

Description of new species of the genus *Viriola* Jousseaume, 1884 (Gastropoda: Triphoridae) from Vietnam

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ABSTRACT. Based on specimens collected during the field trips in 2019–2020, 2023 in the Tho Chu Islands and Spratly Islands (Truong Sa Islands), Vietnam, we have identified five species of the genus *Viriola*. Two of them, namely *Viriola thochuensis* n. sp., *Viriola namyitensis* n. sp. are new to science. Other three species, namely, *V. abbotti*, *V. bayani*, *V. intergranosa* are the first records for Vietnam. The diagnostic characters and distribution of *Viriola* species in Vietnam are presented.

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Описание новых видов рода *Viriola* Jousseaume, 1884 (Gastropoda: Triphoridae) из Вьетнама

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РЕЗЮМЕ. В материале, собранном в 2019–2020, 2023 гг. на островах Тхотю и Спратли (острова Чыонгша), Вьетнам, выявлено пять видов рода *Viriola*. Два из них, *Viriola thochuensis* n. sp., *Viriola namyitensis* n. sp. являются новыми для науки. Остальные три вида, *V. abbotti*, *V. bayani*, *V. intergranosa* впервые отмечены во Вьетнаме. Приведены диагностические признаки и данные о распространении видов *Viriola* во Вьетнаме.

Thailand, Singapore, and Vietnam have recorded the presence of 11 *Viriola* species within the South China Sea. These include *Viriola abbotti* (Baker et Spicer, 1935), *V. bayani* Jousseaume, 1884, *V. cancellata* (Hinds, 1843), *V. corrugata* (Hinds, 1843), *V. intergranosa* (Hervier, 1898), *V. tricineta* (Dunker, 1882), *Viriola connata* (Montrouzier, 1862), *Viriola gracilentata* (Mighels, 1845), *Viriola incisa* (Pease, 1861), *Viriola intercalaris* (A. Gould, 1861), *Viriola interfilata* (A. Gould, 1861) [Bakker, Albano, 2022; Sanpanich, Tan, 2016; Poppe, 2017; Dumrongrojwatana, Tanamai, 2020; Hylleberg, Kilburn, 2003; Hong et al., 2014; Thach, 2007].

Studies on marine gastropods in Vietnam have primarily concentrated on larger species, with smaller genera like *Viriola* receiving comparatively less attention. Previous research has identified three *Viriola* species in Vietnamese waters: *V. connata*, *V. cancellata*, and *V. tricineta*. lack detailed distributional data and accompanying visual documentation, limiting a comprehensive understanding of the group's biodiversity. This study aims to revise the current list of *Viriola* species found in Vietnam, provide precise distributional data, and formally describe two novel species, thus contributing to a more complete understanding of Vietnam's marine biodiversity.

Material and methods

Specimens were collected on coral reefs in the Tho Chu Islands and Spratly Islands, Vietnam, (Fig. 1) in 2019–2020, 2023, using the method described

Introduction

Viriola Jousseaume, 1884 is a genus of the family Triphoridae Gray, 1847. This genus is characterized by the first whorl with hemispherical granules and uninterrupted axial riblets on subsequent protoconch whorls; as well as a teleoconch with smooth spiral cords [Marshall, 1983]. According to WoRMS, a total of 26 species have been described for this genus. They are mainly distributed in the Indo-West Pacific.

