

Three new costellarid species from Japan, Papua New Guinea and other Indo-Pacific locations (Neogastropoda: Muricoidea: Costellariidae)

Hans TURNER¹ & Richard SALISBURY²

¹ CH-6821 Rovio, Switzerland; hturner@tinet.ch

² 8807 Craydon Dr., Boise, Idaho 83704 USA; richsali@micron.net

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ABSTRACT. *Vexillum (Costellaria) nodai* n. sp. (Figs 1–4) is described from Japan, the Philippines, Hawaii and South Africa; it is compared to *Vexillum (Costellaria) kurodai* (Sakurai & Habe, 1964). *Vexillum (Costellaria) leforti* n. sp. (Figs 8–11) is described from Japan and the Philippines; it is compared to *Vexillum (Costellaria) alvinobalani* Suduiraut, 1999 and *V. (C.) filistriatum* (G. B. Sowerby II & III, 1874). *Vexillum (Costellaria) beverlyae* n. sp. (Figs 15–20) is described from Papua New Guinea, the Philippine and Solomon Islands; it is compared to *Vexillum (Pusia) festum* (Reeve, 1845), *V. (C.) leforti* n. sp. and *V. (C.) alvinobalani* Suduiraut, 1999.

INTRODUCTION

Two new costellarid species have been collected in lobster nets from Wakayama Prefecture, Japan. These same species have also been collected in widely distributed locations across the Indo-Pacific. A third new costellarid species has been collected off Rabaul and Nordup, East New Britain, Papua New Guinea. It has been known to the authors for more than 10 years. Only recently have additional specimens come to our knowledge, partially from Indo-Pacific locations widely apart from the original place of discovery.

ABBREVIATIONS

ANSP: Academy of Natural Sciences, Philadelphia, PA
 BMNH: Natural History Museum, London
 MNHN: Muséum national d'Histoire naturelle, Paris
 NSMT: National Science Museum, Tokyo
 ZMA: Zoological Museum, Amsterdam

SYSTEMATICS

Family COSTELLARIIDAE MacDonald, 1860

Genus *Vexillum* Röding, 1798

Subgenus *Costellaria* Swainson, 1840

Type species by monotypy: *Mitra rigida* SWAINSON, 1821 = *Mitra semifasciata* Lamarck, 1811 = *Vexillum (Costellaria) semifasciatum* (Lamarck). Recent. Indo-Pacific.

Vexillum (Costellaria) nodai n. sp.

Figs 1–4

Mitropifex kurodai (young specimen): Kuroda, Habe & Oyama, 1971: 192, pl. 53, fig. 6 (non *Mitropifex kurodai* Sakurai & Habe, 1964)

Type material. Holotype (Figs 1–2) 30.25 x 9.70 mm (aperture length 12.95 mm) at the type locality taken alive, ex coll. Mr. K. NODA; deposited in ANSP (# 402017). Paratype # 1 (30.61 x 10.88 mm, aperture 14.56 mm) from the type locality; in coll. K. NODA. Paratype # 2 (24.4 x 9.7 mm, aperture 11.5 mm) from Cebu, Philippines; in coll. Mr. J. C. MARTIN (# 2659). Paratype # 3 (23.9 x 9.0 mm, aperture 11.3 mm) from off Balicasag Island, Bohol, Philippines; in coll. Mr. E. G. de SUDUIRAUT (# 1006). Paratype # 4 (Figs 3–4) (30.64 x 9.86 mm, aperture 13.04 mm) from off Park Rynie, southern kwaZulu-Natal, South Africa, dredged fresh dead at approximately 150 m depth by G. SMITH, May 1994; in coll. Mr. M. LUSSI. Paratype #5 (24.15 x 9.64 mm, aperture 11.16 mm) from off Balicasag Island, Bohol, Philippines, tangle nets 140 m, May 1998; in coll. Mr. Al DEYNZER. Paratype #6 (11.61 x 4.88 mm, aperture 5.10 mm) from off Pokai Bay, Oahu, Hawaii, dredged by A. Adams, May 19, 1976; in coll. R. Salisbury.

Other material studied. A badly broken and dark stained specimen 34.40+ (portion of spire missing) x 11.55 mm, aperture 15.23 mm; in coll. Mr. K. NODA.

