

Contributions to the knowledge of Leucosiidae III. *Urnalana* gen. nov. (Crustacea: Brachyura)

B.S. Galil

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Bella S. Galil, National Institute of Oceanography, Israel Oceanographic and Limnological Research, P.O. Box 8030, Haifa 31080, Israel (e-mail: bella@ocean.org.il).

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A new genus, *Urnalana*, is established for *Leucosia* species with an urn-shaped carapace: *L. angulata* Rathbun, 1911, *L. chevretii* Haswell, 1880, *L. cumingii* Bell, 1855, *L. elata* A. Milne Edwards, 1874, *L. elatoides* Bouvier, 1915, *L. hilaris* Nobili, 1905, *L. haematostica* Adams & White, 1849, *L. insularis* Takeda & Kurata, 1976, *L. margaritata* A. Milne Edwards, 1874, *L. pulchella* Bell, 1855, *L. purarensis* Ovaere, 1987, *L. thysanotus* George & Clark, 1976, *L. whitei* Bell, 1855, and three new species: *U. elatula*, *U. granulimera*, and *U. parahaematostica*. The species are described or redescribed and illustrated, extended synonymies are given, and a key for their identification is provided.

Introduction

In his “Key to the Indian species of *Leucosia*” Alcock (1896: 211) grouped together the species noted for their “urn-shaped” carapace, with “the thickened epimeral edge visible, dorsally, in all its extent” and “often with a strip of thick fur along the postero-lateral border”: *L. cumingii* Bell, 1855, *L. elata* A. Milne Edwards, 1874, *L. haematostica* Adams & White, 1849, *L. margaritata* A. Milne Edwards, 1874, *L. whitei* Bell, 1855, *L. sima* Alcock, 1896. Nearly a century later, Ovaere (1987: 202), discussing the species of *Leucosia* characterized by a pubescent postero-lateral margin, commented that “The thirteen species known today, showing that character, form a rather heterogenous group”. A study of the extensive collections of the the Nationaal Natuurhistorische Museum, Leiden (formerly Rijksmuseum van Natuurlijke Historie), together with other major collections (listed below) has enabled re-examination of many type specimens and much of the published material. A new genus is established for *Leucosia* species with an urn-shaped carapace: *L. angulata* Rathbun, 1911, *L. chevretii* Haswell, 1880, *L. cumingii* Bell, 1855, *L. elata* A. Milne Edwards, 1874, *L. elatoides* Bouvier, 1915, *L. hilaris* Nobili, 1905, *L. haematostica* Adams & White, 1849, *L. insularis* Takeda & Kurata, 1976, *L. margaritata* A. Milne Edwards, 1874, *L. pulchella* Bell, 1855, *L. purarensis* Ovaere, 1987, *L. thysanotus* George & Clark, 1976, *L. whitei* Bell, 1855, and three new species are described.

Abbreviations.— cl. – carapace length, measured along the vertical median line of the carapace; coll. – collected by; Exp. – expedition; id. – identified by; I. – Island; Is. – Islands; stn – station.

The material examined was lent by the following institutions: the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (KBIN), Museum für Naturkunde, Berlin (MNB), Museum national d’Histoire naturelle, Paris (MNHN), The Natural History Museum, London (NHM), Naturhistorisches Museum, Wien (NMW), the National Science Museum, Tokyo (NSMT), the Queensland Museum, Brisbane (QM), the Nationaal Natuurhistorisch Museum, Leiden (formerly Rijksmuseum van Natuurlijke Historie)

(RMNH), Florida Museum of Natural History (UF), the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM), Western Australian Museum, Perth (WAM), the Zoological Museum, Amsterdam (ZMA), and the Zoologisk Museum, København (ZMK).

***Urnalana* gen. nov.**

Type species.—*Leucosia haematostica* Adams & White, 1849, by present designation.

Diagnosis.—Carapace subpentagonal, globose; regions of carapace indistinct. Dorsal surface of carapace sparsely setose, punctate. Front produced, postfrontal region laterally concave. Antennular fossa sealed by basal antennular segment. Antenna short, inserted between antennular fossa and orbit. Orbits small, rounded, outer orbital margin unisutured, anterior margin of efferent branchial channel forms part of lower orbital margin. Eyes retractable. External maxillipeds concealing trapezoid buccal opening; lacking setose fringe lengthwise on endopod of female. Anterolateral margin of carapace beaded. Lateral angle of carapace beaded, overhanging thoracic sinus. Thoracic sinus anteriorly defined by margin of pterygostomian region. Lateral margin of carapace often edged with setae. Epimeral ledge visible in dorsal view, continuous with posterior margin, margin beaded. Posterior margin prominent, beaded. Chelipeds subequal, robust, longer in adult male than in female specimens. Cheliped merus trigonal; margins prominently granulate; upper surface proximally with cluster of granules partly obscured by pubescent patch; anterior lower margin proximally with triangular cluster of granules partly obscured by pubescent patch, fusing into single row distally; lower surface proximally pitted. Pereiopods slender, short. Dactyli longer than propodi, lanceolate. Male abdominal sulcus deep, elongate, nearly reaching buccal cavity; its lateral margin bearing distinct ridge fitting into suture between abdominal segments. Male abdomen with 2nd segment minute; segments 3-5 fused; 6th segment large, trapezoid; telson triangular. Female abdomen with segments 3-6 fused, greatly enlarged, shield-like; telson lacinate. Shaft of male 1st pleopod short, stout; apical process cornute. Second male pleopod short, curved, apex scoop-like.

Remarks.—*Urnalana* gen. nov. differs from *Leucosia* Weber, 1795, emendato (Galil, 2003), in having an urn-shaped carapace, often laterally pubescent, the entire epimeral ledge visible in dorsal view, a spongy pubescent patch proximally on the upper and the lower surface of cheliped merus, the shaft of the 1st male pleopod uncoiled, and lacking a setose fringe lengthwise on the external maxilliped endopod of the female.

Etymology.—*L. urna*, urn, *L. lana*, wool, for the laterally pubescent urn-shaped carapace.

Key to spp of *Urnalana* gen. nov.

1. Dorsal surface of cheliped merus entirely granulate; male fused abdominal segments 3-5 proximally with broad median furrow 2
- Dorsal surface of cheliped merus distally smooth or obscurely granulate; male fused abdominal segments 3-5 lacking furrow 5
2. Carapace medially carinate; lateral margin of carapace glabrous; posterolateral margin smooth; upper margin of palm carinate ***U. granulimera*** spec. nov.

- Carapace not carinate; lateral margin of carapace pubescent; posterolateral margin granulate; upper margin of palm rounded 3
- 3. Frontal margin bilobate; posterior margin of pterygostomian region overhanging thoracic sinus; epibranchial angle with fringe of horizontal setae; pereopodal carpi 1-3 bi-keeled dorsally *U. thysanotus*
- Frontal margin tridentate; posterior margin of pterygostomian region not overhanging thoracic sinus; epibranchial angle lacking setose fringe; pereopodal carpi 1-3 with single keel dorsally 4
- 4. Cluster of granules anteriorly on epibranchial region; apical process of 1st male pleopod hidden by swollen, setose muff *U. whitei*
- Lacking cluster of granules anteriorly on epibranchial region; 1st male pleopod distally with 2 setose lobes, dagger-shaped apical process at right angle to shaft *U. chevreti*
- 5. Pubescence restricted to lateral epibranchial angle 6
- Lateral margin of carapace glabrous or with dense pubescence extending along postero-lateral margin 8
- 6. Anterolateral margin nearly oblique; anteriormost granule in thoracic sinus prominent, ovate; 1st male pleopod distally spoon-shaped, apical process curved *U. insularis*
- Anterolateral margin angled; row of small subequal granules in thoracic sinus; 1st male pleopod otherwise 7
- 7. Third maxilliped coxa in female bearing conical tubercle; apical process of 1st male pleopod dagger-shaped, curved ventrally *U. elatula* spec. nov.
- Third maxilliped coxa in female smooth; apical process of 1st male pleopod distally club-shaped *U. elata*
- 8. Front produced; posterior margin of cheliped merus with 2 parallel rows of granules 9
- Front squat; posterior margin of cheliped merus with single granulate row, splitting into 2 medially 10
- Front produced; posterior margin of cheliped merus with single granulate row, splitting into 2 distally 11
- 9. Upper margin of cheliped carpus granulate, mottled colour pattern; minute median denticle on penultimate male abdominal segment; apical process of 1st male pleopod curved ventally *U. margaritata*
- Upper margin of cheliped carpus smooth, reticulate colour pattern; prominent median denticle on penultimate male abdominal segment; apical process of 1st male pleopod curved distad *U. pulchella*
- 10. Posterior margin of of cheliped merus with 10-11 granules; triangle between posterodistal marginal rows granulate; upper meral surface distally granulate *U. elatoides*
- Posterior margin of of cheliped merus with 6-7 granules; triangle between posterodistal marginal rows smooth; upper meral surface distally smooth *U. purarensis*
- 11. Anterolateral margin of carapace oblique, sinuous 12
- Anterolateral margin of carapace prominently angulate 13
- 12. Male 1st pleopod lacking setose distal lobe; male 6th abdominal segment setose, median denticle prominent; carapace covered with blood-red spots *U. haematostica*

- Male 1st pleopod bearing setose lobe distally; male 6th abdominal segment glabrous, median denticle minute; carapace posteriorly covered with small red spots *U. parahaematostica* spec. nov.
- 13. Posterolateral margin setose; frontal margin with two triangular lobes; anteriormost granule in thoracic sinus lozenge-shaped *U. angulata*
- Posterolateral margin glabrous; frontal margin sinuous; anteriormost granule in thoracic sinus periform 14
- 14. Posterior margin of pterygostomian region forming a lobe overhanging thoracic sinus; upper margin of palm rounded *U. cumingii*

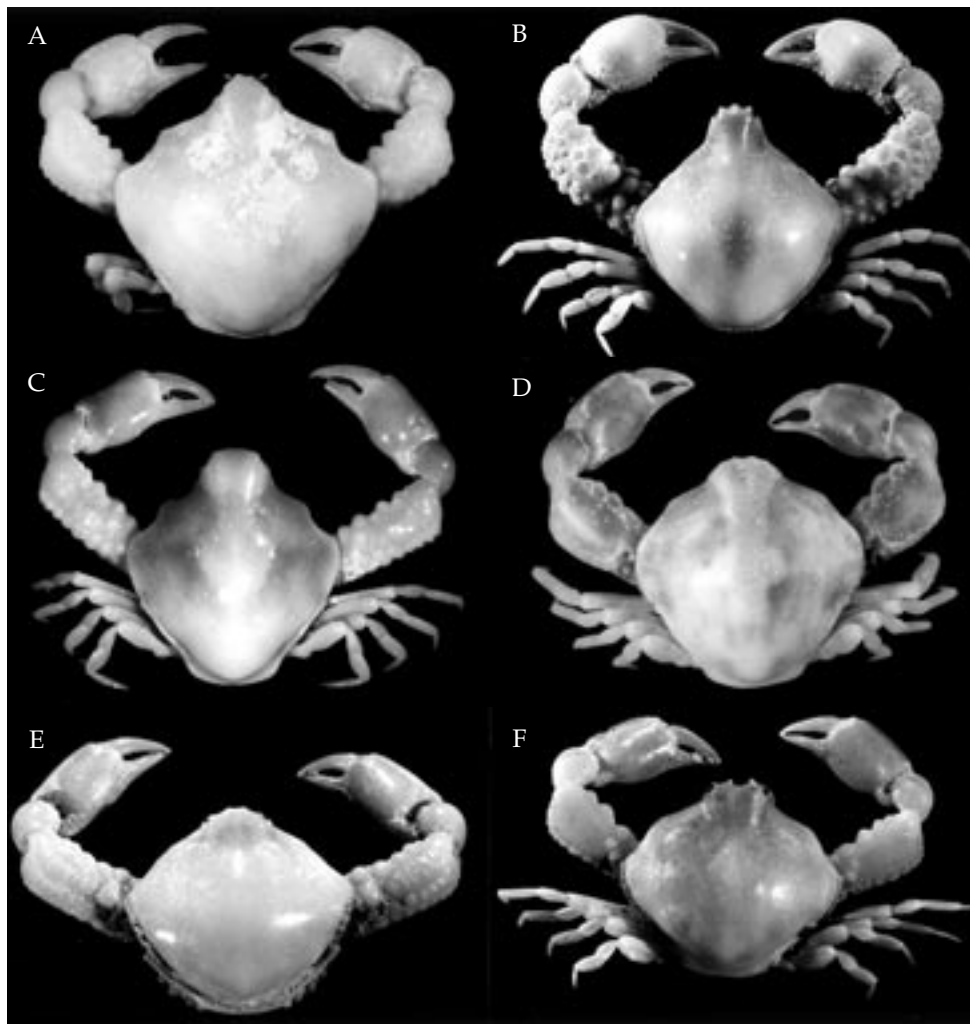


Fig. 1. A, *Urnalana angulata* (Rathbun, 1911), ♀ 13.6 mm cl, MNHN B18996; B, *U. chevrete* (Haswell, 1880), ♂ 12.2 mm cl, ZMK; C, *U. cumingii* (Bell, 1855), ♂ 10.7 mm cl, ZMK; D, *U. elata* (A. Milne Edwards, 1874), ♂ 9.2 mm cl, MNHN; E, *U. elatoides* (Bouvier, 1915), ♂ 8.6 mm cl, MNHN B18332; F, *U. elatula* spec. nov., ♂ 8.2 mm cl, MNHN.

- Posterior margin of pterygostomian region continuing into thoracic sinus; upper margin of palm carinate *U. hilaris*

Urnalana angulata (Rathbun, 1911) comb. nov.
(figs 1A, 4A)

Leucosides angulata Rathbun, 1911: 202, pl. 15, fig. 8.

Leucosia angulata; Ihle, 1918: 315; Serène, 1968: 47; Ovaere, 1987: 197, figs 3a, 6b.

Not *Leucosia angulata*; Tyndale-Biscoe & George, 1962: 77, pl. 1, fig. 3, pl. 2, fig. 3, Davie, 2002: 263 [= *U. cumingii* (White, 1847)].

Material.— **Seychelles**: holotype, 1 ♂ (12.4 mm cl), USNM 41070, 57 m depth, 20.x.1905; 1 ♀ (13.6 mm cl), MNHN B.18996, 4°42.4'S 54°24.9'E, 50-55 m depth, 9.ix.1980.— **Mauritius**: 1 ♂ (12.5 mm cl), NHM, Port Blair, xi.1936.— **Sri Lanka**: 1 ♀ ovigerous (12.8 mm cl), NHM 1934.1.16.42, Gulf of Manaar, coll. Miss Herdman.— **Papua New Guinea**: 1 ♀ (13.8 mm cl), KBIN 26.253, Madang Province, Hansa Bay, Wonginem Reef, 40 m depth, 11.x.1980, coll. J. Pierret, id. A.A. Ovaere.

