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SPECIES OF THE ISOPOD FAMILY SPHAEROMIDAE, FROM THE  
EASTERN, SOUTHERN, AND WESTERN COASTS OF AUSTRALIA.

By W. H. BAKER.

[Read September 9, 1926.]

PLATES XXXVIII. TO LIII.

Owing to the kindness of the authorities of the Australian Museum, Sydney, I have been enabled to examine the Sphaeromids in that institution. The paper deals with this material and with examples recently added to the South Australian Museum collection, as well as a few that have been forwarded from Western Australian Museum. Naturally, most of the specimens in the Australian Museum series are shallow water forms from the eastern coast, many of the species which are common on the southern coast not being represented.

The now well-known marked sexual dimorphism occurring in this group has induced authors to recommend that species should be established on adult males only. I have kept this in view, describing females only when they exhibit some striking characters.

Although the group has much resemblance to the Cymothoidae, none of the species seem to be addicted to parasitism; apparently Sphaeromids are, in the main, scavengers, and are thus of economic importance. Although some swim actively, most are rather sluggish; many live in sponges, etc., where the two sexes are often taken together, thus helping to confirm relationship in doubtful cases. The Australian Sphaeromids are not well known, and systematic collecting—which is much needed—has been neglected; as a result, one very often has only single specimens to deal with, which are frequently females.

It is with great diffidence that I introduce the new genus *Cymodopsis*, chiefly to relieve the very large genus *Cymodoce*, and I claim for it the same value as *Cilicaea*, *Cilicaeopsis*, and *Paracilicaea*. Six species are allotted here, and *Cymodoce aspera*, Haswell, which might otherwise be included, I have left out, believing that species to be nearer to *Bregmocerella*.

Subfamily SPHAEROMINAE.

Group HEMIBRANCHIATAE, Hansen.

SPHAEROMA TEREBRANS, Bate.

Pl. xxxviii., figs. 11, 12.

- Sphaeroma terebrans*, Bate, Ann. Mag. Nat. Hist. (3), vol. 17, p. 28, pl. 2.  
*S. vastator*, *ibid*, p. 28, pl. 2, fig. 4.  
*S. destructor*, Richardson, Bull. U.S. Nat. Mus., No. 54, p. 282, and figs.  
*S. terebrans*, Stebbing, Spolia Zeylan, vol. 2, pt. 5, p. 16, pl. 4.  
*S. terebrans*, Barnard, Ann. S. Afr. Mus., vol. xvii., pt. v., p. 358.  
*S. terebrans*, Calman, P.Z.S., 1921, Crust., ii., p. 217.  
*S. terebrans*, Chilton, N.Z. Jnl. Sci. and Tech., 1919, p. 12, note.

There are a large number of specimens in the collection, the largest about 8 mm. in length. In some the tubercles are quite small and the pubescence varies considerably. In some specimens identified by Dr. Chilton the posterior extremity of the abdomen is much more pointed, the primary tubercles of the thorax and abdomen more distinct, except the two submedian on the anterior division of the abdomen. The margin of the end of abdomen is turned upward, and below still

close to the tip is a distinct swelling. In some examples the end of abdomen appears to be turned downward. In nearly all specimens examined there is a distinct tubercle or dipping of an inner fold on the margin of the epimeron of the 1st thoracic segment. Sometimes the lines marking the coalesced segments of the anterior division of abdomen are very obscure, at others, as in Stebbing's figure, the same statement applies to the transverse ridge on 4th segment of thorax, and there are frequently similar ridges on 3rd and 5th segments as observed by Barnard.

The 3rd joint of antennule seems to vary, it is often as long or longer than the two preceding joints together. Most specimens have 4 teeth on outer ramus of uropod.

With a large number of dry specimens from Queensland, there was one differing, the posterior region of which is shown in pl. xxxviii., fig. 13. I find in some earlier notes on a large number of specimens from the eastern coast, the remark, "These seem to be all juveniles," made on account of the absence of *appendix masculina*. I am glad to find the explanation in the above paper of Dr. Calman's.

SPHAEROMA QUOYANA, Ml. Edw.

Pl. xxxviii., figs. 1-10.

*Sphaeroma quoyana*, Ml. Edw., Hist. Nat. Crust., t. iii., p. 206.

*S. quoyana*, Heller, Reise de Novara Crust., p. 137.

*S. quoyana*, Haswell, Cat. Austr. Crust., p. 287.