Type locality. Off Cape Kirime, Kii peninsula, Wakayama Prefecture, Central Honshu, Japan, in 80–90 m (alive in lobster nets).

Distribution and habitat. Japan, Philippine Islands, Hawaii and South Africa. In the Philippines the species was collected dead on sand and broken coral in 80–180 m. In Hawaii, the species was collected dead in mud and sand in 110–130 m. In South Africa the species was collected fresh dead on a rubble and sponge substrate in ca. 150 m.

Etymology. Named after Mr. Kazutaka Noda, Gobo Town, Wakayama Prefecture, Japan. — A new common Japanese name is here designated: Atsumifude-gai (Atsumi's Mitre); this name refers to Mr. Noda's daughter Atsumi.

Description. Shell large, to approximately 35 mm in length. Elongate-fusiform. Protoconch unknown. Whorls number 8–10; spire outline nearly straight; sutures well defined; early spire whorls sculptured with 12–17 large, rounded, longitudinal ribs, first few spire whorls bear 6 or 7 equally spaced, strong spiral grooves confined to bottom of interspaces; on later whorls, spiral grooves become strong enough to weakly bisect the longitudinal ribs; body whorl with 20–27 large, round longitudinal ribs; ribs on body whorl found in single, paired and even triple sets; 17–19 spiral grooves, weakly bisecting the ribs, body whorl ribs extend to rostrum where they are interrupted by 4 or 5 rows of strong nodulose cords; first of these cords white, very large, occasionally split into two cords, separated from subsequent cords by wide, deep, open trench; remaining 3 or 4 cords brown, large, widely spaced. Columella with 4 very strong folds or teeth. Aperture narrow, length less than half total shell length; interior white, strongly lirate; siphonal notch moderately wide, slightly recurved; outer lip thin, simple and rounded, a few weak crenulations near siphonal notch. Shell dark-brown, with varying number of yellowish-white bands; on each whorl largest yellowish-white band divided by thin dark-brown spiral thread lying in posterior 1/3 of band; body whorl with white pustulose cord emerging just above largest columellar fold.

Discussion. This new species is larger than most members of the subgenus *Costellaria*. It was erroneously illustrated as a young or immature specimen of the Japanese species *Mitropifex kurodai* Sakurai & Habe, 1964. The two species are roughly the same size and have about as many longitudinal ribs

(Figs. 5–7). However, the spiral grooves of *M. kurodai* are much deeper, wider, and do not bisect the ribs. Adult specimens of *M. kurodai* have a small but prominent parietal callus near the anal sulcus which is not seen in this new species. The overall colour pattern of *M. kurodai* is orange-yellow with three narrow white bands on the body whorl. There is no hint of a spiral thread in any of the white bands. This colour pattern contrasts sharply with the dark-brown and yellowish-white bands of *V. nodai* n. sp.

