

## Redescription of the Clingfish *Cochleocephalus spatula* (Gobiesocidae) from Western Australia and South Australia, with the Description of a New Species from Victoria and Tasmania

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### Abstract

*Cochleocephalus spatula* (Günther) is recognized as the valid name for a clingfish inhabiting Western Australia and South Australian seas. It can be distinguished from all other temperate Australian gobiesocids by its relatively long, depressed, rectangular-shaped snout and the anterior placement of its posterior nostril (anterior to front border of eye). The species is redescribed on the basis of new material from both States, as well as the holotype. Victorian and Tasmanian specimens previously identified as *C. spatula* represent a new species, *C. bassensis*. It may be separated from the former species by the more triangular-shaped snout and more posteriorly placed rear nostril (behind eye's anterior border). A description of this species is also included.

### Introduction

Members of the clingfish family Gobiesocidae are generally small fishes possessing a ventral sucking disc that allows them to adhere to the substrate. Most occur in shallow coastal waters, often intertidally, but some have been found at depths over 250 m. Briggs (1955) recognized five species from temperate Australian seas in his monograph on the family. The number was increased to nine with the inclusion of the Cheilobranchidae with the Gobiesocidae by Springer and Fraser (1976). During the past decade, extensive collecting in the shallow waters along Australia's southern coastline has resulted in the discovery of many additional species (e.g. Hutchins 1977, listed 10 gobiesocids for south-western Australia, of which seven were considered to be undescribed). The present total stands at 26 species which includes at least 16 species and four genera which are apparently new (Hutchins, in preparation). Dr J. Briggs of the University of South Florida is currently studying a number of these new genera and species. While attempting to identify a species from Western Australia characterised by an elongate body and long, rectangular-shaped snout, the present author noticed that it agreed well with the type description of *Cochleocephalus spatula* (Günther, 1861) from Western Australia. However, it did not fit the subsequent description of this species appearing in Briggs' monograph. He diagnosed it as a robust clingfish with a broad, somewhat triangular-shaped snout, the description being based on specimens from Victoria and Tasmania. In order to resolve this confusion, the type of *C. spatula* was borrowed from the British Museum (Natural History) and compared with

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the Western Australian material. It was also contrasted with Victorian and Tasmanian specimens previously identified as *C. spatula*. This examination revealed that Günther's type and the Western Australian specimens are conspecific, while the Victorian and Tasmanian material represents a closely related, but nevertheless distinct species. Thus the purpose of this paper is to redescribe *C. spatula*, and to describe the new species from Victoria and Tasmania previously confused with it.

### Methods

Measurements and counts follow Briggs (1955) with the following exceptions: the anteriormost point of the caudal peduncle's measurement of length was taken from the posterior termination of the anal fin integument; the minute uppermost pectoral fin ray is not included in fin ray counts; and the body width measurement was made at the level of the pectoral fin base. The head pore terminology generally follows that of Springer and Fraser (1976).

The material examined is deposited at the Australian Museum, Sydney (AM); British Museum (Natural History), London (BMNH); National Museum of Victoria, Melbourne (NMV); Queen Victoria Museum, Launceston, Tasmania (QVM); South Australian Museum, Adelaide (SAM); and the Western Australian Museum, Perth (WAM).

### Systematics

#### *Cochleocephalus spatula* Günther, 1861

Figures 1, 2, 3a, 4a; Tables 1, 2

*Crepidogaster spatula* Günther, 1861: 508 (Type locality 'Gages Road' [sic] mouth of the Swan River, Western Australia).

*Aspasmogaster spatula* — McCulloch, 1929: 359 (part); Scott (E.O.G.), 1936: 119 (part).

*Cochleocephalus spatula* — Whitley, 1943: 141 (part); Whitley, 1948: 28.

### Diagnosis

This species is distinguished from all other known temperate Australian clingfishes on the basis of its relatively long, depressed, rectangular-shaped snout (dorsal view). In addition, both the anterior and posterior nostrils are located well in advance of the eye, whereas in all other temperate species at least the posterior nostril is either wholly or partly behind the eye's anterior margin.

### Description

Measurements and counts of the holotype and selected non-type specimens are presented in Table 1. The following counts and proportions in parentheses represent the ranges for the non-type material where they differ from those of the holotype.

Dorsal fin rays 6 (4-7); anal fin rays 8 (6-8); pectoral fin rays 20 (17-20); pelvic fin rays 1,4; caudal fin rays 10 (10-11); vertebrae 34-35; branchiostegals 6.



Figure 1 *Cochleocephalus spatula*: (a) SAM F.3600, 47 mm SL, lateral view; (b) WAM P.27881-001, 41 mm SL, showing dorsal colour pattern (part of upper lip missing).