Previous studies conducted in the Philippines,

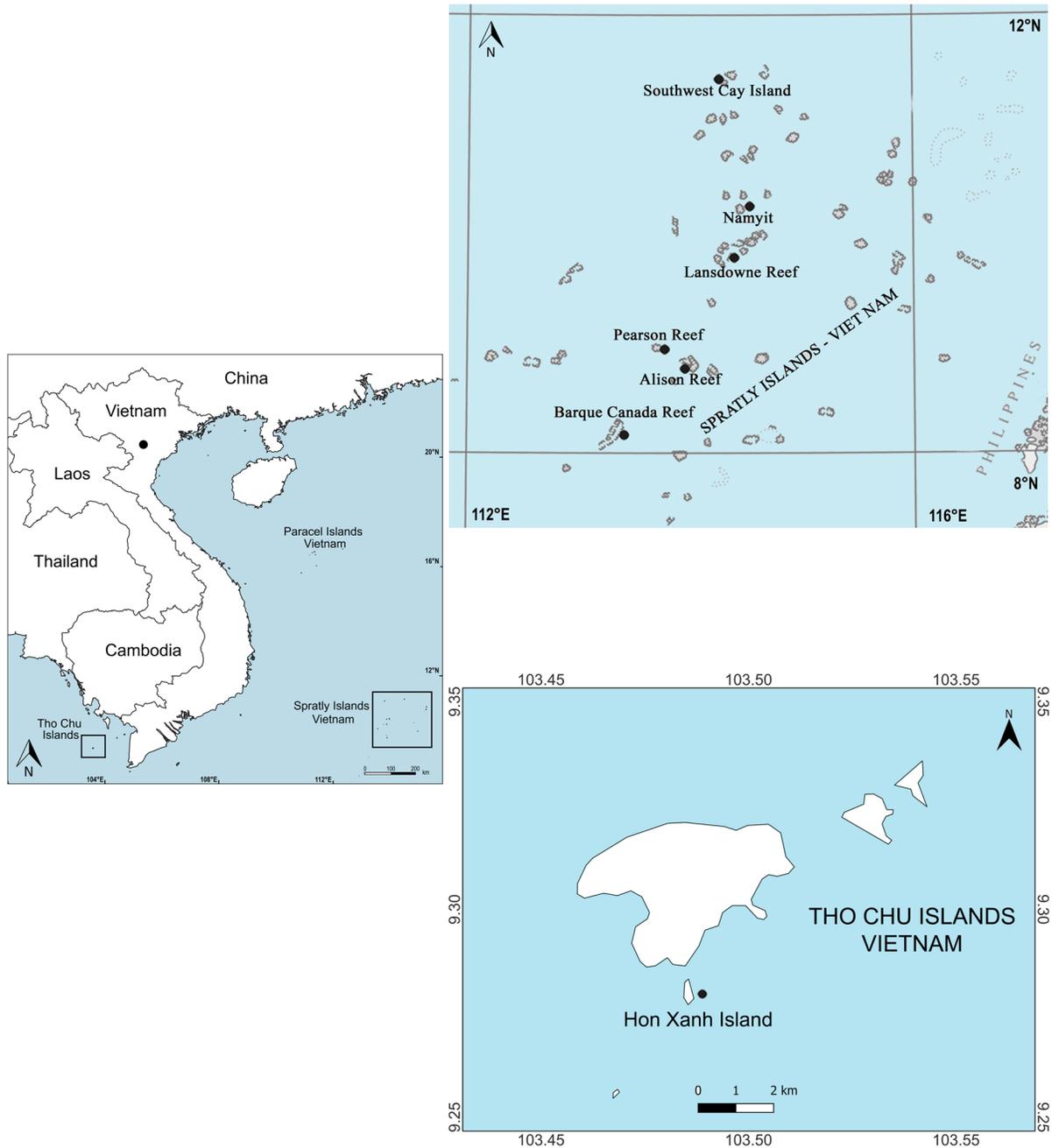


FIG. 1. Map of studied area, the yellow circles are the sampled locations.

by Sirenko [Sirenko, 2012]. In total, 81 specimens of *Viriola* were collected. The shells were photographed by scanning electron microscope (JSM-IT200, JEOL, Japan) and Olympus SZ61TR stereomicroscope with Olympus SC180 camera. The provided measurements are based on studied material, dimensions of the specimen were taken simultaneously while photographing it on the SEM.

The terminology used in descriptions of the shell morphology follows Marshall [Marshall, 1983].

The material is deposited in the following institutions: VNMN, Vietnam National Museum of

Nature (Hanoi, Vietnam); VRTCМ – Laboratory of Aquatic Ecology, Institute of Tropical Ecology, Joint Vietnam-Russia Tropical Science and Technology Research Center (Hanoi, Vietnam).

Abbreviations: BPBM: Bernice Pauahi Bishop Museum; MNHN: Muséum National d'Histoire Naturelle (Paris, France); NHMUK: Natural History Museum of the United Kingdom, London; SH: Shell height; SMF: Naturmuseum Senckenberg, Frankfurt, Germany; SW: Shell width; TheNAT: San Diego Natural History Museum, San Diego, United States; TT: Collection of Tai-Tu Nguyen (Hanoi, Vietnam).

Taxonomy

Class Gastropoda Cuvier, 1795
 Subclass Caenogastropoda Cox, 1960
 Superfamily Triphoroidea Gray, 1847
 Family Triphoridae Gray, 1847

Viriola Jousseaume, 1884
Viriola abbotti (Baker, Spicer, 1935)
 (Figs 2 A–C; 3; Table 1)

Triphora abbotti Baker, Spicer, 1935: 39, pl. 5, fig. 4.

Viriola abbotti – Poppe, 2008: 109, pl. 310, fig. 2; Dan, 2020: 20, fig 21.

Type locality. Ofu Island, Samoan Islands.

Type material. Holotype: TheNAT 23763, Paratype: BPBM 196191.

Other material. South China Sea (East Sea), Spratly Islands (Truong Sa Islands), Khanh Hoa Province, Vietnam: Lansdowne Reef (Len Dao Island), on dead corals and under stones, 09°46'37"N, 114°22'34.8"E, depth 10 m, coll. Tai-Tu N., 19.5.2019, VRTCM.Ga 27051619.01 (3 shells); Pearson Reef (Phan Vinh Island), on dead corals and under stones, 08°57'24.1"N, 113°41'31.2"E, depth 18–21 m, coll. Tai-Tu N., 23.5.2019, VRTCM.Ga 27050619.01 (4 shells); Barque Canada Reef (Thuyen Chai Island), on dead corals and under stones, 08°16'35.3"N, 113°21'10.7"E, depth 12 m, coll. Tai-Tu N., 29.5.2019, VRTCM.Ga 27051019.01 (2 shells); on dead corals and under stones, 08°16'54.4"N, 113°21'51.8"E, depth 8–9 m, coll. Tai-Tu N., 30.10.2020, VRTCM.Ga 27051020.01 (5 shells); Alison Reef (Toc Tan Island), on dead corals and under stones, 08°49'7.04"N, 113°57'6.73"E, depth 2 m, coll. Tai-Tu N., 25.5.2019, VRTCM.Ga 27050719.01 (3 shells); Namyit Island (Nam Yet Island), on dead corals and under stones, 10°11'03.8"N, 114°22'05.2"E, depth 16–18 m, coll. Tai-Tu N., 11.10.2020, VRTCM.Ga 27051920.01 (4 shells).

