

***Phaenomenella*, a new genus of deep-water buccinid
(Gastropoda: Buccinidae)
with the description of a new species from Taiwan**

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ABSTRACT. The radula of *Manaria inflata* Shikama, 1971 is studied and found to differ from both *Manaria* Smith, 1906 and *Eosipho* Thiele, 1929. The new genus *Phaenomenella* gen. nov. is described to accommodate this species and *Aulacofusus insulapratasensis* Okutani & Lan, 1994. Another species with identical radula, but different in sculpture and shape is described as *Phaenomenella angusta* sp. nov.

INTRODUCTION

The Indo-Pacific deep water Buccinidae are the subject of confusion because of the great display of shell shape. Most genera are small, many species are rare, and little material is available for comparative studies. Consequently the generic placement of many species was tentative, based on available data.

Bouchet and Warén (1986) revised the known tropical deep-water Buccinidae, arranged them into generic entities useful for further study and listed all newly described suprageneric names for a better understanding of the matter. The genus *Manaria* Smith, 1906 is well discussed in their paper, with several new discoveries described.

Since then, new material has become available for study, revealing the presence of a separate generic radiation. The genus *Phaenomenella* gen. nov. is described to accommodate *Manaria inflata* Shikama, 1971, *Aulacofusus insulapratasensis* Okutani & Lan, 1994 and *Phaenomenella angusta* sp. nov.

The material reported on in the present study originates from:

- (a) TAIWAN 2000 expedition conducted by MNHN and NMNS;
- (b) Japanese fishermen from Kyushu (Japan) trawling in the South China Sea and around Taiwan, 800-900 m deep, between 1980 and 1990;
- (c) Taiwanese fishermen trawling around Taiwan.

Abbreviations

CHA: Collection Charles Angrand, Vertou, France
JCH: Collection Jens & Christa Hemmen, Germany
KF: Collection Koen Fraussen, Belgium

MNHN: Muséum national d'Histoire naturelle, Paris, France

NMNS: National Museum of Natural Science, Taichung, Taiwan

ZSI: Zoological Survey of India, Calcutta, India

CP: (chalut à perche) beam trawl

dd: empty shell, dead collected

juv.: juvenile or subadult specimen

lv.: collected alive

SYSTEMATICS

BUCCINIDAE Rafinesque, 1815

Genus *Manaria* Smith, 1906

Manaria Smith (1906: 167). Type species: *Manaria thurstoni* Smith, 1906 (type locality: "Gulf of Manar", India) by original designation (Fig. 23).

Remarks. The genus *Manaria* Smith, 1906 is characterized by a high spire and rather short base, a deep suture, slightly flattened whorls with a weak subsutural truncation, an evenly sized spiral sculpture consisting of broad flat cords with narrow interspaces, a paucispiral protoconch, a thick columellar knob and a buccinid radula with tricuspid central tooth with angular base and bicuspid lateral teeth of which the outer cusp is larger. A study to ascertain the correct generic placement of all *Manaria* species is still ongoing. A revision is beyond the scope of this paper.

Eosipho Thiele, 1929 (type species: *Chrysodomus (Sipho) smithi* Schepman, 1911, type locality: 01°58'N, 125°00'E, 1165-1264 m, Siboga stn 122, Celebes Sea, Indonesia) (Figs 14-15) is similar to *Manaria* in spiral sculpture and radula, but differs in lacking of a subsutural truncation, and in having a

smooth columella (without knob) and convex whorls. The species of *Eosipho* usually have a short spire and oval shape.

For differences with *Phaenomenella* gen. nov. we refer to the comparison under that genus.

***Phaenomenella* gen. nov.**

Type species. *Manaria inflata* Shikama, 1971 (type locality: Taiwan) (Figs 1-2).

Description. Shell thin, snow white, of medium size (up to 40 mm). Shape usually oval. Protoconch paucispiral, flattened, with an angular carina partly concealed under suture. Apical teleoconch whorls angulate with strong axial ribs on shoulder. All whorls densely covered with strong spiral cords, usually of equal size. Interspaces narrow and deep. Aperture ovate, apically pinched, lip usually thick. Columella smooth, gently twisted. Siphonal canal short, broad, open.

Operculum corneous, pale brown. Shape ovate, abapically pointed with terminal nucleus, filling aperture.

Periostracum thin, smooth, greyish, well-adherent.

Radula typically buccinid (Figs 18, 20). Central tooth tricuspid with broad quadrangular base, lateral teeth tricuspid with large outer cusp and small middle cusp.