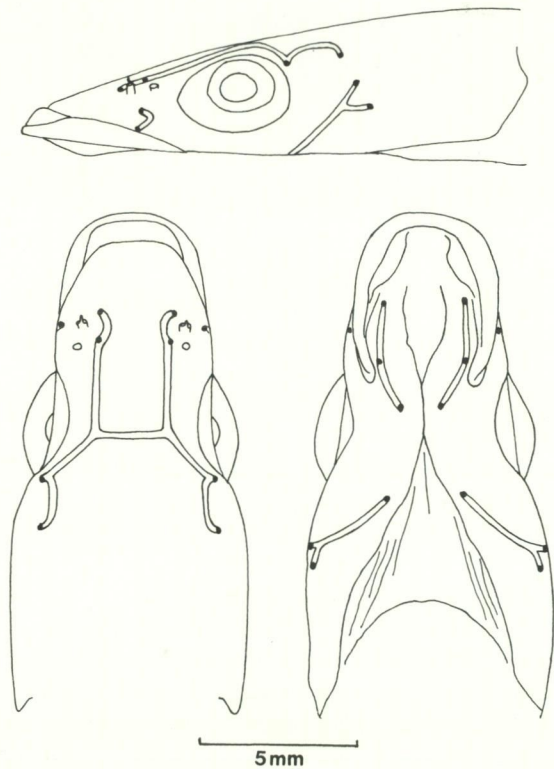


Figure 2 Diagram of the cephalic pore system of *Cochleocephalus spatula*, SAM F.3600, 47 mm SL (pores represented by black dots, the underlying canals outlined by solid lines), lateral, dorsal and ventral views (drawn with the aid of a camera lucida).

**Table 1** Measurements (mm) of the holotype and selected non-type specimens of *Cochleocephalus spatula*.

	<b>Holotype BMNH 1847.7.21.86</b>	<b>SAM F.1474</b>	<b>SAM F.3600</b>	<b>WAM P.26455 -013</b>	<b>WAM P.26455 -013</b>
Standard length	37	57	47	27	23
Head length	12	19	16	9.5	8.4
Head width	4.7	8.5	7.6	4.0	3.4
Body depth	3.3	5.3	4.4	2.1	1.5
Body width	4.5	7.7	6.6	3.3	2.5
Snout length	4.0	6.7	5.8	3.1	2.7
Eye diameter	2.7	4.0	3.6	2.6	2.3
Bony interorbital width	2.4	3.6	3.0	1.6	1.3
Snout to origin of dorsal fin	27	45	37	21	17
Caudal peduncle length	4.6	5.7	4.3	2.1	3.0
Caudal peduncle depth	1.5	2.5	2.1	1.3	1.0
Caudal fin length	7.0	9.2	8.4	5.0	3.4
Ventral disc length	5.8	9.5	9.1	4.5	3.4
Ventral disc width	3.8	6.4	5.4	3.5	2.4

**Table 2** Fin ray counts for non-type specimens of *Cochleocephalus spatula*.

<b>Dorsal fin rays</b>				<b>Anal fin rays</b>			<b>Pectoral fin rays</b>			
4	5	6	7	6	7	8	17	18	19	20
2	8	14	1	5	11	9	2	5	9	7

Body elongate, subcylindrical (moderately depressed anteriorly, tapering to a compressed caudal peduncle), depth 11.2 (10.2-15.3) and width 8.2 (7.1-9.8), both in SL; caudal peduncle moderately long, depth 3.1 (1.6-3.1) in its length; head flat, depressed, length 3.1 (2.6-3.1) in SL and width 2.6 (2.1-2.6) in head length; snout rectangular in shape (dorsal view), slightly longer than wide, length 3.0 (2.8-3.1) in head length and 1.2 (1.1-1.3) in head width; nostrils located well forward of eye; anterior nostril tubular with a simple triangular flap on posterior half of rim, flap reaching about half way to posterior nostril when folded backwards; posterior nostril with a low raised rim, higher in front; eye with a large clear cornea, diameter 4.4 (3.7-5.0) in head length, slightly greater than bony interorbital width (5.0 [4.8-6.5] in head length).

Skin smooth and scaleless, usually covered by a thick mucous layer; two sensory systems present; first consists of well-developed pores found only on head (Figure 2); each pore usually has a short, tubular opening slightly longer than thickness of mucous, and served

by a canal in the underlying bone (outlines of canals indicated in Figure 2); a total of 12 open pores on each side of head is made up of two lacrymal pores, two nasal canal pores, two postocular pores and six preoperculomandibular pores (three associated with each bone); second system consists of minute papillae arranged in consistent patterns on head and body, those on latter in two longitudinal series (because of the difficulty in detecting these papillae they are not described further here).