Diagnosis. The shell is rather long, cyrtoconoid, with flat profile of upper whorls and convex of lower ones. First few teleoconch whorls white, subsequent whorls smoky gray to yellowish brown; protoconch yellowish brown. Protoconch of 6 whorls, first whorl has hemispherical granules, whorls 2–4 have 1 median spiral thread, whorls 5–6 have 2 median spiral threads, uninterrupted by axial riblets on protoconch whorls. Teleoconch of up to 13 whorls with three smooth spiral cords. The first and third spiral cords are granulated on the upper 4 teleoconch whorls. The second spiral cord is smooth and appears on the seventh teleoconch whorl. Spiral microsculpture of fine threads between the main spiral cords. Base with two additional weakly tuberculed spiral cords and one spiral cord with microsculpture of fine threads. Peristome with an additional rather smooth spiral cord (Fig. 3D, Sp1). Outer lip rather thick and flared. Anterior siphonal canal oblique, subtubular, rather long (Figs 2, 3).

Dimensions. SH: 4.3–6.9 mm; SW: 1.4–2.1 mm.

Distribution. In Vietnam, known from Lans-

downe Reef, Pearson Reef, Barque Canada Reef, Alison Reef, Namyit Island of the Spratly Islands. Elsewhere: Samoan Islands, Philippines, Hawaii, Polynesia Islands, Kiribati, Gulf of Aqaba, Taiwan, Marshall Islands, Christmas Island [Baker, Spicer, 1935; Poppe, 2008; Dan, 2020; Bakker, Albano, 2022; Albano *et al.*, 2023].

Remarks. *Viriola abbotti* differs from *V. incisa* in its smoky gray to yellowish brown shell (*vs.* purplish red shell); spiral microsculpture of fine threads between the main spiral cords (*vs.* smooth). *V. abbotti* differs from *V. cancellata* in having spiral microsculpture of fine threads between the main spiral cords (*vs.* spiral microsculpture of fine threads and weakly axial riblets); First few teleoconch whorls white, subsequent whorls smoky gray to yellowish brown (*vs.* The shell yellowish brown with white blotches on the first spiral cord, white granules on the second spiral cord, and reddish brown between spiral cords 1–3).

Viriola bayani Jousseaume, 1884
 (Figs 2 G–J; 4; Table 1)

Viriola bayani Jousseaume, 1884: 238, 267, pl. 4, fig. 20; Poppe, 2008: 109, pl. 310, fig 2; Steger *et al.*, 2018: 249, fig. 3; Angelidis, Polyzoulis, 2018: 6, fig. 6, Albano *et al.*, 2023: 63, fig. 38.

Euthymella bayani (Jousseaume, 1884) – Severns, 2011: pl. 92, fig. 1.

Triforis bayani (Jousseaume, 1884) – Tryon, 1887: 189, pl. 39, fig. 56.

Type locality. New Caledonia Island, southwest Pacific Ocean.

Type material. Syntype: MNHN-IM-2000-1388.

Other material. South China Sea, Spratly Islands, Khanh Hoa Province, Vietnam: Southwest Cay Island, on dead corals and under stones, 11°26'11.8"N 114°19'56.3"E, depth: 5–8 m, coll. Tai-Tu N., 6.10.2020, VRTCM.Ga 27051220.01 (1 shell).

Diagnosis. The shell is narrowly conical, long with flat sides. Teleoconch brown to reddish brown with white blotches on the main spiral cords. Teleoconch whorls with three smooth spiral cords. The second spiral cord, developing later, presents as a string of granules in the early teleoconch. Prosocline axial ribs between the main spiral cords. The last whorl has 24–26 axial ribs. Base with three additional smooth spiral cords (Fig. 4C, S1–S3). Peristome with an additional tuberculed spiral cord (Fig. 4D, Sp1). Outer lip thick and flared. Parietal callus thick. Anterior siphonal canal oblique, subtubular, long. Protoconch missing.

Dimensions. SH: 7.8 mm; SW: 2.0 mm (protoconch missing).

