DESCRIPTION AND REVISION OF SOME SOUTH AFRICAN AEOLIDACEAN NUDIBRANCHIA (MOLLUSCA, GASTROPODA)

By

Terrence M. Gosliner

South African Museum

&

Roberta J. Griffiths

Department of Zoology and Institute of Oceanography, University of Cape Town

(With 22 figures and 5 tables)

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ABSTRACT

This study examines aeolids of the families Flabellinidae, Aeolidiidae, Tergipedidae, and Embletoniidae from South Africa. The genus *Coryphella* Gray, 1850, is regarded as a junior synonym of *Flabellina* Voigt, 1834. *Flabellina funeka* sp. nov. is described and *Flabellina capensis* (Thiele, 1925) is rediscovered from the Cape Peninsula. *Aeolidiella indica* Bergh, 1888, is designated as the senior synonym of *A. saldanhensis* Barnard, 1927, and *A. multicolor* Macnae, 1954, from South Africa, as well as several other species from other parts of the world. *Catriona columbiana* (O'Donoghue, 1922) is newly recorded from South Africa and *C. casha* sp. nov. is described. *Cuthona speciosa* (Macnae, 1954) is redescribed and transferred to *Cuthona*. *Embletonia gracilis* Risbec, 1928, is recorded from South Africa.

CONTENTS

INTRODUCTION

The aeolidacean nudibranch fauna of South Africa has been sporadically and poorly studied. Bergh (1907) recorded the cosmopolitan, pelagic species, *Glaucus atlanticus* and Thiele (1925) described the external morphology and radula of *Coryphella capensis* based on a single specimen collected off Plettenberg Bay. Barnard (1927) studied the external morphology and radula of

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Aeolidiella saldanhensis, *Godiva quadricolor* (as *Hervia*), *Cratena capensis*, and *Facelina faurei*. The only complete descriptions of South African aeolid nudibranchs were provided by Macnae (1954). He further elucidated the morphology of species described by Bergh and Barnard and described seven additional taxa. Of the 13 species of aeolids recorded from South Africa to date, 8 are members of the Facelinidae, 2 of the Aeolidiidae, and 1 each of the Flabellinidae, Tergipedidae, and Glaucidae.

Our collections and morphological study of some South African opisthobranchs have yielded several new taxa, of which two species are here described. Two additional species, not previously recorded from South Africa, are described in detail and the descriptions of three species previously recorded from South Africa are amplified and their systematic placement revised.

Family **Flabellinidae**

Flabellina funeka sp. nov.

Figs 1A, 2–4

Material

Holotype

South African Museum, Cape Town, SAM–A34317, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 17 January 1980.

Paratypes

SAM–A34318, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 17 January 1980

SAM–A34319, 10 m depth, Venus Pool, False Bay (34°17′S 18°28′E), 6 January 1980

SAM–A34320, 17 m depth, New Harbour wall, Hermanus (34°17′S 19°15′E), 11 October 1971

SAM–A34321, 17 m depth, New Harbour wall, Hermanus (34°17′S 19°15′E), 11 October 1971

Etymology

'Funeka' is derived from Zulu, meaning to be sought after, owing to its beauty.

External morphology

The fully mature animals (Fig. 1A) are 9 to 40 mm in length, when actively crawling. The oral tentacles are shorter than the rhinophores and are basally thickened (Fig. 2A). The foot corners are short and well developed. When fully extended they are held at an angle of 90° from the foot, but are recurved inwardly when the animal's head is raised. The foot is slender and transversely grooved anteriorly. The rhinophores are conical with 10 to 14 transverse lamellae which may be complete or interrupted (Fig. 2B). The cerata arise from

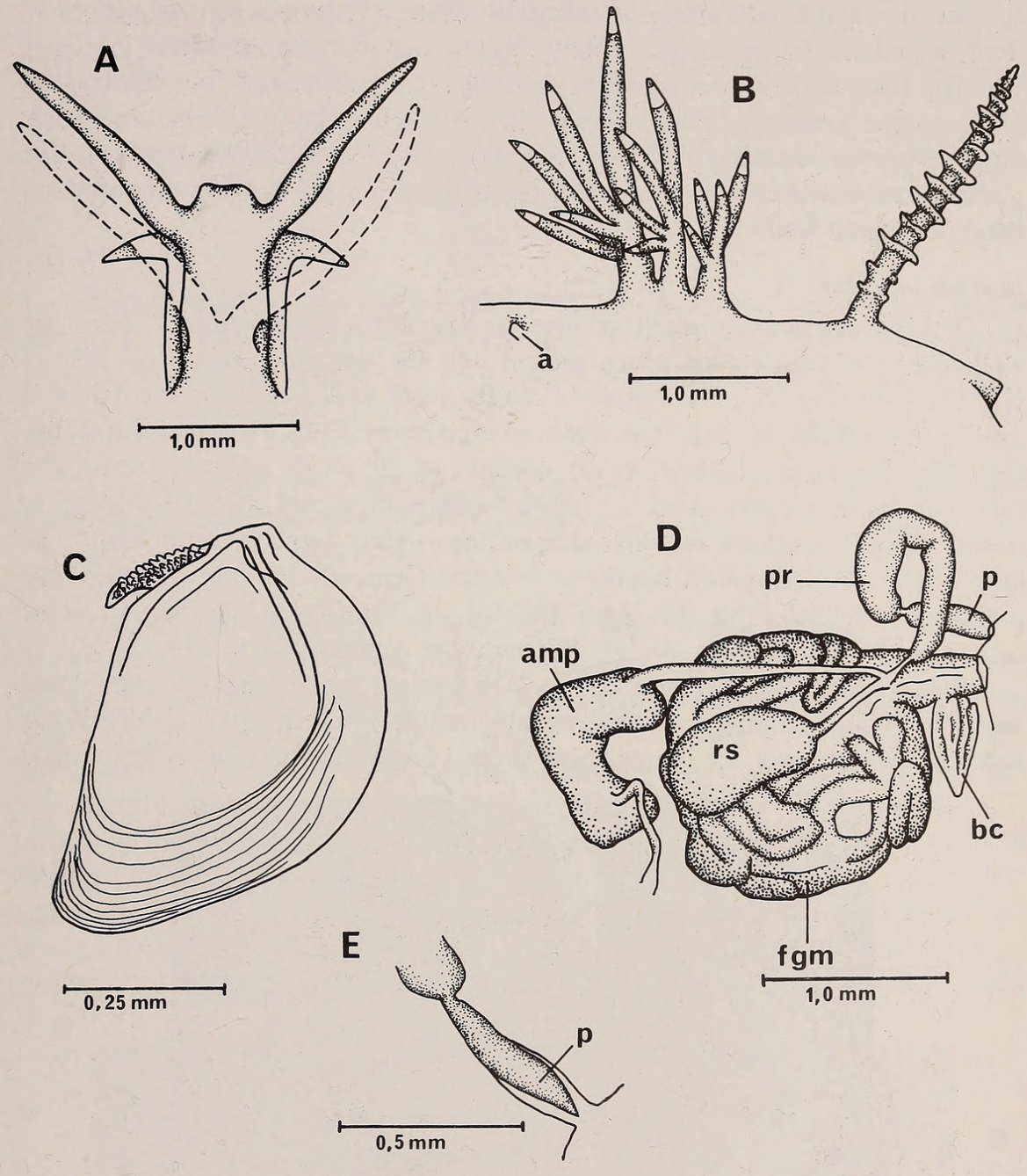

Fig. 2. *Flabellina funeka* sp. nov. A. Dorsal view of head. B. Lateral view of pedunculate cerata and rhinophore. C. Jaw. D. Reproductive system. E. Penis.

compound peduncles which generally contain two or three major subdivisions. The right anterior digestive branch is formed by 2 or 3 compound peduncles with 4 to 6 cerata in the anteriormost cluster, 9 to 10 cerata in the second, and 6 to 10 in the third. In some instances the first and second peduncles are incompletely separated, thus forming a single, larger peduncle. These peduncles are followed by the long interhepatic space. In the posterior digestive branch there are 7 to 9 peduncles per side. They consist of 7 to 11, 6 to 9, 5 to 7, 4 to 6, 2 to 4, 1 to 3, 1 to 2, 1, 1 cerata per peduncle. The pleuroproctic anus

is situated in the middle of the interhepatic space. The gonopores are ventral to the first and second peduncles of the right anterior digestive branch.

The body surface is covered by vivid mauve pigment. The rhinophores and oral tentacles are tipped with opaque white pigment. The ceratal peduncles are purple but the ceratal epidermis is translucent. The vermilion-red digestive gland does not entirely fill the lumen of the cerata. Each ceras has a subapical band of opaque white pigment.

Internal morphology

The buccal mass is small relative to the size of the animal. There are well-developed oral glands which extend into the anteriormost ceratal peduncle. The jaws (Fig. 2C) are thin and broadly ovoid with 5 to 6 rows of denticles on the masticatory border. The outer row contains 23 to 33 prominent denticles. The triseriate radula (Fig. 3) consists of 30 to 35 rows of teeth. The rachidian teeth are broad with a thick basal portion and 5 to 10 shallow to deeply incised denticles on each side of the slightly larger central cusp. The lateral teeth are triangular, basally arched and terminate in an acute apex. The number of denticles on the inner face of the laterals is variable. In some instances denticles may be absent, but there are commonly 7 to 12.

The reproductive system (Fig. 2D) has a large, slightly convoluted ampulla. A postampullary duct of variable length gives rise to the duct of the receptaculum seminis. The large, pear-shaped receptaculum seminis lies ventral

Fig. 3. *Flabellina funeka* sp. nov. Scanning electron micrograph of the radula. Scale: 10 μm between squares.

to the ampulla. Slightly more distally from the receptaculum duct, the postampullary duct bifurcates into a short oviduct and a longer vas deferens. The thick, prostatic vas deferens constricts sharply and terminates in a short, conical, unarmed penial papilla (Fig. 2E). The female gland mass is well developed with the mucous gland forming the largest portion. The saccate bursa copulatrix is situated near the female gonopore and appears to have a glandular epidermis.

Natural history

Flabellina funeka has been found at several localities in False Bay and at Hermanus. It has only been found subtidally in 7 to 17 m of water. It appears to feed exclusively on members of the gymnoblastic hydroid genus, *Eudendrium*.

Egg mass

The egg mass of *Flabellina funeka* (Fig. 4) is highly convolute and undulate, consisting of several whorls. There is a single egg per capsule.

Discussion

The generic distinction between *Coryphella* Gray, 1850, and *Flabellina* Voigt, 1834, is based upon the manner in which the cerata are inserted into the notum. *Coryphella* is characterized by cerata that insert directly into the notum, while a stalk or peduncle of notal tissue is found in species of *Flabellina*. While the majority of species can be separated using this feature, several others are more problematic. *Coryphella iodinea* (Cooper, 1862) (MacFarland 1966), *C. pellucida* (Alder & Hancock, 1843) (Kuzirian 1979), *C. cynara* Marcus & Marcus, 1967, *C. pricei* MacFarland, 1966, and *C. trilineata* O'Donoghue, 1921 (MacFarland 1966, as *C. fisheri*) possess cerata on cushions that are somewhat more elevated than in most species of *Coryphella*, but less pronounced than those of *Flabellina*. This fact led MacFarland (1966) to erect the genus

Fig. 4. *Flabellina funeka* sp. nov. Egg mass at 5 × magnification.

Flabellinopsis for *Aeolis iodinea* Cooper, 1862. Marcus and Marcus (1967) quite correctly noted that this further complicates the problem of separating *Flabellina* and *Coryphella* and suggested that *Flabellinopsis* be regarded as a junior synonym of *Coryphella*.

If one compares the type species of *Coryphella* (*Eolis rufibranchialis* Johnston, 1832 = *Eolidia verrucosa* M. Sars, 1829) with that of *Flabellina* (*Doris affinis* Gmelin, 1791), several other differences appear. In *Coryphella verrucosa* the pleuroproctic anus is situated near the anterior limit of the right posterior digestive branch (Kuzirian 1979) while in *Flabellina affinis* it is situated in the interhepatic space. In *Coryphella verrucosa* the rhinophores are slightly rugose (Kuzirian 1979) while in *Flabellina affinis* they possess 25 to 28 annulations (Bergh 1875). These and other morphological criteria of *Coryphella verrucosa*, *Flabellina affinis* and species which appear to be intermediate between *Coryphella* and *Flabellina* are compared in Table 1. Other species of *Flabellina* were considered by Gosliner (1980). Analysis of the features listed in Table 1 demonstrates several morphological trends. Within the Flabellinidae there is a tendency for the cerata to become modified into more discrete clusters and for these clusters to become elevated from the notum on peduncles. The rhinophores can be smooth, rugose, annulate or perfoliate and this appears to be a morphological sequence to increase sensory surface area. All species of *Flabellina* possess perfoliate rhinophores except for *F. affinis*, which has annulate rhinophores. There is also a tendency towards the anterior migration of the anus into the interhepatic space. Despite these major trends within the family, it is difficult to find a high degree of correlation of these characters among species that are intermediate between *Coryphella* and *Flabellina*. Of species with somewhat pedunculate cerata, *C. pellucida* retains smooth rhinophores, *C. pedata* has rugose rhinophores, *C. pricei* and *C. trilineata* have annulate rhinophores, and *C. cynara* and *C. iodinea* have perfoliate ones. In *C. iodinea* and *C. trilineata* the anus is found posteriorly while in *C. cynara*, *C. pedata*, *C. pellucida*, and *C. pricei* it is in the interhepatic space. Radular and reproductive characters provide no additional basis on which to separate the genera.

Mayr (1969) suggested that a distinct morphological gap should exist between genera. The presence of intermediate forms with poor correlation of morphological characteristics suggests that maintenance of the generic separation of *Coryphella* and *Flabellina* is untenable. We therefore regard *Coryphella* Gray, 1850, as a junior subjective synonym of *Flabellina* Voigt, 1834, syn. nov. on the basis of priority. The species regarded as members of *Flabellina* are as follows:

Flabellina affinis (Gmelin, 1791)
    Doris affinis Gmelin, 1791
    Flabellina affinis (Gmelin, 1791), Voigt, 1834
Flabellina albomarginata (Miller, 1971)
    Coryphella albomarginata Miller, 1971
    Flabellina albomarginata (Miller, 1971)—comb. nov.
Flabellina alisonae Gosliner, 1980

Flabellina annuligera (Bergh, 1900)
Samla annuligera Bergh, 1900
Flabellina annuligera (Bergh, 1900), Miller, 1971
Flabellina athodona (Bergh, 1875)
Coryphella athodona Bergh, 1875
Flabellina athodona (Bergh, 1875)—comb. nov.
Flabellina barentsi (Vayssière, 1913)
Coryphella barentsi Vayssière, 1913
Flabellina barentsi (Vayssière, 1913)—comb. nov.
Flabellina babai Schmekel, 1970
Flabellina berghi (Vayssière, 1888)
Coryphella berghi Vayssière, 1888
Flabellina berghi (Vayssière, 1888)—comb. nov.
Flabellina browni (Picton, 1980)
Coryphella browni Picton, 1980
Flabellina browni (Picton, 1980)—comb. nov.
Flabellina borealis (Odhner, 1922)
Coryphella borealis Odhner, 1922
Flabellina borealis (Odhner, 1922)—comb. nov.
Flabellina californica (Bergh, 1904)
Coryphella californica Bergh, 1904
Flabellina californica (Bergh, 1904)—comb. nov.
Flabellina capensis (Thiele, 1925)
Coryphella capensis Thiele, 1925
Flabellina capensis (Thiele, 1925)—comb. nov.
Flabellina cooperi (Cockerell, 1901)
Coryphella cooperi Cockerell, 1901
Flabellina cooperi (Cockerell, 1901)—comb. nov.
Flabellina cynara (Marcus & Marcus, 1967)
Coryphella cynara Marcus & Marcus, 1967
Flabellina cynara (Marcus & Marcus, 1967)—comb. nov.
Flabellina dushia (Marcus & Marcus, 1963)
Coryphella dushia Marcus & Marcus, 1963
Flabellina dushia (Marcus & Marcus, 1963)—comb. nov.
Flabellina engeli Marcus & Marcus, 1968
Flabellina falklandica (Eliot, 1907)
Coryphella falklandica Eliot, 1907
Flabellina falklandica (Eliot, 1907)—comb. nov.
Flabellina frigida (Grieg, 1905)
Coryphella frigida Grieg, 1905
Flabellina frigida (Grieg, 1905)—comb. nov.
Flabellina fusca (O'Donoghue, 1921)
Coryphella fusca O'Donoghue, 1921
Flabellina fusca (O'Donoghue, 1921)—comb. nov.
Flabellina gracilis (Alder & Hancock, 1844)
Eolis gracilis Alder & Hancock, 1844
Coryphella gracilis (Alder & Hancock, 1844), Alder & Hancock, 1855
Flabellina gracilis (Alder & Hancock, 1844)—comb. nov.
Flabellina incognita (Derjugin, 1926)
Coryphella barentsi Derjugin, 1924, *non* Vayssière, 1913
Coryphella stimpsoni incognita Derjugin, 1926, *non* Verrill, 1879
Flabellina incognita (Derjugin, 1926)—comb. nov.
Flabellina iodinea (Cooper, 1862)
Aeolis (Phidiana?) iodinea Cooper, 1862
Flabellinopsis iodinea (Cooper, 1862), MacFarland, 1966
Coryphella iodinea (Cooper, 1862), Marcus & Marcus, 1967
Flabellina iodinea (Cooper, 1862)—comb. nov.

