

- b. Outer branch of uropods small, much shorter than inner branch.
  - c. Body scantily clothed with coarse hairs. Hinder margin of anterior division of abdomen with a pair of well marked submedian processes . . . . . *bidentata*.
  - cc. Body covered with short pubescence through which longer hairs protrude. Hinder margin of anterior division of abdomen straighter, with small submedian processes or tubercles . . . . . *coronata* var. *fusiformis*.
- bb. Outer branch of uropods large, as long as, or not much shorter than, inner branch.
  - d. Telsonic segment with at least one pair of rounded dorsal elevations or bosses, or domed with a median longitudinal furrow.
    - e. Telsonic segment with two large dorsal elevations. Size moderate (under  $\frac{3}{4}$  in.).
      - f. Endopod of uropods reaching well beyond level of apex of telson, and tip of exopod not bent. Appendix masculina of second pleopods long and slender, not widened apically . . . . . *coronata*.
    - ff. Endopod of uropods not, or scarcely, reaching beyond level of apex of telson, and exopod with tip bent outwards and slightly upwards. Appendix masculina of second pleopods widened apically . . . *unguiculata*.
    - ee. Telsonic segment with four large dorsal elevations. Size large ( $1\frac{1}{2}$  in.) . . . . . *aculeata*, var. *grandis*.
  - dd. Telsonic segment without dorsal bosses.
    - g. Anterior part of abdomen without backwardly directed processes.
      - h. Apex of outer branch of uropods not bidentate . . . . . *gaimardii*.
      - hh. Apex of outer branch of uropods bidentate . . . . . *tuberculosa*.
    - gg. Anterior part of abdomen with a pair of backwardly directed processes . . . . . *tuberculosa*, var. *bispinosa*.
  - aa. Body not very convex. Terminal process of abdomen very narrow, long and acute, projecting much beyond lateral angles of posterior notch. Branches of uropoda narrowly lanceolate . . . . . *longicaudata*.

*Cymodoce bidentata* (Haswell). (with two teeth).

The convex, subovate body has the sides nearly straight; the surface is granulate and scantily clothed with coarse hairs, particularly posteriorly. The hinder edge of the anterior division of the abdomen has two submedian, backwardly-directed, thick processes (to which the specific name refers) on each side of which is the usual tooth or tubercle, and, in addition, two or three smaller tubercles. The telsonic segment has two pairs of dorsal tubercles; the anterior pair (which are smaller than the others) are nearly beneath the submedian processes from the anterior part of the abdomen, and the second are spiniform and upturned; posterior to these is a median, spiniform tubercle. The terminal notch is wide, and the median process is tongue-shaped, blunt, and slightly bifid, or rounded apically, and projects back a little beyond the lateral angles of the notch. The male appendage of the second pleopods is about half as long again as the rami. The uropods are thick, hairy, and granulate; the large, inner ramus reaches well beyond the apex of the abdomen, and is elongate S-shaped, with a tooth on the underside, near the acute apex. The outer ramus is very small, with a tooth below the acute apex, as in the endopod.

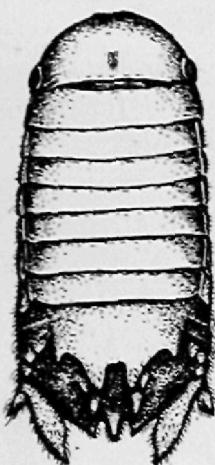


FIG. 283.—*Cymodoce bidentata* (after Baker, x 4).

Length: 13 mm., or  $\frac{1}{2}$  in. (S.A.M.)

This species occurs in Victoria and Tasmania, and has been dredged in St. Vincent Gulf.

*Cymodoce coronata* (Haswell). (crowned).

