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# A REVISION OF THE AUSTRALIAN SPECIES OF THE RISSOELLIDAE. (MOLLUSCA: GASTROPODA)

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## SUMMARY

The Rissoellidae is tentatively included in the Heterogastropoda. The 14 Australian species and subspecies of *Rissoella*, 11 of which are new, are separated into 4 subgenera. Their known distributions, radulae and opercula, and in some cases the external features of the animal, are described. A key to the Australian species is given.

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## INTRODUCTION

The family Rissoellidae consists of small, rather featureless gastropods found living mainly on algae in the lower littoral and shallow sublittoral zones throughout the world. It is in general, a poorly known group and contains only one genus. The anatomy of only 2 species has been described (Fretter, 1948) and the radulae of a few species have been described by Thiele (1912, 1925), Sars (1878), Troschel (1858) and Robertson (1961) but only the New Zealand fauna has been fully investigated (Ponder, 1966, 1968). Robertson (1961, 1962) has listed the taxa included in the Rissoellidae and discussed the generic units involved.

The two British species studied by Fretter (1948) were shown to have two pairs of tentacles, brightly pigmented spots on the mantle area and no ctenidium. They are hermaphroditic and a few adults survive the winter and produce hemispherical egg capsules from which emerge the crawling young, there being no pelagic larval stage. They feed on micro-algae and detritus and have a simple alimentary canal.

The anatomical peculiarities of the rissoellids were attributed to their minute size by Fretter (1948) who retained them in the Rissoacea. Fretter and Graham (1954) implied that *Rissoella* has opisthobranch rather than prosobranch affinities but later Fretter (1956) and Fretter and Graham (1962) again gave *Rissoella* prosobranch status. Other authors have included the Rissoellidae in the Rissoacea (Prosobranchia) except Nordsieck (1972), who includes it in his 'superfamily' Microrissoidea (not based on a genus or family taxon and therefore unavailable) and Golikov and Starobogatov (1975) who erect a new 'suborder' Rissoellina within the Prosobranchia. Robertson (1961) does not commit himself as to their likely affinities.

The Rissoellidae shows a number of characters atypical of prosobranchs. These include the lack of an osphradium, a ctenidium and oesophageal glands or crystalline style, their hermaphrodite condition, the possession of a pigmented hypobranchial gland, the eyes placed in a median position on the tentacles, two pairs of head tentacles, the invasion of the mantle roof by the renal organ, the peculiar radula and operculum and their possible euthyneurous condition (Fretter and Graham, 1962: 313).

Although several of the above characters are more typical of the Opisthobranchia we are reluctant to include the Rissoellidae in that group because of the several prosobranch-like characters it possesses such as the simple shell, non-heterostrophic protoconch, the simple foot, the rather prosobranch-like reproductive system (despite the hermaphrodite condition) and egg capsules.

It is quite probable that *Rissoella* is a neotenous group and, consequently, some of its features may be juvenile characteristics (the two pairs of head tentacles are a possible example). If this were the case some of the prosobranch features could also be explained in this way — e.g. the simple shell, relatively spacious mantle cavity and the simple foot.

Climo (1975) has recently outlined the characteristics of some families of the Heterogastropoda, a group which shows mixed opisthobranch and prosobranch characters. The Rissoellidae could, tentatively, be included in the Heterogastropoda although this must be considered to be a location of convenience only. A more detailed examination of the higher classification of the Rissoellidae and the other family usually included in the Rissoacea which also shows opisthobranch affinities, the Omalogyridae, is long overdue but should await anatomical information on some of the other families that are doubtful inclusions in the Rissoacea. Families such as the Trachysmidae and Trochaclisidae fall into this category. The recent radical changes in the regrouping of these families by Golikov and Starobogatov (1975) are done, in most cases, without demonstrating any supporting evidence.

The Australian Rissoellidae is comparatively rich in species, 14 species and subspecies being recognised in this revision and, undoubtedly, additional species will be added. The Australian fauna can be split into 4 subgenera within the genus *Rissoella*, 2 of which have a world-wide distribution (*Rissoella* s.s., *Jeffreysilla*), one appears to be confined to Australia, the South Pacific, New Zealand, the Subantarctic and Antarctic (*Jeffreysiella*), and the other is confined to New Zealand and southern Australia (*Zelaxitas*).

#### ABBREVIATIONS

A.M.	.....	Australian Museum, Sydney.
coll.	.....	collected by.
Coll.	.....	collection.
N.M.V.	.....	National Museum of Victoria, Melbourne.
N.S.W.	.....	New South Wales.

Qld	.....	Queensland.
Q.M.	.....	Queensland Museum, Brisbane.
S.A.	.....	South Australia.
S.A.M.	.....	South Australian Museum, Adelaide.
S.E.M.	.....	Scanning Electron Microscope.
sev	.....	several.
S.W.A.	.....	South Western Australia.
Tasm.	.....	Tasmania.
T.M.	.....	Tasmanian Museum, Hobart.
Vic.	.....	Victoria.
W.A.	.....	Western Australia.
W.A.M.	.....	Western Australian Museum, Perth.
w	.....	used in 'material examined' to indicate the number of 'wet' (i.e. formalin preserved) specimens.

Note: In the locality data, and sometimes elsewhere, compass points (north, south etc.) are abbreviated to N., S. etc.

#### MATERIAL AND METHODS

Most of the specimens used in this study were obtained from littoral or sublittoral samples washed from algae or from beneath stones. These were usually fixed in 10% neutral formalin and later preserved in 5% neutral formalin and/or dried. The samples were sorted beneath a stereo-microscope and the species initially separated mostly on shell characters. The animal was removed from specimens selected for radular examination, or, if this was not possible the shells were crushed to obtain the animal. Their radulae, which were obtained by macerating in concentrated, warm NaOH, were washed thoroughly in distilled water. These were mounted wet onto a piece of microscope-slide cover slip and this was fixed to a S.E.M. stub by double sided tape. The radula dried onto the glass with sufficient tenacity so that no additional adhesive was required. The operculum of each specimen was also mounted in the same way or directly on the double-sided tape. A shell was selected that best matched the one(s) crushed and this was mounted on the double-sided tape on the same stub as the radula and operculum. In many cases more than one radula and operculum were examined from one population. The specimens were coated, usually with gold, and examined and photographed with the scanning electron microscope (S.E.M.).

The S.E.M. stubs were given registered numbers (S.E.M. stub no.) and these are referred to in the text. All of this material is housed in the Australian Museum.

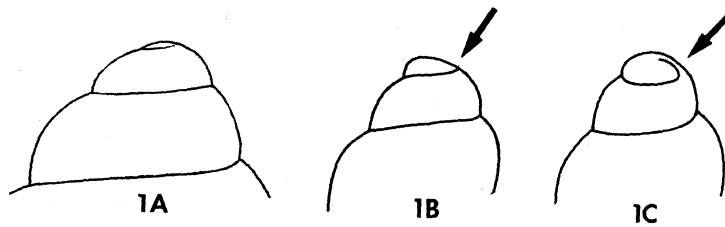
The coverage of the material available is such that most of the common shallow water species from the east, south and west coasts, and Tasmania have probably been encountered but, no doubt, additional species will be discovered with more extensive sampling. A few suitable samples were available from the north coast but no rissuellids were obtained.

Most of the material included in this revision was collected alive. 'Dead' shells are difficult to identify except in a few cases where shape and/or colour are distinctive. The differentiating shell characters of most species are so subtle that only perfect material can be used to make a reliable identification and sometimes confirmation is necessary from an examination of the radula.

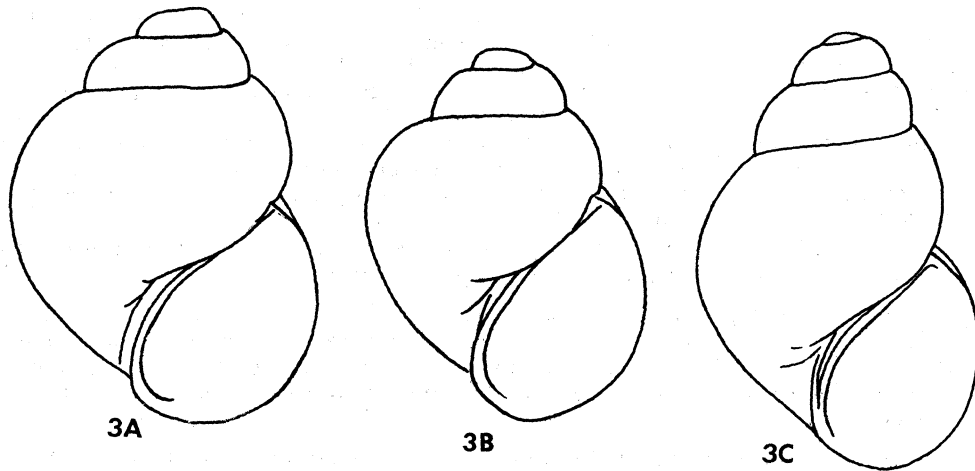
Except where it is otherwise indicated, all of the material listed under 'Additional Material Examined' is housed in the Australian Museum.

KEY TO THE AUSTRALIAN SPECIES AND SUBSPECIES OF *RISSELLA* BASED ON SHELL CHARACTERS AND GEOGRAPHIC LOCATION

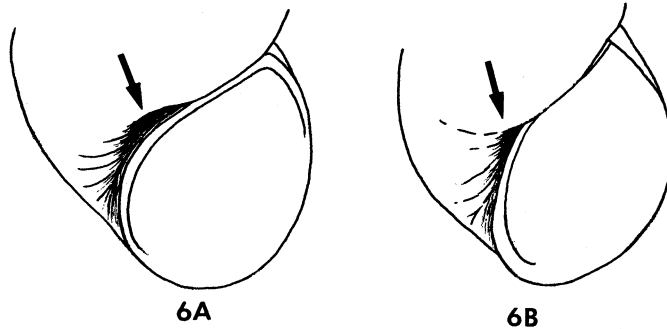
- 1. Spire length approximately equal to, or less than, length of aperture, protoconch evenly rounded (fig. 1A) ..... 2
- Spire length considerably greater than length of aperture, protoconch deviated (figs 1B,C) ..... 12



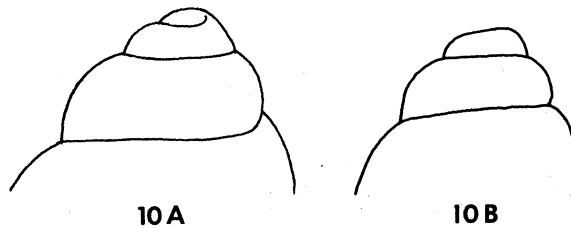
- 2. White or colourless ..... 3
- Brown ..... 11
- 3. Spire length usually less than length of aperture, body whorl very large and inflated (figs 3A,B) ..... 4
- Spire length about equal to (sometimes slightly longer or shorter) length of aperture, body whorl large but not markedly inflated (fig. 3C) ..... 6



- 4. Western and south Western Australia ..... *Rissoella (Rissoella) atrimacula* sp.nov.  
Tropical Pacific and eastern Australia ..... 5
- 5. Spire very short, tropical eastern Australia and Pacific (fig. 3A) .....  
..... *Rissoella (Rissoella) globosa* sp. nov.  
Spire moderately short, south eastern Australia (fig. 3B) .....  
..... *Rissoella (Rissoella) fallax* sp. nov.
- 6. Umbilicus well developed, south Western Australia (fig. 6A) .....  
..... *Rissoella (Jeffreysilla) confusa umbilicata* subsp. nov.  
Umbilicus small to moderate (fig. 6B) ..... 7



- 7. Colourless, or white with distinct axial colourless streaks ..... 8  
Semi-transparent to semi-opaque, uniform white ..... 9
- 8. Transparent, colourless, tropical eastern Australia and Pacific .....  
..... *Rissoella (Jeffreysilla) confusa confusa* sp. and subsp. nov.  
Transparent, colourless or white with axial colourless streaks, Western to  
South Australia ..... *Rissoella (Rissoella) vitrea* sp. nov.
- 9. Protoconch symmetrically coiled ..... 10  
Protoconch slightly deviated, southern Australia .....  
..... *Rissoella (Jeffreysiella) wilfredi* (Gatliff and Gabriel)
- 10. Protoconch raised, first half whorl clearly visible in side view, south  
Western Australia (fig. 10A) . *Rissoella (Jeffreysilla) confusa umbilicata* subsp. nov.  
Protoconch flattened, first half whorl largely hidden in side view, south  
eastern Australia (fig. 10B) .. *Rissoella (Jeffreysilla) confusa robertsoni* subsp. nov.



11. Umbilicate when adult, south eastern Australia and Tasmania .....  
 ..... *Rissoella (Zelaxitas) micra* (Finlay)  
 Non-umbilicate when adult, Tasmania and southern Australia .....  
 ..... *Rissoella (Zelaxitas) imperforata* sp. nov.
12. Shell greater than 1.5 mm in length ..... 13  
 Shell less than 1.5 mm in length ..... 15
13. Relatively inflated body whorl and large aperture, white, southern  
 Australia ..... *Rissoella (Jeffreysiella) wilfredi* (Gatliff and Gabriel)  
 Relatively narrow body whorl and small aperture, yellowish to pinkish,  
 western, southern and eastern Australia and Pacific ..... 14
14. Narrow spire, western and southern Australia .....  
 ..... *Rissoella (Jeffreysiella) fretterae* sp. nov.  
 Medium spire, eastern Australia and Pacific .....  
 ..... *Rissoella (Jeffreysiella) secunda* (Iredale)
15. Colourless, transparent, south Western Australia .....  
 ..... *Rissoella (Jeffreysiella) colleenae colleenae* sp. and subsp. nov.  
 White, semi-transparent, eastern Australia .....  
 ..... *Rissoella (Jeffreysiella) colleenae pacifica* subsp. nov.

#### TAXONOMY

Family **Rissoellidae** M. E. Gray, 1850.

Synonym *Jeffreysiadae* Carpenter, 1856.

**DIAGNOSIS:** *Shell:* Small, thin, spire raised, whorls convex, aperture simple, peristome thin and sharp. *Radula:* Variable, a central, lateral, and 0-2 marginal teeth. *Operculum:* Approximately semicircular, the columellar edge very bluntly angled; not spirally coiled, nucleus together with a short, blunt, internal peg at apex of angle on columellar edge. *Animal:* Head with long oral lobes and cephalic tentacles; eyes in about middle of base of cephalic tentacles. Mantle with brightly pigmented spots. Mantle cavity lacks a ctenidium, respiratory currents being maintained largely by a ciliated exhalant tract which runs forward from the anus. Jaw present, oesophageal glands and crystalline style absent. Renal organ spread along much of roof of mantle cavity. Hermaphroditic; sperm and ova produced in same gland. Penis simple, folded back in a groove. Female genital system dialic and relatively simple. Egg capsules hemispherical or ovoid, attached, with stiff outer coverings (i.e. not gelatinous) with 1-2 eggs. Development direct in the 2 species investigated (Fretter, 1948).

Genus **Rissoella** J. E. Gray 1847.

Type species (Monotypy): *Rissoa? glaber* Alder (= *Rissoella glaber* (err. pro *glabra*) J. E. Gray, 1847; = *Rissoa? diaphana* Alder, 1848; = *Rissoa albella* Alder, 1844).

Synonym *Jeffreysia* Alder, in Forbes and Hanley, 1850.

Type species (original designation): *Jeffreysia diaphana* (Alder, 1848).

**DIAGNOSIS:** *Shell:* Simple, thin, globose to elongate, umbilicate or non-umbilicate, usually colourless, white or brownish. Surface smooth except for very weak growth lines. Protoconch simple, of about  $1\frac{1}{3}$ - $1\frac{1}{2}$  whorls, sometimes apex deviated. Aperture simple, entire, with inner lip sometimes slightly thickened, outer lip thin, without a varix and never thickened. Whorls convex, body whorl usually large, often globose. *Head:* As in family diagnosis. *Operculum:* With the slightly convex columellar edge bordered on its inner side

by a sharp ridge from which arises a short, blunt peg. A short, rounded ridge arises from the base of the peg and passes across less than half of the inner surface of the operculum at right angles to the columellar edge. Outer edge simple, convex. Abapical end of operculum narrowly angled, adapical end broadly convex (all orientation taken as if operculum retracted into the apertural opening). *Radula*: Variable, 3, 5 or 7 teeth in each row. Central teeth generally large, usually with many cusps but sometimes 2 (subgenus *Jeffreysilla*). Lateral teeth large, usually with many long cusps but sometimes 1 or 2 (subgenus *Jeffreysilla*). Marginal teeth small, cusped or simple, usually only 1 pair, second pair, if present, simple (subgenus *Jeffreysiella*).

REMARKS: Ponder (1966) summarised the characteristics of the family and of the 6 subgenera then recognised and Robertson (1961) listed all of the taxa attributed to the family Rissoellidae at that time. Robertson (1962) has outlined the complex nomenclatural history of this generic name and concluded that *Rissoella* M. E. Gray, 1850 was the valid name for this genus group. Keen (1971:372) has indicated that *Jeffreysia* Alder in Forbes and Hanley (1850) has slight precedence over *Rissoella* M. E. Gray, 1850. Keen suggests accepting *Rissoella* J. E. Gray, 1847 as a valid introduction, as accepted by Robertson (1961) but this conclusion was rejected by Robertson (1962). Robertson's reasons for rejection of the 1847 introduction of *Rissoella* were that there is 'no such name as *Rissoa? glaber*, Alder' and that it 'was published as a "synonym" (subdivision) of the genus *Odostomia*'. The first point can be overcome by allowing, as Robertson (1961) did, the type designation of *Rissoa? glaber* Alder (= *Rissoa? diaphana* Alder, 1848) by monotypy. There is no doubt that *glaber* is a misspelling of *Rissoa glabra* (Brown), as Robertson acknowledges, but Gray's (1847) interpretation of this species was that of Alder's as he even accredited it with Alder's authorship not that of Brown. Robertson has indicated that *R. glabra* (Brown) (= *Pyramis glabrus* Brown, 1827) is a pyramidellid of uncertain identity, the species described under Brown's name by Alder (1844) being renamed by Alder (1848) as *Rissoa? diaphana*. Thiele (1929), Nordsieck (1972) and other authors have used *glabra* Brown as a senior synonym of *diaphana* Alder and there is little in the original figure and description of Brown's species to suggest that they are wrong except that Brown (1844) mentions a weak fold on the columella. This observation supports Robertson's view and is the one which we also tentatively adopt. The International Code of Zoological Nomenclature (I.C.Z.N.) (1961), article 70(b) clearly indicates that in the case of a deliberate use of a misidentification by the author of a new genus, the type species is to be interpreted as the one actually before the designator, not the one that correctly bears its name. Article 70(b)(i) states that in such a case the author of the new nominal genus is considered to have established also a new nominal species with the same specific name as the misidentified species. In our view the statement '*Rissoa? glaber*, Alder' indicates an assumption by Gray of a misidentification on Alder's part. Consequently *glaber* (err. pro *glabra*) Gray, should be the type species of *Rissoella*. An earlier species name is *Rissoa albella* Alder, 1844. Whether or not both of Alder's species are the same as Brown's *glabra* will not be definitely determined unless Brown's specimens (said to be in the cabinet of General Bingham) can be located. The I.C.Z.N. (1961) Article 11(d) disallowed the availability of a name published in synonymy but this was revised in 1963 to allow names erected prior to 1961 which have been so treated to become available. The name *Rissoella* J. E. Gray, 1847 has been used by a number of authors prior to 1961. In conclusion the introduction of *Rissoella* by J. E. Gray, 1847 is considered by us to be valid.

