

# Infralittoral Rissoinidae (Gastropoda, Rissooidea) of Maldives with the introduction of a new subfamily and one replacement name, the description of three new species, and a note on the identity of *Rissoa rosea* Deshayes, 1863

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The infralittoral Rissoinidae collected by the second author between 1994 and 2007 are discussed. They belong to the subfamilies Rissoininae Stimpson, 1865, Zebininae Coan, 1964, and Stosiciinae subfam. nov. A total of 30 species are recorded, including three that are new, viz. *Rissoina mirjamae*, *Sulcorissoina stasii* and *Zebina moolenbeeki*. *Rissoina hernandezii* is introduced as nomen novum for *Phintorene decipiens* Laseron, 1956 (non *Rissoina decipiens* E.A. Smith, 1890).

Key words: Gastropoda, Rissoinidae, Pyramidellidae, taxonomy, biogeography, Indian Ocean, Maldives.

## INTRODUCTION

Maldives is a country south to southwest of India and Sri Lanka in the tropical Indian Ocean. It consists of nearly 1,200 mostly uninhabited islands grouped in a double chain of 26 atolls with a total land area of nearly 300 km<sup>2</sup> spread over roughly 90,000 square kilometers of sea. The atolls are based on an isolated volcanic submarine ridge that originated from the Réunion hotspot, which is believed to have been active for 66 million years. It is over 800 kilometers long and rises abruptly from the depths of the Indian Ocean. At the sea surface it runs north-south, from

07°06'30"N to 00°41'48"S, and from 72°32'30"E to 73°45'54"E, encompassing the Lakshadweep (formerly Laccadives) Archipelago in the north, Maldives in the middle, and the Chagos Archipelago in the south. The atolls are composed of coral reefs and sand bars; the surrounding sea water has an average surface temperature of about 28-29°C, year round. These substrate and temperature parameters indicate suitable habitats for members of the marine gastropod family Rissoinidae.

The Rissoinidae comprises of a group of small-sized (2-25 mm) detritus-feeding snails that dates back to the Early to Mid-Jurassic, and now occurs mostly in tropical and subtropical marine environments. In shell-morphology the Rissoinidae have reached an unusually wide diversity, and many clades, several of which date back to Mesozoic times, are recognizable. The phylogeny of the family, however, remains largely unresolved. Shallow water coralline environments appear to be the most rich in species (MF, pers. observ.). The total number of extant species may be as high as 450, of which about two third are living in the Indo-Pacific region. Little, however, is known about the rissoinids of the western Indian Ocean. Therefore, a survey of the Maldives Rissoinidae is of interest. Smith (1903) lists about 380 marine molluscs from Maldives and "Laccadives", including many with shells of 10 mm or less, but no species referable to the

Rissoinidae was included. As far as we know, no rissoinids have been recorded from Maldives except by Sleurs (1993; 1996), who listed *Moerchiella antoni* (Schwartz von Mohrenstern, 1860), a species not found in our material, *Apataxia cerithiiformis* (Tryon, 1887), and *Stosicia lochi* Sleurs, 1996. In the unpublished paper by Robertson [1964] five species are recorded of which four are identified to the species level. Two species named by Robertson are easily identified and also found in the material studied. One is a nomen dubium used for many more or less similar species, and the fourth perhaps is a misidentification.

Between 1994 and 2007, the second author (SG) made several diving trips during which coralline sediments were collected. At 75 stations, shells of one or more species of Rissoinidae appeared to be present. All stations are situated at a depth between 12 and 48 meters. Thirty-six stations were situated in caves. In total, 30 rissoinid species were collected. These are discussed below. Most species are illustrated. Three species are described as new to science, and one replacement name is introduced.

#### MATERIAL AND METHODS

The shells were hand-picked from the dried and sieved sediment, separated into morphospecies, and subsequently studied with the help of a binocular microscope at low magnification. Specimens were photographed using a Minolta AF 3x Zoom in combination with a Sony 100 $\alpha$  camera, using natural daylight. Images were created by using Combina Z5. Plates were prepared using Photoshop (version 6.1). The definitions of size, slenderness, and allometric growth that are used to describe the shells are the same as in Faber (2013). All specimens are illustrated at the same magnification of 12.7  $\times$ .

The following abbreviations are used: Hs - Shell height; ICZN - International Commission for Zoological Nomenclature; MNHN - Muséum national d'Histoire naturelle, Paris; OD - Original designation; SD - Subsequent designation; SG - Sandro Gori collection, Livorno; Ws - Shell width.

#### STATIONS VISITED

1. Old Shark Point, Villingili, North Male Atoll, sand in small caves, 30 m (16.xi.1994).
2. Guraidho Kandu, oceanside drop-off, South Male Atoll, sand in caves, 25 m (17.xi.1995).
3. Hurahu Kandu west, oceanside drop-off, Felidhee Atoll, sand in big cave, 38 m (19.xi.1995).
4. Tundufushi Fhalu, oceanside drop-off, Ari Atoll, 25 m (i.1996) (leg. Ramacciotti).
5. Magaa Kandu, Ari Atoll, sand in cave, 25 m (19.xi.1996).
6. Vaadhoo Caves, South Male Atoll, 32 m (22.xi.1996).
7. Rackedhoo Kandu, oceanside drop-off, Felidhee Atoll, 35 m (11.xi.1997).
8. Mulaku Kandu east, oceanside drop-off, Mulaku Atoll, sand in big cave, 35 m (12.xi.1997).
9. Hurahu Kandu west, oceanside drop-off, Felidhee Atoll, sand in big cave, 37 m (13.xi.1997).
10. Muli housereef, oceanside drop-off, Mulaku Atoll, 20 m (iii.1998) (leg. Ramacciotti).
11. Raabandhihuraa house-reef, Mulaku Atoll, 30 m (07.xi.1998).
12. Hurahu Kandu west, oceanside drop-off, Felidhee Atoll, sand in small cave, 30 m (08.xi.1998).
13. Maduvvari Kandu, Mulaku Atoll, sand in cave, 29 m (08.xi.1998).
14. Guraidhoo Kandu oceanside drop-off, South Male Atoll, 35 m (10.xi.1998).
15. Vaadhoo Caves, South Male Atoll, 34 m (10.xi.1998).
16. Vaadhoo Caves, South Male Atoll, 04°06'4"N; 073°27'E, 28 m (20.xi.1999).
17. Brocken Rock, Digurashu Kandu, Ari Atoll, 03°33'37"1"N; 72°56'21"4"E, 24 m (22.xi.1999).
18. Tinfushi EthereThila, Digurashu Kandu, Ari Atoll, 03°33'423"N; 72°56'030"E, 21 m (23.xi.1999).
19. Moofushi Kandu, Ari Atoll, 03°53'N; 72°42'50"E, sand in small cave, 28 m (24.xi.1999).
20. Maalhoss Thila, Maalhoss Uthuru Kandu, Ari Atoll, 29 m (25.xi.1999).
21. Madivaru Kandu, Rasdhoo Atoll, 04°15'05"N; 72°59'05"E, sand in cave, 31 m (26.xi.1999).
22. Nassimo Thila, North Male Atoll, 26 m (27.xi.1999).
23. Dighufinolhu, North Male Atoll, 20 m (iii.2001) (leg. Ramacciotti).
24. Maalhoss Thila, Ari Atoll, 20 m (iv.2001) (leg. Ramacciotti).
25. Himmafushi, North Male Atoll, 20 m (03.iv.2001) (leg. Ramacciotti).
26. Gulhi, South Male Atoll, 25 m (15.iv.2001) (leg. Ramacciotti).
27. Tundufushi, Ari Atoll, 30 m, 20.xi.2001 (leg. Ramacciotti).
28. Guraidhoo Kandu, south oceanside drop-off, South Male Atoll, 03°54'N; 73°28'E, sand in small cave, 20 m (12.xi.2001).
29. Ambara Kandu, north side, Felidhee Atoll, 93°23'N; 73°26'E, sand in cave, 24 m (13.xi.2001).
30. Vaavu Atoll, Felidhoo Atoll, Miyaru Kandu, south side, Alimatha, 19 m (13.xi.2001).
31. Vattaruh Kandu, west oceanside drop-off, Vattarurah Atoll, 36 m (14.xi.2001).
32. Rackedhoo Kandu, east oceanside drop-off, Felidhee Atoll, 30 m (14.xi.2001).
33. Hurahu Kandu east, oceanside drop-off, Felidhee Atoll, sand in cave, 26 m (15.xi.2001).
34. Mulaku Kandu, Mulaku Atoll, 37 m (15.xi.2001).
35. Hurahu Kandu, west oceanside drop-off, Felidhee Atoll, sand in big cave, 38 m (16.xi.2001).
36. Vaavu Atoll, Felidhoo Atoll, Diggaluvashsee Kuda Kandu,