TABLE 1

Comparison of some species of *Coryphella* and *Flabellina*.

	Distribution	Coloration	Cerata	Rhinophores	Radular rows	Denticles per side of rachidian
Flabellina affinis	Mediterranean	body and cerata violet; speckled, pale brown	on compound peduncles	18–25 annulations	34	6–7
Coryphella verrucosa	North Atlantic Circumboreal	body transparent white; cerata red (rarely green) white tips	not elevated	rugose	13–20	4–8
Flabellina funeka	South Africa	body mauve; cerata red, white tips	on compound peduncles	10–14 annulations	30–35	5–8
Coryphella cynara	Gulf of California	body semi-transparent blue; cerata orange-brown, white tips, body with blue lines	on simple 'cushions'	30 perfoliations	16	7–9
Coryphella fusca	North Pacific	body transparent, cerata deep brown, opaque tips	not elevated	32–38 annulations	19	4–7
Coryphella iodinea	North-eastern Pacific	body purple; cerata orange	markedly elevated	46–80 perfoliations	22	14–16
Coryphella pedata	European Atlantic Mediterranean	body violet; cerata orange-red, white tips	slight elevation	rugose	20	3–6
Coryphella pellucida	North Atlantic	body transparent, white. cerata carmine, white tips	markedly elevated	smooth	30–40	8–11
Coryphella pricei	California	body translucent white. cerata red-orange or olive green	slight elevation	*c.* 20 annulations	19	6–8
Coryphella trilineata	North-eastern Pacific	body translucent grey, cerata orange-red	first group only slightly elevated	14–20 annulations	17–18	5–8

Flabellina islandica (Odhner, 1937)
Coryphella islandica Odhner, 1937
Paracoryphella islandica (Odhner, 1937), Miller, 1971
Flabellina islandica (Odhner, 1937)—comb. nov.
Flabellina japonica (Volodchenko, 1941)
Coryphella japonica Volodchenko, 1941
Flabellina japonica (Volodchenko, 1941)—comb. nov.
Flabellina lineata (Lovén, 1846)
Aeolis lineata Lovén, 1846
Aeolis argentolineata Costa, 1866, Trinchese, 1877
Coryphella lineata (Lovén, 1846), Bergh, 1875
Flabellina lineata (Lovén, 1846)—comb. nov.
Flabellina longicaudata (O'Donoghue, 1922)
Coryphella longicaudata O'Donoghue, 1922
Flabellina longicaudata (O'Donoghue, 1922)—comb. nov.
Flabellina macassarana Bergh, 1905
Flabellina nobilis (Verrill, 1880)
Coryphella nobilis Verrill, 1880
Flabellina nobilis (Verrill, 1880)—comb. nov.
Flabellina orientalis (Volodchenko, 1941)
Coryphella orientalis Volodchenko, 1941
Flabellina orientalis (Volodchenko, 1941)—comb. nov.

Denticles on laterals	Position of receptaculum seminis	Position of bursa copulatrix	Penis	Anal position	Foot corners	Reference
6	distal or rarely proximal	distal	elongate, conical	interhepatic space	short, stout	Bergh 1875; Vayssière 1913; Schmekel 1970
7–12	proximal	distal	trumpet-shaped	lateral on anterior margin of second hepatic group	moderate length	Thompson & Brown 1976; Kuzirian 1979
0–12	proximal	distal	short, conical	interhepatic space	short, stout	present study
12–15	absent	distal	bulbous, papillate	interhepatic space	long, slender	Marcus & Marcus 1967
3–5	unknown	unknown	unknown	unknown	long, slender	O'Donoghue 1921
11–16	absent	distal	short, conical	lateral, below margin of second hepatic group	short, stout	MacFarland 1966; Marcus & Marcus 1967
5–7	two proximal	absent	bulbous	interhepatic space	short, stout	Alder & Hancock 1848. Thompson & Brown 1976; Schmekel 1970
smooth	proximal	distal	unknown	interhepatic space	long, slender	Kuzirian 1979
smooth	absent	distal	short, conical	interhepatic on anterior lateral edge of second group	stout, tapering	MacFarland 1966
6–12	proximal	distal	short, conical, tip pointed and curved	lateral on anterior margin of second hepatic group	short, pointed	O'Donoghue 1921 MacFarland 1966

Flabellina ornata (Risbec, 1928)
Coryphella ornata Risbec, 1928
Flabellina ornata (Risbec, 1928), Baba, 1955
Flabellina parva (Hadfield, 1963)
Coryphella parva Hadfield, 1963
Flabellina parva (Hadfield, 1963)—comb. nov.
Flabellina pedata (Montagu, 1815)
Doris pedata Montagu, 1815
Eolis landsburgii Alder & Hancock, 1846, Alder & Hancock, 1855
Coryphella pedata (Montagu, 1815), Odhner, 1939
Flabellina pedata (Montagu, 1815)—comb. nov.
Flabellina pellucida (Alder & Hancock, 1843)
Eolis pellucida Alder & Hancock, 1843
Coryphella pellucida (Alder & Hancock, 1843), Gray, 1850
Flabellina pellucida (Alder & Hancock, 1843)—comb. nov.
Flabellina poenicia (Burn, 1957)
Hervia? poenicia Burn, 1957
Coryphella poenicia (Burn, 1957), Burn, 1962
Flabellina poenicia (Burn, 1957)—comb. nov.
Flabellina polaris (Volodchenko, 1946)
Coryphella polaris Volodchenko, 1946
Flabellina polaris (Volodchenko, 1946)—comb. nov.

Flabellina pricei (MacFarland, 1966)
Coryphella pricei MacFarland, 1966
Flabellina pricei (MacFarland, 1966)—comb. nov.
Flabellina robusta (Trinchese, 1874)
Coryphella robusta Trinchese, 1874
Flabellina robusta (Trinchese, 1874)—comb. nov.
Flabellina rubrolineata (O'Donoghue, 1929)
Coryphellina rubrolineata O'Donoghue, 1929
Coryphella rubrolineata (O'Donoghue, 1929), Miller, 1971
Flabellina rubrolineata (O'Donoghue, 1929)—comb. nov.
Flabellina salmonacea (Couthouy, 1838)
Eolis salmonacea Couthouy, 1838
Coryphella salmonacea (Couthouy, 1838), Bergh, 1864
Flabellina salmonacea (Couthouy, 1838)—comb. nov.
Flabellina stohleri Bertsch & Ferreira, 1974
Flabellina telja Marcus & Marcus, 1967
Flabellina trilineata (O'Donoghue, 1921)
Coryphella trilineata O'Donoghue, 1921
Flabellina trilineata (O'Donoghue, 1921)—comb. nov.
Flabellina trophina (Bergh, 1894)
Himatella trophina Bergh, 1894
Himatina trophina (Bergh, 1894), Thiele, 1931
Coryphella trophina (Bergh, 1894), Marcus, 1961*a*
Flabellina trophina (Bergh, 1894)—comb. nov.
Flabellina verrucosa (M. Sars, 1829)
Eolidia verrucosa M. Sars, 1829
Eolis rufibranchialis Johnston, 1832, Odhner, 1939
Coryphella verrucosa (M. Sars, 1829), Gray, 1850
Flabellina verrucosa (M. Sars, 1829)—comb. nov.
Flabellina verta (Marcus, 1970)
Coryphella verta Marcus, 1970
Flabellina verta (Marcus, 1970)—comb. nov.
Flabellina violacea (Risbec, 1928)
Coryphella ornata violacea Risbec, 1928
Coryphella violacea Risbec, 1928, Gosliner, 1980
Flabellina violacea (Risbec, 1928)—comb. nov.

Several species of *Flabellina* possess purple ground colour: *Flabellina affinis* (Gmelin, 1791), *F. pedata* (Montagu, 1815), *F. iodinea* (Cooper, 1862), *F. annuligera* (Bergh, 1900), *F. violacea* (Risbec, 1928), *F. telja*, Marcus & Marcus, 1967, *F. babai* Schmekel, 1970, and *F. alisonae*, Gosliner, 1980. *Flabellina affinis*, *F. annuligera*, *F. telja*, *F. babai*, and *F. alisonae* have distinctly pedunculate cerata; however, the peduncles are simple except in *F. affinis*. Of the described species of *Flabellina*, *F. affinis* is most similar to *F. funeka* but differs in several significant features. The cerata of *F. affinis* are purple, while in *F. funeka* they are red. There are 25 to 28 annulae on the rhinophores of *F. affinis*, while there are 10 to 14 in *F. funeka*. *F. affinis* possesses a single compound ceratal peduncle in the right anterior digestive branch, while *F. funeka* has 2 or 3 compound branches. There are no significant radular differences between the two species. The reproductive systems of *F. affinis* and *F. funeka* differ in two important features. In *F. affinis* the prostate is thin and highly convoluted (Schmekel 1970) while in *F. funeka* it is

thick and significantly shorter. In *F. affinis* the penial papilla is slender and elongate, while it is short and conical in *F. funeka*. Schmekel (1970) described a typical and an atypical form of the reproductive system of *F. affinis*. In the typical form the receptaculum seminis and bursa copulatrix are both distal to the female gland mass, while in the atypical form the receptaculum is proximally situated. The latter configuration is found in *F. funeka*. These differences between *F. funeka* and *F. affinis* are consistent and warrant specific separation.

Flabellina capensis (Thiele, 1925)

Figs 1B, 5–6

Coryphella capensis Thiele, 1925: 287, pl. 34 (fig. 1).
Flabellina capensis (Thiele, 1925) **comb. nov.**

Material

University of Cape Town, Department of Zoology

CP 811, 10 m depth, Oatlands Point, False Bay (34°12′S 18°27′E), 10 December 1972, 2 specimens
CP 819, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 13 May 1973, 1 specimen
CP 827, 10 m depth, Oudekraal, west coast Cape Peninsula (33°59′S 18°21′E), 20 February 1974, 1 specimen
CPR 86C, 17 m depth, New Harbour wall, Hermanus (34°27′S 19°15′E), 11 October 1974, 1 specimen

South African Museum, Cape Town

SAM–A34878, 18 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 17 January 1980, 1 specimen
SAM–A34879, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 30 March 1980, 4 specimens
SAM–A34880, 10 m depth, Rooi Els, Cape Hangklip (34°18′S 18°49′E), 23 January 1980, 1 specimen
SAM–A34881, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 11 February 1980, 1 specimen

Distribution

Cape Province, Cape Peninsula to Plettenberg Bay.

External morphology

Live animals (Fig. 1B) may reach 43 mm in length; they are extremely active and bristle their cerata when disturbed. The body is long and slender. The oral tentacles are long and tapered, attaining 12 mm in length in a 26 mm animal. The shorter rhinophores are rugose and nodular (Fig. 5A). The foot is transversely grooved anteriorly with acute tentacular foot corners. The cerata

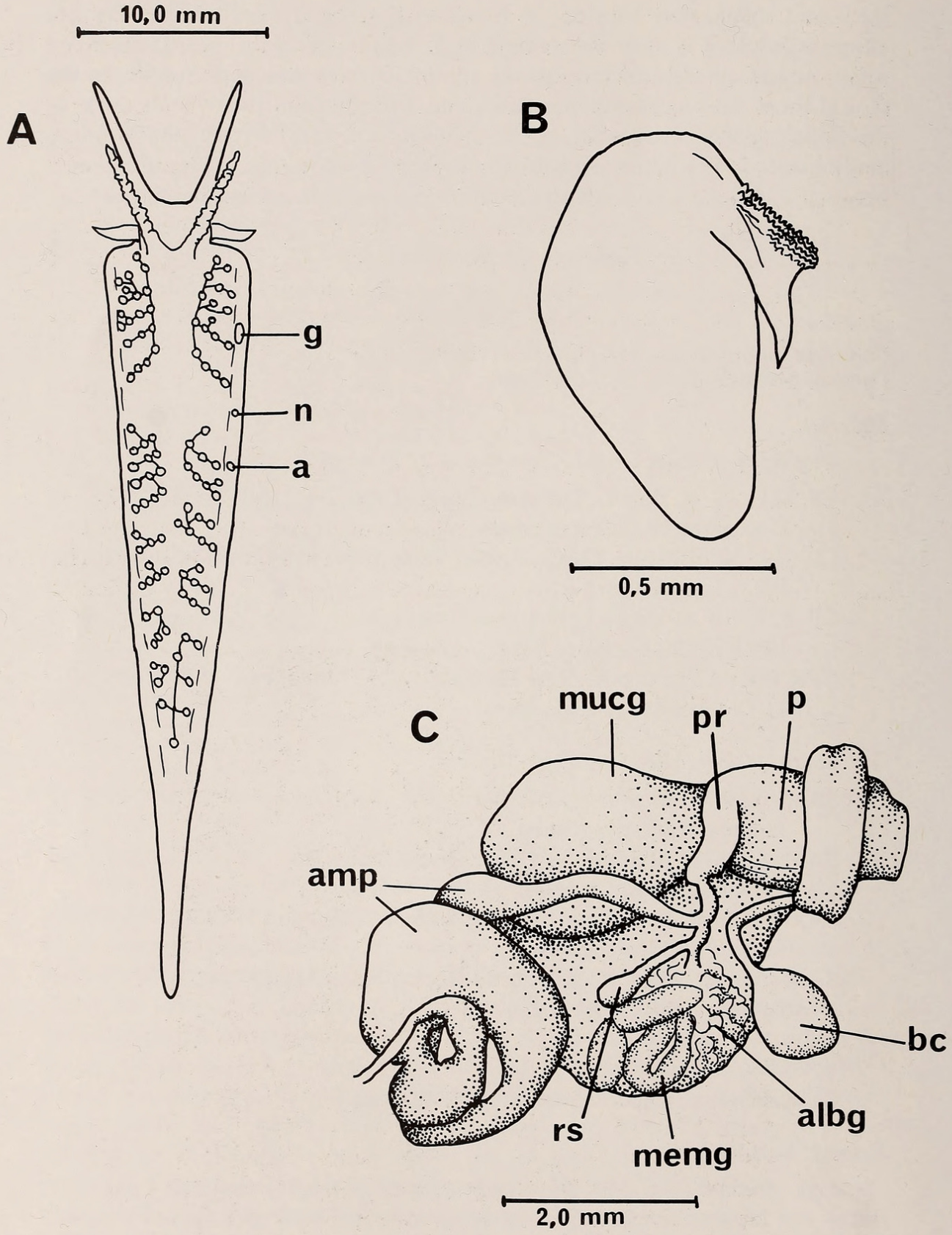

Fig. 5. *Flabellina capensis* (Thiele, 1925). A. Dorsal view of animal showing branching of the digestive system and position of the gonopores, nephroproct and anus. B. Jaw. C. Reproductive system.

are arranged in linear rows that are not clearly separated into distinct clusters (Fig. 5A). There are up to 8 ceratal rows in the right anterior digestive system, followed by as many as 17 rows per side in the posterior digestive branches. The pleuroproctic anus is ventral to the second or third ceratal row of the posterior digestive system and the nephroproct is in the interhepatic space anterior to the anus. The gonopore is ventral to the third and fourth ceratal rows of the right anterior digestive branch.