The 4 subgenera here included in *Rissoella* are readily separated on radular characters but they are extremely difficult to define on shell features. A brief diagnosis of each subgenus is given to facilitate its recognition and for routine identification a key based on shell characters and geographical distribution is given above for all the Australian species.

#### Subgenus **Rissoella**.

Synonyms *Jeffreysiopsis* Thiele, 1912.



Type species (subsequent designation Robertson, 1961): *Paludestrina duperrei* Vélain, 1877.

?*Jeffreysina* Thiele, 1925.

Type species (subsequent designation Winckworth, 1932): *Jeffreysia globularis* ('Jeffreys' MS') Forbes and Hanley, 1852.

DIAGNOSIS: *Shell*: As in generic diagnosis. *Head*: With rather long to short tentacles. *Operculum*: As in generic diagnosis. *Radula*: Central teeth large, each with convex cutting edge bearing numerous sharp cusps; lateral teeth large, each with strongly arched to almost straight cutting edge, with numerous sharp, usually large cusps. A single pair of relatively well-developed marginal teeth in each row, with few to many cusps (these probably absent in the type species of *Jeffreysina*).

REMARKS: Thiele (1925) showed that his *Jeffreysiopsis* should be regarded as a synonym of *Rissoella* s.s. because the radulae of the type species of both genus names were very similar.

Thiele (1925) noted that the radulae of *Rissoella globularis* and *R. opalina* (Jeffreys) are very similar and figured the radula of the latter. Sars (1878) gave an illustration of the radula of *R. globularis* from which Thiele (1925) suggested he omitted the finely cusped marginal teeth. Thiele indicated that the main differences between *Rissoella* and *Jeffreysina* are expressed in the differences between the radulae of the type species of each genus group name and that the shells of *Jeffreysina* are 'less high than in the other groups'. The Australian species do not, however fall neatly into either category. The shells of species showing a radula similar to that of the type species of *Rissoella* are virtually identical to those with a radula more akin to that of *Jeffreysina*. The main differences in the radulae of the type species of *Jeffreysina* and *Rissoella* are the narrow and strongly arched cutting edge of the lateral teeth and the coarsely cusped central teeth in *Rissoella* contrasted with the broad, almost straight cutting edge of the lateral teeth and finely cusped central teeth in *Jeffreysina*. The Australian species all show coarsely cusped central teeth and there is a gradation between the strongly arched and the almost straight cutting edges of the lateral teeth.

The examination of a single radula of *R. globularis* suggests that Sars' (1878) interpretation was correct although our mount was a poor one. There does not appear to be any sign of marginal teeth outside the massive lateral teeth. The small central teeth are narrow and almost rudimentary. The mount was not good enough however to state positively whether or not rudimentary marginal teeth exist although it is likely that they do not. A new species described herein (*R. fallax*) has a radula with a similar form to that of *R. globularis* and *R. opalina* and has simple, plate-like marginal teeth which are possibly functionless. The loss of such teeth would give the supposed condition in *R. globularis* just as the loss of similar teeth in the subgenus *Jeffreysiella* presumably gave rise to the typical *Rissoella* pattern. On the above evidence *Jeffreysina* is here tentatively regarded as a subjective synonym of *Rissoella*.

There have not been any species of this subgenus previously recorded from Australia, although Ponder (1966) described a species from New Zealand.

***Rissoella (Rissoella) atrimacula* sp. nov.**

Figs 1a; 3a; 4a-e

(Derivation of name: *ater*, Latin adj. — black; *macula*, Latin noun — speck or spot. Refers to appearance of living animal).

*Shell*: Minute, semi-transparent, globose, rather short-spined, with a distinct but narrow

umbilical chink. Protoconch of 1 $\frac{1}{2}$  whorls, teleoconch of 2 $\frac{1}{2}$  convex whorls. Inner lip of aperture slightly thickened, adapical portion not separated from parietal area by a groove. Surface smooth except for very indistinct growth lines. Colour translucent white. There is some slight variation in the height of the spire and in the size of the umbilicus in the paratype series (figs 1a; 4a, b).

Dimensions:	Length	Diameter
Holotype	1.52 mm	1.06 mm
Paratype	1.55	1.07
Figured specimens (S.E.M.)		
(paratype)	1.47	1.07
(Rottnest Is., W.A.)	1.07	0.80

*Animal*: Mostly black and visible through entire shell. Foot brownish-black. Head uniform black, with medium-length tentacles and oral lobes (Yallingup, S.W.A.) (fig. 3a).

*Operculum*: Typical (figs 4c, d).

*Radula*: Central teeth large, with 9-11 strong, but variable, sharp, narrow cusps on wide, curved edge. Cusps rather irregular in size. A pair of broad basal projections on each central tooth. Lateral teeth have a strong rib on inner edge of each tooth and the broad, slightly curved cutting edge has 10-12 sharp cusps. Cutting edge almost equal in width to base of tooth. Marginal teeth small, with 3 blunt, heavy, very short cusps (fig. 4e).

Opercula and radulae have been examined from the type series (S.E.M. stub no. 111), from Hopetoun Jetty, S.W.A. (S.E.M. stub no. 198) and from North Point, Rottnest Island, W.A. (S.E.M. stub no. 115).

**TYPES**: Holotype A.M. (C. 99655). Paratypes (46/13w) A.M. (C. 99656), 1 shell, 2 radulae and 3 opercula on S.E.M. stub no. 111. 3 W.A.M. (WAM 1376-75).

**TYPE LOCALITY**: Yallingup, S.W.A., on algae on limestone platform, lower shore, 2 Jan 1972, coll. W. F. Ponder and B. R. Wilson.

**ADDITIONAL MATERIAL EXAMINED**: Hopetoun Jetty, S.W.A., 0.5-2 m, on algae, semi-exposed and semi-sheltered reef, 5 Feb. 1972, coll. W. F. Ponder, S.E.M. stub no. 198 (sev). South Pt., S. of Two Peoples Bay, near Albany, S.W.A., on algae in large sheltered pool, on outer coast, 0-2 m, 2 Feb. 1972, coll. W. F. and J. M. Ponder (sev). Kilcarnup, N. side of Margaret River, S.W.A., on beach, 1 Jan. 1972, coll. W. F. Ponder (5). ca. 0.6 km off Peppermint Grove Beach, between Bunbury and Busselton, S.W.A., 4-7 m, in shell sand, 28 Dec. 1971, coll. W.F. and J.M. Ponder and R. Hancey (2), S.W. end of Garden Is., off Fremantle, W.A., 0.3 m, 2 lots, on algae (16); on beach (2), 21 Jan. 1972, coll. W. F. and J. M. Ponder and N. Coleman. Woodmans Pt., Cockburn Sound, W.A., 1-3 m, on sublittoral algae. 12 Dec. 1971, coll. W. F. and J. M. Ponder (9). W. side Carnac Is., off Fremantle, W.A., 18 Dec. 1971, 2 lots, on algae, 4-8 m (sev); on low tidal algae (4), coll. W. F. and J. M. Ponder, B. R. Wilson and N. Coleman. W. end Thomson Bay, Rottnest Is., W.A., 0.2 m, on algae, 30 Jan. 1972, coll. W. F. and J. M. Ponder (sev). W. end of Salmon Bay, Rottnest Is., W.A., on *Lithothamnion*, Aug. 1969, coll. S. Slack-Smith (1). Eagle Bay, Rottnest Is., W.A., 2 lots, on *Lithothamnion* on reef edge, Aug. 1969, coll. S. Slack-Smith (4). North Pt., Rottnest Is., W.A., protected reef, on coralline algae, 3 Dec. 1969, coll. S. Slack-Smith, S.E.M. stub no. 115 (sev/15w). Pt. Peron, S. of Fremantle, W.A., 2-3 m, 27 Jan 1972, coll. W. F. and J. M. Ponder (1). Triggs, near Perth, W.A., *Caulerpa* on platform, open coast, 0-2 m, 29 Jan. 1972, coll. W. F. Ponder (sev). Horrocks Beach, N. of Geraldton, W.A., on algae on limestone platform, 9 Jan. 1972, coll. W. F. Ponder (1).

DISTRIBUTION AND HABITAT: S.W. to mid W.A. (Hopetoun to Geraldton), on algae in mid to lower intertidal and shallow sublittoral; often very abundant (fig. 11).

REMARKS: This species has a similar shell to *R. (R.) globosa* sp. nov. from the tropical Pacific and N.E. Australia but differs in radular features. It can be distinguished from the sympatric species by its globose, translucent-white shell which has a rather 'solid' appearance. The uniformly black mantle is also a useful recognition feature.

**Rissoella (Rissoella) fallax** sp. nov.

Figs 1b; 3b; 4f-h.

(Derivation of name: *fallax*, Latin adj. — false. Refers to superficial resemblance to *R. (Zelaxitas)* species).

*Shell*: Minute, thin, semi-transparent, colourless (white when dead shell), short-spined, body whorl globose, umbilicate. Spire short, about  $\frac{2}{3}$  height of aperture. Protoconch of  $1\frac{1}{2}$  whorls, teleoconch of up to  $2\frac{2}{3}$  convex whorls. Lips of aperture rather thin, simple. Umbilicus moderate to small, simple. Smooth except for indistinct growth lines (figs 1b; 4f).

Dimensions:	Length	Diameter
Holotype	1.02 mm	0.77 mm
Paratype	0.92	0.70
Additional paratypes		
(Fairlight, N.S.W., S.E.M.)	0.98	0.72
(C.101420)	0.96	0.68
(Balmoral, N.S.W.,		
C.101421)	1.40	0.98
(Wimbie Beach, N.S.W.,		
C.101422)	1.70	1.15
(Pirates Bay, S. Tasm.,		
C.101423)	1.17	0.85

*Animal*: Head-foot semi-transparent white, mantle black. Cephalic and oral tentacles of moderate length and width (Pirates Bay, Eaglehawk Neck, S. Tasm.) (fig. 3b).

*Operculum*: Typical (fig. 4g).

*Radula*: Central teeth slightly higher than broad, with curved cutting edge and simple base. Each tooth with about 16 very small denticle-like cusps. Lateral teeth large, triangular, each with cutting edge almost straight, inner-most cusp massive followed by 6-9 rather irregular, smaller cusps. Marginal teeth simple, plate-like (as in the subgenus *Zelaxitas*) (fig. 4h).

Opercula and radulae have been examined from Fairlight, Sydney (S.E.M. stub no. 204) and Batemans Bay, N.S.W. (S.E.M. stub no. 232).

TYPES: Holotype A.M. (C.101418).

Paratypes (1) A.M. (C.101419), 1 shell and 1 radula on S.E.M. stub no. 204.

Paratypes (2) A.M. (C.101420).

Paratype (1) A.M. (C.101421).

Paratype (1) A.M. (C.101422), 1 radula and 1 operculum on S.E.M. stub no. 232.

Paratypes (2) A.M. (C.101423).

TYPE LOCALITY: Fairlight, North Harbour, Sydney, N.S.W., on algae, low tide, 23 Dec. 1968, coll. W. F. Ponder (holotype and paratype C.101419).

LOCALITIES OF ADDITIONAL PARATYPES: Off Fairlight, North Harbour, Sydney, N.S.W., on red algae, 7-11 m, coll. J. Voorwinde (S.E.M. stub no. 204). 4-5 m off Fairlight, North Harbour, Sydney, N.S.W., coll. J. Voorwinde (C.101420). Balmoral, Sydney, N.S.W., on algae, 19 Jan. 1969, coll. W. F. Ponder and J. Voorwinde (C.101421). On exposed side of Wimbie Beach, Batemans Bay, N.S.W., on fairly exposed rocks, on large brown algae, 6 Jan. 1970, coll. W. F. Ponder and P. H. Colman (C.101422). Pirates Bay, Eaglehawk Neck, S. Tasm., under stones, low tide, 30 Mar.-2 Apr. 1970, coll. W. F. Ponder (C.101423).

ADDITIONAL MATERIAL EXAMINED: 5 m off Chinamans Beach, Middle Harbour, Sydney, N.S.W., J. Voorwinde Coll. (2). Little Coogee Bay, Sydney, N.S.W., July 1895, coll. J. Brazier (2). Gunnamatta Bay, Port Hacking, N.S.W., J. Voorwinde Coll. (1). On exposed side of Wimbie Beach, Batemans Bay, N.S.W., on algae, 6 Jan. 1970, coll. W. F. Ponder and P. H. Colman (1). Little Squally Cove, Deal Is., Bass Strait, N. Tasm., on algae, 10-30 m, 4 May 1974, coll. S. A. Shepherd (4). Murray Pass., Deal Is., Bass Strait, N. Tasm., on algae, 30-50 m, 8 May 1974, coll. S. A. Shepherd (4). East Cove, Deal Is., Bass Strait, N. Tasm., 6-15 m, 3-10 May 1974, coll. S. A. Shepherd (5). Boat Harbour, N. Tasm., on coralline algae in pools, 19 Mar. 1975, coll. W. F. Ponder and R. Kershaw (2). Pirates Bay, Eaglehawk Neck, S. Tasm., on brown algae on intertidal rocks, 30 Mar.-1 Apr. 1970, coll. W. F. Ponder (1). ?Off Low Rocky Pt., W. Tasm., 42°58.2'S, 145° 26.6'E, 84 m 10 Apr. 1973, B.M.R. stn S73-2095, M.T. 'Sprightly' (3). ?S. of West Pt., W. Tasm., 41°09.2'S, 144°24.2'E, 88 m, 14 Apr. 1973, B.M.R. stn S73-2121, M.T. 'Sprightly' (1). E.S.E. side of Gabo Is., Vic., below lighthouse, 15-18 m, on algae, Feb. 1973, coll. P. Hutchings (1). Pt. Lonsdale, Vic., on short algae, exposed edge of platform, 22 Mar. 1975, coll. W. F. Ponder and R. Burn (1).

DISTRIBUTION AND HABITAT: Mid N.S.W. to Tasm. and mid Vic., on algae in lower littoral and sublittoral; not common (fig. 11).

REMARKS: This species has proved to be rather uncommon, as usually 1 or 2 specimens only were located when it was present in samples.

The radula is diagnostic and is unusual in having similar central teeth to *Rissoella* s.s. and simple plate-like marginal teeth like those in species of *R. (Zelaxitas)* and *R. (Jeffreysiella)*. The lateral teeth are intermediate in form between species of *R. (Zelaxitas)* and *Rissoella* s.s. The shell agrees well with those of some species of *Rissoella* s.s. and *R. (Jeffreysilla)* but, although it is similar in shape to some species of *R. (Zelaxitas)*, it differs from them in texture and colour. There are no species sympatric with *R. fallax* with which it can be readily confused except *R. (Jeffreysilla) confusa robertsoni* subsp. nov. That subspecies, apart from having a very different radula, has a shell with a less inflated body whorl and a narrower umbilicus.

The 2 lots of deep-water specimens from Tasmania are only tentatively referred to this species on shell characters. They presumably had a shallow-water origin if the identification is correct.

***Rissoella (Rissoella) globosa* sp. nov..**

Figs 1c; 3c; 5a-h

(Derivation of name: *globosa*, Latin adj. — spherical. Refers to shape of shell).

*Shell*: Minute, thin, semi-transparent, globose, translucent white, rather short-spined, with narrow umbilical chink. Protoconch of  $1\frac{1}{2}$  whorls; teleoconch of up to  $2\frac{1}{2}$  convex whorls. Inner lip of aperture slightly thickened, adapical portion not separated from parietal area by a groove. Surface smooth except for very indistinct growth lines. There is slight variation in the relative size of the umbilicus (figs 1c; 5a, c, d).

Dimensions:	Length	Diameter
Holotype	1.12 mm	0.80 mm
Paratype (Heron Is., Qld)	0.86	0.70
Figured specimens, paratypes (S.E.M.)		
(Heron Is., Qld)	0.95	0.74
(Lord Howe Is.)	0.92	0.72
(New Caledonia)	1.22	0.90

*Animal*: Tentacles rather short, head and snout reddish-brown, remainder of head-foot semi-translucent white. Hypobranchial pigmentation a bright yellow loop and a few dark brown or black spots. Sole with distinct median mucous slit (Heron Island) (fig. 3c).

*Operculum*: Typical (figs 5b, e).

*Radula*: Central teeth large, and with a wide cutting edge containing 8-15 rather long, sharp cusps with the median one the longest. A pair of broad, projecting basal structures present on each tooth. Lateral teeth large, with one major cusp, 3-5 cusps on either side, and, bordering these, a few denticles. All cusps rather long and sharp, somewhat variable. Each lateral tooth has a strong rib on its inner edge and the cutting edge is curved and about half the width of the base. Marginal teeth of moderate size, entire cutting edge of each tooth very finely serrated and produced into 2 very short, blunt, cusp-like structures (figs 5f-h).

Opercula and radulae have been examined from paratypes from all three type localities (S.E.M. stub nos 119, 164, 197).

TYPES: Holotype A.M. (C.101424).

Paratypes (5) A.M. (C.101425), 1 shell, 2 opercula and 2 radulae on S.E.M. stub no. 197. 2 Q.M. (MO 5718).

9/3w paratypes from Lord Howe Island, A.M. (C.101426), 1 shell, 2 opercula and 2 radulae on S.E.M. stub no. 119.

24/11w paratypes from New Caledonia, A.M. (C.101427), 1 shell, 3 opercula and 3 radulae on S.E.M. stub no. 164.

TYPE LOCALITY: Heron Island, Qld, opposite marine station buildings, on red algae on outer reef crest, 21 Sept. 1970, coll. W. F. Ponder, S.E.M. stub no. 197 (holotype and paratypes).

LOCALITIES OF ADDITIONAL PARATYPES: Nouméa, New Caledonia, on algae, on coral outcrop, near outer reef, 16 May 1971, coll. P. H. Colman, S.E.M. stub no. 164: N. side of Rabbit Is., Lord Howe Is., below low tide, in sheltered water, on brown algae on coral, 2 Feb. 1971, coll. P. H. Colman, S.E.M. stub no. 119.

ADDITIONAL MATERIAL EXAMINED: Lord Howe Is., outside reef, W. of Erscotts Passage, 18-24 m, on algae, steeply sloping rocky bottom, Feb. 1973, coll. J. Randall (2). Lord Howe Is., shore, coll. R. Bell, pres. T. Iredale (sev). Yam Is., Torres Strait, Qld, reef edge on S. side, on *Sargassum*, 6 July 1976, coll. W. F. Ponder and I. Loch (20/20w). Lizard Island, Qld, Casuarina Beach, on algae in lower littoral on coral rubble, Dec. 1975, coll. W. F. Ponder (sev). Hayman Is., Qld, J. Voorwinde Coll. (1). Lindeman Is., Qld, on algae, J. Voorwinde Coll. (1).

DISTRIBUTION AND HABITAT: New Caledonia, Lord Howe Is. and Qld, on algae, lower littoral and shallow sublittoral (fig. 11).

REMARKS: The shell of this species differs from that of *R. (R.) atrimacula* sp. nov. from Western Australia only in its generally slightly smaller size. The radular characters, however,

readily distinguish the two species. In particular can be noted the longer cusps cutting edge of the lateral teeth of *R. (R.) atrimacula* relative to the length of the base, the totally different marginal teeth of the two species and the relatively much longer main cusp on the lateral and central teeth in *R. (R.) globosa*. Although the shells of these two species are virtually indistinguishable, their geographical separation should prevent difficulties in their identification.

***Rissoella (Rissoella) vitrea* sp. nov.**

Figs 1d-f; 3d; 6a-f

(Derivation of name: *vitrea*, Latin adj. — glassy, transparent. Refers to appearance of shell).