Description.— Front produced, frontal margin with two prominent triangular lobes medially. Anterolateral margin obscurely milled, hepatic margin projecting, angular, slopping ventrally. Anterior margin of epibranchial angle slightly swollen, indistinctly milled. Posterolateral margin with setose fringe anteriorly. Thoracic sinus deep, anteriorly defined by overhanging, smooth rounded margin of pterygostomian region; row of minute granules on ventral surface of epibranchial angle; ventrally, large, lozenge-shaped granule, followed by minute granules. Exognath of external maxillipeds lacinate. Anterolateral angle of 3rd sternal segment prominently denticulate in male, denticle smaller in female. Cheliped merus less than half as long as carapace, wider distally; anterior margin with 3 triangular denticles medially, posterior margin bearing 7-9 close-set perliform granules, splitting into two divergent rows distally; upper surface smooth but for proximal pubescent patch and cluster of 3 granules. Outer margin of carpus carinate distally, 3-granule cluster on inner margin. Upper, lower margins of palm carinate; inner basal lobe with row of 3-5 granules. Fingers carinate. Pereiopodal merus 1st with two obscurely granulate rows on dorsal surface, merus 2nd bearing two rows, posterior row distally obsolete; 3-4th meri with single indistinctly-granulate row; ventral margin of meri 1-4 with two rows, concave. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Shaft of male 1st pleopod straight, distally setose; cornuted, sickle-shaped apical process.

Colour.— "A spot of orange-brown on postero-lateral margin above first leg, a small spot near posterior angle, two tiny spots near middle of posterior margin. Underside of body and chelipeds sparingly speckled with same colour; touches of same on articulations of legs, on top of merus joints and about the middle of dactyli." (Rathbun, 1911: 203).

Remarks.— *Urnalana angulata* comb. nov., and *U. cumingii* comb. nov. possess a prominently angular anterolateral margin and an orange-brown spot on the postero-lateral margin of the carapace. *Urnalana angulata* differs from the latter species in having two triangular denticles on the frontal margin, a large lozenge-shaped granule anteriorly in the thoracic sinus, and dorso-ventrally flattened tubercles on the anterior margin of the cheliped merus. Tyndale-Biscoe & George (1962: 77) noticed that their specimen dif-

ferred from the type in the form of the frontal margin, the number of granules in the thoracic sinus and the colour pattern, but declared "these are not considered to be of specific importance". Ovaere (1987: 200) did consider their specimen "not conspecific with *L. angulata* (Rathbun, 1911), but left it unidentified. Further comparison of the description and photographs of the Western Australian specimen with our material led to its identification with *U. cumingii* (White, 1847).

Distribution.— Seychelles, Mauritius, Sri Lanka, Papua New Guinea; 40-57 m depth.

Urnalana chevretii (Haswell, 1880) comb. nov.
(figs 1B, 4B)

Leucosia chevretii Haswell, 1880: 47, pl. 5, fig. 2; 1882: 120; McNeill, 1968: 41; Ovaere, 1987: 200, figs 3b, 6c.

Leucosia chevretii; Serène, 1968: 47; Griffin & Stanbury, 1970: 125; Arnold & George, 1987: 212, fig. 1, fig. 3d-f; Davie, 2002: 264.

Leucosia whitei Miers, 1884: 249 (part); 1886: 325 (part); Walker, 1887: 111; Ihle, 1918: 283 (part); Tyndale-Biscoe & George, 1962: 77, fig. 4.10a, b, pl. 1, figs 6, 9, pl. 2, figs 6, 9 (part); Campbell & Stephenson, 1970: 254, fig. 17; Zarenkov, 1990: 58, pl. 2, fig. 7, pl. 3, figs 1-5; Dai & Xu, 1991: 10, fig. 7; Huang, 1994: 580; Tan, 1996: 1041; Chen & Sun, 2002: 446, fig. 202.

Material.— **Singapore:** 1 ♀ (11.8 mm cl), ZMK, 12.xii.1906; 1 ♂ (12.2 mm cl), ZMK, 1.ix.1908.— **Philippines:** 1 ♂ (12.1 mm cl), USNM, 11°36.40'N 123°26.35'E, 48 m depth, 'Albatross' stn 5181, Panay, S. Antonio I., 27.iii.1908, id. Tan as *L. whitei*; 1 ♂ (10.4 mm cl), 1 ♀ (11.5 mm cl), USNM 234264, Cabaleta I., Quezon Prov., 33-58 m depth, 21-25.iv.1959, coll. F.G. Dayrit & G.E. Norton; 1 ♂ (11.4 mm cl), WAM C.24977, Sulu Archipelago, Basilan Straits, 70 m depth, 12.ii.1964, coll. B. Wilson, id. R. George.— **Indonesia:** 1 ♀ (12.5 mm cl), ZMK, Kei Is. Exp., Ambon, 13-18 m depth, 28.ii.1922; 1 ♀ (12.5 mm cl), ZMK, Kei Is. Exp., Sulawesi I., Makassar, 35 m depth, 27.vi.1922; 1 ♂ (14.2 mm cl), MNHN B18546, Makassar, 1°27'S 117°02'E, 51-54 m depth; 3 ♂♂ (8.6- 10.9 mm cl), 1 ♀ (10.8 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 64, 5°51'S 106°22'E, 35 m depth, 26.vii.1922, coll. Th. Mortensen; 1 ♂ (11.1 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 65, 5°52'S 106°17'E, 25 m depth, 27.vii.1922, coll. Th. Mortensen; 3 ♂♂ (10.6-11.3 mm cl), 1 ♀ (11.4 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 66, Pulo Bala, 5°54'S, 106°12'E, 24 m depth, 27.vii.1922, coll. Th. Mortensen; 1 ♂ (10.1 mm cl), 1 ♀ (11.3 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 67, 38 m depth, 27.vii.1922, coll. Th. Mortensen; 1 ♂ (10.7 mm cl), 1 ♀ (11.9 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 69, 5°47.0'S, 106°17.0'E, 50 m depth, 27.vii.1922, coll. Th. Mortensen; 1 ♂ (9.3 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 70, 5°40'S, 106°21'E, 35 m depth, 28.vii.1922, coll. Th. Mortensen; 3 ♂♂ (10.0-10.7 mm cl), 2 ♀♀ ovigerous (10.6-11.0 mm cl), ZMK, Sunda Strait, Kei Is. Exp., stn 82, 6°38'S, 105°21'E, 35 m depth, 30.vii.1922, coll. Th. Mortensen; 1 ♂ (11.5 mm cl), ZMK, Sunda Strait, Kei Is. Exp., stn 84, 5°55'S, 105°31'E, 38 m depth, 31.vii.1922, coll. Th. Mortensen; 2 ♂♂ (8.3, 10.1 mm cl), ZMK, Sunda Strait, Kei Is. Exp., stn 89, 5°57'S, 105°32'E, 18 m depth, 31.vii.1922, coll. Th. Mortensen; 1 ♂ (8.6 mm cl), 1 ♀ (12.6 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 106, 5°50'S, 106°16'E, 32 m depth, 5.viii.1922, coll. Th. Mortensen; 7 ♂♂ (8.3-11.1 mm cl), 5 ♀♀ ovigerous (11.5-12.1 mm cl), 2 ♀♀ (8.9, 12.2 mm cl), ZMK, Java Is. Exp., stn 118, 7.viii.1922, coll. Th. Mortensen; 1 juvenile (8.9 mm cl), WAM C.24978, between Du Rowa and Kai Kulah, 5°32'S 132°46'E, 36 m depth, 11.vi.1970, id. R. George.— **Arafura Sea:** 1 ♂ (12.2 mm cl), NHM 1884.31, 'Challenger' stn 188, 9°59.0'S, 139°42.0'E, 51 m depth, 10.ix.1874, id. E.J. Miers as *L. whitei*.— **Australia:** 1 ♂ (10.9 mm cl), 1 ♀ (11.0 mm cl), NHM 92.3.26.173-180, Holothuria Bank, 70 m depth, coll. P. Bassett-Smith; 1 ♀ ovigerous (12.1 mm cl), WAM C.7680, Long I., off Onslow, 51 m depth, 17.vi.1960, id. M.T. Biscoe as *L. whitei*; 1 ♂ (14.3 mm cl), QM w15183, Green I., 9.x.1980.

Description.— Front prominent, frontal margin tridentate, deflexed. Exognath of external maxillipeds elongate. Hepatic region tumescent, bearing cluster of obsolescent granules. Lateral angle of carapace overhanging thoracic sinus, margin milled, obsoles-

cent in larger specimens. Thoracic sinus shallow, densely setose, anteriorly defined by coalesced granulate margin of pterygostomian region; sinus with median row of granules. Posterolateral margins of carapace granulate, anteriorly edged with posteriorly narrowing strip of dense pubescence. Posterior margin prominent, beaded. Cheliped merus more than half as long as carapace; entirely granular but for smooth patch medially on lower surface; anterior, posterior margins bearing prominent periform granules, larger medially. Carpus unevenly granulate. Upper margin of palm smooth but for few granules proximally; lower margin with row of granules extending to proximal part of pollex, granules most prominent medially; inner surface of palm proximally with row of granules, parallel with lower margin. Pereiopodal meri with two granulate rows on lower surface, with two granulate rows on upper surface on first three pereopods, posterior dorsal row on third pereopod distally obsolete, single dorsal row on fourth pereopod. Pereiopodal carpi prominently keeled dorsally, propodi keeled dorsally, ventrally. Male abdominal segments 3-5 proximally with broad median furrow; 6th abdominal segment wider than long, medially dimpled, bearing minute denticle medially. Female abdomen with 3 horizontal furrows, distal 2 furrows interrupted medially. Shaft of male 1st pleopod short, stout, sinuous; distally bearing two setose bulbous lobes, inner lobe larger; cornuted; apical process dagger-like, at right angle to shaft, tip curved.

Colour.— “[c]arapace very light brown, with a blush of dark brown on each hepatic region, and a lighter brown mark on the gastric and genital regions; the tubercles of the arms pink, and the fingers red at the base.” (Haswell, 1880: 48).

Remarks.— Haswell (1880) described *Leucosia chevretii* as “Nearly allied to *L. whitei*, Bell; but distinguished by the form of the front, and the absence of granules on the hepatic region.” However, soon after the species was considered “a variety of *L. whitei*” (Miers, 1884: 249), and later “a synonym of *L. whitei*” (Tyndale-Biscoe & George, 1962: 77). In the late 1950s, examination of one of Haswell’s type specimens, a dried female specimen from Darnley Island, convinced McNeill (1968: 41) it is a valid species; that specimen was subsequently lost. Arnold & George (1987) selected a neotype, and clearly distinguished *U. chevreti* from *U. whitei* by the lack of granules on the epibranchial region and on the upper margin of the cheliped palm, the colour of the carapace, the absence of the large red spot on the inner surface of the palm, and the form of the 1st male pleopod.

Distribution.— Singapore, South China Sea, Philippines, Indonesia, New Guinea; Arafura Sea, Australia; 13-70 m depth.

Urnalana cumingii (Bell, 1855) comb. nov.
(figs 1C, 4C)

Leucosia cumingii White, 1847: 48 (n.n.); Bell, 1855a: 363; 1855b: 290, pl. 31, fig. 3; 1855c: 9.

Leucosia cumingi; Ihle, 1918: 285; Estampador, 1937: 511; Serène, 1968: 47.

Leucosia angulata; Tyndale-Biscoe & George, 1962: 77, pl. 1, fig. 3, pl. 2, fig. 3; Davie, 2002: 263.

Leucosia galantua Ovaere, 1988: 95, figs 1-3; Tan, 1996: 1035, figs 5a, 4d; Davie, 2002: 264.

Material.— **Philippines**: holotype, 1 ♀ (11.2 mm cl), NHM 1843.6, Philippines, preserved dry, parasitized; 1 ♀ (11.0 mm cl), USNM, 5°11.50'N 119°54.0'E, 18 m depth, ‘Albatross’ stn 5159, Tinakta I., Tawi Tawi Group, Sulu Archipelago, 21.ii.1908, id. C.G.S. Tan as *L. galantua*; 1 ♀ ovigerous (11.8 mm cl), USNM

234264, Nasasa Bay, Zambales Province, 11-33 m depth, ii.1960, id. C.G.S. Tan as *L. galantua*.— **Indonesia**: 1 ♂ (10.7 mm cl), ZMK, Java Sea, Toeal, 20 m depth, Kei Is. Exp., stn 19, 12.iv.1922, coll. Th. Mortensen.

Description.— Front not much produced, frontal margin sinuous, with shallow median depression. Anterolateral margin obscurely milled, hepatic margin projecting, angular, slopping ventrally. Margin of epibranchial angle slightly swollen, indistinctly milled. Posterolateral margin glabrous. Intestinal region medially prominent. Thoracic sinus anteriorly defined by overhanging, smooth, rounded margin of pterygostomian region; row of small granules on ventral surface of epibranchial angle; row of small perliform granules ventrally. Exognath of external maxillipeds laciniate. Anterolateral angle of 3rd sternal segment obsoletely denticulate. Cheliped merus less than half as long as carapace, wider distally; anterior margin with 3 large perliform granules medially, posterior margin bearing 7 close-set lozeng-shaped granules, splitting distally into v-shape; upper surface proximally with V-shaped cluster of perliform granules partly obscured by pubescent patch; distally smooth. Carpus bearing small granules proximally on inner margin. Inner basal palmar lobe with of 3-5 granules. Fingers carinate. Pereiopodal meri 1-2 with two obscurely granulate rows on dorsal surface, posterior row distally obsolete; 3-4th meri with single indistinctly-granulate row; ventral margin of meri 1-4 with two rows, concave. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Shaft of male 1st pleopod straight, distally setose; cornute, sickle-shaped apical process bent at right angle to shaft.

Colour.— “the carapace pale yellowish-white, with yellow markings. The fingers marked with transverse brown fascia; the hand with a small brown spot near the articulation of the moveable finger; and the abdomen with orange-coloured spots on the anterior part.” (Bell, 1855b: 290).

Remarks.— *Urnalana cumingii* differs from *U. angulata* in its sinuous frontal margin, the rounded denticles on the anterior margin of the cheliped merus, the small granules in the thoracic sinus, and the shape of the apical process of the male 1st pleopod. Tyn-dale-Biscoe & George (1962) misidentified a specimen of *U. cumingii* as *U. angulata* (see above). Ovaere (1988), redescribed that specimen as *Leucosia galantua*.

Distribution.— Philippines, Indonesia, Papua New Guinea, Australia; 18-33 m depth.

Urnalana elata (A. Milne Edwards, 1874) comb. nov.
(figs 1D, 5A)

Leucosia elata A. Milne Edwards, 1874: 41, pl. 2, fig. 2; Ihle, 1918: 315; Serène, 1968: 47; Ovaere, 1987: 185.

Leucosia sagamiensis Sakai, 1961: 132, pl. 3, fig. 1, text-fig. 1a,b; 1965: 47, pl. 19, fig. 1, text-fig. 7; 1976: 121, pl. 35, fig. 1, text-fig. 69; Serène, 1968: 47; Takeda, 1979: 153, 1987: 11; Ovaere, 1987: 196, figs 4a-c (part).

Leucosia bikiniensis Sakai, 1983: 627, fig. 3c-e; Ovaere, 1987: 185.

Not *Leucosia elata*; Nobili, 1906a: 167 [= *U. elatoides* (Bouvier, 1915)].

Not *Leucosia sagamiensis*; Miyake, 1983: 68, pl. 23, fig. 6 [= *U. pulchella* (Bell, 1855a: 363)].