The animals are translucent white with red or brown ceratal cores. Opaque white markings are distributed as follows: two lines, one on the dorsal surface of each cephalic tentacle, which converge and terminate on the head immediately anterior to the rhinophores; an anterior and posterior vertical line and varied spots on each ceras; and a line on the dorsal surface of the posterior 3 to 5 mm of the foot.

Internal morphology

The jaws (Fig. 5B) are delicate and elongate with 5 to 6 rows of irregularly shaped denticles on the masticatory border. The triseriate radula (Fig. 6) contains 13 to 15 rows of teeth. The rachidian teeth are sharply arched with 6 to 8 acute denticles on each side of the slightly more prominent central cusp. The lateral teeth are triangular with a thickened basal portion. The inner margin of

Fig. 6. *Flabellina capensis* (Thiele, 1925). Scanning electron micrograph of the radula. Scale: 30 μm between squares.

each lateral tooth bears 10 to 13 denticles. There are no obvious labial glands around the buccal mass.

The reproductive system (Fig. 5C) consists of a large, slightly convoluted ampulla that joins the elongate receptaculum seminis via a short duct. The vas deferens is short, with a small prostatic portion that expands into a hollow paddle-shaped penis. At the distal end of the female gland mass a bursa copulatrix lies ventral to the receptaculum seminis and enters the female atrium. The bursa may be elongate or spherical in shape.

Natural history

Flabellina capensis feeds on the gymnoblastic hydroid *Eudendrium* sp. in shallow subtidal waters.

Discussion

Flabellina capensis was described by Thiele (1925) from a single specimen collected off Plettenberg Bay, South Africa. He stated that the preserved animal was 10 mm long with elongate oral tentacles and nodular rhinophores. The triseriate radula consisted of 17 rows of teeth. The rachidian teeth were arched with 8 to 9 denticles on each side of the slightly prominent central cusp. The triangular laterals had 9 to 12 denticles on their inner face. Although the species was poorly described, the external features bear a strong resemblance to the present material. The radular teeth of our specimens and those described by Thiele (1925, pl. 66 (fig. 1)) are very similar in shape and number of denticles on the rachidian and lateral teeth. The material in this study is consistent with these characteristics and is considered to be conspecific with *Flabellina capensis*.

Flabellina capensis resembles the European *Flabellina lineata* (Lovén, 1846) in its external and internal morphology. Both species possess elongate oral tentacles, reddish colour with numerous white lines (Thompson 1976; Thompson & Brown 1976) and radular teeth which are similar in form (Odhner 1939). The reproductive systems are virtually identical (Schmekel 1970). There are, however, consistent differences in the external morphology. The South African material possesses opaque white lines along the oral tentacles which converge and terminate just anterior to the rhinophores, while in *F. lineata* a white line extends along the dorsomedial surface for the entire length of the animal. There are also two lateral lines along the body in *F. lineata*. Odhner (1939) and Thompson & Brown (1976) described the presence or absence of opaque white lines on the notum in *F. lineata*. *F. lineata* also has white lines on the posterior surface of the rhinophores, which are absent in specimens of *F. capensis*. While both species have the opaque white line on the anterior face of each ceras, there is an additional line on the posterior face of the cerata in *F. capensis*. The rhinophores are largely smooth in *F. lineata*, while they are strongly wrinkled to nodular in *F. capensis*. Despite their similarity, *F. capensis* and *F. lineata* appear to have several consistent differences which are here considered sufficient to warrant specific separation. Picton (1980) has similarly suggested separation of *F. lineata* and *F. browni* which occur sympatrically in the British Isles.

Family **Aeolidiidae**

Aeolidiella indica Bergh, 1888

Figs 1C, 7–10

Aeolidiella indica Bergh, 1888*a*: 755, pl. 78 (figs 1–2).
Aeolidiella orientalis Bergh, 1888*b*: 673, pl. 16 (figs 8–13) **syn. nov.**
Aeolidiella saldanhensis Barnard, 1927: 201, figs 2–3 **syn. nov.**
Aeolidiella hulli Risbec, 1928: 262, fig. 88, pl. 10 (fig. 7), pl. 12 (fig. 4) **syn. nov.**
Aeolidiella takanosimensis Baba, 1930: 122, fig. 4a–b, pl. 4 (fig. 5a–c) **syn. nov.**
Aeolidiella multicolor Macnae, 1954: 36, figs 27–29, pl. 2 (fig. 4) **syn. nov.**
Aeolidiella lurana Marcus & Marcus, 1967: 115, figs 149–150 **syn. nov.**

Material

University of Cape Town, Department of Zoology

LB 572A, intertidal Schaapen Island, Saldanha Bay (33°06′S 18°02′E), 6 May 1973
CP 797, intertidal, Clovelly, False Bay (34°05′S 18°26′E), 16 April 1972

Other material

intertidal, Langebaan Lagoon (33°06′S 18°02′E), 5 December 1979
intertidal, Onrus (34°26′S 19°10′E), 5 February 1980
intertidal, Knysna Lagoon (34°05′S 23°04′E), 3 March 1980
intertidal, Langebaan Lagoon (33°06′S 18°02′E), 6 April 1980
intertidal, Coffee Bay, Transkei (31°59′S 29°09′E), 7 March 1981*

Distribution

Japan (Baba 1930, 1949, 1979); California (Sphon 1971); Mexico (Ferreira & Bertsch 1975); Hawaii (Gosliner 1980); Mauritius (Bergh 1888*a*); Noordwachter Island (Bergh 1888*b*); Red Sea (Eliot 1908); Tanzania (Edmunds 1969); New Caledonia (Risbec 1928); Naples (Schmekel 1970); Brazil (Marcus & Marcus 1967).

External morphology

Live mature animals may attain a length of up to 35 mm (Fig. 1C). The conical oral tentacles are slightly longer than the smooth rhinophores. A pair of black eyes are visible at the posterior base of the rhinophores. The foot is transversely grooved anteriorly and rounded, with stout, slightly produced corners. The anterior digestive group contains 7 obliquely set ceratal rows per side, followed by up to 20 rows in the posterior branches (Fig. 7A). The gonopore is situated on the ventral edge of the third to fifth rows of the right anterior digestive group and the cleioproctic anus between the third and fourth rows of the first ceratal group of the right posterior digestive branch.

* Additional data received while in press.

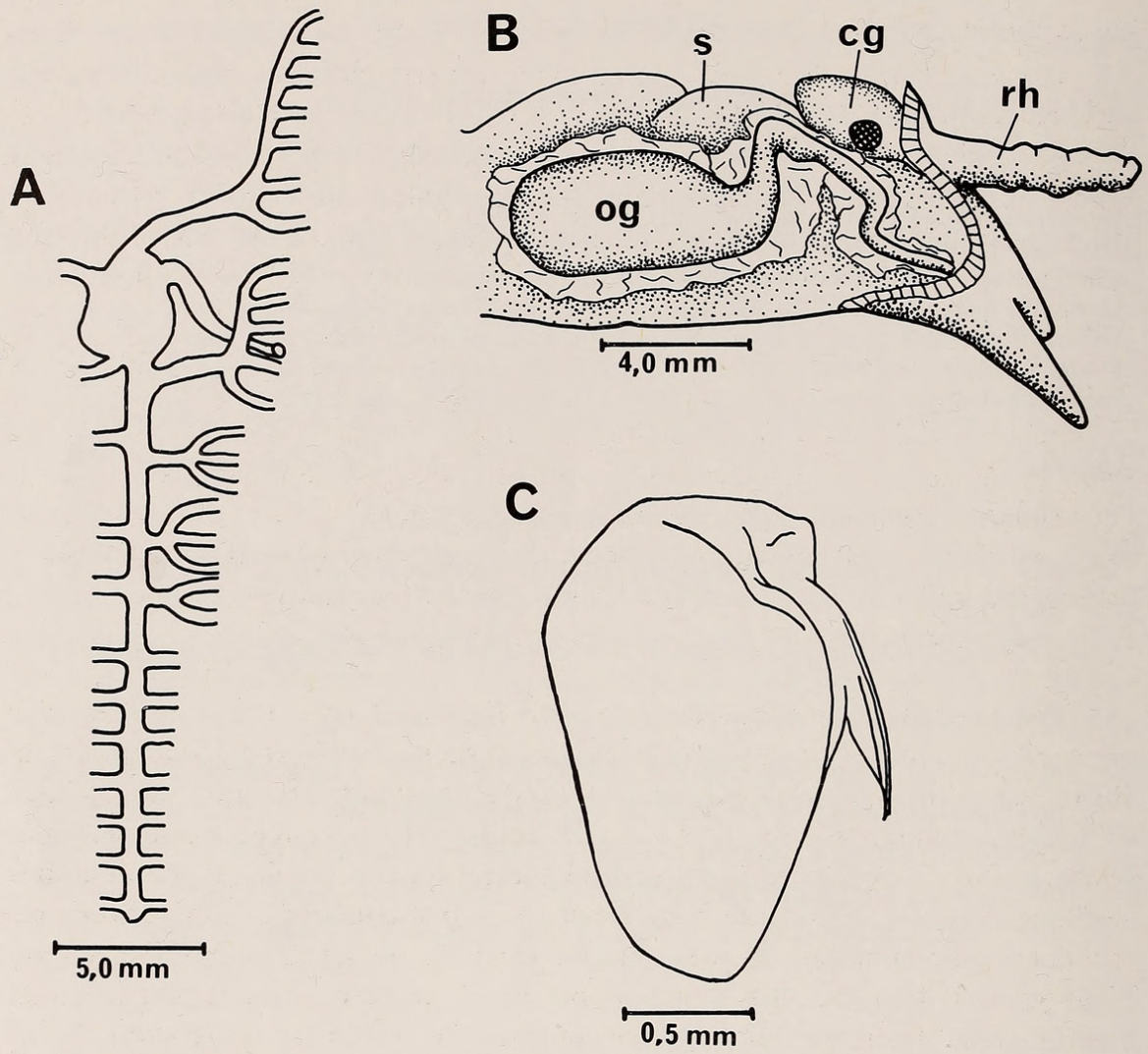

Fig. 7. *Aeolidiella indica* Bergh, 1888*a*. A. Branching of the digestive system. B. Lateral view showing oral gland. C. Jaw.

The body is translucent white with or without opaque white on the tips of the oral tentacles and rhinophores. The head bears a U-shaped pattern of orange extending from the rhinophores to the base of the oral tentacles. In some specimens, up to half of the base of the U may be filled with orange pigment. Extending posteriorly from the base of the rhinophores are translucent or opaque white areas outlined with orange pigment in the shape of an elongate diamond, followed by a large orange circle outlining the pericardial region. Combination of these two areas of pigmentation has been characterized as a 'Greek vase' by Eliot (1908) in describing *Aeolidiella orientalis*. Posterior to this, a second but smaller circle of orange pigment may occur. Outside of these designs on the dorsum, the back may be covered with orange pigment of varying intensity. The ceratal epithelium is diffusely covered with orange pigment which may be either interrupted by a subapical band of translucent white or overlain with opaque white or pale blue flecks. The digestive gland in the cerata is brown and terminates in a white cnidosac.

Internal morphology

The jaws (Fig. 7C) are broad and ovoid with an elongate, smooth masticatory border. The radula (Fig. 8) bears 15 to 22 teeth that have a widely emarginate anterior margin with a prominent central cusp and 17 to 32 evenly graded lateral denticles on each side. A large oral gland (Fig. 7B) extends on either side of the buccal mass to the posterior end of the stomach. The reproductive system is identical to that described by Macnae (1954, as *Aeolidiella multicolor*).

Natural history

In this study *Aeolidiella indica* was found in the intertidal zone from Langebaan Lagoon, Saldanha Bay to Coffee Bay, Transkei. In all cases it has been found associated with the sea anemone *Anthothoe stimpsonii* (Verrill) upon which it feeds voraciously. In the field, *A. indica* are frequently found aggregated under stones and in the vicinity of their egg masses (Fig. 9).

Discussion

The generic distinctions between *Aeolidiella* Bergh, 1867, and *Spurilla* Bergh, 1864, have been the subject of considerable controversy (Marcus 1961*a*; Burn 1969; Edmunds 1969). Marcus (1961*a*) differentiated the taxa on the basis of smooth rhinophores in *Aeolidiella* in contrast to perfoliate rhinophores in *Spurilla*. Burn (1969) noted that several species have rhinophores with bulbous swellings or oblique ribs and stated that the ornamentation of the rhinophores and denticulation of the jaws were not important in the separation of the genera. He suggested that the branching of the 'liver' (digestive gland) and the anal position should serve as more significant criteria for generic separation. However, Burn (1969) included species with both an arch or several rows in the right anterior digestive branch within the genus *Spurilla* (Table 2), and did not specify the anal position for the majority of species he included in this genus. Burn noted that the presence of an anterior accessory digestive branch within the head is unique to *Spurilla*, although its presence has been noted in only three of the seven species which he included in the genus. The final criterion that he used to separate the genera was the presence of broadly emarginate, concave teeth in *Aeolidiella* as opposed to evenly curved teeth in *Spurilla*. However, the radular teeth of the type species, *Aeolidiella soemmerringi* (Leuckart, 1828) Bergh 1867, *non* Leuckart = *A. alderi* (Cocks, 1852) (G. Brown, University of Bristol, 1980 pers. comm.), as well as *A. glauca* (Alder & Hancock, 1845) and *A. sanguinea* (Norman, 1877) are of the same shape as those found in *Spurilla macleayi* (Burn 1969), *S. japonica* (Baba 1949), *S. chromosoma* (Marcus 1961*a*), *S. olivae* (MacFarland 1966) and *S. alba* (Edmunds 1969). The radular teeth of *Spurilla neapolitana* (Marcus 1955; Gosliner 1980) and *S. orientalis* (Bergh 1905) are evenly curved without emargination of the anterior border. As greater variation occurs among species of *Spurilla* than between *Spurilla* and *Aeolidiella*, the shape of the teeth cannot be utilized for generic separation.

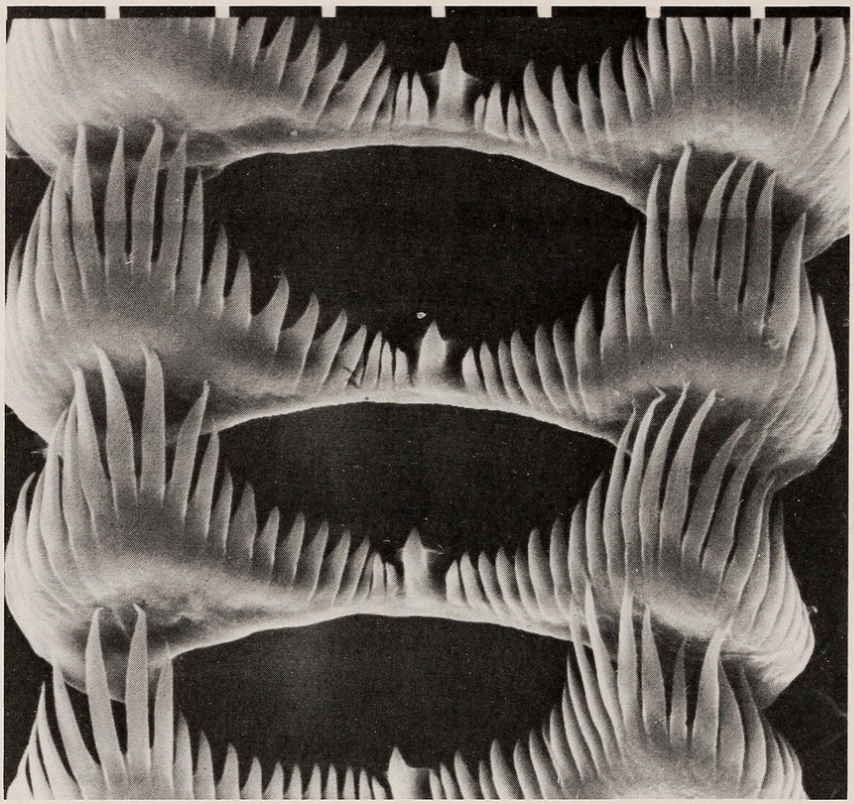

Fig. 8. *Aeolidiella indica* Bergh, 1888*a*. Scanning electron micrograph of the radula. Scale: 30 μm between squares.