Distribution. In Vietnam known from Southwest Cay Island of the Spratly Islands. Elsewhere: New Caledonia, Philippines, Israel, Crete Island, Astypalaia Island, Greece, Turkey, Cyprus, Hawaii, Marshall Islands [Jousseaume, 1884; Poppe, 2008;

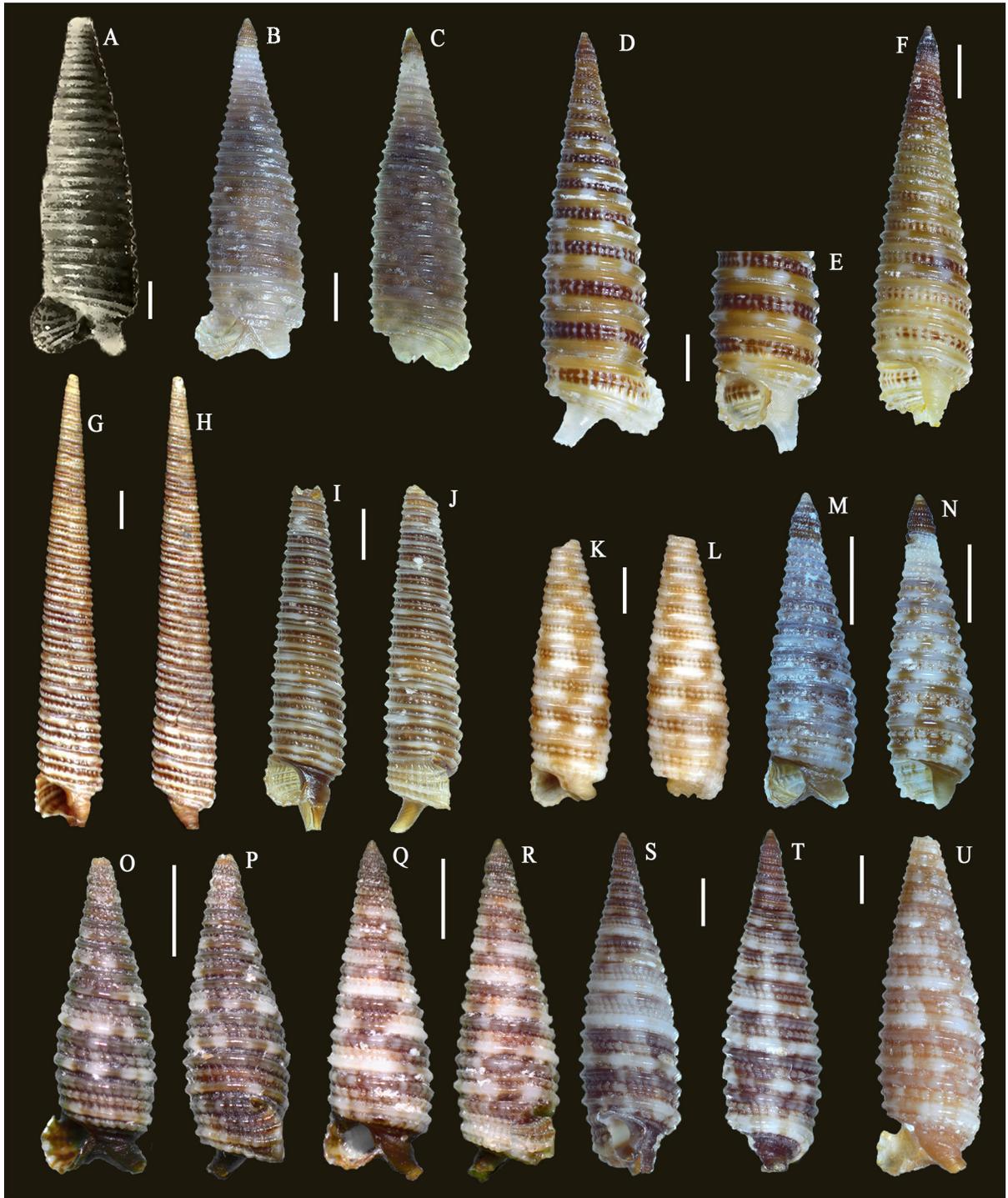


FIG. 2. A–C. *Viriola abbotti* (Baker et Spicer, 1935), A. Original figure in Baker, Spicer, 1935; B–C. Other material from Spratly Islands, Vietnam. D–F. *V. namyitensis* n. sp., D–E. Holotype, VNMN M-000.002.348, Namyit Island, Spratly Islands, Khanh Hoa province, Vietnam. G–J. *V. bayani* Joussemaue, 1884, G–H. Syntype, MNHN-IM-2000-1388, I–J. Other material from Spratly Islands. K–N. *V. intergranosa* (Hervier, 1898), K–L. Syntype, MNHN-IM-2000-1314; M–N. Other material from Spratly Islands. O–U. *V. thochuensis* n. sp., S–T. Holotype, VNMN M-000.002.348, Hon Xanh Island, Tho Chu Islands, Kien Giang province, Vietnam. Scale bars: 1 mm.

Steger *et al.*, 2018; Angelidis, Polyzoulis, 2018; Albano *et al.*, 2021; Bakker, Albano, 2022; Albano *et al.*, 2023].