Gill openings wide, membranes joined across isthmus, but not attached to it, upper attachment of gill membranes opposite first pectoral fin ray; upper attachment of pelvic fin membrane opposite twelfth (10-13th) pectoral fin ray; upper attachment of axial dermal flap opposite sixth-seventh pectoral fin ray; ventral disc double, small to moderate in size, length 6.4 (5.2-6.7) and width 9.7 (7.7-9.7), both in SL; disc papillae arranged as in Figure 3a, those in peripheral series usually increasing in number with increasing SL (poorly preserved or old material may lack some or all papillae).

Mouth inferior, upper lip projecting well forwards of lower lip; teeth in both jaws conical, posteriorly curved and small to moderate in size; lateral teeth uniserial, expanding to 4-6 series anteriorly to form a tooth patch on either side of symphysis; anterior teeth in lower jaw project forwards at about 45°; palatine and vomerine teeth absent; three gills on each side; second gill arch with about five short gill rakers.

Both fin rays and bases of dorsal and anal fins short, base of anal fin slightly longer and originating below or anterior to dorsal fin; snout to origin of dorsal fin 1.4 (1.2-1.4) in SL.

Subopercular element present, forming terminal bone posteriorly on side of head, not spine-like; dorsal postcleithral bone reaches as high as seventh pectoral fin ray; ventral postcleithral bone without serrations and shaped as in Figure 4a.

Colour in alcohol: after more than 120 years in preservative the holotype is an overall brown colour. The non-type material ranges from dark brown to pale yellowish-brown, the latter variation often with 6-7 darker indistinct cross bars along the back.

Colour when fresh (based on dorsal view colour transparencies of two recently collected specimens): ground colour pale green to pale brown with many closely packed very small brown spots, many of which merge to form short darker lines and blotches on head and body (Figure 1b); six short brown bars across back, first above gill opening, last on caudal peduncle; a row of dark brown blotches on mid-side of body; small white blotches present on larger individuals, usually scattered on head and body; occasionally these blotches may be larger and more numerous, giving a piebald appearance.

### Distribution

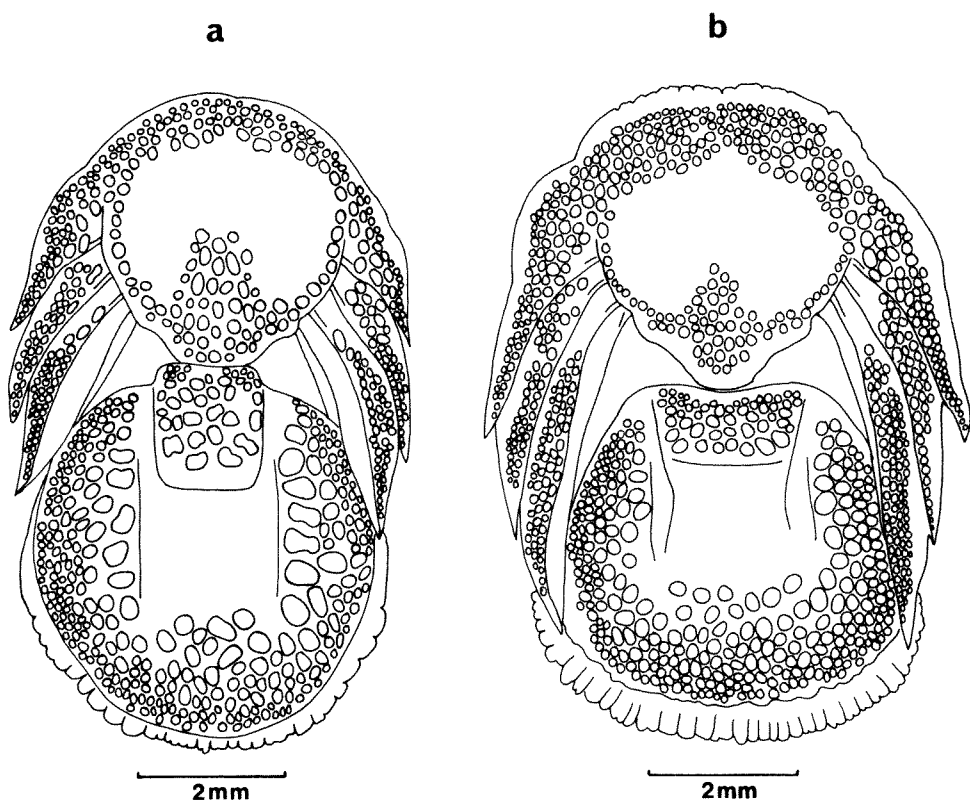
*Cochleoceps spatula* is known from Port Gawler (34°40'S, 138°26'E), north of Adelaide in South Australia to Fremantle (32°03'S, 115°44'E) in Western Australia. It has been collected by both beach seine and beam trawl from *Posidonia* seagrass beds in depths to 10 m.