*Shell*: Minute, thin, colourless, transparent, narrowly to moderately umbilicate, typically colourless but often semi-transparent to semi-opaque white, with narrow, colourless axial streaks. Spire of moderate height to rather low. Protoconch of about  $1\frac{1}{2}$ - $1\frac{1}{2}$  whorls, teleoconch of up to  $2\frac{1}{2}$  convex whorls. Inner lip of aperture rather thin, adapical portion attached to parietal area. Umbilicus variable, sometimes almost closed, in other specimens moderate to rather wide. Surface smooth, with very indistinct growth lines (figs 1d-f; 6a-c).

Dimensions:	Length	Diameter
Holotype	0.95 mm	0.65 mm
Paratype	0.97	0.65
Figured specimens		
(Aldinga, S.A.)	1.30	0.94
(Thevenard, S.A.)	0.86	0.62
S.E.M. (Paratype)	0.93	0.62
(Rottnest Is., W.A.)	1.40	0.95
(Thevenard, S.A.)	0.88	0.62

*Animal*: Head-foot black, tips of tentacles white, sole greyish. Visceral mass and mantle black. Cephalic and oral tentacles rather short, oral tentacles broad (Aldinga, S.A.) (fig. 3d.).

*Operculum*: Typical (fig. 6d).

*Radula*: Central teeth large, with strongly convex cutting edge having 10-13 irregular, sharp cusps. A pair of basal projections present on each tooth. Each lateral tooth with a strong, rather long ridge on its inner side and a relatively short, strongly convex cutting edge, which has one prominent median cusp and 13-18 smaller cusps. The base is about twice the width of the cutting edge. Marginal teeth rather large, with 11-14 sharp cusps, the apical one stronger and larger than the others (figs 6e, f).

Radulae and opercula have been examined from the paratype series (S.E.M. stub no. 112), near Albany (S.E.M. stub no. 255, 257), North Point, Rottnest Island (S.E.M. stub no. 114), Port Denison, N. of Geraldton (S.E.M. stub no. 250) all from W.A. and Thevenard, near Ceduna (S.E.M. stub no. 244) and Snapper Point, Aldinga (S.E.M. stub no. 231) from S.A.

TYPES: Holotype A.M. (C.101428)

Paratypes (1 20/20w) A.M. (C.101429) 4 W.A.M. (WAM1377-75), 1 shell, 2 opercula and 2 radulae on S.E.M. stub no. 112

TYPE LOCALITY: Denham, Shark Bay, W.A., on short algae on flats, in front of township, about 1 m below low tide, 10 Jan. 1972, coll. W. F. and J. M. Ponder.

ADDITIONAL MATERIAL EXAMINED: Exposed reef just N. of Snapper Pt., Aldinga, S.A., low tide, 4 lots, on short brown algae, S.E.M. stub no. 231 (3); on brown algae (3); on coralline algae (1); stone washings, S.E.M. stub no. 231 (2), 11 Jan. 1970, coll. W. F. Ponder.

Waldegrave Is., W. side Eyre Peninsula, S.A., on algae, 1 m, 25 Oct. 1973, coll. S. A. Shepherd (2). W. side of Thevenard, near Ceduna, S.A., semi-sheltered rock platform on short algae, 6 Dec. 1971, coll. W. F. and J. M. Ponder, S.E.M. stub no. 244 (1). South Pt., S. of Two Peoples Bay, near Albany, S.W.A., on large brown algae on exposed shore, 3 Feb. 1972., coll. W. F. Ponder, S.E.M. stub nos 255, 257 (5). W. end reef, Rottneest Is., W.A., on *Lithothamnion* from intertidal reef edge, Aug. 1969, coll. S. Slack-Smith (1). North Pt., Rottneest Is., W.A., protected reef, on coralline algae, 3 Dec. 1969, coll. S. Slack-Smith, S.E.M. stub no. 114 (8). Port Denison, 65 km S. of Geraldton, W.A., on algae on limestone reef, 0-2 m, 24 Jan. 1972, coll. W. F. and J. M. Ponder, S.E.M. stub no. 250 (sev). Red Bluff, N. of Monkey Mia, E. side of Peron Peninsula, Shark Bay, W.A., on brown algae, on sandflats, 11 Jan. 1972, coll. W. F. and J. M. Ponder (1). Pt. Quobba, W.A., on algae, exposed limestone reef platform, between tides, 12 Jan. 1972, coll. W. F. and J. M. Ponder (7). Just S. of wreck of S.S. 'Mildura', N.W. Cape, W.A., on limestone reef platform, 0-2 m, moderately exposed, 18 Jan. 1972, coll. W. F. and J. M. Ponder (2).

DOUBTFUL IDENTIFICATIONS: Glenelg, Gulf St. Vincent, S.A., J. Voorwinde Coll. (1). 80 km S.E. of Kangaroo Is., S.A., 37°00'S, 138°33'E, 77 m, 26 June 1962, H.M.A.S. 'Gascoyne' G2/76/62 (1). Tumbay Bay, S.A., coll. Mrs. J. Thompson, J. Voorwinde Coll., 3 lots (sev).

DISTRIBUTION AND HABITAT: Mid S.A. to N.W.A. (N.W. Cape), in lower littoral and shallow sublittoral; sometimes abundant (fig. 11).

REMARKS: The shell can be separated from the other Western Australian species, *R. (R.) atrimacula*, by its narrower spire and smaller size. The radula shows considerable differences from *R. (R.) atrimacula* and is the closest of the Australian species to the type species of *Rissoella*, *R. albella* (Alder), from Europe. In shell features *R. (R.) vitrea* is very similar to narrow specimens of *R. (J.) confusa umbilicata* subsp. nov. from south Western Australia and *R. (J.) confusa confusa* subsp. nov. from Queensland. Both of these subspecies, however, have a totally different radula.

The radulae of the two South Australian lots examined are very similar to those of the Western Australian specimens, the only apparent difference being that the central teeth are a little narrower in the 2 specimens examined from Aldinga. In the mount of the radula from Ceduna the lateral teeth obscured the central teeth so that their shape could not be ascertained. The marginal and lateral teeth however are typical. The type series, most of the specimens from Rottneest Island and occasional shells from South Australia are colourless and glassy. The remainder are similar to *Rissoella (Jeffreysilla) zebra* (Thiele) from East Africa in having opaque or semi opaque white shells with axial colourless streaks.

#### Subgenus *Jeffreysilla* Thiele, 1925

Type species (monotypy): *Rissoella zebra* Thiele, 1925.

Synonym *Phycodrosus* Rehder, 1943.

Type species (original designation): *Rissoella caribaea* Rehder, 1943 (fide Robertson, 1961).

DIAGNOSIS: *Shell*: Depressed, globose, with small to large umbilicus. *Head*: With short, rather narrow tentacles. *Radula*: With rather wide central teeth, the entire cutting edge taken up by a pair of broad cusps separated by a median notch. Lateral teeth elongate, with 1 or 2 cusps. Marginal teeth simple, triangular. *Jaw*: Rodlets smooth, not dentate or comb-like as in the other groups (fide Thiele, 1925; not confirmed).

REMARKS: The species so far described in this subgenus are largely tropical or subtropical in distribution. The subgenus has not previously been recognised from Australasia, the only species definitely attributed to it being the type species and *R. caribaea*, the former from Tanganyika (= Tanzania) and the latter from Florida, Bahama Islands and western Puerto Rico (Robertson, 1961).

The radulae of species in this subgenus do not tend to be particularly useful at the species level because they lack prominent cusps and, as far as the Australian forms are concerned, the teeth are very similar in shape. Thus, because the shell features are very similar and because the external appearance of the living animal has not been observed in most cases, the Australian forms are here regarded as geographic subspecies.

**Rissoella (Jeffreysilla) confusa** sp. nov.

(Derivation of name: *confusus*, Latin adj. — confused. Refers to the difficulty in classifying this species).

*Shell*: Minute, thin, semi-opaque to transparent, colourless to white, with very narrow to broad umbilicus. Spire slightly less to slightly greater than height of aperture. Protoconch of 1¼-1½ whorls, teleoconch of 2½ convex whorls. Inner lip of aperture slightly to moderately thickened. Surface smooth but not highly glossy; with indistinct growth lines.

*Operculum*: Typical.

*Radula*: Typical of subgenus and virtually identical in the 3 subspecies here recognised. Central teeth more or less rectangular, with lateral teeth narrowly triangular and marginal teeth broadly triangular. All teeth are finely serrated.

REMARKS: Other details are given below under the typical subspecies.

This species, as here recognised, has a number of apparently distinct geographic forms which are given subspecific names. The amount of material available is regrettably small and it is possible that the examination of more comprehensive collections will necessitate changes in the status of the taxa here recognised.

**Rissoella (Jeffreysilla) confusa confusa** subsp. nov.

Figs 1g; 3e; 7a-e

*Shell*: Transparent, colourless, surface glossy. Umbilical chink typically narrow, absent in juveniles. Protoconch of 1¼ whorls, teleoconch up to 2½ convex whorls. Spire about equal to height of aperture in length. Inner lip very slightly concave, almost straight (figs 1g; 7a, c, d).

Dimensions:	Length	Diameter
Holotype	1.50 mm	0.96 mm
Paratypes	1.40	0.92
	1.37	0.90
Figured specimens (S.E.M.)		
(Paratype)	1.00	0.68
(New Caledonia)	1.16	0.75
(New Hebrides)	1.02	0.69

*Animal*: Head dark grey; tentacles dark grey dorsally, unpigmented ventrally and laterally, of intermediate length, rather narrow. Foot black dorsally, sole dirty white. Mantle pigmentation visible through shell and includes a large, irregular (often figure 8-shaped), pale yellow area and one large and several small black spots. Remainder colourless except for visceral area which is black or dark brown (Lizard Island) (fig. 3e).

*Operculum*: Fig. 7b.

*Radula*: Fig. 7e.



Radulae and opercula examined from Lizard Island (S.E.M. stub nos 158, 166) and New Caledonia (no. 163).

TYPES: Holotype A.M. (C.101430)

Paratypes (11/1w) A.M. (C.101431), 1 shell, 2 radulae and 2 opercula on S.E.M. stub nos 158, 166. 3 Q.M. (MO5719).

TYPE LOCALITY: Lizard Island, Qld, lagoonal reef flats between Lizard and Palfrey Island, 1.5 m, on coralline algae growing on sandy bottom with isolated coral outcrops, 11 Dec. 1974, coll. W. F. Ponder, P. H. Colman and I. Loch.

ADDITIONAL MATERIAL EXAMINED: N. entrance of Aoki Harbour, Malaita Is., Solomon Ids, coral rubble and sand bottom, 18 Aug. 1973, coll. P. H. Colman (10). Off Hotel Tanna, Tanna Is., New Hebrides, on algae on exposed reefs, 1 Feb. 1967, coll. W. F. Ponder, S.E.M. stub no. 120 (4). Pt. Adel, Port Vila, Efaté, New Hebrides, beneath coral blocks, low tide, Jan. 1967, coll. W. F. Ponder (1). Out of Nouméa, New Caledonia, on algae on coral outcrop, near outer reef, 16 May 1971, coll. P. H. Colman, S.E.M. stub no. 163 (5/1w). Murray Is., Torres Strait, Qld, 9-15 m, coll. C. Hedley (8). Lizard Is., Qld, reef off S. end of Casuarina Beach, 1-2 m, 3 Dec. 1974, coll. P. H. Colman and I. Loch (sev). Lizard Is., Qld, reef flats off exposed point N. of Crystal Beach, 2 m, 11 Dec. 1974, coll. P. H. Colman (4). Macgillivray Reef, Lizard Is., Qld, on *Halimeda*, 5 m, 10 Dec. 1974, coll. W. F. Ponder and P. H. Colman (9). Opal Reef, N.E. of Port Douglas, Qld, on algae on sandy rubble at base of niggerhead, 29 m, 26 Nov. 1972, coll. P. H. Colman (2). Euston Reef, E.N.E. of Cairns, Qld, 21 m, at bottom of sandy slope below steep coral walls, S.W. side of reef, 30 Nov. 1972, coll. P. H. Colman, (2 lots) (3). Hayman Is., Qld, J. Voorwinde Coll. (1). Heron Is., Qld, 3 lots, 11 m (1); 37 m (1); 4 m, S.E. side (1), J. Voorwinde Coll.

DISTRIBUTION AND HABITAT: Solomon Ids, New Hebrides, New Caledonia and N. to mid Qld, on algae in lower littoral and shallow sublittoral (fig. 12).

REMARKS: Differs from the subspecies described below in its usually small umbilical chink, colourless glassy shell and nearly straight inner lip. The only other known tropical Indo-Pacific species is *R. (Jeffreysilla) zebra* Thiele, 1925 which is relatively broader and has translucent axial streaks alternating with broader opaque white areas.

***Rissoella (Jeffreysilla) confusa robertsoni* subsp. nov.**

Fig. 1h

*Shell*: Minute, semi-translucent to semi-opaque, white, thin, umbilicate, spire of moderate length, body whorl not much expanded. Protoconch of 1½ whorls, rather flattened, teleoconch of 2½ convex whorls. Aperture simple, lips thin, inner lip separated from much of parietal area by umbilicus. Umbilicus moderate (fig. 1h).

Dimensions:	Length	Diameter
Holotype	1.00 mm	0.67 mm
Additional paratypes	1.12	0.77
	0.80	0.62

*Animal*: Not observed alive.

*Operculum*: Typical.

*Radula*: Typical, identical to that of other subspecies. Radula and operculum obtained from specimen collected with holotype.

TYPES: Holotype A.M. (C.101452)

Paratype, 1 operculum and 1 radula on S.E.M. stub no. 205 (shell from which radula and operculum obtained broken). Paratypes (2) A.M. (C.101453).

TYPE LOCALITY: Inside breakwater, S. side of Ulladulla, N.S.W., on sheltered reef on small brown algae, 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman (holotype) (S.E.M. stub no. 205).

LOCALITY FOR ADDITIONAL PARATYPES: Green Cape, on Disaster Bay side, N.S.W., between rocks, 15 m, 13 Feb. 1973, coll. P. Hutchings.

ADDITIONAL MATERIAL EXAMINED: Collaroy Beach, Sydney, N.S.W., in shell sand, 1950-1960, J. Voorwinde Coll. (1). Fairlight, Sydney, N.S.W., on algae at low tide, 23 Dec. 1968, coll. W. F. Ponder (1). Boat Harbour, N. Tasm., on brown algae, 19 Mar. 1975, coll. W. F. Ponder and R. Kershaw (1).

DISTRIBUTION AND HABITAT: Mid N.S.W. to N. Tasm., on algae in lower littoral and shallow sublittoral; uncommon (fig. 12).

REMARKS: Very similar to *R. (J.) confusa umbilicata* subsp. nov. but that subspecies usually has a slightly broader spire and has a less flattened protoconch. The small differences in the shell are considered to be of subspecific value mainly because of the wide geographic separation of the two forms. This subspecies is also very similar to *R. (J.) confusa confusa* but it differs from this tropical form in the semi-translucent to semi-opaque shell, more convex spire outline and flattened protoconch.

This subspecies is named for Dr Robert Robertson of the Academy of Natural Sciences of Philadelphia who made an exhaustive study of the nomenclatural problems of the Rissoellidae.

***Rissoella (Jeffreysilla) confusa umbilicata* subsp. nov.**

Figs 1i, j; 7f-k

(Derivation of name: *umbilicatus*, Latin, shaped like a navel. Refers to the prominent umbilicus of the shell).

*Shell*: Distinguished from the other subspecies by its broadly ovate shape and prominent, broad umbilicus. Umbilicus distinct but relatively narrow in juveniles. Spire about equal to or slightly greater than height of aperture. Protoconch of 1¼ whorls, teleoconch of up to 2¾ convex whorls. The large umbilicus results in the adapical section of the inner lip being detached or semi-detached from the parietal wall in adult specimens except for that portion in the adapical corner of the aperture. Surface shining but not highly glossy, semi-translucent to semi-opaque, colourless to white (fig. 1i,j; 7f, i).

Dimensions:	Length	Diameter
Holotype	1.22 mm	0.78 mm
Paratypes	1.48	0.86
	1.20	0.82
	1.42	0.90
Figured specimens (S.E.M.)		
(Paratype)	1.31	0.87
(Hopetoun Jetty, S.W.A.)	1.04	0.73
(Off Dunsborough, S.W.A.)	1.08	0.74

*Animal*: Not observed alive.

*Operculum*: Figs 7g, j.

*Radula*: Typical of species (figs 7h, k).

Opercula and radulae examined from Hopetoun, S.W.A. (S.E.M. stub no. 199, 242), off Dunsborough, S.W.A. (S.E.M. stub no. 122), Thevenard, S.A. (S.E.M. stub no. 243) and the type series.

TYPES: Holotype A.M. (C.101454).

Paratypes (4) A.M. (C.101455), 1 shell, 2 radulae and 2 opercula on S.E.M. stub no. 147. 2 W.A.M. (WAM 407-76).

TYPE LOCALITY: Mississippi Bay, 48 km E. of Esperance, S.W.A., on sheltered side of west head of bay, 0-2 m, on algae, 6 Feb. 1972, coll. W. F. Ponder.

ADDITIONAL MATERIAL EXAMINED: Largs Bay, S.A., J. C. Verco Coll. (S.A.M.) (2). W. side of Thevenard, near Ceduna, S.A., semi-sheltered rock platform on short algae, 6 Dec. 1971, coll. W. F. and J. M. Ponder, S.E.M. stub no. 243 (sev). Pt. Sinclair, S.A., 1 m, on algae, 9 Feb. 1972, coll. W. F. and J. M. Ponder (10). E. of Observatory Is., Recherche Archipelago, S.W.A., Jan. 1944, coll. G. P. Whitley (1). E. side of Hopetoun Jetty, S.W.A., on algae, W. side of sheltered limestone reef, 0-1 m, 4 Feb. 1972, coll. W. F. and J. M. Ponder, S.E.M. stub no. 242 (25). Hopetoun Jetty, S.W.A., on algae, semi-exposed and semi-sheltered reef, 0.5-2 m, 5 Feb. 1972, coll. W. F. Ponder, S.E.M. stub no. 199 (2/w). Off Dunsborough, W.A., on algae, on limestone and coral reef, 16 m, 27 Dec. 1971, coll. W. F. Ponder, B. R. Wilson and N. Coleman, S.E.M. stub no. 122 (5).

DISTRIBUTION AND HABITAT: W.S.A. and S.W.A., on algae in lower littoral and shallow sublittoral (fig. 12).

REMARKS: This subspecies differs from the tropical Pacific subspecies *R. (Jeffreysilla) confusa confusa* in its slightly larger, more opaque, less glossy shell, and larger umbilical chink and in the distinctly concave inner lip of the aperture, this lip in the typical subspecies being almost straight. A small series from 16 m off Dunsborough, W.A. has a slightly narrower spire and slightly smaller umbilicus than the other populations examined. In shape the shells in this population resemble specimens of *R. (J.) confusa robertsoni* but specimens of that subspecies have a more flattened protoconch.

Subgenus **Zelaxitas** Finlay, 1927.

Type species (original designation): *Laeviltorina cystophora* Finlay, 1924.

DIAGNOSIS: *Shell*: Minute, with short spire, inflated body whorl, non-umbilicate or umbilicate, brown. *Head*: Tentacles short, broad. *Radula*: With small, broad central teeth, having 2 small cusps and a long pair of oblique basal processes. Lateral teeth with numerous (about 11) rather long cusps on a long, straight cutting edge. Inner edge of lateral teeth with a strong, oblique ridge running to basal margin. Marginal teeth long, plate-like with a pair of very weak, indistinct, rounded, cusp-like structures near inner end.

REMARKS: Ponder (1966) transferred *Zelaxitas* from the Littorinidae, where it was originally placed, to the Rissoëllidae and discussed the 2 New Zealand species. This subgenus has not previously been recognised outside New Zealand.

