Dittosa, a new genus of leucosiid
(Crustacea: Decapoda: Brachyura) from southern
Australia and New Zealand

Cheryl G. S. Tan
Department of Zoology, National University of Singapore, Lower Kent Ridge Road,
S(0511), Republic of Singapore

Abstract.—A new genus, Dittosa, is established for two southern Australian
species of Philyra Leach, 1817: Philyra laevis Bell, 1855, P. murrayensis Rath­
bun, 1923, and the New Zealand Ebalia cheesmani Filhol, 1886, on the basis
of the male first and second gonopods which are of equal length, presence of
two fissures on the roof of the orbit, structure of the male abdomen, form of
the front and third maxilliped exopod, and appearance of the intestinal region
of the carapace.

There are 41 known species in the genus Philyra Leach, 1817 (Bell 1855, Serène 1968,
Rathbun 1924, Takeda & Nakasone 1991). These are generally characterized by their
rounded carapaces, massive chelipeds, ex­
panded exopod of third maxilliped and
rather broad front which is not produced.

For the species of Philyra in which the
male first gonopod is known, this structure
is stiff and stout, and about twice to three
times the length of the second gonopod (Ste­
phensen 1946, Dai & Yang 1991). Recently,
in the course of examining leucosiids in the
Smithsonian Institution collection, I found
that two southern Australian species, P. lae­
vis Bell, 1855, and P. murrayensis Rath­
bun, 1923, and a New Zealand species, Ebalia
cheesmani Filhol, 1886, have the male first
and second gonopods of almost equal length,
with the first gonopod long and sinuous, and
the second gonopod elongate and slender.
In addition, the number of fissures on the
orbital roof, male abdominal segmentation,
the form of the front, appearance of the in­
testinal region and, to a lesser extent, form
of the third maxilliped exopod in these two
species differ from those in typical Philyra
species. In this paper, a new genus, Dittosa,
is established for P. laevis, P. murrayensis,
and Ebalia cheesmani on the basis of this
unique suite of characters.

For purposes of comparison, eight other
species of Philyra were studied and these
are listed in the Appendix. The following
abbreviations are used in the text: G1, G2,
the male first and second gonopods respec­
tively; APE, U.S. “Albatross” Philippine
Expedition and USARP, United States Ant­
arctic Research Program. Measurements are
given in the order carapace length times
width in millimeters (mm), exclusive of the
posterior intestinal spine and lateral tuber­
cles. Specimens examined are deposited in
the National Museum of Natural History
(USNM), Smithsonian Institution, Wash­
ington D.C., U.S.A., and the Zoological
Reference Collection (ZRC), Department of
Zoology, National University of Singapore.

Family Leucosiidae Samouelle, 1819
Dittosa, new genus

Type species.—Philyra laevis Bell, 1855,
by present designation.

Diagnosis. —Carapace rounded, with
widely spaced tubercles or granules along
the margins, surface smooth or granular, in­
testinal region with raised region (ridge, tu-
Fig. 1. *Dittosa murrayensis*, male, 18.8 x 18.4: a, right third maxilliped; b, front, dorsal view; c, right G1; d, right G2; e, right G2, apex; f, right G1, apex; g, abdomen. *Dittosa laevis*, male, 14.2 x 13.5: h, right third maxilliped; i, right G1, apex; j, right G1; k, right G2; l, right G2, apex. *Dittosa murrayensis*, male, 18.8 x 18.4: m, right pterygostomian region, ventral view, with third maxilliped removed. *Dittosa laevis*, male, 14.2 x 13.5, female, 14.0 x 13.6. n, male abdomen excluding segment 1; o, telson, female abdomen; p, front, dorsal view;
bercle or spine). Front bilobed, lobes separated by V-shaped notch, inner angle of each lobe extended and denticulate, giving front a 4-toothed appearance. Eyes medium sized, visible from dorsal view, roof of orbit with 2 sutures, floor of orbit with 1 suture. Antennules folded obliquely. Antennae occupying orbital hiatus, basal segment fixed, other segments movable. Third maxilliped with exopod not strongly dilated (sometimes dilated proximally), merus triangular, not narrowed. Chelipeds more massive than ambulatory legs, palm broad, fingers longer than palm. Male abdomen with segments 3–6 fused, suture between segments 5–6 discernible to absent, or if present, laterally interrupted. G1 elongate, usually sinuous; G2 elongate, as long as or slightly longer than G1, usually more slender.