Remarks. *V. bayani* differs from *V. senafirensis* (Sturani, 1903) in its long, narrowly conical shell,

with flat sides (vs. shell short, cyrtocoid, with convex sides). *V. bayani* differs from *V. corrugata* in having a brown shell with white streaks on the spiral cords (vs. yellowish brown); the last whorl has 24–26 axial ribs (vs. 34–36 axial ribs).

Table 1. Comparison of shell characters of *Viriola* species in Vietnam.

	<i>V. abbotti</i>	<i>V. bayani</i>	<i>V. namyitensis</i>	<i>V. intergranosa</i>	<i>V. thochuensis</i>
Dimensions (mm)	SH: 4.3–6.9 mm; SW: 1.4–2.1 mm.	SH: 7.8 mm; SW: 2.0 mm (not included protoconch).	SH: 7.4–8.4 mm; SW: 2.1–2.5 mm.	SH: 3.8–3.9 mm; SW: 1.2–1.3 mm.	SH: 3.6–6.3 mm; SW: 1.1–2.2 mm.
Shell shape	rather long, cyrtoconoid, flat above and convex below.	narrowly conical, long with flat sides.	rather long, cyrtoconoid, flat above and convex below.	short, cyrtoconoid.	short, conoid, rather flat sides, base wide.
Shell colour	First few teleoconch whorls white, subsequent whorls smoky gray to yellowish brown.	Teleoconch brown to reddish brown with white blotches on the main spiral cords.	Teleoconch yellowish brown with white blotches on the first spiral cord, white granules on the second spiral cord, between spiral cords 1–3 reddish brown.	First few teleoconch whorls are white, subsequent whorls white with brown streaks.	The shell has a white background with patches of brown to dark brown. The third spiral cord on the teleconch whorls is more brightly colored than the first and second spiral cords.
Number of whorls	- Protoconch with 6 whorls. - Teleoconch of 13 whorls.	Unclear (protoconch absent).	- Protoconch with 6 whorls. - Teleoconch with 13 whorls.	- Protoconch with 6 whorls. - Teleoconch with 8–9 whorls.	- Protoconch with 5–5½ whorls. - Teleoconch with 8–9 whorls.
The main spiral cords	- The first and third spiral cords are smooth, appearing as granulated spiral cords on the first 4 teleoconch whorls. - The second spiral cord is smooth and appears on the seventh teleoconch whorl.	- The first and third spiral cords are smooth. - The second spiral cord is smooth, presenting as a string of granules in the early teleoconch.	- The first and third spiral cords are smooth, appearing as granulated spiral cords on the first teleoconch whorl. - The second spiral cord is weakly granular, appearing on the first teleoconch whorl.	- The first and third spiral cords are smooth, appearing as granulated spiral cords on the first 3 teleoconch whorls. - The second spiral cord is granular, appears on the fifth teleoconch whorl.	- The first and third spiral cords are smooth, appearing as granulated spiral cords on the first 2 teleoconch whorls. - The second spiral cord is granular, appears on the second teleoconch whorl.
Sculpture between the main spiral cords	Spiral microsculpture of fine threads.	Prosocline axial ribs.	Spiral microsculpture of fine threads and weakly axial ribs.	Spiral microsculpture of strings of granules and axial ribs.	Spiral microsculpture of fine threads and axial ribs.
Last whorl	- Base with two additional weakly tubercled spiral cords and one spiral cord with microsculpture of fine threads. - No axial ribs on the last whorl.	- Base with three additional smooth spiral cords. - The last whorl has 24–26 axial ribs.	- Base with two additional weakly tubercled spiral cords. - The last whorl has 34–36 axial ribs.	- Base with an additional granulated spiral cord and a small, smooth spiral cord - The last whorl has 22–24 axial ribs.	- Base with an additional granulated spiral cord and a small, smooth spiral cord. - The last whorl has 26–28 axial ribs.
Peristome	Peristome with an additional rather smooth spiral cord.	Peristome with an additional tubercled spiral cord.	Peristome with an additional tubercled spiral cord.	Peristome with an additional tubercled spiral cord.	Peristome with an additional tubercled spiral cord.
Outer lip	rather thick and flared.	thick and flared.	thick and flared.	rather thin and flared.	rather thick and flared.
Anterior siphonal canal	oblique, subtubular, rather long.	oblique, subtubular, long.	oblique, subtubular, long.	oblique, subtubular, rather short.	oblique, subtubular, rather short.