- Kudiboli, south oceanside drop-off, sand in cave, 29 m (16.xi.2001).
37. Medhu Faru, oceanside drop-off, Guraidhoo Kandu corner, South Male Atoll, 03°54'N; 73°28'E, 36 m (17.ii.2001).
38. Embodhoo Kandu, north side, South Male Atoll, sand in cave, 17 m (17.ii.2001).
39. Maalhoss Thila, Ari Atoll, 20 m (06.ii.2002) (leg. Ramacciotti).
40. Vaadhoo caves, South Male Atoll, 04°06'N; 73°27'E, sand in cave, 32 m (06.ii.2004).
41. Guraidhoo Kandu, south oceanside drop-off, South Male Atoll, 03°54'N; 73°28'E, sand in small cave, 38 m (07.ii.2004).
42. Thinfushi, EtherThila, Digurashu, Kandu, Ari Atoll, 03°33'42"3"N; 72°56'03"E, 31 m (08.ii.2004).
43. Rangali Kandu, north side, South Ari Atoll, sand in cave, 20 m (08.ii.2004).
44. Guraidhoo Kandu, south oceanside drop-off, South Male Atoll, sand in cave, 27 m (09.ii.2005).
45. Maadiggari Kandu, west side, North Nilandhee Atoll, 32 m (10.ii.2005).
46. Filitheyo Kandu, North Nilandhee Atoll, 24 m (11.ii.2005).
47. Medhu Faru Kandu, west side, Mulaku Atoll, 26 m (12.ii.2005).
48. Mulaku Kandu, west corner, Mulaku Atoll, sand in cave, 22 m (13.ii.2005).
49. Vattaruh Kandu, east oceanside drop-off, Vattaruh Atoll, sand in big cave, 36 m (13.ii.2005).
50. Rackedhoo Kandu, west corner, Felidhee Atoll, 20 m (14.ii.2005).
51. Hurahu Kandu, east oceanside drop-off, Felidhee Atoll, sand in big cave, 34 m (14.ii.2005).
52. Miyaru Kandu, south oceanside drop-off, Felidhee Atoll, sand in cave, 28 m (15.ii.2005).
53. Embodhoo Kandu, south oceanside drop-off, South Male Atoll, sand in cave, 36 m (16.ii.2005).
54. Losfushi drop-off, Guraidhoo, South Male Atoll, 03°53'40"N; 073°28'E, 44 m (08.ii.2006).
55. Guraidhoo Kandu, south oceanside drop-off, South Male Atoll, 03°53'18"N; 073°28'12"E, 35 m (09.ii.2006).
56. Devana Kandu, north corner, Felidhee Atoll, 03°34'36"N; 073°29'48"E, 24 m (09.ii.2006).
57. Vanharuvali Kandu, north corner oceanside drop-off, Mulaku Atoll, 03°08'11"5"N; 073°31'03"5"E, cave, 32 m, (11.ii.2006).
58. Mulaku Kandu, south side, Mulaku Atoll, 03°10'36"N; 073°28'02"E, 21 m (12.ii.2006).
59. Medhu Faru Kandu, south corner oceanside drop-off, Mulaku Atoll, 03°09'26"4"N; 073°29'53"E, cave, 41 m (12.ii.2006).
60. Hakura Thila, Mulaku Atoll, 02°54'23"9"N; 073°33'15"6"E, sand in cave, 33 m (13.ii.2006).
61. Vattaruh Kandu west side, Vattaruh Atoll, brussaje on limestone, 12 m (14.ii.2006).
62. Vattaruh Kandu, west side, Vattaruh Atoll, 03°13'11"N; 073°25'04"E, 12 m (14.ii.2006).

63. Hurahu Kandu, east oceanside drop-off, Felidhee Atoll, 03°29'10"N; 073°42'00"E, sand in big cave, 30 m (15.ii.2006).
64. Hurahu Kandu, west corner oceanside drop-off, Felidhee Atoll, 03°28'59"N; 073°42'01"E, sand in big cave, 34 m (16.ii.2006).
65. Hurahu Kandu, west corner entrance, Felidhee Atoll, 03°29'14"N; 073°45'48"E, sand bank, 16 m (16.ii.2006).
66. Vaadhoo Caves, South Male Atoll, 04°07'40"14"N; 073°27'30"5"E, 34 m (7.III.2007).
67. Maaya Thila, Ari Atoll, 04°05'28"1"N; 72°51'42"E, 30 m (8.iii.2007).
68. Filitheyo Kandu, south side near the corner, Nilandhee Atoll, 03°11'24"3"N; 073°02'35"3"E, 28 m (11.iii.2007).
69. Mulaku Kandu, east corner, Mulaku Atoll, 03°10'38"8"N; 073°28'32"6"E, 28 m (11.iii.2007).
70. Vattaruh Kandu, east oceanside drop-off, Vattaruh Atoll, 03°13'09"9"N; 073°25'34"E, sand in big cave, 35 m (12.iii.2007).
71. Devana Kandu, north oceanside drop-off, Felidhee Atoll, 03°35'00"N; 073°30'21"E, 21 m (13.III.2007).
72. Hurahu Kandu, west corner entrance, Felidhee Atoll, 03°29'14"N; 073°45'48"E, sand bank, 20 m (13.iii.2007).
73. Miyaru Kandu, north side, Alimatha island, Felidhee Atoll, 03°35'58"2"N; 73°30'14"5"E, 15 m (14.iii.2007).
74. Miyaru Kandu, Felidhee Atoll, north corner, oceanside, drop-off, 03°35'58"N; 073°29'49"E, 40 m (9.ii.2006).
75. Vataruh Kandu, Vataruh Atoll, west side, 03°13'11"N; 073°25'04"E, 12 m (14.ii.2006).

## SYSTEMATIC PART

Superfamily Rissooidea Gray, 1847  
 Family Rissoinidae Stimpson, 1865  
 Subfamily Rissoinae Stimpson, 1865

*Rissoina* d'Orbigny, 1840

*Rissoina* d'Orbigny, 1840: 395. Type species, by monotypy (as the mentioned *R. elegantissima* and *R. sagra* were at that time nomina nuda): *Rissoina inca* d'Orbigny, 1840.

*Rissoina ambigua* (A.A. Gould, 1849) (Figs 1-2)

*Pyramidella ambigua* A.A. Gould, 1849: 118.

*Rissoina ambigua* (Gould, 1851) [sic] - Robertson, 1964: 6.

*Rissoina ambigua* (Gould, 1849) - Cernohorsky, 1978: 44, pl. 11 fig. 6.

*Rissoina materinsulae* Pilsbry, 1904: 27, pl. V, figs 43, 43a.

*Rissoina materinsulae* Pilsbry, 1904 - Poppe, 2008: pl. 198 fig. 11.

*Rissoina crebrecostrata* Thiele, 1930: 572, pl. IV.

Stations: 1, 2, 4, 5, 7 [figured shell], 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 32, 33, 34, 35, 38, 39, 41, 42, 43, 44, 45, 46, 47, 50, 52, 54, 55, 56, 57, 58, 59, 60, 61, 65, 68, 69, 70, 72, 73, 74, 75.

Remarks. — A widespread species, known from Japan (often recorded as *R. materinsulae*, which is a junior synonym) to southwestern Australia (as *Rissoina crebrecostrata* Thiele, 1930, another junior synonym), and from the Red Sea to Hawaii. The protoconch indicates planktotrophic larval development. This is the most common species encountered, both in number of specimens and number of stations. This is a species more common in shallower water, but fresh looking empty shells are regularly found in deeper water.

Both this species and the next, *Rissoina honoluluensis* R.B. Watson, 1886, have been connected with the nominal species *Rissoa rosea* Deshayes, 1863, described from l'Île de Reunion (Indian Ocean). Several later authors placed *Rissoa rosea* in *Rissoina*. See, for instance, [vieocean.free.fr/mollusques/Rissoidae3.htm](http://vieocean.free.fr/mollusques/Rissoidae3.htm) (species 2256), and [nmr-pics.nl/Rissoinidae/album/slides/Rissoina%20rosea.html](http://nmr-pics.nl/Rissoinidae/album/slides/Rissoina%20rosea.html), [ogokuda.blog.fc2.com/img/20140704224759651.jpg/](http://ogokuda.blog.fc2.com/img/20140704224759651.jpg/). The original description of *R. rosea* (Deshayes, 1863: 61-62; pl. 7 fig. 29, here copied as Fig. 3) and in particular its colour is reminiscent of *Rissoina honoluluensis* R.B. Watson, 1886, whereas the size of 6 mm for the type rather suggests *R. ambigua* (A.A. Gould, 1849). Shells of *Rissoina honoluluensis* have been identified as *R. rosea*. *Rissoina honoluluensis* may show a pink to salmon colour, but with a maximum size of 4 mm it is in fact too small to be a junior synonym. *Rissoina ambigua* is larger, it may reach 6 mm, and some specimens are of a salmon colour, but it is never pink. There is no type material of *R. rosea* in the MNHN collection (personal communication Virginie Héros), however, among the Maldives material [stations: 1, 22 (Figs 3-5), 24, 36, 51, 53, 55, 65] we found several shells that closely match the description of Deshayes' species in colour and shell details, for instance a strongly tilted protoconch (Figs 4-5). Closer inspection showed it not to be a rissoinid. It appears to be a species belonging to the Pyramidellidae. Currently, however, there is no genus available in which "*Rissoa*" *rosea* can be placed with confidence (Marc Lavaleye, and Pat Lafollette, each in litt.).

*Rissoina honoluluensis* R.B. Watson, 1886 (Figs 6-7)

*Rissoina honoluluensis* R.B. Watson, 1886: 619-620, pl. XLVI fig. 9.

*Rissoina honoluluensis* Watson, 1886 - Faber & Kaiser, 2015: 20, figs 3-4.