Remarks. This new genus is characterized by a paucispiral protoconch, an oval shape with oval aperture and thickened lip (when adult), a smooth periostracum and a radula with a peculiar central tooth (base broad and quadrangular) and tricuspid lateral teeth with sharp cusps.

Manaria Smith, 1906 differs by the deep suture, the slightly flattened whorls with a weak subsutural truncation and by the presence of a columellar knob. The radula differs by the central tooth with longer cusps and narrower base and by the bicuspid lateral teeth.

Eosipho Thiele, 1929 (Figs 14-15) differs in having smoother spiral cords. The radula differs by the central tooth with longer cusps and narrower base and by the bicuspid lateral teeth.

Recent species belonging to *Serratifusus* Harasewych, 1991 (type species: *Fusus craspedotus* Tate, 1888 from the Miocene of southeast Australia) have an almost identical radula, especially the shape of the

central tooth, but differ by the columbariid shape of the shell.

"Manaria" callophorella Fraussen, 2004 (type locality: between Taiwan and Japan, 800-900 m deep, trawled by fishermen from Kyushu, Japan) (Figs 16-17, 25) is sympatric with *Phaenomenella angusta* sp. nov. and *Eosipho smithi* (Schepman, 1911). It is similar to *Phaenomenella* gen. nov. in shape and sculpture, but differs in having a protoconch with a more spherical top (instead of flattened), axial ribs which are shouldered close to the suture (instead of an angulated whorl), a shallow sutural canal and a hairy periostracum. The radula is still unknown.

Range and habitat. *Phaenomenella* species are known from Taiwan and South China Sea only. They live in deep water (155-900 m) on sandy and muddy bottom. The following species are assigned to the new genus: *Phaenomenella inflata* (Shikama, 1971) comb. nov., *Phaenomenella insulapratasensis* (Okutani & Lan, 1994) comb. nov. and *Phaenomenella angusta* sp. nov. which is described below. No fossil species have yet been recognized as belonging to this genus.

Etymology. *Phaenomenella* is named after the Greek expression *phainomenon*, latinized as *phaenomenon* (noun, neutrum) (or *phaenomena* plural) meaning "an appearance", in modern languages also used for "something extraordinary", which refers to the exceptionally beautiful shape of these shells, with the diminutive suffix *-ella* (Latin) which refers to the small size.

***Phaenomenella inflata* (Shikama, 1971)
comb. nov.**

Figs 1-5, 18-19

Manaria (?) *inflata* Shikama, 1971: 31, pl. 3, figs 7-8 (type locality: Taiwan).

Material examined. South China Sea, Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, 1 lv., MNHN. - Off Da-Lie, trawled by fishermen, 1 lv., KF nr. 3260.

Eastern Taiwan, off Suao, trawled by fishermen, 190 m, 1 lv., KF nr. 0524. - Off Pheng-hu Islands (Pescadores Islands), trawled by fishermen, 155 m, 1 lv., KF nr. 2835.