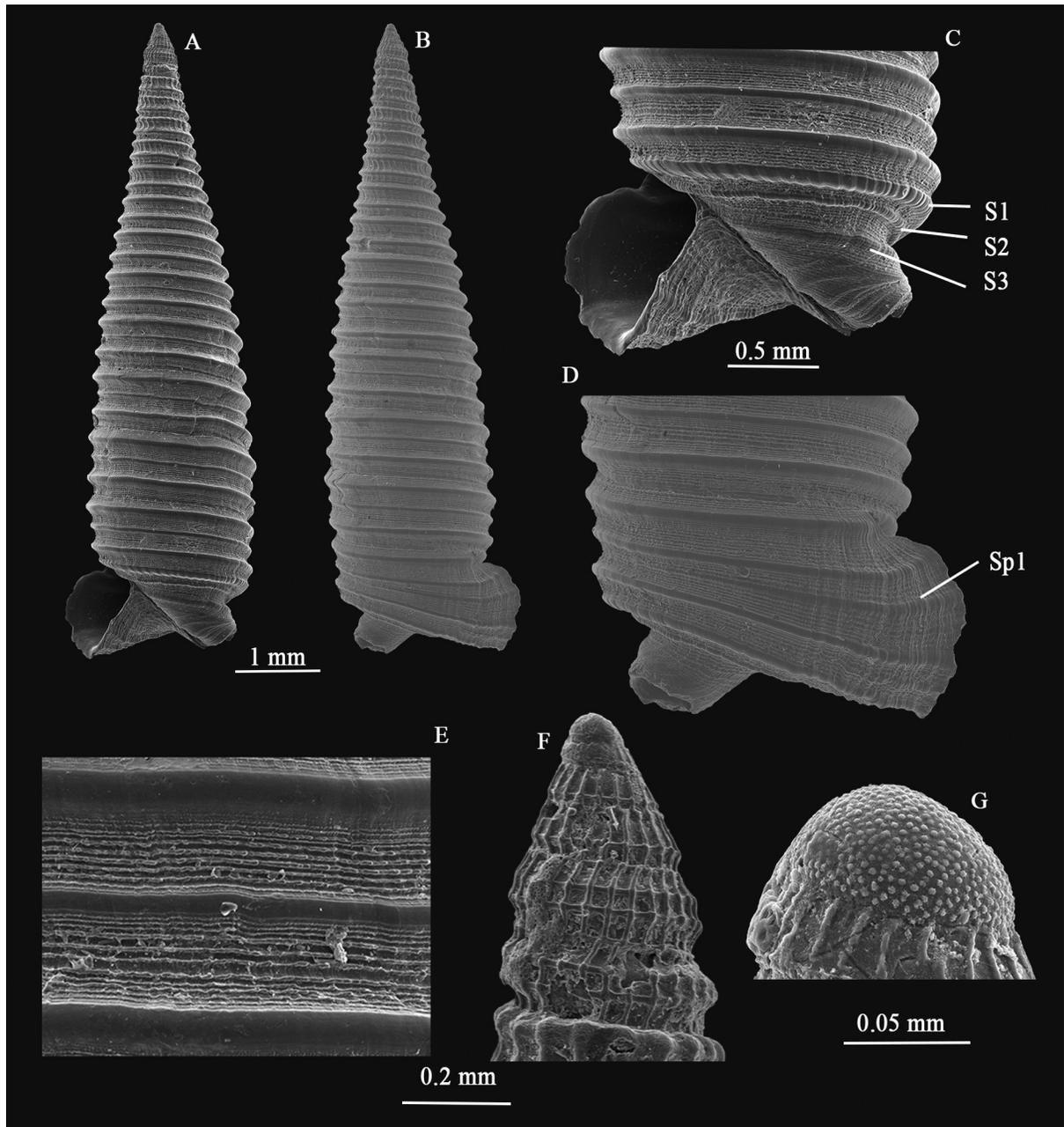


FIG. 3. *Viriola abbotti* (Baker et Spicer, 1935), Pearson Reef, Vietnam, 18–21 m, 23.5.2019, BL – 6.43 mm. **A.** Front view. **B.** Dorsal view. **C.** Last whorl. **D.** Peristome. **E.** Teleoconch microsculpture. **F.** Protoconch. **G.** First protoconch whorl. **S1–S3.** Additional spiral cords on the base. **Sp1.** Additional spiral cord on the peristome. Scale bars: A–B. 1 mm; C–D. 0.5 mm; E–F. 0.2 mm; G. 0.05 mm.

Viriola namyitensis n. sp.

(Figs 2 D–F, 5; Table 1)

Zoobank registration: urn:lsid:zoobank.org:act:0971EF73-B78E-484E-9A37-2FB6710001F8

Type locality: Namyit Island, Spratly Islands, Khanh Hoa province, Vietnam, 10°11'03.8"N, 114°22'05.2"E, depth 16–18 m.

Type material. Holotype VNMN M-000.002.348 (shell height 7.4 mm, shell width 2.1 mm, Figs. 2

D–E). Paratype: VRTCM.Ga 27050719.03 (1 shells), Tai-Tu N. (14 shells), same data as holotype.

Etymology: This species is named after the type locality, Namyit Island, Spratly Islands, Khanh Hoa province, Vietnam.