### Comparisons

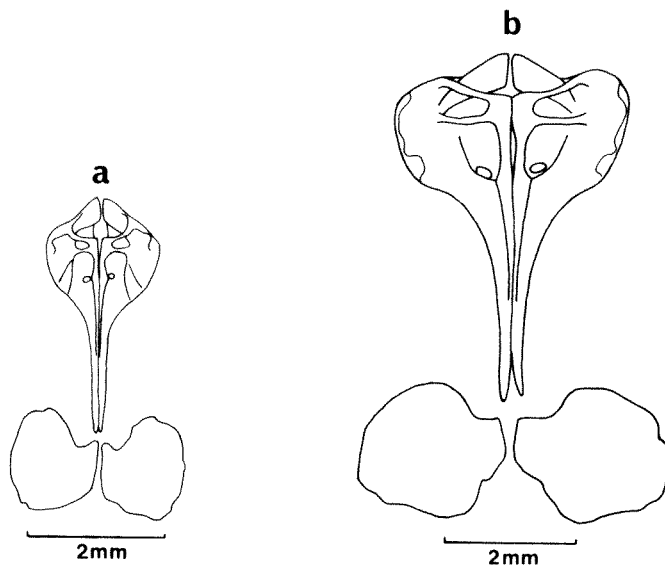
The closest relative to *Cochleoceps spatula* is an undescribed species, *Cochleoceps* species 1, so far known only from south-western Australia. Both are elongate species with similar

colorations, cephalic pore configurations and ventral disc papillae patterns. However, the latter possesses a much shorter snout (wider than long) with the posterior nostril behind the eye's anterior margin (anterior to margin in *C. spatula*). Also, the anterior teeth on its lower jaw are greatly enlarged, incisorlike, and project forwards almost horizontally, a condition not found in *C. spatula*.

*Cochleocephalus spatula* is easily separated from *C. bassensis* sp. nov. (described below) on the basis of the latter's more robust form, its shorter more triangular-shaped snout, more posteriorly placed nostrils, different cephalic pore configuration (one less preopercular pore, see Figure 6), differently shaped pelvis and postcleithral bones (Figure 4) and different anal and pectoral fin ray counts (5-6 v. 6-8 for *C. spatula*, and 24-26 v. 17-20 respectively). Furthermore, *C. bassensis* sp. nov. is apparently covered with bright red spots in life, while the colour pattern of *C. spatula* consists of brown spots, lines, bars and blotches.



**Figure 3** Ventral sucking discs showing arrangement of papillae of (a) *Cochleocephalus spatula*, SAM F.3600, 47 mm SL, and (b) *C. bassensis* sp. nov., QVM 1979/5/79, 30 mm SL (camera lucida drawings).



**Figure 4** Pelvic and ventral postcleithral bones (ventral view) of (a) *Cochleoceps spatula*, WAM P.26604-008, 39 mm SL, and (b) *C. bassensis* sp. nov., WAM P.27750-001, 40 mm SL (camera lucida drawings of cleared and stained material).

### Remarks

*Cochleoceps spatula* was described (as *Crepidogaster spatula*) by Günther in 1861 from a 44 mm Western Australian specimen collected off the mouth of the Swan River, Fremantle, in an area known as Gage Roads (incorrectly referred to by Günther as 'Gages Road'). Unfortunately most subsequent authors have incorrectly applied this name to a species inhabiting the Bass Strait area of Victoria and Tasmania, commencing with Waite (1906), who presented a detailed description and illustration of this south-eastern Australian clingfish, which although related to Günther's fish, is nevertheless a distinct species. Furthermore, Briggs (1955) reinforced this error by redescribing *C. spatula* from Bass Strait material only (at the time specimens from Western Australia, other than the holotype which was not examined, were unavailable). Because the Bass Strait species has always been incorrectly identified with *C. spatula*, it therefore remains undescribed. The following species account presents a description of *C. bassensis* sp. nov. based on material from Victoria and Tasmania.

Associated with this confusion is the problem concerning the correct identity of the type species of *Cochleoceps* Whitley (1943). This genus was described to accommodate Günther's *Crepidogaster spatula*. The type species of *Crepidogaster* Günther, 1861 (preoccupied = *Aspasmogaster* Waite, 1907) is *Aspasmogaster tasmaniensis*, also described by Günther (1861). In separating these two species, Whitley relied on differences between a figure of *A. tasmaniensis* in Scott (1936) and that of '*Crepidogaster spatula*' from Waite, 1906 (see Figure 7). As noted above, Waite's illustration is based on a Bass Strait specimen and does

not depict the true *C. spatula*. However, Whitley also referred to some of the diagnostic features of *C. spatula* given in the original description. Thus Whitley's description of *Cochleoceps* was unknowingly based on two species, *C. spatula* from Western Australia and *C. bassensis* sp. nov. from Bass Strait. Nevertheless, the Western Australian species must remain as the type of *Cochleoceps* because Whitley both designated it as such and supplied enough information to identify it. This may be important if *C. bassensis* sp. nov. proves to be generically distinct from *C. spatula* (see Remarks in the following species account).