Figures 1-9

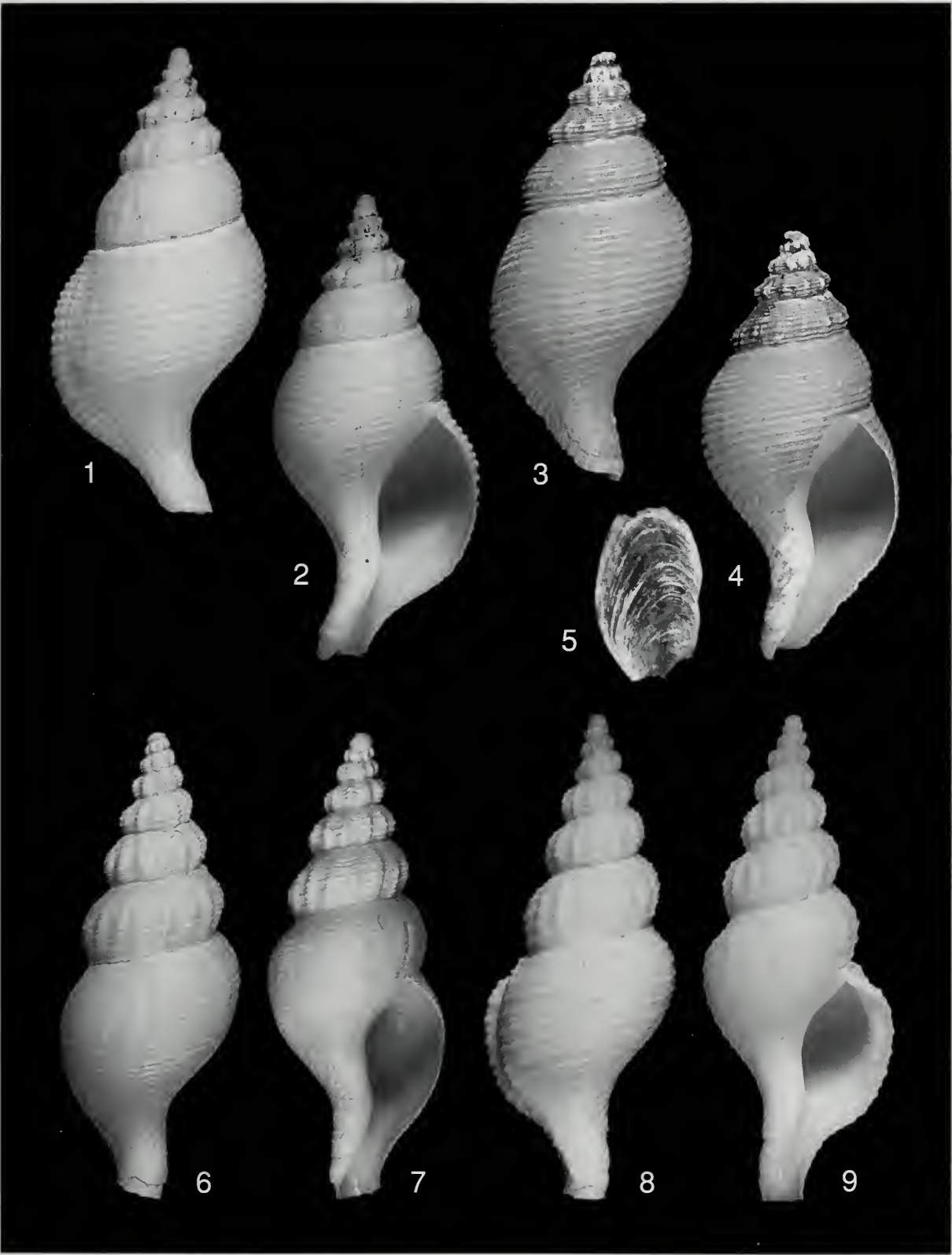
1-5. *Phaenomenella inflata* (Shikama, 1971) comb. nov.

1-2. Taiwan, off Suao, dredged, 190 m, 33.8 mm, KF nr. 0524; 3-5. Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, 30.5 mm, operculum, 6.9 mm, MNHN.

6-9. *Phaenomenella angusta* sp. nov.

6-7. Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, holotype, 29.9 mm, NMNS-5070-001.

8-9. South China Sea, trawled by Japanese fishermen from Kyushu, 800-900 m, paratype 2, 34.6 mm, KF nr. 3459.



Range and habitat. *Phaenomenella inflata* comb. nov. is known from off Taiwan only. It lives in moderately deep water (155-326 m) on sandy and muddy bottom.

Remarks. Shape broad, inflated. Apical teleoconch whorls angulate, with strong axial ribs on shoulder. Penultimate and body whorl densely covered with strong spiral cords, interspaces of equal size.

Radula typically buccinid, central tooth tricuspid with quadrangular base, lateral teeth tricuspid with large outer cusp and small middle cusp.

For differences with *Phaenomenella insulapratasensis* (Okutani & Lan, 1994) we refer to the remarks under that species.

Phaenomenella insulapratasensis

(Okutani & Lan, 1994) comb. nov.

Figs 10-13, 22

Aulacofusus insulapratasensis Okutani & Lan, 1994: 1-3, figs 1-4 (type locality: Pratas Islets (Reef), South China Sea, 300 m deep).

Material examined. South China Sea, Vietnam, trawled by Taiwanese fishermen, 3 lv., KF nr. 1495, 3259, 3260. - Trawled by Russian shrimpers, 1 lv., KF nr. 1372.

Range and habitat. *Phaenomenella insulapratasensis* comb. nov. is known from off Vietnam. Specimens trawled by Taiwanese fishermen are often said to come from off Taiwan. It lives in moderately deep water on sandy and muddy bottom.

Remarks. Shape broad, inflated. Apical teleoconch whorls angulate, with strong axial ribs on shoulder. All whorls densely covered with sharp spiral cords, interspaces broad and of equal size.

Radula, published by Okutani & Lan (1994: 2, fig. 4), identical to *Phaenomenella inflata*, typically buccinid, central tooth tricuspid with quadrangular base, lateral teeth tricuspid with large outer cusp and small middle cusp.

Phaenomenella inflata is similar in shape and spiral sculpture, but differs in having a shell that is slightly more slender, not as heavy and solid, with convex whorls, smoother spiral cords, slender protoconch and longer siphonal canal.