*S. quoyana*, Hedley, Austr. Assn. Adv. Sci., vol. 8, 1901.

*S. pentodon* (?), Richardson, U.S. Nat. Mus. Bull. 54, p. 286.

*S. verrucauda*, Dana, U.S. Expl. Exp. Crust., ii., p. 779, pl. lii., fig. 6.

*S. verrucauda*, Chilton, N.Z. Jnl. Sci. and Tech., 1919, p. 12.

The body has many black dendritic markings and is obscurely granulate. The head is anteriorly depressed, there is a well-marked rostrum with a transverse ridge behind it. The eyes are large.

A distinct transverse ridge is found on the 4th, 5th, 6th, and 7th segments of thorax.

The sides of the posterior division of abdomen slope inwards sufficiently to allow the uropods to be almost completely hidden.

The anterior portion of epistome is slightly excavate.

The flagellum of the antennule has 11 joints.

The antennal flagellum has 14 joints.

The left mandible has a small secondary plate, the spines are 9 in number, the incisory plate is narrow obscurely divided into 3 lobes or teeth, the joints of the palp are broad and compressed.

The 2nd maxilla has broad plates densely fringed.

In the maxillipeds a large portion of the 2nd joint and its plate is folded longitudinally; the hairs on the plate are dense and some plumose; the coupling spine is a long curved setum.

The legs are in 3 series, the 7th pair the longest.

The 2nd pleopod has the appendix slightly exceeding the length of endopod. The exopod of the 3rd is without division. The 5th has the exopod with 3 shagreenate lobes on the distal division and one on the proximal.

The uropods are rather small, lanceolate, the inner ramus reaches to the end of abdomen, the outer ramus is 4- or 5-toothed—sometimes the teeth are obsolete—it has a longitudinal keel below; both rami are fringed with fine hairs.

This species is very common on the east and south coasts of Australia and is credited with wood destruction, but sometimes found burrowing in mud probably containing decaying wood or seaweed.

**Exosphaeroma intermedia**, n. sp.

Pl. xxxix., figs. 1-8.

Body rather smooth, punctate, with obscure rounded areolae like fish scales and some minute setules.

Head short, with a transverse ridge on the forehead. Eyes large.

1st thoracic segment longest; the following subequal in length. The epimera of 2nd, 3rd, and 4th segments are subacute, those of 5th, 6th, and 7th rounded, the 7th not so deep.

The posterior division of abdomen is widely dome-shaped all over, the end is somewhat truncate and entire.

The two basal antennal joints are contiguous, these are short, triangulate, the base of triangle being the distal end, there they are a little bilobed by a small sulcus about the middle, 2nd joints small and short, 3rd joints narrow, flagellum short with 12 joints.

Antenna moderately robust, flagellum of 13 joints, the first 5 or 6 short, the others becoming longer.

Epistome somewhat quadrate, anteriorly with a mucronate apex or partially covered by basal antennal joints, the limbs recede.

The right mandible is slender, not salient, the incisory plate 4-lobed, then follow a number of curved branched spines. The molar is prominent with margin fringed with numerous denticles. The palp is large, its distal joint falcate.

1st maxilla with inner branch short, ending in 5 large branched spines. The outer branch has 8 or 9 strong spines, some of which have lateral branches, the shaft is setose on each side.

The 2nd maxilla has broad leaf-like lobes; their margins with many serrate spines.

The maxilliped has the basal joints narrow, the plate of the 2nd joint ends in a mass of branched spines with a row of similar ones on inner margin for some distance. The 2nd joint of palp is only separated from the 3rd by a small shallow cleft and is scarcely lobed, the 3rd and 4th are strongly lobed bearing setae, and are as in *Cymodoce* and other genera.

The legs are all robust, provided with furry pads on 4th, 5th, and 6th joints, the first 3 pairs carry long setae on 3rd and 4th joints, but they are not so long or numerous as in *Sphaeroma*. In the remaining legs the basos and ischium bear longish fine hair and also some strong spines in the usual positions on those limbs.

The pleopods are very sphaeroma-like, broad, the peduncles of the first 3 pairs have each 3 coupling spines on inner sides and furry hairs on outer. In the 2nd pair the appendix much outreaches the endopod to which it is attached.

The exopods of the 3rd and 4th pairs have each a division. There is a distal gap on the respiratory ramus of the 4th pair. The exopod of the 5th pair has prominent setuliferous lobes with fine hair on the outer margin.