#### Material Examined

*Cochleoceps spatula*, 29 specimens, 23-57 mm SL. Western Australia: BMNH 1847.7.21.86, holotype, 37 mm SL, Gage Roads, off Fremantle; AM I.23368-001, 40 mm SL, Woodman Point, Cockburn Sound, 17 October 1981; WAM P.21336, 27 mm SL, Forest Beach, Geographe Bay, January 1972; WAM P.26455-013, 10 specimens (one cleared and stained), 23-40 mm SL, off Wonnerup estuary, Geographe Bay, 25 December 1977; WAM P.26604-008, 5 specimens (one cleared and stained), 38-41 mm SL, off Emu Point, King George Sound, 15 April 1980. South Australia (all specimens at SAM): F.1474, three specimens, 40-57 mm SL, Port Gawler, 11 February 1931; F. 3600, four specimens, 43-48 mm SL, Foul Bay, Yorke Peninsula, December 1965; F.3606, four specimens, 43-53 mm SL, Wool Bay, Yorke Peninsula, 10 December 1965.

*Cochleoceps* species 1, 17 specimens from Western Australia, 14-40mm SL (all at WAM): P.26455-011, five specimens, 14-22 mm SL, off Wonnerup estuary, Geographe Bay, 25 December 1977; P.26604-009, seven specimens (one cleared and stained), 30-40 mm SL, off Emu Point, King George Sound, 15 April 1980; P.26622-004, five specimens, 29-34 mm SL, Thomson Bay, Rottne Island, 16 June 1980.

#### *Cochleoceps bassensis* sp. nov. Figures 3b, 4b, 5, 6, 7; Table 3, 4

*Crepidogaster spatula* — Waite, 1906: 201, pl. 36, Fig. 4.

*Aspasmogaster spatula* — Waite, 1921: 179, figure; Waite, 1923: 206, figure; McCulloch, 1929: 359 (part); Scott, 1936: 119 (part).

*Cochleoceps spatula* — Whitley, 1943: 141 (part); Whitley, 1954: 29; Scott, 1954: 110; Briggs, 1955: 52, Fig. 29; Scott, 1962: 286, figure; Scott *et al.*, 1974: 318, figure; Glover, 1982: 14.

#### Holotype

AM I.23367-001, 50 mm SL, Western Port, Victoria (38°26'S, 145°08'E), J. Gabriel, no other data.

#### Paratypes

Eleven specimens, 6-50 mm SL.

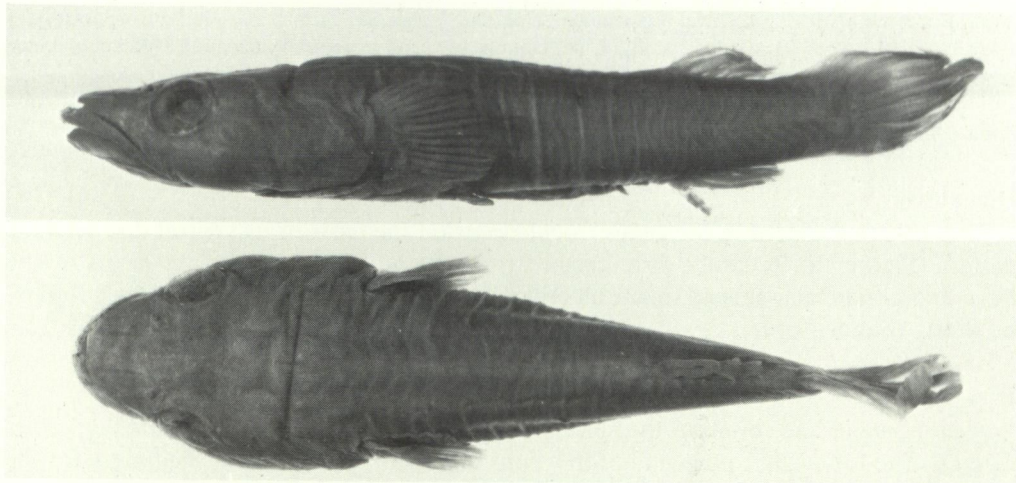
##### Victoria

AM I.7607, two specimens, 35-50 mm SL, same collection data as for holotype; NMV A.2828, 28 mm SL, off Stony Point, Western Port, trawled in 16 m, Department of Fisheries and Wildlife (*Caprella*), 1 June 1967.

