. Appleton & Co. 466 pp.
- Stebbing, T.R.R. 1914. Stalk-eyed Crustacea Malacostraca of the Scottish National Antarctic Expedition. Transactions of the Royal Society of Edinburgh 50(9): 253–307, pls. 23–32b.
- Stebbing, T.R.R. 1917. The Malacostraca of Natal. Annals of the Durban Museum 2(1): 33 pp., 6 pls.
- Steinbeck, J., and E. F. Ricketts. 1941. Sea of Cortez. A leisurely journal of travel and research with a scientific appendix comprising materials for a source book on the marine animals of the Panamic faunal province. New York: Viking Press. 598 pp., 40 pls.
- Stillman, J. H., and G. N. Somero. 1996. Adaptation to temperature stress and aerial exposure in congeneric species of intertidal porcelain crabs (genus *Petrolisthes*): correlation of physiology, biochemistry and morphology with vertical distribution. Journal of Experimental Biology 199(8): 1845–1855.
- Stimpson, W. 1857. On the Crustacea and Echinodermata of the Pacific shores of North America. Boston Journal of Natural History 6(27): 444–532, pls. 18–23.
- Stimpson, W. 1858. Prodromus descriptionis animalium evertibratum, quae in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit. Pars VII. Crustacea Anomura. Proceedings of the Academy of Natural Sciences of Philadelphia 10: 225–252.
- Stimpson, W. 1859. Notes on North American Crustacea, no. 1. Annals of the Lyceum of Natural History of New York 7(11): 49–93, 1 pl.
- Stimpson, W. 1860. Notes on North American Crustacea, in the Museum of the Smithsonian Institution. No. II. Annals of the Lyceum of Natural History of New York 7(22): 176–246, pls. 2, 5.
- Stuck, K. C., and F. M. Truesdale. 1986. Larval and early postlarval development of *Lepidopa benedicti* Schmitt, 1935 (Anomura: Albuneidae) reared in the laboratory. Journal of Crustacean Biology 6(1): 89–110.
- Subramoniam, T. 1984. Spermatophore formation in two intertidal crabs *Albunea symnista* and *Emerita asiatica* (Decapoda: Anomura). Biological Bulletin (Woods Hole) 166(1): 78–95.
- Subramoniam, T. 1993. Spermatophores and sperm transfer in marine crustaceans. Advances in Marine Biology 29: 129–214.
- Subramoniam, T., and M. Panneerselvam. 1985. Semi-annual breeding pattern in the burrowing sand crab *Albunea symnista* (L.) (= *symnista*) of Madras coast. Indian Journal of Marine Sciences 14(4): 226–227.
- Sun, X., and J. Wang. 1996. Notes on the Hippoidea in the Beijing Natural History Museum. Memoirs of Beijing Natural History Museum 55: 25–37.
- Suzuki, K. 1971. Decapod Crustaceans. In S. Nishimura and K. Suzuki (editors), Common seashore animals of Japan in color [15th printing, 1986]: 77–125, pls. 26–46. Osaka: Hoikusha Publishing Co.
- Tablado, A., and L. A. Venerus. 2000. Catálogo de ejemplares tipo de la División Invertebrados del Museo Argentino de Ciencias Naturales. I. Porifera, Cnidaria, Mesozoa, Platyhelminthes, Nemertinea, Rotifera, Nematomorpha, Nematoda, Bryozoa, Annelida, Crustacea y Echinodermata. Revista de Museo Argentino de Ciencias Naturales, n.s., 2(2): 203–236.
- Thomassin, B. A. 1969. Identification, variabilité et écologie des Hippidea (Crustacea, Anomura) de la région de Tulear, s. w. de Madagascar. Recueil des Travaux de la Station Marine d'Endoume, Faculté des Sciences de Marseille, sér. suppl. 9: 135–177.
- Thomassin, B. A. 1973. *Albunea madagascariensis* n. sp., nouvelle espèce d'Hippidea (Decapoda, Anomura) des sables coralliens de la région de Tuléar (s.w. de Madagascar). Crustaceana 24(3): 265–274, 1 pl.
- Tinker, S. W. 1965. Pacific Crustacea. Rutland, VT, and Tokyo, Japan: Charles E. Tuttle Co. 134 pp.
- Tirmizi, N. M. 1978. On the presence of *Albunea steinitzi* Holthuis in the northern Arabian Sea (Decapoda, Hippidea). Crustaceana 35(1): 94–95.
- Tudge, C. C., D. M. Scheltinga, and B.G.M. Jamieson. 1999. Spermatozoal ultrastructure in the Hippoidea (Anomura, Decapoda). Journal of Submicroscopic Cytology and Pathology 31(1): 1–13.
- Turgeon, D. D., A. E. Bogan, E. V. Coan, F. G. Hochberg, W. G. Lyons, P. M. Mikkelsen, J. F. Quinn, Jr., C. F. E. Roper, G. Rosenberg, B. Roth, A. Scheltema, M. J. Sweeney, F. G. Thompson, M. Vecchione, and J. D. Williams. 1998. Common and scientific names of aquatic invertebrates from the United States and Canada: mollusks, 2nd ed. American Fisheries Society Special Publications 20: viii + 501 pp.
- Türkay, M. 1982. Marine Crustacea Decapoda von den Kapverdischen Inseln mit Bemerkungen zur Zoogeographie des Gebietes. Courier Forschungsinstitut Senckenberg 52: 91–129.
- Turner, C. H., and J. C. Sexsmith. 1964. Marine