The uropods are subequal, the inner ramus is ovate-lanceolate, the outer with 2 teeth on the external margin with slight indications of 2 more above these.

One male specimen, 8 mm. long, found on a clump of live coral, Vanderlin Island, Sir Edward Pellew Group, Gulf of Carpentaria, June, 1923, collected and presented by Dr. W. E. J. Paradiice, Royal Australian Navy, to Australian Museum; it being the type.

**Exosphaeroma bicolor**, n. sp.

Pl. lii., figs. 1-5; also pl. li., figs. 8, 10.

Body surface nearly smooth, glabrous. The segments of thorax do not differ much in length. The epimera are marked off from the tergites by a faint groove on each side. The epimeron of 1st thoracic segment projects anteriorly beneath

the eye but the posterior angle is abrupt, the lower margin is straight, the following 3 epimera are rounded, separate, and rather sinuate; the last 3 are deeper and broader rounded, that of the 7th segment reaches down to near the level of the 6th. The anterior division of abdomen is a little longer than the 1st thoracic segment; obscurely divided by lines into 4 segments; the lateral margins of this division reach to the level of the 6th thoracic epimera. The head is short, steeply declivous in front; a faint swelling marks the place of the rostrum. The eyes are large and prominent with many ocelli. The posterior division of abdomen is moderately domed, declivous behind with a reduction in steepness near the end which is obtusely pointed; the margin here is a little insinuate in vertical direction.

The peduncular joints of the antennule are subequal in length; the 1st has a shallow distal notch; the flagellum has 10 joints. The joints of the antennal peduncle are short and stout; the flagellum carries 11 joints.

The epistome is elongate, rounded anteriorly, its lateral limbs receding. The upper lip is prominent.

The right mandible has the incisory plate rather slender, tridentate, no definite secondary plate, spine row well marked, with strong molar, and palp with compressed joints, the last narrow, falcate, it and the middle joint comb-like.

The 1st maxilla is strong, the inner branch with 4 curved plumose setae, the outer branch with 4 or 5 distal, blunt teeth and a few serrate spines; the outer margin of this branch bears some fine setules. The 2nd maxilla has large lobes bearing strong setae.

The maxilliped has the plate of the second joint rather elongate, the distal setae well developed. There is an inner fold with 3 feather setae. The palp is large, the 2nd, 3rd, and 4th joints are well lobed with rather scanty setae; these joints have each a setum posteriorly (as noticed in *Zusara*, etc.).

The legs are robust, well spined, with moderate furry pads on 4th, 5th, and 6th joints.

The 1st pleopod has the peduncle projecting more than usual on the inner side with 5 coupling spines which are not so crowded as usual, the outer side is bent down in the proximal direction. The rami are rather small. The endopod about as long again as broad, its outer margin slightly concave. The exopod has a large outstanding spine slightly curved. The 2nd pleopod also with rather small rami; the *appendix* is thick, obtuse, and over-reaches the endopod considerably. The peduncle has a strong setum on outer angle. The 3rd pleopod has the exopod with division near the middle of lamina. The peduncle has 3 or 4 longish setae on outer angle. In the 4th pleopod the endopod has few branchial folds (6-7), the apex is rather acute, and there is a broad shallow insinuation near by, and one plumose setum. The exopod carries 3 distal similar setae and a number of setules on the outer margin. The rami of 5th pleopod are rather narrow. The exopod has a distal rasp slightly prominent and 2 lobed with similar thickenings almost continuous on inner margin for some distance as in *E. calcareus*. The endopod has few branchial folds (6-7) and is distally truncate with a small elevation on the inner angle.

Uropods have the inner ramus rather broad not reaching the end of abdomen, subacute at end. The exopod is narrower, longer, lanceolate, very acute, reaching beyond end of abdomen.

Length, 10 mm.

This species is near *Exosphaeroma calcareus*, Dana, and *E. falcatum*, Tattersall. It has the habit of rolling into a ball with the outer rami of the uropods outstanding. The female has a less projecting abdomen than the male and the rami of uropods are equal in length. The specimens (8 males and 2 females) are from shore between tide limits, Kangaroo Island, and were collected by Mr. H.

M. Hale, Zoologist of the South Australian Museum. Type, C. 1050, South Austr. Mus.

**Exosphaeroma alli, n. sp.**

Pl. li., figs. 6, 7, 9.