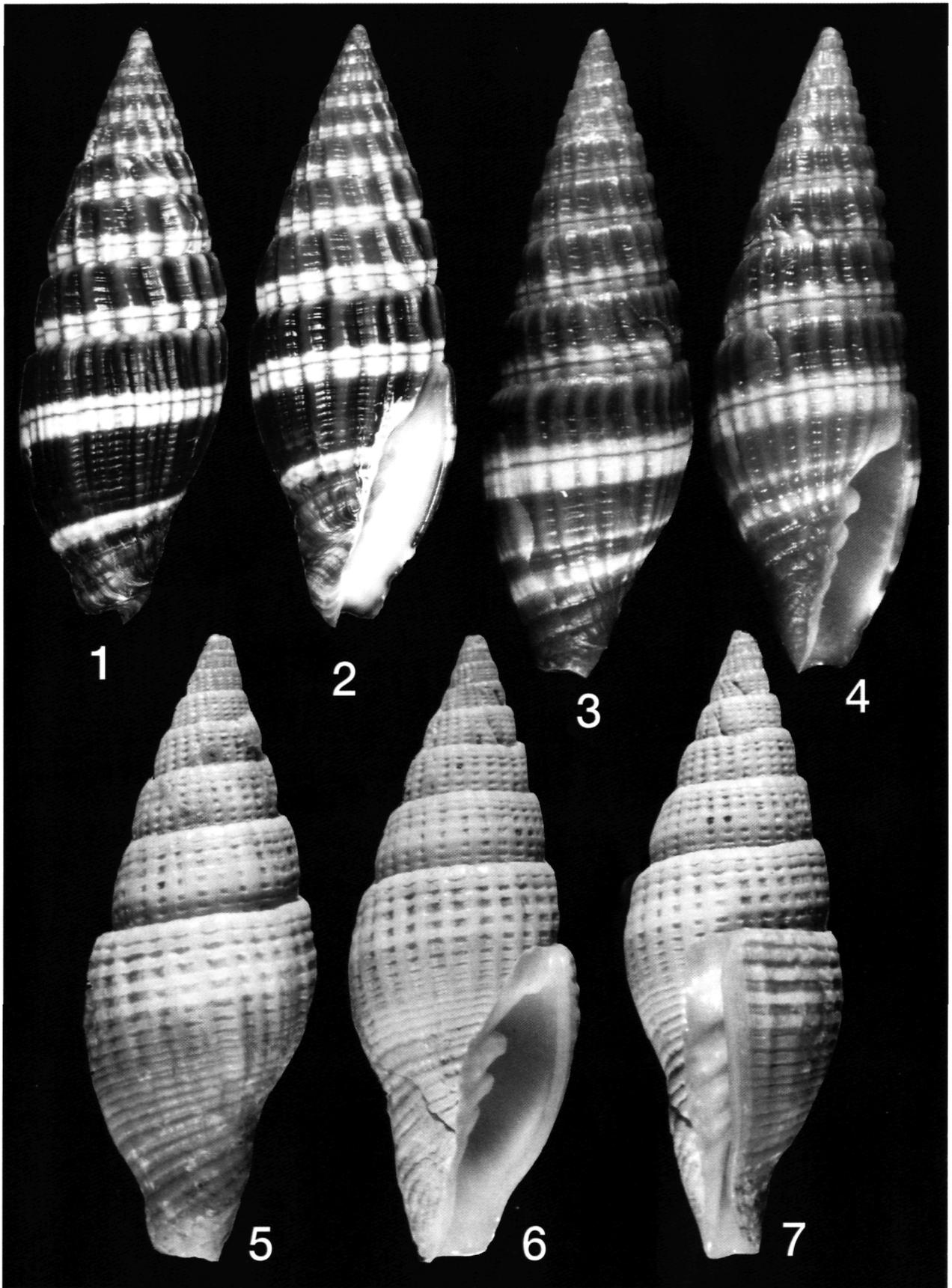
Like many other Japanese species it is also found in the Philippines in deep water. Remarkably, a live specimen of *V. nodai* (paratype # 4, Figs 3–4) was collected off Natal, South Africa, extending the species' range across the Indian Ocean. The South African specimen is slightly more slender than those found in Japan and the Philippines.

Vexillum (Costellaria) leforti n. sp.
Figs 8–11

Type material. Holotype (Figs 8–9) 19.94 x 6.18 mm (aperture length 8.58 mm) at the type locality collected alive, ex coll. Mr. K. NODA; deposited in ANSP (# 402018). Paratype # 1 (19.90 x 6.05 mm, aperture 8.58 mm) from the type locality; in coll. Mr. K. NODA. Paratype # 2 (Figs 10–11) 19.9 x 6.1 mm (aperture 8.5 mm) from off Panglao Island, 140–150 m depth, Bohol, Philippines, collected by native fisherman in tangle net; ex coll. Mr. J. P. LEFORT (#1376); deposited in BMNH (# 19990434). Paratype # 3 (18.7 x 6.2 mm, aperture 8.0 mm) from the Cebu area, Philippines, ex coll. S. MARTIN, 1990; now in ZMA (Moll. 3.99.043). Paratype # 4 (16.6 x 5.7 mm, aperture 7.8 mm) from the Cebu area, Philippines, ex coll. S. MARTIN, 1990; now in ZMA (Moll. 3.99.044). Paratype #5 (17.21 x 5.67 mm, aperture 7.61 mm) from off Balicasag Island, Bohol, Philippines; in coll. Mr. E. G. de SUDURAUT. Paratype # 6 (16.4 x 5.5 mm, aperture 7.1 mm) from off Balicasag Island, Bohol, Philippines, tangle nets in depth 160 to 180 m, August 1998; in coll. senior author (H. T.). Paratype # 7 (15.8 x 4.9 mm, aperture 6.8 mm) from Bohol, Philippines, deep water, 1986, ex H. FISCHÖDER; in coll. Dr. T. W. BAER. Paratype # 8 (14.0 x 4.5 mm, aperture 6.5 mm) from Bohol Straits, Philippines, deep water; in coll. Mr. M. P. MARROW.