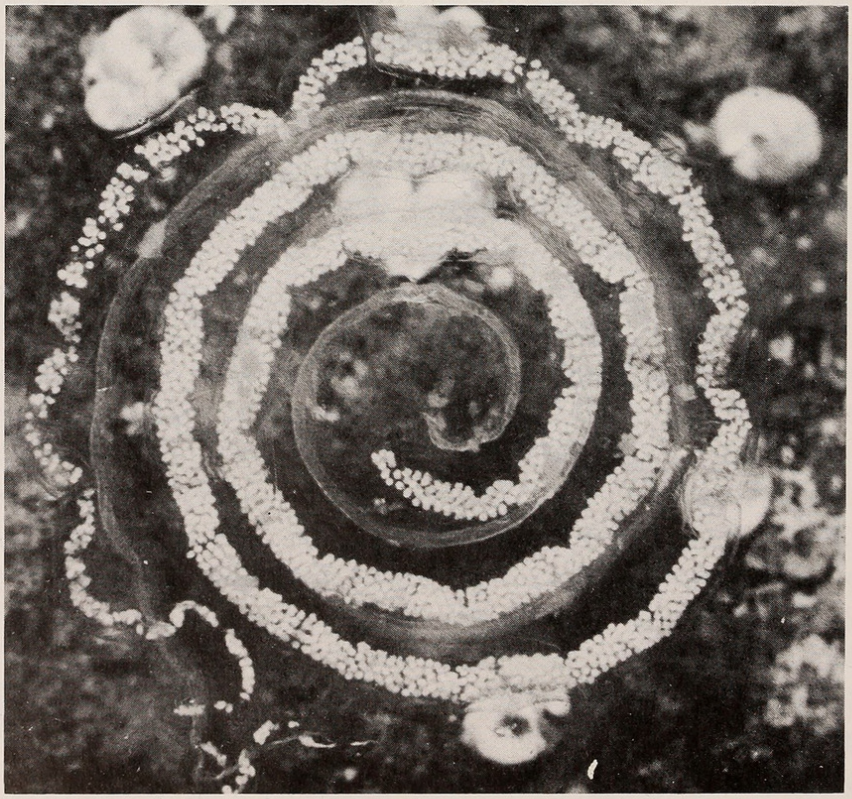

Fig. 9. *Aeolidiella indica* Bergh, 1888*a*.
Egg mass at 10 × magnification.

TABLE 2
Comparison of morphological features of *Spurilla* species.

Species	Distribution of cerata		Rhinophores	Teeth	Anal position	Accessory digestive branch	Reference
	anterior branch	posterior branch					
S. neapolitana	1 arch	1 arch	perfoliate	convex anterior margin, denticles uniformly graded, central denticle reduced in size	within arch of first posterior digestive branch	present	MacFarland 1909; Burn 1969
S. macleayi .	1 arch	1 arch	ribbed	emarginate, graded lateral denticles, central same size as lateral denticles	within arch of first posterior digestive branch	unknown	Burn 1969
S. olivae .	? 3 or 5 rows	rows	perfoliate	emarginate, denticles evenly graded	? between row 5 and 6	unknown	MacFarland 1966
S. chromosoma	5 to 6 rows	1 arch	perfoliate	emarginate, evenly graded denticles	within arch of first posterior digestive branch	unknown	Marcus 1961*a*
S. orientalis .	3 rows	unknown	? perfoliate	anterior margin convex, uniformly graded denticles	unknown	unknown	Bergh 1905
S. alba . .	3 or 4	6 rows	knobbed	emarginate, central denticle twice size of laterals	between first and second rows of posterior digestive branch	present	Edmunds 1969; Burn 1969
S. japonica .	4 rows	? rows	knobbed	emarginate, central denticle twice size of laterals	middle of first posterior digestive branch	present	Baba 1949

Edmunds (1969), referring to Burn's (1969) discussion, stated that the anus is situated more anteriorly in *Spurilla*. However, in *Spurilla japonica* the anus is situated in the middle of the first ceratal group of the posterior digestive branch (Baba 1949) as is the case in most species of *Aeolidiella*. There are thus inherent problems in separating the genera. If all species of *Spurilla* do, indeed, possess a branch of the anterior digestive system within the head as suggested by Burn (1969), this will serve as an important generic distinction, particularly as it can be found in species with ornamented rhinophores. This character, however, needs to be verified in *S. macleayi*, *S. chromosoma*, *S. olivae*, and *S. orientalis*. If these species do not possess cephalic extensions of the digestive gland, a further possible generic distinction may exist in the structure of the digestive system. In the type species of *Spurilla*, *S. neapolitana*, the right anterior digestive gland consists of a single arch as in *S. macleayi*. However, the remaining species considered as *Spurilla* by Burn (1969) have a series of ceratal rows in the anterior digestive branch, as do all species considered to be members of *Aeolidiella* in this study. This means of separating the genera was followed by Baba (1979). Generic separation of the related aeolid genera *Berghia* and *Baeolidia* is also based on the configuration of the right anterior digestive branch (Gosliner 1980) as is the separation of the facelinid and favorinid aeolids (Miller 1974; Gosliner 1980). Pending additional morphological data with regard to accessory branching of the anterior digestive branch into the head, we prefer to maintain the separation of *Aeolidiella* and *Spurilla*, following Burn (1969).

Three species of *Aeolidiella*, *A. glauca*, *A. alderi*, and *A. sanguinea*, have been reviewed by Tardy (1969). Tardy demonstrated consistent differences between these taxa, which he considered significant enough to justify separation of these species previously placed in synonymy (Engel 1925). These three species all possess only two ceratal rows in the anterior digestive branch, rather than an elongate arch as suggested by Engel (1925) and Macnae (1954). All other species of *Aeolidiella*, where described, possess five or more rows in the anterior digestive system. Of the remaining species, *A. indica*, *A. orientalis*, *A. saldanhensis*, *A. hulli*, *A. takanosimensis*, *A. multicolor*, and *A. lurana* are strikingly similar in their morphology and a detailed comparison of these species is presented in Table 3.

Variation in colour has been adequately described only in *Aeolidiella multicolor* and *A. takanosimensis*. The latter appears to be more variable but is commonly decorated with red or orange pigment surrounding distinctive shapes of opaque white areas on the head and mid-dorsal region of the pericardium (Sphon 1971; Baba 1979). Alternatively, *A. takanosimensis* may rarely lack orange pigment or other dorsal markings (Gosliner 1980). Similar pattern distribution is found in *A. multicolor*. The latter species is far more consistent in its coloration and always bears a U-shaped area of orange pigment on the head and opaque or translucent white patches in the region of the pericardium, which resemble a 'Greek vase' (Eliot 1908). The above basic pattern of coloration has also been recorded in *A. orientalis* (Bergh 1890, pl. 86 (fig. 1);

Eliot 1908; Edmunds 1969), *A. hulli* (Risbec 1928, pl. 12 (fig. 4)), and *A. lurana* (Marcus & Marcus 1967, fig. 149). The coloration of *A. indica* was superficially described (Bergh 1888*a*) and there is nothing contradictory to that of the above species. *A. saldanhensis* (Barnard 1927) was described from preserved specimens and coloration was not given.

In all citations of the above species the rhinophores and masticatory border of the jaws are smooth and the foot corners are short. The two South African species *A. saldanhensis* and *A. multicolor* were separated by Macnae (1954) on the basis of the rounded foot corners reported in the former. However, in his drawing Barnard (1927: 201, fig. 2) indicated the presence of angular foot corners.

Where it has been described, the anterior digestive branch in all the above species consists of 5 to 7 oblique ceratal rows. The arrangement of the posterior digestive branches was used by Baba (1979) to distinguish *A. takanosimensis* from *A. multicolor* based on Macnae's (1954) account. However, the description by Macnae of the ceratal branching in *A. multicolor* is erroneous. Our examination of South African material has shown the ceratal configuration to be identical with that described for *A. takanosimensis* (Fig. 7A). The first three ceratal groups of the posterior digestive system of *A. lurana* were described as arches (Marcus & Marcus 1967) in an 8,5 mm specimen. The authors consider that these may be groups of two rows which in larger specimens may proliferate into additional rows. The branching of the posterior digestive system is incompletely described in *A. saldanhensis*, *A. indica*, *A. orientalis*, and *A. hulli*.

Examination of specimens of varying size shows that the radula of *A. orientalis* contains 9 to 25 teeth with 5 to 35 denticles on each side of the central denticle (Bergh 1888*b*; Eliot 1908; Edmunds 1969). The number of teeth and denticles of *A. indica*, *A. saldanhensis*, *A. hulli*, *A. takanosimensis*, *A. multicolor*, and *A. lurana* fall within the limits of this variability. Figure 10 shows the structure and variability of the radular tooth within and between species. Marcus & Marcus (1967) suggested that *A. multicolor* is distinct from *A. indica* on the basis of the radular tooth. However, at least the same degree of variability is shown in the drawings of the teeth of *A. takanosimensis* (Baba 1949, 1979; Ferreira & Bertsch 1975; Gosliner 1980).

Large oral glands have been described in *A. multicolor*, *A. takanosimensis*, and *A. hulli*, but have not been studied in *A. saldanhensis*, *A. indica*, *A. orientalis*, and *A. lurana*. The reproductive system has been described only in *A. multicolor* (Macnae 1954) and *A. takanosimensis* (Schmekel 1970) and they are entirely consistent with each other. The penis has been described for *A. orientalis* (Bergh 1888*b*) and is identical with that of the above two species.

The distribution of the above species under discussion (*A. indica*, *A. orientalis*, *A. saldanhensis*, *A. hulli*, *A. takanosimensis*, *A. multicolor*, and *A. lurana*) has been listed in Table 3. *Aeolidiella takanosimensis* has the widest recorded distribution. This pattern of wide-ranging, dispersed taxa is difficult to explain if they are considered as distinct species.

TABLE 3

Comparison of morphological characteristics of different species of *Aeolidiella*.

Species	Distribution	Colour	Jaw masticatory border	No. of radular teeth	No. of lateral denticles	Branching of digestive system		Foot corners	Oral glands	Reference
						anterior	posterior			
A. glauca	Mediterranean, England	white spots on body, rhinophores and oral tentacles, cerata pink to dark brown	smooth	18–20	25–30	2 rows	10 simple, single rows	short	unknown	Alder & Hancock 1845; Tardy 1969; Thompson & Brown 1976
A. alderi	Mediterranean, England	rhinophores white, yellow or orange, cerata rose-salmon or brown	smooth	18–20	25–30	2 rows	9 single rows	short	unknown	Tardy 1969
A. sanguinea	Mediterranean	oral tentacles and rhinophores with opaque white and whole body coloured yellow-orange, rose or vermilion	smooth	18–20	25–30	2 rows	9 single rows	short	unknown	Tardy 1969
A. multicolor	South Africa	white with orange and white pattern on dorsum, cerata orange and blue	smooth	15–22	17–32	6 to 8 rows	3 groups of 2–4, 2–3, 2–3 rows followed by 6 rows	short	large oral glands	Macnae 1954; present study
A. saldanhensis	South Africa	unknown	smooth	24	24	unknown	unknown	short	unknown	Barnard 1927
A. takanosimensis	Japan, California, Mexico, Hawaii, Naples	variable; usually red-orange pigment surrounding opaque white pattern on dorsum; cerata red to brown, subapical white band	smooth	12–20	15–20	7 rows	4 groups of 4,4,3 and 2 rows followed by 5 rows	short	large oral glands	Baba 1949; Baba 1979; Schmekel 1970; Gosliner 1980

A. drusilla	New Zealand	unknown	finely striated	21	23–25	unknown	unknown	short	large oral glands	Bergh 1900
A. faustina	New Zealand	unknown	finely striated	25	35	unknown	unknown	unknown	unknown	Bergh 1900
A. indica	Mauritius	white-yellow or green-yellow body, cerata grey or yellow	smooth	19–22	17–21	5 to 7 rows	first group has 2–3 rows followed by 8 rows	short	unknown	Bergh 1888*a*
A. orientalis	Red Sea, Indian Ocean, Tanzania	body translucent white dorsum red with white marks; apical part of rhinophores and oral tentacles red; cerata red-brown with subapical white bands	smooth	9–25	5–35	7 rows	14 rows	short	unknown	Bergh 1888*b*; Eliot 1908; Edmunds 1969
A. hulli	New Caledonia	grey with white area over heart, cerata reddish-brown	smooth	15	24–30	unknown	unknown	short	large oral glands	Risbec 1928
A. risbeci	Vietnam	unknown	smooth	15	35–40	unknown	unknown	short	large oral glands	Risbec 1956; Marcus 1961*a*; Burn 1969
A. lurana	Brazil	white with pink, yellow, orange and opaque white pattern on dorsum, cerata orange with white subapical band	smooth	16	18–21	5 rows	3 groups of 2 rows each	short	unknown	Marcus & Marcus 1967
A. occidentalis	St Thomas (West Indies)	unknown	smooth	15–19	28–30	unknown	unknown	unknown	unknown	Bergh 1874

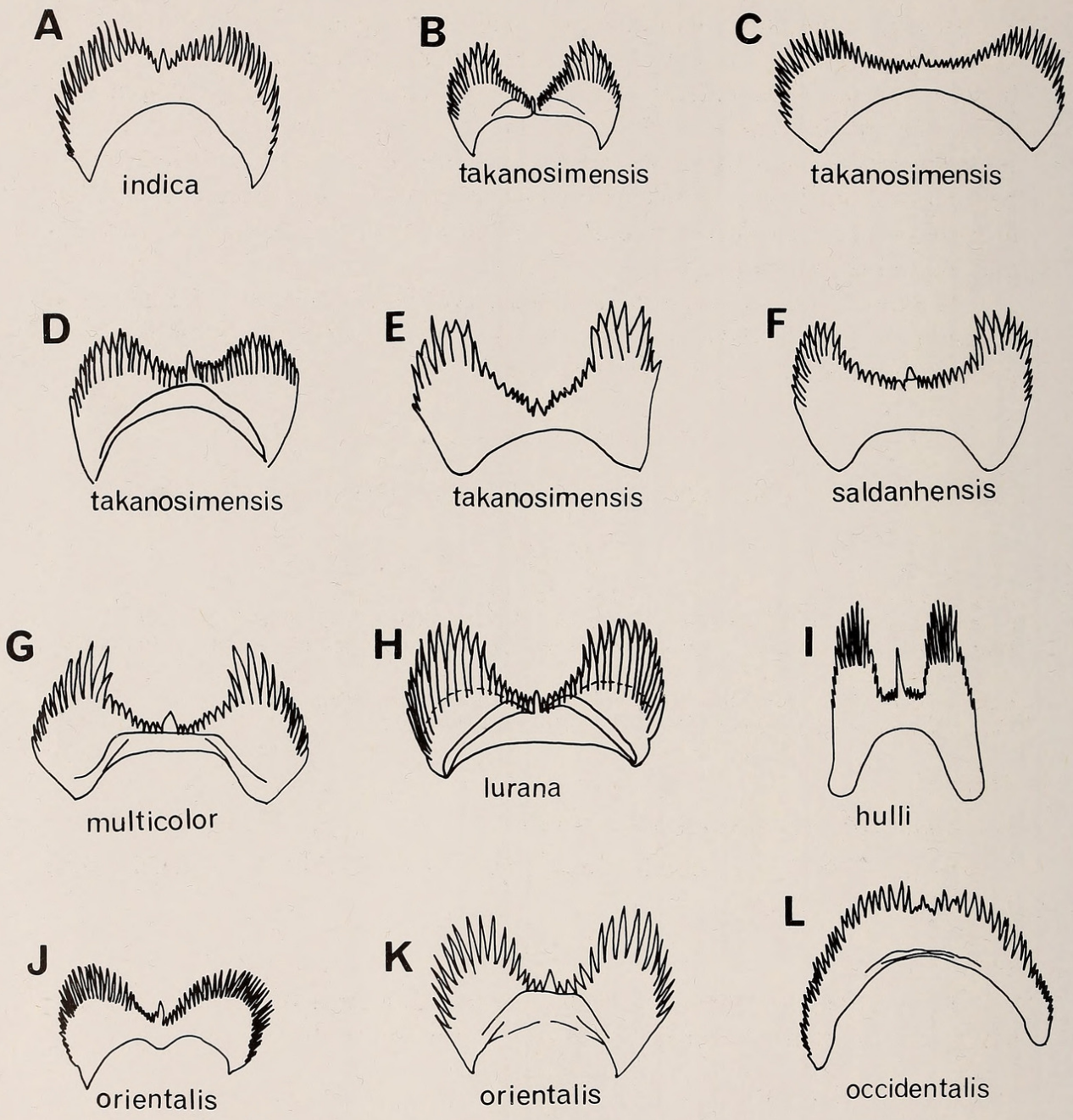

Fig. 10. Radular teeth of some species of *Aeolidiella*. A. *A. indica* (after Bergh 1888*a*). B. *A. takanosimensis* (after Baba 1949). C. *A. takanosimensis* (after Ferreira & Bertsch 1975). D. *A. takanosimensis* (after Baba 1979). E. *A. takanosimensis* (after Gosliner 1980). F. *A. saldanhensis* (after Barnard 1927). G. *A. multicolor* (after Macnae 1954). H. *A. lurana* (after Marcus & Marcus 1967). I. *A. hulli* (after Risbec 1928). J. *A. orientalis* (after Bergh 1888*b*). K. *A. orientalis* (after Edmunds 1969). L. *A. occidentalis* (after Bergh 1874).