- baits of California. Sacramento: California Department of Fish and Game. 71 pp.
- Turner, C. H., and J. C. Sexsmith. 1975. Marine baits of California, 2nd rev. ed. Sacramento: California Department of Fish and Game. 66 pp.
- Urita, T. 1934. A new crab of the family Albuneidae from Saghalien. *Dobutsugaku Zasshi* 46(546): 149–154.
- Urita, T. 1942. Decapod crustaceans from Saghalien, Japan. *Bulletin of the Biogeographical Society of Japan* 12(1): 1–78.
- Van Engel, W. A., and P. A. Sandifer. 1972. Order Decapoda. In M. L. Wass (editor), A checklist of the biota of lower Chesapeake Bay with inclusions from the upper bay and the Virginian Sea. Virginia Institute of Marine Science Special Science Report 65: 1–290.
- Verrill, A. E. 1901. Additions to the fauna of the Bermudas from the Yale Expedition of 1901, with notes on other species. *Transactions of the Connecticut Academy of Sciences* 11: 15–62, 9 pls.
- Verrill, A. E. 1908. Decapod Crustacea of Bermuda; I—Brachyura and Anomura. Their distribution, variations, and habits. *Transactions of the Connecticut Academy of Arts and Sciences* 13: 299–474, pls. 9–28.
- Wang, F. 1989. [A new record of the classification of Chinese chanxie (“cicada”) crabs.] *Sichuan Journal of Zoology* 8(1): 39 [in Chinese].
- Ward, M. 1942. Notes on the Crustacea of the Desjardins Museum, Mauritius Institute with descriptions of new genera and species. *Mauritius Institute Bulletin* 2(2): 49–108, pls. 5, 6.
- Weber, F. 1795. *Nomenclator entomologicus secundum entomologiam systematicam ill. Fabricii adjectis speciebus recens detectis et varietatibus. Chilonii et Hamburgi.* viii + 172 pp.
- Wehrtmann, I. S., and P. Báez. 1997. Larvas y estadios tempranos de desarrollo de crustáceos decápodos de Chile: descripciones publicadas. *Investigaciones Marinas* 25: 263–276.
- Wenner, E. L., and T. H. Read. 1982. Seasonal composition and abundance of decapod crustacean assemblages from the South Atlantic Bight, USA. *Bulletin of Marine Science* 32(1): 181–206.
- Werding, B. 1982. *Zygopa michaelis* Holthuis 1960 aus der Bucht von Santa Marta, Kolumbien (Crustacea: Decapoda: Albuneidae). *Senckenbergiana Biologica* 62(4/6): 391–392.
- Westervelt, C. A., Jr. 1967. The littoral anomuran decapod crustacean fauna of the Punta Peñasco-Bahía la Cholla area in Sonora, Mexico. Ph.D. dissertation, University of Arizona. xi + 143 pp.
- White, A. 1847. List of the specimens of Crustacea in the collection of the British Museum. London. 143 pp.
- White, A. 1850. List of the specimens of British animals in the collection of the British Museum. Part IV. Crustacea. London. 141 pp.
- Wicksten, M. K. 1980. Crustacea and Pycnogonida. In D. Straughan and R. W. Klink (editors). A taxonomic listing of common marine invertebrate species from southern California. Technical Reports of the Allan Hancock Foundation 3: 196–223.
- Williams, A. B. 1965. Marine decapod crustaceans of the Carolinas. *Fishery Bulletin* 65(1): 298 pp.
- Williams, A. B. 1984. Shrimps, lobsters, and crabs of the Atlantic coast of the eastern United States, Maine to Florida. Washington, D.C.: Smithsonian Institution Press. 550 pp.
- Williams, A. B., L. G. Abele, D. L. Felder, H. H. Hobbs, Jr., R. B. Manning, P. A. McLaughlin, and I. P. Farfante. 1989. Common and scientific names of aquatic invertebrates from the United States and Canada: decapod crustaceans. *American Fisheries Society Special Publications* 17: vii + 77 pp.
- Wirtz, P., and H. R. Martins. 1993. Notes on some rare and little known marine invertebrates from the Azores, with a discussion of the zoogeography of the region. *Arquipélago, Boletim da Universidade dos Açores Ciências Biológicas e Marinhas* 11A: 55–63.
- Yamaguchi, E., and M. Yamada. 1955. Marine invertebrates from northern Japan. Sapporo: Kokkai-Kyoiku-Hyoron-Sha. 189 pp.
- Yang, S. I., and X. Sun. 1979. A new record of Albuneidae (Crustacea: Decapoda) from China. *Acta Zootaxonomica Sinica* 4(3): 203.
- Young, A. M. 1978. Superorder Eucarida order Decapoda. In R. G. Zingmark (editor), An annotated checklist of the biota of the coastal zone of South Carolina: 171–185. Columbia, SC: University of South Carolina Press.
- Yü, S. C. 1935. A new *Lophomastix* from Chefoo. *Abstracts of Papers from the Scientific Conference of Nanning, Kwangsi*: 51 [not seen].
- Zariquiey Alvarez, R. 1961. Decápodos españoles XV. Sobre un raro crustáceo decápodo: *Albunea carabus* (Linneo 1758). *Investigacion Pesquera* 19: 103–110.
- Zariquiey Alvarez, R. 1968. Crustáceos decápodos Ibéricos. *Investigacion Pesquera* 32: 1–510.
- Zimsen, E. 1964. The type material of I. C. Fabricius. Copenhagen: Munksgaard. 656 pp.
- Zolessi, L. C. de, and M. E. Philippi. 1995. Lista sistemática de Decapoda del Uruguay (Arthropoda: Crustacea). *Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo* 12(183): 1–24.