Material.— **New Caledonia**: syntypes, 3 ♂♂ (7.7-9.7 mm cl), 1 ♀ (9.9 mm cl), MNHN B174, preserved dry.— **Comoro Islands**: 1 ♀ (6.0 mm cl), MNHN B18337, Mayotte, 47 m depth, viii.1958, coll. A. Crosnier; 1 juvenile, MNHN B18714, Mayotte, 50 m depth, ix.1959, coll. A. Crosnier.— **Papua-New Guinea**: 1 ♀ (9.7 mm cl), KBIN 26086, Hansa Bay, Laing I., 9.vii.1979, coll. J. Pierret, id. A. Ovaere as *L. sagamiensis*.— **Australia**: 1 (10.9 mm cl), NHM 1910.3.18.85, Goram Is., coll. W. Stalker; 1 ♂ (11.6 mm cl), WAM C8271, Broome,

21.i.1962, coll. M. Macdonald; 1 ♀ (13.4 mm cl), WAM C8270, Port Headland, ix.1961, coll. Brown, id. R.W. George as *L. angulata*; 1 (13.4 mm cl), WAM C24989, Point Coulomb, 23.vi.1971; 1 ♀ (12.2 mm cl), WAM C25789, Dampier Archipelago, Goodwyn I., 20°32'S 116°32.7'E, 31.viii.1999, coll. M. Hewitt; 1 ♀ (9.3 mm cl), WAM C25790, Dampier Archipelago, Lewis I., 20°33.95'S 116°33.7'E, 4.ix.1999, coll. M. Hewitt.— **New Caledonia**: 1 ♂ (9.2 mm cl), 2 ♀♀ (10.0, 9.8 mm cl), MNHN, Touho, ix.1993; 1 ♂ (10.0 mm cl), MNHN, Touho, intertidal, 11.ix.1993; 1 ♀ (10.9 mm cl), MNHN, Kúdo mangrove, Koumac, 1993.— **Marshall Islands**: 1 ♂ (6.7 mm cl), USNM 176603, Bikini Atoll, 18 m depth, 26.viii.1947, coll. J.P. Morrison, holotype of *L. bikiniensis*.— **Samoa**: 1 ♀ ovigerous (8.2 mm cl), Upolu, ZMK ex. Mus. Godeffroy.

Description.— Front squat, medially concave, frontal margin notched medially. Hepatic region bearing low lozenge-shaped carina parallel with margin. Anterolateral margin angled. Epibranchial lobe prominent, margin smooth, fringed with setae. Epimeral margin minutely granulate. Intestinal region somewhat inflated, more prominent in younger specimens. Thoracic sinus anteriorly defined by overhanging margin of pterygostomian region; sinus with longitudinal strip of minute granules overgrown by club-like setae anteriorly; row of small perliform granules on ventral surface of epibranchial angle; another row above base of 1st pereopod.

3rd maxilliped smooth. Cheliped merus 0.6 as long as carapace; anterior margin bearing single row of granules, median granules large, perliform; granules on posterior margin progressively smaller distally, splitting into two divergent rows; upper surface proximally with cluster of granules partly obscured by pubescent patch, two large granules anteriorly; lower margin smooth, anteriorly with cluster of perliform granules partly obscured by pubescent patch, fusing distally into single row of large perliform granules. Carpus with obsolescent granules proximally on inner margin, obscure carina distally on outer margin. Upper margin of palm carinate, smooth; inner, outer basal lobe granulate, lower margin with milled carina distally, continuing into pollex. Pereiopodal meri 1-3 bearing two granulate rows on ventral and dorsal surface 4th pereiopodal merus with single row dorsally, two rows ventrally. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Penultimate abdominal segment with modest median denticle. Shaft of male 1st pleopod sinuous, distally club-like, setose.

Colour.— "...gris verdâtre brillant, avec de nombreuses taches d'un rouge orangé" (A. Milne Edwards, 1874: 42).

Remarks.— A. Milne Edwards' (1874) description fits three closely resembling species: *Urnalana elata*, *U. elatula* spec. nov., and *U. insularis*, though his drawing (pl. 2, fig. 2a) showing the anterior part of the thoracic sinus without a large granule, rather excludes the last species. Examination of the syntypes (MNHN B174) confirmed the lack of a prominent, ovate granule anteriorly in the thoracic sinus, distinguishing it from *U. insularis*, and established that the female specimen lacks a denticle on the third maxilliped coxa, separating it from *Urnalana elatula* spec. nov.

Sakai (1961: 134) thought *L. sagamiensis* is "most nearly related to *L. elata*", differing only "in its broader carapace, shorter neck and much larger tubercles on the anterior border of the merus of the cheliped", probably basing this on A. Milne Edwards' inexact illustration. Sakai (1983: 628) considered *Leucosia bikiniensis* "closely related to *Leucosia insularis* Takeda and Kurata (1976)", but the figure of the pleopod is that of *U. elata*.

Distribution.— Comoro Is., Papua-New Guinea, Australia, New Caledonia, Samoa, Marshall Is., Japan; intertidal to 50 m depth.

Urnalana elatoides (Bouvier, 1915) comb. nov.
(figs 1E, 5B)

Leucosia elatoides Bouvier, 1915: 217, figs 15, 16, pl. 7 fig. 5; Ihle, 1918: 315; Serène, 1968: 47; Ovaere, 1987: 185.

Leucosia elata; Nobili, 1906a: 167.

Material.— **Mauritius:** lectotype, 1 ♀ (9.6 mm cl), MNHN B16961, near Port Louis, 1913, coll. P. Carié; paralectotype, 1 ♀ (9.8 mm cl), MNHN B16961, same data; 2 ♀♀ (9.9, 10.7 mm cl), MNB 7568.— **Red Sea:** 1 ♂ (7.9 mm cl), 1 ♀ (7.8 mm cl), MNHN B16960, Obock, 1897, coll. Jousseau, id. G. Nobili as *L. elata*.— **Djibouti:** 5 ♂♂ (7.2–7.9 mm cl), 4 ♀♀ (7.5–9.7 mm cl), MNB 15569, coll. Wache.— **Madagascar:** 1 ♂ (8.6 mm cl), MNHN B18332, id. H. Balss; 1 carapace (9.9 mm cl), MNHN B18722, Tuléar.

Description.— Front squat, slightly concave medially, frontal margin medially bidenticulate. Anterolateral margin medially inflated; swollen distal margin of pterygostomian region visible in dorsal view. Epibranchial margin minutely granulate ventrally. Posterolateral margin bearing fringe of club-like setae. Epimeral marginal granules larger anteriorly. Thoracic sinus anteriorly defined by thickened margin of pterygostomian region; cluster of minute granules overgrown by club-like setae anteriorly; row of perliform granules on ventral surface of epibranchial angle; another row above base of 1st pereopod. Exognath of external maxillipeds lacinate; ischium anterolaterally swollen in adult females. Cheliped merus $\frac{2}{3}$ as long as carapace; anterior margin bearing row of granules, median granules large, perliform; perliform granulate row on posterior margin splitting into two divergent rows of smaller granules, triangle between rows minutely granulate; upper surface proximally with cluster of perliform granules partly obscured by pubescent patch, distalmost granule prominent, distally bearing irregular row of obsolescent granules; lower margin proximally granulate. Carpus bearing granules proximally on inner margin. Upper margin of palm carinate, smooth; lower margin with medially interrupted granulate row continuing into pollex. Pereiopodal meri 1–3 bearing two granulate rows on ventral and dorsal surface, 4th pereiopodal merus with single row dorsally, two rows ventrally. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Minute median denticle on penultimate abdominal segment of male. Shaft of male 1st pleopod sinuous, distally club-like, setose.

Colour.— “...rouge orangé, avec des taches claires sur la carapace” (Bouvier, 1915: 217).

Remarks.— *Urnalana elatoides* comb. nov. and *U. purarensis* comb. nov. possess a squat front, a shallow thoracic sinus, and distally split granulate row on the posterior margin of the cheliped merus; but *U. elatoides* is distinguished in having a larger number of smaller marginal granules posteriorly on the cheliped merus, the upper meral surface distally granulate, and the space between the posterodistal marginal rows on the cheliped merus granulate.

Distribution.— Red Sea, Djibouti, Madagascar, Mauritius.

Urnalana elatula spec. nov.
(figs 1F, 5C)

Leucosia sagamiensis; Ovaere, 1987: 196, figs 4a–c (part).

Material.—**New Caledonia:** holotype, 1 ♂ (8.2 mm cl), MNHN, stn 836, east lagoon, 20°46.4'S 165°15.75'E, 57 m depth, 11.i.1987; paratypes, 1 ♀ (7.7 mm cl), MNHN, Koumac, 15 m, 4.x.1993; 1 juvenile, MNHN B 21110, stn 27, Noumea, 22°17'S 166°31'E, 18 m depth, v.1984; 1 ♀ (9.0 mm cl), MNHN B 21094, stn 73, Ouen I., Prony Bay, 22°18'S 166°38'E, 15 m depth, viii.1984; 1 ♂ (8.0 mm cl), 1 ♀ (8.4 mm cl), MNHN B 21121, stn 89, Ouen I., Prony Bay, 22°22'S 166°38'E, 32 m depth, viii.1984; 1 ♀ (8.0 mm cl), MNHN B 21093, stn 90, Ouen I., Prony Bay, 22°25'S 166°38'E, 32 m depth, viii.1984; 1 ♀ (7.3 mm cl), MNHN B 21194, stn 119, Ouen I., Prony Bay, 22°28'S 166°46'E, 20 m depth, viii.1984; 1 ovigerous ♀ (8.0 mm cl), MNHN B 21337, stn 123, Ouen I., Prony Bay, 22°30'S 166°40'E, 21 m depth, viii.1984; 1 ♀ (6.9 mm cl), MNHN B 18431, stn 131, Ouen I., Prony Bay, 22°28'S 166°50'E, 38 m depth, viii.1984; 1 ovigerous ♀ (9.1 mm cl), MNHN B 21336, stn 133, Ouen I., Prony Bay, 22°24'S 166°52'E, 59–62 m depth, viii.1984; 2 ♂♂ (8.6, 8.4 mm cl), MNHN B 21090, stn 247, Ouen I., Prony Bay, 22°24'S 166°51'E, 43 m depth, x.1984; 1 ovigerous ♀ (9.0 mm cl), MNHN B 21101, stn 248, Ouen I., Prony Bay, 22°24'S 166°47'E, 47 m depth, x.1984; 1 ovigerous ♀ (8.5 mm cl), MNHN B 21098, stn 251, Noumea, 22°19'S 166°25'E, 20 m depth, xi.1984; 1 ♂ (8.2 mm cl), 1 ♀ (8.3 mm cl), MNHN B 21329, stn 272, Noumea, 22°12'S 166°23'E, 20 m depth, xi.1984; 1 ♂ (7.9 mm cl), 1 ♀ (8.7 mm cl), MNHN B18205, stn 672, east lagoon, 21°41.4'S 166°23.2'E, 15–20 m depth, 8.viii.1986; 1 ♂ (8.1 mm cl), MNHN, stn 748, east lagoon, 21°16.9'S 165°49.9'E, 35 m depth, 6.i.1987; 1 ♂ (8.7 mm cl), MNHN, stn 821, east lagoon, 20°51'S 165°23.2'E, 32 m, 10.i.1987; 2 ♀♀ (8.3, 8.9 mm cl), MNHN, stn DW 951, north east lagoon, 20°29.6'S 164°09.6'E, 12 m depth, 28.iv.1988; 2 ♀♀ (8.3, 8.9 mm cl), MNHN, stn DW 951, north east lagoon, 20°29.6'S 164°09.6'E, 12 m depth, 28.iv.1988; 1 ♂ (6.5 mm cl), MNHN, stn DW 975, north east lagoon, 20°21.7'S 164°03.1'E, 23–24 m depth, 29.iv.1988.

Description.—Front squat, medially concave, frontal margin bilobate. Hepatic region bearing low rounded carina parallel with margin. Anterolateral margin prominently angled. Epibranchial lobe prominent, margin smooth, fringed with setae. Epimeral margin minutely granulate. Thoracic sinus anteriorly defined by angled overhanging margin of pterygostomian region; longitudinal strip of minute granules overgrown by club-like setae anteriorly; row of perliform granules on ventral surface of epibranchial angle. Exognath of external maxillipeds lacinate; anterior margin of ischium granulate; coxa of female prominently denticulate. Cheliped merus with anterior margin bearing single row of granules, median granules large, perliform; granules on posterior margin progressively smaller distally, splitting into two divergent rows; upper surface proximally with cluster of granules partly obscured by pubescent patch, three large granules anteriorly; lower margin smooth, proximally with cluster of perliform granules partly obscured by pubescent patch, fusing distally into single row of large perliform granules. Carpus with obsolescent granules proximally on inner margin, obscurely granulate carina on outer margin. Upper margin of palm carinate, smooth; inner, outer basal lobe granulate, lower margin with milled carina distally, continuing into pollex. Pereiopodal meri 1–3 bearing two granulate rows on ventral and dorsal surface 4th pereiopodal merus with single row dorsally, two rows ventrally. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Penultimate abdominal segment with modest median denticle. Shaft of male 1st pleopod subdistally thickened, distally setose; apical process dagger-shaped, bent at right angle to shaft.

Remarks.—*Urnalana elatula* spec. nov. is distinguished from the closely related *U. elata* in having a conical tubercle on the coxa of the outer maxilliped in the adult female, and in the form of the apical process of the male 1st pleopod. One of the specimens identified by Ovaere (1987: 196, Fig. 4a) as *Leucosia sagamiensis* Sakai, 1961 was described as possessing “coxa of the third maxillipeds with a distinct central spine”, and it is clearly *U. elatula*.

Etymology.— Alluding to its proximity to *U. elata* (A. Milne Edwards, 1874).

Distribution.— Papua-New Guinea, New Caledonia; 12-62 m depth.

Urnalana granulimera spec. nov.

(figs 2A, 5D)

Material.— **Fiji**: holotype, 1 ♂ (8.8 mm cl), MNHN, MUSORSTOM 10, stn CP 1370, Viti Levu, 18°12.3'S 178°33.1'E, 113-123 m depth, 16.viii.1998, coll. Bouchet & Richer; Paratypes: 1 ♂ (8.6 mm cl), MNHN, SUVA 4, stn CP 20, Viti Levu, Beqa Lagoon, 18°26.4'S 178°02.4'E, 50-51 m depth, 25.ix.1999, coll. B. Richer de Forges.— **New Caledonia**: 1 ♂ (8.7 mm cl), MNHN, BATHUS 1, stn DW 652, 21°17.38'S 165°57.10'E, 110-190 m depth, 12.iii.1993, coll. B. Richer de Forges.

Description.— Front prominent, frontal margin tridentate. Exognath of external maxillipeds elongate. Hepatic region with ovate, dimpled tumescence. Lateral angle of carapace overhanging thoracic sinus, margin obsolete milled. Thoracic sinus deep, anteriorly defined by thin overhanging margin of pterygostomial region; sinus with median row of granules. Posterolateral margins of carapace smooth. Dorsal surface of carapace sparsely setose laterally, setae denser near posterolateral margin; medially carinate, posterolaterally with crescentic tumescences. Cheliped merus more than half as long as carapace; entirely granular but for smooth patch medially on lower surface; anterior, posterior margins bearing prominent perliform granules, larger medially. Carpus bearing granules on lower inner and outer margins, granulate crest on upper margin. Upper margin of palm with prominent, smooth carina; lower margin with scalloped carina extending to proximal part of pollex; outer surface of palm proximally with row of minute granules, parallel with lower margin. Pereiopodal meri 1-3 with two granulate rows on lower surface, two granulate rows on upper surface, posterior dorsal row on distally obsolete; upper and lower margins of merus of 4th pereiopod prominently carinate. Pereiopodal carpi prominently keeled dorsally, propodi keeled dorsally, ventrally. Male abdominal segments 3-5 proximally with broad median furrow; 6th abdominal segment wider than long, medially denticulate. Shaft of male 1st pleopod short, stout, sinuous, distally setose; apical process curved, tapering distally.