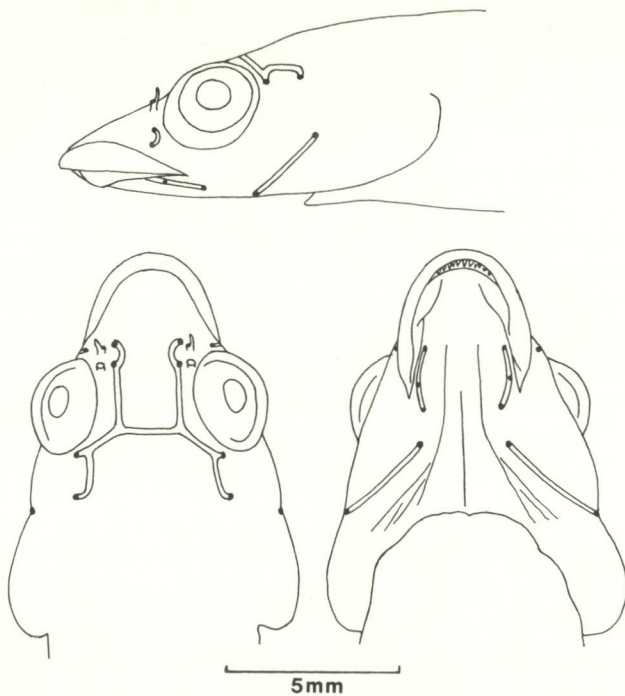
##### Tasmania

AM E.1001, 38 mm SL, Oyster Bay, trawled by F.R.V. *Endeavour*; AM I.10410, 47 mm SL, Oyster Bay, trawled by F.R.V. *Endeavour*, 13 September 1909; AM I.13005, 26 mm SL, Wineglass Bay, at 20 m, E.A. Briggs; NMV A.1730, 6 mm SL, south-western Bass Strait (40°38'S, 145°23'E), dredged in 36





**Figure 5** *Cochleoceps bassensis* sp. nov. holotype, AM I.23367-001, 50 mm SL, lateral and dorsal views (right-hand side of upper lip damaged).



**Figure 6** Diagram of the cephalic pore system of *Cochleoceps bassensis* sp. nov., QVM 1979/5/79, 30 mm SL (pores represented by black dots, the underlying canals outlined by solid lines), lateral, dorsal and ventral views (drawn with the aid of a camera lucida).

m, G. Poore on board F.V. *Sarda*, 4 November 1980; NMV A.2298, 32 mm SL, southern-western Bass Strait (40°22'S, 145°17'E), dredged in 40 m, M. Gomon *et al.* on board F.V. *Sarda*, 3 November 1980; WAM P.27750-001, 40 mm SL (cleared and stained), same collection data as for previous specimen; QVM 1979/5/44, 37 mm SL, Binnalong Bay, 28 April 1979; QVM 1979/5/79, 30 mm SL, 3 km NE of Eddystone Point (Stn 342), 27-36 m, 11 July 1979.

### Diagnosis

This species is placed in the genus *Cochleocephalus* on the basis of its ventral disc papillae pattern (Figure 3b). It can be distinguished from the other members of the genus by the large, more triangular-shaped snout, all others possessing either rectangular-shaped snouts, or short, rounded ones.

### Description

Measurements and counts of the holotype and selected paratypes are presented in Tables 3 and 4. The following counts and proportions in parentheses represent the ranges for the paratypes when they differ from those of the holotype.

Dorsal fin rays 6(5-6); anal fin rays 6 (5-6); pectoral fin rays 25(24-26), pelvic fin rays I,4; caudal fin rays 12 (11-12); vertebrae 33-34; branchiostegals 6.

Body robust, moderately depressed anteriorly and compressed posteriorly, depth 5.6 (4.7-6.6) and width 4.2 (4.1-5.1), both in SL; caudal peduncle prominent, depth 0.9 (0.7-1.1) in its length; head wide, moderately depressed, length 2.4 (2.4-2.5) in SL, width 1.5 (1.3-1.6) in head length; snout triangular in shape (dorsal view), rounded anteriorly, length 2.9 (2.9-3.2) in head length and 1.9 (1.9-2.4) in head width (snout relatively more narrow in females); anterior nostril located just in front of anterior margin of eye, posterior nostril just behind anterior margin of eye; both nostrils tubular, anterior more prominent with a simple pointed flap on posterior half of rim reaching to or behind posterior nostril when folded backwards; eye moderate, diameter 5.1 (4.1-5.1) in head length; bony interorbital width about equal to eye diameter or, in large specimens, somewhat greater, width 4.0 (4.0-4.8) in head length.

Skin smooth and scaleless, usually covered with a thick mucous layer (a series of transverse skin ridges on body are probably due to shrinkage during preservation); two sensory systems present, similar in shape and position as described for *C. spatula*, except that preopercular series consists of two open pores instead of three (compare Figures 2 and 6).