APPENDIX 1: INDETERMINATE LITERATURE RECORDS

As with all systematic revisionary work, there are some records which are impossible to assign to species with confidence unless the specimens are examined. Unfortunately, there are always specimens that have become lost over time or else are not available for examination. These most vexing records are given below with suggestions as to their identities, but all are considered specimens *inquirenda* at present.

Albunea guerinii: Stebbing, 1917: 26 (not *Albunea guerinii* Lucas, 1853 = *A. carabus* (Linnaeus, 1758)).

Albunea symnista [sic]: Barnard, 1950: 405–406. – Kensley, 1981: 35 (list) (not *A. symmysta* (Linnaeus, 1758)).

REMARKS: Although it is certain that this specimen from Durban is not *A. carabus*, there is no way to accurately ascertain its identity, especially as I have seen no South African, or even Mozambique, material. It may be *A. holthuisi*, which is known from as close as Madagascar. Barnard (1950) saw no new material and only repeated Stebbing's (1917) record while correctly suggesting that it was not likely to be identical with the Mediterranean species *A. guerinii* (a synonym of *A. carabus*). There are two lots of albuneid zoea stage? V larvae in the BMNH from off South Africa (BMNH 1951.2.17.2352, BMNH 1951.2.17.2357) which are probably the larvae of the species cited by Barnard (1950).

Albunealarve Claus, 1876: 59.

“*Albunea*?” Claus, 1876: pl. 9, figs. 1–10.

REMARKS: The most likely identity for these larvae from Zanzibar is either *Albunea holthuisi* or *A. microps*, both of which are known from that area. The larvae of neither species is known.