Colour (in alcohol).— Carapace orange, with pale marbeling; pereiopodal meri with distal orange band.

Remarks.— *Urnalana granulimera* spec. nov. shares with *U. chevreti*, *U. thysanotus* and *U. whitei* a granulate dorsal surface of cheliped merus, however, it differs from them all in having the dorsal surface of the carapace medially carinate, and sparsely setose laterally, the upper margin of the chela prominently carinate. Additionally it can be distinguished from *U. thysanotus* by its tridentate frontal margin, and the single-keeled pereiopodal carpi 1-3; and from *U. chevreti* and *U. whitei* in having the thoracic sinus anteriorly defined by the thin overhanging margin of the pterygostomial region, the keeled merus of the 4th pereiopod, and the form of the apical process of the 1st male pleopod.

Etymology.— For the boldly granulate cheliped merus.

Distribution.— Fiji, New Caledonia; 50-190 m depth.

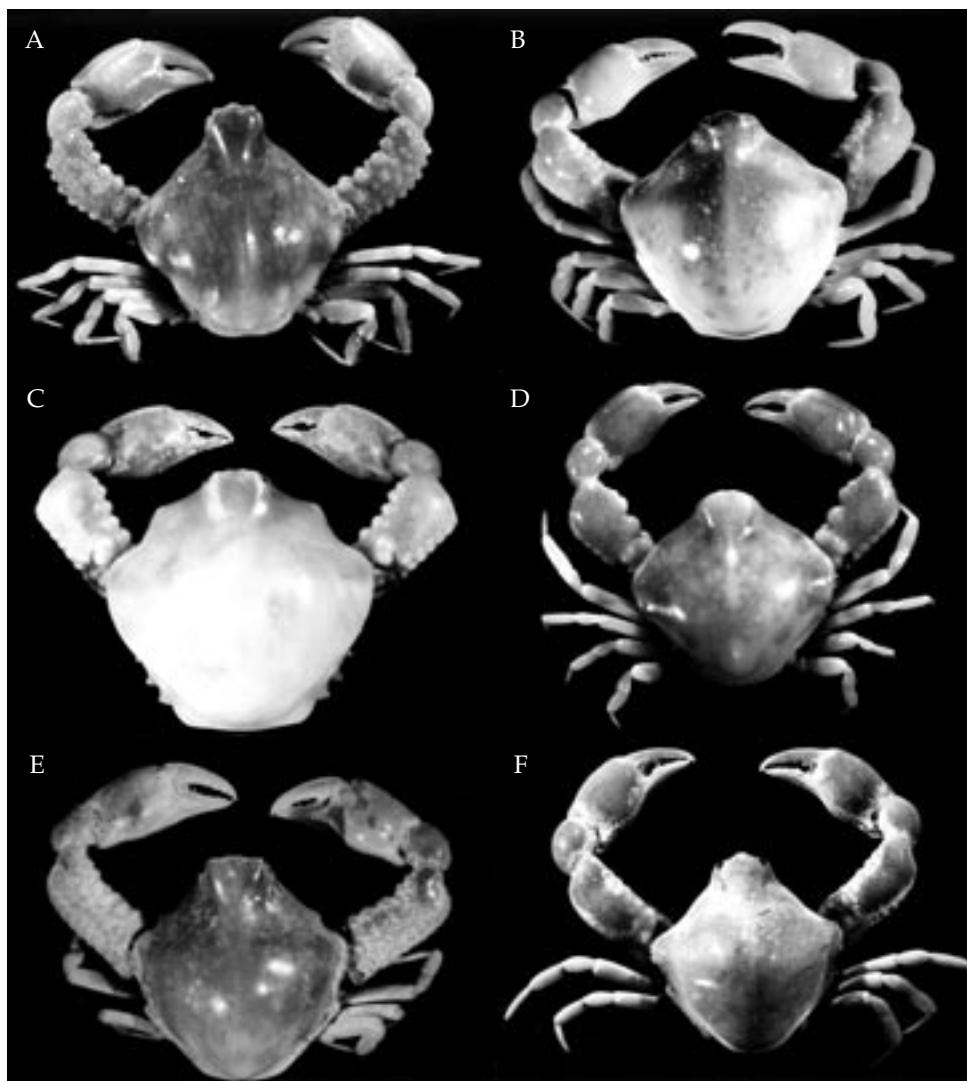


Fig. 2A, *Urnalana granulimera* spec. nov. holotype, ♂ 8.8 mm cl, MNHN; B, *U. haematostica* (Adams & White, 1849), ♂ 10.7 mm cl, ZMK; C, *U. hiliaris* (Nobili, 1905), ♀ 11.2 mm cl, NHM 1888.2; D, *U. insularis* (Takeda & Kurata, 1976), ♀ 9.5 mm cl, MNHN; E, *U. margaritata* (A. Milne Edwards, 1874), ♂ 7.6 mm cl, MNHN B19159; F, *U. parahaematostica* spec. nov., ♂ 11.7 mm cl, ZMK.

Urnalana haematostica (Adams & White, 1849) comb. nov.
(figs 2B, 6A)

Leucosia haematostica White, 1847: 128 (n.n.); Adams & White, 1849, pl. 12, fig. 2; Bell, 1855a: 362; 1855b: 289; 1855c: 8; Walker, 1887: 111; Alcock & Anderson, 1894: 203; Alcock, 1896: 229; Nobili, 1903: 24; Laurie, 1906: 363; Ihle, 1918: 315; Balss, 1922: 127; Dawydoff, 1952: 138; Tyndale-Biscoe & George, 1962: 80, pl. 1.7, 2.7; Shen & Dai, 1964: 27, fig.; Ovaere, 1987: 185, figs 1a, 5a; Huang, 1989: 317, fig.

283; 1994: 580; Zarenkov, 1990: 56, fig. 1(6-10), fig. 2 (9); Dai & Yang, 1991: 97, pl.10 (8), fig. 45 (1-2);

Ng et al., 2001, fig. 1e; Chen & Sun, 2002: 444, fig. 201, pl. 15, fig. 4; Davie, 2002: 264.

Leucosia hoematostica; Adams & White, 1849: 54; Serène, 1968: 47.

Leucosides hoematostica; Rathbun, 1910: 310.

Leucosides haematostica; McNeill & Ward, 1930: 367, pl. 40, figs 7,8; Buitendijk, 1939: 230; Suvatti, 1950: 143.

Leucosia hemastostica; Serène & Vadon, 1981: 125.

Not *Leucosia haematostica*; Stimpson, 1858: 160; 1907: 152; Miers, 1879: 40; Yokoya, 1933: 128; Sakai, 1934: 285; 1935: 61, pl. 12, fig. 1; 1937: 147, text-fig. 26e, pl. 15, fig. 5; 1965: 47, pl. 19, fig. 2; 1976: 121, pl. 36, fig. 2, text fig. 65e; Miyake, 1961a: 14; 1961b: 171; Miyake et al., 1962: 127; Kim, 1973: 613; Takeda, 1973a: 33; 1973b: 12; 1982b: 103, fig. 302; 1987: 11; Yamaguchi et al., 1976: 34; Ng et al., 2001: 8 [= *U. parahaematostica* spec. nov.].

Material.— **Eastern Seas:** syntypes, 1 ♂ (13.5 mm cl), 2 ♀ ♀ (13.2, 11.7 mm cl), NHM 1847.21, pres. Capt. E. Belcher, dry mounted.— **Sri Lanka:** 2 ♀ ♀ ovigerous (13.1, 12.7 mm cl), NHM 1907.5.22.48, Aripu Reef, Gulf of Manaar, 18.iii.1902, coll. Herdmann.— **Thailand:** 1 ♂ (10.3 mm cl), ZMK, between Koh Chuen and Koh Chang, 27.5 m depth, 3.iii.1900, coll. Th. Mortensen, id. M.J. Rathbun; 1 ♂ (6.6 mm cl), ZMK, 4 miles S of Koh Sakait, 16.5 m depth, 3.ii.1900, coll. Th. Mortensen, id. M.J. Rathbun.— **Singapore:** 1 ♂ (11.9 mm cl), NHM 1961.12.19.92.— **Indonesia:** 2 ♂ ♂ (12.4, 12.6 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 65, 5°52'S 106°17'E, 25 m depth, 27.vii.1922, coll. Th. Mortensen; 1 ♂ (12.4 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 110, 5°55'S 105°53'E, 12 m depth, 5.viii.1922, coll. Th. Mortensen; 1 ♂ (11.8 mm cl), 1 ♀ ovigerous (12.1 mm cl), 1 ♀ (11.5 mm cl), 1 juvenile, ZMK, Java, Kei Is. Exp., stn 116, 5°57'S 106°34'E, 22 m depth, 7.viii.1922, coll. Th. Mortensen; 1 ♂ (13.9 mm cl), RMNH D 4211, near Koepang, Timor, 6-15 m depth, 4.xii.1929, id. A.M. Buitendijk as *Leucosides haematostica*.— **New Guinea:** 1 ovigerous ♀ (12.0 mm cl), KBIN 25.848, Madang Province, Hansa Bay, off Sakula River mouth, 10 m depth, x.1977, id. A. Ovaere.— **Australia:** 1 ♀ (13.9 mm cl), WAM C.7678, Bernier I., Shark Bay, 70 m depth, 16.v.1960, coll. R.W. George, id. M.T. Biscoe; 1 ♀ (14.7 mm cl), WAM C.7679, Dampier Archipelago, NE Malus I., 18 m depth, 31.v.1960, id. M.T. Biscoe; 1 ♀ (12.0 mm cl), QM W.23185, NW shelf, 19°59.0'S, 117°50.7'E, 41-42 m depth, 26.vi.1983; 1 ♂ (12.2 mm cl), QM W.23184, NW shelf, 19°58.2'S, 117°49.4'E, 43 m depth, 26.vi.1983.

Description.— Front not much produced, frontal margin obtuse, deflexed. Exognath of external maxillipeds lacinate. Lateral angle of carapace prominent, overhanging thoracic sinus, margin obscurely milled. Thoracic sinus deep, densely setose, anteriorly defined by overhanging margin of pterygostomial region; row of granules ventrally. Cheliped merus half as long as carapace; anterior, posterior margins bearing 7-9 perliiform granules, larger medially, splitting distally; upper margin with V-shaped cluster of granules, partly obscured by setose patch; 3 rows of perliiform granules (proximally obscured by densely setose patch) fusing distally on lower margin. Carpus with 3-granules on inner margin. Upper margin of palm obscurely carinate; lower inner margin with row of granules extending to proximal part of pollex, granules most prominent proximally. Pereiopodal meri with two granulate rows on lower surface, single granulate row on upper surface, save for first pereiopod bearing two rows, posterior row distally obsolete. Pereiopodal carpi dorsally carinate; propodi keeled dorsally, ventrally. Male abdominal segments 3-5 lacking median furrow, lateral margins constricted subdistally; 6th abdominal segment sparsely setose anteriorly to prominent median denticle. Female abdomen smooth. Shaft of male 1st pleopod short, stout, sinuous; digitate, cornuted apical process partly concealed by subdistal setae.

Colour.— "Carapace... of a light yellow, covered with numerous small round blood-red spots, fewer posteriorly, ...Fore-legs with round, scattered, blood-red spots, and a large quadrate mark of the same colour on the outer surface of each claw. Hind-legs with a blood-red band on the upper half of each joint." (Adams & White, 1849: 54).

Remarks.— *Urnalana haematostica* differs from the closely allied *U. parahaematostica* spec. nov., in having the male 6th abdominal segment setose, with a prominent median denticle; the male 1st pleopod lacking an apical setose lobe, and by its colour pattern.

The spelling hoematosticta (Adams & White, 1849:54), is a typographical error as the name obviously refers to the blood-red spots on the carapace.

Distribution.— Sri Lanka, Thailand, Singapore, South China Sea, Indonesia, Coral Sea, New Guinea, Australia; 4 -70 m depth.

Urnalana hilaris (Nobili, 1905) comb. nov.
(figs 2C, 6B)

Leucosia hilaris Nobili, 1905: 162; 1906a: 168; 1906b: 100, pl. 6, fig. 29; Bouvier, 1915: 219; Laurie, 1915: 409; Ihle, 1918: 316; Serène, 1968: 47.

Material.— **Persian Gulf**: syntype, 1 juvenile, MNHN B17533, 25°10'N 55°10'E, Pearl Oyster bank, 10-15 m depth, 1901, coll. J. Bonnier & Ch. Perez.— **Red Sea**: syntype, 1 ♂ (9.9 mm cl), MNHN B17522, Djibouti, 1897, coll. Jousseau.— **Mauritius**: 1 ♀ (11.2 mm cl), NHM 1888.2; 3 ♀ ♀ (10.4-11.3 mm cl), NHM 1887.3, purch. Robillard; 3 ♀ ♀ (9.1-10.8 mm cl), MNHN B17524, Port Louis, coll. P. Carié, 1913, id. Bouvier as *L. hilaris*.

Description.— Front not much produced, frontal margin sinuous, with shallow median depression. Anterolateral margin obscurely milled, hepatic margin projecting, angular, slopping ventrally. Margin of epibranchial angle somewhat thickened, indistinctly milled. Posterolateral margin glabrous. Posterior margin laterally expanded. Thoracic sinus shallow, undefined anteriorly, continuous with pterygostomial region; row of 4 perliform granules above base of 1st pereopod, successively smaller posteriorly. Exognath of external maxillipeds lacinate. Cheliped merus half as long as carapace, wider distally; anterior margin with 3 large perliform granules medially, posterior margin bearing 7-8 close-set lozenge-shaped granules, splitting into v-shape distally; upper surface with two large perliform granules anterior to pubescent patch; distally smooth. Carpus distally carinate on outer margin. Upper and lower margins of palm carinate; inner surface of palm proximally with row of 3-5 granules; fingers carinate. Pereiopodal meri 1- 2 with two obscurely granulate rows on dorsal surface, posterior row distally obsolete; 3-4th meri with single indistinctly-granulate row; ventral margin of meri 1-4 with two rows, concave. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Penultimate abdominal segment with modest median denticle. Shaft of male 1st pleopod straight; flattened, cornute apical process curved ventrally.

Colour.— "...jaunâtre, lavée de brun. La couleur brune enclot sur la region gastrique une petite figure jaunâtre en forme de trèfle. Il y a aussi des taches oranges assez nombreuses. Les chélipèdes ont une couleur brun-roux; les pattes ambulatories sont tachetées de jaunâtre" (Nobili, 1906b: 101).

Remarks.— Nobili (1906b: 102) compared *Leucosia hilaris* with *L. elata*, *L. cumingii*, and *L. sima*; unfortunately the latter species, presumably kept at the Zoological Museum, Calcutta, was not available for study by the author. *Urnalana hilaris* is distinguished from *U. elata* in its glabrous rather than tomentose posterolateral margin, and from *U. cumingii* in its anteriorly undefined thoracic sinus, the carinate margin of the palm and the form of the apical process of the 1st male pleopod.