Based on the above morphological and distributional comparison, we find as much variability for any single characteristic within a single species as between species. The similarity in coloration pattern, radular teeth and branching of the digestive system leads us to the conclusion that *A. orientalis*, *A. saldanhensis*, *A. hulli*, *A. takanosimensis*, *A. multicolor*, and *A. lurana* should be regarded as junior subjective synonyms of *A. indica* Bergh, 1888. The description of *A. indica* was published earlier in 1888 than that of *A. orientalis* and, therefore, has priority.

The descriptions of *A. risbeci* Marcus, 1961*a*, *A. occidentalis* Bergh, 1874, *A. faustina* Bergh, 1900, and *A. drusilla* Bergh, 1900, are incomplete and prevent meaningful comparison with *A. indica*.

Family **Tergipedidae**

Catriona columbiana (O'Donoghue, 1922)

Figs 1D, 11–12

Amphorina columbiana O'Donoghue, 1922: 160, pl. 6 (figs 23–24).
Cuthona alpha Baba & Hamatani, 1963*a*: 340, pl. 11. Williams & Gosliner, 1979: 214.
Cratena spadix MacFarland, 1966: 351, pl. 60 (fig. 4), pl. 68 (figs 12–17), pl. 69 (figs 6–7a). Williams & Gosliner, 1979: 214.
Catriona columbiana (O'Donoghue, 1922), Marcus & Marcus, 1960: 179.
Catriona alpha (Baba & Hamatani, 1963*a*) Roller, 1969: 421.

Material

South African Museum, Cape Town

SAM–A34873, 1 m depth, Cape Town docks (33°54′S 18°26′E), 25 June 1972, 4 specimens.

Distribution

Japan (Baba & Hamatani 1963*a*), British Columbia (O'Donoghue 1922), California (MacFarland 1966), South Africa (present study).

External morphology

Several specimens were examined, the largest measuring 11 mm in length when alive (Fig. 1D). The foot is broad with anteriorly rounded corners. The oral tentacles are shorter than the rhinophores. The rhinophores are smooth and elongate and eye spots are visible at their posterior base. The distribution of cerata and digestive branches is shown in Figure 11A. The left and right anterior digestive groups each comprise 4 or 5 parallel rows of cerata. There are 6 posterior digestive branches per side which, except for the last row, branch alternately from the midline. During movement the cerata are characteristically carried flat over the back of the animal and may hang down over the lateral edges of the foot. The gonopores are ventral to the second and third ceratal rows of the right digestive group. The acleioproctic anus is situated in front of the inner corner of the second ceratal group and the nephroproct adjacent to the anus.

The general body colour is translucent white as are the cephalic tentacles and rhinophores (Fig. 1D). The cerata contain the light pink or yellow digestive gland and all are covered with a layer of opaque white epidermal pigment. This pigment also extends over the dorsum with a thick line between the rhinophores extending on to the front of the head, but not reaching the anterior margin. The oral tentacles bear an inner dorsolateral opaque white line down their length and the basal third of the rhinophores is speckled with white pigment. The middle of the rhinophores contains a broad transverse orange band, while the distal portion is densely opaque white.

Internal morphology

The jaws are fragile and elongate (Fig. 11C). The masticatory border (Fig. 11D) is thin and bears a row of strong bristles along the cutting edge. The radula (Figs 11B, 12) is long and thin with 80 teeth that become progressively larger and more developed towards the formative end. An elongate pre-radular tooth is present. The mature teeth have a receded median cusp and may or may not be flanked by 1 to 3 minute secondary denticles. There is usually a minute secondary denticle between the first and second lateral denticles.

The reproductive system (Fig. 11E) has a large bulbous ampulla on top of the genital mass. The albumen gland is small and closely associated with the membrane gland. The mucous gland is the largest portion of the female gland mass. The receptaculum seminis is attached by a short duct to the lateral side of the vagina. The proximal portion of the vas deferens is thickened and glandular, forming the prostate, while the distal end narrows and is closely folded against, and opens into, the penis. A large bulbous penial gland is present and the penis is elongate, conical and armed with a short stylet (Fig. 11F–G).

Natural history

Catriona columbiana was found crawling upon the ascidian *Ciona intestinalis* (Linnaeus) growing on wooden pilings in Table Bay docks.

Discussion

This species is discussed together with *Catriona casha* below.

Catriona casha sp. nov.

Figs 1E, 13–14

Material

Holotype

South African Museum, Cape Town

SAM–A34871, 1 m depth, Cape Town docks (33°54′S 18°26′E), 26 June 1972

Paratypes

SAM–A34872, 1 m depth, Cape Town docks (33°54′S 18°26′E), 26 June 1972, 5 specimens.

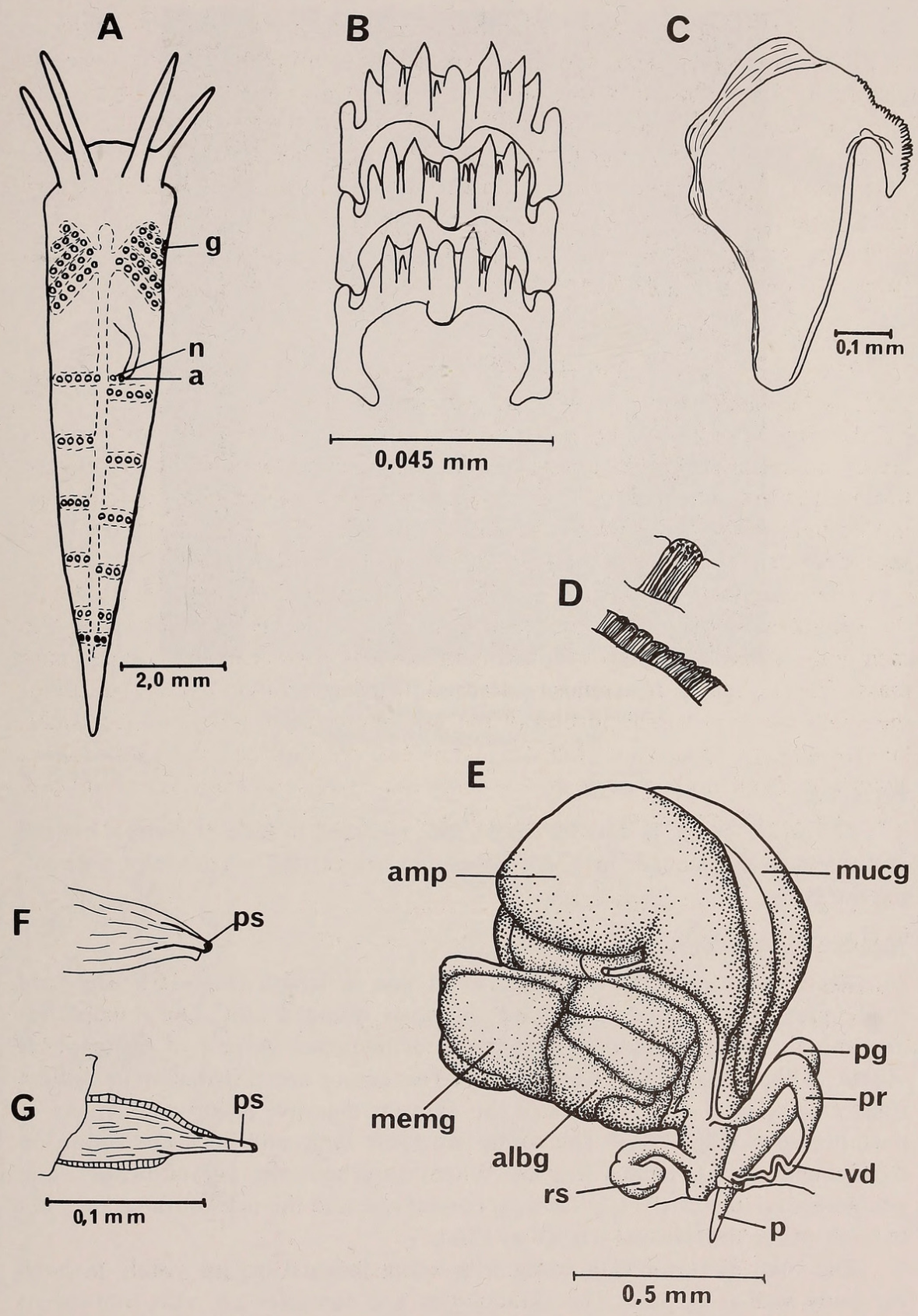

Fig. 11. *Catriona columbiana* (O'Donoghue, 1922). A. Dorsal view showing distribution of cerata and position of gonopores, nephroproct and anus. B. Radular teeth. C. Jaw. D. Detail of bristles of jaw. E. Reproductive system. F. Penis with retracted stylet. G. Penis with everted stylet.

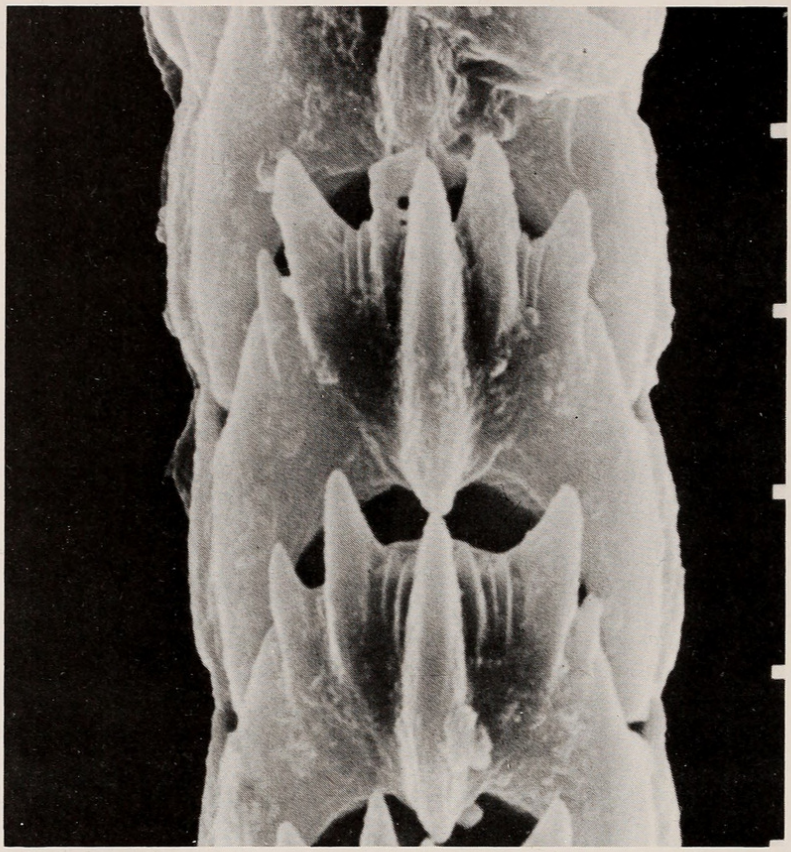

Fig. 12. *Catriona columbiana* (O'Donoghue, 1922).
Scanning electron micrograph of the radula.
Scale: 10 μm between squares.

Etymology

The word 'casha' is derived from Zulu, meaning to hide or conceal oneself and refers to the manner in which the cerata are carried horizontally, concealing the body.

External morphology

The live animals varied from 2 to 11 mm in length (Fig. 1E). They are small, somewhat stout with a broad anteriorly rounded foot. The rhinophores are smooth, stout and longer than the oral tentacles. A pair of eye spots is visible at the base of the rhinophores. The cerata are distributed in distinct transverse rows, 4 on each side of the anterior digestive group and 7 pairs of posterior rows (Fig. 13A). The cerata are fairly large and thick and droop on the ground as the animal crawls. When disturbed, the cerata bristle. The gonopores are below the second right ceratal row and the acleioproctic anus lies in front of the fifth ceratal row (Fig. 13A).

The body is translucent white with white internal organs visible through the body wall (Fig. 1E). The rhinophores and tentacles are also translucent white. The cerata contain a branch of the orange to orange-brown digestive gland and each bears a band of dense opaque white epidermal pigment at the distal end. Juvenile specimens show the same coloration pattern as the adults.

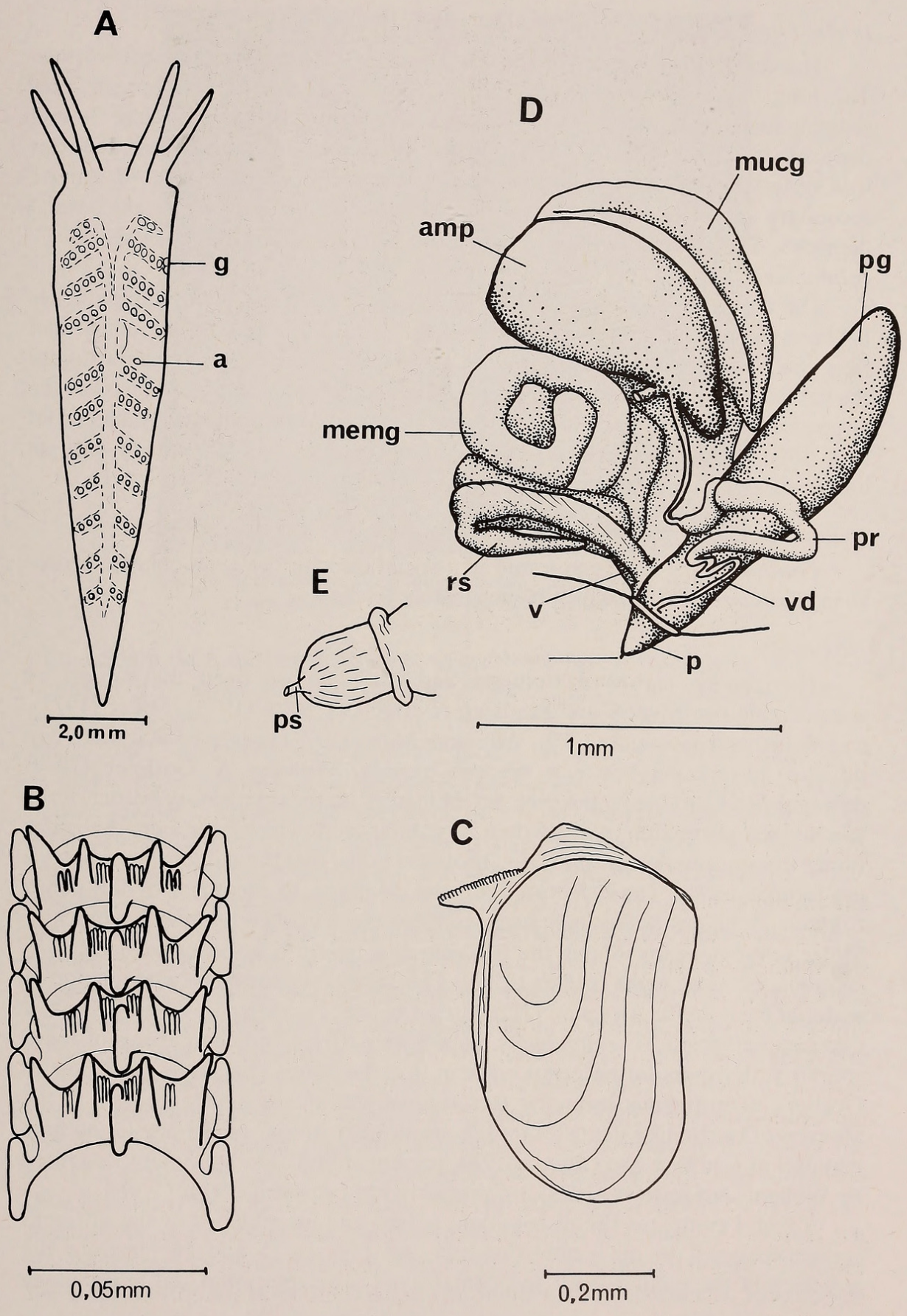

Fig. 13. *Catriona casha* sp. nov. A. Dorsal view of ceratal distribution and positions of gonopores and anus. B. Radular teeth. C. Jaw. D. Reproductive system. E. Penis showing penial stylet.