Type locality. Off Cape Kirime, Kii peninsula, Wakayama Prefecture, Central Honshu, Japan, in 80 m (in lobster nets).

Figs. 1–4. *Vexillum (Costellaria) nodai* n. sp. Figs. 1–2. Holotype, ANSP #402017 (30.25 x 9.70 mm) ex coll. K. NODA; Japan, Honshu, Wakayama Pref., Kii peninsula, off Cape Kirime, in 80–90 m collected alive. Figs. 3–4. Paratype # 4 (30.64 x 9.86 mm) coll. M. Lussi; South Africa, Southern kwaZulu-Natal, off Park Rynie, in 150 m dredged fresh dead. **Figs. 5–7.** *Mitropifex kurodai* Sakurai & Habe, 1964, figured paratype NSMT-Mo 39797 (32.0 x 11.7 mm); Japan, Shikoku, Kochi Pref., off Ashizuri-Misaki, about 200 m depth.



Distribution and habitat. Japan (at the type locality found alive) and Central Philippines (Cebu and Bohol area, deep water; paratype # 6 collected dead on sand among volcanic stones, in 160–180 m).

Etymology. Named after Mr. Jean Paul LEFORT, Maeva, Huahine Island, French Polynesia, who was very generous in providing extensive material of uncommon and new mitriform species to H. T. for studies. — A new common Japanese name is here designated: Nanase-fude-gai (Nanase's Mitre); this name refers to Mr. NODA's daughter Nanase.

Description. Shell of medium size to 20 mm in length. Fusiform-elongate; spire sharply acuminate. Conoidal protoconch of 3 glassy white whorls, basal diameter 0.6 mm. Teleoconch whorls number 8 or 9, spire whorls slightly convex in outline, sutures form a narrow flat ledge, early whorls with 12–21 longitudinal ribs; ribs weakly bisected by indistinct subsutural groove, interspaces with 3–8 deep spiral grooves; later spire whorls bisected by wide, shallow grooves, forming nodulose regions along tops of ribs; ribs appear almost vertebrate in shape; body whorl with 25–29 longitudinal ribs, subsutural groove obsolete, bisected by 15–18 deep spiral grooves giving the shell a pustulose appearance. Aperture narrow, strongly lirate within, white with brown band, length less than half total shell length; outer lip thin, finely crenulated along margin, margin outline curves gently, margin straight at anterior section near siphonal notch; columella with 4 folds; largest folds may have groove along top of tooth. Shell white, early whorls light-brown, the 3rd and 4th whorls decorated with dark-brown spots and dashes, later whorls occasionally spotted dark-brown; body whorl white with large brown band at centre; occasionally small light-brown spot at intersection of spiral grooves and ribs; on some specimens these spots fill several spiral intersections forming a spotted line at the periphery of the shell, or the light-brown spots may be scattered randomly over the upper body whorl.

Discussion. This new species could be confused with *Vexillum (Costellaria) alvinobalani* Suduiraut, 1999 (Figs 12–13). Both species are found in deep water off the Philippines and have white shells with brown bands. However, both species may be easily distinguished since *V. leforti* is much smaller (adult shells 20 mm in length, whereas *V. alvinobalani* grows

to a comparatively large size of 35 mm). Furthermore the shell base of *V. leforti* is truncated (not distinctly elongated as in *V. alvinobalani*). The colour pattern is also quite different: *V. leforti* does not show a subsutural brown band nor a brown shell base as in *V. alvinobalani*; in addition, light-brown coloured early whorls, some with dark-brown spots and dashes (a very distinctive character of *V. leforti*) are not found in *V. alvinobalani*.