*Austrosina quinita* Laseron, 1956: 394, fig. 14.

Stations: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 16, 19, 21, 22, 23, 26, 27, 28, 32, 33, 34, 35, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 65, 68 (figured shell), 69, 70, 72, 73, 74, 75.

Remarks. — A widespread shallow water species. Literature records are few, probably due to its small size,

or confusion with other species. It differs from most other rissoinids in showing a wide variety in colour and colour pattern. Shells may be white, yellow, brown, reddish, or pink; banded, or spotted. Specimens of *R. honoluluensis* may reach a maximum size of nearly 4.0 mm (often less). The dome-shaped planktotrophic larval shell is quite characteristic (see Faber & Kaiser, 2015: 23, fig. 4). It is known from the Red Sea to Clipperton in the eastern Pacific, and from southern Japan and Hawaii to Queensland.

*Rissoina bilinea* (Laseron, 1956) (Figs 8-9)

? *Rissoina funiculata* Souverbie in Souverbie & Montrouzier, 1866: 256-257, pl. IX fig. 7.

*Costalynia bilinea* Laseron, 1956: 397-398, figs 25-26.

Stations: 31, 60, 68 (figured specimen).

Remarks. — This species clearly differs from *Rissoina ambigua* and *R. honoluluensis* in having two fairly strong spiral ribs on the base, as well as a strong fasciole at the anterior end. The latter character forms the basis of the recognition of the genus-level taxon *Rissolina* A.A. Gould, 1861 [type species: *Rissoina plicatula* Gould, 1861; SD: Nevill (1885: 77)] but as this character occurs throughout many, distantly related, rissoinid genera, it represents an apomorphy on the species level, and therefore it is not of value as a genus-level taxon. Laseron (1956: 395) separated this species, and a few others, from *Rissolina* because in these species the axial ribs are not crossed by incised lines. This character is not constant even within a specimen, and there are no other characters separating *Costalynia* (type species, by OD: *Rissoina cardinalis* Brazier, 1877) from *Rissolina* and, therefore, from *Rissoina*.

Only a few specimens have been collected. The protoconch indicates planktotrophic larval development. This species is common in the Central-West Pacific. The Maldives record is a range-extension.

*Rissoina mirjamae* spec. nov. (Figs 10-11)

*Zebina* sp 3352;

<http://vieocean.free.fr/mollusques/Rissoidae2.htm>

Stations: 1(1), 1(1), 8(2), 31(1); 35(1), 38(1), 40(2), 42(1), 43(1), 55(1), 56(1), 70(1) 72(1).

Description of the holotype. — Shell medium-sized, 8.1 mm, elongate-conical, non-umbilicate, opaque to slightly translucent white, with 2 1/2 protoconch whorls, and 7.5 teleoconch whorls. Protoconch whorls rounded, smooth, sutures well-visible, ending with a "sinusigera" notch; teleoconch whorls glossy, very

weakly convex, the greatest width well below the middle. Sutures distinct. First teleoconch whorls with about 10 low, narrow, axial riblets, separated by grooves of slightly greater width; on the subsequent teleoconch whorls the ribs become more numerous. Gradually they become weaker and more widely separated, their strength remains subsuturally somewhat stronger than suprasuturally, but they disappear altogether at about the penultimate whorl. Base evenly rounded, sculptured with about 15 narrow and widely separated spiral grooves, thus forming low, flat ribs which become more narrow and crowded towards the anterior end, around the axis. There is no other spiral sculpture except for weak and irregular microscopic grooves. Aperture D-shaped, columella weakly curved; outer lip progressively incrassate into a wide and moderately strong labial rim, straight in profile, which forms a  $17^\circ$  angle with the axis. Posterior sinus narrow, pointed; anterior sinus very shallow, hardly impressed, a bit flaring.

Type locality. — Maldives: Felidhee Atoll, Hurahu Kandu, west corner entrance,  $03^\circ 29' 14''$  N;  $073^\circ 45' 48''$  E, sand bank, 20 m. Station 72, 13.III.2007.

Type material. — The holotype (MNHN IM-2000-32454) (locality data see above), as well as one shell (paratype) from Maldives: South Male Atoll, Embodhoo Kandu, north side, sand in cave, 17 m. Station 38 (17.II.2001) (MNHN IM-2000-32455).

Other material examined. — See the station list (number of specimens in parentheses).

Variability. — All specimens examined are constant in characters. There is some variation in size of the adult shells, from medium-sized to large (8.1-9.6 mm), and in the number of whorls with visible axial sculpture. Otherwise there is little variation; the disappearance of the axial sculpture occurs gradually, more or less at the same whorls, with the last whorl being smooth.

Distribution. — Hitherto only known from Maldives, Réunion (see the Internet reference) and from the Philippines. The Panglao expedition (2006) produced several specimens.

Etymology. — Named in memory of Mirjam Bentz van den Berg for her bright spirit, inspiring humor, sharp mind, and endless kindness.

Differential diagnosis. — This species shows some characters usually associated with the genus *Moerchiella*, namely a gradual disappearance of axial and spiral sculpture, but this is not restricted to that genus. Subadult specimens resemble some species in the genus *Zebinella*, in particular because of the straight sides and close-set axial sculpture. However, the spire whorls lack any spiral macrosculpture, which together with fine axial sculpture creates the fine, reticulate sculpture typical of *Zebinella*. We place

it in the genus *Rissoina*, because in general outline it is similar to typical *Rissoina* species such as *R. ambigua* (compare Figs 1-2).

Remarks. — Despite its comparatively large size, this species seems to have been overlooked, partly due to confusion with other species. For instance, the website of conchology.be shows several specimens as the superficially similar *Moerchiella dorbignyi*.

*Rissoina subfuniculata* Weinkauff, 1881 (Figs 12-15)

? *Rissoina costulata* Dunker, 1860: 235-236.

*Rissoina subfuniculata* Weinkauff, 1881: 76-77, pl. 15b fig. 8.

Stations: 2, 7 (figured specimens), 9, 11, 17, 21, 33, 34, 42, 47, 51, 52, 56, 57, 65, 69.

Remarks. — This species is very similar to *R. torresiana* particularly in size, shape, macrosculpture and protoconch type. Yet there are marked, constant differences, the most obvious one being the basal fold, which does not project strongly below the aperture. Also, the axial ribs are more densely spaced, the apertural varix lacks spiral riblets, and the protoconch is white instead of yellowish-brown. These differences are constant. *Rissoina costulata* Dunker, 1860, is a nomen dubium; no type material is known, and the description is rather vague and may apply to more than one species.

*Rissoina hernandezii* nom. nov. (Figs 16-18)

? *Rissoina plicata* A. Adams, 1853: 264 [nomen dubium].

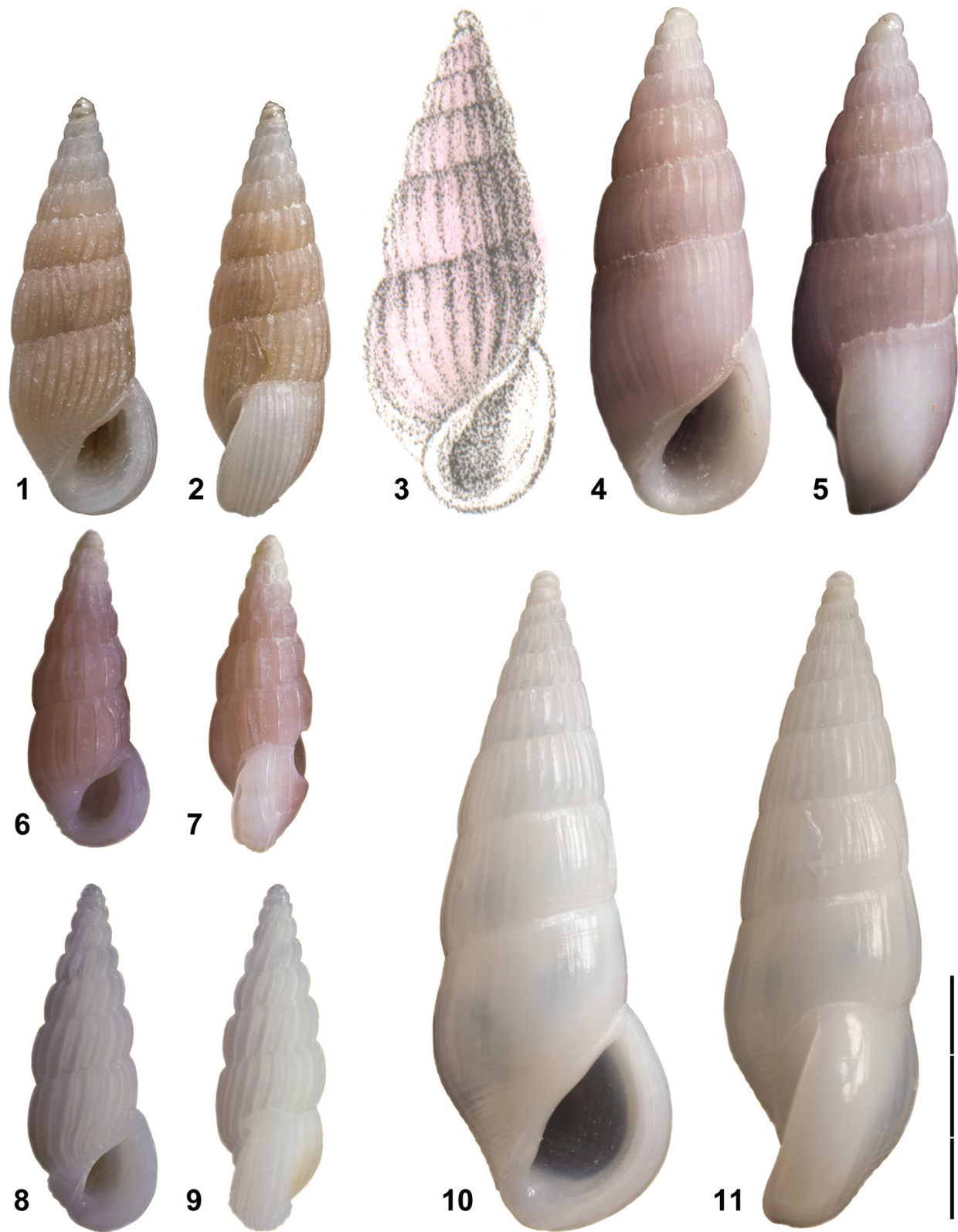
? *Rissoina scalariana* A. Adams, 1853: 265 [nomen dubium].