Species included in this subgenus are very similar to *Rissoella (Rissoella)* in most radular features except that the central teeth are relatively small and have reduced cusps. The

consistently massive, simple marginal teeth are similar to those found in *R. (R.) fallax* but are unlike those of any other species of *Rissoella* (*Rissoella*). They are also like the outer marginal teeth of species of *R. (Jeffreysiella)*. The species included in *R. (Zelaxitas)* can be regarded as a compact Australasian group characterized by their short-spined, globose brown shells and rather distinctive radula.

***Rissoella (Zelaxitas) imperforata* sp. nov.**

Figs 1k; 3f; 8a, b

(Derivation of name: *im* (= in), Latin-without; *perforare*, Latin verb — to make a hole. Refers to lack of umbilicus in shell).

*Shell*: Minute, thin, smooth and shining, translucent brown to semi-opaque brown, top of spire often eroded to white. Spire about half as high as aperture. Protoconch of 1½ whorls, colourless, teleoconch of up to 2 strongly convex whorls. Aperture large with inner lip slightly thickened, greyish-white to yellowish-white. A very narrow umbilical chink with a sharp external edge present in juveniles, adults non-umbilicate. Surface with indistinct growth lines only (figs 1k; 8a).

Dimensions:	Length	Diameter
Holotype	1.00 mm	0.75 mm
Paratypes	0.92	0.70
	0.96	0.74
Figured specimen (paratype)	0.94	0.74

*Animal*: With short, broad tentacles; foot, tentacles and head grey dorsally (due to black pigment finely scattered over surface), colourless ventrally. Mucous slit in posterior half of sole. Mantle uniformly black (Eaglehawk Neck) (fig. 3f).

*Operculum*: Typical.

*Radula*: Very like that of *R. (Z.) micra* (Finlay) but with the central teeth more expanded laterally and with a weaker pair of cusps on the central teeth which show a slight tendency towards serration on their outer edges (fig. 8b).

Radulae and opercula examined from Eaglehawk Neck, S. Tasm. (S.E.M. stub nos 116, 222).

TYPES: Holotype A.M. (C.101457).

Paratypes (44/3 w) A.M. (C.101458) 1 shell, 2 radulae and 2 opercula on S.E.M. stub no. 116, 4 T.M. (E9239), 2 N.M.V. (F.30003).

TYPE LOCALITY: Pirates Bay, Eaglehawk Neck, S. Tasm., on brown algae, lower littoral, 30-31 Mar. 1970, coll. W. F. Ponder.

ADDITIONAL MATERIAL EXAMINED: East Cove, Deal Is., Bass Strait, N. Tasm., 147°20'E, 39°30'S, 6-15 m, 3-10 May 1974, coll. S. A. Shepherd (4). Boat Harbour, N. Tasm., on coralline algae in pools, 19 Mar. 1975, coll. W. F. Ponder and R. Kershaw (8). N. end of Pirates Bay, Eaglehawk Neck, S. Tasm., on large brown algae, low tide, 2 Apr. 1970, coll. W. F. Ponder, S.E.M. stub no. 222 (sev). Pirates Bay, Eaglehawk Neck, S. Tasm., intertidal, on coralline algae (1); under stones (5), 30-31 Mar. 1970, coll. W. F. Ponder. Eaglehawk Neck, S. Tasm., pres. C. Hedley (1). Primrose Pt., E. side of Frederick Henry Bay, S. Tasm., on matted green algae, low tide, 31 Mar. 1970, coll. W. F. Ponder (1). Roches Beach, W. side of Frederick Henry Bay, S. Tasm., on coralline algae, semi-sheltered reef, 1 Apr. 1970, coll. W. F. Ponder and E. Turner (2). Pt. Lonsdale, Vic., on coralline algae in pools, 18 Sept. 1973, coll. W. F. Ponder and R.

Burn (4). Port Fairy, Vic., 4 km W. of town, 19 Aug. 1973, coll. W. F. Ponder and R. Burn, 2 lots, on brown algae (6); coralline algae (5).

DISTRIBUTION AND HABITAT: Tasm. and mid-Vic., on algae in lower littoral; rarely common (fig. 13).

REMARKS: This species is extremely close to *R. (Z.) micra* (Finlay) in size and general appearance but the small differences in the central teeth of the radula and in the adult shell between the 2 species serve to separate them. The adult shell of *imperfurata* is non-umbilicate but in *micra* it is distinctly umbilicate. In addition, the spire in *micra* tends to be relatively higher. The radula of *R. (Z.) imperfurata* differs from that of *R. (Z.) micra* in having relatively broader central teeth which have weaker cusps.

This species has some similarity with *R. (Z.) cystophora* (Finlay) from New Zealand but that species has an even larger aperture, thinner inner lip and relatively shorter spire (fig. 8j).

**Rissoella (*Zelaxitas*) *micra*** (Finlay, 1924).

Figs 1l-n; 3g; 8c-i

*Laevilitorina micra* Finlay, 1924:522, fig. 5

*Zelaxitas micra*.— Finlay, 1927: 375.

*Notosetia fulva* Laseron, 1950: 279, fig. 69.

*Rissoella (Zelaxitas) micra*.— Ponder, 1966: 170, pl. 2, figs 1-5

*Shell*: Minute, thin, translucent, brown, somewhat shining. Spire greater than half height of aperture to almost equal in height. Protoconch of 1½ colourless whorls, teleoconch up to about 2¼ strongly convex whorls. Aperture large, inner lip slightly thickened, white. Umbilicus prominent in adults, externally bordered by a sharp edge. Umbilical chink small in juveniles. Surface with indistinct growth lines only (figs 1l-n; 8c, d, f).

Dimensions:	Length	Diameter
Holotype	0.72 mm	0.60 mm (from Ponder, 1966, but dimensions reversed in error)

Figured specimens

(lectotype of <i>Notosetia fulva</i> )	1.20	0.88
(Fairlight, Sydney)	0.95	0.70
(Whangarei Heads, N.Z.)	0.80	0.60
S.E.M. (Fairlight, Sydney)	1.10	0.76
	0.86	0.68
(Wellington, N.Z.)	1.10	0.84

*Animal*: Tentacles short, rather broad, colourless to grey, some greyish-brown pigmentation dorsally on head and sides of foot. Sole white with mucous slit in posterior half. Anterior edge of foot indented. Two dark-brown pigment spots in mantle on either side of body whorl show through shell (Middle Harbour, Sydney) (fig. 3g).

*Operculum*: Typical (fig. 8e).

*Radula*: Central teeth small, each with cutting edge having 2 short but rather strong cusps; basal area bulges laterally into 2 short, rounded expansions and a pair of wing-like basal projections emerge obliquely from the middle of the base. Lateral teeth with 9-11 (usually 11) long, sharp cusps on a straight cutting edge. Inner side of each lateral tooth with a long ridge-like structure. Marginal teeth simple plates showing 2 weak cusp-like folds on their inner ends (figs 8g-i).

Radulae and opercula examined from Fairlight and Long Reef, Sydney, N.S.W. (S.E.M. stub nos 113, 200, 201), Primrose Point, S. Tasmania (S.E.M. stub no. 221), and Island Bay, Wellington, New Zealand (S.E.M. stub no. 210).

TYPES: *L. micra*, Auckland Institute and Museum, Auckland (holotype and paratypes).  
*Notosetia fulva*, A.M., lectotype (C.101459), here designated, and 10 paralectotypes (C.101460).

TYPE LOCALITIES: *Laevilitorina micra*, Taieri Beach, Otago, New Zealand, on algae.

*Notosetia fulva*, Long Reef, Collaroy, N.S.W., under stones.

ADDITIONAL AUSTRALIAN MATERIAL EXAMINED: Forster, N.S.W., on fine brown algae, on boulder bank, low tide, 4 Jan. 1969, coll. W. F. Ponder (2/6 w). Fingal Bay, Port Stephens, N.S.W., on beach in shell sand, 1950-1960, J. Voorwinde Coll., 2 lots (3). N. side Long Reef, Collaroy, N.S.W., on *Corallina*, low tide, 4 Sept. 1975, coll. A.M. party (4); under stones, 21 Jan. 1975, coll. W. F. Ponder (10). Long Reef, Collaroy, N.S.W., on algae, 1950-1960, J. Voorwinde Coll., 3 lots (8). On outer point, Long Reef, Collaroy, N.S.W., on short brown algae, 10 Mar. 1970, coll. P. H. Colman, S.E.M. stub no. 201 (1). Chinamans Beach, Sydney, N.S.W., 3-7 m, J. Voorwinde Coll. (1). Fairlight, Sydney, N.S.W., low tide, 3 lots, on short algae, S.E.M. stub no. 113; on coralline algae, S.E.M. stub no. 200 (25); under stones (4w), 23 Dec. 1968, coll. W. F. Ponder. Near Fairlight Pool, Manly, Sydney, N.S.W., on coralline algae, 16 July 1975, coll. A.M. party (7). Off Sow and Pigs Reef, Sydney, N.S.W., 9 Jan. 1879, coll. J. Brazier (1). Balmoral, Sydney, N.S.W., on brown algae, 18 Jan. 1969, coll. W. F. Ponder and J. Voorwinde (9w). Shell Harbour, N.S.W., on algae, J. Voorwinde Coll. (1). S. side of Ulladulla, N.S.W., on sheltered reef, inside breakwater, on small brown algae, 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman (sev). S. side of Ulladulla, N.S.W., on moderately exposed rock platform, outside breakwater, on small brown algae, 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman (1). Ulladulla, N.S.W., in shell sand, 1950-1960, J. Voorwinde Coll. (1). Wimbie Beach, Batemans Bay, N.S.W., on fairly exposed rocks, 2 lots, on large brown algae (sev); coralline algae (8), 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman. Bittangabee, N. side of Green Cape, N.S.W., on algae, low tide, 13 Feb. 1973, coll. W. F. Ponder (9). S. end of Green Cape, N.S.W., on algae, 16 m, 13 Feb. 1973, coll. S. A. Shepherd (5). Pirates Bay, Eaglehawk Neck, S. Tasm., under stones, 30 Mar. — 2 Apr. 1970, coll. W. F. Ponder (1). Primrose Pt., E. side of Frederick Henry Bay, S. Tasm., low tide, 2 lots, on coralline algae in pools, S.E.M. stub no. 221 (3); on matted algae (1/2w), 30 Mar. 1970, coll. W. F. Ponder. E.S.E. side of Gabo Is., Vic., 28 m, on algae and detritus below lighthouse, Feb. 1973, coll. P. Hutchings (6/2w).

DISTRIBUTION AND HABITAT: New Zealand, N.S.W., E. Tasm. and far E. Vic., on algae and beneath stones in mid to lower littoral and on algae in shallow sublittoral, often abundant (fig. 13).

REMARKS: The Australian material of this species is indistinguishable from the 2 lots of New Zealand specimens available for comparison in radular and shell characters. The Australian specimens often tend to develop a slightly wider umbilicus than the available New Zealand material but some of the Australian shells fall within the range of variation of the New Zealand examples.

Subgenus **Jeffreysiella** Thiele, 1912 (August).

Type species (original designation): *J. notabilis* Thiele, 1912.

Synonym *Heterorissoa* Iredale, 1912 (October).

Type species (original designation): *H. secunda* Iredale, 1912.

**DIAGNOSIS:** *Shell:* With spire elevated to moderately elevated, non-umbilicate to narrowly umbilicate, often large for genus. Protoconch usually deviated. *Radula:* With large, multicusped central teeth which are sometimes asymmetrical. Lateral teeth large, with numerous minor cusps and one large terminal cusp. Two pairs of marginal teeth; inner pair rather simple or similar to (but smaller than) the lateral teeth; outer marginal teeth simple plates. *Head:* With long, slender tentacles.

**REMARKS:** Thiele (1925) suggested that *Heterorissoa* was a synonym of *Jeffreysiella* but the only evidence given was that Iredale included *Jeffreysia edwardiensis* Watson, 1880 in *Heterorissoa* which Thiele regarded as belonging to *Jeffreysiella*. Iredale (1912) separated his new genus from *Rissoella* on the basis that the operculum lacked an internal peg, but the examination of a topotype (fig. 10b) shows it has an operculum typical of the genus *Rissoella*. Unfortunately the radula could not be obtained from the remains of 2 dried animals available but the shell characters are identical to those of *Jeffreysiella* species from New Zealand and Australia so that *Heterorissoa* can be considered to be a subjective synonym of *Jeffreysiella*.

This subgenus is distinctive in the generally tall-spined shell bearing a more-or-less deviated protoconch, and in having 7 teeth instead of the usual 5 in each row of the radula.

***Rissoella (Jeffreysiella) colleenae* sp. nov.**

*Shell:* Rather loosely coiled, transparent to semi-translucent, colourless to whitish, spire rather elongate. Protoconch of  $1\frac{1}{2}$  convex whorls, teleoconch of  $2\frac{1}{4}$ - $2\frac{3}{4}$  convex whorls. Inner lip thin. Umbilical chink very narrow or absent, no umbilicus present.

*Operculum:* Typical.

*Radula:* Central teeth highly asymmetrical, cusps on right side strongly developed, those on left side reduced to minute denticles and displaced to left dorso-lateral margin. Basal processes long, narrow, basal margin strongly convex. Lateral teeth triangular, very elongate, terminating in a sharp cusp, the inner margin only denticulate. Inner marginal teeth simple curved plates, the outer marginals simple sub-rudimentary plates.

**REMARKS:** This species is much smaller than all others in the subgenus. Two geographic subspecies can be recognised.

***Rissoella (Jeffreysiella) colleenae colleenae* subsp. nov.**

Figs 2a; 9a-c

*Shell:* Minute, thin, transparent, colourless, non-umbilicate with tall spire, slightly longer than height of aperture. Teleoconch of up to about  $2\frac{1}{4}$  convex whorls. Apical portion of inner lip attached to parietal area. Umbilical chink narrow, small (figs 2a; 9a).

Dimensions:	Length	Diameter
Holotype	0.93 mm	0.54 mm
Paratypes	0.94	0.57
	0.87	0.50
Figured specimen (S.E.M.) (Paratype)	0.93	0.52

*Animal:* Not observed alive.

*Operculum:* Typical (fig. 9b).

*Radula*: Central teeth broad with 6-8 large, sharp cusps, increasing in size from left to right to the 5th cusp (or in some cases the 6th) the following cusp(s) smaller. A small group of about 8 denticles on right side near upper margin of each tooth probably represents right-hand cusps, the large 5th cusp probably representing original median cusp. A swelling on right side of each central tooth merges with the right basal process, the left basal process being simple. Lateral teeth triangular each with a very long, sharp, smooth median cusp and about 10 denticles along the inner margin below the base of the cusp. Marginal teeth simple, curved plates, the cutting edges bluntly rounded. Outer marginals much reduced, simple plate-like structures (fig. 9c).

Operculum and radula examined from type locality.

TYPES: Holotype A.M. (C. 100000).

Paratypes (8) A.M.(C.100001), 1 shell, 2 radulae and 2 opercula on S.E.M. stub no. 203.  
2 W.A.M. (WAM1378-75).

TYPE LOCALITY: Twilight Cove, 6 km W. of Esperance, S.W.A. on west headland, on algae on exposed rocky shore, 26 Jan. 1972, coll. W. F. and J. M. Ponder.

ADDITIONAL MATERIAL EXAMINED: Mississippi Bay, 48 km E. of Esperance, S.W.A., on algae, 0-2 m, 6 Feb. 1972, coll. W. F. Ponder (2). Bunker Bay, 11 km W. of Dunsborough, S.W.A., on algae, 24 Dec. 1971, coll. W. F. and J. M. Ponder (2).

DISTRIBUTION AND HABITAT: S.W.A., on algae in lower littoral (fig. 14).

REMARKS: This subspecies differs from *R. (J.) colleenae pacifica* subsp. nov. in its slightly smaller, less elongate, transparent shell and in minor details of the radula.

The new species is named for Miss Colleen Robinson as a small mark of gratitude for her very considerable help over several years.

***Rissoella (Jeffreysiella) colleenae pacifica* subsp. nov.**

Figs 2b; 3h; 9d-f

(Derivation of name: Pacific Ocean).

*Shell*: Minute, thin, fragile, semi-transparent, white, non-umbilicate, with elongate spire (longer than height of aperture). Protoconch colourless, transparent, teleoconch up to 2¾ convex whorls. Inner lip of aperture typically attached to parietal area over most of its adapical half but sometimes partly separated by a very narrow fissure. Umbilical area usually represented by a minute chink (figs 2b; 9d).

Dimensions:	Length	Diameter
Holotype	1.10 mm	0.55 mm
Paratypes	1.06	0.57
	1.08	0.58
	1.10	0.57
Figured specimen (S.E.M.) (Paratype)	1.24	0.64

*Animal*: Head — foot translucent white, with long oral and cephalic tentacles. Pigmented parts of hypobranchial gland pale brown with a dark brown spot centrally placed on last part of body whorl (N. Stradbroke Is., Qld) (fig. 3h).



*Operculum*: Typical (fig. 9e).

*Radula*: Central teeth large, each with 6-7 sharp cusps, gradually increasing in size from left to right to the second to last cusp, the right-hand cusp being slightly smaller than the one preceding it. The original left-hand cusps are reduced to denticles and their position is distorted so that they lie near the dorso-lateral (left) margin. This margin is turned forwards and merges with the left basal process. The basal processes are rather elongate and narrow. The lateral teeth are elongately triangular and are bluntly serrated on their inner margins. Each has a sharp and short single cusp but the entire tooth has a long cusp-like appearance. Marginal teeth simple, inner marginals simple, curved plates; outer marginals simple plates (fig. 9f).

Operculum and radula observed from type locality.

TYPES: Holotype A.M. (C.101461).

Paratypes (16/17 w) A.M. (C.101462), 1 shell, 2 radulae and 3 opercula on S.E.M. stub no. 191. 3 Q.M. (MO 5720).

TYPE LOCALITY: N.W. side of Pt. Lookout, N. Stradbroke Is., Moreton Bay, Qld, on short red algae at low tide, 12 Dec. 1969, coll. W. F. Ponder and P. H. Colman.

ADDITIONAL MATERIAL EXAMINED: Noosa Head, Qld, 2 lots, J. Voorwinde Coll. (1); coll. J. Laseron (3).

DISTRIBUTION AND HABITAT: S. Qld, on algae in lower littoral (fig. 14).

REMARKS: This subspecies is similar in shape to *Rissoella elongatospira* Ponder, 1966 from New Zealand but that species has a slightly broader spire and consequently a larger aperture. The New Zealand species is also pale brown in colour and has a totally different radula which places it in the subgenus *Rissoella* (*Rissoella*).

The typical subspecies is colourless and transparent, not white, and is slightly smaller in overall size.

***Rissoella* (*Jeffreysiella*) *fretterae* sp. nov.**

Figs 2c, d; 9g-i

*Shell*: Large for genus, with elongate spire, transparent, very pale pinkish or yellowish, thin and fragile. Protoconch usually pink, of 1½ whorls, the apex deviated; teleoconch of up to 5 weakly convex whorls. Aperture simple, lips thin. A minute umbilical chink present, sometimes extremely narrow umbilicus. Smooth except for very fine growth lines (fig. 2c, d).

Dimensions:	Length	Diameter
Holotype	3.46 mm	1.64 mm
Paratype	2.12	1.16
Additional paratype (Deal Is., Tasm.)	2.22	1.22
Figured specimen (Garden Is., W.A.)	1.80	0.90

*Animal*: Head lacks black pigment (pers. comm. R. Burn from Pt. Lonsdale specimen).

*Operculum*: Typical (fig. 9g).