Albunea [sp.] Cano, 1893: 16, 23, pl. 2, figs. 87, 92.

REMARKS: This specimen from China may be the megalopal stage of either *Albunea groeningi*, n. sp. or *A. occultus*, n. sp. Due to the sketchy quality of the drawings, it is unlikely that its true identity will ever be known.

Albunea sp. Gurney, 1942: 266, fig. 111.

REMARKS: As with all South African records, the identity of these specimens (larvae) is unknown. They may be *A. holthuisi*, which is the species whose known range has the closest geographic proximity to South Africa.

Albunea sp. B Gurney, 1942: 263–266, fig. 110a–d.

Albunea sp. Boschi, 1981: 240, fig. 241–57.

REMARKS: These larvae are definitely of the ge-

nus *Lepidopa*, rather than *Albunea*, but as no specimens from the former genus have been reported from Bermuda, it is unclear what taxon they might represent. Comparisons with the larvae described by Stuck and Truesdale (1986) show that Gurney's (1942) larvae are probably not *L. benedicti*. The best candidates are therefore *L. richmondi* and *L. venusta*. Boschi's (1981) figure is a direct copy of Gurney's (1942).

Albunea symmysta: Kikuchi and Miyake, 1978: 31 (list) (not *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: This record might refer to *Albunea groeningi*, n. sp. or *A. occultus*, n. sp. It may even represent *Paralbunea dayriti*, which is also known from Amakusa, Japan.

Albunea symnista [sic]: Rathbun, 1924: 29 (not *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: These specimens from Cape Jaubert, Australia, are likely either *Albunea groeningi*, n. sp. or *A. occultus*, n. sp., both of which are found in nearby localities. No specimens of true *A. symmysta* are known from Western Australia.

Albunea symnista [sic]: T. Sakai, 1935: 61 (not *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: These specimens from Shimoda are likely either *Albunea groeningi*, n. sp. or *A. occultus*, n. sp., both of which are found in nearby localities in Japan.

Albunea symnista [sic]: Kikuchi, 1959: 1949 (list). – Kikuchi, 1961: 5 (list) (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea [sic] *symnista* [sic]: Kikuchi, 1961: 5 (list) (not *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: These records from Sado Island are likely either *Albunea groeningi*, n. sp. or *A. occultus*, n. sp., both of which are found in nearby localities in Japan.

Albunea symnista [sic]: Wang, 1989: 39. – Sun and Wang, 1996: 31 (list) (not *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: These specimens from Zhejiang Province, China, could be *A. symmysta*, although they are more likely either *A. groeningi*, n. sp. or *A. occultus*, n. sp., both of which are found on nearby Taiwan where *A. symmysta* is apparently absent.

Blepharipoda occidentalis: Schuster-Dieterichs, 1956: 51 (list, part) (not *Blepharipoda occidentalis* J. W. Randall, 1840).

REMARKS: Whatever taxon Schuster-Dieterichs (1956) identified as *B. occidentalis* from El Salvador, it is very unlikely to be conspecific with

that species. No specimens of *B. occidentalis* are known south of central Baja California, Mexico, and the species, genus and family are otherwise exclusively antitropical in distribution. The El Salvador material may have been a raninid brachyuran, many species of which are large, spinose, and superficially similar in morphology to *Blepharipoda*. Knight (1968a, 1968b) found no *Blepharipoda* larvae in numerous plankton samples from off El Salvador.

Lepidopa richmondi: Gore and Van Dover, 1981: 1018–1026, figs. 1–6. – Spivak, 1997: 81 (list) (not *Lepidopa richmondi* Benedict, 1903).

Lepidopa Richmondi: Seridji, 1988: 1298 (not *Lepidopa richmondi* Benedict, 1903).

REMARKS: Although these larval and megalopal stages were said not to be *L. richmondi* by Stuck and Truesdale (1986), it is unclear what *Lepidopa* species they represent. Until they can be matched up with larvae reared from a known parent, all that can be said is that they are probably conspecific with either *L. benedicti* or *L. websteri*. The larva of Gore and Van Dover (1981) actually differs from the *L. benedicti* of Stuck and Truesdale (1986) only in minor features. It is here suggested that the single larva of Gore and Van Dover (1981) may have been aberrant in its development and that certain morphological features may be atypical (cf. larvae of Kurata, 1970). There were three zoeal stages and one megalopal stage, obtained in 18+ days at 24°C and 35‰ salinity (Gore and Van Dover, 1981). This is in contrast to the more typical four zoeal stages found in oth-

er *Lepidopa* species (Knight, 1970; Sanchez and Aguilar, 1975; Stuck and Truesdale, 1986). Care must be exercised when extrapolating larval data from a single specimen to an entire species, as both variation and typical development are unknown when only a single specimen is studied.