The body is convex, with the anterior segments smooth and the hinder coarsely granulate and hairy. The anterior division of the abdomen is short, with a pair of submedian tubercles (which are variable in size and shape) on the posterior margin. The telsonic segment is moderately convex, divided into two bosses by a shallow median furrow, and with two tubercles (one behind the other) on each boss. The posterior notch is deep, and the median process is slightly upturned and reaches to the level of the angles of the notch. The appendix masculina is long and very slender. The uropods are thick and hairy; the inner branch reaches slightly beyond the apex of the abdomen and ends in a tooth; the outer ramus is somewhat shorter, has the inner margin curved, and the outer margin straight, and is very acute apically.

The female is less hairy, and is almost smooth. The telsonic segment is obtusely angular apically, with little trace of a posterior notch. The inner ramus of the uropods is truncate apically, and does not reach to the end of the abdomen; the outer branch is considerably shorter. Length: 17 mm., or  $\frac{5}{8}$  in. (S.A.M.)

This species, and varieties of it, are common on southern Australian coasts. It is a difficult matter to separate some of the varieties from the preceding species.

*Cymodoce coronata* var. *fusiformis* (Baker). (shaped like a spindle).

The body is covered with short hairs, intermixed with which are longer hairs; the clothing is easily rubbed off. The hinder margin of the anterior division of the abdomen bears six tubercles; the telsonic segment has the median process of the notch with a wide raised base and a slight sulcation above it, and close to its end is a small bifid tubercle. The sides of the notch are acute and bifid. The inner ramus of the uropods is more tapering than in typical specimens of *C. coronata*, and the outer ramus is much shorter. Length: 17 mm., or  $\frac{5}{8}$  in. (S.A.M.)

This variety is very like typical specimens of *C. bidentata*, from which it differs in the characters given in the key. Intermediate forms separate the var. *fusiformis* from typical examples of *C. coronata*.

*Cymodoce unguiculata* (Barnard). (with a little nail or claw).

The sexes do not differ greatly. The surface of the convex body is smooth, clothed with fine, scattered hairs, and the margins are thickly fringed with hairs. The telsonic segment has a large boss on each side of the dorsum in both sexes; the terminal abdominal projection extends slightly beyond the lateral angles of the apical notch in the male, and has a tubercle on its upper surface. In the female this process is short and blunt, and conceals the notch when viewed from above. The male appendage of the second pleopods is distinctive in shape; it is longer than the rami, with the terminal part widened to the form of a spatula, with an acute apex and thickly armed with short, curved spines on the margins. The uropods do not, or scarcely, exceed the end of the telson; the endopod is suboval in shape, and subtruncate apically; in the male the exopod is ovate, with an acute, outwardly curved apex, and a subapical tooth on the inner margin. In the adult female the apex of the exopod is usually short and blunt, not falcate, as in the male. Length: 13 mm., or  $\frac{1}{2}$  in. (S.A.M.)

Originally described from South Africa, this species was recorded from South Australia on the evidence of some small examples, dredged on the south-eastern coast.

*Cymodoce aculeata* var. *grandis* (Baker). (*aculeata*, sharp; *grandis*, very large).

The thick, convex, subovate body is nearly smooth and polished; the abdomen and hinder parts of the last two thoracic segments are a little granulate; the margins of the posterior three or four side-plates of the thoracic somites, and the lateral and postero-lateral margins of the anterior part of the abdomen, are fringed with brown fur, while the dorsal surface of the posterior part of the abdomen bears a similar fringe, and the branches

of the uropods are margined with fur. There is a transverse rugosity on the anterior part of the abdomen, and on each side of the dorsum of the telsonic segment are two elevations or bosses, behind the outermost of which is a small oblique ridge, covered with fur. The posterior notch is deep and the terminal process is truncate, and reaches to the level of the acute lateral angles of the notch. The legs are robust, with furry pads on the merus, carpus, and propodus of each. The branches of the uropods are subequal in length; the endopod narrows slightly towards the obliquely truncate apex, while the exopod is suboval, with the outer margin thickened and curving slightly outwards at the apex. Length: 39 mm., or 1½ in. (S.A.M.)

This large and striking variety is twice the length of typical specimens, which range from New South Wales to Tasmania.