*Fractoralla decipiens* Laseron, 1956: 399, fig. 29 [non *Rissoina decipiens* E.A. Smith, 1890].

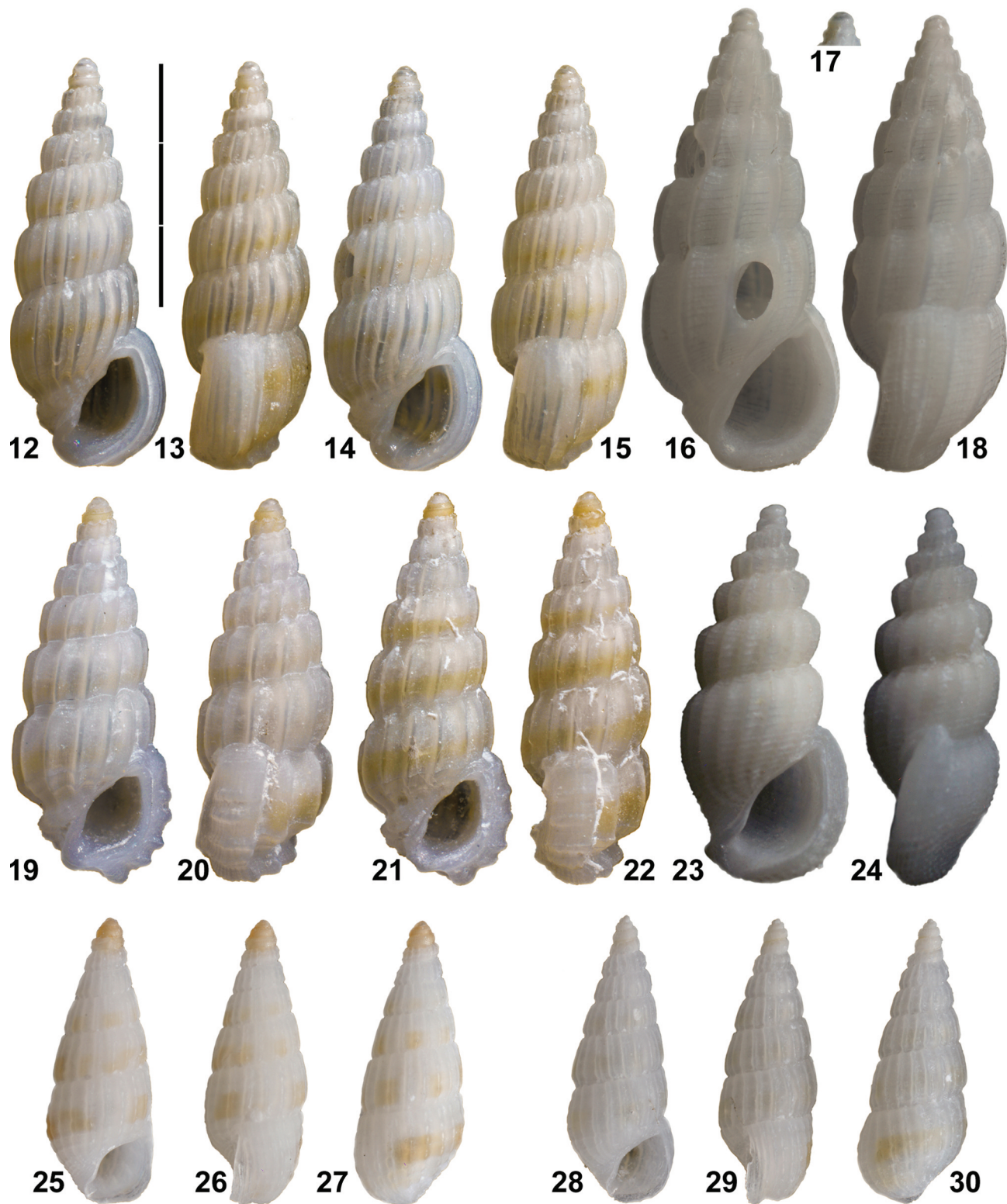
Stations: 9, 13, 18, 21, 34 (figured specimen), 46, 53, 65, 68, 72, 75.

Etymology. — This species was originally described from Queensland, Australia. However, it is a secondary homonym of *R. decipiens* E. A. Smith, 1890, a species from Saint Helena (Atlantic). The two species have never been regarded as belonging to different genera after 1899 (ICZN art. 23.9.5.). We believe that both will remain in the genus *Rissoina*, and therefore a replacement name becomes necessary. The replacement name honours José María Hernández Otero (1946-2008), malacologist, unforgettable friend, and companion of several shelling trips of the second author (SG).

Remarks. — The protoconch indicates planktotrophic larval development. The Central-West Pacific *Rissoina duclosi* Montrouzier in Souverbie &



**Figs 1-11.** 1-2, *Rissoina ambigua* (A.A. Gould, 1849); 5.1 mm (Station 7: Felidhee Atoll, Rackedhoo Kandu, oceanside drop-off, 35 m; 11.xi.1997). 3, "*Rissoa*" *rosea* Deshayes, 1863, original type figure copied from Deshayes [1863: 61-62; pl. 7 (XXXIV) fig. 29]. 4-5, "*Rissoa*" *rosea* Deshayes, 1863; 6.2 mm (Station 22: North Male Atoll, Nassimo Thila, 26 m (27.XI.1999)). 6-7, *Rissoina honoluluensis* R.B. Watson, 1886; 3.9 mm (Station 68: North Nilandhee Atoll, Filitheyo Kandu, south side near the corner, 03°11'24"3"N; 073°02'35"3"E, 28 m; 11.III.2007). 8-9, *Rissoina bilinea* (Laseron, 1956); 5.0 mm (Station 68: Nilandhee Atoll, Filitheyo Kandu, south side near the corner, 03°11'24"3"N; 073°02'35"3"E, 28 m; 11.III.2007). 10-11, *Rissoina mirjamae* spec. nov.; 8.1 mm; holotype (Station 72: Felidhee Atoll, Hurahu Kandu, west corner entrance, 03°29'14"N; 073°45'48"E, sand bank, 20 m; 13.iii.2007).



**Figs 12-30.** 12-13, *Rissoina subfuniculata* Weinkauff, 1881; 5.0 mm (Station 7: Felidhee Atoll, Rackedhoo Kandu, oceanside drop-off, 35 m; 11.XI.1997). 14-15, *Rissoina subfuniculata* Weinkauff, 1881; 5.0 mm (Station 7: Felidhee Atoll, Rackedhoo Kandu, oceanside drop-off, 35 m; 11.xi.1997). 16-18, *Rissoina hernandezii* nom. nov.; 5.8 mm (Station 34: Mulaku Atoll, Mulaku Kandu, 37 m; 15.xi.2001). 19-20, *Rissoina torresiana* (Laseron, 1956); 4.8 mm (Station 7: Felidhee Atoll, Rackedhoo Kandu, oceanside drop-off, 35 m; 11.xi.1997). 21-22, *Rissoina torresiana* (Laseron, 1956); 4.9 mm (Station 7: Felidhee Atoll, Rackedhoo Kandu, oceanside drop-off, 35 m; 11.xi.1997). 23-24, *Rissoina quasimodo* Faber, 2013; 4.7 mm (Station 25: North Male Atoll, Himmafushi, 20 m; 03.iv.2001, leg. S. Ramacciotti). 25-27, *Apataxia cerithiiformis* (Tryon, 1887); 3.6 mm (Station 73, 74). 28-30, *Apataxia* aff. *eripona* Laseron, 1956; 3.6 mm (Station 73, 74).

Montrouzier, 1866 is very similar but has a protoconch indicating direct development. Two other nominal species, *Rissoina plicata* and *R. scalariana*, both of A. Adams, 1853, are similar too, but their protoconchs are not known, being neither described nor preserved in type material, and therefore both nominal taxa are and most probably will remain nomina dubia.

*Rissoina torresiana* (Laseron, 1956) (Figs 19-22)

? *Rissoina obeliscus* Schwartz von Mohrenstern, 1860: 53, pl. II fig. 15.  
*Costalynia torresiana* Laseron, 1956: 395, fig. 18.