V. leforti n. sp. resembles superficially *V. filistriatum* (G. B. Sowerby II & III 1874) (Fig. 14) with which it has been confused by collectors. *V. filistriatum* is indeed similar in size (holotype is 16.7 mm in length) and shows likewise a white shell with a brown subperipheral zone on the body whorl. *V. filistriatum* differs, however, by a more coarse and clathrate sculpture and by a very distinctive colour pattern with quadrangular brown blotches mainly on the periphery of the whorls. This brown colour pattern, scarcely noticed on the worm and faded holotype (not illustrated), is fairly well developed on fresh specimens (Fig. 14; CERNOHORSKY 1978: pl. 36, fig. 7; PECHAR & al. 1980: pl. 31, figs 13–14).

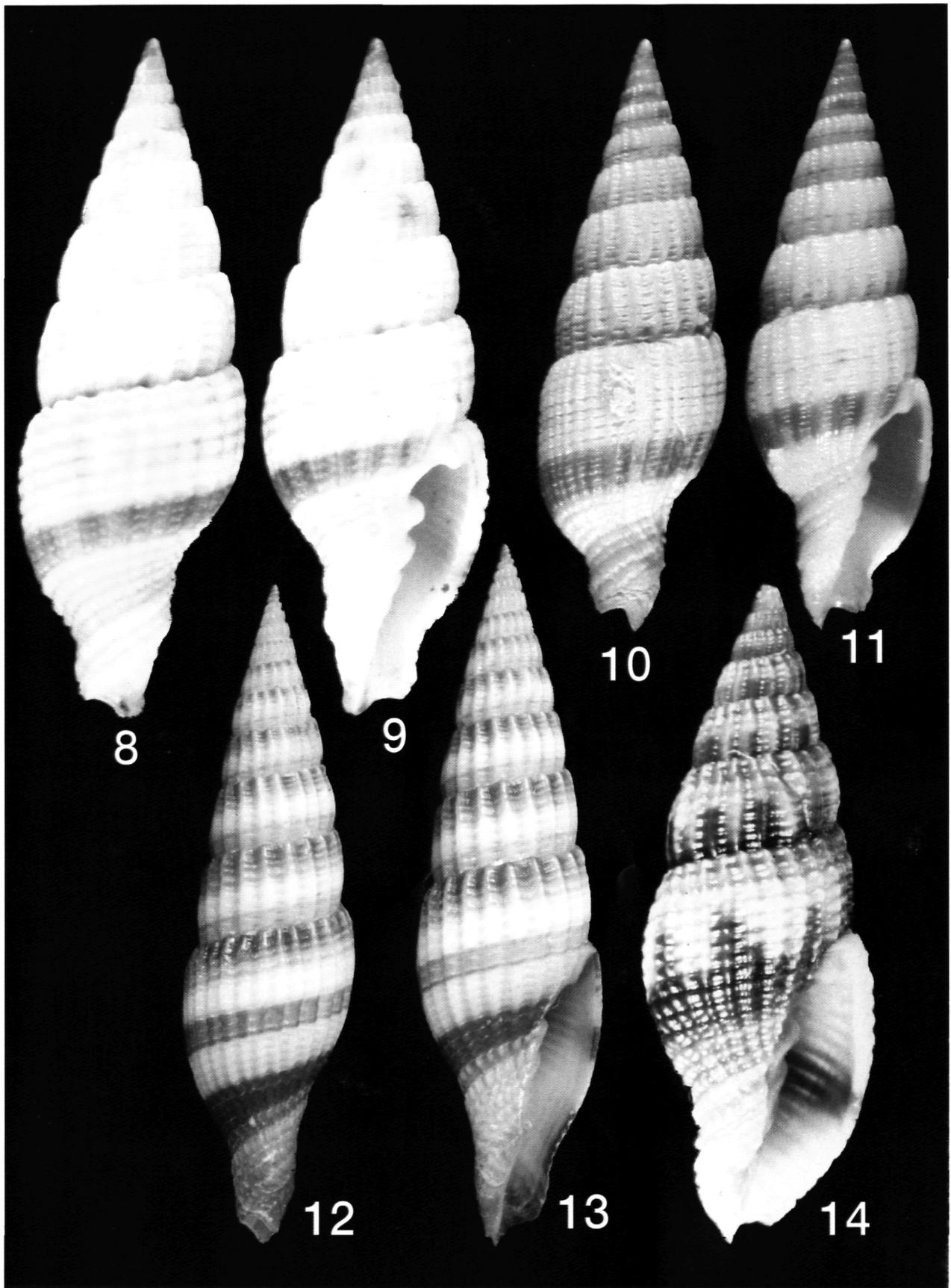
Vexillum (Costellaria) beverlyae n. sp.