The body is smooth and glabrous. The head is rounded in front and very short. The eyes are large. The 1st segment of thorax is longest, the remaining are subequal in length except the last, which is shorter. The 1st epimeron has the lower margin nearly straight, abrupt behind, the remaining ones are nearly uniform in size, except 2nd and 7th, the 7th is a little smaller than and not reaching down to quite the level of the 6th; they are not distinctly marked off from their respective tergites. The anterior division of abdomen is very short, the coalesced segments well marked laterally. The posterior division is not strongly domed, is smooth and shovel-shaped at end, and thin-walled.

The antennule is rather large, 1st joint broad and not much produced at inner distal angle, 2nd joint almost half as long as 1st, 3rd a little longer than this, 1st joint of flagellum longer than the rest, flagellum of 8 longish joints. The antenna has a few setae on 5th joint of peduncle, the flagellum is rather long, of 13 joints.

The epistome is rather long, apically retiring and acute; the limbs are retiring; the upper lip is large.

The right mandible has a rather slender incisory process almost entire at apex, there is a minute secondary process and a spine cluster which springs from a common base; the molar is large.

The inner ramus of 1st maxilla with 4 recurved setae, the outer ramus is rather narrow and the distal teeth much worn in specimen.

The 2nd maxilla is robust with spines on the outer and middle lobes more robust than on the inner lobe, which reaches a little beyond the other.

The maxilliped has narrow basal joints, the plate of the 2nd being also narrow; there are 2 setae on the hinder end of 3rd joint of palp and one on the 4th. The lobes of these joints are moderately long and setose.

The legs are rather slender, 1st pair with rather long fine setae on usual joints; the rest of the legs are sparsely spined and setose.

The peduncle of 1st pleopod has 5 coupling spines on the inner angle, the outer side has numerous setules, the exopod has the usual outstanding spine on the outer proximal angle, the outer margin of endopod is straight or slightly convex. The 2nd pleopod has a large endopod; the *appendix* is moderately robust tapering towards the end, and reaches nearly to the end of the fringe of the endopod. The peduncle has a long setum on the outer angle as well as the usual setules. The 3rd pleopod has large rami; there are a few longish setae on the outer angle of the peduncle. The dividing line on the exopod is nearer the middle than the end, but not so much so as in the previous species. The endopod of the 4th pleopod has a very shallow, wide emargination and 3 plumose setae on the end with 2 on the end of the exopod. The rami of 5th pleopods are rather narrow, the exopod is subacute distally with 2 outstanding rasp-like lobes, the other lobes are not well marked but are similar to those of preceding species. The endopod is distally truncate with small prominence on the inner angle. Branchial folds are few on both 4th and 5th pleopods.

The uropods have laminate rami, the inner ramus has the inner margin nearly straight, the outer very convex, not quite reaching the end of abdomen, distally subacute. The outer ramus is shorter, narrower, distally rounded, and on distal margin slightly serrate.

Length, 7 mm.

The body is whitish with much dark dendritic marking. Several specimens were collected at Victor Harbour in shallow water by Miss Ali.  
Type, C. 1055, South Austr. Mus.

*Exosphaeroma alata*, n. sp.

Pl. xxxix., figs. 9-11; pl. xl., figs. 1-3.

The body, especially the head, is rough with rather scanty tubercles which arrange themselves more definitely on the posterior margins of thoracic segments.

The head has a transverse, low ridge just behind the antennular region; behind this there are two indistinct submedian tubercles. The eyes are large.

The 1st segment of thorax is longest, the 2nd, 3rd, and 4th subequal in length, the last 3 shorter. The epimera, except the 1st and last, are subequal, the last not so deep, the penultimate one with an oblique ridge on the outer side.

The anterior division of abdomen is short, its lateral margins are slightly turned up. The posterior division is at first domed, but soon shelves away to a long posterior triangular projection with very acute apex; the posterior margin of the cavity of the abdomen is broken by a wide notch or channel opening, this is roofed over by the projecting end.

The basal antennular joints are short with rather corroded surfaces, they touch each other medianly; there is a small notch on the posterior border which holds a small lateral portion of the epistome. The 2nd joint of peduncle is short, the 3rd long, the flagellum of 9 longish joints. Antennal peduncle is robust, flagellum of 17 short joints. The epistome is short with well projecting lateral angles.

The mandibles are normal; the left with incisory plate 3 or 4 divided, secondary plate trifold, very small spine row and strong molar; palp of moderate size.

The 1st maxilla has a small tuft of setae on the middle of the shaft besides the terminal setae.