Distribution.— Red Sea, Mauritius, 10-15 m depth.

Urnalana insularis (Takeda & Kurata, 1976) comb. nov.
(figs 2D, 7A)

Leucosia insularis Takeda & Kurata, 1976: 21, figs 1, 3a, pl. 1, fig. 1; Ovaere, 1987: 185.

Material.— **New Caledonia**: 1 ♀ (7.7 mm cl), MNHN B 21081, stn 21, Noumea, 22°23'S 166°23'E, 10 m, v.1984; 2 juveniles, MNHN, stn 232, Ouen I., Prony Bay, 22°35'S 166°43'E, 28 m, x.1984; 1 ♂ (9.5 mm cl), MNHN B 21072, stn 465, Atoll de Surprise, 18°22'S 163°05'E, 45 m, i.iii.1985; 1 ovigerous ♀ (9.8 mm cl), MNHN, Pott I., 8 m, 3.xii.1986; 1 ♂ (8.6 mm cl), MNHN, stn DW 1094, north lagoon, 19°54.4'S 163°41.2'E, 26 m, 24.x.1989; 1 juvenile, MNHN, Koumac, 55–60 m, 7.x.1993; 3 ♂♂ (7.7–9.3 mm cl), 1 ♀ (9.5 mm cl), MNHN, Koumac, Karembé, 22.x.1993; 1 juvenile, MNHN, Koumac reef, 20 m, 24.x.1993; 1 juvenile, MNHN, Koumac, Karembé, 26.x.1993.— **Loyalty Islands**: 1 ♀ (6.9 mm cl), MNHN, stn DW 1222, Ouvéa lagoon, 20°28'S 166°30'E, 15 m, 19.ix.1992.— **Chesterfield Islands**: 1 ♀ (7.8 mm cl), MNHN, stn DW 18, 20°44'S 160°59'E, 69 m depth, 21.vii.1988; 1 ♀ (7.7 mm cl), MNHN, stn DW 160, 19°46'S 158°23'E, 35–41 m depth, 1.ix.1988.— **Mariana Islands**: 1 ♂ (7.7 mm cl), 1 ♀ ovigerous (10.8 mm cl), UF 1012, Guam, Apra Harbour, 1 m depth, 1.iii.1998, coll. J. Stamer & L. Kirkendale; 1 ♂ (8.6 mm cl), UF 625, Guam, Tepungan Channel, 2–3 m depth, 23.iii.1999, coll. S. Norby.— **Fiji Islands**: 1 ♂ (7.9 mm cl), MNHN, SUVA 4, stn DW 08, Viti Levu, 18°22.3'S 178°02.4'E, 28–30 m, 24.ix.1999; 1 ♀ (9.1 mm cl), UF 1483, Viti Levu, reef flat, 16.x.2001, coll. L. Kirkendale & V. Bonito.— **Japan**: 1 ♂ (10.8 mm cl), NSMT Cr4985, Wanto-ne, between Chichi-jima and Haha-jima, Ogasawara Is., 200 m depth, viii.1968, coll. T. Sasaki, id. M. Takeda as *Leucosia insularis*, Holotype; 1 ♀ (12.7 mm cl), NSMT Cr5885, Cape Shionomisaki, Kii Peninsula, 45–68 m depth, 15–20.vii.1978, id. M. Takeda as *Leucosia sagamiensis*.

Description.— Front squat, medially concave, frontal margin obscurely bidenticulate. Exognath of external maxillipeds laciniate. Anterolateral margin nearly oblique; swollen distal margin of pterygostomian region scarcely visible in dorsal view. Epibranchial lobe prominent, margin smooth, fringed with setae. Epimeral margin minutely granulate. Thoracic sinus anteriorly defined by rounded overhanging margin of pterygostomian region; minute granules overgrown by club-like setae anteriorly; row of perliform granules on ventral surface of epibranchial angle; another row above base of cheliped, anteriormost granule ovate, prominent. Coxa in 3rd maxilliped of female smooth. Anterior margin of cheliped merus bearing single row of granules, median granules large, perliform; granules on posterior margin progressively smaller distally, splitting into two divergent rows; upper surface proximally with cluster of granules partly obscured by pubescent patch, two large granules medially, distally smooth; lower margin proximally with cluster of perliform granules partly obscured by pubescent patch, fusing distally into single row of large perliform granules. Carpus with obsolescent granules proximally on inner margin. Upper margin of palm carinate, smooth; inner, outer basal lobe granulate, lower margin with milled carina distally, continuing into pollex. Pereiopodal meri 1–3 bearing two granulate rows on ventral and dorsal surface 4th pereiopodal merus with single row dorsally, two rows ventrally. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Penultimate abdominal segment with modest median denticle. Shaft of male 1st pleopod sinuous, distally spoon-shaped, setose; cornute claw-like apical process curved ventrally.

Colour.— “mottled with brownish stripes which are indistinct, but symmetrically disposed and more or less reticulated. Similar stripes on chelipeds” (Takeda & Kurata, 1976: 22).

Remarks.— Takeda & Kurata (1976: 21) described *Leucosia insularis* as having within the thoracic sinus “a large, suboval truncated tubercle in front of coxa of cheliped”,

and “The first male pleopod...having a hooked tip” (1976: 23). *Urnalana elata*, *U. insularis* and *U. elatula* spec. nov. are squat-fronted species possessing a prominent, pubescent epibranchial lobe. However, *U. insularis* is easily distinguished as it is the only one with an ovate granule anteriorly in the thoracic sinus, and its 1st male pleopod is spoon-shaped, rather than club-shaped as in *U. elata* is, or dagger-shaped as in *U. elatula* spec. nov.

Distribution.— Japan, New Caledonia, Loyalty Is., Mariana Is., Fiji; 2–200 m.

Urnalana margaritata (A. Milne Edwards, 1874) comb. nov.
(figs 2E, 7B)

Leucosia margaritata A. Milne Edwards, 1874: 42, pl. 2, fig. 3; Ihle, 1918: 284; Serène, 1968: 47; McNeill, 1968: 41; Chen, 1989: 242, fig. 29, pl. 1, fig. 2; Ovaere, 1987: 191, figs 2a, 5c; Davie, 2002: 265.

Leucosides margaritata; Rathbun, 1910: 310; Suvatti, 1950: 143.

Leucosia biminensis Dai & Xu, 1991: 8, fig. 6; Huang, 1994: 580; Chen & Sun, 2002: 456, fig. 207.

Not *Leucosia margaritata*; Alcock, 1896: 230; Nobili, 1906b: 99; Zarenkov, 1990: 57, pl. 2, fig. 5, pl. 3, figs 6–10. [= *U. pulchella* (Bell, 1855)].

Material.— **New Caledonia**: holotype and paratypes, 2 ♂♂, 2 ♀♀, MNHN B181, preserved dry. — **Thailand**: 1 ♂ (5.9 mm cl), USNM 39648, W Koh Kut, 55 m depth, 28.i.1900, coll. Th. Mortensen, id. M.J. Rathbun as *Leucosides margaritata*; 1 ♀ ovigerous (6.1 mm cl), USNM 39647, between Koh Chuen and Koh Chang, 27 m depth, 3.iii.1900, coll. Th. Mortensen, id. M.J. Rathbun as *Leucosides margaritata*; 1 ♀ ovigerous (7.3 mm cl), ZMK, between Koh Kahdat and Koh Kut, 11 m depth, 9.i.1900, coll. Th. Mortensen, id. M.J. Rathbun as *Leucosides margaritata*; 1 ♂ (6.5 mm cl), ZMK, N Koh Kut, 18 m depth, 23.i.1900, coll. Th. Mortensen, id. M.J. Rathbun as *Leucosides margaritata*. — **Philippines**: 1 ♀ (7.3 mm cl), USNM, Cabaleta, Quezon Province, 33–58 m depth, 21–25.iv.1959, coll. F.G. Dayrit & J.E. Norton. — **Indonesia**: 1 ♂ (5.7 mm cl), ZMA Crust. De. 241861, ‘Siboga’ stn 162, W coast of Salawatti, between Loslos and Broken Is., 18 m depth, 18.viii.1899; 1 ♀ ovigerous (7.4 mm cl), ZMK, Sulawesi, Makassar, 35 m depth, 27.vi.1922, coll. Th. Mortensen; 3 ♂♂ (5.5–5.7 mm cl), 1 ♀ ovigerous (7.0 mm cl), ZMK, 8°26’S 114°29’E, 70 m depth, 5.iv.1929; 1 ♂ (6.9 mm cl), ZMK, Kei Is. Exp., stn 14, S of Doe Roa, 40 m depth, 10.iv.1922, coll. Th. Mortensen; 1 ♀ ovigerous (7.8 mm cl), ZMK, Kei Is. Exp., stn 64, Java Sea, 5°51’S 106°22’E, 35 m depth, 26.vii.1922, coll. Th. Mortensen; 2 ♂♂ (5.3, 6.2 mm cl), 1 ♀ ovigerous (6.7 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 65, Java Sea, 5°52’S 106°17’E, 25 m, 27.vii.1922, coll. Th. Mortensen; 2 ♂♂ (5.8, 6.4 mm cl), 2 ♀♀ ovigerous (6.9, 7.5 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 66, 5°54’S, 106°12’E, 27.vii.1922, coll. Th. Mortensen; 1 ♀ ovigerous (6.6 mm cl), ZMK, Sunda Str., Kei Is. Exp., stn 76, 6°8’S, 105°44’E, 29 m depth, 29.vii.1922, coll. Th. Mortensen; 2 ♀♀ ovigerous (6.4 mm cl), ZMK, Sunda Str., Kei Is. Exp., stn 77, 6°22’S, 105°44’E, 30 m depth, 29.vii.1922, coll. Th. Mortensen; 1 ♀ ovigerous (6.7 mm cl), ZMK, Sunda Str., Kei Is. Exp., stn 89, 5°57’S, 105°32’E, 18 m depth, 31.vii.1922, coll. Th. Mortensen; 2 ♂♂ (6.0, 6.8 mm cl), 2 ♀♀ (6.6, 6.9 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 116, Java Sea, 5°57’S 106°34’E, 22 m depth, 7.viii.1922, coll. Th. Mortensen; 1 ♂ (7.0 mm cl), 2 ♀ (6.6, 6.9 mm cl), ZMK, Java Sea, Kei Is. Exp., stn 118, Java, 27 m depth, 7.viii.1922, coll. Th. Mortensen. — **Papua New Guinea**: 1 ♂ (5.9 mm cl), KBIN 25715, Hansa Bay, 35 m depth, x.1976, coll. J. Bouillon, id. A. Ovaere. — **Australia**: 1 ♀ ovigerous (8.9 mm cl), NHM 1950.12.1.33, off Low Isles, Great Barrier Reef, id. F. A. McNeill; 1 ♀ ovigerous (6.7 mm cl), WAM C26130, Dampier Archipelago, Enderby I., 20°37.05’S 116°33.86’E, 13–14 m depth, 19.vii.1922. — **Palau Is.**: 1 ♂ (5.7 mm cl), USNM. — **Chesterfield Is.**: 1 ♀ (8.1 mm cl), MNHN, stn DW 38, 19°21.62’S 158°42.50’E, 61 m depth, 23.vii.1988; 1 ♀ (9.0 mm cl), 1 juvenile, MNHN, stn DW 41, 19°21.52’S 158°31.87’E, 52 m depth, 23.vii.1988; 2 ♀♀ (8.5, 8.9 mm cl), MNHN, stn DW 72, 19°15.30’S 158°20.89’E, 32 m, 25.viii.1988; 2 ♂♂ (7.4, 7.8 mm cl), MNHN, stn DW 73, 19°12.11’S 158°22.57’E, 41 m depth, 25.viii.1988; 2 ♀♀ (6.5, 9.1 mm cl), MNHN, stn DW 108, 19°09.08’S 158°49.10’E, 68 m, 27.viii.1988; 2 ♀♀ (7.9, 9.0 mm cl), MNHN, stn DW 118, 19°25.06’S 158°28.35’E, 52 m depth, 28.viii.1988; 1 ♀ (8.7 mm cl), MNHN, stn DW 154, 19°52.04’S 158°26.50’E, 35 m, 1.ix.1988; 1 ♀ (8.1 mm cl), MNHN, stn DW 155, 19°49.08’S 158°24.85’E, 42 m depth, 1.ix.1988. — **New Caledonia**: 1 ♀ (9.6 mm cl), MNHN B 21067, stn 13, Noumea, 22°20’S 166°29’E, 20 m,