Remarks.—In general appearance, Ditto
tosa bears a close resemblance to Philyra sensu stricto. The massive chelipeds, form of the fingers, rounded shape of the carapace, granulation on the lateral borders of the carapace and broad front that is not produced are characters common to both genera. The most significant difference between Dit
tosa and Philyra is that in Ditto
tosa, the G1 and G2 are almost equal in length. Such a condition is relatively rare in the Leuco

The male abdomen in Ditto
tosa has the third to sixth segments fused. The suture between the fifth and sixth segments is indistinct and the sixth segment has no mobility whatsoever. In Philyra sensu stricto, there may be limited mobility of the sixth segment as the

suture between the fifth and sixth may reach the lateral margins of the abdomen and may be rather deep. In general, the sixth segment of the male abdomen in Philyra has its proximal end wider than the distal end of the fifth segment. In this way, a wide notch between the fifth and sixth segments is formed on either side of the abdomen (Fig. 3a, b) and the sixth segment may have a flattened, distal, transverse tubercle. In P. globus (Fabricius, 1775), the type species of Philyra (fide H. Milne Edwards 1837), the suture between the fifth and sixth segment is deep and the lateral notch between these segments is present on either side (Stephensen 1946:fig. 11 I). There is a median denticle on the sixth segment in this species.

The type species of Philyra, Cancer globus Fabricius, 1775, is a senior synonym of Leucosia globulosa Bosc, 1802. Thus, P. globulosa (Bosc, 1802) (sometimes wrongly attributed to H. Milne Edwards 1837) should be referred to as P. globus (Fabricius, 1775) (see Manning & Holthuis 1981:66).

Another useful character in Ditto
tosa is that the roof of the orbit has two clear sutures corresponding to the α and β sutures described by Ihle (1918:52). In Philyra globus and in all other species of Philyra examined (see Appendix), the α suture is absent. In the case of D. murrayensis, the β and γ sutures are deep and open anteriorly, thus forming a prominent extra-orbital lobe (Fig. 1b).

In species of Philyra, the front is generally almost straight with a shallow median groove on the dorsal surface, or trilobate, with two outer lobes formed by the inner supra-orbital angle and a smaller, median triangular lobe. The former condition is true for P. globus. The three species of Ditto
tosa have the front distinctly bilobed, each lobe being separated by a moderately deep,
Fig. 2. *Dittosa cheesmani* (Filhol, 1886) male, 11.4 × 11.6, female: a, Male left cheliped upper surface; b, Male front, dorsal view; c, male sternum; d, male right pterygostomian region, ventral view, with third maxilliped removed; e, right G1; f, right G2; g, male carapace, dorsal view; h, male right third maxilliped; i, female abdomen, telson; j, male right last ambulatory leg; k, male abdomen. Scale = 1 mm.
V-shaped median notch. The inner angles of each lobe are pointed and denticulate, conferring a “four-toothed” appearance to the front (Figs. 1b, p, 2b). The variability in this character within *Dittosa* cannot be ascertained as there are currently only three species. This character should be used in conjunction with the other characters as the front has been shown to be variable in some congeneric leucosiids. Nevertheless, generally, the “four-toothed” front is absent in *Philyra*.

In *Dittosa*, a protrusion of some sort is present on the posterior intestinal region, be it a spine or a transverse ridge (see Figs. 2g, 4A, C, E). For *Philyra*, the intestinal region, though it may be covered in granules, and swollen, does not possess spines or raised ridges. In *P. globus*, it is finely granular.