*Cymodoce gaimardii* (M. Edwards). (personal name).

The convex, suboval body is smooth and there are no large dorsal processes from any of the somites. The telsonic segment has the terminal notch deep and the median process large, apically truncate and reaching

to the level of the acute lateral angles of the notch. The first three pairs of legs are rather more robust than the others. The uropods do not reach to the end of the abdomen; the branches are subequal in length, with their apices obtuse or subacute.

The female apparently does not differ much from the male; the terminal notch of the abdomen is not so deep and the median projection is rounded (not truncate) apically. The example illustrated is probably a young male. Length: 25 mm., or 1 in. (S.A.M.)

A small variety of this species also occurs.

*Cymodoce tuberculosa* (Stebbing). (with tubercles).

The body is ovate in shape, with a granulate and tuberculate surface. There are no processes from the anterior portion of the abdomen. The

terminal notch of the telsonic segment is deep, with the median process not reaching as far as the rounded lateral angles of the notch, on each side of which is a small nick. The anterior portion of the epistome is furnished with two projecting teeth. The robust legs are spine-armed. The male appendage of the second pleopods is a little longer than the rami; it is rather broad and of equal width to within a short distance of the end, where the inner margin slopes obliquely to the subacute apex. The uropods are very granulate, sometimes with spine-like granules; the inner branch is longer and wider than the outer and terminates in a curved spine, below which are two further spines; the exopod is deeply bifid at the apex.

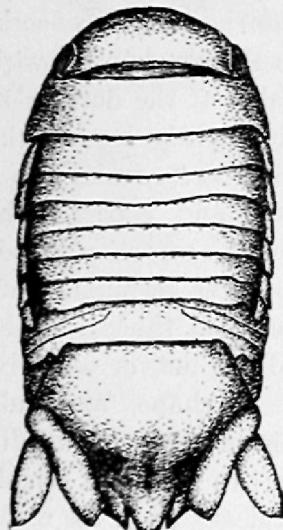


FIG. 284.—*Cymodoce gaimardii*  
after Baker, x 2).

The body of the female is smooth and slightly hairy, the epistome has no projecting teeth, the uropods are shorter, and the hinder margin of the abdomen is upturned, with a shallow incision instead of a longitudinal channel. Immature males have the hinder margin of the abdomen arched, without a terminal notch, and in other respects differ considerably from

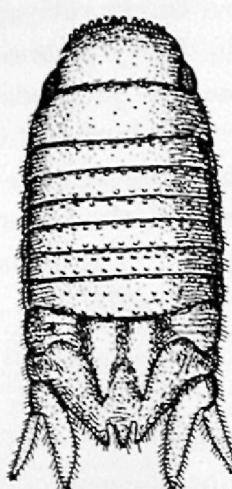


FIG. 285.—*Cymodoce tuberculosa*  
var. *bispinosa* (after Baker, x 5).

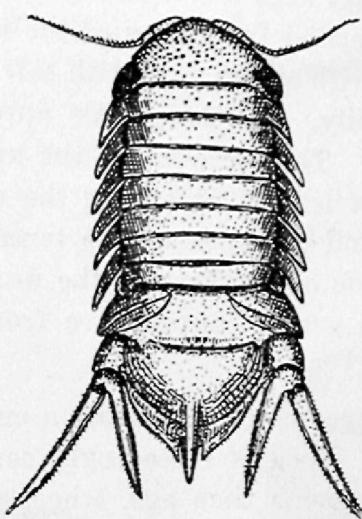


FIG. 286.—*Cymodoce longicaudata*  
(after Baker, x 3).

adult males. The colour is pale brown, with varying black markings; in degenerate females with young pigmentation is almost or quite lost. Length: 11 mm., or  $\frac{7}{16}$  in. (S.A.M.)

This, like some other species of the genus, may sometimes be found in numbers in the cavities of sponges.

*Cymodoce tuberculosa*, var. *bispinosa* (Baker). (with two spines).