? *Rissoina obeliscus* Schwartz, 1860 - Poppe, 2008: pl. 198 fig. 6 [? non Schwartz von Mohrenstern].

Stations: 2, 4, 5, 6, 7 (figured specimens), 8, 10, 11, 13, 14, 15, 16, 17, 18, 19, 21, 23, 25, 27, 28, 33, 35, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 52, 53, 54, 55, 56, 57, 59, 64, 65, 68, 69, 72, 73.

Remarks. — The protoconch indicates planktotrophic larval development. This species is very similar to *R. subfuniculata* Weinkauff, 1881 (see above). It is common in the Central-West Pacific. The identity of *Rissoina obeliscus* Schwartz von Mohrenstern, 1860, is uncertain as the types lack the protoconch and early teleoconch whorls.

*Rissoina quasimodo* Faber, 2013 (Figs 23-24)

*Rissoina quasimodo* Faber, 2013: 24, figs 39-40.

Stations: 8, 19, 20, 23, 25 (illustrated specimen), 57, 68, 75.

Remarks. — The protoconch indicates planktotrophic larval development, but heretofore only known from the Philippines. The Maldives shells are very similar to the Philippine specimens. This record constitutes a considerable range extension to the west.

*Rissoina* spec.

Station: 38.

Remarks. — The single shell is not in very good condition, lacking the protoconch. It does not match any of the known rissoinids, but we have seen the same species in Philippine material, and it will be discussed in detailed in another publication.

*Rissoina* aff. *scolopax* Souverbie, 1877

? *Rissoina scolopax* Souverbie, 1877: 75-76; pl. I fig(s) 3.

Stations: 9, 73.

Remarks. — Unfortunately, the type specimens of *R. scolopax*, in the Muséum d'Histoire naturelle in Bordeaux, lack protoconchs, as do our specimens. The shells also resemble *Rissoina bertholleti* Issel, 1869, but in the latter the axial ribs are fewer, with the interspaces being much wider.

*Rissoina* aff. *sismondiana* Issel, 1869

*Rissoina* aff. *sismondiana* Issel, 1869: 293, pl. V fig. 7.

Station: 8.

Remarks. — The incomplete specimens show the characteristic sharp, very widely placed and vertically aligned axial ribs. No similar species are known, and therefore we list our shells under this name with more confidence than perhaps indicated, despite the fact that no protoconch is preserved.

*Rissoina plicatula* A.A. Gould, 1861

*Rissoina plicatula* A.A. Gould, 1861: 401.

*Costalynia birestes* Laseron, 1956: 397, figs 23-24.

*Rissoina birestes* Laseron, 1956 - Poppe, 2008: pl. 197 fig. 9.

Stations: 14, 60.

Remarks. — A species with planktotrophic larval development. Described from the Ryukyu and Ogasawara Islands, Japan (*Rissoina plicatula*) and Queensland, Australia (*Costalynia birestes*, a subjective junior synonym), and common in the Philippines; only a few old specimens from Maldives stations.

*Apataxia* Laseron, 1956

*Apataxia* Laseron, 1956: 401. Type species, by OD: *A. erecta* Laseron, 1956 = *A. cerithiiformis* Tryon, 1887.

*Apataxia cerithiiformis* (Tryon, 1887) (Figs 25-27)

*Rissoina balteata* Pease, 1870 [sic] - Robertson, 1964: 6 [not of Pease, 1869].

*Rissoina cerithiiformis* "Dunker" Tryon, 1887: 384, pl. 57 fig. 92.

*Apataxia erecta* Laseron, 1956: 401-402, fig. 35.

*Rissoina (Phosinella) balteata* Pease, 1869 - Cernohorsky, 1978: pl. 12 fig. 7 [not of Pease, 1869].

*Rissoina (Apataxia) cerithiiformis* (Tryon, 1887) [sic] - Sleurs, 1993: 105-112.

*Rissoina balteata* Pease, 1869 - Poppe, 2008: plate 197 fig. 4 [not of Pease, 1869].

Stations: 1, 2, 4, 5, 7, 8, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 25, 27, 28, 29, 33, 35, 38, 44, 45, 46, 48, 49, 50, 51, 52,



54, 55, 57, 58, 60, 64, 65, 68, 69, 70, 72, 73, 73 (figured specimen), 74, 75.

Remarks. — A very common species with a very wide occurrence in the whole Indo-Pacific region. *Rissoina balteata* Pease, 1869 is a name sometimes used for this species. However, no type material is known (Johnson, 1994: 7), and it is described as having a varicose outer lip. This character does not match with the genus *Apataxia*.

The protoconch indicates planktotrophic larval development. In the use of the specific epithet we follow Sleurs (1993). In contrast with the opinion of Sleurs (1993), we regard *Apataxia* Laseron, 1956, as a full genus instead of a subgenus of *Rissoina* d'Orbigny, 1840. The former differs from *Rissoina* in not having an incrassate outer lip (a unique apomorphy). Instead, the aperture of adult specimens is reinforced within, with a series of spiral ribs, ending in tooth-like structures. The aperture of adult shells therefore is narrower than in the sub-adult stage. *Apataxia cerithiiformis* is known from Pliocene deposits in Kalimantan (MF pers. obs., material in Naturalis). The Miocene *Rissoina goikulensis* Ladd, 1966 (p. 71, plate 13 fig 29) seems to belong to *Apataxia* as well, as does the next species.

*Apataxia* aff. *eripona* Laseron, 1956 (Figs 28-30)

? *Apataxia eripona* Laseron, 1956: 402, fig. 36.

Station: 73 (figured shell).

Remarks. — Only a single specimen was found. The teleoconch is identical to that of *A. cerithiiformis*. The protoconch, however, is very different, and suggests lecithotrophic larval development. Such a difference was observed by Laseron (1956) when he compared his new species, *Apataxia erecta* (a junior synonym of *A. cerithiiformis*) and *A. eripona*. His illustrations, however, suggest that the protoconch in the type specimens of *A. eripona* is comparatively smaller. We have not been able to make a direct comparison, and therefore we cannot exclude the possibility that *A. eripona*, described from three specimens from Port Moresby, Papua New Guinea, is another non-planktotrophic daughter of *A. cerithiiformis*.

*Phosinella* Mörch, 1876

*Phosinella* Mörch, 1876: 51. Type species, by SD (Nevill, 1885: 73): *Rissoa pulchra* C.B. Adams, 1850.

*Phintorene* Iredale, 1955: 81. Type species, by OD: *Rissoina allanae* Laseron, 1950.

Remarks. — Iredale (1955) compared *Phintorene* only with *Rissoina* and noted the slender form and cancellate sculpture. There is no ground to separate *Phintorene* from *Phosinella*, as *Rissoina allanae* is a *Phosinella* in all aspects.

*Phosinella* aff. *angusta* (Laseron, 1956) (Figs 31-32)

? *Phintorene angusta* Laseron, 1956: 407, fig. 50.

Station: 5 (figured specimen).

Remarks. — This rather small and slender *Phosinella* matches *P. angusta* except for the number of spiral ribs, which is one less than illustrated by Laseron (1956: 407; fig. 50) and in the material seen from Panglao (Philippines; collection MNHN). It could be a different species but one that does not match any other described species. Only a single specimen collected.

*Phosinella bellula* (A. Adams, 1853) (Figs 33-34)

*Rissoina bellula* A. Adams, 1853: 266.

*Rissoina bellula* Adams, 1851 [sic] - Schwartz von Mohrenstern, 1860: 96, pl. VIII fig 60.

Stations: 5, 33, 53, 65, 68 (figured shell), 72.

Remarks. — The sharp, wavy axial riblets are quite characteristic. The protoconch indicates planktotrophic larval development. This species was originally described from the Philippines, Calapan, and has a patchy distribution throughout the Central-West Pacific. The Maldives records constitute a range-extension to the west.