The form of the exopod of the third maxillipeds appears to gradate in *Philyra* (Fig. 3c–e). In *P. globus*, *P. globosa* (Fabricius, 1798), and *P. heterograna* Ortmann, 1892, the exopod is greatly expanded proximally, with the outer edge describing a semi-circular arc and the merus is very narrow and is shaped like a right-angled triangle (see Stephensen 1946, Fig. 11C, D). In others, e.g., *P. scabriuscula* (Fabricius, 1798), the exopod is expanded and the merus is not narrowed but rather regularly triangular. In *P. olivacea* Rathbun, 1909 (Fig. 3d), and *P. biprotubera* Dai & Guan, 1986, the exopod is less expanded but the outer edge still describes a curve and the merus is narrow. The fourth condition is shown in species such as *P. granigera* Nobili, 1906, and *P. syndactyla* Ortmann, 1892 (Fig. 3e), where the outer edge of the exopod may be straight, the distal portion only slightly dilated and the merus broad. In *Dittosa*, however, the exopod is expanded slightly proximally (Figs. 1a, h, 2h), but never as in *P. globosa*.
or *P. globus*, and the merus is triangular and not narrowed. However, the third maxillipeds in *Dittosa* are rather similar to those of *P. olivacea* and *P. granigera*. Due to the variation exhibited by this character, it is advisable to use it in conjunction with other characters such as the gonopods and the number of orbital roof sutures.

The variation shown by the structure of the third maxilliped exopod and the merus in *Philyra* sensu stricto suggests the possibility that the genus, as it presently stands, is heterogeneous and in need of a revision. Specimens of *Philyra* species examined here sometimes differ significantly from *P. globus* in terms of the structure of the male G1, form of the abdomen, extent to which the front edge of the buccal cavity extends beyond the front, structure and ornamentation of the sternum, form of the front and as discussed above, structure of the third maxillipeds.
Dittosa resembles also the genus Praebebalia Rathbun, 1911. The carapace in Praebebalia has lateral projections similar to that found in Dittosa, the chelipeds are longer than the carapace, the edge of the buccal frame projects beyond the front and there are two fissures on the upper orbital roof. Again, the chief difference between the two genera is the relative length of the G1 and G2. I have examined specimens of the type species, Praebebalia extensiva Rathbun, 1911, and have found that its G1 is much longer than the G2. Fusion of the male abdominal segments is also different, with segments 3–5 fused in Praebebalia and segments 3–6 fused in Dittosa. Also, in Praebebalia, the palms of the chelipeds are slender and about twice the length of the fingers. In Dittosa, the chelipeds are massive, the palms are broad and as long as the fingers. Praebebalia also lacks the lateral projections on either side of the intestinal projection found in Dittosa.

Nagai (1992) figured the G1 and G2 of Praebebalia longidactyla Yokoya, 1933, P. mosakiana Sakai, 1965, P. taeniata Takeda, 1977, and P. kumanoensis Sakai, 1983. These differ from Praebebalia extensiva in that they have G2 as long as or slightly longer than G1 (Nagai 1992, Fig. 2) and the abdominal segments 3–6 are fused. Their relatively smaller size (4.3–6.5 mm length, 4.3–6.5 mm width) also separates them from P. extensiva (12.7 × 13.0). This suggests that a group distinct from Praebebalia sensu stricto should perhaps be recognized and that a review of the genus is necessary. From Nagai’s (1992) figures, the form of the front (broadly bilobed), absence of lateral projections on the carapace, slender chelipeds, and absence of posterior projections of the four Praebebalia species are characters that serve to distinguish them from Dittosa.

Etymology. —The name is arbitrarily derived from the Greek “dittoς” (dissos; dixoς) which means “two-fold, double”, alluding to the equal length of the male first and second gonopods. The gender is feminine.
rounded blade-like teeth; anterior edge of propodus of ambulatory legs carinate, dactylus flattened, both edges carinate.

Outer surface of male abdomen minutely punctate, distal end of segment 6 with median, transverse, low, rounded tubercle, short median, transverse groove present at base of segment 6, telson triangular, apex pointed. G1 long, sinuous, proximal half setose, stout, gradually tapering to slender, pointed apex, apex simple, sparsely covered with short setae; G2 very thin, slightly longer than G1, slender throughout, tip bifid with one branch reduced to pointed lobe, other branch long.