Material examined. South China Sea, Spratly Islands, Vietnam: Lansdowne Reef, on dead corals and under stones, 09°46'37"N, 114°22'34.8"E, depth 10 m, coll. Tai-Tu N, 19.5.2019, VRTCM.Ga 27051619.02 (3 shells); Pearson Reef, on dead corals and under stones, 08°57'24.1"N, 113°41'31.2"E, depth 18–21 m, coll. Tai-Tu N, 23.5.2019,

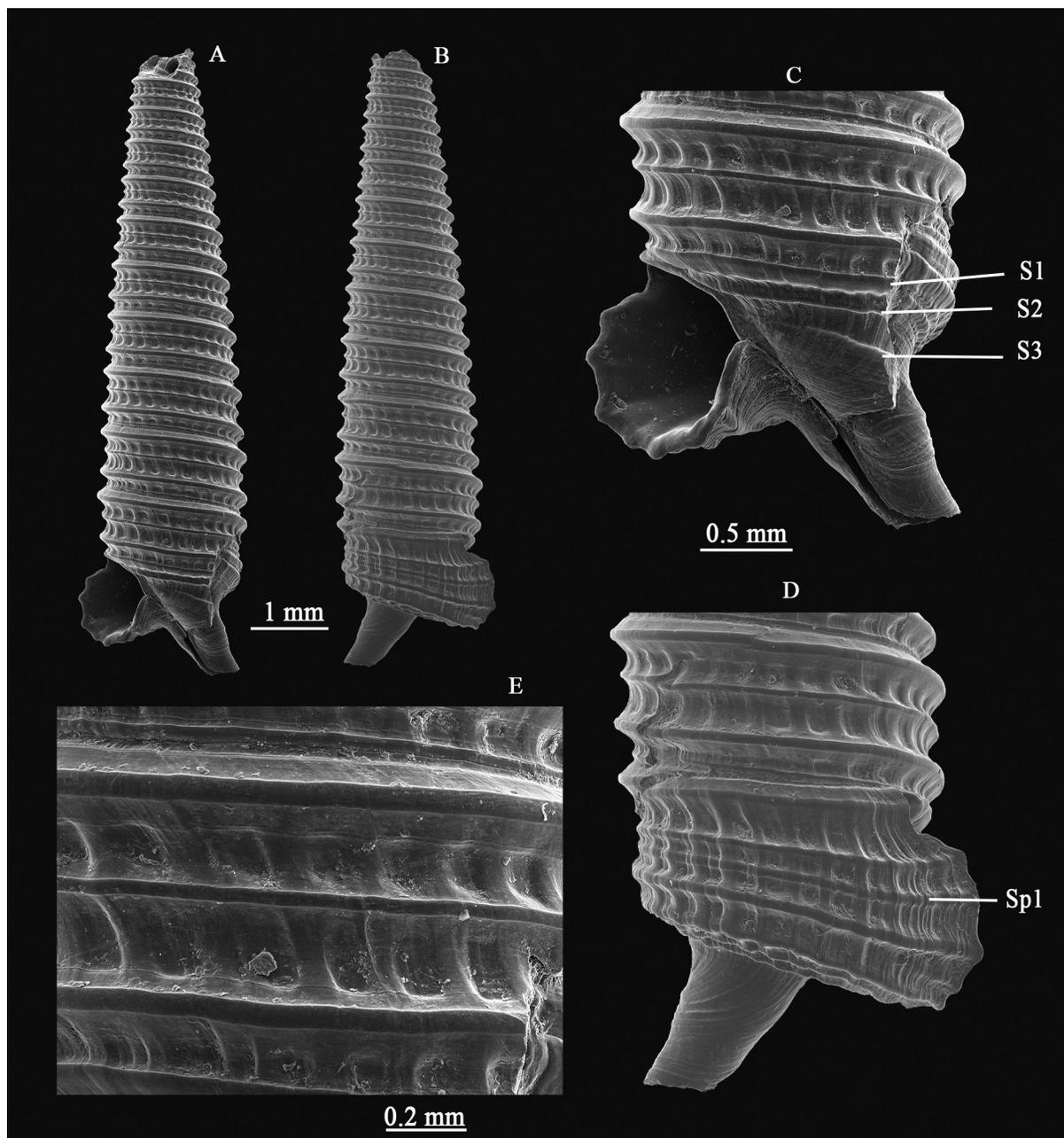


FIG. 4. *Viriola bayani* Jousseume, 1884, Southwest Cay Island, Vietnam, 5–8 m, 6.10.2020, BL – 7.79 mm (not including protoconch). **A.** Front view. **B.** Dorsal view. **C.** Last whorl. **D.** Peristome. **E.** Teleoconch microsculpture. **S1–S3.** Additional spiral cords on the base. **Sp1.** Additional spiral cord on the peristome. Scale bars: A–B. 1 mm; C–D. 0.5 mm; E. 0.2 mm.

VRTCM.Ga 27050619.02 (1 shell); Barque Canada Reef, on dead corals and under stones, 08°16'35.3"N, 113°21'10.7"E, depth: 12 m, coll. Tai-Tu N., 29.5.2019, VRTCM.Ga 27051019.02 (2 shells); on dead corals and under stones, 08°15'52.2"N, 113°21'45.5"E, depth: 6–8 m, coll. Tai-Tu N., 29.10.2020, VRTCM.Ga 27051020.02 (2 shells); on dead corals and under stones, 08°16'54.4"N, 113°21'51.8"E, depth: 8–9 m, coll. Tai-Tu N., 30.10.2020, VRTCM.Ga 27051020.03 (3 shells); Alison Reef, on dead corals and under stones, 08°49'7.04"N, 113°57'6.73"E, depth: 2 m, coll. Tai-Tu N., 25.5.2019, VRTCM.Ga 27050719.02 (2 shells); on dead corals and under stones, 08°49'47.8"N, 113°56'3.2"E, depth:

3 m, coll. Tai-Tu N., 27.5.2019, VRTCM.Ga 27050719.03 (3 shells).