Figs 15–20

Vexillum (Costellaria) festum (Reeve): PECHAR, PRIOR & PARKINSON (1980): pl. 33, figs 13 & 16 (non *Mitra festa* Reeve, 1845)

Type material. Holotype (Figs 15–16) 31.57 x 9.24 mm (aperture length 14.25 mm), taken alive by B. PARKINSON, night dive, May 1976, 21.00 hours; ex coll. Mr. Al & Mrs. B. DEYNZER, Sanibel FL, USA; deposited in ANSP (# 402019). Paratype # 1 (26.85 x 7.98 mm, aperture 11.43 mm) from Rabaul P.N.G., crabbed, in sand, depth 17 m, Febr. 1984, ex coll. Mrs. A. RICHARDS; now in coll. junior author (R. S.). Paratype # 2 (23.83 x 7.33 mm, aperture 11.25 mm) collection data as paratype # 1; deposited in BMNH (# 19990435). Paratype # 3 (21.83 x 7.27 mm, aperture 9.92 mm) collection data as paratype # 1. Paratype # 4 (25.1 x 8.2 mm, aperture 10.8 mm) from off Nordup P.N.G., ex coll. Mrs. A. RICHARDS, Nov. 1982; now in coll. Mr. J. P. LEFORT. Paratype # 5 (Figs 17–18) 24.0 x 7.5 mm (aperture 10.81 mm) from the Solomon

Figs. 8–11. *Vexillum (Costellaria) leforti* n. sp. Figs. 8–9. Holotype, ANSP #402018 (19.94 x 6.18 mm) ex coll. K. NODA; Japan, Honshu, Wakayama Pref., Kii peninsula, off Cape Kirime, in 80 m collected alive. Figs. 10–11. Paratype # 2, BMNH #19990434 (19.9 x 6.1 mm) ex coll. J. P. LEFORT; Philippines, Bohol, off Panglao Island. **Figs. 12–13.** *Vexillum (Costellaria) alvinobalani* Suduiraut, 1999, holotype, MNHN (31.7 x 18.2 mm); Philippines, Bohol, off S.W. coast of Balicasag Island, in 440–480 m. **Fig. 14.** *Vexillum (Costellaria) filistriatum* (G. B. Sowerby, II & III 1874), specimen 14.6 x 5.2 mm, coll. H. TURNER; Hawaiian Islands, Oahu Bay, Pokay Bay, dredged on sand in 75 m.



Islands, Honiara – Guadalcanal, night dive, depth 43 m, collected alive by S. YEE, Aug. 1980, in coll. Mr. G. & Mrs. B. COOK. Paratype # 6 (Figs. 19–20, light coloured specimen) 29.02 x 8.41 mm (aperture 11.94 mm) from Punta Engano, Cebu, Philippines, net fisherman; in coll. DEYNZER. Paratype # 7 (24.54 x 8.58 mm, aperture 10.78 mm) from Talvat, Rabaul P.N.G., depth 33 m, in black sand by the wall of a small drop-off; in coll. DEYNZER. Paratype # 8 (28.0 x 9.1 mm, aperture 12.8 mm) from off Nordup P.N.G., ex coll. Mrs. A. RICHARDS, Nov. 1982; now in coll. Mr. S. GORI.

Type locality. Off Nordup near Rabaul, East New Britain, Papua New Guinea, in 36 m, in dark volcanic sand on slope at bottom of a coral cliff.

Distribution and habitat. Papua New Guinea, Solomon Islands and the Philippine Islands. Live and dead specimens found at scuba depths (17 to 36 m) in dark volcanic sand in Papua New Guinea, alive in muddy sand at 43 m in the Solomons.

Etymology. Named after Mrs. Beverly DEYNZER, Sanibel FL, USA.