Female: Telson elongate, bell-shaped. Non-sexually dimorphic characters similar to male.

Remarks.—The ridge on the posterior intestinal region of the carapace varies in form in individual specimens. It may be nearly indistinct, particularly in larger specimens. Hale (1927:195) remarks: “The ridge of the intestinal region may be obsolete in old examples, but in juveniles it is often prominent and produced upwards in the form of a subtriangular tooth; the carapace of the young sometimes bears large scattered granules”. Hale (1927:195) also gives an interesting account of their behavior, noting that the crabs probably remain buried in the mud at high water and during rough weather, only commencing their activities at low-tide. During mating, the male performs a kind of courtship dance during which the female becomes quiescent. The male then grasps the female and moves off, presumably to a burrow. The specimens I examined are from South Australia (type locality of D. laevis) and match Bell’s (1855) description and figures well.

Dittosa murrayensis (Rathbun, 1923)  
Figs. 1a–g, m, 4 C, D

Philyra murrayensis Rathbun, 1923:136, pl. 34 [type locality: Off Murray river mouth, South Australia].—Hale, 1927:195, Fig. 196.

Material examined.—USNM, 1 male, 18.8 x 18.4, South Australia, Victoria, Port Phillip Bay, 3 miles west of Brighton Pier, Stn. 5 and 6, 11 m, very shelly bottom, colls. C. F. E. Roper, S. Stevenson & R. Plant, 10 Feb 1972.

Description.—Carapace slightly broader than long, surface with minute punctae and granules, regions not well-demarcated, shallow, oblique groove present immediately behind margin of hepatic region, intestinal region defined by groove anteriorly and laterally; hepatic and subhepatic margins raised to form facet, anterolateral margins with small denticle immediately after hepatic margin, junction of antero- and posterolateral margin with 2 denticles, posterolateral margin with denticle close to posterior margin, posterior margin with flattened, upward pointing spine on either side of median line, posterior intestinal region with large backward and upward pointing spine on higher level than posterior marginal spines; subhepatic region with median denticle.

Front bilobed; extraorbital lobe rather pronounced. Edge of buccal cavern slightly visible beyond front, outer angle projecting beyond orbital margin. Surface of third maxilliped ischium smooth, inner margin finely granular, setose along margins, exopod slightly dilated proximally, tapering gradually distally. Chelipeds very long, stout, surface finely granular, fingers longer than palm, flattened, cutting edges finely denticulate; anterior edge of propodus of ambulatory legs carinate, dactylus flattened, both edges carinate.

Outer surface of male abdomen smooth, telson triangular, distal end rounded, edges setose. G1 stouter and slightly shorter than G2, long, rather straight, tapering to narrow tip distally; G2 slender, elongate; with curved tip, tip sparsely setose.

Remarks.—The presence of spines on the intestinal region and posterior margin of the
carapace, the structure of the G1 and G2, the absence of a tubercle on the penultimate segment of the male abdomen, the long chelipeds of the male, the prominent outer angle of the buccal frame and the relative size of this species distinguishes it from *D. laevis*. Hale (1927:196) remarks that “the small tubercles of the carapace are much more distinct in some specimens than in others, and the obsolete median carina may bear scattered tubercles.” This is the only specimen of *D. murrayensis* found in USNM and it matches Rathbun’s (1923) description and plate well. Moreover, it was collected from Port Philip Bay, South Australia, close to the mouth of the River Murray, which is the type locality of the species.

*Dittosa* cheesmani (Filhol, 1886)

*Ebalia laevis* McLay, 1988:94, fig. 18a-c (see McLay, 1988 for complete synonymy).

**Material examined.** — USNM 270105, male, 11.4 × 11.6; “Eltanin,” Cruise 23, Stn. 1709, 43°31’S–43°30’S, 176°10’W–176°08’W, 143–183 m, Blake Trawl, 24 May 1966, coll. USARP; USNM 270106, 15 males, 14 females; ZRC, 1 male, 1 female.