v.1984; 4 ♂♂ (6.2-7.3 mm cl), 6 ♀♀ (6.7-8.2 mm cl), MNHN, stn 113, Ouen I., Prony Bay, 22°23'S 166°48'E, 32 m depth, viii.1984; 3 ♂♂ (6.6-7.6 mm cl), 1 ♀ ovigerous (7.9 mm cl), 1 juvenile, MNHN, stn 120, Ouen I., Prony Bay, 22°28'S 166°43'E, 46 m depth, viii.1984; 1 ♀ ovigerous (8.3 mm cl), MNHN B21338, stn 178, St Vincent Bay, 22°01'S 166°04'E, 20 m depth, ix.1984; 1 ♂ (5.4 mm cl), MNHN B 21076, stn 234, Ouen I., Prony Bay, 22°32'S 166°51'E, 56 m, x.1984; 1 ♀ (7.7 mm cl), MNHN B 21097, stn 325, Grand recif sud, 22°26'S 167°020'E, 75 m depth, xi.1984; 1 ♂ (7.6 mm cl), MNHN B19159, stn A2, lagon, 22°18.3'S 166°25.6'E, 14 m depth, 11.ii.1985; 17 ♂♂ (4.6-6.4 mm cl), 15 ♀♀ (5.0-7.2 mm cl), MNHN B21117, stn 438, Atoll de Huon, 18°10'S 162°51'E, 37 m depth, ii.1985; 4 ♂♂ (6.6-6.8 mm cl), 4 ♀♀ (7.0-7.7 mm cl), MNHN B21078, stn 447, Atoll de Surprise, 18°20'S 163°06'E, 36 m, 28.ii.1985; 1 ♂ (7.0 mm cl), MNHN, stn 469, Atoll de Surprise, 18°29'S 162°10'E, 39 m, 1.iii.1985; 1 ♂ (6.7 mm cl), 1 ♀ (7.2 mm cl), MNHN 18314, stn 604, East Lagoon, 22°13.7'S 167°03.6'E, 80 m depth, 5.viii.1986; 1 ♀ ovigerous (7.2 mm cl), MNHN 18313, stn 626, East Lagoon, 21°57.9'S 166°52.5'E, 47-48 m depth, 6.viii.1986; 1 ♂ (6.3 mm cl), 1 ♀ ovigerous (6.7 mm cl), MNHN 18315, stn 632, East Lagoon, 21°57.3'S 166°49.6'E, 44-45 m depth, 6.viii.1986; 1 juvenile, MNHN 18219, stn 702, East Lagoon, 21°26.7'S 166°08.2'E, 37 m depth, 10.viii.1986; 1 ♀ ovigerous (6.7 mm cl), MNHN 18214, stn 712, East Lagoon, 21°24.5'S 165°59.7'E, 47-49 m depth, 11.viii.1986; 1 ♂ (6.7 mm cl), MNHN 18316, stn 729, East Lagoon, 21°18.7'S 165°53.5'E, 42-45 m depth, 12.viii.1986; 1 ♂ (6.2 mm cl), MNHN, stn 873, East Lagoon, 20°38.55'S 164°46.2'E, 27 m depth, 13.i.1987; 1 ♂ (7.0 mm cl), MNHN, stn 890, East Lagoon, 20°20.3'S 164°35.6'E, 23 m depth, 14.i.1987; 1 ♂ (7.0 mm cl), 1 ♀ (7.5 mm cl), MNHN, stn DW 1075, North Lagoon, 19°52.0'S 163°58.4'E, 28 m depth, 23.x.1989, coll. B. Richer de Forges; 1 ♀ ovigerous (7.7 mm cl), MNHN, stn DW 1097, North Lagoon, 19°51.7'S 163°42.5'E, 34 m depth, 24.x.1989, coll. B. Richer de Forges; 2 ♀♀ ovigerous (6.8, 7.5 mm cl), MNHN, North Lagoon, 19°42.5'S 163°57.2'E, 32 m depth, 25.x.1989, coll. B. Richer de Forges; 1 ♂ (7.3 mm cl), MNHN, stn DW 1192, North Lagoon, 19°35.3'S 163°24.10'E, 48 m depth, 1.xi.1989, coll. B. Richer de Forges; 1 ♂ (8.0 mm cl), MNHN, stn DW 1207, North Lagoon, 19°43.6'S 163°32.0'E, 37 m depth, 2.xi.1989, coll. B. Richer de Forges; 1 ♂ (6.9 mm cl), 1 ♀ (5.7 mm cl), 1 ♀ ovigerous (7.8 mm cl), MNHN, stn DW 1214, North Lagoon, 19°49.9'S 163°36.6'E, 29 m depth, 3.xi.1989, coll. B. Richer de Forges; 1 ♀ ovigerous (6.7 mm cl), MNHN, stn DW 1236, Lagoon, 18°13'S 165°53.68'E, 45 m depth, 13.iii.1993, coll. B. Richer de Forges; 5 ♂♂ (4.6-6.4 mm cl), 5 ♀♀ (4.8-7.3 mm cl), 1 juvenile, MNHN, Touho, 22°44.20'S 165°14'E, 51-59 m depth, 15.ix.1993; 2 ♂♂ (4.9, 6.2 mm cl), 1 ♀ ovigerous (6.1 mm cl), 1 juvenile, MNHN, Touho, Mengalia Beach, intertidal, 22.ix.1993; 1 juvenile, MNHN, Koumac, 55-60 m depth, 7.x.1993; 5 ♂♂ (6.3-6.4 mm cl), 1 ♀ ovigerous (6.8 mm cl), MNHN B21295, Atoll de Huon, 18°02'S 162°56'E, 32 m depth, coll. B. Richer de Forges; 1 ♀ (8.1 mm cl), MNHN B19164, stn D61, Chesterfield-Bellona Plateau, 21°42.40'S 159°29'E, 50 m depth.

Description.—Front produced, frontal margin slightly sinuous, medially depressed, nondeflexed. Exognath of external maxillipeds lacinate. Ischium of 3rd maxilliped anteriorly flat in adult females. Anterolateral margin oblique, distally angular. Lateral angle of carapace prominent, overhanging thoracic sinus, margin indistinctly granulate. Posterolateral margins of carapace anteriorly edged with wedge of pubescence. Intestinal region prominent. Anterolateral angle of 3rd sternal segment denticulate. Thoracic sinus shallow, undefined, filled with plumate setae; row of small granules on ventral surface of epibranchial angle, another row above base of 1st pereopod. Cheliped merus more than half as long as carapace; anterior margin bearing row of perliform granules, posterior margin bearing two rows splitting distally, upper surface proximally with oblique row of granules partly obscured by pubescent patch, distally smooth; lower margin anteriorly with cluster of perliform granules partly obscured by pubescent patch, narrowing distally. Carpus bearing granules proximally on inner margin, distally on outer margin. Upper margin of palm carinate, closely granulate; lower inner margin with row of granules extending to proximal part of pollex, granules most prominent proximally. Pollex with parallel rows of small granules on inner and lower margins. Pereiopodal meri with two granulate rows on lower surface, single granulate row

on upper surface, save for first pereopod bearing two rows, posterior row distally obsolete. Pereiopodal carpi dorsally carinate; propodi carinate dorsally and ventrally. Male penultimate abdominal segment with minute median denticle, reniform dimple. Shaft of male 1st pleopod straight; flattened, cornute apical process curved ventrally.

Colour.— Carapace "...brun verdâtre clair, tacheté de rouge" (A. Milne Edwards, 1874: 42).

Remarks.— *Urnalana margaritata* is distinguished from *U. pulchella* in its mottled reddish colour pattern and pale pubescence, the sinuous frontal margin, the milled anterolateral margin, the flattened ischium of the 3rd maxilliped in the female, the granulate lower surface of the cheliped merus, the palm with its dorsal granulate crest and two ventral granulate rows, the minute denticle on the penultimate male abdominal segment and the ventrally-curved apical process of the 1st male pleopod.

Leucosia biminensis (Dai & Xu, 1991: 46) is distinguished from *L. parapulchella* (Dai & Xu, 1991) [= *U. pulchella*, see below] "in the antero-lateral border being with a distinct prominence and the first pleopod bent outer and ventrally". These characters and the accompanying illustrations are clearly those of *U. margaritata*.

Distribution.— Indonesia, Australia, Palau Is., Chesterfield Is., New Caledonia; intertidal – 80 m depth.

Urnalana parahaematostica spec. nov.
(figs 2F, 7C)

Leucosia haematostica; Stimpson, 1858: 160; 1907: 152; Miers, 1879: 40; Yokoya, 1933: 128; Sakai, 1934: 285; 1935: 61, pl. 12, fig. 1; 1937: 147, text-fig. 26e, pl. 15, fig. 5; 1965: 47, pl. 19, fig. 2; 1976: 121, pl. 36, fig. 2, text fig. 65e; Miyake, 1961a: 14; 1961b: 171; Miyake et al., 1962: 127; Kim, 1973: 302, fig. 65, textfig. 96; Takeda, 1973a: 33; 1973c: 12; 1982b: 103, fig. 302; 1987: 11; Yamaguchi et al., 1976: 34; Ng et al., 2001: 8.

Material.— **Japan**: holotype, 1 ♂ (10.2 mm cl), NSMT cr13460, Shikoku I., Kounoura, Ebime Prefecture, 30.vii.1999, coll & id. M. Takeda as *Leucosia haematostica*. Paratypes, 1 ♂ (9.9 mm cl), 1 ♀ (9.9 mm cl), NSMT cr12777, Tosa Bay, 98–101 m depth, 18.i.1988, coll. Kotaka Maru; 1 ♂ (9.4 mm cl), 1 ovigerous ♀ (10.8 mm cl), NSMT cr12679, Tosa Bay, 97–99 m depth, 7.ix.1998, coll. Kotaka Maru; 1 ♂ (9.6 mm cl), 1 ovigerous ♀ (10.1 mm cl), NHM 1878.11, 33°10'N 129°12'E, 66 m depth, vi.1876, coll. Jeffreys.— **Taiwan**: 1 ♂ (11.7 mm cl), ZMK, ex. Mus. Godeffroy; 1 ♂ (12.4 mm cl), NMW 19030, ex. Mus. Godeffroy.

Description.— Front not much produced, frontal margin obtuse, deflexed. Exognath of external maxillipeds lacinate. Lateral angle of carapace prominent, overhanging thoracic sinus, margin obscurely milled. Thoracic sinus deep, densely setose, anteriorly defined by overhanging margin of pterygostomian region; row of granules ventrally. Cheliped merus half as long as carapace; posterior margin bearing 7–9 perliiform granules, larger medially, splitting distally; upper margin with V-shaped cluster of granules, partly obscured by setose patch; 3 rows of perliiform granules (proximally obscured by densely setose patch) fusing distally on lower margin. Carpus with 3-granules on inner margin. Upper margin of palm obscurely carinate; lower inner margin with row of granules extending to proximal part of pollex, granules most prominent proximally. Pereiopodal meri with two granulate rows on lower surface, single granulate row on upper surface, save for first pereopod bearing two rows, posterior row distally obsolete. Pereiopodal carpi dorsally carinate; propodi keeled dorsally, ventrally. Male abdominal segments 3–5

lacking median furrow, lateral margins constricted subdistally; 6th abdominal segment glabrous, median denticle minute. Shaft of male 1st pleopod short, stout, sinuous, distally setose; digitate, cornuted apical process partly concealed by subdistal setae.

Colour.— “the anterior half of the carapax was bluish-white, the posterior half dotted with red; a band of crowded red punctae across the middle, interrupted at the median dorsal line. Below white, with a few scattered red dots” (Stimpson, 1907: 152).

Remarks.— Miers (1879: 40) and Stimpson (1907) noted the Japanese specimens they described as *Leucosia haematostica* differed in their colour pattern from the typical form described by Adams & White (1849), as well as in having “the tubercles on the arms proportionally smaller but similarly disposed, the postabdomen of the male with the sides nearly straight and the second joint not constricted”. Miers ascribed these features to “the difference in age of the specimens, which agree in the form of the carapace, front, thoracic sinus, and legs”. However, as comparison with the type material of *L. haematostica* and additional material (see above) added to the list of distinguishing characters the form of the male 1st pleopod, it is described as a new species, *U. paraematostica*.

Distribution.— Japan, Korea, Taiwan; 66–101 m depth.

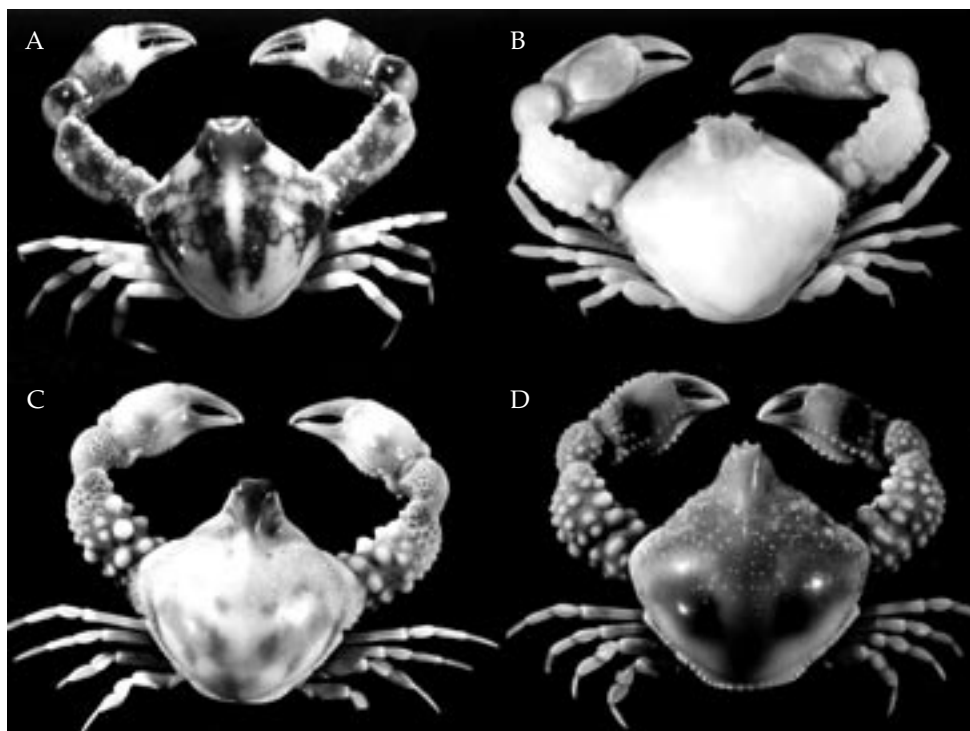


Fig. 3. A, *Urnalana pulchella* (Bell, 1855), ♂ 8.3 mm cl, MNHN; B, *U. purarensis* (Ovaere, 1987), ♂ 8.2 mm cl, NTOU; C, *U. thysanotus* (George & Clark, 1976), ♂ 12.9 mm cl, WAM C.26115; D, *U. whitei* (Bell, 1851), ♀ 14.8 mm cl, WAM C.26171.

Urnalana pulchella (Bell, 1855) comb. nov.
(figs 3A, 8A)

Leucosia pulchella Bell, 1855a: 363; 1855b: 290, pl. 31, fig. 4; 1855c: 9; Ihle, 1918: 316; Serène, 1968: 47; Huang, 1994: 580.

Leucosia margaritata; Alcock, 1896: 230; Nobili, 1906b: 99; Zarenkov, 1990: 57, pl. 2, fig. 5, pl. 3, figs 6-10. *Leucosia sagamiensis*, Miyake, 1983: 68, pl. 23, fig. 6.

Leucosia alcocki Ovaere, 1987: 188, figs 1b, 5b; Takeda, 1989: 138, fig. 2, pl. 1a.

Leucosia pseudomargaritata Chen, 1987: 197, fig. 3; Chen, 1996: 299, fig. 23; Chen & Sun, 2002: 451, fig. 205.

Leucosia parapulchella Dai & Xu, 1991: 7, fig. 5; Huang, 1994: 580; Chen & Sun, 2002: 454, fig. 206.