The varietal name refers to the presence of two processes which extend back from the anterior part of the abdomen of the male. The adult male of the variety differs from the male of *C. tuberculosa* in the following characters also:—The body is not so markedly granulated; the terminal notch of the telson is more open and the median posterior process reaches to the level of its lateral angles, and the two spines or tubercles on the epistome are smaller.

The female has the body smoother and lacks processes from the anterior part of the abdomen; the terminal portion of the telson is slightly upturned, and the posterior median notch is represented by two obscure incisions. The uropods are short, the endopod tipped with a tooth, and the exopod is slightly bifid apically. Length: 9 mm., or  $\frac{3}{16}$  in. (S.A.M.)

*Cymodoce longicaudata* (Baker). (long-tailed).

The body, unlike that of the preceding species, is not very convex, and in lateral view the animal is not so deep; also, the side-plates of the first to sixth thoracic segments are much more prominent, sickle-shaped, thin,

and projecting. The lateral parts of the second of the fused segments of the abdomen project like those of the aforementioned thoracic somites. The dome-shaped telsonic segment has an acute spine on each side above the uropods, behind which the submarginal areas of the telson are flattened out; the terminal notch has the lateral angles acute, and the overshadowing median process is very long, carinate above, spiniform, acute, and reaches much beyond the angles of the notch. The legs are fairly robust, sparsely armed with spines, and with soft hairs instead of the furry pads common in the family. The long male appendage of the second pleopods is very slender. The branches of the uropods are narrow and lanceolate, and are equal in length, or one or the other is a little the longer; they reach to or beyond the apex of the terminal median process of the telson; on the underside of the base of the uropods is a small spine. The female differs little in general appearance from the male. Length: 16 mm., or  $\frac{5}{8}$  in. (S.A.M.)

A glance at the illustration enables one to readily recognise this distinct species, which is exceedingly common in shallow water on parts of our coasts. Some time ago, when collecting on the north coast of Kangaroo Island, two of us obtained a quart of specimens in half an hour by sweeping a hand dredge through short sea-grass (*Zostera*) growing in a few inches of water. The animal is not able to roll into a ball like some of our more convex forms.

#### PARACILICAEA (Stebbing).

This genus is by no means distinctly separated from *Cymodoce*. As mentioned in the key to the genera, the adult males of our species have the inner branch of the uropods small or tiny; in the one possible exception (which has been tentatively referred to this genus) the clothing is very distinctive.

- a. Exopod of uropods subcylindrical without nick or tooth on outer edge . . . . . *hamata*.
- aa. Exopod of uropods laminate, with at least one nick or tooth on outer margin.
  - b. Telsonic segment with tubercles and with three tiny notches on each side of terminal notch.  
Exopod of uropods with three teeth on outer margin *septemdentata*.
  - bb. Telsonic segment without tubercles and without notches alongside terminal notch. Exopod of uropods with one tooth or notch on outer margin.
    - c. Dorsum of body covered with scale-like pubescence . . . . . *pubescens*.
    - cc. Dorsum of body with very short, not scale-like pubescence . . . . . *gigas*.

*Paracilicaea hamata* (Baker). (hooked).

The body is moderately convex, suboval, and contracted to a slight "waist" between thorax and pleon. The surface is covered with fur intermixed with which are some longer hairs. The anterior part of the abdomen bears a pair of submedian dorsal tubercles and its side-parts project downwards much more than those of the narrower last thoracic somite; the dorsum of the telsonic segment is domed, with the surface granulate and with a pair of more or less spiniform submedian tubercles, between which is a shallow furrow. The legs are rather robust and are armed with the usual spines. The male appendage of the second pleopods is thick, apically rounded, and not much longer than the branches. The outer ramus of the uropods is long, curved, and cylindrical with a