**Description of male.** — Carapace slightly broader than long, surface covered with granules, those at the edges mushroom shaped, intestinal and cardiac regions demarcated by shallow grooves, hepatic and subhepatic margins raised to form facet, anterolateral margin with shallow notch immediately after hepatic margin, junction of antero- and posterolateral margins with pointed tubercle, posterior margin with flattened, triangular projection on either side of median line, subhepatic region with obtuse triangular projection, mid-intestinal region with rounded tubercle, posterior intestinal region with rounded spine.

Front bilobed, lobes separated by u-shaped notch; edge of buccal cavern visible beyond front, extending beyond orbital margin. Outer surface of third maxillipeds with large, round granules, outer margins setose, exopod slightly narrower than ischium, anterior surface of merus with shallow depression, without elevated granules.

Outer edge of chelipeds with pointed granules of varying sizes, surface with flat pavement of granules, palm broader than merus, outer edge carinate, distal edge with ridge just at base of movable finger, fingers slightly shorter than palm, immovable finger cutting edge with large, triangular tooth close to proximal end, movable finger with corresponding notch, cutting edges denticulate; anterior edge of first to third pairs of ambulatory legs with acuminate granules, last pair of legs with acuminate granules lining both anterior and posterior edges, dactylus flattened, carinate and setose on both edges.

Proximal end of abdomen with raised granules, distal end of penultimate segment with transverse tubercle, telson triangular, with rounded apex. Proximal end of G1 rather stout, gradually tapering to simple point, proximal half with long setae, G2 slender, elongate, slightly longer than G1.

Paratype females: Telson triangular, with rounded tip. Projections on posterior margin less pointed than that in males. Other non-sexually dimorphic characters similar to males.

**Remarks.** — There has been some confusion concerning the identities of *Ebalia laevis* Bell, 1855 (formerly *Phlyxia laevis*) and *Ebalia cheesmani* Filhol, 1886. Bennett (1964) synonymised both species, noting that in specimens of *E. laevis* which he examined, the degree of variability was high, particularly with respect to “...the posterodorsal projections, the anterolateral outline and the granulation...” (Bennett, 1964:21), making it difficult to distinguish it from *E. cheesmani*.

Additional confusion has been created due to the fact that Bell’s (1855) *Phlyxia laevis* (now *Ebalia laevis*), differs considerably from what other authors have called *Phlyxia* (or *Ebalia*) *laevis* or *E. cheesmani* (for com-
complete listing of authors, see McLay, 1988). From Bell’s (1855) figures, it can be seen that the front is narrow and projected forwards, and the anterior margin of segment six of the abdomen is shown to have a median forward pointing denticle, followed by a flat tubercle. This is not mentioned by Bennett (1964) in his reasons for synonymysing E. cheesmani with E. laevis. Although it is known that characters such as granulation, structure of the carapace anterolateral margins and posterior projections are highly variable within leucosiid species, characters such as elongation of the front and particularly, the presence of a median, anteriorly-directed denticle on the anterior margin of the male sixth abdominal segment, seem to be constant and reliable. The latter character has been used in defining other leucosiid taxa such as Drachiella Guinot, 1976. Thus, E. laevis sensu stricto, may be a true Phlyxia or even a Praebebalia, but this can only be determined after the type specimens are examined. It is unlikely to be a species of Dittosa, due to the reasons mentioned above. It is certainly very unlikely to be a synonym of P. cheesmani.

Therefore, it is best to refer the present specimens to E. cheesmani, as they agree, in general, with what has been described. Bennett’s (1964) remarks concerning the large degree of variation found in specimens of E. laevis may perhaps suggest the presence of more than one species. In the specimens I observed, the variation in characters is not as substantial.