Material.— **Chinese Seas:** lectotype, 1 ♀ (9.2 mm cl), NHM 1847.21, HMS Samarang, coll. A. Adams.— **Red Sea:** 1 ♀ (8.9 mm cl), MNHN B.28346, between Hanish Is. and Arabian coast, 1901, coll. J. Bonnier and Ch. Pérez, id. G. Nobili as *L. margaritata*, by H. Chen as *L. pseudomargaritata*.— **Muscat:** 1 ♀ (10.3 mm cl), NHM 1887.16, coll. J.B. Miles.— **Comoro Is:** 1 ♂ (9.6 mm cl), MNHN B18610, Mayotte lagoon, 46 m depth, viii.1959, coll. A. Crosnier.— **Madagascar:** 2 ♂ (9.2, 8.6 mm cl), MNHN B18607, Nosy Iranja, 28.viii.1965, coll. P. Plante; 1 ♀ (9.5 mm cl), MNHN B19730, Nosy Be; 1 ♀ (8.0 mm cl), MNHN B18609, Tuléar, coll. B. Thomassin; 1 ovigerous ♀ (8.5 mm cl), MNHN B18608, NW coast, 13°58.3'S 42°49.6'E, 34 m depth.— **South Africa:** 1 ♂ (9.5 mm cl), SAM A44495, 27°26.2'S 32°44.2'E, 55-60 m depth, 3.vi.1987; 1 ovigerous ♀ (9.5 mm cl), SAM A44497, 27°31.2'S 32°42.6'E, 61 m depth, 2.vi.1990; 1 ovigerous ♀ (9.1 mm cl), SAM A44499, 26°52.4'S 32°55.2'E, 45-47 m depth, 3.vi.1990; 1 ♂ (9.1 mm cl), SAM A44500, 26°52.9'S 32°55.3'E, 49 m depth, 3.vi.1990.— **Indonesia:** 1 ♂ (7.5 mm cl), NHM 1844.106, Borneo, presented by the Lords of the Admiralty; 1 ♀ ovigerous (9.2 mm cl), ZMK, Kei Is. Exp., stn 85, 16.iv.1922, coll. Th. Mortensen; 2 ♂ (7.1, 6.6 mm cl), ZMK, 8°26'S 114°29'E, 70 m depth, 5.iv.1929; 1 ovigerous ♀ (8.8 mm cl), 2 ♀ ♀ (9.0, 8.2 mm cl), ZMK, 8°23'S 114°28'E, 50 m depth, 6.iv.1929; 1 ♂ (5.7 mm cl), ZMK, Java Sea, 'Galathea' stn 455, 5°32'S 112°41'E, 66 m depth, 26.viii.1951.— **Papua New Guinea:** 1 ♀ (9.0 mm cl), KBIN 26227, Hansa Bay, Duangit Reef, 50 m depth, 6.xii.1980, coll. J. Pierret, id. A. Ovaere as *L. alcocki*, Holotype.— **Australia:** 1 ♂ (8.2 mm cl), 1 ♀ (8.8 mm cl), QM 23231, 19°59.2'S 117°03.6'E, 52 m depth, 5.ix.1983; 2 ♂ (8.3, 8.7 mm cl), 1 ovigerous ♀ (9.1 mm cl), QM 23236, 20°00.4'S 117°00.4'E, 52 m depth, 4.ix.1983; 1 ♂ (8.7 mm cl), QM 23234, 19°04.8'S 118°50.7'E, 81 m depth, 30.x.1983; 1 ♂ (8.4 mm cl), QM 23225, 19°02.2'S 119°04.1'E, 84-83 m depth, 13.ii.1983; 1 ♂ (8.8 mm cl), QM 23223, 19°59.3'S 117°03.5'E, 52 m depth, 22.ii.1983; 1 ♂ (8.7 mm cl), 1 ♀ (8.7 mm cl), 1 ovigerous ♀ (8.7 mm cl), QM 23226, 20°00.2'S 117°00.5'E, 53 m depth, 22.ii.1983.— **Fiji Is:** 1 ♂ (8.3 mm cl), 1 ♀ (8.2 mm cl), MNHN, Viti Levu, 17°49.1'S 177°12.2'E, 38 m depth, 21.x.1998, coll. B. Richer de Forges; 1 ♂ (7.1 mm cl), MNHN, Viti Levu, 17°45.1'S 177°13.7'E, 37 m depth, 21.x.1998, coll. B. Richer de Forges; 1 ♂ (9.0 mm cl), MNHN, Viti Levu, 17°47.9'S 177°12.8'E, 32 m depth, 21.x.1998, coll. B. Richer de Forges.

Description.— Front produced, frontal margin minutely quadrilobate, deflexed. Exognath of external maxillipeds lacinate; ischium anteriorly swollen in adult females. Anterolateral margin oblique, slightly incurved posteriorly. Lateral angle of carapace prominent, overhanging thoracic sinus, margin indistinctly granulate. Posterolateral margins of carapace anteriorly edged with wedge of dense pubescence. Intestinal region prominent. Anterolateral angle of 3rd sternal segment prominently denticulate. Thoracic sinus shallow, undefined, filled with plumate setae; row of small granules on ventral surface of epibranchial angle. Cheliped merus more than half as long as carapace; anterior margin bearing single row of perliform granules, posterior margin bearing double row; upper surface proximally with oblique row of granules partly obscured by pubescent patch, distally smooth; lower margin anteriorly with cluster of perliform granules partly obscured by pubescent patch, narrowing distally. Carpus bearing granules proximally on inner margin, distally on outer margin. Upper margin of palm with row of granules; lower inner margin with row of granules extending to proximal part

of pollex, granules most prominent proximally. Pollex with parallel rows of small granules on inner and lower margins. Pereiopodal meri with two granulate rows on lower surface, single granulate row on upper surface, save for first pereiopod bearing two rows, posterior row distally obsolete. Pereiopodal carpi dorsally carinate; propodi carinate dorsally and ventrally. Male penultimate abdominal segment subtriangular, with prominent median denticle. Shaft of male 1st pleopod straight; cornuted, foliolate, apical process curved distad.

Colour.— “très élégante. Le fond est gris-perle pâle (excepté le front qui est brunâtre) élégamment reticulé de lignes rouge-brun. Ces lignes sont plus serrées sur la partie antérieure de la carapace et surtout en quatre endroits, deux dans la région gastrique et deux aux angles latéraux. Sur la partie postérieure il n’y a que deux lignes descendants et brièvement ramifiés. Les tubercules de la face supérieure du bras ont la même couleur rouge-brun, et la surface libre entre quatre rangées de tubercules est réticulée comme la carapace. Le carpe et la main sont semblablement ornés. Les pattes ambulatories sont blanc jaunâtre, annelées de rouge orange. La pubescence des bras et des angles latéraux de la carapace est noir charbon” (Nobili, 1906b: 99).

Remarks.— This “pretty little species” (Bell, 1855b: 291) was repeatedly misidentified starting with Alcock (1896: 230) who mistook it for *Leucosia margaritata* A. Milne Edwards, 1874. However, since Alcock described his specimens as possessing a sharp tooth “on the ventral surface of the ischium joint [of the external maxillipeds] of the female” and “the carapace and chelipeds elegantly reticulated with bright reddish brown”, we are certain of their identity. That reticulate colour pattern was described by Nobili (1906b) as well. Ovaere (1987) recognized that the specimens described by Alcock and Nobili differ from *L. margaritata* and placed them in a new species, *L. alcocki*. Nobili’s specimen was reidentified by Chen as *L. pseudomargaritata*. Chen’s description and illustration of *L. pseudomargaritata* (1987) was recognized as a junior synonym of *L. pulchella* (Huang, 1994), though the author persists in using the name (Chen, 1996; Chen & Sun, 2002). The characters distinguishing *L. parapulchella* from *L. pulchella* cited by Dai & Xu (1991), such as the lack of the denticle on the male abdomen or the acute apical process on the male 1st pleopod, are juvenile characters.

Urnalana pulchella is distinguished from *U. margaritata* in its handsomely reticulate colour pattern and black pubescence, the quadrilobate frontal margin, the oblique, non-angulate anterolateral margin, the anteriorly raised ischium of the 3rd maxilliped in the female, the smooth lower surface of the cheliped merus, the thoracic sinus bearing a single row of granules, the prominent median denticle on the penultimate male abdominal segment and the apical process of the 1st male pleopod being curved distad.

Of the three specimens seen by Bell (1855b: 290), only one exists – it is here selected as the lectotype.

Distribution.— Red Sea, Gulf of Aden, Muscat, Comoro Is., Madagascar, South Africa, Andamans, India, South China Sea, Gulf of Tonkin; Indonesia, Papua-New Guinea, Australia, Fiji Is; 29–90 m depth.

Urnalana purarensis (Ovaere, 1987) comb. nov.
(figs 3B, 8B)

Leucosia purarensis Ovaere, 1987: 192, figs 2b, 6a.

Material.— **Papua New Guinea**: holotype, 1 ♀ (8.3 mm cl), KBIN 26253, Madang Province, Hansa Bay, Purar Reef, 4°11.47'S 144°55.05'E, 10 m depth, 29.x.1980, coll. J. Pierret.— **Taiwan**: 1 ♂ (8.2 mm cl), NTOU, Lan-Yu, 4-5 m depth, 9.vii.1997.— **Mariana Is.**: 1 ♂ (10.2 mm cl), 1 ♀ (7.5 mm cl), UF 682, Guam, Piti Bombholes, 3 m depth, coll. S. Norby; 1 ♂ (8.0 mm cl), 1 ♀ ovigerous (9.3 mm cl), UF 548, Guam, coll. H. Conley; 1 ♂ (8.0 mm cl), ZRC 2001.2239, Guam, Agat, Alutom I., 3-5 m depth, iv.2001, coll. H. Conley; 1 ♀ ovigerous (9.0 mm cl), ZRC 2000.0600, SW of Orote peninsula, 15-18.iv.2000, coll. G. Paulay.— **Tahiti**: 1 ♂ (8.3 mm cl), USNM 251335, Arue, coll. H.A. Rehder.— **Tuamoto Archipelago**: 1 ♂ (7.3 mm cl), UF 1502, Rangiroa Atoll, Off Motu Maeherehona, outer reef slope, 3-12 m, 10.ii.2001, coll. G. Paulay; 1 ♀ (8.7 mm cl), UF 1621, Tikehau Atoll, Tuherahera Motu, 0-3 m, 10.vi.2001, coll. G. Paulay.

Description.— Front squat, slightly concave medially, frontal margin medially bi-denticulate. Anterolateral margin medially inflated; swollen distal margin of pterygostomian region visible in dorsal view. Epibranchial margin minutely granulate ventrally. Posterolateral margin bearing fringe of club-like setae. Epimeral marginal granules larger anteriorly. Thoracic sinus anteriorly defined by thickened margin of pterygostomian region; cluster of minute granules overgrown by club-like setae anteriorly; row of perliform granules on ventral surface of epibranchial angle; another row above base of 1st pereopod. Exognath of external maxillipeds laciniate; ischium anterolaterally swollen in adult females. Cheliped merus $2/3$ as long as carapace; anterior margin bearing row of granules, median granules large, perliform; perliform granulate row on posterior margin splitting medially into two divergent rows of smaller granules; upper surface proximally with cluster of perliform granules partly obscured by pubescent patch, distalmost granule prominent; lower margin proximally granulate, anteriorly with cluster of perliform granules partly obscured by pubescent patch, fusing distally into single row of large perliform granules. Carpus bearing granules proximally on inner margin. Upper margin of palm carinate, smooth; inner, outer basal lobe granulate, lower margin with milled carina distally, continuing into pollex. Pereiopodal meri 1-3 bearing two granulate rows on ventral and dorsal surface, 4th pereiopodal merus with single row dorsally, two rows ventrally. Pereiopodal carpi dorsally carinate, propodi dorsally and ventrally carinate. Minute median denticle on penultimate abdominal segment of male. Shaft of male 1st pleopod sinuous, distally club-like, setose.

Colour (in alcohol).— Carapace and chelipeds bright orange, pale stripe along median line of carapace, pale markings on intestinal, branchial regions; pubescence dun-coloured. Pereiopods white, orange marks on upper margin of meri, carpi.

Remarks.— *Urnalana purarensis* is distinguished from the closely resembling *U. elatoides* (see above) in having fewer and larger marginal granules posteriorly on the cheliped merus, the upper meral surface distally smooth, and the space between the posterodistal marginal rows on the merus smooth.

Distribution.— Taiwan, Papua New Guinea, Guam, Tahiti, Tuamoto Archipelago; 0-12 m depth.

Urnalana thysanotus (George & Clark, 1976) comb. nov.
(figs 3C, 9A)

Leucosia thysanotus George & Clark, 1976: 304, figs 1-4; Davie, 2002: 265.

Leucosia thysanota; Ovaere, 1987: 185.

Material.— **Australia:** 1 ♂ (12.9 mm cl), 1 ♀ (14.1 mm cl), WAM C.26115, Dampier Archipelago, 20°24.64'S 116°44.05'E, 28–27 m depth, 17.vii.1999; 1 ♀ (13.8 mm cl), WAM C.26138, Dampier Archipelago, Enderby I., 20°35.90'S 116°25.60'E, 18–17.5 m depth, 20.vii.1999; 1 ♀ (10.1 mm cl), WAM C.26151, Dampier Archipelago, 20°29.11'S 116°30.78'E, 25–25.5 m depth, 21.vii.1999; 1 ♀ (14.8 mm cl), WAM C.26173, Dampier Archipelago, Goodwyn I., 20°31.09'S 116°33.04'E, 15–14 m depth, 25.vii.1999.

Description.— Dorsal surface of carapace minutely, densely punctate anteriorly. Front prominent, frontal margin obsoletely bilobate. Postfrontal region deeply concave laterally. Exognath of external maxillipeds elongate. Hepatic region obliquely tumescent, with band of minute granules continuing into epibranchial region. Lateral angle of carapace overhanging thoracic sinus, margin smooth, fringed with stiff setae. Anterior half of posterolateral margin granulate. Thoracic sinus deep, anteriorly defined by thin overhanging margin of pterygostomian region; sinus with L-shaped band of closely packed nail-shaped setae anteriorly. Posterolateral margins of carapace granulate, anteriorly edged with posteriorly narrowing strip of short fur. Posterior margin prominent, beaded. Cheliped merus more than half as long as carapace; entirely granular but for smooth patch medially on lower surface; anterior, posterior margins bearing prominent periform granules, larger medially. Carpus unevenly granulate. Upper margin of palm with row of obsolescent granules; lower margin crenulate, granulate, carina extending to proximal part of pollex, granules most prominent proximally; inner surface of palm proximally with row of granules, parallel with lower margin; inner surface of palm patch granules proximally. Pereiopodal meri with two granulate rows on lower surface, with two granulate rows on upper surface on first three pereiopods, posterior dorsal row on third pereiopod distally obsolete, single dorsal row on fourth pereiopod. Pereiopodal carpi 1–3 prominently bi-keeled dorsally, 4th carpus with single keel; propodi keeled dorsally and ventrally, leaf-like. Male abdominal segments 3–5 proximally with broad median furrow; 6th abdominal segment wider than long, medially minutely dimpled, bearing minute denticle. Shaft of male 1st pleopod short, stout, sinuous; curved, cornute apical process hidden by swollen setose muff.

Colour.— “Carapace marbled with brown, white and orange; paler posteriorly. Front dark brown. Hepatic granules red. Arm of cheliped brown with white granules; hand pale with orange-brown spot on palm, base of fingers orange. Legs white with orange blotches” (George & Clark, 1976: 304).

Remarks.— George & Clark (1976: 306) distinguished *Leucosia thysanotus* from *L. whitei* “by the nature of the front, the hairiness of the epibranchial angle, the hepatic granules, the dorsal margin of the hand and the carpus of the walking legs”. To these characters we add the form of male 1st pleopod and the different colour pattern.

Distribution.— Northwestern Australia; intertidal to 11 m depth.

Urnalana whitei (Bell, 1851) comb. nov.
(figs 3D, 9B)

Leucosia whitei Bell, 1855a: 362; 1855b: 289, pl. 31, fig. 2; 1855c: 9; Hess, 1865: 155; Haswell, 1880: 45; 1882: 118; Miers, 1884: 249 (part); Ihle, 1918: 283 (part); Tyndale-Biscoe & George, 1962: 77, fig. 4.10a, b, pl. 1, figs 6, 9, pl. 2, figs 6, 9 (part); McNeill, 1968: 41; Serène, 1968: 47; Arnold & George, 1987: 212, fig. 2, fig. 3a–c; Ovaere, 1987: 185; Davie, 2002: 266.