Gill openings wide, membranes joined across isthmus but not attached to it; upper attachment of gill membrane opposite third (3-5th) pectoral fin ray; upper attachment of axial dermal flap opposite thirteenth (12-14th) pectoral fin ray; upper attachment of pelvic fin membrane opposite fifteenth (13-15th) pectoral fin ray; ventral disc double, moderate to large in size, length 3.3 (3.2-3.9) and width 4.2 (3.2-5.1), both in SL; disc papillae arranged as in Figure 3b, those in peripheral series usually increasing in number with increasing SL (papillae in single series which flanks bases of pelvic fin rays often lost, compare Figure 3b with Figure 29 in Briggs 1955).

Mouth terminal to slightly inferior, upper lip generally projecting farther forward than lower lip; lateral teeth in both jaws uniserial, conical, posteriorly curved and moderate

in size; in upper jaw lateral series continued anteriorly, with a patch of much smaller similarly shaped teeth on either side of symphysis; in lower jaw the symphyseal patch is continued anteriorly, the anteriormost series projecting forwards and more worn than those behind; palatine and vomerine teeth absent; three gills on each side; second gill arch with seven short gill rakers.

Both fin rays and bases of dorsal and anal fins short, bases generally equal in length; origin of dorsal fin over or slightly in front of anal fin; snout to dorsal fin origin 1.3 (1.2-1.3) in SL.

Subopercular element present, forming terminal bone posterity on side of head, not spine-like; dorsal postcleithral bone reaches as high as thirteenth pectoral fin ray; ventral postcleithral bone without serrations and characteristically shaped (Figure 4b).

**Table 3** Measurements (mm) of the holotype and selected paratypes of *Cochleoceps bassensis*.

	Holotype		Paratypes		
	AM I.23367-001	AM E.1001	NMV A.2298	QVM 1979/5/79	NMV A.2828
Standard length	50	38	32	30	28
Head length	21	16	13	12	11
Head width	14	9.7	8.0	8.1	7.5
Body depth	9.0	5.8	6.6	5.0	4.5
Body width	12	8.8	6.5	5.9	6.6
Snout length	7.3	5.2	4.1	4.0	3.6
Eye diameter	4.1	3.5	3.0	2.7	2.7
Bony interorbital width	5.3	3.6	2.7	2.7	2.5
Snout to origin of dorsal fin	38	29	27	24	22
Caudal peduncle length	4.3	2.5	3.0	2.8	2.7
Caudal peduncle depth	4.9	3.7	2.7	2.7	2.6
Caudal fin length	8.6	7.3	*	5.9	5.4
Ventral disc length	15	9.8	8.9	9.0	8.3
Ventral disc width	12	7.5	7.3	6.5	7.1

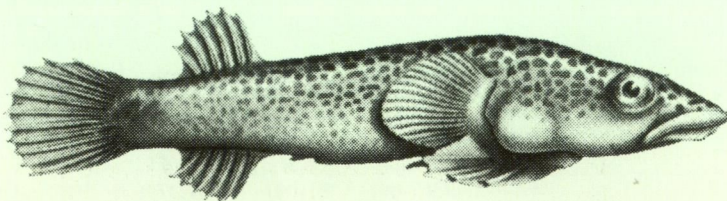
\* Measurement not taken because of damaged fin.

**Table 4** Fin ray counts for type specimens of *Cochleoceps bassensis*.

Dorsal fin rays	Anal fin rays	Pectoral fin rays
<u>5</u> <u>6</u>	<u>5</u> <u>6</u>	<u>24</u> <u>25</u> <u>26</u>
1 9	1 9	3 3 2

Colour of holotype in alcohol: after many years in preservative the holotype is an overall pale brown colour. The colour of the paratypes ranges from pale brown to dark brown, except for two of the more recently collected specimens from Tasmania (at QVM). Their ground colour is pale yellow, the back and upper sides profusely covered with red stipple-like spotting, the undersides being more sparsely spotted; this spotting is continued on to the fin rays of the dorsal, anal, pelvic and caudal fins (the pectoral fins are unspotted); aggregations of these spots indicate the original presence of much larger spots (see Figure 7), the colour having generally faded.

Colour in life: apparently covered with bright red spots (Figure 7). See also following discussion under Remarks.



**Figure 7** Waite's (1906) illustration of "*Crepidogaster spatula*" (= *Cochleocephalus bassensis* sp. nov.) showing diagnostic colour pattern.

### Distribution

*Cochleocephalus bassensis* is known from both sides of Bass Strait, from Western Port in Victoria (38°22'S 145°32'E) to the north-eastern and north-western corners of Tasmania. As well it has been found on Tasmania's east coast as far south as Wineglass Bay (42°10'S, 148°18'E) on Freycinet Peninsula (it may also occur in South Australia, see Remarks section below). It has been taken by both bottom trawl and dredge on sandy bottoms at depths to 40 m.