Phaenomenella angusta sp. nov.

Figs 6-9, 20-21

Type material. Holotype (29.9 mm) (TAIWAN 2000, stn CP27) in NMNS-5070-001. Paratype 1 (28.9 mm) (TAIWAN 2000, stn CP27) in MNHN Moll 7058. Paratypes 2-3 (34.6, 28.7 mm) in KF nr. 3459, 4954. Paratype 4 (34 mm) in CHA.

Type locality. South China Sea, Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m.

Material examined. South China Sea, Taiwan: TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, 1 lv. juv., 1 dd juv., MNHN Moll 7058, NMNS-5070-001 - Northeast Taiwan, dredged, 200 m, 1 lv., CHA.

East China Sea, between Taiwan and Japan, exact data not available, but most probably along Nansei-Shoto ridge, trawled by Japanese fishermen from Kyushu, 800-900 m, 2 lv., KF nr. 3459.

Range and habitat. Known from 200-326 m deep off Taiwan, and 800-900 m deep between Taiwan and Japan. Sympatric with *Phaenomenella inflata* at TAIWAN 2000 stn CP27. Sympatric with "*Manaria*" *callophorella* and *Eosipho smithi* between Japan and Taiwan.

Description. Shell up to 34.6 mm high, thin but solid. Shape slender, fusiform, with high spire. 6 1/2 to 7 round, convex, rather inflated teleoconch whorls. Suture deep. Snow-white, occasionally pale brown (CHA), semi-transparent, surface glossy.

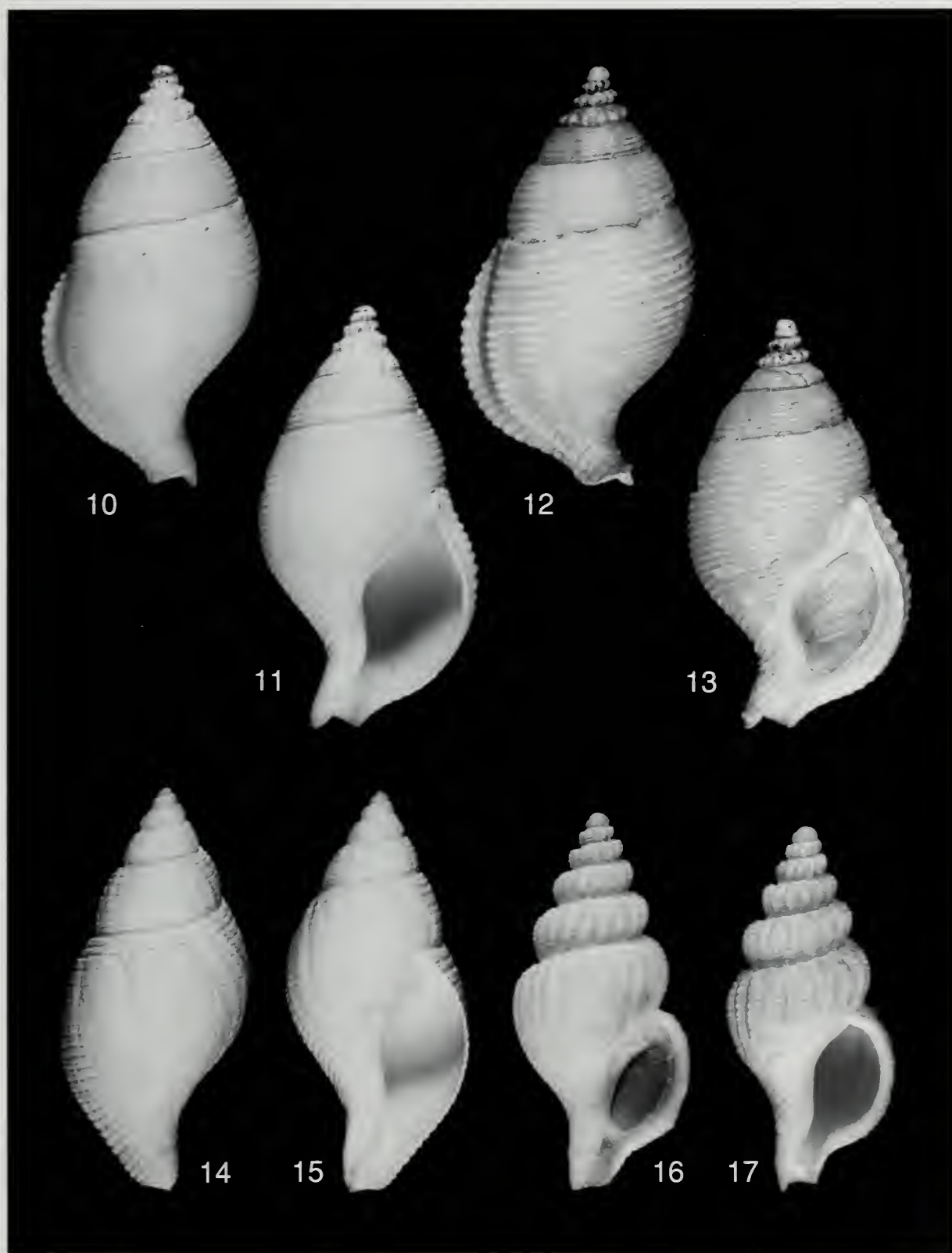
Protoconch (Fig. 21) paucispiral, consisting of about one whorl, tip flattened, whorl slightly conical, glossy, smooth.