*Radula*: Similar to *R. (Jeffreysiella) wilfredi* but central teeth with only two cusps and a minute denticle on the right side of the median cusp (fig. 9h, i).

Opercula and radulae observed from Gabo Is., Vic. (S.E.M. stub no. 117), Deal Is., N. Tasm. (S.E.M. stub no. 317) and Garden Is., W.A. (S.E.M. stub no. 245).

TYPES: Holotype A.M. (C.101464).

Paratypes A.M. 3(C.102196), 2 (C.102197), 1 shell, 1 operculum and 1 radula on S.E.M. stub no. 117, 1 operculum, 1 radula on S.E.M. stub no. 317.

TYPE LOCALITY: Gabo Is., Vic., on algae, 28 m, Feb. 1973, coll. P. Hutchings.

LOCALITIES OF ADDITIONAL PARATYPES: East Cove, Deal Is., Bass Strait, N. Tasm., 6-15 m, 3-10 May 1974, coll. S. A. Shepherd, S.E.M. stub no. 317 (3 paratypes). Deal Is., Bass Strait, N. Tasm., on algae, 6 m, 6 May 1974, coll. S. A. Shepherd (2 paratypes).

ADDITIONAL MATERIAL EXAMINED: Pt. Lonsdale, Vic., 26 Oct. 1975, coll. R. Burn (1) (N.M.V.). S. of Cowaramup Bay, near Margaret River mouth, S.W.A., in shell sand, coll. H. Baker, pres. J. Hewitt (2, 1 presented to W.A.M.). S.W. end of Garden Is., off Fremantle, W.A., 0-3 m, on algae, 21 Jan. 1972, coll. W. F. and J. M. Ponder and N. Coleman, S.E.M. stub no. 245 (2).

DISTRIBUTION AND HABITAT: Vicinity of Bass Strait and E. Vic. and S.W.A. to mid W.A., on algae in lower littoral (fig. 14).

REMARKS: The shell is very similar in size, shape and colour to *R. (Jeffreysiella) secunda* but has a slightly narrower spire than most specimens of that species. The radula, however, differs in detail and is closest to *R. (Jeffreysiella) wilfredi* but the number of prominent cusps on the central teeth is reduced to 2, not 3 as in *R. (J.) wilfredi*.

This species is named for Dr Vera Fretter for her work on gastropods and, in particular, her detailed account of the anatomy of *Rissoella*.

***Rissoella (Jeffreysiella) secunda* (Iredale, 1912).**

Figs 2e-g; 10a-h.

*Heterorissoa secunda* Iredale, 1912: 221, text-fig.

*Heterorissoa wilfredi*. — Iredale, 1924: 245; Laseron, 1950: 286 (non Gatliff and Gabriel, 1911).

*Notosetia pellucida* Laseron, 1950: 280, fig. 72.

*Rissopsis puniceus* Laseron, 1950: 283, fig. 82.

*Shell*: Large for genus, uniform pinkish, pinkish-fawn or pale brown, or with white base and remainder of shell coloured, or white with only apical end of spire pinkish. Sometimes two broad spiral colour bands on last whorl. Protoconch of 1½ whorls, usually distinctly deviated. Outline of shell variable, whorls of teleoconch convex, up to 4, the last sometimes swollen. Aperture not particularly large (figs 2e-g; 10a, c-e).

Dimensions:	Length	Diameter
Paratype	1.78 mm	0.98 mm
Figured specimens (paratype)	1.84	1.00
Lectotype of		
<i>Notosetia pellucida</i>	1.30	0.74
(Lectotype of		
<i>Rissopsis puniceus</i> )	3.00	1.50
S.E.M. (Kermadec Ids)	1.72	0.91
(Port Stephens, N.S.W.)	2.84	1.55
	1.76	1.04
(Fairlight, Sydney)	1.24	0.83

*Animal*: Not observed alive.

*Operculum*: Typical (figs 10b, f).

*Radula*: Central teeth with 5-6 cusps, the third or fourth from the left side being the largest. Other details as in *R. (J). wilfredi* (figs 10g, h).

Opercula and radulae observed from New Caledonia (S.E.M. stub no. 162), Lord Howe Island (S.E.M. stub no. 118), Fairlight and Balmoral, Sydney, N.S.W. (S.E.M. stub nos 177, 121), Batemans Bay, N.S.W. (S.E.M. stub no. 239), and an operculum only from the Kermadec Islands (S.E.M. stub no. 160).

TYPES: *H. secunda*. Location of holotype unknown. Not found in British Museum (Nat. Hist.). 2 paratypes A.M. (C.38205, C.102507).

*Notosetia pellucida* Laseron. Lectotype A.M. (C.101465), here designated, and 11 paralectotypes (C.101466).

*Rissopsis puniceus* Laseron. Lectotype A.M. (C.101467), and 10 paralectotypes (C.101468).

TYPE LOCALITIES: *H. secunda* Iredale. Raoul (Sunday) Is., Kermadec Ids. *Notosetia pellucida* Laseron. North Harbour, Sydney, N.S.W., on algae. *Rissopsis puniceus* Laseron. Port Stephens, N.S.W., in shell sand.

ADDITIONAL MATERIAL EXAMINED: Raoul (Sunday) Is., Kermadec Ids, 1908-1910, coll. T. Iredale and R. Bell, 3 lots, S.E.M. stub no. 160 (sev). W. side of Ile Signal, off Noum'ea, New Caledonia, on algae, 0-2m, on sandy and dead coral bottom, 25 Apr. 1971, coll. P.H. Colman, S.E.M. stub no. 162 (10/5 w). Lord Howe Is., shore, coll. R. Bell (sev). Lord Howe Is., outside reef, W. of Escotts Passage, steeply sloping rocky bottom, Feb. 1973, coll. J. Randall, S.E.M. stub no. 118 (sev/9w), Yam Is., Torres Strait, Qld, reef edge on S. side, on *Sargassum*, 6 July 1976, coll. W. F. Ponder and I. Loch (1). Lizard Is., Qld, off Casuarina Beach, on algae in lower littoral on coral rubble, Dec. 1975, coll. W. F. Ponder (sev). Lindeman Is., Qld, J. Voorwinde Coll. (2). Noosa Heads, Qld, J. Voorwinde Coll. (1). Forster, N.S.W., on *Caulerpa*, low tide, open coast, 4 Jan. 1969, coll. W. F. Ponder (1). Forster, N.S.W., J. Voorwinde Coll. (sev). Seal Rocks, N.S.W., J. Voorwinde Coll. (7). Fingal Bay, Port Stephens, N.S.W., in shell sand, 1950-1960, J. Voorwinde Coll., 3 lots (8). Port Stephens, N.S.W. 1950-1960, J. Voorwinde Coll., S.E.M. stub no. 177 (sev/1w). Long Reef, Collaroy, N.S.W., 1950-1960, J. Voorwinde Coll., 4 lots (10). Collaroy Beach, N.S.W., 1950-1960, J. Voorwinde Coll. (1). Manly Beach, Sydney, N.S.W., J. Voorwinde Coll. (4). North Harbour, Sydney, N.S.W., 1950-1960, J. Voorwinde Coll., 3 lots (sev). Fairlight, Sydney, N.S.W., low tide, 23 Dec. 1968, coll. W. F. Ponder, 3 lots, S.E.M. stub no. 177 (4); J. Voorwinde Coll., 5 lots (11). Balmoral, Sydney, N.S.W., on algae, 19 Jan. 1969, coll. W. F. Ponder and J. Voorwinde, S.E.M. stub no. 121 (1). Forty Baskets Beach, Sydney, N.S.W., J. Voorwinde Coll. (sev). Off Sow and Pigs Reef, Sydney, N.S.W., 9 Jan. 1879, coll. J. Brazier, 3 lots (3); J. Voorwinde Coll., 1950-1960, 2 lots (3). Off Chinamans Beach, Sydney, N.S.W., 1968, J. Voorwinde Coll., 2 lots (3). Ocean Beach, Kurnell, Botany Bay, N.S.W., 1950-1960, J. Voorwinde Coll. (2). Werri Beach, N.S.W., in shell sand, 1950-1960, J. Voorwinde Coll. (1). Shell Harbour, N.S.W., on algae, J. Voorwinde Coll. (1). Honeymoon Beach, Jervis Bay, N.S.W., under stones on sandy beach, low tide, 18 Jan. 1969, coll. W. F. Ponder and N. Coleman (1/1w). Inside breakwater, S. side of Ulladulla, N.S.W., on coralline algae, 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman (3/3w). Outside breakwater, S. side of Ulladulla, N.S.W., on coralline algae on moderately exposed rock platform, 5 Jan. 1970, coll. W. F. Ponder and P. H. Colman (1). Ulladulla, N.S.W., in shell sand, 1950-1960, J. Voorwinde Coll., 5 lots (12). On seaward side of long rocky point, Batehaven, Batemans Bay, N.S.W., on red algae, medium exposure, 6 Jan. 1970, coll. W. F. Ponder and P. H. Colman, S.E.M. stub no. 239 (7).

DISTRIBUTION AND HABITAT: Kermadec Islands, New Caledonia, Lord Howe Is., Qld, and N.S.W. on algae in the lower littoral and shallow sublittoral (fig. 14).

REMARKS: There are insufficient differences in the shell to separate representatives of populations throughout the range of this species, including the types of Laseron's species *N. pellucida* and *R. puniceus*. The radulae of specimens from Nouméa, New Caledonia, agree exactly with those from Sydney which reinforces the view that only a single species can be recognised. Unfortunately, it has not been possible to examine the radula of a specimen from the Kermadec Islands, the type locality of *R. (J.) secunda*, and, although the shell characters are identical with specimens from other parts of the range of *R. (J.) secunda* (as here recognised) confirmation of the use of this name for populations outside the Kermadec Islands is required. The shell of *R. (J.) secunda* is rather variable in shape and size even within one population. Squat specimens tend to be narrowly umbilicate whereas narrower shells are non-umbilicate. The colour varies from white to yellowish-brown or pinkish, the pink colour sometimes forming 1 or 2 broad spiral bands and is sometimes restricted to the protoconch and the first whorl of the teleoconch.

*Rissoella (Jeffreysiella) rissoaformis* (Powell, 1939) from New Zealand has a similar shell to *R. (J.) secunda* but the radula differs in having symmetrical central teeth (fig. 6g).

The opportunity is taken to note that at least one undescribed species of *Rissoella* is found at the Kermadec Islands for which, at present, only shells are available (C.102957).

***Rissoella (Jeffreysiella) wilfredi* (Gatliff and Gabriel, 1911).**

Figs 2h-j; 3i; 10i-m.

*Jeffreysia wilfredi* Gatliff and Gabriel, 1911: 188, pl. 46, fig. 3.

*Heterorissoa wilfridi* (sic.)— Iredale, 1912: 222.

*Jeffreysiella wilfredi*.— Macpherson and Gabriel, 1962: 95.

*Shell*: White, translucent, shining but not glossy. Protoconch white or colourless, of 1½ whorls, often slightly tilted. Teleoconch usually with rapidly increasing whorls of up to 3 in number, the last swollen and usually with a relatively large aperture and short spire. Aperture simple, inner lip thin (figs 2h-j; 10i).

Dimensions:	Length	Diameter
Holotype (from original description)	2 mm	1 mm
Paratype (C.35268)	1.75	1.10
Figured specimens		
(Frederick Henry Bay, S. Tasm.)	1.38	0.95
S.E.M. (Port Fairy, Vic.)	1.72	1.04

*Animal*: Tentacles long, cephalic tentacles slender and pointed, oral tentacles pointed, with rather broad bases. Head-foot mostly semi-translucent white, sole with median mucous slit. Mantle black or dark grey, head usually with some black pigmentation (Eaglehawk Neck) (fig. 3i) and Point Lonsdale, Vic. (Pers. comm. R. Burn).

*Operculum*: Typical (fig. 10j).

*Radula*: Central teeth with straight upper edge, cusps asymmetrical, 2 on right of largest cusp, 1 on left with a row of very small denticles merging with the right basal process which represent the reduced cusps of the right side of the tooth. Lateral teeth with broad bases, the outer portion long, the inner portion short. Median cusp large with many minor cusps on both sides of tooth. Inner marginal teeth similar in shape and cusp formation to lateral teeth except that a prominent outer basal cusp is present on each tooth. Outer marginal teeth simple plates (figs 10k-m).

Opercula and radulae examined from Primrose Pt., S. Tasm. (S.E.M. stub nos 219, 220) and Port Fairy, Vic. (S.E.M. stub no. 171).

TYPES: Holotype N.M.V. (F. 715)

Paratypes (1), N.M.V. (F. 27076), 2 A.M. (C. 35268, C. 45067).

TYPE LOCALITY: Ocean beach, near Pt. Nepean, Vic.

ADDITIONAL MATERIAL EXAMINED: East Cove, Deal Is., Bass Strait, N. Tasm., 6-15 m, 3-10 May 1974, coll. S. A. Shepherd (4). Deal Is., Bass Strait, N. Tasm., on algae, 6 m, 6 May 1974, coll. S. A. Shepherd (4). Murray Pass., Deal Is., Bass Strait, N. Tasm., on algae, 30-50 m, 8 May 1974, coll. S. A. Shepherd (1). Boat Harbour, N. Tasm., on coralline algae in pools, 19 Mar. 1975, coll. W. F. Ponder and R. Kershaw (1). Freestone Cove, Wynyard, N. Tasm., on algae, low tide, 20 Oct. 1971, coll. J. Beu (1). Green Cape, Maria Is., E. Tasm., 5.5 m, 26 Mar. 1970, algae on intertidal rocks, 31 Mar. 1970, coll. W. F. Ponder (2w). Primrose Pt., E. side of Frederick Henry Bay, S.Tasm., low tide, on brown algae, S.E.M. stub nos 219, 220 (3 lots) (8); matted green algae (2), 31 Mar. 1970, coll. W. F. Ponder. Roches Beach, W. side of Frederick Henry Bay, S.Tasm., on coralline algae, semi-sheltered reef, 1 Apr. 1970, coll. W. F. Ponder & E. Turner (sev). Near Granville Harbour, W.Tasm., 23 Nov. 1967, coll. A. Dartnall (1) coll. W. F. Ponder and D. C. Wolfe (2w). Pirates Bay, Eaglehawk Neck, S. Tasm., on brown (T.M.). Between Eagle and Crawfish Rocks, N.W. Arm, Western Port, Vic., 4-5 m, 15 Feb. 1969, coll. W. F. Ponder and B. J. Smith (1w). San Remo and Shoreham, Vic., Gatliff Coll. (9) (N.M.V.). Shoreham, Vic., Gabriel Coll. (5) (N.M.V.). Pt. Nepean, Vic., ex. Gatliff Coll. (1) (N.M.V.). Pt. Lonsdale, Vic., on short algae, exposed edge of platform, 22 Mar. 1975, coll. W. F. Ponder and R. Burn (1); coll. R. Burn (2) (N.M.V.). Port Fairy, Vic., 4 km W. of town, on coralline algae, 19 Mar. 1973, coll. W. F. Ponder and R. Burn, S.E.M. stub no. 171. Off Middle Pt., near Cape Northumberland, S.A., on algae, 13 m, 19 Mar. 1974, coll. S. A. Shepherd (3). Robe, S.A., J.C. Verco Coll. (3) (S.A.M.). Mississippi Bay, 48 km E. of Esperance, S.W.A., on algae, 0-2 m, 6 Feb. 1972, coll. W. F. Ponder (1). E. side of Hopetoun Jetty, S.W.A., on algae, W. side of sheltered limestone reef, 0-1 m, 4 Feb. 1972, coll. W. F. and J. M. Ponder (1).

DISTRIBUTION AND HABITAT: Bass Strait, Tasm., Vic., S.A. and southernmost S.W.A., on algae in the lower littoral and sublittoral (fig. 14).

REMARKS: Differs from *R. (J.) secunda* and *R. (J.) fretterae* in its smaller size, more rapidly increasing and fewer whorls and its uniform white colour. The material examined has consisted of small numbers but these appear to be fairly constant over the range of the species. *Rissoella (J.) wilfredi* and *R. (J.) fretterae* probably occur sympatrically along most of the southern Australian coast although they have only been obtained together from two localities (Deal Is., Bass Strait and Point Lonsdale, Victoria).

Some specimens examined from Tasmania show considerable variation in shape, some being narrow like *R. (J.) secunda*, but are consistent in their uniformly white coloration and smaller size than *R. (J.) secunda* as well as in exhibiting the radular features of *R. (J.) wilfredi*.

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Fig. 1.

- a. *Rissoella (Rissoella) atrimacula* sp. nov., Yallingup, S.W.A., holotype, A.M. (C.99655). 1.52 mm × 1.06 mm.
- b. *R. (R.) fallax* sp. nov., Fairlight, North Harbour, Sydney, N.S.W., holotype, A.M. (C.101418). 1.02 mm × 0.77 mm.
- c. *R. (R.) globosa* sp. nov., Heron Is., Qld, holotype, A.M. (C.101424). 1.12 mm × 0.80 mm.
- d. *R. (R.) vitrea* sp. nov., Denham, Shark Bay, W.A., holotype, A.M. (C.101428). 0.95 mm × 0.65 mm.
- e. *R. (R.) vitrea* sp. nov., W. side of Thevenard, S.A., A.M. (C.101478). 0.86 mm × 0.62 mm.
- f. *R. (R.) vitrea* sp. nov., N. of Snapper Pt., Aldinga, S.A., A.M. (C.101479). 1.30 mm × 0.94 mm.
- g. *R. (Jeffreysilla) confusa confusa* subsp. nov., Lizard Is., Qld, holotype, A.M. (C.101430). 1.50 mm × 0.96 mm.
- h. *R. (J.) confusa robertsoni* subsp. nov., S. side of Ulladulla, N.S.W., holotype, A.M. (C.101452). 1.00 mm × 0.67 mm.
- i. *R. (J.) confusa umbilicata* subsp. nov., Mississippi Bay, 48 km E. of Esperance, S.W.A., holotype, A.M. (C.101454). 1.22 mm × 0.78 mm.
- j. *R. (J.) confusa umbilicata* subsp. nov., off Dunsborough, S.W.A., A.M. (C.101480). 1.08 mm × 0.74 mm.
- k. *R. (Zelaxitas) imperforata* sp. nov., Pirates Bay, Eaglehawk Neck, S. Tasm., holotype, A.M. (C.101457). 1.00 mm × 0.75 mm.
- l. *R. (Z.) micra* (Finlay), lectotype of *Notosetia fulva* Laseron, Long Reef, Sydney, N.S.W., A.M. (C.101459). 1.20 mm × 0.88 mm.
- m. *R. (Z.) micra* (Finlay), Fairlight, North Harbour, Sydney, N.S.W., A.M. (C.101482). 0.95 mm × 0.70 mm.
- n. *R. (Z.) micra* (Finlay), Smugglers Bay, Whangarei Heads, New Zealand, A.M. (C.101481). 0.80 mm × 0.60 mm.