Lepidopa scutellata: Schmitt, 1924: 96 (not *Thia scutellata* (Fabricius, 1793)).

REMARKS: Although it is very possible that Schmitt (1924) did have a *Lepidopa* larva, its identity cannot be determined. Given the Barbados locality, it was probably either *L. richmondi* or *L. luciae*, n. sp., both of which have been collected in nearby Trinidad. This specimen was not mentioned by previous researchers discussing *Lepidopa* larvae (e.g., Gore and Van Dover, 1981; Stuck and Truesdale, 1986).

Lepidopa sp. B Knight, 1970: 136–138, figs. 60–64.

Lepidopa spp. Knight, 1970: 141 (part).

REMARKS: Some part of the larvae referred to by Knight (1970) under this blanket heading of *Lepidopa* spp. are undoubtedly *L. myops*. However, because *L. californica* and *L. myops* are still the only species of this genus known from the Pacific side of Baja California, the identity of these other larvae is unclear. *Lepidopa* sp. B may only represent additional variability in the larvae of *L. californica*, but more study and more specimens from the west coast of Baja California are required to answer this question with any certainty.

APPENDIX 2: EXCLUDED TAXA

The following taxa were at one time placed within the Albuneidae. Most were subsequently recognized as “true crabs,” having only convergently evolved characters in common with albuneids, and were removed to other families within the Brachyura. During this study, one species (*Hippa caerulea*) has been found to be a gnathiid isopod. Only those references which included these taxa among the Albuneidae are included, along with a few important works which show correct systematic placement.

ISOPODA LATREILLE, 1817

GNATHIIDAE LEACH, 1814

GNATHIA LEACH, 1813

Gnathia sp. cf. *phallonajopsis* Monod, 1925

cf. *Gnathia phallonajopsis* Monod, 1925: 5–6.

Hippa caerulea Risso, 1816: 50–51. – Desmarest, 1825: 424. – Risso, 1827: 36–37.

Hippa caerulea [sic]: Risso, 1844: 94.

Hippa caerulea [sic]: Hope, 1851: 12.

cf. *Gnathia phallonajopsis*: Monod, 1926: 463–470, figs. 195–199 (synonymy).

Albunea carabus: Holthuis, 1977: 61–62 (not *Albunea carabus* (Linnaeus, 1758)).

Gnathia sp. cf. *phallonajopsis*: Boyko, 2001: 115–122.

REMARKS: As was shown in detail elsewhere (Boyko, 2001), the taxon known as *Hippa caerulea* is not a hippoid decapod at all, but rather is an unidentifiable gnathiid isopod close to *Gnathia phallonajopsis*. The description by Risso (1816) was based on subadult females or possibly praniza larvae.

ANOMURA MACLEAY, 1838
 PAGURIDAE LATREILLE, 1802
 PAGURUS FABRICIUS, 1775

Pagurus Fabricius, 1775: 410 (part).

?*Blepharipoda*: Rathbun, 1926: 126 (not *Blepharipoda* Randall, 1840).

“*Pagurus*” *brucei* (Rathbun, 1926)

Blepharipoda brucei Rathbun, 1926: 126–127, pl. 28, figs. 10, 11.

Pagurus brucei: Schweitzer and Boyko, 2000: 631.

REMARKS: This species was established based only on a few pereopod fragments. Subsequent examination of the types showed that they could not belong to any *Blepharipoda*, but rather appeared to represent a species of pagurid hermit crab (Schweitzer and Boyko, 2000). Due to the fragmentary nature of the types and only known specimens, the current generic placement is uncertain and they are tentatively referred to the paraphyletic genus *Pagurus* until better preserved material becomes available.