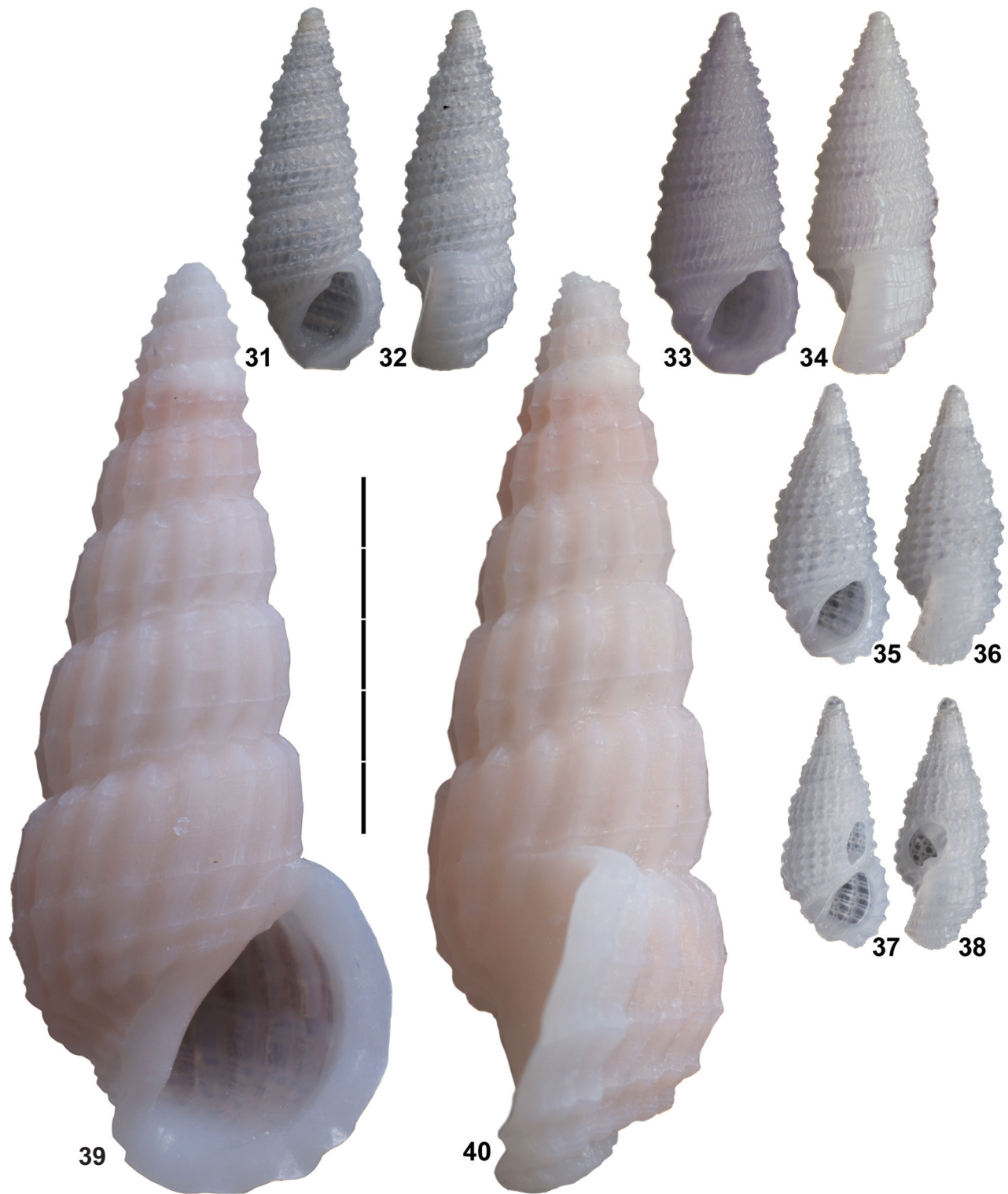
*Phosinella* aff. *seguenziana* (Issel, 1869) (Figs 35-38)

? *Rissoina seguenziana* Issel, 1869: 209-210.

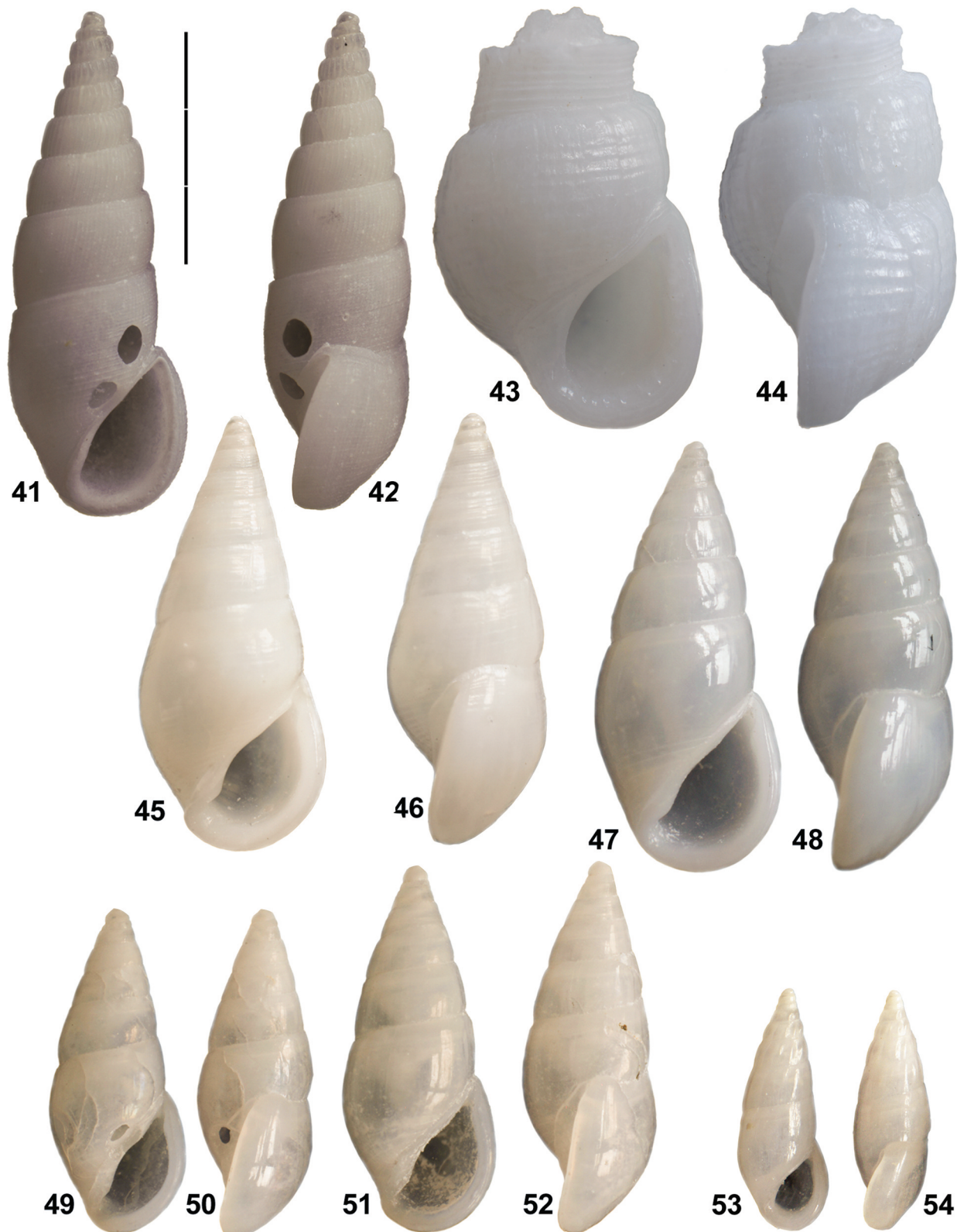
*Rissoina tornatilis* A.A. Gould, 1861 - Poppe, 2008: pl. 198 fig. 1 [not of Gould, 1861].

Stations: 5, 8, 17(?), 17, 19, 23, 27, 28, 38, 44, 47, 50, 52, 55, 58, 65, 73, 74, 75.

Remarks. — The Maldives shells belong to a rather compact group of mostly small *Phosinella* characterized by a nearly smooth protoconch with a sinusigera notch but also with less than 2.5 whorls. The teleoconch is narrow, with rather indistinct sutures. The basal fold is flattened into a basal disk and protrudes as a conspicuous "tooth" at the anterior end of the labrum. The type of *R. seguenziana* Issel, 1869, shows this character, but the shell lacks the early teleoconch



**Figs 31-40.** 31-32, *Phosinella* aff. *angusta* (Laseron, 1956); 5.0 mm (Station 5: Ari Atoll, Magaa Kanduu, sand in cave, 25 m; 19.xi.1996). 33-34, *Phosinella bellula* (A. Adams, 1853); 5.1 mm (Station 68: North Nilandhee Atoll, Filithayo Kanduu, south side near the corner, 03°11'24"3"N; 073°02'35"3"E, 28 m; 11.iii.2007). 35-36, *Phosinella seguenziana* (Issel, 1869); 4.0 mm (Station 73: Felidhee Atoll, Alimatha, Miyaru Kanduu north side, 03°35'58"2"N; 73°30'14"5"E, 15 m; 14.iii.2007). 37-38, *Phosinella seguenziana* (Issel, 1869); 3.6 mm (Station 73: Felidhee Atoll, Alimatha, Miyaru Kanduu north side, 03°35'58"2" N; 73°30'14"5" E, 15 m; 14.iii.2007). 39-40. "*Phosinella*" *sincera* (Melvill & Standen, 1896); 12.9 mm (decollate) (Station 72: Felidhee Atoll, Hurahu Kanduu, west corner entrance, 03°29'14" N; 073°45'48" E, sand bank, 20 m; 13.iii.2007).