Internal morphology

The masticatory border of the jaw (Fig. 13C) bears a row of stiff bristles. The long tapering radula (Figs 13B, 14) has 76 teeth with an elongate pre-radular tooth. The teeth bear a receded central cusp and 2 large lateral denticles on either side. No variation in the number of large lateral denticles was observed, as seen in *Catriona columbiana*. There are 2 to 4 minute secondary denticles beside the central cusp and 2 or 3 between the lateral denticles. The tooth, therefore, bears more secondary denticles than that of *C. columbiana*.

The reproductive system is typically tergipedid. A large bulbous ampulla lies between the mucous and membrane glands (Fig. 13D). The post-ampullary duct from the ampulla is very thin. A glandular prostate forms the proximal portion of the vas deferens which narrows distally and becomes folded against the base of the large penial gland. The penis is conical and stout and bears a minute straight stylet (Fig. 13E). The receptaculum seminis is elongate and folded upon itself, with an enlarged, apparently glandular duct joining the vagina.

Natural history

Catriona casha has been found in association with the gymnoblastic hydrozoan, *Tubularia* sp., on which it presumably feeds.*

Discussion

The generic status of *Catriona* and *Cuthona* has been the subject of considerable controversy and has been reviewed by Burn (1973), Miller (1977), and Williams & Gosliner (1979). Although Miller (1977) suggested that there was no clear distinction between the two genera, Williams & Gosliner (1979) distinguished *Catriona* by the presence of bristles on the masticatory border of the jaw and the possession of more than 50 radular teeth which bear a quadrangular rather than an angular cutting edge. They also noted that the radula always bears a pre-radular tooth. These features are not common to members of the genus *Cuthona*. Williams & Gosliner suggested that the specimen upon which much of Miller's argument for joining the two genera is based, is not conspecific with *C. columbiana* (as *C. alpha* (Miller 1977)). This view is supported by examination of material from South Africa and is discussed below. Furthermore, examination of *Catriona casha* and *C. columbiana* from South Africa and comparison of these species with others in the genus confirm that the above characters (Williams & Gosliner 1979) remain distinctive to *Catriona*, with the possible exception of the absence of bristle-like denticles on the masticatory border of the jaw in the type material of *Catriona oba* (Marcus 1970; present study). The specimens described by Williams & Gosliner (1979) are probably not conspecific with *C. oba*.

Table 4 compares the distribution, colour and morphology of the different species assigned to the genus *Catriona* and Figures 15 and 16 illustrate the structure of the radular teeth and penial stylet. The coloration and morphology

* Additional data received while in press.

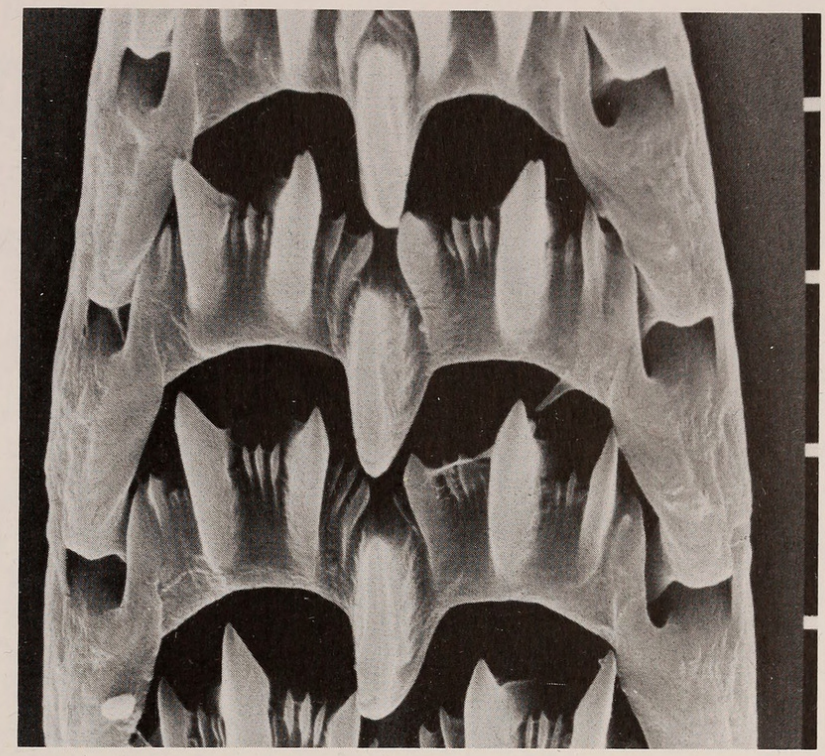

Fig. 14. *Catriona casha* sp. nov. Scanning electron micrograph of the radula. Scale: 10 μm between squares.

of the South African specimens of *C. columbiana* agree closely with that of the holotype of *C. alpha* described by Baba & Hamatani (1963*a*) and Roller (1969), and there is little doubt that they are conspecific. Williams & Gosliner (1979) considered *C. alpha* (Baba & Hamatani 1963*a*) and *C. spadix* (MacFarland 1966) as junior synonyms of *C. columbiana* (O'Donoghue, 1922). Within the geographical range of *C. columbiana*, the cerata vary from pale yellowish-brown to light pink, orange, brown or vermilion with external opaque white over the whole surface or restricted to a white longitudinal line or subapical band on the cerata. The brighter coloured specimens (North America) have orange rhinophores and oral tentacles, while in the paler specimens (Japan, South Africa) the orange pigment is restricted to a band on the rhinophores. Although Williams & Gosliner (1979) stated that *C. columbiana* characteristically has only 2 large lateral denticles on the radular tooth, it should be noted that Baba & Hamatani (1963*a*) showed the possession of 2 or 3 denticles. South African specimens also possess 2 or more commonly 3 lateral denticles interspersed with 0, 1, or 2 minute denticles. The penial stylet in *C. columbiana* from South Africa is small and is visible only under high magnification. It is embedded in the tip of the elongate penis (Fig. 11F–G) and resembles that described for *C. columbiana* (MacFarland 1966, as *C. spadix*). The presence of a penial stylet in *C. columbiana* as *C. alpha*) was not described by Baba & Hamatani (1963*a*), but was confirmed by Roller (1969). The shape of the penis (Baba & Hamatani 1963*a*, pl. 11 (fig. 6)) resembles that of the South African specimens. Regrettably the penis and stylet described by O'Donoghue (1922) were not illustrated.

TABLE 4

Comparison of the different species of *Catriona*. (PS) indicates information from present study.

Species	Distribution	Coloration	No. of teeth	Jaw border	Penis	Penial style	No. of rows in anterior digestive system	Reference
C. gymnota	Northern Europe, U.S.A. Atlantic coast	orange rhinophores, orange to red cerata with distal white band and orange tips	68–81	bristles (PS)	elongate, conical (PS)	present (PS)	3–4 (PS)	Couthouy 1838; Alder & Hancock 1855; Gould & Binney 1870;Odhner 1939; Williams & Gosliner 1979; (PS)
C. maua	Florida, Naples	white on rhinophores and oral tentacles, head and back; rhinophores with posterior red line; cerata with 2 white longitudinal stripes, red to pale brown liver	80–120	bristles	elongate, conical	present	3–4	Marcus & Marcus 1960; Edmunds1964; Schmekel 1968
C. oba	Brazil, Florida	rhinophores with red streak. 2 white lines on back; cerata pink with longitudinal white line	53	smooth (PS)	elongate, conical	present	2–3	Marcus 1970 (PS)
C. tema	Ghana	orange band on rhinophores; pigment on head and back, white subapical band and spots on cerata	137	bristles	short, conical	present	3	Edmunds 1968
C. alpha of Miller	New Zealand	white pigment on rhinophores, oral tentacles and back; subapical band on cerata; orange band on rhinophores; cerata light brown, pinkish tinge or fawn with green mottling	64	irregularly sinuate	very elongate	absent	3–4	Miller 1977
C. columbiana	British Columbia, California, Japan	rhinophores orange or orange band, white on oral tentacles, rhinophores, head, dorsum and cerata; cerata light vermilion, yellow or brown and may bear longitudinal white line, white line on oral tentacles	65–105	bristles	elongate, conical	present	5	O'Donoghue 1922; Baba & Hamatani 1963*a*; MacFarland 1966; Roller 1969; Williams & Gosliner 1979
C. columbiana (PS)	South Africa	rhinophores with orange band, white on head and back, white line on oral tentacles, dense white on cerata; cerata light yellow or pink	80	bristles	elongate, conical	present	4–5	(PS)
C. casha	South Africa	cerata orange with subapical dense white band; no other markings	76	bristles	short, conical	present	4	(PS)

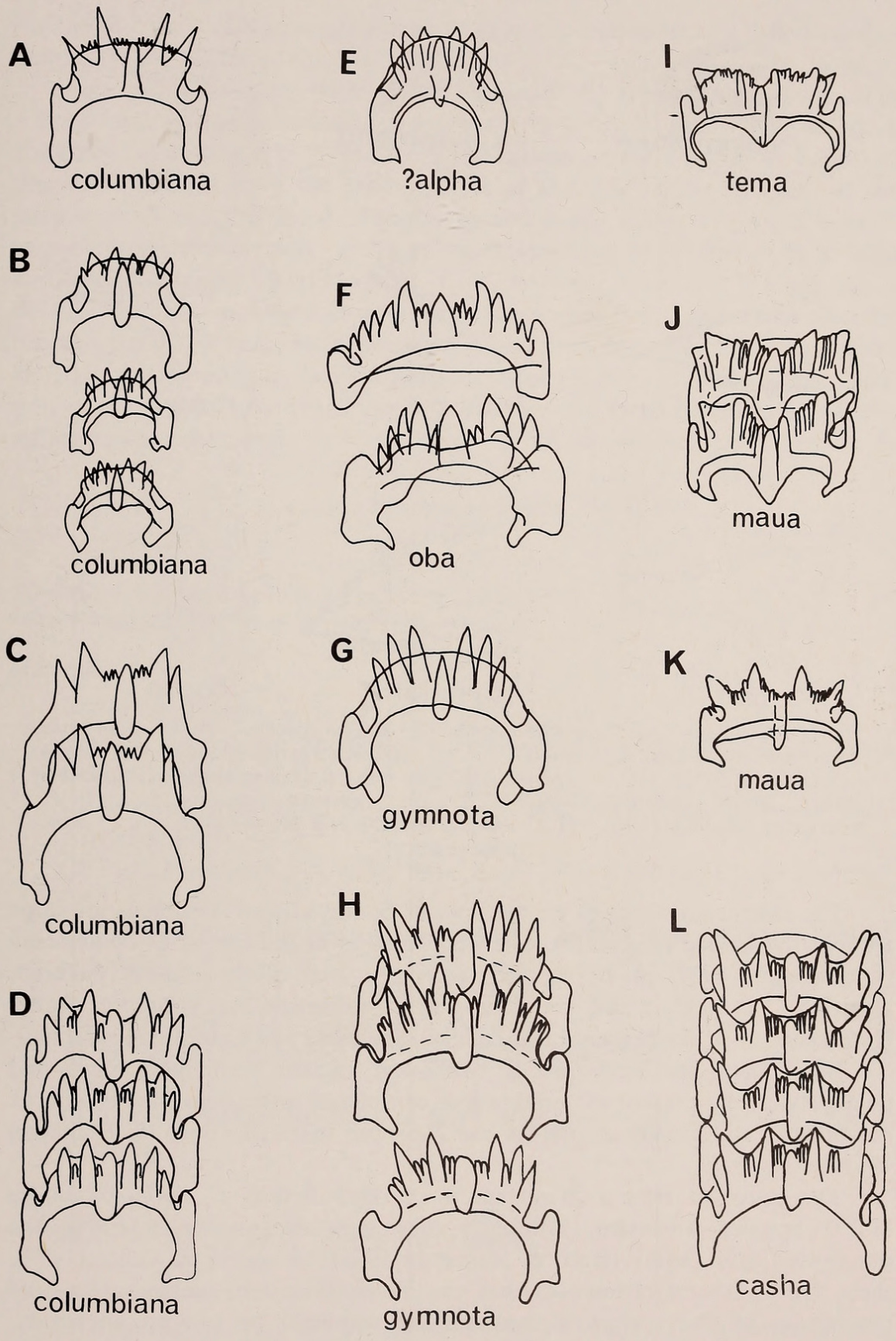

Fig. 15. Comparison of the radular teeth of *Catriona* species. A. *C. columbiana* (after O'Donoghue 1922). B. *C. columbiana* (after Baba & Hamatani 1963*a* as *Cuthona alpha*). C. *C. columbiana* (after MacFarland 1966 as *C. spadix*). D. *C. columbiana* (present study). E. *?C. alpha* (after Miller 1977). F. *C. oba* (after Marcus 1970). G. *C. gymnota* (after Alder & Hancock 1855). H. *C. gymnota* (present study). I. *C. tema* (after Edmunds 1968). J. *C. maua* (after Marcus & Marcus 1960). K. *C. maua* (after Edmunds 1964). L. *C. casha* (present study).

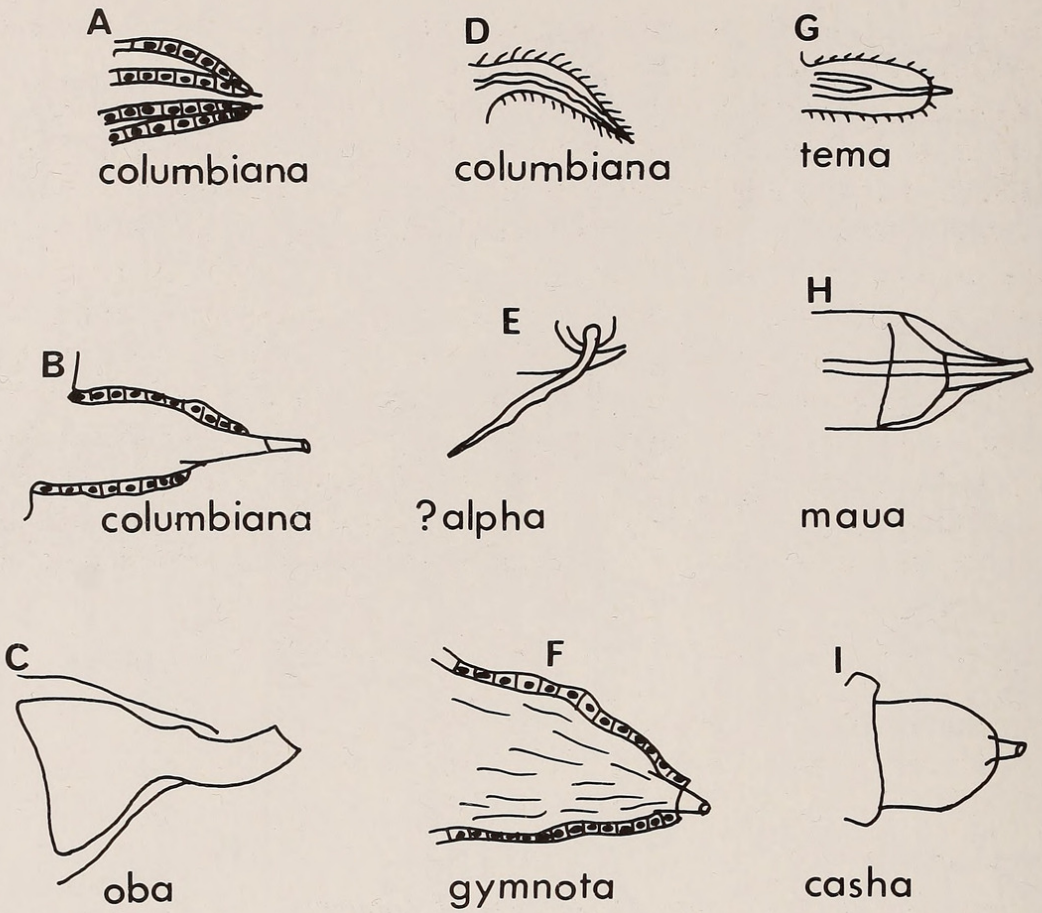

Fig. 16. Comparison of the penial papillae of *Catriona* species. A. *C. columbiana* (after MacFarland 1966 as *C. spadix*). B. *C. columbiana* (present study). C. *C. oba* (after Marcus 1970). D. *C. columbiana* (after Baba & Hamatani 1963*a* as *Cuthona alpha*). E. *?C. alpha* (after Miller 1977). F. *C. gymnota* (present study). G. *C. tema* (after Edmunds 1968). H. *C. maua* (after Marcus & Marcus 1960). I. *C. casha* (present study).