BRACHYURA LATREILLE, 1802
 RANINIDAE de HAAN, 1839
 RANINA LAMARCK, 1801

Albunea Weber, 1795: 94 (part). – Fabricius, 1798: 372–373, 397 (part). – Herbst, 1804: 29–31 (part) (not *Albunea* Weber, 1795). *Ranina* Lamarck, 1801: 156.

Ranina ranina (Linnaeus, 1758)
 Figure 1D

Cancer raninus Linnaeus, 1758: 625.

Hippa scabra Fabricius, 1787: 330. – Fabricius, 1793: 476. – Zimsen, 1964: 648.

Albunea scabra: Weber, 1795: 94. – Fabricius, 1798: 398. – Herbst, 1804: 31 (list). – Haig, 1955: 9.

Cancer scaber [sic]: Herbst, 1796: 11.

not *Albunea scabra*: Molina, 1810: 187 (= *Blepharipoda spinosa* (H. Milne Edwards and Lucas, 1841)).

REMARKS: The type or types of *Hippa scabra* are lost (Zimsen, 1964). Weber (1795) included this species, under its junior synonym name of *H. scabra*, in his new genus *Albunea*.

NOTOPUS de HAAN, 1841

Hippa Fabricius, 1793: 475 (part) (not *Hippa* Fabricius, 1793).

Albunea Weber, 1795: 94 (part). – Fabricius, 1798: 372–373, 397 (part). – Duméril, 1816: 431 (part) (not *Albunea* Weber, 1795).
Notopus de Haan, 1841: 137.

Notopus dorsipes (Fabricius, 1787)
 Figure 1E

Hippa dorsipes Fabricius, 1787: 329.

Albunea dorsipes: Weber, 1795: 94. – Fabricius, 1798: 397–398.

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

Notopus dorsipes: T. Sakai, 1965: 1, pl. 1, fig. 1. not *Cancer dorsipes*: Herbst, 1791: 5–8, pl. 2, fig. 2. – Herbst, 1796: 197–198, pl. 45, figs. 1–7 (= *Albunea symmysta* (Linnaeus, 1758)).

not *Albunea dorsipes*: Herbst, 1804: 31 (list) (= *Albunea symmysta* (Linnaeus, 1758)).

REMARKS: This species was an original member of the genus *Albunea*, as defined by Weber (1795).

CORYSTIDAE SAMOUELLE, 1819

CORYSTES BOSC, 1801–1802

Albunea: Fabricius, 1798: 372–373, 397 (part). – Lamarck, 1801: 155 (part). – Herbst, 1804: 29–31 (part) (not *Albunea* Weber, 1795).
Corystes Bosc, 1801–1802: 65.

Corystes cassivelaunus (Pennant, 1777)
 Figure 1B

Cancer cassivelaunus Pennant, 1777: 6, pl. 7, fig. 13.

Cancer personatus Herbst, 1785: 193, pl. 12, fig. 71.

Hippa symnista [sic]: Fabricius, 1787: 329 (part) (not *Albunea symmysta* (Linnaeus, 1758)).

Albunea Symnista [sic]: de Villers, 1789: 157–158 (part) (not *Albunea symmysta* (Linnaeus, 1758)).

Hippa dentata Fabricius, 1793: 475.

Euryala denata: Weber, 1795: 94.

Albunea dentata: Fabricius, 1798: 398. – Lamarck, 1801: 155. – Herbst, 1804: 31 (list).

Albunea personata: Lamarck, 1801: 155.

Corystes dentata: Roux, 1829: 70–72, pl. 12.

Corystes cassivelaunus: White, 1850: 21.—Christiansen, 1969: 34–37, fig. 12.

REMARKS: The type or types for *Hippa dentata* are lost (Zimsen, 1964). The types of *Cancer personatus* are in the ZMB (K. Sakai, 1999).

Although moderately convergent with albuneids, and also adapted to a sand-burrowing lifestyle, corystids have long been recognized as brachyurans, primarily because cause their fifth

pereopods are not reduced. This species exhibits so strong a sexual dimorphism that males and females were identified as separate species (*personata* and *dentata*) for many years.

THIIDAE DANA, 1852

Thia LEACH, 1815

Hippa: Fabricius, 1793: 474 (part) (not *Hippa* Fabricius, 1787).