Description. Shell of medium size, to 31 mm in length, elongate-fusiform, acuminate. Protoconch hemi-ellipsoidal in shape, basal diameter 0.55 mm, 2 1/2 glassy white whorls. Teleoconch of adult shell with 10–12 whorls, sutures well defined, slightly stepped. Early whorls ornamented with 12–16 strong, round, evenly spaced, slightly curved axial ribs. Interstices between ribs with 4–7 deep spiral grooves, on early whorls grooves do not bisect ribs, on later whorls few spiral grooves may weakly cross crown of rib. Penultimate whorl ornamented with 18 or 19 strong, moderately curved axial ribs with narrow, smooth crowns; body whorl ornamented with 19–23 strong, moderately curved axial ribs with narrow, smooth crowns. Interstices with 7 or 8 deep, evenly spaced spiral grooves on penultimate whorl, with 18–23 spiral grooves on body whorl; anterior portion of body whorl ornamented with progressively more distinct pustulate spiral cords. Columella acuminate, with 4 slender folds decreasing in size anteriorly. Columellar fasciole with 4–7 oblique, rounded cords, some cords appearing to be a continuation of columellar folds. Aperture with a callosity on parietal side of posterior angle. Outer lip

thin, simple and smooth, with noticeably undulate slight constriction at anterior portion. 7 or 8 unbroken slender lirations in interior of aperture, not extended into siphonal canal; latter narrow and relatively straight-sided, slightly recurved towards dorsum. Shell white, spire in all specimens examined totally white; body whorl white with thin, golden line at shell periphery; golden line faded and extremely hard to see in beach-worn shells; with a broad yellow-cream, golden or reddish-brown band on lower body whorl, just posterior to white (or light yellow) columellar fasciole; columella white.

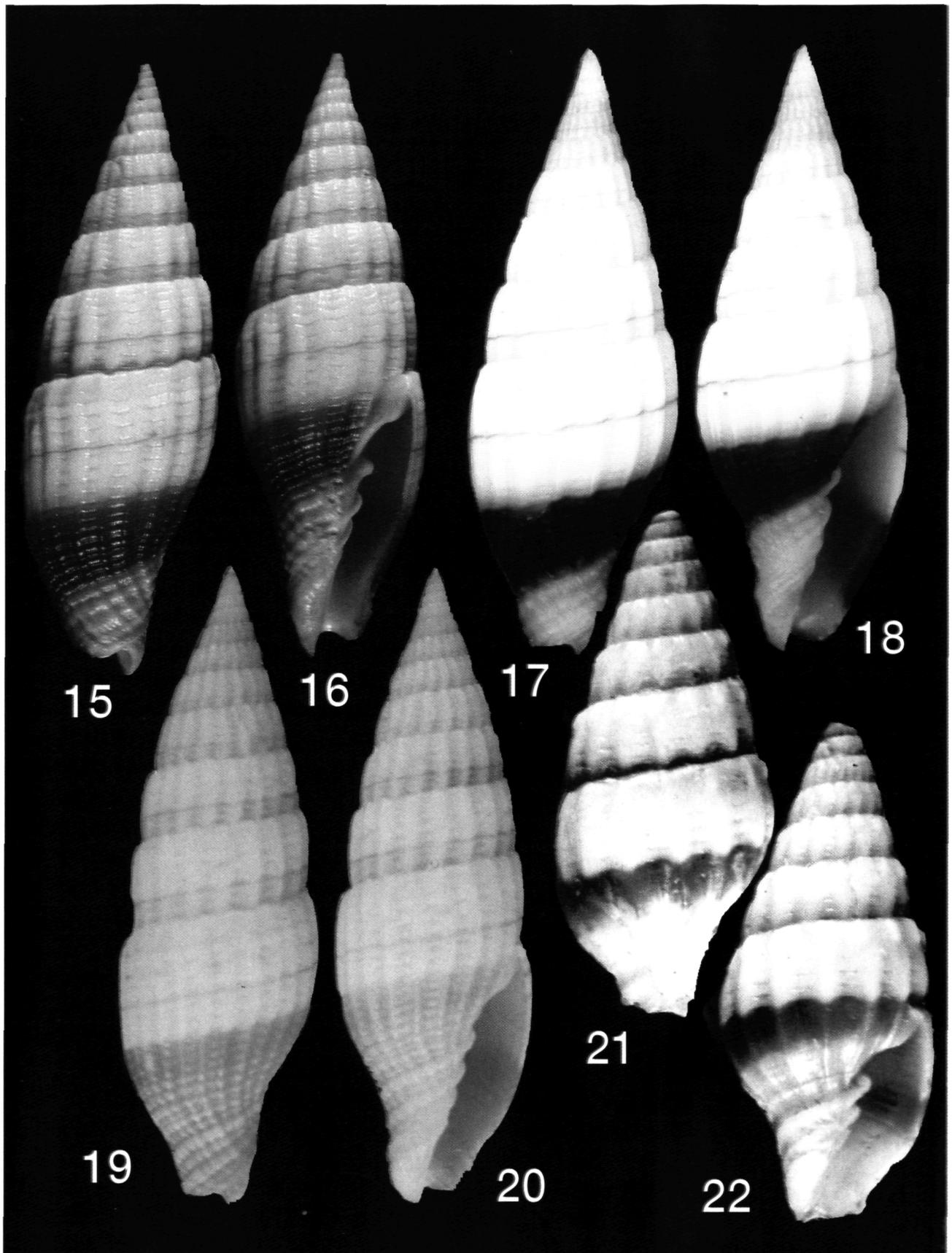
Discussion. This new costellarid has been confused with *Vexillum (Pusia) festum* (Reeve, 1845) (Figs. 21–22, lectotype). It differs from that species in being much larger (adult shells 31 mm in length versus 15 mm), more slender and acuminate in shape, whorls less shouldered at the sutures, with uniform spiral grooves between close-set, evenly spaced and more slender axial ribs. Moreover, *V. beverlyae* n. sp. differs from *V. festum* by the more basal position of the brown band on the body whorl. The band of this new species occasionally being light golden-red (Figs. 19–20), rather than brown.