The masticatory bristles on the jaws of South African specimens are large and clearly defined (Fig. 11D). The denticulation of the jaw of *C. columbiana* (O'Donoghue 1922, pl. 6 (fig. 23)) resembles that of the present material, although O'Donoghue did not distinguish their bristle-like structure. Roller (1969) confirmed the presence of bristles in Japanese and Californian material.

Based upon the similarities in coloration, radular teeth, jaws, penis and penial stylet, the present material is also considered to be synonymous with *C. columbiana* and closely resembles the Japanese material (Baba & Hamatani 1963*a*).

The status of New Zealand specimens identified as *C. alpha* by Miller (1977) remains uncertain. Although they may superficially resemble the description of *C. alpha* (Baba & Hamatani 1963*a*) as stated by Miller (1977), there are significant differences that require confirmation, particularly as the description of this species is now further amplified by the present study. Specimens described by Miller (1977) differ in that they have fewer ceratal rows in the anterior digestive branch, up to 4 lateral denticles in the radular tooth

instead of 2 to 3, a very elongate penis without a penial stylet and the absence of bristles on the masticatory border of the jaw.

Catriona casha agrees with other members of the genus in the possession of a long tapering radula bearing more than 50 teeth, a pre-radular tooth, a quadrangular cutting edge to the teeth and bristles on the masticatory border of the jaw. It differs from the other species of *Catriona* in the structure of the radular tooth and the shape of the penis and penial stylet. The tooth bears 2 major lateral denticles only, with 2 to 4 secondary denticles between the central and lateral denticles. South African *C. columbiana* have 2 to 3 large lateral denticles and have not been observed to possess more than 2 secondary denticles between the major ones. Most significantly, the penis of *C. casha* is stout and not elongate and tapering as in all other species of *Catriona* (Fig. 16). The penial stylet forms a small tube projecting from the rounded tip of the penis. The above differences are considered to be sufficient to warrant separate specific status.

Cuthona speciosa (Macnae, 1954)

Figs 1F, 17–19

Catriona speciosa Macnae, 1954: 4, figs 1–3, pl. 1 (figs 1–3).
Cuthona speciosa (Macnae, 1954) **comb. nov.**

Material

University of Cape Town, Department of Zoology

CP 818, 10 m depth, Castle Rocks, False Bay (34°14′S 18°29′E), 27 April 1973, 2 specimens
CP 791, intertidal, St James, False Bay (34°06′S 18°27′E), 30 March 1972, 1 specimen
CP 792, 2 m depth, Clovelly, False Bay (34°08′S 18°26′E), 10 September 1972, 1 specimen
CPR 94A, intertidal, Wilderness (34°00′S 22°33′E), 3 February 1973, 2 specimens

Other material

20 m depth, Llandudno (34°01′S 18°20′E), 15 December 1979, 2 specimens.
30 m depth, Vulcan Rock, Hout Bay (34°04′S 18°19′E), 20 January 1980, 1 specimen

Distribution

South Africa (Macnae 1954; present study).

External morphology

Live specimens (Fig. 1F) are up to 18 mm in length. The anterior margin of the foot is very slightly produced into tentacular processes. The stout oral tentacles are slightly shorter than the smooth, slender rhinophores. The cerata

are smooth and cylindrical and arranged in clearly recognizable rows with 2 to 4 rows per side in the anterior digestive branch. The posterior digestive branch has up to 7 rows per side. The gonopores are situated ventral to the second and third ceratal rows of the right side. The acleioproctic anus is situated on the anterodorsal margin of the right posterior digestive branch. The nephroproct opens anterior to the anus.

The general body colour is yellow-orange, as are the cephalic tentacles and rhinophores, which may be decorated with pale pink pigment. The digestive gland within the cerata is dark brownish-green while the ceratal epithelium is yellow-orange and is covered either with bright luminescent blue or luminescent lilac pigment. In lilac-coloured specimens, the yellow cnidosac, visible in blue specimens, is obscured by opaque white pigment.

Internal morphology

The jaws (Fig. 17A) are thin and fragile. The masticatory border is smooth, without denticles. The uniseriate radula (Figs 18–19) has up to 64 teeth with 4 to 6 major denticles on each side of the central cusp. 1 or 2 secondary

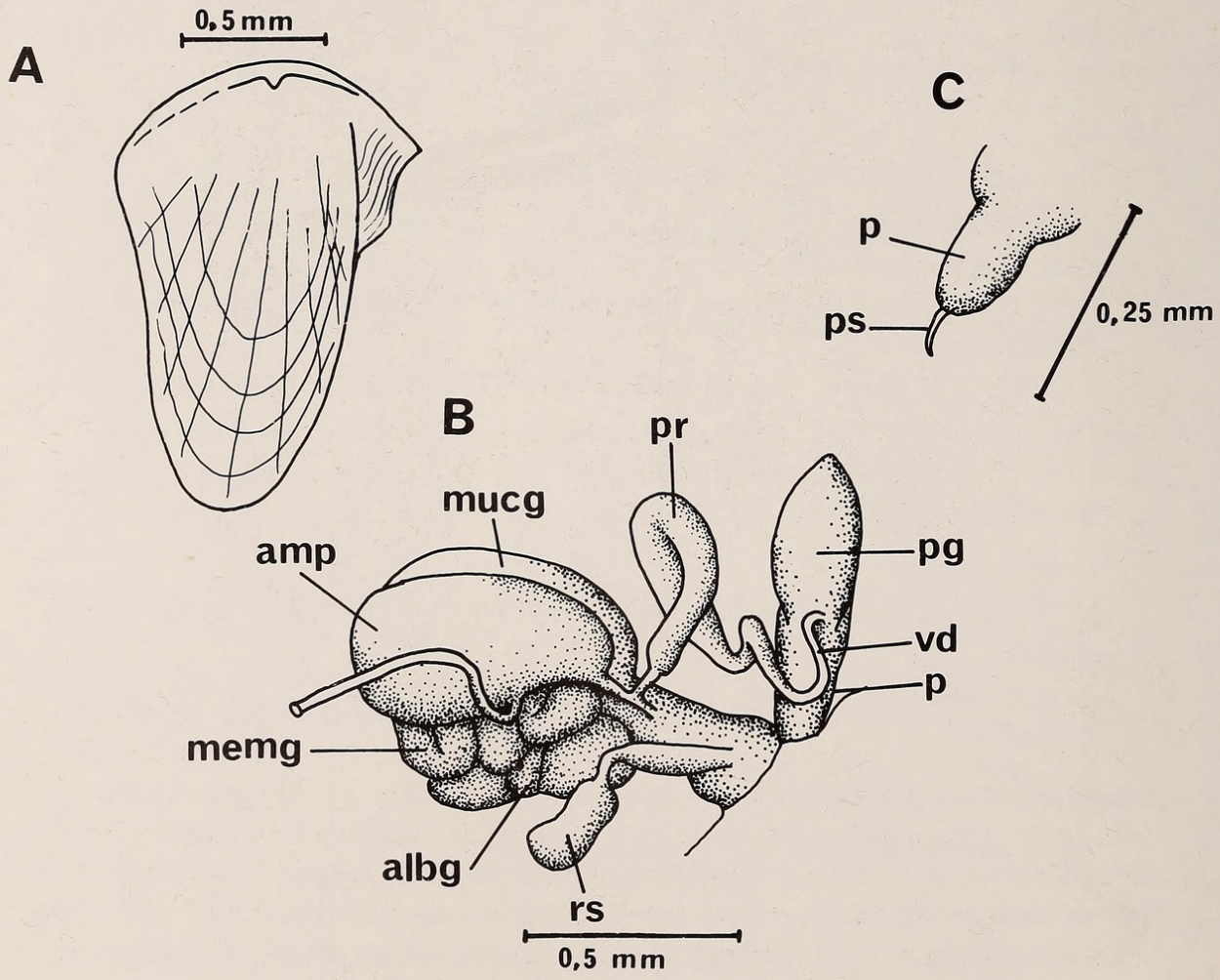

Fig. 17. *Cuthona speciosa* (Macnae, 1954). A. Jaw. B. Reproductive system. C. Penis showing penial stylet.

denticles may or may not be present between the central and first lateral denticle and between the first and second lateral denticles. The distribution of secondary denticles is highly variable within and between radulae.

The reproductive system (Fig. 17B) is similar to that described by Macnae (1954) but differs in three respects. There is no thin duct separating the penis from the penial gland; the penial stylet is slightly curved (Fig. 17C) and shorter than the penis; the prostatic vas deferens does not taper markedly into a non-prostatic portion.

Natural history

Cuthona speciosa is found on and feeds upon calyptoblastic hydrozoans of the genus *Sertularella*.*

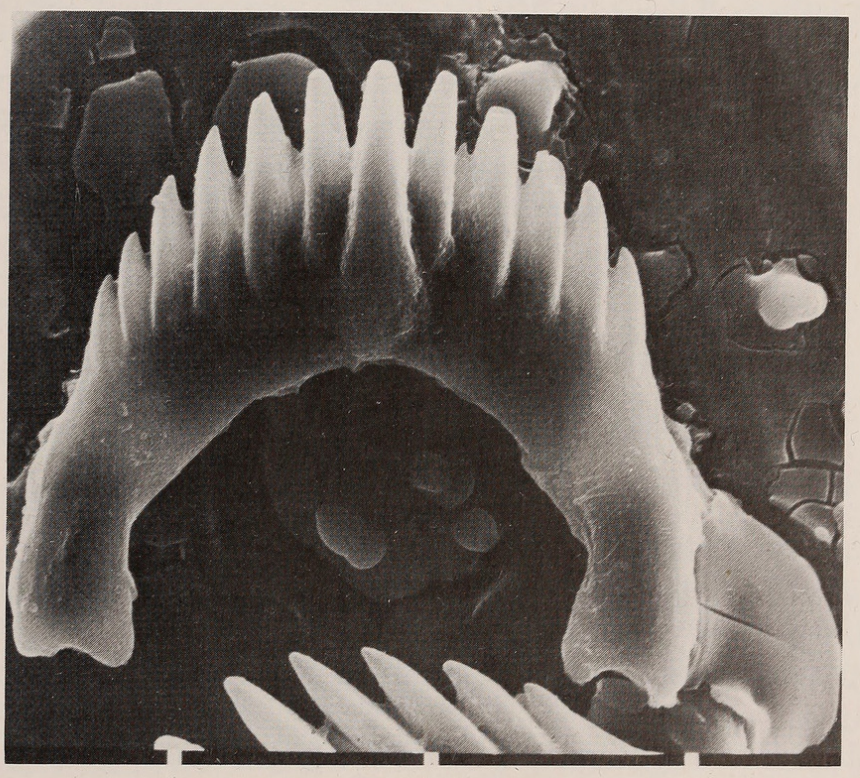

Fig. 18. *Cuthona speciosa* (Macnae, 1954). Scanning electron micrograph of radula. Scale: 30 μm between squares.

Discussion

Macnae (1954) described *Catriona speciosa* from two specimens from False Bay, South Africa. The presence of a non-tapering radula and the absence of a pre-radular tooth indicate that this species is more properly placed in *Cuthona*, comb. nov. The present material agrees closely with that described by Macnae, but differs in several respects and encompasses a wider range of variation. The number of ceratal rows in the anterior digestive branch ranges from 2 to 4 and an increasing number of rows is not correlated with body size. Macnae described only 3 rows. The specimens described in this study were larger and

* Additional data received while in press.

more variable in their coloration and also had more radular teeth than previously described. They also differ from Macnae's specimens in that the jaws lacked denticles on the masticatory border. Variability in the general shape and structure of the radular teeth between specimens collected from different localities was a notable feature of the present material. Figure 19 illustrates the variability of this characteristic, which has not been adequately studied in other nudibranchs. Differences may be noted in the degree of arching of the base of the tooth, the size of the articulating surfaces, the relative sizes of the lateral denticles, the number of lateral denticles and the presence and position of the secondary denticles. In comparison with other specimens, the tooth of the animal shown in Figure 19D, as well as all other mature teeth in this radula, were considerably worn with blunt denticles. The two radular teeth which were still in the process of being formed bore typical elongate, sharp denticles.

Cuthona speciosa is thus more variable than previously described. The present material is, however, consistent with that described by Macnae (1954). The consistency of reproductive morphology in material from the present study suggests that discrepancies between this and Macnae's material (1954, fig. 3) are due to observational rather than morphological differences.

Family **Embletoniidae**

Embletonia gracilis Risbec, 1928

Figs 20–22

Material

South African Museum, Cape Town

SAM–A34874, intertidal, St James, False Bay (34°06′S 18°21′E) 1 January 1980, 1 specimen

SAM–A34875, intertidal, Clovelly, False Bay (34°08′S 18°26′E), 18 January 1980, 1 specimen

SAM–A34876, intertidal, St James, False Bay (34°06′S 18°21′E), 16 February 1980, 2 specimens

SAM–A 34877, intertidal, Clovelly, False Bay (34°08′S 18°26′E), 31 May 1980, 6 specimens

Distribution

New Caledonia (Risbec 1928), Japan (Baba 1959), Hawaii (Gosliner, 1980), Australia (Burn 1966), South Africa (present study).

External morphology

The elongate, slender animals reach a maximum length of 7 mm at maturity (Fig. 20). The animal is dorsoventrally compressed with the cerata held close to the body when actively crawling. The oral tentacles have been modified into a wide bilobed velum. The rhinophores are short and cylindrical.