**Figs 41-54.** 41-42, *Moerchiella* spec. 1; 6.6 mm (Station 65: Felidhee Atoll, Hurahu Kandu, west corner entrance, 03°29'14"N; 073°45'48"E, sand bank, 16 m; 16.ii.2006). 43-44, *Tomlinella insignis* (A. Adams & Reeve, 1850); 5.4 mm (Station 72: Felidhee Atoll, Hurahu Kandu, west corner entrance, 03°29'14"N; 073°45'48"E, sand bank, 20 m; 13.iii.2007). 45-46, *Sulcorissoina imbricata* (A.A. Gould, 1861); 5.6 mm (Station 49: Vattaruh Atoll, Vattaruh Kandu, east oceanside drop-off, sand in big cave, 36 m; 13.ii.2005). 47-48, *Sulcorissoina stasii* spec. nov.; 5.5 mm (Station 1: Felidhee Atoll, Villingili, Old Shark Point, sand in small caves, 30 m; 16.xi.1994). 49-50, *Sulcorissoina stasii* spec. nov.; 4.2 mm (Station 5: Magaa Kandu, Ari Atoll, sand in cave, 25 m; 19.xi.1996). 51-52, *Sulcorissoina stasii* spec. nov.; 4.7 mm (Station 75: Vattaruh Kandu, Vattaruh Atoll, west side, 03°13'11"N; 073°25'04"E, 12 m 14.ii.2006). 53-54, *Zebina moolenbeeki* spec. nov.; 3.2 mm; Station 72. Felidhee Atoll, Hurahu Kandu, west corner entrance, 03°29'14" N; 073°45'48" E, sand bank, 20 m. 13.iii.2007).

and protoconch whorls. Identification, therefore, is not certain. Other nominal species in this group are *Phosinella tornatilis* (Gould, 1861), *P. hystrix* (Souverbie, 1877), *P. angusta* (Laseron, 1956), *P. decepta* (Laseron, 1956) *P. curtisi* E.A. Smith, 1884, *P. sculpturata* Preston, 1908, and a few others, which for various reasons are less similar to the Maldives shells.

*Phosinella digera* (Laseron, 1956)

? *Rissoina transenna* R.B. Watson, 1886: 620-621, pl. 46 fig. 10.  
*Phintorene digera* Laseron, 1956: 408, fig. 52.

Station: 1.

Remarks. — A common and widespread Indo-Pacific species, with planktotrophic larval development. The adult shell is very small. Possibly a more shallow water species, as only two, not very fresh shells were collected. The type figure of *Rissoina transenna* recalls *P. digera*, but the holotype is now in very bad condition, and synonymy is not certain.

"*Phosinella*" *sincera* (Melvill & Standen, 1896)  
(Figs 39-40)

*Rissoina sincera* Melvill & Standen, 1896: 308, pl. XI fig. 66.  
*Rissoina (Phosinella) clathrata* A. Adams, 1853 - Cernohorsky, 1978: 47, pl. 12 fig. 4 [not of A. Adams, 1853].

Stations: 5, 39, 72 (figured specimen).

Remarks. - Although the sculpture is prominently reticulate, this species does not seem to belong to *Phosinella*. The adult shell is much larger than in other *Phosinella* species, sparsely clathrate, with peculiar rounded axial ribs and poorly developed axial ribs. The early teleoconch whorls are rather globose with deep sutures, and the protoconch is small, brown, and of a planktotrophic type not observed in other planktotrophic *Phosinella* species. A few Indo-Pacific species, including *Rissoina sumatrensis* Thiele, 1925, are similar, and together they may form a genus of their own. More research is needed.

*Moerchiella* G. Nevill, 1885

*Moerchiella* G. Nevill, 1885: 73, 88. Type species, by OD: *Rissoa gigantea* Deshayes, 1848.

? *Moerchiella* spec. 1. (Figs 41-42)

? *Rissoina orbigny* [sic] var. *submarginata* G. Nevill, 1885: 92.

Station: 65.

Remarks. — This species resembles *Rissoina vangoethemorum* Sleurs, 1994, but is more elongate, and the sculpture is weaker. It shows similarity to *Moerchiella dorbignyi* (A. Adams, 1853) but the sculpture is very regular all over the teleoconch and hence on the early teleoconch whorls weaker, and on the body whorl stronger than in most species of *Moerchiella*, except *M. dorbignyi* var. *submarginata* Nevill, 1885 (probably a species distinct from *M. dorbignyi*). Another similar species is *Rissoina millecostata* Garrett, 1873, which, however, shows more pronounced axial ribs. The protoconch is unknown. In our specimen the protoconch is of a planktotrophic type with a deep sinusigera notch, almost the length of a quarter whorl, hence the protoconch has about 2-2¼ whorls, depending on where one starts counting. Such a protoconch has not yet been observed in the genus *Moerchiella* except for *M. striolata* (A. Adams, 1853), which, however, is much larger (see Sleurs, 1993: 103-105). *Moerchiella dorbignyi* (A. Adams, 1853), which we have not seen from Maldives, has a protoconch indicating direct development. Our shell may be an undescribed species.

*Tomlinella* Viader, 1938

*Tomlinella* Viader, 1938: 6. Type species, by monotypy: *T. miranda* Viader, 1938.

*Tomlinella insignis* (A. Adams & Reeve, 1850)  
(Figs 43-44)

*Rissoa insignis* A. Adams & Reeve, 1850: 53, pl. 11 fig. 20.

Stations: 55, 72 (figured specimen).

Remarks. — (Sub)adult specimens are invariably decollate. The protoconch is unusual, sculptured with two strong, irregular spiral ribs. With circa 1.5 whorls, it is of non-planktotrophic larval development. This species has been recorded from Oman to Japan.

*Sulcorissoina* Kosuge, 1965

*Sulcorissoina* Kosuge, 1965: 108. Type species, by OD: *Rissoina imbricata* A.A. Gould, 1861.

*Sulcorissoina imbricata* (A.A. Gould, 1861) (Figs 45-46)

*Rissoa imbricata* A.A. Gould, 1861: 400.

[*Rissoina*?] (*Sulcorissoina*) [*Sulcorissoina*?] *imbricata* Gould - Kosuge, 1965: 108, pl. 15 fig. 5, text figs 9-10.

*Rissoina (Sulcorissoina) imbricata* Gould, 1861 - Cernohorsky, 1978: 44, pl. 12 fig. 9.

Stations: 14, 49, 72.

Remarks. — "*Rissoina imbricata* differs widely from all other *Rissoina* species, except the next, new, species, in having incised spiral grooves only. The shell is peculiarly obese, and the protoconch, which indicates planktotrophic larval development, is lower and wider than in most rissoinids. Only a few shells were collected. Kosuge (1965: 108) made it the type of his new genus; it is here accepted as a full genus.

***Sulcorissoina stasii* spec. nov. (Figs 47-52)**

Rissoidae sp. 3785; <http://vieocean.free.fr/mollusques/Rissoidae2.htm>

*Rissoina (Sulcorissoina) indica* Preston, 1905 (sp. 1315) [http://vieocean.free.fr/mollusques/intro\\_frame.htm](http://vieocean.free.fr/mollusques/intro_frame.htm) [not of Preston].

Stations: 1(3), 2(1), 4(2), 5(3), 7(1), 9(3), 10(1), 13(2), 14(3), 18(1), 34(2), 36(1), 38(1), 43(2), 47(1), 50(2), 52(1), 54(2), 56(2), 65(3), 69(1), 72(3), 74(2), 75(1).

Description of the holotype. — Shell small, oval, translucent to transparent, non-umbilicate. The protoconch consists of two smoothish, glossy whorls; the teleoconch consists of five glossy, moderately rounded whorls, smooth except for a few spiral striae on the base. Aperture D-shaped; posterior sinus narrowly pointed; anterior sinus deflected towards the axis, with labial lip strongly bent anteriorly. Labrum weakly but discernably incrassate. Outer lip slightly opisthocline in profile, at a rather weak 10° angle with the axis.

Type locality. — Maldives: North Male Atoll, Villingili, Old Shark Point, sand in small caves, 30 m. Station 1, 16.xi.1994.

Type material. — The holotype (MNHN IM-2000-32452), and two paratypes (MNHN IM-2000-32453, and coll. Sandro Gori) from the same station.

Other material examined. — See the station list (number of specimens in parentheses).

Distribution. — So far, *S. stasii* spec. nov. is only known from Maldives, and from Réunion. However, the planktotrophic protoconch suggests a more wide-spread occurrence is possible.

Differential diagnosis. — This species differs from *S. imbricata* in lacking the incised spiral grooves on all teleoconch whorls, except on the base. It is also a thinner and more globose shell. The spire is comparatively shorter.

Etymology. — This species is named after Massimo Stasi (Livorno), a bright nature lover and friend of the second author (SG).

Remarks. — On the site [vieocean.free.fr/mollusques](http://vieocean.free.fr/mollusques), there are two specimens figured. One with the name *Rissoina (Sulcorissoina) indica* Preston, 1905. Preston (1905: 6; plate I fig. 24), however, described it

as *Eulima indica*. The original description and illustration suggest a eulimid and are unlike our shells in having more whorls and in being much more slender.

*Zebinella* Mörch, 1876

*Zebinella* Mörch, 1876: 47. Type species, by SD: *Helix decussata* Montagu, 1803 (E. von Martens, 1878: 30).

*Zebinella evanida* G. Nevill & H. Nevill, 1874

*Rissoina evanida* G. Nevill & H. Nevill, 1874: 25-26, fig. 14.

*Zymalata concinna* Laseron, 1956: 417, fig. 75.

*Rissoina concinna* (Laseron, 1956) - Poppe, 2008: pl. 197 fig. 1.

*Rissoina evanida* G. Nevill & H. Nevill - Faber, 2013: 31, figs 43-44.

Stations: 31, 44, 57, 74.

Remarks. — Only a few specimens of this species, which has a planktotrophic larval development, were collected. It is very common in the Philippines and Indonesia.

*Zebinella tenuistriata* (Pease, 1868)

*Rissoina tenuistriata* Pease, 1868: 295-296.

*Rissoina tenuistriata* Pease, 1868 - Cernohorsky, 1978: 44, pl. 12 fig. 3.