Albunea: Fabricius, 1798: 372–373, 397 (part). – Herbst, 1804: 29–31 (part). – Desmarest, 1823: 283 (part). – Desmarest, 1825: 172–173 (not *Albunea* Weber, 1795).

albunea: Latreille, 1803: 171–172 (part) (not *Albunea* Weber, 1795).

Thia Leach, 1815: 312.

Lepidops: Miers, 1878: 331–332 (part) (not *Lepidops* Stimpson, 1858).

Lepidopa: Gordon, 1938: 187–190 (part) (not *Lepidopa* Stimpson, 1858).

REMARKS: This genus is no. 1577 on the “Official list of generic names in zoology” (ICZN, 1964).

Thia scutellata (Fabricius, 1793)

Figure 1A

Hippa scutellata Fabricius, 1793: 474–475. – Weber, 1795: vii. – Holthuis, 1962: 125–128, pl. 4. – Zimsen, 1964: 649.

Albunea scutellata: Fabricius, 1798: 397. – Herbst, 1804: 31 (list). – Desmarest, 1823: 284. – Desmarest, 1825: 173–174.

albunea scutellata: Latreille, 1803: 172. – Lamarck, 1818: 224.

Lepidopa scutellata: Ortmann, 1896: 226 (part). – Gordon, 1938: 188 (part).

Lepidopa scutellata: Holthuis, 1962: 125–128.

Thia scutellata: Holthuis, 1962: 125–128. – Christiansen, 1969: 40–41, fig. 14.

Thia scutella [sic]: Salva and Feldmann, 2001: 24, fig. 12a–c.

not *Albunea scutellata*: H. Milne Edwards, 1837b: 204, pl. 21, figs. 9–13. – Chenu and Desmarest, 1877: 32, fig. 22 (= *Lepidopa benedicti* Schmitt, 1935).

not *Albunea scutellata*: Gibbes, 1850b: 187 (= *Lepidopa websteri* Benedict, 1903).

not *Albunaea* [sic] *scutellata*: Dana, 1852: 406 (= *Lepidopa chilensis* Lenz, 1902).

not *Lepidopa scutellata*: Stimpson, 1858: 230.— Stimpson, 1859: 79. – Faxon, 1895: 237 (list). – Ortmann, 1896: 226 (part), 227 (part). – Gordon, 1938: 188 (list, part) (= *Lepidopa richmondi* Benedict, 1903).

not *Lepidops* [sic] *scutellata*: Miers, 1878: 332 (part) (= *Lepidopa chilensis* Lenz, 1902).

not *Lepidops* [sic] *scutellata*: Miers, 1878: 332 (part). – Moreira, 1901: 30, 88–89 (= *Lepidopa richmondi* Benedict, 1903).

not *Lepidopa scutellata*: Ortmann, 1896: 226 (part). – Benedict, 1903: 894, fig. 6*. – Schmitt, 1935: 209–210* (= *Lepidopa benedicti* Schmitt, 1935).

not *Lepidopa scutellata*: Ortmann, 1896: 227 (part) (= *Lepidopa websteri* Benedict, 1903).

not *Lepidopa scutellata*: Ortmann, 1896: 227 (part). – Gordon, 1938: 188 (part) (= *Lepidopa chilensis* Lenz, 1902).

not *Lepidopa scutellata*: Schmitt, 1924: 96 (= *Lepidopa* sp. indet.).

REMARKS: This species was the last albuneid to be recognized as a brachyuran and removed from the Albuneidae (Holthuis, 1962). The longstanding confusion about the identity of this species dates back to Weber (1795), who placed it under the heading “Cancroidea dubia.” This species later was designated the type of the genus *Lepidopa* by Stimpson (1858), who incorrectly applied the name to a species of that genus. The type species of *Lepidopa* was subsequently designated as *L. venusta* by the plenary powers of the ICZN (ICZN, 1964). The type(s) of *Hippa scutellata* are lost (Holthuis, 1962; Zimsen, 1964) and a neotype (RMNH D351) was designated by Holthuis (1962). The familiar placement of the species has been recently verified by Salva and Feldmann (2001). This specific name is no. 1956 on the “Official list of specific names in zoology” (ICZN, 1964).

This species is also adapted to a sand-dwelling mode of life and has been collected in the same samples as *Albunea carabus* in shallow (3–7 m) water off Spain (Rubió and Holthuis, 1976).