Acknowledgments

This study was carried out as part of the author’s Graduate Student Fellowship at the Department of Invertebrate Zoology, Division of Crustacea, National Museum of Natural History, Smithsonian Institution. The author acknowledges funding from the Smithsonian Institution, R. B. Manning for his supervision, R. Lemaitre for his encouragement and advice, A. Rajaguru, K. Reed, P. Rothman, L. Ong (Museum Support Center), J. Maret and C. Walter for their help and support, W. Moser for his expert advice on photography, and the other staff at the Department of Invertebrate Zoology for their kind assistance. The author thanks P. Davie, Queensland Museum, for reviewing the manuscript, and P. K. L. Ng, Department of Zoology, National University of Singapore, for his advice and comments.

Literature Cited


Rathbun. 1924. Results of Dr. E. Mjöberg’s Swedish scientific expedition to Australia 1910–1913, Brachyura, Albuneidae and Porcellanidae.—Arkiv för Zoologi, 16(23):1–33, 1 pl.

Samouelle, G. 1819. The entomologist’s useful compendium, or an introduction to the knowledge of British insects, London, 469 pp.

Sakai, T. 1965. The crabs of Sagami Bay, collected by His Majesty the Emperor of Japan, edited by Biological Laboratory, Imperial Household, Tokyo, 206 pp., pls. 1–100.


Appendix

List of Philyra species examined

Philyra anatum (Herbst, 1782)
USNM 39653, 1 male, East of Koh Chang, Thailand, 11 m, seine, 25.i.1900; USNM 39654, 1 juvenile, Sound at Koh Chang, Thailand, 5.5–9 m, soft clay bottom, coll. 1900.

Philyra globus (Fabricius, 1775)
USNM 42756, 3 males, 2 females, Ganges Delta, India; 2 females, Stn. GVF 53, channel between Songkhla and Goh Gnu Island, 3 Nov 1957.
Philyra olivacea Rathbun, 1909
USNM 62038, 1 male, tideflats, Tsimei, China, don. S. F. Light (University of China), Jun 1923; USNM 57505, 1 young female, San Mun Bay, East Coast of China, coll. M. Maki, 11 Jun 1922; 1 female, of Tachalom, Gulf of Thailand, 28 Jul 1923.

Philyra pisum de Haan, 1841
USNM 55381, 2 males, 2 females, Kagi, Taiwan, Taihoku Normal School coll., Aug 1918; USNM 54522, 4 males, Chiba Prefecture, coll. M. Sasaki; 1 male, no data; USNM 45859, 1 male, Japan, exchange, no other data; USNM 18865, 1 male, Atami Province, Japan, "Mr. Sakamoto," no other data; 2 males, 2 females, Chemulpo, Korea, coll. P. L. Jony.

Philyra platychira de Haan, 1841
USNM 73207, 1 male, 1 female, Iloilo, Panay Island, Philippines, Ilo Ilo 'Eclipse' Expedition, coll. H. C. Kellers, April 1929; USNM 65350, 1 female, Lubig Bay, Port Binanga, Philippines, coll. APE, 8 Jan 1908; 1 female, near Mariveles, Luzon, Philippines, coll. A. M. Reese, 8 Jan 1908.

Philyra punctata Bell, 1855
USNM 252713, 1 male, 1 female, between Mossel Bay and Algoa Bay, South Africa, 32 m, coll. R/V 'Thomas B. Davie,' 15 Feb 1980; USNM 221770, 1 male, 1 female, between Port Elizabeth and Mossel Bay, South Africa, R/V 'Thomas B. Davie,' 15 Feb 1980.

Philyra syndactyla Ortmann, 1892
USNM 56781, 12 males, 1 female, mouth of Jeddo Bay, Yenosima, Japan, coll. E. L. Morse; USNM 45863, 20 males, 2 females, Yenoshima, Japan.

Philyra tuberculosa Stimpson, 1858
USNM 57768, 1 male, Tisme, China, coll. S. F. Light (University of China), Jun 1923.

Praebalalia extensiva Rathbun, 1911
USNM 041064, Holotype male, Seychelles Providence, West Indian Ocean, Stn. D8, 229 m, coll. R/V Sealark, 4 Oct 1905.