*Rissoina striata* Quoy & Gaimard - Poppe, 2008: pl. 198 fig. 9 [not of Quoy & Gaimard, 1832].

Stations: 9, 39, 47, 55, 57, 74, 75.

Remarks. — *Zebinella tenuistriata* is a common species in the Philippines. In the Maldives material it is rare; only a few specimens were present. Perhaps more than one species is present, as most shells are quite small and fragile. The protoconch indicates planktotrophic larval development.

Subfamily Zebininae Coan, 1964

Members of this subfamily are characterized by the lack of an opercular peg and a peculiar sculpture of fine, parallel incised lines on the outer lip (see Sleurs, 1991).

*Pandalosia* Laseron, 1956

*Pandalosia* Laseron, 1956: 391. Type species, by OD: *Pandalosia excelsis* Laseron, 1956.

*Pseudoschwartziella* Bandel, 2006: 103. Type species, by OD: *Pseudoschwartziella jordanica* Bandel, 2006 [= *Pandalosia ephamilla* (R.B. Watson, 1886)].

Remarks. — *Pandalosia* is usually regarded as a synonym or subgenus of *Schwartziella*, but the shells are smaller, more narrow and elongate, and particularly glossy; apparently they lack the irregular microsculptural grooves present in *Schwartziella*. The basal fold is well-developed.

*Pandalosia subfirmata* (O. Boettger, 1887)

*Rissoina* (*Schwartziella*) *subfirmata* O. Boettger, 1887: 126-127, pl. 6 figs 1-1c.

Stations: 1, 5, 11, 21, 44, 50, 55, 58, 72, 74.

Remarks. — A species with planktotrophic larval development. Common in the Central Indo-Pacific. A few specimens.

*Zebina* H. Adams & A. Adams, 1854

*Zebina* H. Adams & A. Adams, 1854: 328. Type species, by SD (Rehder, 1980: 27): *Rissoina semiglabrata* A. Adams, 1853.

***Zebina moolenbeeki* spec. nov. (Figs 53-54)**

Stations: 1(1), 75(1).

Description of the holotype. — Shell small, slender, elongate-conical, with three smooth protoconch whorls and five teleoconch whorls, of which the first few weakly undulate, gradually becoming smooth, except for minute, irregular, incised axial and spiral striae. Whorls flat, sutures indistinct. Base rounded. Aperture elongate, pointed anteriorly and evenly rounded posteriorly, with a shallow siphonal depression. Apertural rim slightly incrassate, the inside with the typical "zebinid" growth lines. Apertural rim weakly opisthocline, at a mean angle of 20° with the axis.

Type locality. — Maldives: Vataruh Kandu, Vataruh Atoll, west side; 12 m, 03°13'11"N; 073°25'04"E. Station 75; 14.II.2006.

Type material. — The holotype (MNHN IM-2000-32451) (locality data see above).

Other material examined. — A second specimen is present from station 1. However, that specimen lacks the protoconch whorls, and therefore it is not regarded as a paratype.

Distribution. — So far, *Z. moolenbeeki* spec. nov. is only known from Maldives, but the planktotrophic protoconch suggests a more widespread occurrence.

Differential diagnosis. — This species differs from all the other species that belong to *Zebina* sensu stricto in its extreme slenderness (Ws/Hs 0.375). The South African *Z. leucophanes* (Tomlin, 1931) is similar but

broader, with the axial ribs more developed and a simple protoconch indicating direct development.

Etymology. — Named after Robert G. Moolenbeek for over 35 years of friendship and support.

Remarks. — This species belongs to *Zebina* sensu stricto, characterized by an opaque shell with wavy early teleoconch whorls. Other "slender" zebinids are more transparent and without wavy ribs. They are better placed in the genus *Iopsis* Gabb, 1873 [type species, by monotypy: *Iopsis fusiformis* Gabb, 1873 = *Rissoina browniana* d'Orbigny, 1842].

*Zebina* spec. 1

Station: 55.

Remarks. — The single shell, which is large for the genus, is characterized by its wide, pyramidal shell. However, it is much worn, and lacks most of the spire. Probably a shallow water species belonging to the group of *Z. tridentata* (Michaud, 1830) and *Z. bidentata* (Philippi, 1844). Given its large width, it probably belongs to the former.

*Zebina* aff. *bidentata* (Philippi, 1845)

*Rissoa bidentata* Philippi, 1845: 64.

Stations: 22, 73.

Remarks. — Two specimens, both lacking the protoconch but otherwise matching Philippi's species. They differ from *Zebina* spec. 1 in being narrower, and less pyramidal.

*Zebina malagazzae* Sleurs & Van Goethem, 2002

*Zebina* (?*Zebina*) *malagazzae* Sleurs & Van Goethem, 2002: 183-187, figs 1a-e, 2.

Stations: 28, 58.

Remarks. — A finely striate species with planktotrophic larval development. It occurs widespread, but is never common. A few not very fresh shells.

**Stosiciinae subfam. nov.**

Members of this subfamily differ from other rissoinids by the presence of a well-marked siphonal notch, an operculum without a peg, and a microsculpture consisting of very typical axial grooves not observed in any other rissoinid (Sleurs, 1996). Especially the latter character is a plesiomorphy of substantial taxonomic weight. Additionally, Sleurs (1996: 120-121) remarked

“...Both the simple operculum and the location of the sperm receptacle at the right side of the bursa copulatrix suggest a closer relationship to *Zebina* s.l. than to *Rissoina* s.l.”. The oldest member seems to be “*Stosicia*” *antiqua* Dockery, 1993, from the Cretaceous of Alabama, which, however, differs from all “modern” Stosiciinae in having predominately axial sculpture, whereas extant species either have spiral or reticulate sculpture. Several well-marked genera can be recognized, but a detailed review falls outside the scope of this paper. Currently we recognize *Stosicia* Brusina, 1870 (see Faber, 2014); *Bittinella* Dall, 1924 (see below); the still nameless Miocene to Recent Caribbean clade containing “*Stosicia*” *aberrans* (C.B. Adams, 1850), “*Cerithium*” *plectrum* Dall, 1915, and a few other species; and *Iselliella* “Nevill” Weinkauff, 1881 (type species, by OD: *Rissoina mirabilis* “Dunker” Weinkauff, 1881), which includes a number of Indo-Pacific species with a relatively strong, reticulate teleoconch including “*Stosicia*” *mirabilis*. The enigmatic, morphologically very deviant “*S.*” *bourguignati* (Issel, 1869) from the tropical Indo-Pacific does not fit in any of the above groups and may be in need of a separate genus.

The next species is not a *Stosicia* Brusina, 1870 (type species: *Rissoa buccinalis* Grateloup, 1828, by monotypy) but belongs to the genus level taxon *Bittinella* Dall, 1924, with at least four extant species in the Indo-Pacific. Members differ from *Stosicia* in various characters, including the thin, turruculate and reticulate shell and the wide, open siphonal notch.

#### *Bittinella* Dall, 1924

*Bittinella* Dall, 1924: 89. Type species, by monotypy: *Bittium hiloense* Pilsbry & Vanatta, 1908.

#### *Bittinella lochi* (Sleurs, 1996)

*Stosicia lochi* Sleurs, 1996: 146-147, figs 6D, 17D-I.

Uncommon. The small protoconch is of a planktotrophic type. The very similar *Bittinella hiloensis* (Pilsbry & Vanatta, 1908) has a protoconch indicating direct development and is probably endemic to Hawaii. *Bittinella lochi* is common in the Central Indo-Pacific.

Stations: 4, 10, 13, 14, 25, 55, 65.

#### DISCUSSION

With a total of 30 species, the Maldives infralittoral cannot be regarded as particularly species-rich. Similar habitats around Panglao (Central Philippines) pro-

duced about two times as many rissoinid species. This may be partly explained by a more limited collecting method, basically hand-collecting of sediments, whereas in Panglao much sampling was done by other techniques, such as the use of lumen lumen nets, but it seems likely that Maldives has fewer species for other reasons. In particular the genera *Zebina*, *Zebinella*, *Stosicia* and *Phosinella* are poorly represented. This may be coincidental. More interesting is the near lack of species with direct larval development; a dispersal strategy that appears to be quite uncommon in this isolated, oceanic island group. Only *Tomlinella insignis* A. Adams & Reeve, 1850, and *Zebina bidentata* (Philippi, 1844) have a protoconch indicating direct development.

Robertson (1964: 6) reports the occurrence of *Rissoina plicata* A. Adams, 1853, a dubious species, based on worn shells, lacking the protoconch, and *R. exasperata* Souverbie, 1866. The latter is a species of *Phosinella* with direct larval development. It is not present in our material. Since Robertson (1964) separately records a “*Phosinella* sp.”, we assume that his *R. exasperata* is a misidentification.

The near absence of “direct developers” is peculiar. Given the large area of shallow water environments, the sustainability threshold does not seem too high to defer non-planktotrophic species from permanent settling – far smaller archipelagos and islands do have endemic rissoinid species [e.g. St. Helena (mid-Atlantic), Rapa (south Pacific), and the Revillagigedos (eastern Pacific)]. Nor does the seamount on which the Lakshadweep, Maldives, and Chagos archipelagos are situated appear to be too young, or for a paleontologically too short period above sea-level, to develop an endemic rissoinid fauna. We cannot offer a good explanation for this phenomenon.

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