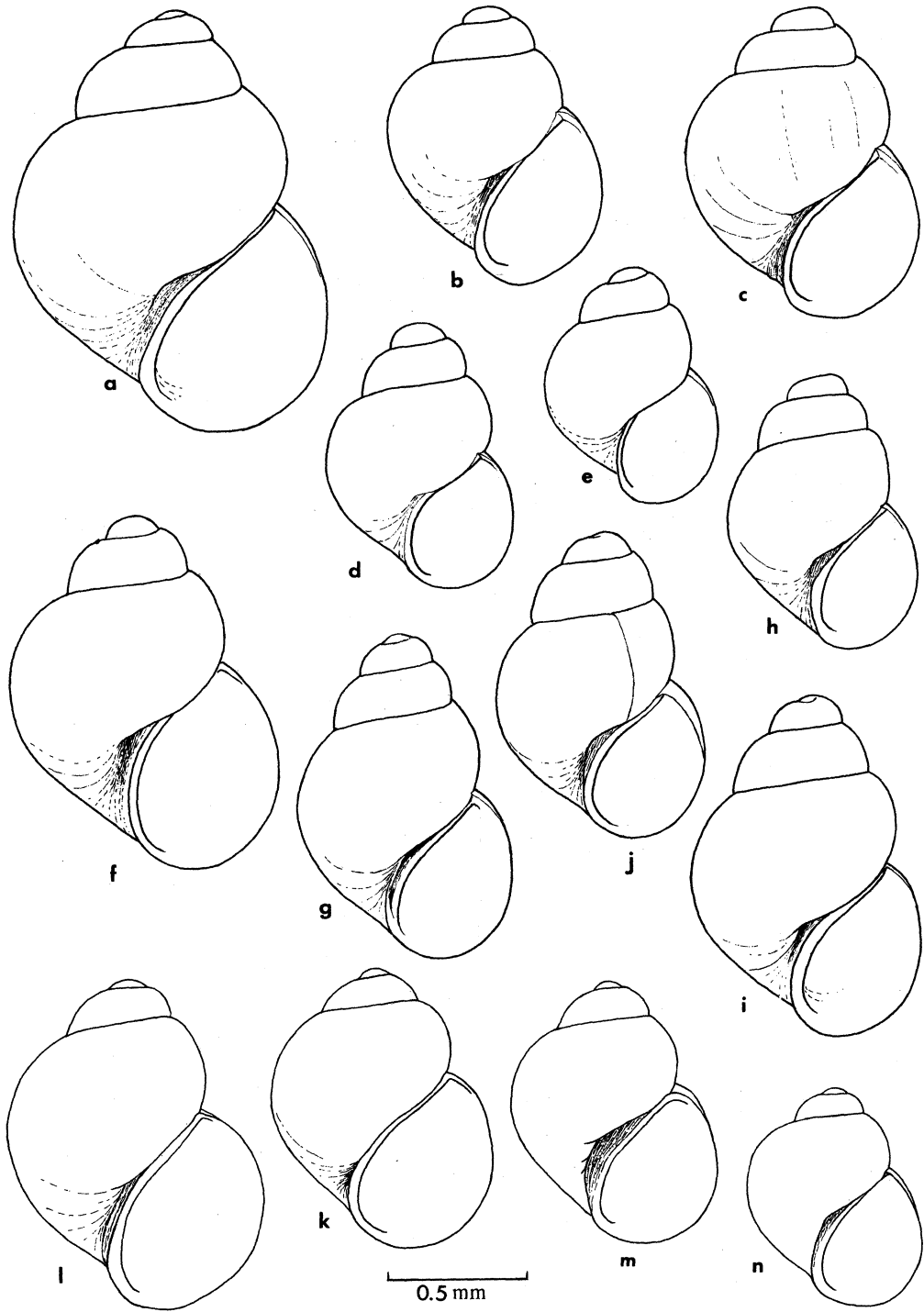




Fig. 2.

- a. *Rissoella (Jeffreysiella) colleenae colleenae* subsp. nov., Twilight Cove, 6 km W. of Esperance, S.W.A., holotype, A.M. (C.100000). 0.93 mm × 0.54 mm.
- b. *R. (J.) colleenae pacifica* subsp. nov., N.W. side of Pt. Lookout, Stradbroke Is., Moreton Bay, Qld, holotype, A.M. (C.101461). 1.10 mm × 0.55 mm.
- c. *R. (J.) fretterae* sp. nov., Gabo Is., Mallacoota, Vic., holotype, A.M. (C.101464). 3.46 mm × 1.64 mm.
- d. *R. (J.) fretterae* sp. nov., S.W. end of Garden Is., S.W. of Perth, W.A., A.M. (C.101463). 1.80 mm × 0.90 mm.
- e. *R. (J.) secunda* (Iredale), lectotype of *Notosetia pellucida* Laseron, North Harbour, Sydney, N.S.W., A.M. (C.101465). 1.30 mm × 0.74 mm.
- f. *R. (J.) secunda* (Iredale), lectotype of *Rissopsis puniceus* Laseron, Port Stephens, N.S.W., A.M. (C.101467). 3.00 mm × 1.50 mm.
- g. *R. (J.) secunda* (Iredale), Raoul (Sunday) Is., Kermadec Ids, paratype, A.M. (C.38205). 1.84 mm × 1.00 mm.
- h. *R. (J.) wilfredi* (Gatliff and Gabriel), Ocean beach, near Pt. Nepean, Vic., holotype, N.M.V. (F. 715). 2 mm × 1 mm.
- i, j. *R. (J.) wilfredi* (Gatliff and Gabriel), Roches Beach, W. side of Frederick Henry Bay, S. Tasm., A.M. (C.101483). i. 1.38 mm × 0.95 mm, j. 1.34 mm × 0.82 mm.

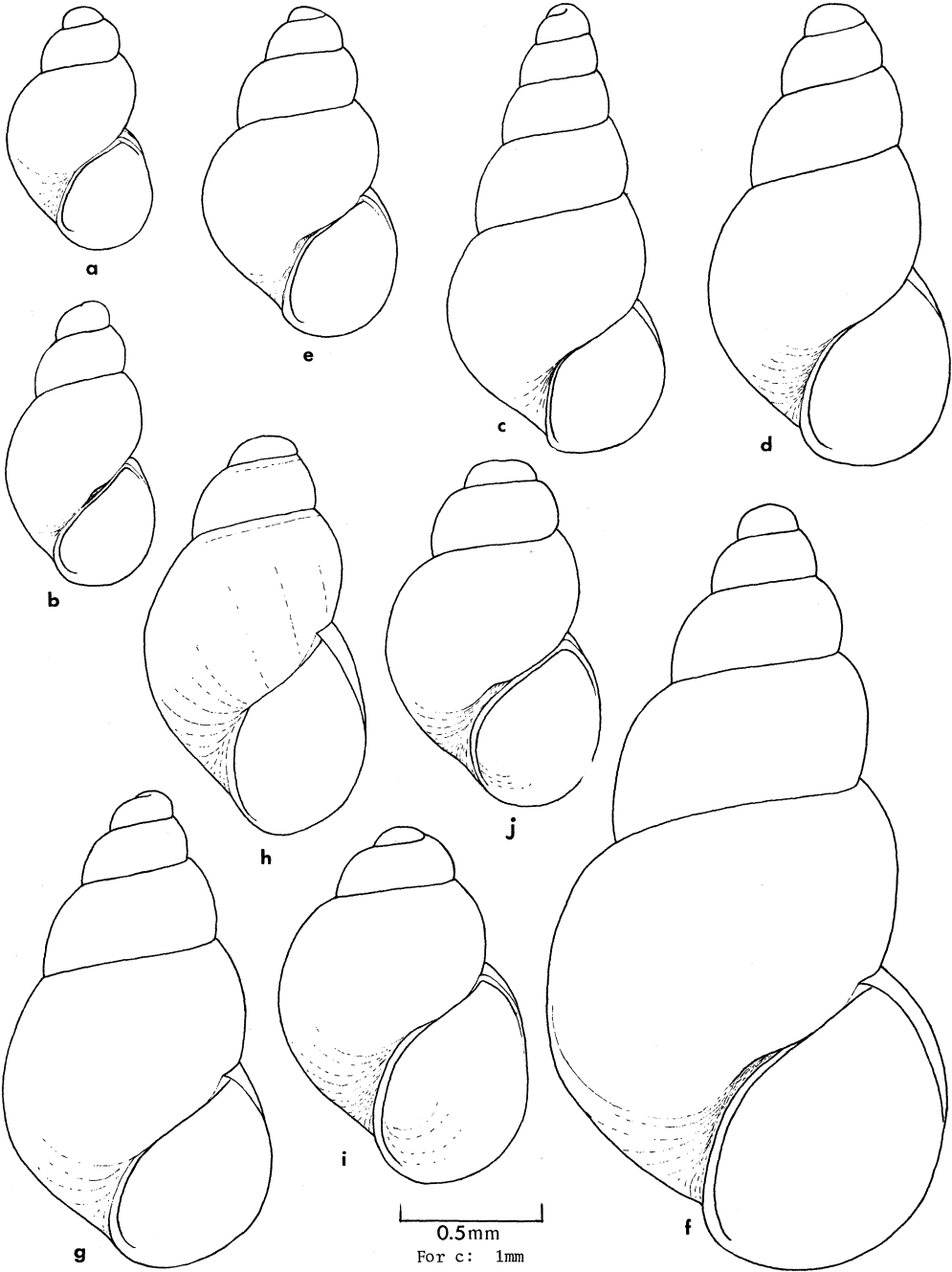


Fig. 3. Semi-diagrammatic dorsal views of head.

- a. *Rissoella (Rissoella) atrimacula* sp. nov., Yallingup, S.W.A.
- b. *R. (R.) fallax* sp. nov., Pirates Bay, Eaglehawk Neck, S. Tasm.
- c. *R. (R.) globosa* sp. nov., Heron Is., Qld.
- d. *R. (R.) vitrea* sp. nov., N. of Snapper Pt., Aldinga, S.A.
- e. *R. (Jeffreysilla) confusa confusa* subsp. nov., Lizard Is., Qld.
- f. *R. (Zelaxitas) imperforata* sp. nov., Pirates Bay, Eaglehawk Neck, S. Tasm.
- g. *R. (Z.) micra* (Finlay), Fairlight, Sydney, N.S.W.
- h. *R. (Jeffreysiella) colleenae pacifica* subsp. nov., N.W. side of Point Lookout, N. Stradbroke Is., Qld.
- i. *R. (J.) wilfredi* (Gatliff and Gabriel), Eaglehawk Neck, S. Tasm.

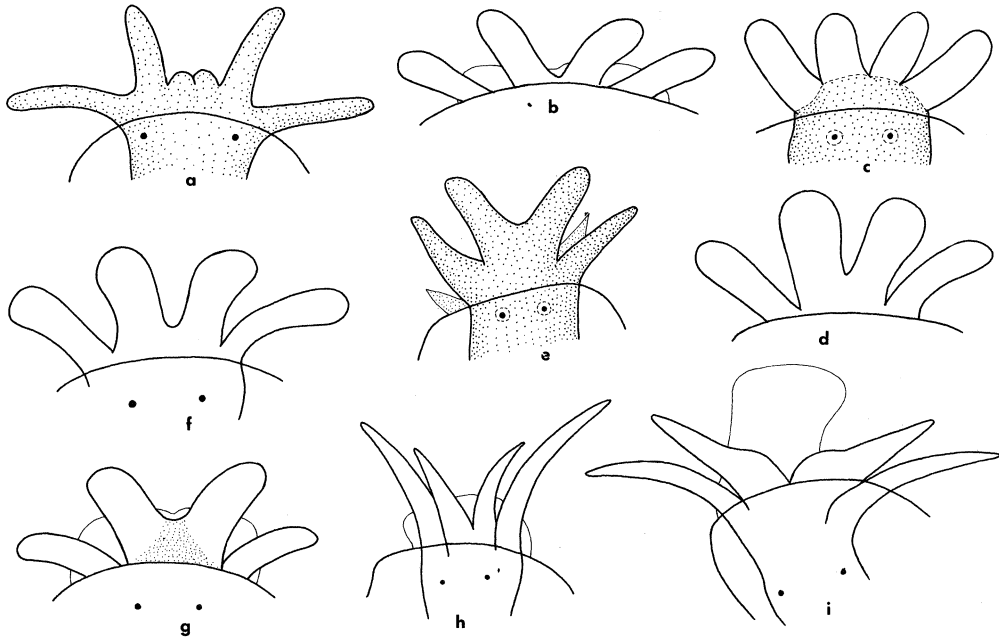


Fig. 4

*Rissoella (Rissoella) atrimacula* sp. nov.

- a. Shell — 1.47 mm × 1.07 mm, Yallingup, S.W.A., S.E.M. stub no. 111.
- b. Shell — 1.07 mm × 0.80 mm, c. Operculum — X100, North Pt., Rottnest Is., W.A., S.E.M. stub no. 115.
- d. Operculum — X100, e. Radula — X1000, Hopetoun Jetty, S.W.A., S.E.M. stub no. 198.

*R. (R.) fallax* sp. nov.

- f. Shell — 0.98 mm × 0.72 mm, Fairlight, Sydney, N.S.W., S.E.M. stub no. 204.
- g. Operculum — X110, h. Radula — X1100, Wimbie Beach, Batemans Bay, N.S.W., S.E.M. stub no. 232.

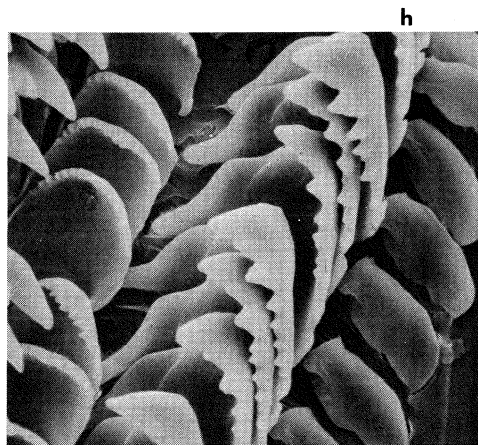
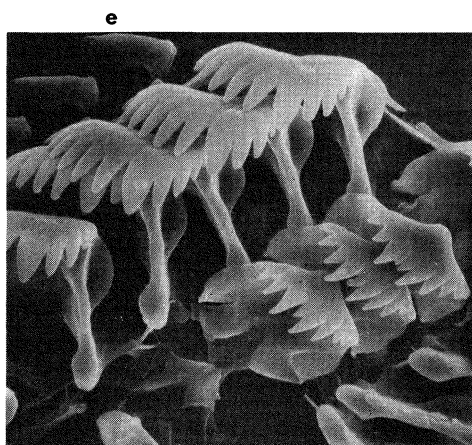
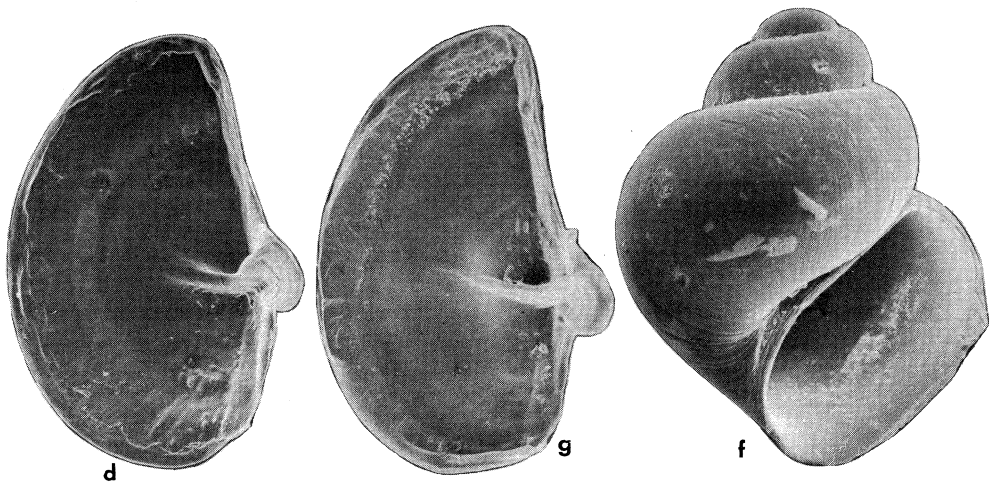
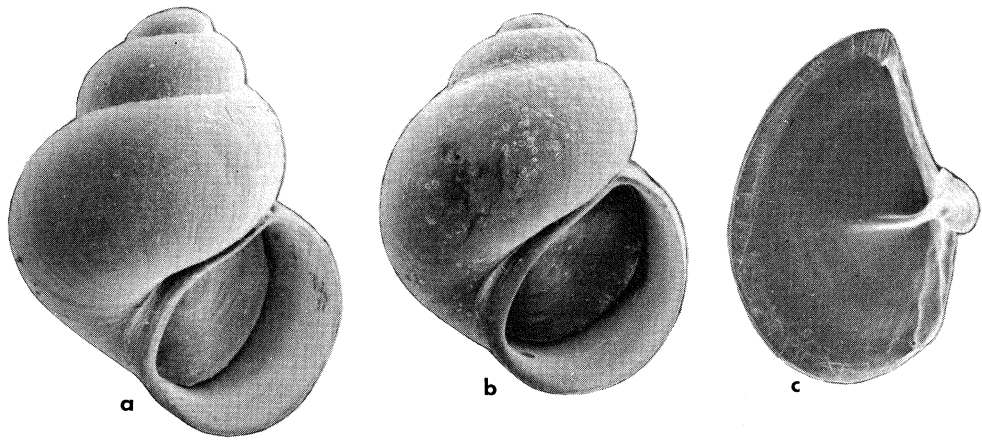


Fig. 5

*Rissoella (Rissoella) globosa* sp. nov.

- a. Shell — 0.95 mm × 0.74 mm, b. Operculum — X130, Heron Is., Qld, S.E.M. stub no. 197.
- c. Shell — 0.92 mm × 0.72 mm, N. side of Rabbit Is., Lord Howe Is., S.E.M. stub no. 119.
- d. Shell — 1.22 mm × 0.90 mm, e. Operculum — X130, f. Radula — X1000, Nouméa, New Caledonia, S.E.M. stub no. 164.
- g. Radula — X1300, h. Radula X3000, Heron Is., Qld, S.E.M. stub no. 197.