V. beverlyae n. sp. could also be confused with *Vexillum leforti* n. sp. (described above, Figs 8–11), but may be distinguished because the whorls of *V. beverlyae* are less rounded and are separated by only shallow sutures, the apex and early whorls are not brown but white, the brown band on the body whorl is not so narrow and sharply delimited to a zone at the posterior aperture angle, but extending much farther towards the shell base.

V. beverlyae n. sp. resembles to some degree also the recently described *Vexillum alvinobalani* Suduiraut, 1999 (Figs 12–13). It differs from that species mainly by a less coarse sculpture, spiral cords not over-riding the axial ribs, and by the colour pattern lacking broad brown sub-sutural and peripheral bands.

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Figs. 15–20. *Vexillum (Costellaria) beverlyae* n. sp. Figs. 15–16. Holotype, ANSP #402019 (31.57 x 9.24 mm); Papua New Guinea, East New Britain, off Nordup, 36 m depth, collected alive by B. PARKINSON, night dive, May 1976, 21.00 hours. Figs. 17–18. Paratype #5 (24.0 x 7.5 mm) coll. G. & B. COOK; Solomon Islands, Honiara – Guadalcanal, depth 43 m, collected alive by S. YEE, night dive, Aug. 1980. Figs. 19–20. Paratype # 6 (29.02 x 8.41 mm, light coloured specimen) coll. DEYNZER; Philippines, Cebu, Punta Engano, net fisherman. **Figs. 21–22.** *Vexillum (Pusia) festum* (Reeve, 1845). Lectotype of *Mitra festa* Reeve, BMNH #1967756 (11.0 x 4.6 mm); Philippines, Island of Mindoro, Puerto Galero.



CALLOMON (Osaka, Japan), Mrs. Bunnie COOK & Mr. George COOK (Honolulu HI), Mrs. Beverly DEYNZER & Mr. Al DEYNZER (Sanibel FL), Mr. Sandro GORI (Livorno, Italy), Mr. Jean Paul LEFORT (Huahine, French Polynesia), Mr. Markus LUSSI (Durban, South Africa), Mr. Maxwell P. MARROW (Hampton, Victoria, Australia), Mr. Jean Claude MARTIN (Saint Denis, Réunion), Mr. Kazutaka NODA (Gobo Town, Japan) and Mr. Emmanuel Guillot de SUDUIRAUT (Lapu Lapu City, Cebu, Philippines). Our special thanks are due to Dr. Gary ROSENBERG (Academy of Natural Sciences, Philadelphia, PA) who was instrumental in obtaining material of new species from Japan and helped on early versions of the *V. nodai* description.

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