The lobes of the palp of the maxilliped are short and close together, the terminal joint is also short, at the posterior angles of the 2nd, 3rd, and 4th joints there is a long setum as in *Zuzara venosa*.

The legs are slender, very sparsely spined, the last pair in the male are very long and appear to have a prehensile function; the propodus is long and curved.

The 1st pleopod has a peduncle with 3 coupling spines on the inner angle, the outer side slopes away obliquely and is destitute of fine hair. The exopod has a small outer proximal spine. The endopod is slightly longer than broad. The appendix of the 2nd pleopod reaches as far as the fringe of the endopod. The exopods of the 3rd, 4th, and 5th have oblique divisions.

The uropods are very large, wing-like, both rami are somewhat wedge-shaped and subequal, the outer have the external margins thickened and upturned, both rami are minutely serrate at the distal margins and reach beyond the apex of abdomen.

Length of male, 11 mm.

The female is of typical *Exosphaeroma* form, mouth parts are unmodified, marsupial plates overlap slightly, the abdomen is not produced, the uropods are of ordinary size, the body is much smoother.

This species is close to *E. amplicauda*, Stimpson, it is also near *Isocladus*, and if that genus is of subgeneric value, as Hansen suggests, then this also should bear a subgeneric designation.

The specimens are from Mullumbimby, New South Wales, in fresh water in the river, L. Kesteven, Riddlemore Bridge, Parramatta River, also Miller's Point, Pt. Jackson. Types in Australian Museum, Sydney.

**Neosphaeroma, n. gen.**

Characters mainly as in *Exosphaeroma*, but pleopod 3 with some branchial folds on the endopod.

A small number of plumose setae on both exopod and endopod of pleopod 4. Endopods of pleopods 1 and 2 sometimes becoming very elongate, and that of No. 1 being modified in the male into an appendage of probably sexual use (*N. laticauda*).

Exopods of pleopods 3, 4, and 5 with divisions.

Type of genus, *Neosphaeroma laticauda*, Whitelegge.

**NEOSPHAEROMA LATICAUDA, Whitelegge.**

Pl. xli., figs. 1-5.

*Cassidina laticauda*, Whitelegge, "Thetis" Scientific Results N.S. Wales Isopoda, pt. i., p. 238.

Hansen (Quart. Journal Microscopic Science, Oct., 1905) at page 130 says: "It is impossible for me to refer—*Cassidina laticauda*, Whitelegge—this species not only to any genus, but to any section or group of the Sphaerominae." A specimen occurs in the collection of the South Australian Museum, a female from Gulf St. Vincent, which is referable to Whitelegge's species, a fact which I have been able to confirm by the kind loan of cotypes male and female from the Australian Museum.

The following additions to Whitelegge's description—"Thetis" Scientific Results, page 238—are here given:—

The body of the southern specimen is about twice the size of the cotypes.

The marsupial laminae overlap and the mouth parts are unmodified.

The 1st and 2nd pleopods are normal, but in the 3rd the exopod has a division and the endopod carries 8 branchial folds; both rami carry many marginal plumose setae.

In the 4th pleopod the exopod is 2-jointed, the endopod branchial, both rami with a few plumose marginal setae.

The 5th pleopod also has a division on the exopod with 2 setuliferous lobes on the proximal portion at its inner distal angle and 3 on the terminal division.

In the adult male (cotype of Whitelegge's) the appendages on the 7th sternum are well developed.

The 1st pleopod has the endopod narrow-elongate about  $2\frac{1}{2}$  times as long as broad with its inner margin modified into a peculiar sheath-like apparatus, thus from near the middle of the lamina there arise 4 long setae unlike the marginal ones in having short pinnae; these lie in the cavity of the sheath extending to its distal end.

In the 2nd pleopod the endopod is also narrow-elongate with the appendix long and folded on itself with a recess or ledge on the lamina.

The 3rd pleopod has the branchial folds on the endopod.

Except for these differences the sexes are similar.

**NEOSPHAEROMA AUSTRALE, Whitelegge.**

Pl. xli., figs. 6-11.

*Sphaeroma australis*, "Thetis" Scientific Results N.S. Wales Isopoda, pt. ii., p. 250.

The following may be added to Whitelegge's description:—

Posterior division of abdomen is broad and dome-shaped, gradually declivous to the end, the margin of which is broad, entire, and minutely serrate; from a posterior view, this has a broad insinuation in vertical direction.

The epistome is elongate, the apex rather broadly rounded, the upper lip is large.