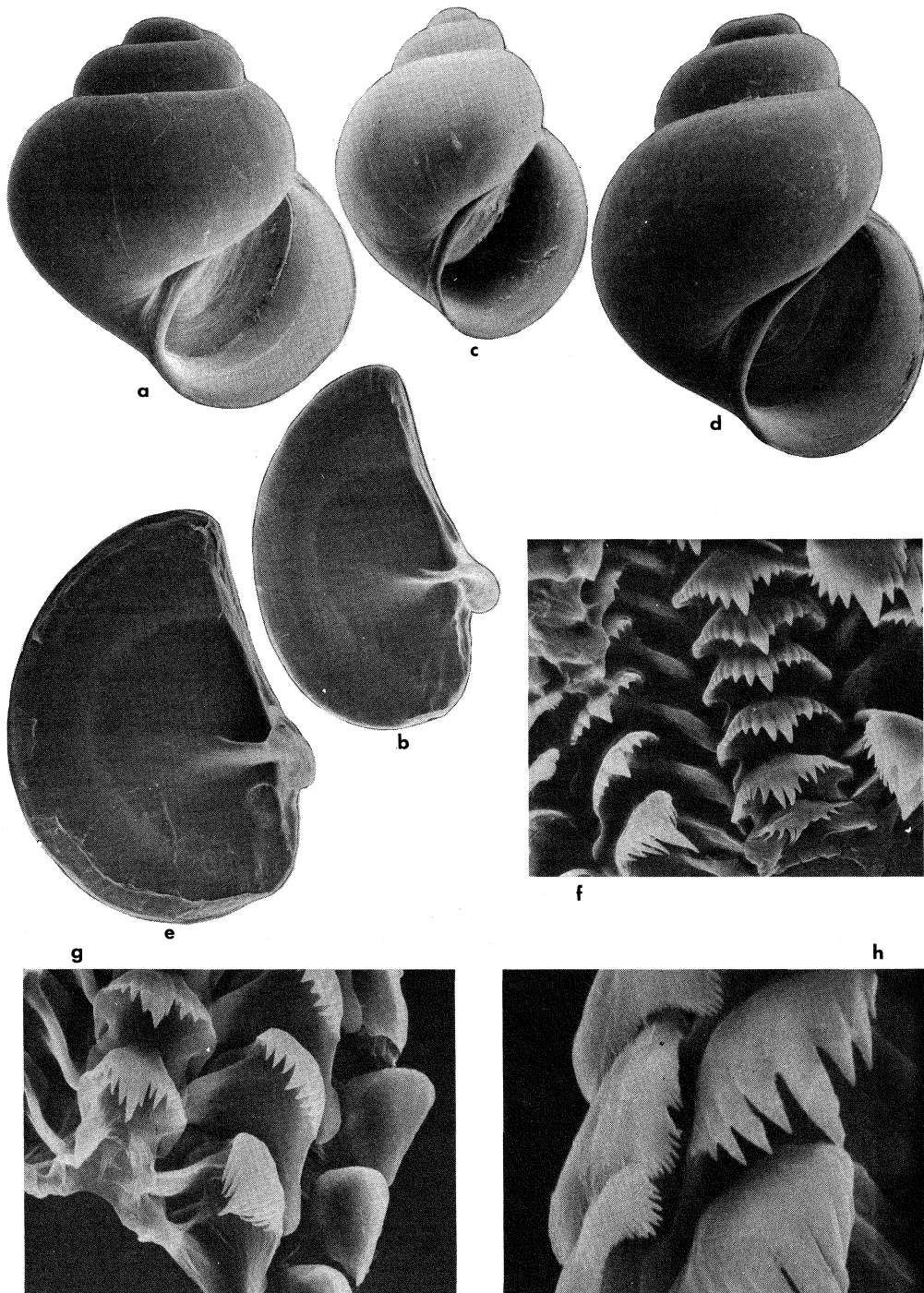




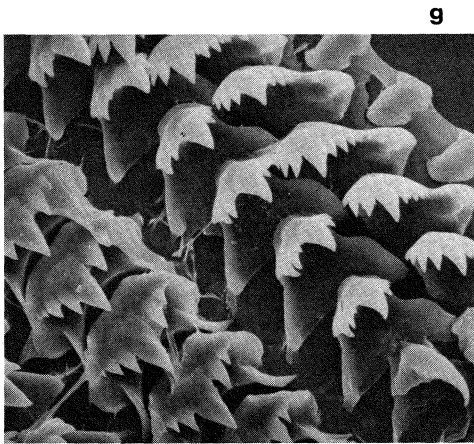
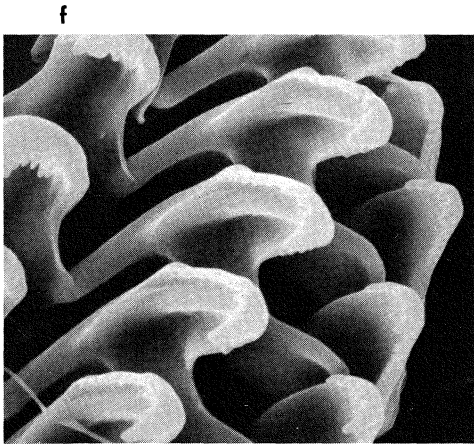
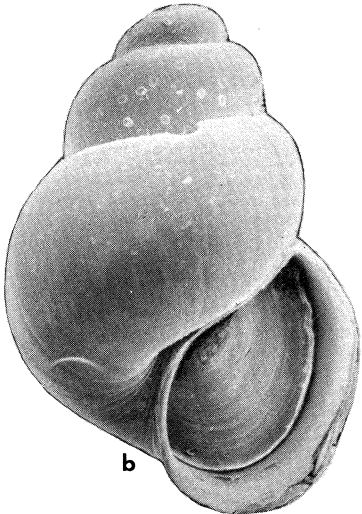
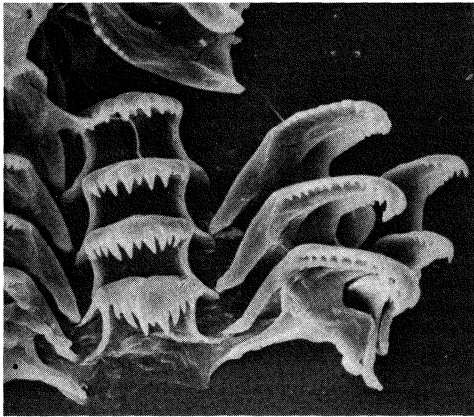
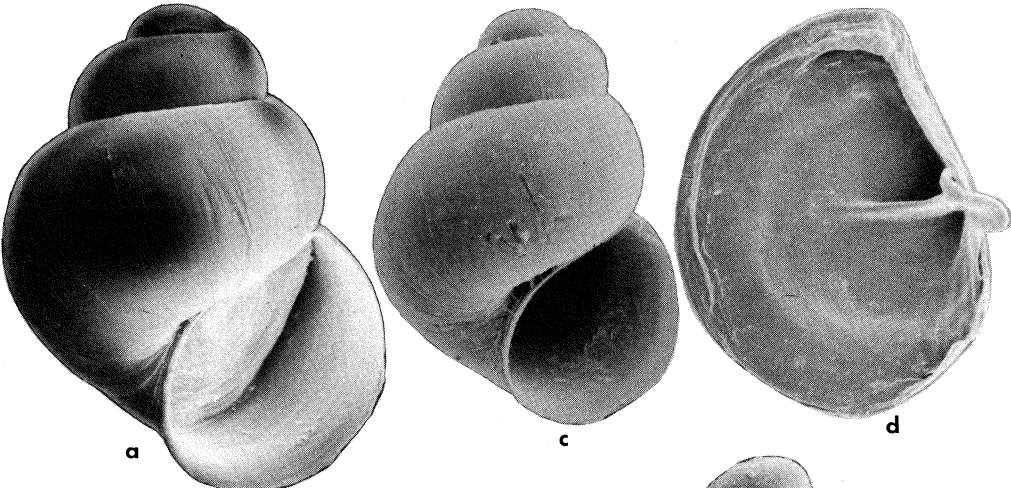
Fig. 6.

*Rissoella (Rissoella) vitrea* sp. nov.

- a. Shell — 0.88 mm × 0.62 mm, W. side of Thevenard, S.A., S.E.M. stub no. 244.
- b. Shell — 1.40 mm × 0.95 mm, North Pt., Rottnest Is., W.A. S.E.M. stub no. 114.
- c. Shell — 0.93 mm × 0.62 mm, d. Operculum — X180, e. Radula — X1300, Denham, Shark Bay, W.A., S.E.M. stub no. 112.
- f. Radula — X1000, N. of Snapper Pt., Aldinga, S.A., S.E.M. stub no. 231.

*R. (Jeffreysiella) rissoaformis* (Powell)

- g. Radula — X740, Island Bay, Wellington, New Zealand, S.E.M. stub no. 206.



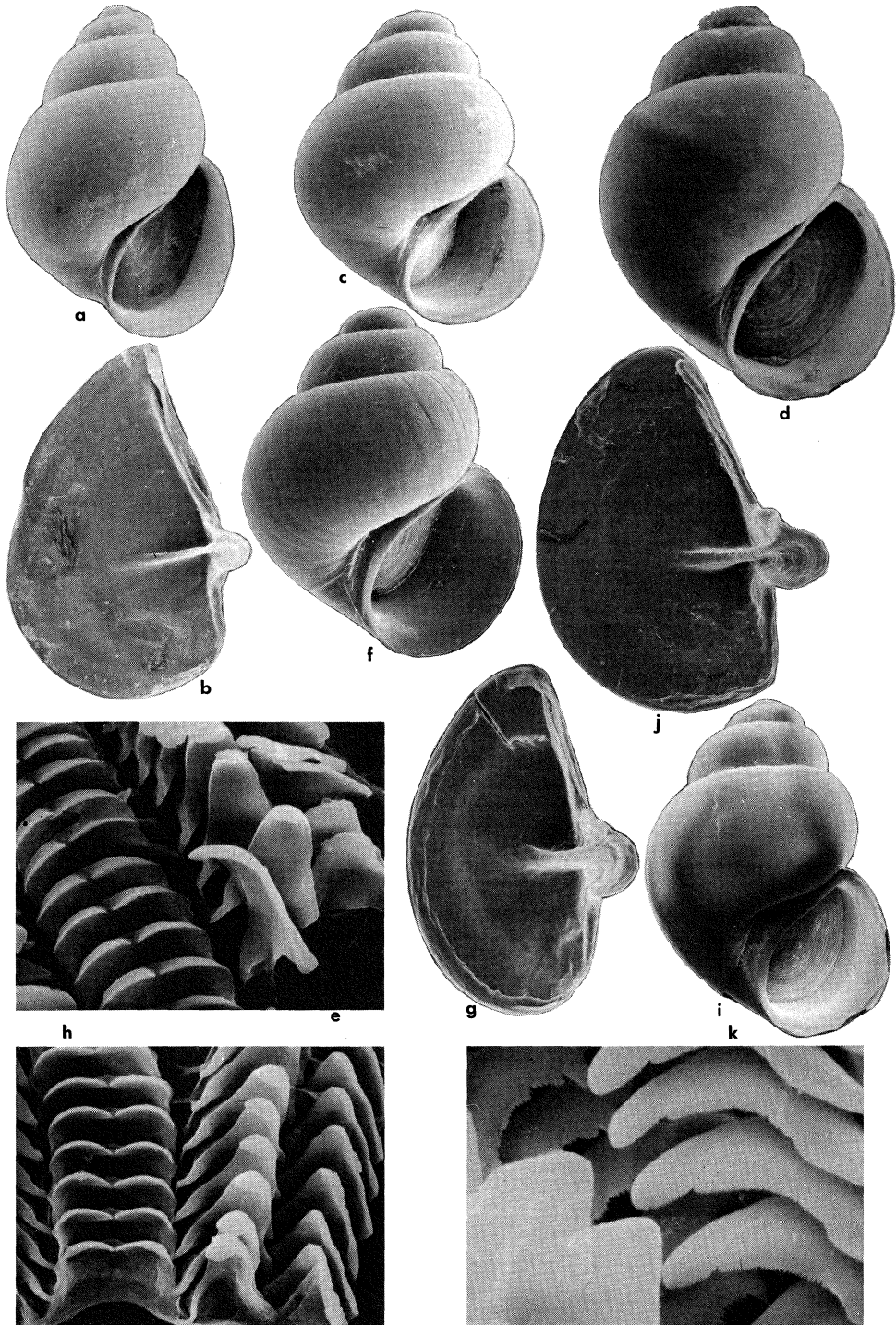
## Fig. 7.

*Rissoella (Jeffreysilla) confusa confusa* subsp. nov.

- a. Shell — 1.16 mm × 0.75 mm, b. Operculum — X140, Nouméa, New Caledonia, S.E.M. stub no. 163.
- c. Shell — 1.02 mm × 0.69 mm, Tanna Is., New Hebrides, S.E.M. stub no. 120.
- d. Shell — 1.00 mm × 0.68 mm, Lizard Is., Qld, S.E.M. stub no. 226.
- e. Radula — X1500, Lizard Is., Qld, S.E.M. stub no. 202.

*R. (J.) confusa umbilicata* subsp. nov.

- f. Shell — 1.04 mm × 0.73 mm, g. Operculum — X150, h. Radula — X1500, Hopetoun Jetty, S.W.A., S.E.M. stub no. 199.
- i. Shell — 1.31 mm × 0.87 mm, Mississippi Bay, S.W.A., S.E.M. stub no. 147.
- j. Operculum — X160, Off Dunsborough, S.W.A., S.E.M. stub no. 167.
- k. Radula — X3300, Off Dunsborough, S.W.A., S.E.M. stub no. 122.



## Fig. 8.

*Rissoella (Zelaxitas) imperforata* sp. nov.

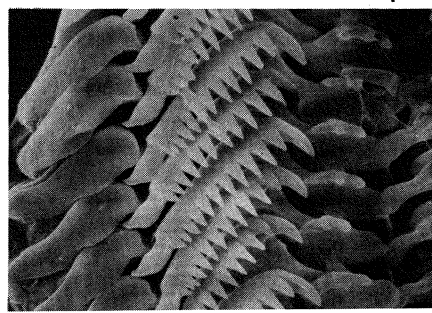
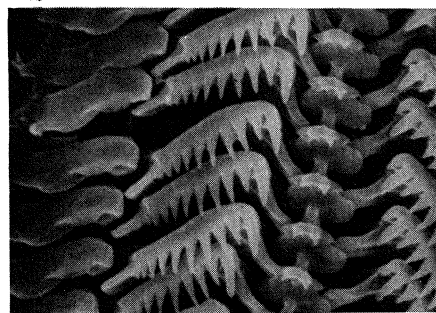
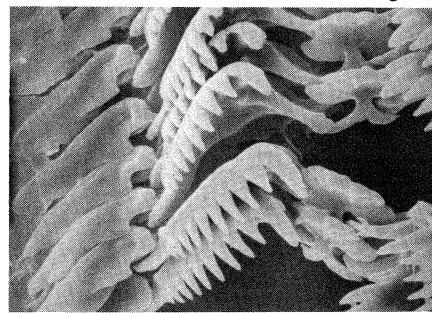
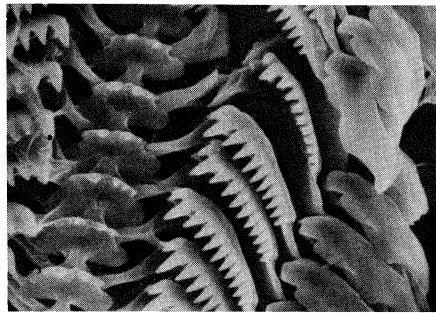
- a. Shell — 0.94 mm × 0.74 mm, Pirates Bay, Eaglehawk Neck, S. Tasm., S.E.M. stub no. 116.
- b. Radula — X800, Pirates Bay, Eaglehawk Neck, S. Tasm., S.E.M. stub no. 222.

*R. (Z.) micra* (Finlay).

- c. Shell — 1.10 × 0.76 mm, d. Shell — 0.86 mm × 0.68 mm, e. Operculum — × 150, Fairlight, Sydney, N.S.W., S.E.M. stub nos 113, 200.
- f. Shell — 1.10 mm × 0.84 mm, g. Radula — X800, Island Bay, Wellington, New Zealand, S.E.M. stub no. 210.
- h. Radula — X1200, Primrose Pt., E. side Frederick Henry Bay, S. Tasm., S.E.M. stub no. 221.
- i. Radula — X1300, Long Reef, Sydney, N.S.W., S.E.M. stub no. 201.

*R. (Z.) cystophora* (Finlay)

- j. Shell — 0.86 mm × 0.64 mm, Island Bay, Wellington, New Zealand, S.E.M. stub no. 169.



## Fig. 9.

*Rissoella (Jeffreysiella) colleenae colleenae* subsp. nov.

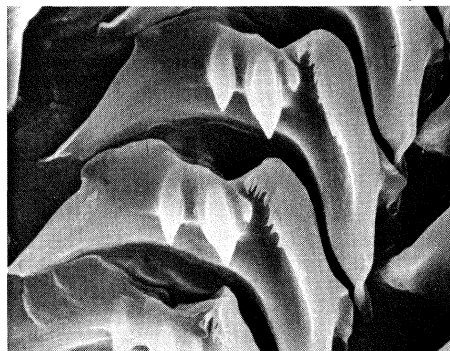
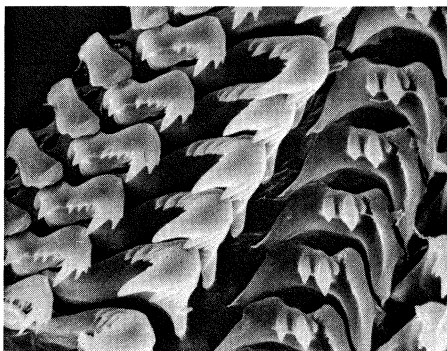
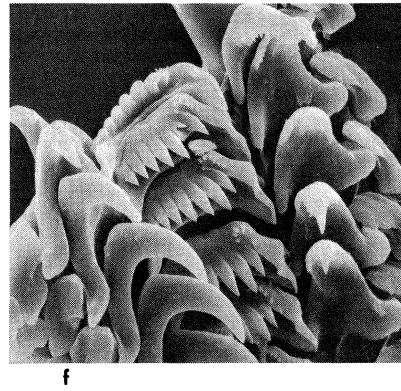
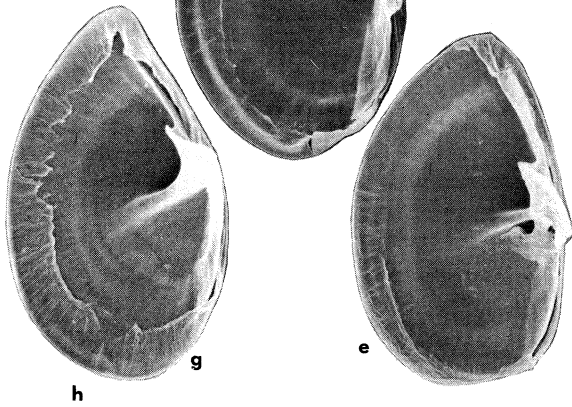
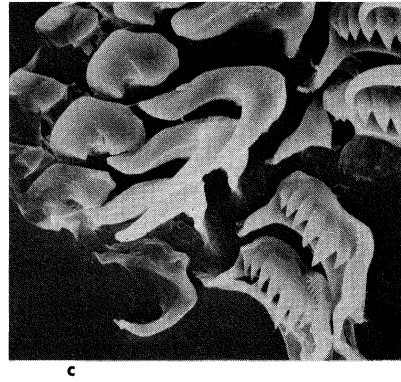
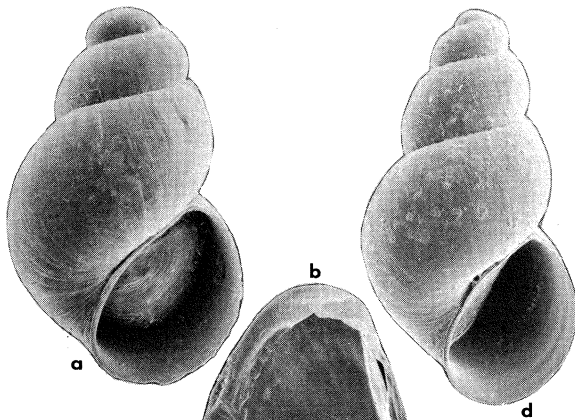
- a. Shell — 0.93 mm × 0.52 mm, b. Operculum — X140, c. Radula — X1200, Twilight Cove, 6 km E. of Esperance, S.W.A., S.E.M. stub no. 203.

*R. (J.) colleenae pacifica* subsp. nov.

- d. Shell—1.24 mm × 0.64 mm, e. Operculum — X140, f. Radula — X1200, N.W. side of Pt. Lookout, N. Stradbroke Is., Qld, S.E.M. stub no. 191.

*R. (J.) fretterae* sp. nov.

- g. Operculum — X90, h. Radula — X700, i. Radula — X1600, S.W. end of Garden Is., off Fremantle, W.A., S.E.M. stub no. 245.