5 or 6 fine spiral cords on first teleoconch whorl, subsutural cord strongest (paratype 1), interspaces of equal size. 6 or 7 spiral cords on second whorl, interspaces slightly wider. From third whorl on some additional fine secondary spiral cords appear, growing as strong as primary cords towards fourth or fifth whorl. About 16-18 equal-sized spiral cords on penultimate, 39-41 on body whorl, occasionally alternating broad and fine, interspaces broader abapically.

Figures 10-17

10-13. *Phaenomenella insulapratasensis* (Okutani & Lan, 1994) comb. nov.

10-11. off Vietnam, trawled by Taiwanese fishermen. 39.2 mm, KF nr. 1495; 12-13. same locality, 26.0 mm, KF nr. 3260; **14-15.** *Eosipho smithi* (Schepman, 1911). South China Sea, between Taiwan and Japan, trawled by Japanese fishermen from Kyushu, 800-900 m, 45.0 mm, KF nr. 3460; **16-17.** "*Manaria*" *callophorella* Fraussen, 2004; 16. paratype 3, South China Sea, between Taiwan and Japan, trawled by Japanese fishermen from Kyushu, 800-900 m deep, 21.3 mm, JCH; 17. paratype 4, South China Sea, Helen Bank, 500 m, 19.9 mm, KF nr. 2833.



13 or 14 axial ribs on first teleoconch whorl, early ribs weak, later stronger, interspaces of equal size. 10 strong axial ribs on second and third whorl, 16 on penultimate whorl, body whorl almost smooth.

Aperture ovate. Columella smooth, gently twisted. Parietal callus thin, glossy, smooth. Outer lip thin when subadult, adult specimens with thick labral varix, outer lip with about 18 internal lirae within. Siphonal canal slightly twisted toward dorsum.

Operculum thin, corneous, pale brown. Shape oval, abapically pointed with terminal nucleus, filling aperture.

Radula (Fig. 20) typical of genus, central tooth tricuspid with quadrangular base, lateral teeth tricuspid with large outer cusp and small middle cusp.

Remarks. *Phaenomenella angusta* sp. nov. is characterized by its slender shape with slightly inflated whorls, and its wide aperture with broad lip. However atypical in shape, the generic placement is based on protoconch morphology, the sculpture of the adapical whorls and on the radula, which is identical to *Phaenomenella inflata* (Fig. 18).

Etymology. Derived from the Latin *angustus* (adjective), meaning “slender”, which refers to the shape of the species.

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Figures 18-25

18-19. *Phaenomenella inflata* (Shikama, 1971) comb. nov. 18. radula, scale bar 120 µm, Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, MNHN; 19. protoconch, Taiwan, off Suao, KF nr. 0524; **20-21.** *Phaenomenella angusta* sp. nov. 20. radula, scale bar 120 µm, Taiwan, TAIWAN 2000, stn CP27, 22°13,3'N, 120°23,5'E, 326 m, paratype 1 MNHN Moll 7058; 21. protoconch of holotype, same locality; **22.** *Phaenomenella insulapratasensis* (Okutani & Lan, 1994) comb. nov., protoconch, off Vietnam, trawled by Taiwanese fishermen, KF nr. 1495; **23-24.** *Manaria thurstoni* Smith, 1906. 23. Holotype, ZSI nr. M3727/1, 06°31'N, 19°39'E, 730 m, 30.1 mm, after Bouchet & Warén (1986: fig. 86); 24. radula, after Bouchet & Warén (1986: fig. 22); **25.** “*Manaria*” *callophorella* Fraussen, 2004, protoconch of holotype, between Taiwan and Japan, 800-900 m deep, trawled by fishermen from Kyushu, Japan, MNHN.