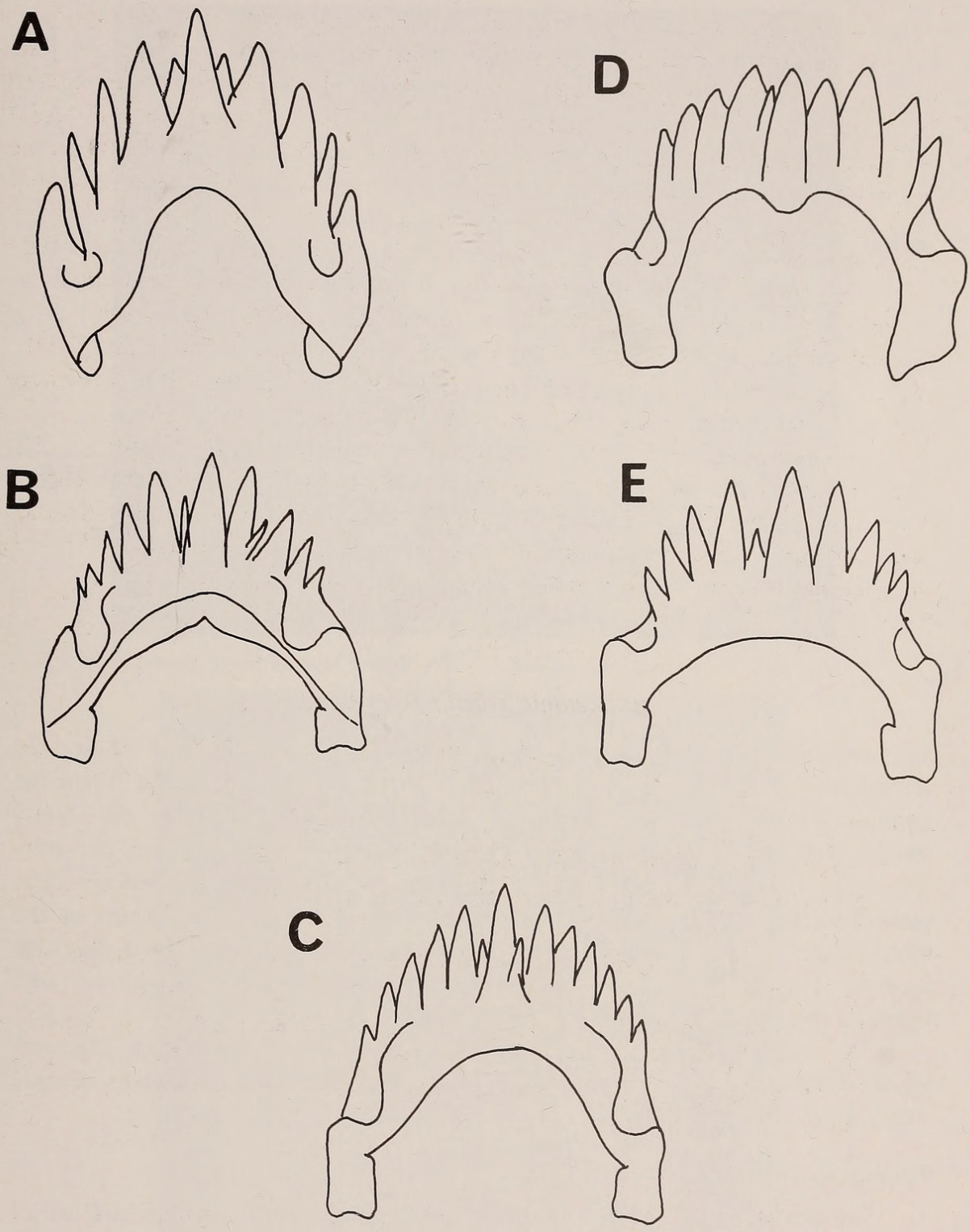

Fig. 19. Radular teeth of *Cuthona speciosa* (Macnae, 1954). A. False Bay (after Macnae 1954). B. Wilderness. C. Llandudno. D. St James, False Bay. E. Oudekraal. All specimens except C had blue cerata.

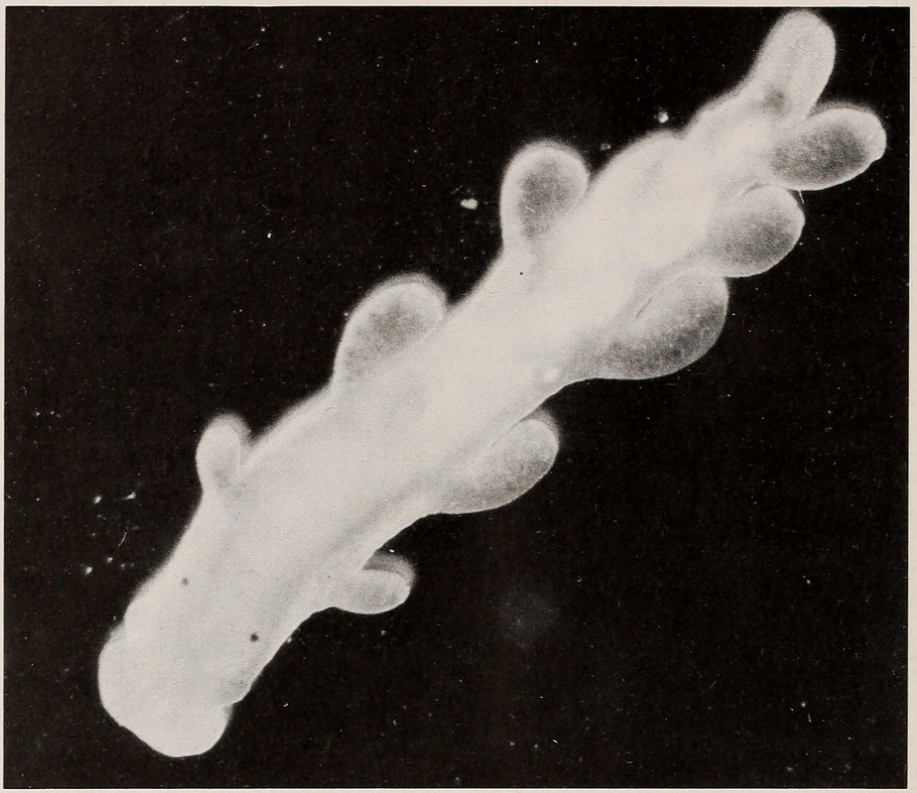

Fig. 20. *Embletonia gracilis* Risbec, 1928. Dorsal view of living animal at 20 × magnification.

The anterior foot corners are simply rounded. The cerata are short and club-shaped, with four short and rounded cnidosacs on each ceras. When the animals are disturbed, the cerata elongate and four blunt apices are clearly visible. The cerata are arranged in 5 to 6 rows with a single ceras per row. There are 2 ceratal rows per side forming the anterior digestive branches. The pleuroproctic anus is situated immediately ventral to the notal brim in the interhepatic space, adjacent to the first ceras of the right posterior digestive branch. The separate male and female gonopores are located ventrally, between the first two cerata of the right side.

The living specimens are translucent white with salmon-pink digestive gland visible in the cerata and within the notum. In some specimens opaque white spots are present on the notum.

Internal morphology

The jaws (Fig. 21A) are elongate and delicate with a single row of 17 denticles along the slightly projecting masticatory border. The uniseriate radula contains 70 to 86 teeth. The teeth (Fig. 22) possess 2 to 4 denticles on each side of the equally prominent central cusp. The oral glands are well developed, as indicated by Baba and Hamatani (1963*b*) for *Embletonia gracilis paucipapillata*.

The reproductive system (Fig. 21B) consists of 6 to 8 hermaphroditic follicles that empty into the saccate ampulla. Distally, the ampulla narrows considerably and diverges into a short oviduct and a short non-prostatic vas

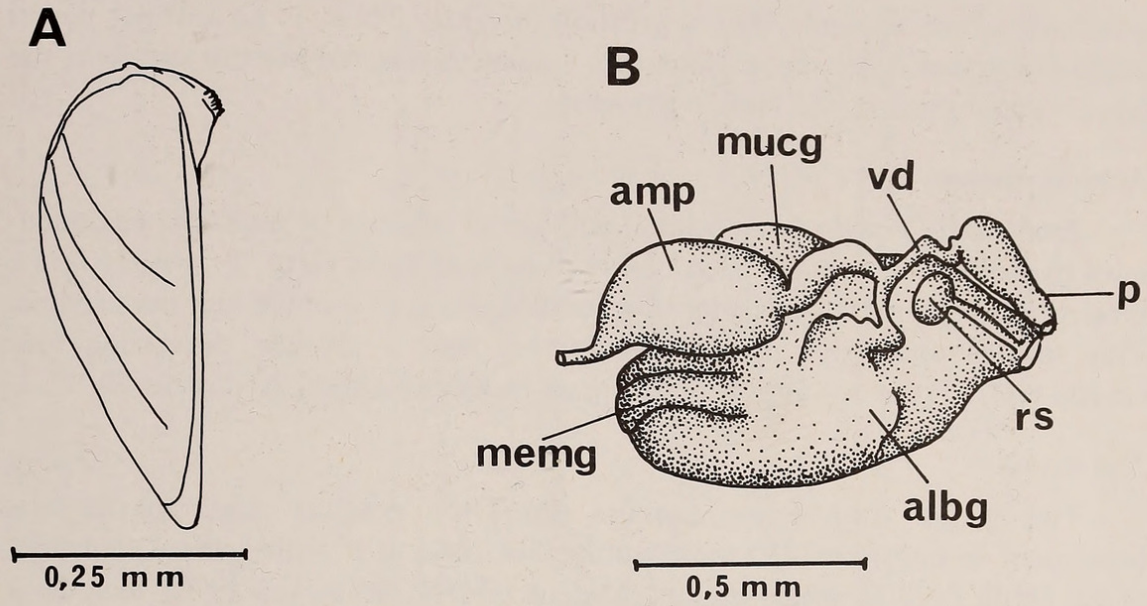

Fig. 21. *Embletonia gracilis* Risbec, 1928. A. Jaw. B. Reproductive system.

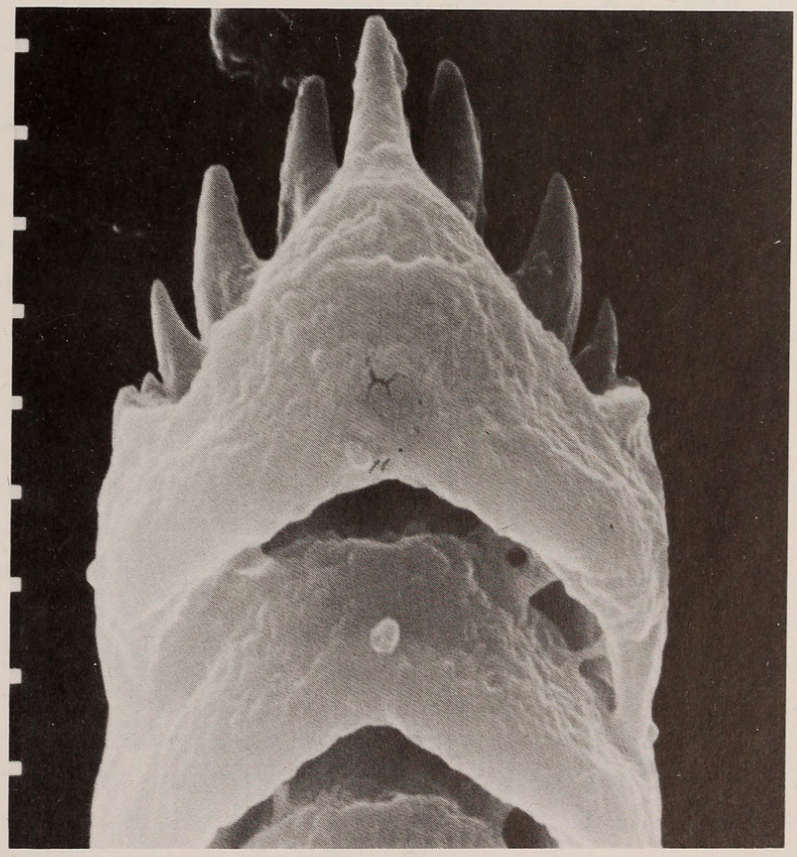

Fig. 22. *Embletonia gracilis* Risbec, 1928. Scanning electron micrograph of ventral view of radula.
Scale: 3 μm between squares.

deferens, which expands into a prostatic portion. There is no distinct penial papilla or apical stylet. A receptaculum seminis is situated distally and joins the female gland mass at the female gonopore.

Natural history

Embletonia gracilis is associated with small colonies of intertidal campanularid hydroids, but has not been observed to feed upon them. *E. gracilis* lays a semicircular egg mass consisting of 4 to 19 eggs, with a single egg per capsule. This species undergoes direct development into a juvenile possessing four cerata buds. From deposition of egg mass to hatching took 20 days at 20 °C.

Discussion

The genus *Embletonia* contains three or possibly four species. Its placement is questionable; some authorities placing it within the Dendronotacea (Miller 1977) while others (Marcus 1961*b*; Schmekel 1970) include it within the Aeolidacea. Marcus (1961*b*) stated that *Embletonia* is an aeolidacean genus, as the gonads are situated ventral to the digestive gland ducts. Miller (1977) stated that the Embletoniidae are more closely related to the Dendronotacea, although he provided no specific reasons. As the present material possesses ventral gonads, we consider the Embletoniidae as aeolids, closely allied to the Tergipedidae.

The type species of *Embletonia*, *E. pulchra* (Alder & Hancock, 1844), is known only from European waters. This species is characterized by a penis with a penial stylet, and a well-developed prostate (Marcus & Marcus 1958). *Embletonia faurei* Labbé, 1923, was described solely on the basis of external morphology, from two specimens collected from Brittany, France. Thompson & Brown (1976) considered *E. faurei* a junior synonym of *E. pulchra*. *E. faurei* has 9 cerata on each side of the animal (Labbé 1923) whereas there are 5 or 6 cerata per side in *E. pulchra*. The reproductive system of *E. faurei* was described by Schmekel (1970) and differs from that of *E. pulchra* (Marcus & Marcus 1958) in that a distinct prostatic portion is absent from the vas deferens. This appears to be a significant difference worthy of specific separation.

There remains some question as to whether the two species with an unarmed penis, which lacks a penial papilla, *E. gracilis* Risbec, 1928, and *E. paucipapillata* Baba & Hamatani, 1963*b*, should be regarded as distinct species. Both occur in Japan (Baba & Hamatani 1963*b*) and differ in their body shape, coloration, number of ceratal rows and degree of elaboration of the apical ends of their cerata. The specimens described from New Caledonia (Risbec 1928), Australia (Burn 1966), and South Africa (present study) are compared with the Japanese material in Table 5. The above specimens possess features that are intermediate between the Japanese forms, with the exception that deeply bifid ceratal apices are unique to specimens of *E. paucipapillata* from Osaka Bay. Additional material from other localities is required before a more definitive statement can be made with regard to the status of *E. gracilis* and *E. paucipapillata*.

TABLE 5

Comparative morphology of some species of *Embletonia*.

Specimens	Coloration	Ceratal rows	Ceratal apex	Body shape	Radula	Size	Reference
E. gracilis New Caledonia	white with grey digestive gland	7	with four blunt extensions	elongate, fusiform	*c.* 50 rows 3–4 denticles on each side of central cusp	5 mm	Risbec 1928
E. gracilis Japan	yellowish white, yellow digestive gland	7–8	with four blunt extensions	elongate, linear	72 rows 3 denticles on each side of central cusp	8 mm	Baba 1959; Baba & Hamatani 1963*b*
E. gracilis Australia	translucent white with opaque white patches, dull pink digestive gland	4–6	with four blunt extensions	short, fusiform	unknown	4,5 mm	Burn 1966
E. gracilis South Africa	translucent white, dull pink digestive gland	5–6	rounded, occasionally with four blunt extensions	elongate, fusiform	70–86 rows 2–4 denticles on each side of central cusp	4–7 mm	present study
E. paucipapillata	yellowish white, vivid orange digestive gland, opaque white on head and cerata	4–5	deeply bifid	short fusiform	80 rows 3 denticles on each side of central cusp	3–4 mm	Baba 1959; Baba & Hamatani 1963*b*

Of the specimens of *E. gracilis* previously described, the South African material most closely agrees with that described from Australia by Burn (1966). Our material differs from all described specimens of *E. gracilis* in that the apices of the cerata are normally rounded and exhibit the characteristic 'apical twigs' (Baba 1959) only when the animals are disturbed. It should be noted that, while the anal position of *E. gracilis* was described as acleioproctic (Baba & Hamatani, 1963*b*; Burn 1966), Baba & Hamatani's figure (pl. 17 (fig. 10)) clearly indicates that the anus is situated well below the notum (pleuroproctic) as in the present material.

Baba (1967) described the genus *Embletoniella* to include the two species of Embletoniidae with apical twigs in the cerata and an unarmed penis. Burn (1973) suggested that *Embletoniella* be regarded as a subgenus of *Embletonia*, at most. In material from this study the short apical twigs can be seen only when the cerata are fully extended. *Embletoniella* can be separated from *Embletonia* only by its absence of penial armature. This separation seems unnecessary as the closely allied genus *Cuthona* contains species with an armed and unarmed penis (Burn 1973). Therefore, we prefer to regard *Embletoniella* Baba, 1967, as a junior subjective synonym of *Embletonia* Alder & Hancock, 1851, syn. nov.

ACKNOWLEDGEMENTS

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ABBREVIATIONS

a	anus	og	oral gland
albg	albumen gland	p	penis
amp	ampulla	pg	penial gland
bc	bursa copulatrix	pr	prostate
cg	cerebral ganglion	ps	penial stylet
fgm	female gland mass	rh	rhinophore
g	gonopore	rs	receptaculum seminis
memg	membrane gland	s	stomach
mucg	mucous gland	v	vagina
n	nephroproct	vd	vas deferens

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