### Comparisons

The differences between *Cochleocephalus bassensis* and *C. spatula* were discussed in the account of the latter species. It is separable from the undescribed *Cochleocephalus* species 1 from Western Australia by the latter's more elongate form (similar to *C. spatula*) and large incisor-like teeth in the lower jaw. The so-called 'cleaner clingfishes' *Cochleocephalus* species 2 from Western Australia, South Australia and Victoria (see Scott *et al.*, 1980: pl. 13), and *Cochleocephalus* species 3 from New South Wales, both of which are undescribed, have recently been confused with *C. bassensis* (all three species are covered with close-packed red spots). However, these species have narrow blue cross bars on their backs, a feature absent in *C. bassensis*. In addition, they are smaller (maximum known size of 30 mm SL as against 50 mm SL), have short rounded snouts instead of a prominent triangular-shaped one and possess fewer sensory pores on the mandible (two v. three on each side). Species of the genus *Aspasmogaster* differ from *C. bassensis* by possessing completely different patterns of ventral disc papillae (they lack the triangular patch located posteriorly on the



midline of the disc's anterior half, see Scott *et al.* 1974: 318). In addition, *Aspasmogaster* possesses only one sensory pore in the mandibular series, which is directly connected to the preopercular series, and has three lacrymal pores. *Cochleoceps bassensis* possesses three mandibular pores which are not directly connected to the preopercular series, and its lacrymal series consists of only two pores (a review of *Aspasmogaster* is in preparation by the present author).

### Remarks

Although *Cochleoceps bassensis* differs considerably in body shape from *C. spatula*, they are nevertheless closely related (see remarks in species account for *C. spatula*). However, within the genus *Cochleoceps* there appears to be three natural groups which may be diagnosed as follows:

- 1 Elongate body and six preoperculomandibular pores (*C. spatula* and *C. species 1*).
- 2 Robust body and five preoperculomandibular pores (*C. bassensis*).
- 3 Moderately robust body and four preoperculomandibular pores (*C. species 2* and *C. species 3*).

Further studies may show that more than one genus is represented here, but for the present all five species are retained in *Cochleoceps*.

With regard to the life colours of *C. bassensis*, little information is available. Waite's 1906 description and illustration of '*C. spatula*' (= *C. bassensis*) indicate that it is covered with 'crowded carmine spots, those on head round, those on the body lengthened' (see Figure 7). However, Waite's material was sent to him in Sydney from Melbourne so it was most likely preserved before despatch. Nevertheless, enough of the coloration must have remained for Waite to prepare his description. Judging by the colour differences observed by the present author between live and recently preserved material of both *Cochleoceps* species 2 and *C. species 3*, there seems little doubt that in life *C. bassensis* is covered with closely packed bright red spots. Life colours referred to '*C. spatula*' by Scott 1976, were taken from northern Tasmania specimens of a species characterized by obvious spine-like subopercular bones, a feature lacking in all species of *Cochleoceps*. Thus Scott's description is not of *C. bassensis*, his specimens apparently representing a new genus and species.

As noted above, Waite's description and illustration were made from specimens sent to him by the collector. These are still extant and in reasonable condition (they formed the basis of Briggs' 1955 description of '*C. spatula*', but were incorrectly listed as I.7606 from Port Phillip Bay). The specimen most likely to have been the subject for Waite's figure has been selected as the holotype for *C. bassensis*.

*Cochleoceps bassensis* has been included (as *C. spatula*) in numerous accounts on South Australian fishes (Waite 1921, 1923; Scott [T.D.] 1954, 1962; Scott *et al.* 1974, 1980; and Glover 1979, 1982). However, no specimens could be located to substantiate these records. The first inclusion was by Waite (1921) who simply added South Australia to its distribution without further comment. Scott (1962) stated that the 'species is rare in South Australia'. However, until positive proof of its presence is made available, these South Australian records must be open to doubt.

This species is named *bassensis* with reference to its Bass Strait distribution.

### Additional Material Examined

*Cochleoceps* species 2, three specimens, 18-29 mm SL. Western Australia (all at WAM): P.26608-025, 20 mm SL (cleared and stained), Lookout Point, east of Albany, 19 April 1980; P.26616-002, 18 mm SL, Rottneest Island, 7 June 1980. South Australia: NMV A.2829, 29 mm SL, Flinders Island, 29 March 1982.

*Cochleoceps* species 3, six specimens, 19-24 mm SL. New South Wales: AM I.21975-001, 19 mm SL, The Haven, Terrigal, 26 February 1977; NMV A.2830, 24 mm SL, Montague Island, 15 September 1981; WAM P.27103-001, four specimens (one cleared and stained), 21-22 mm SL, Big Island, Wollongong, 3 February 1981.

Gobiesocid species (with subopercular spines) from Tasmania: QVM 1980/5/17, six specimens, 25-29 mm SL, Eddystone Point, November 1979.

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