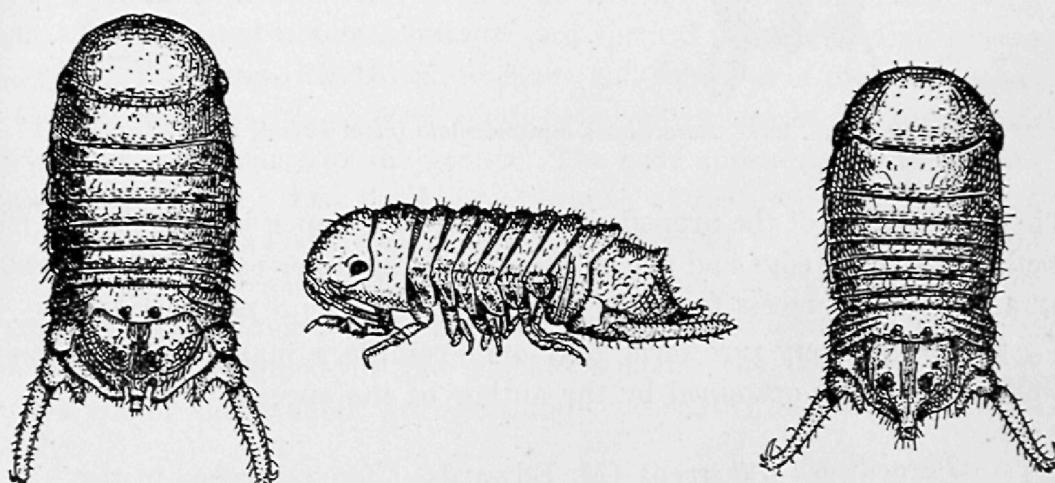


FIG. 287.—*Paracilicaea hamata*; dorsal and side views of male, and dorsal view of female (after Baker, x 5).

curved spine, and several smaller hooked spines, at the apex; the tiny inner branch has a subacute apex. As shown by the illustrations, the female does not differ markedly from the male, although the legs are rather more slender in the former. Length: 9 mm., or  $\frac{3}{4}$  in. (S.A.M.)

This species is found in sponges in our Gulfs and on the shores of Kangaroo Island. Mud and other fine debris becomes entangled in the furry clothing, so that the animal usually has a dingy coating of foreign material.

*Paracilicaea septemdentata* (Baker). (with seven teeth).

The very convex body is rather narrow, with the sides nearly straight and parallel. The surface of the head is slightly rough and each of the last three thoracic somites has a row of tubercles on the hinder margin, those of the seventh segment being spiniform. The abdomen is furnished with large tubercles. When viewed from above or from the side the telsonic segment appears abruptly truncate posteriorly, with the lower part (the apex) produced backwards; the terminal notch is moderately deep and the median process subtriangular; on each side of the latter there are three

tiny notches, so that the posterior end of the abdomen has six small teeth and one larger central tooth, hence the specific name. The robust legs lack the usual furry pads. The male appendage of the second pleopods is moderately wide, rounded apically, and is not much longer than the rami.

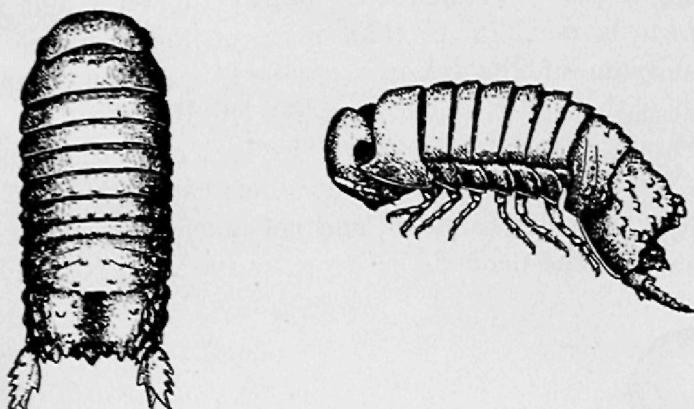


FIG. 288.—*Paracilicaea septemdentata* (after Baker, x 5).

The outer branch of the uropods is large, with the apex bifid, and with four teeth on the outer edge and one on the inner; the inner ramus is represented by a small bifid process from the peduncle. Length: 8 mm., or  $\frac{3}{10}$  in.