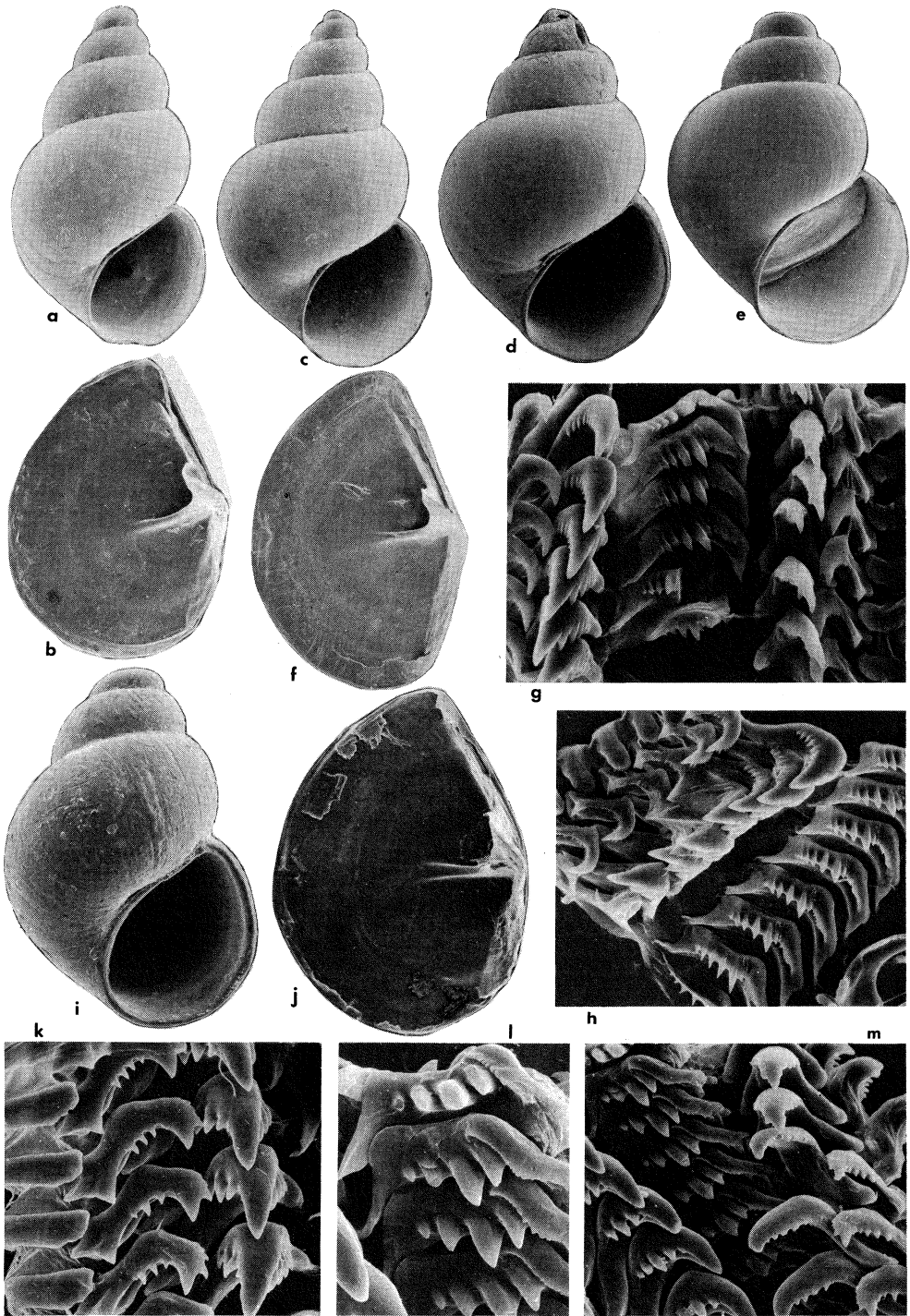
## Fig. 10.

*Rissoella (Jeffreysiella) secunda* (Iredale)

- a. Shell — 1.72 mm × 0.91 mm, b. Operculum X100, Raoul Is., Kermadec Ids, S.E.M. stub no. 160.
- c. Shell — 2.84 mm × 1.55 mm, d. Shell — 1.76 mm × 1.04 mm, Port Stephens, N.S.W., S.E.M. stub no. 177.
- e. Shell — 1.24 mm × 0.83 mm, f. Operculum — X70, g. Radula — X900, h. Radula — X560, Fairlight, Sydney, N.S.W., S.E.M. stub no. 177.

*R. (J.) wilfredi* (Gatliff and Gabriel)

- i. Shell — 1.72 mm × 1.04 mm, j. Operculum — X90, k. Radula — X 00, l. Radula — X1000 m. Radula — X600, Port Fairy, Vic., S.E.M. stub no. 171.



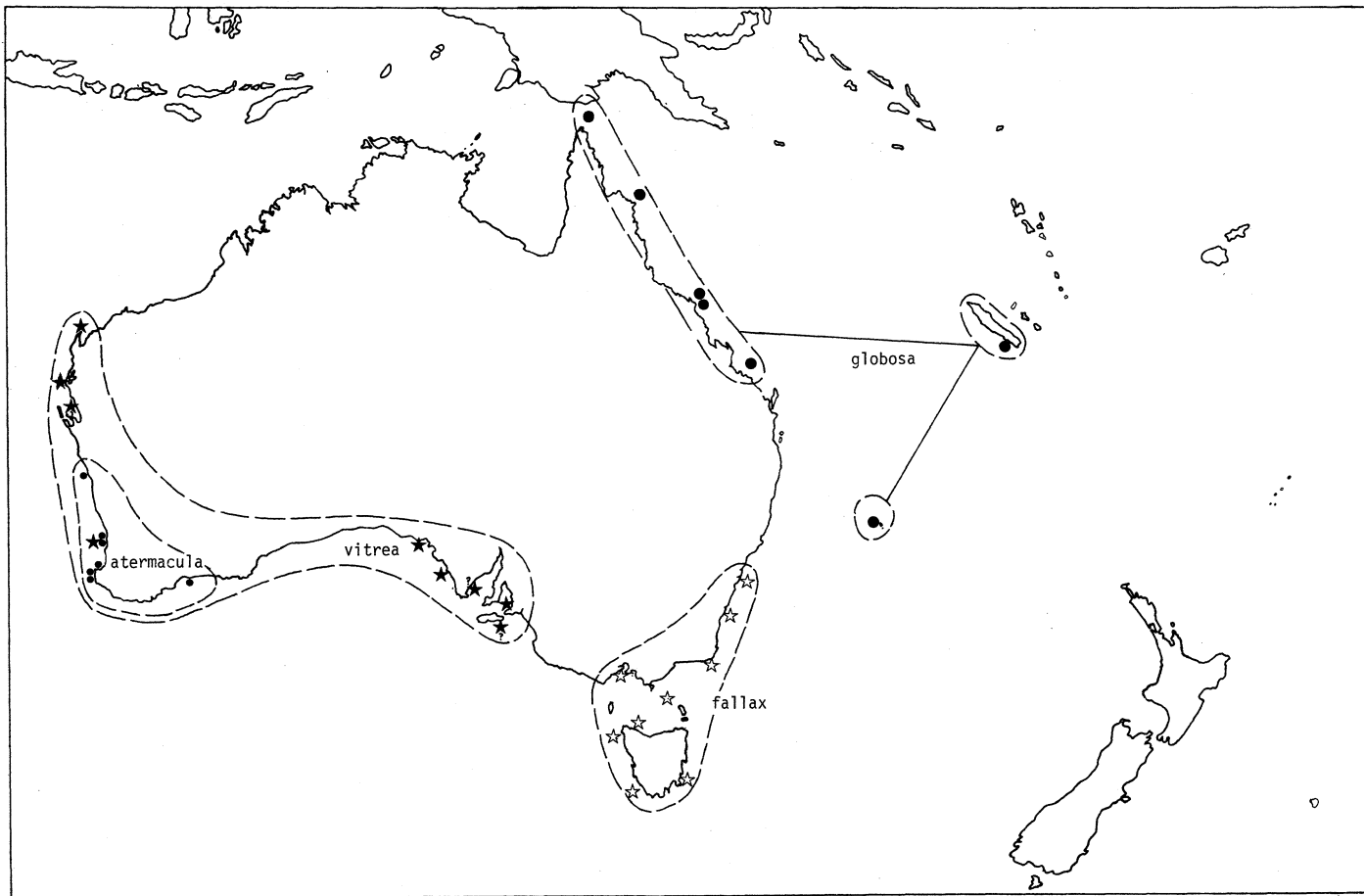


Fig. 11. Distribution of *Rissoella* (*Rissoella*) species.

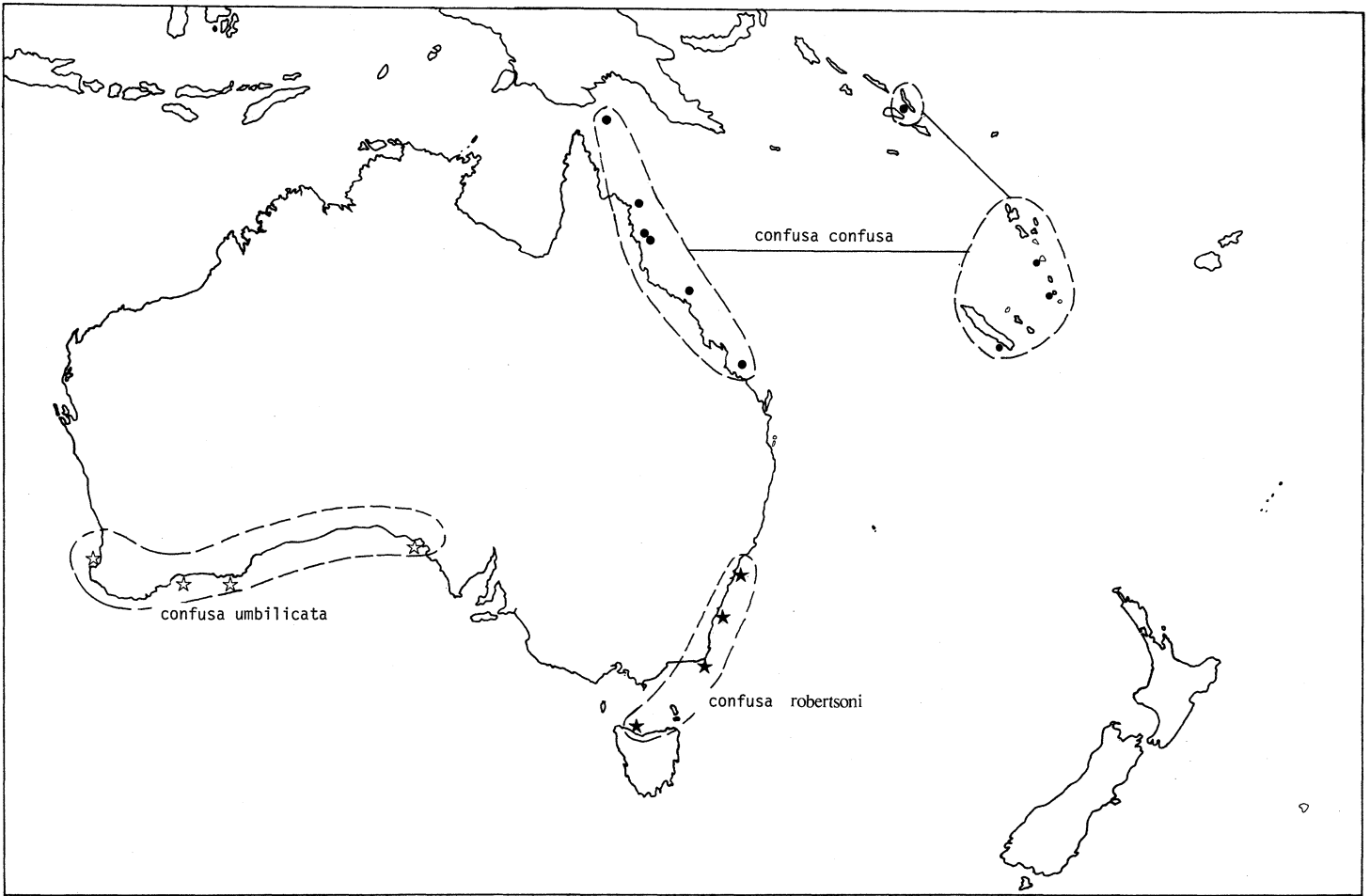


Fig. 12. Distribution of *Rissoella* (*Jeffreysilla*) species.

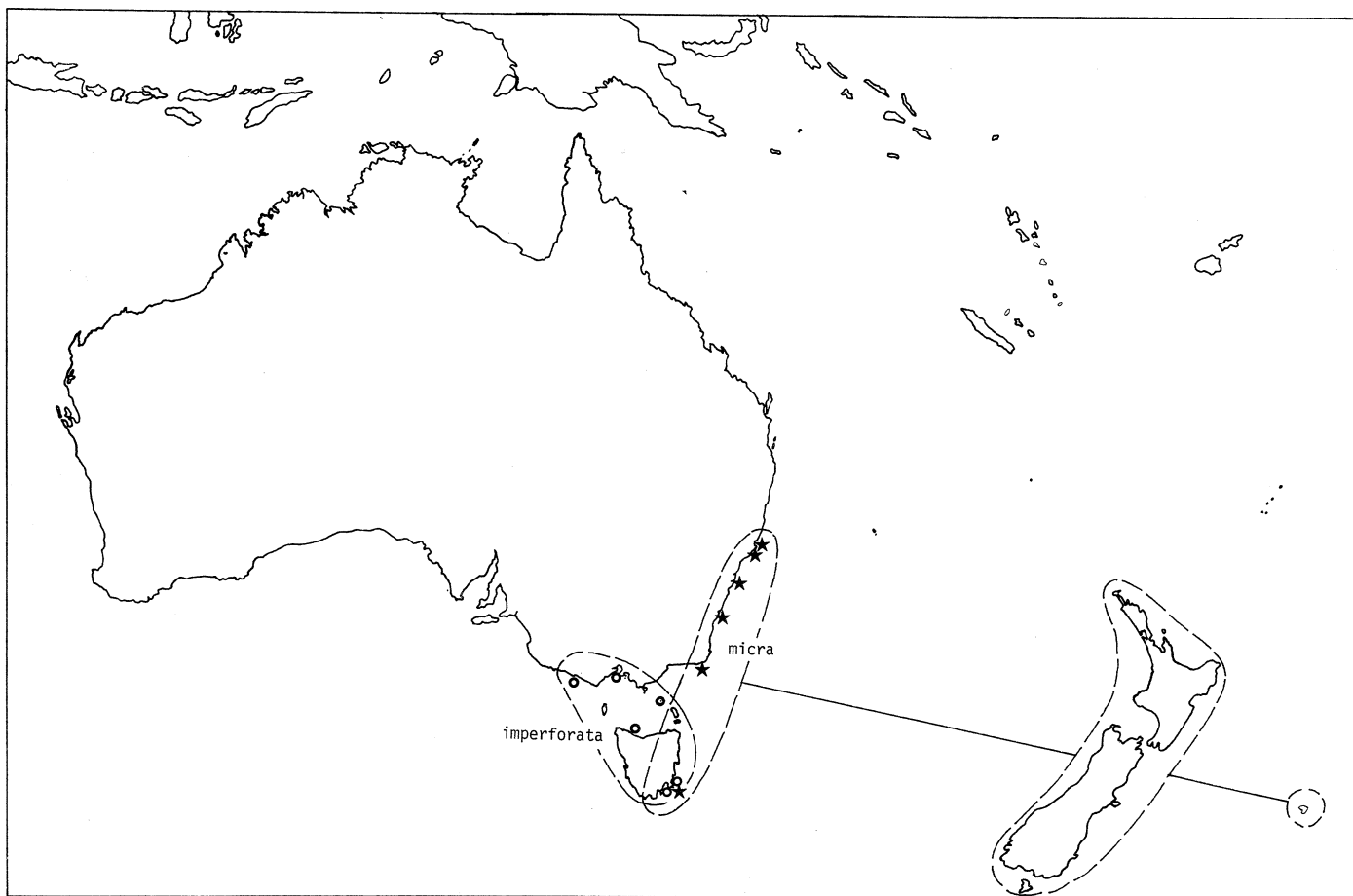


Fig. 13. Distribution of *Rissoella* (*Zelaxitas*) species.

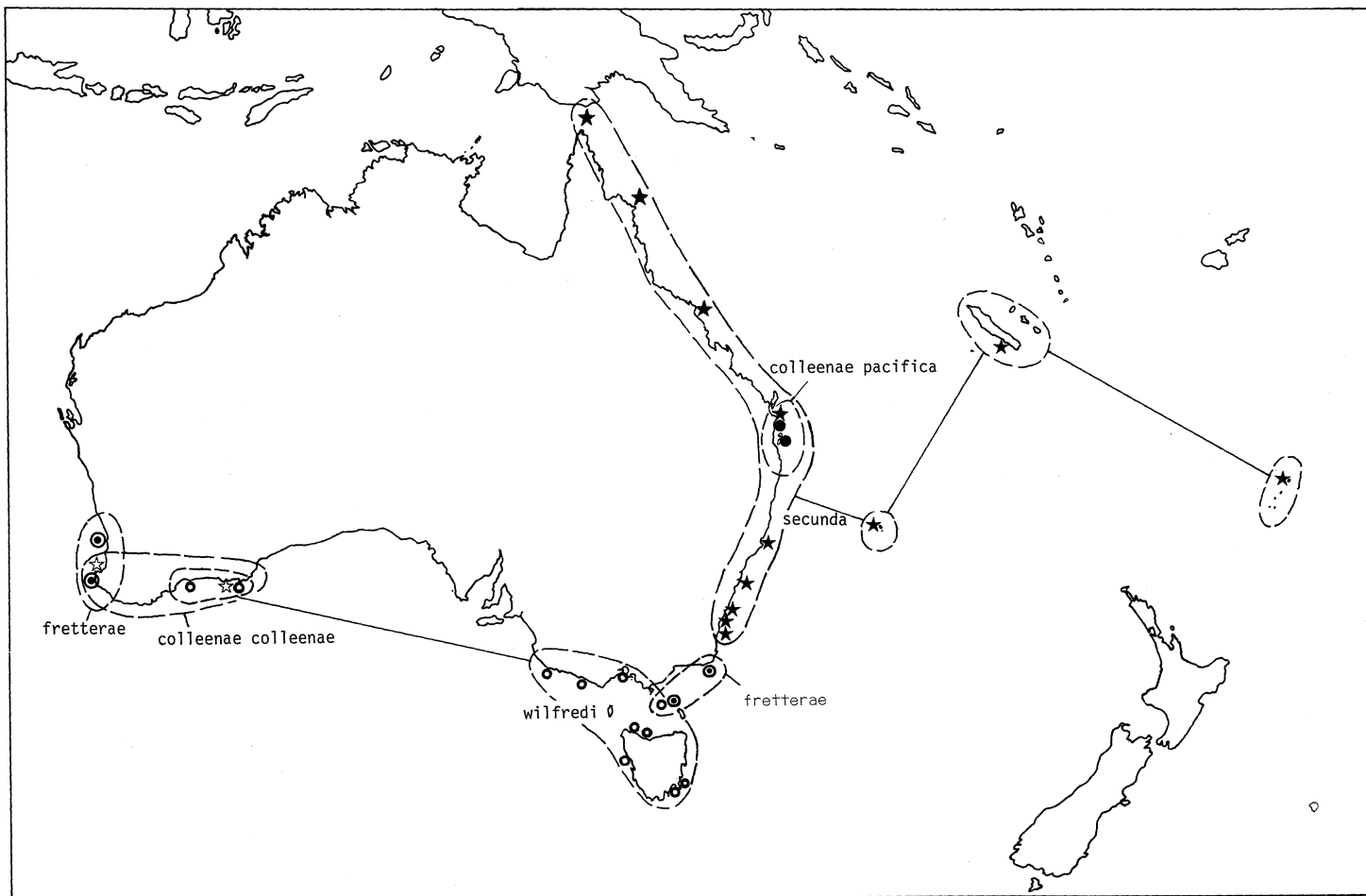


Fig. 14. Distribution of *Rissoella* (*Jeffreysiella*) species.