Not *Leucosia whitei*; Miers, 1886: 325 (part); Walker, 1887: 111; Ihle, 1918: 283 (part); Tyndale-Biscoe &

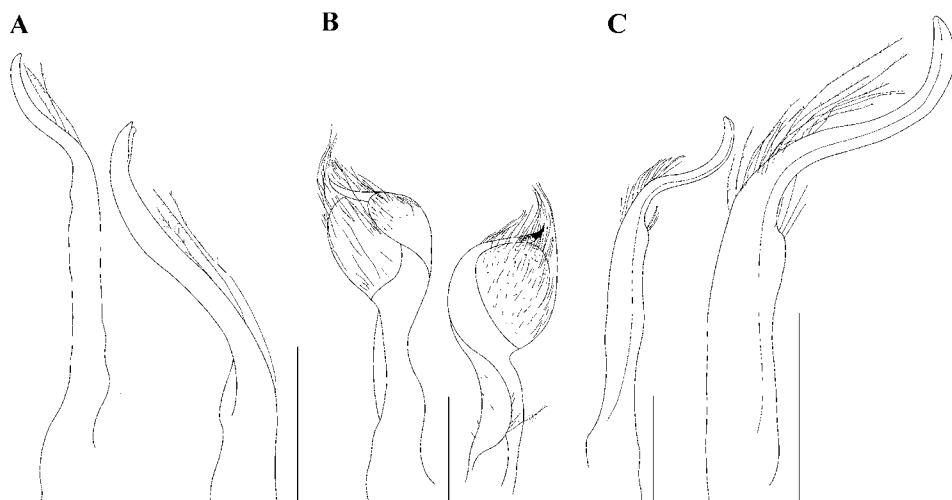


Fig. 4. First male pleopod. A, *Urnalana angulata* (Rathbun, 1911), holotype, 12.4 mm cl, USNM 41070; B, *U. chevreti* (Haswell, 1880), 8.7 mm cl, ZMK; C, *U. cumingii* (Bell, 1855), 10.7 mm cl, ZMK. Scale 1 mm.

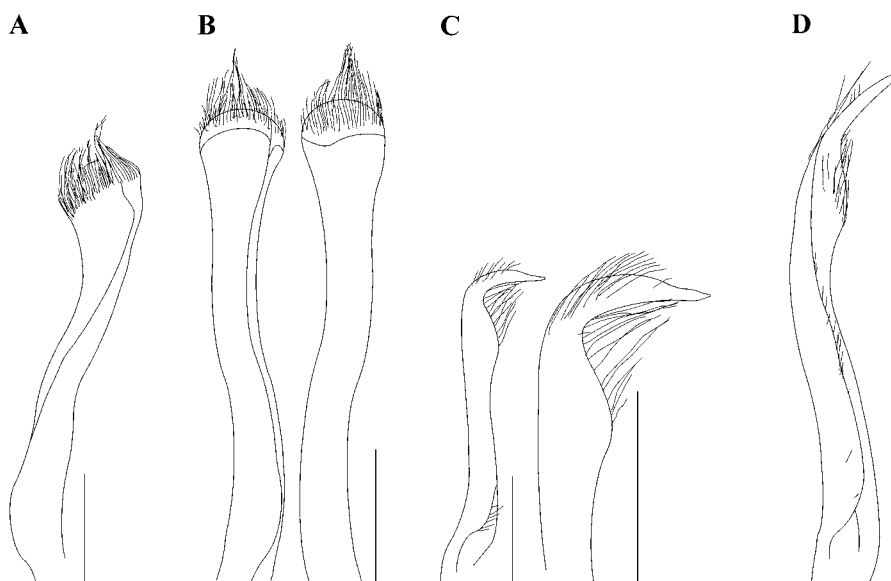


Fig. 5. First male pleopod. A, *Urnalana elata* (A. Milne Edwards, 1874), 11.6 mm cl, WAM C8271; B, *U. elatoides* (Bouvier, 1915), 8.6 mm cl, MNHN B18332; C, *U. elatula* spec. nov., 8.2 mm cl, MNHN; D, *U. granulimera* spec. nov. holotype, 8.8 mm cl, MNHN. Scale 1 mm.



Fig. 6. First male pleopod. A, *Urnalana haematostica* (Adams & White, 1849), 12.6 mm cl, ZMK B, *U. hilaris* (Nobili, 1905), 11.2 mm cl, NHM 1888.2. Scale 1 mm.

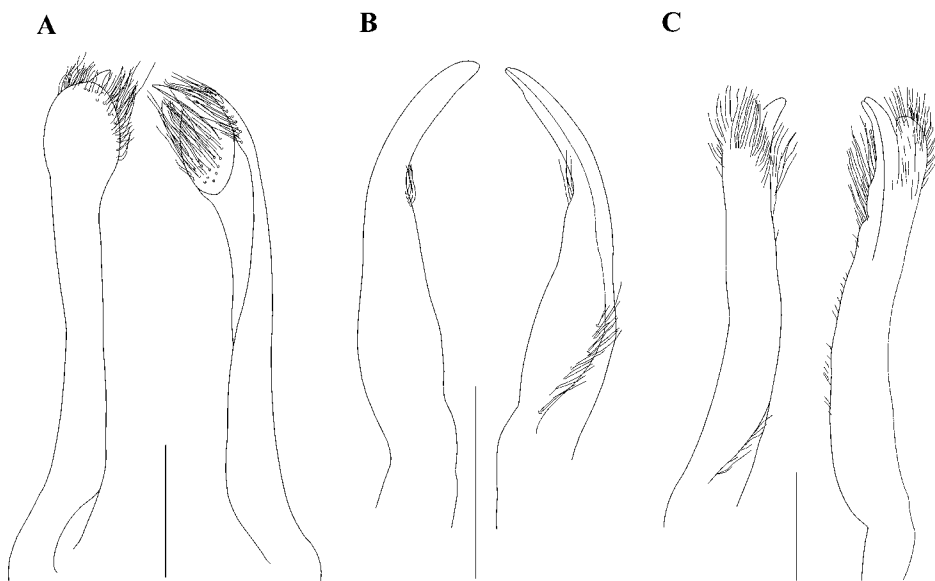


Fig. 7. First male pleopod. A, *Urnalana insularis* (Takeda & Kurata, 1976), 7.9 mm cl, MNHN; B, *U. margaritata* (A. Milne Edwards, 1874), 6.4 mm cl, ZMK ; C, *U. parahaematostica* spec. nov., 11.7 mm cl, ZMK. Scale 1 mm.

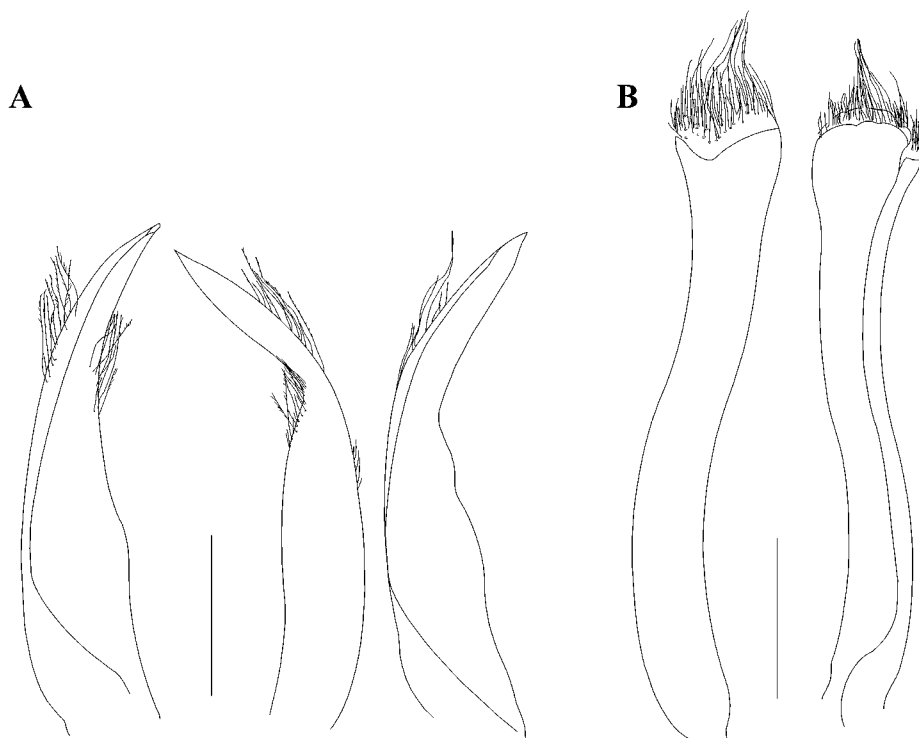


Fig. 8. First male pleopod. A, *Urnalana pulchella* (Bell, 1855), 8.3 mm cl, MNHN; B, *U. purarensis* (Ovaere, 1987), 8.3 mm cl, USNM 251335. Scale 1 mm.

George, 1962: 77, fig. 4.10a, b, pl. 1, figs 6, 9, pl. 2, figs 6, 9 (part); Campbell & Stephenson, 1970: 254, fig. 17; Zarenkov, 1990: 58, pl. 2, fig. 7, pl. 3, figs 1-5; Dai & Xu, 1991: 10, fig. 7; Huang, 1994: 580; Tan, 1996: 1041; Chen & Sun, 2002: 444, fig. 201, pl. 15, fig. 4 [= *U. chevreti* (Haswell, 1880)].

Material.— **Australia:** holotype, 1 ♀ ovigerous (15.6 mm cl), NHM 1850.112, east coast, HMS 'Rattlesnake', coll. Macgillivray; 1 ♂ (15.5 mm cl), NHM 1882.7, 'Alert', Prince of Wales Channel, 16 m depth, coll. Dr. Coppinger; 1 juvenile (11.1 mm cl), 1 ♀ ovigerous (15.5 mm cl), WAM C.24979, Clarence Strait, S. Bathurst I., 12°4'S 130°17'E, 29-33 m depth, 30.vi.1970; 1 ♂ (17.7 mm cl), WAM C.14390, Abbot Point, Queensland, vi.1984, coll. J. Ottoway; 2 ♂♂ (14.0, 14.3 mm cl), 2 ♀♀ (14.9, 15.0 mm cl), QM W.23362, Northwest shelf, 19°29.6'S, 118°52.2'E, 40 m depth, 25.x.1983; 1 ♀ (14.8 mm cl), WAM C.26171, Dampier Archipelago, 20°22.29'S, 116°35.56'E, 39 m depth, 17.vii.1999; 1 ♀ (14.9 mm cl), WAM C.26102, Dampier Archipelago, Mermaid Sound, 20°35.32'S, 116°43.88'E, 10 m depth, 14.vii.1999; 1 juvenile (7.8 mm cl), WAM C.26178, Dampier Archipelago, 20°26.04'S, 116°36.77'E, 33-38 m depth, 26.vii.1999; 1 ♀ (13.9 mm cl), WAM C.26148, Dampier Archipelago, 20°28.45'S, 116°27.43'E, 37-38 m depth, 21.vii.1999.— **Indonesia:** 1 ♂ (14.9 mm cl), 3 ♀♀ (16.1-16.8 mm cl), 3 juvenile (11.7-12.6 mm cl), WAM C.21732, Wasir I., 5°30'S, 134°12'E, 36-73 m depth, coll. B.R. Wilson & L. Joll, 15.vi.1970.

Description.— Front prominent, frontal margin tridentate, deflexed. Exognath of external maxillipeds elongate. Hepatic region tumescent, bearing cluster of perliform granules. Lateral angle of carapace overhanging thoracic sinus, bearing cluster of perliform granules, margin milled, obsolescent in larger specimens. Thoracic sinus shallow, densely

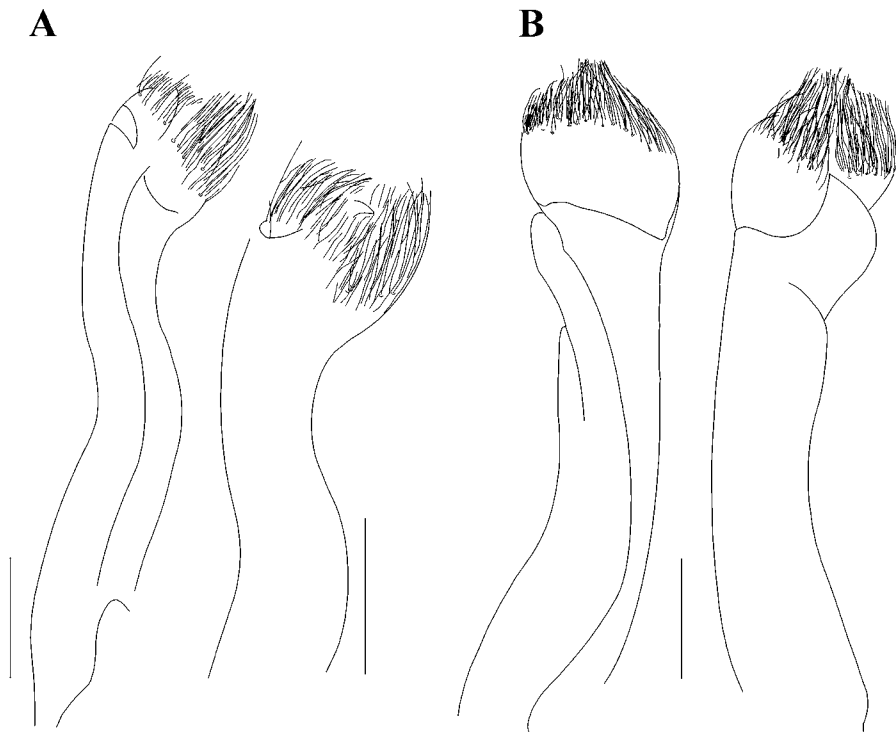


Fig. 9. First male pleopod. A, *Urnalana thysanotus* (George & Clark, 1976), 12.9 mm cl, WAM C.26115; B, *U. whitei* (Bell, 1851), 14.8 mm cl, WAM C.26171. Scale 1 mm.

setose, with median stripe of closely packed paxilliform setae; anteriorly defined by thickly granulate margin of pterygostomial region; sinus with median row of granules. Posterolateral margins of carapace granulate, anteriorly edged with posteriorly narrowing strip of dense pubescence. Posterior margin prominent, beaded. Cheliped merus more than half as long as carapace; entirely granular but for smooth patch medially on lower surface; anterior, posterior margins bearing prominent perliform granules, larger medially. Carpus unevenly granulate. Upper margin of palm with row of granules, progressively smaller distally; lower margin with row of granules extending to proximal part of pollex, granules most prominent medially; inner surface of palm with row of granules, proximally parallel with lower margin; inner surface of palm unevenly granulate proximally. Pereiopodal meri with two granulate rows on lower surface, with two granulate rows on upper surface on first three pereiopods, posterior dorsal row on third pereiopod distally obsolete, single dorsal row on fourth pereiopod. Pereiopodal carpi prominently keeled dorsally, propodi keeled dorsally and ventrally. Male abdominal segments 3-5 proximally with broad median furrow; 6th abdominal segment wider than long, bearing minute denticle medially. Shaft of male 1st pleopod short, stout, sinuous; cornuted, claw-like apical process hidden within swollen setose muff.

Colour.—“light brown; the spots on the carapace small, of an angular form, and red colour; a large red spot on the upper surface of the hand” (Bell, 1855b: 290); “Carapace...

grey-yellow anteriorly, with elongate triangular reddish patch in each metabranchial region; palm grey-yellow, with a large red spot at base; fingers ...base orange or red" (Arnold & George, 1987: 211, table I).

Remarks.— *Urnalana whitei* differs from *U. chevreti* in having a cluster of granules anteriorly on the epibranchial region; the upper margin of the cheliped palm granulate; the apical process of 1st male pleopod hidden by a swollen, setose muff; and a conspicuous red spot on the inner surface of the palm.

Distribution.— Indonesia, Australia; 14-73 m depth.

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