Apparently a very rare form, only one example, a male from St. Vincent Gulf, having been examined by the author of the species.

*Paracilicaea pubescens* (M. Edwards). (in reference to the peculiar clothing).

The strongly convex, suboval body is granulate and covered with unusual pubescence, to which the specific name alludes. Each "hair" is like a scale on a stalk. In the adult male the anterior part of the abdomen has two small submedian dorsal tubercles and the telsonic segment has two large, conical, dorsal bosses. The terminal notch of the abdomen is shallow, and the median projection is short. The male appendage of the second pleopods is narrow and is much longer than the rami. The outer branch of the uropods is twice as long as the inner and has a nick in the outer margin and the apex subacute. The female has a more ovate body than the male, the anterior portion of the abdomen is shorter, the bosses on the telsonic segment are smaller, and the branches of the uropods are subequal in length. Immature males, and even some small males which, judging by the development of the sexual appendage, are at least nearly mature, have the same appearance as the female. Length: 25 mm., or 1 in. (S.A.M.)

Females, immature males, and the mature or nearly adult males resembling the females and mentioned above, are very much like females of *Cilicaea latreillei*, and may be easily confused with that species, but the scale-like character of the clothing of *P. pubescens* enables one to separate them.

*Paracilicaea gigas* (Baker). (very large).

The very convex suboval body is covered with exceedingly short pubescence. The upper surface of the head, epistome, and peduncles of the antennae are covered with large granules. The first three thoracic segments are smooth, or with small pearly granules; the last four (where not overlapped by the preceding somites) are studded with similar granules to those of the head, but on the fourth segment they are low and rather sparser. The anterior part of the abdomen is granulate and has the hinder margin broadly triangular, with the usual nick forming a tooth on each side. The telsonic segment has the dorsum strongly domed, with a median furrow, from the posterior end of which diverges a furrow running subparallel to the hinder margin of the telson on each side. The greater part of the telsonic segment is granulate, the furrows and an area on each side being smooth. The terminal notch is narrow and vertical and the median process is short, apically rounded in the adult male, and subacute in the young male. The legs are robust, with pads of small bristles in place of the furry pads often present in members of the group. The male appendage of the second pleopods is whip-like. The short inner branch of the uropods is somewhat ovate in shape, narrowly truncate, and with a small point at each apical angle. The outer branch has the apex acute, and a nick in the outer margin; it is much longer than the endopod in the adult male, but much shorter than the endopod in the immature male; the peduncle and the outer margin of the exopod are granulate. Length: 35 mm., or  $1\frac{3}{8}$  in. (S.A.M.)

## CILICAEOPSIS (Hansen).

This genus and the four preceding are closely allied. The absence of a median process in the terminal abdominal notch distinguishes *Cilicaeopsis*.

*Cilicaeopsis granulata* (Whitelegge). (granulate).

In the adult male the body is strongly convex and rather narrowly subovate, with the surface closely granulate; the granules on the abdomen and uropods are elevated and there are stiff hairs in the spaces between them. The anterior part of the abdomen has a large median process which reaches beyond the end of the telson and is truncate apically and with three small terminal projections. The telsonic segment has a well-defined semi-circular terminal notch, with a pair of small teeth at the side. The male appendage of the second pleopods narrows towards the apex and is about twice as long as the inner ramus. The outer ramus of the uropods is large and lanceolate, and the inner branch is represented by a small acute projection of the peduncle. In the female the median process from the anterior portion of the abdomen is absent (its place being taken by a short conical tubercle), and there is a pair of sub-

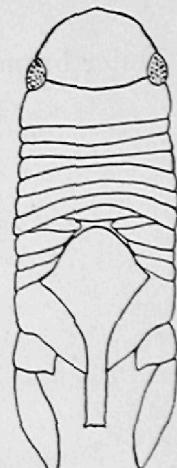


FIG. 289.—*Cilicaeopsis granulata* (after Whitelegge, x 4).