Diagnosis. The shell is rather long, cyrtocoenoid, flat above and convex below. The teleoconch is yellowish brown with white blotches on the first spiral cord, white granules on the second spiral cord, and reddish brown between spiral cords 1–3. The first whorl of protoconch has numerous hemispherical granules. Teleoconch has 13 whorls, with three spiral cords. The second spiral cord is weakly granular, appearing on the first teleoconch whorl. Spiral micros-

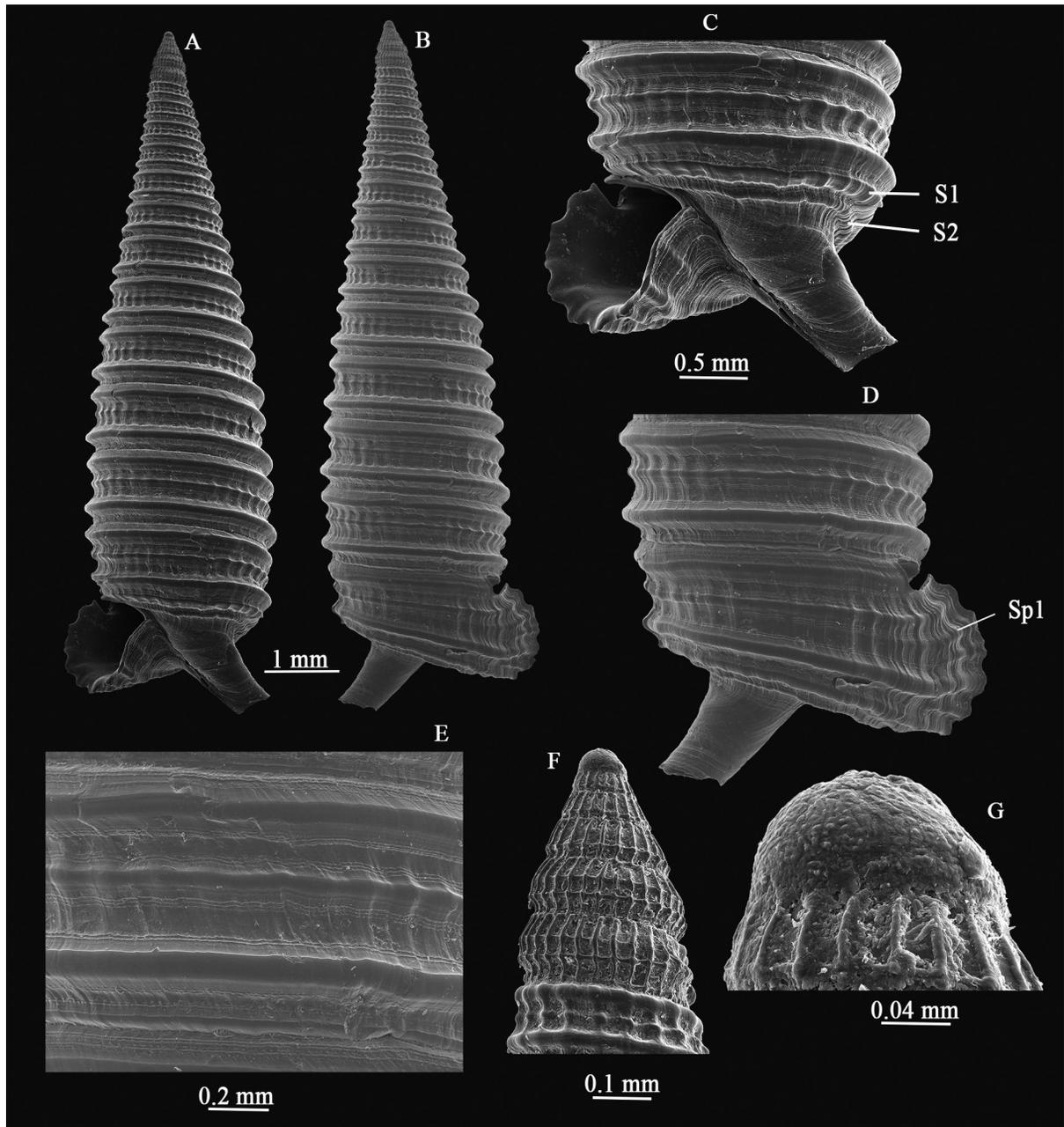


FIG. 5. *Viriola namyitensis* n. sp., Namyit Island, Spratly Islands, Khanh Hoa province, Vietnam, 16–18m, 11.10.2020, BL – 7.42 mm. **A.** Front view. **B.** Dorsal view. **C.** Last whorl. **D.** Peristome. **E.** Teleoconch microsculpture. **F.** Protoconch. **G.** First protoconch whorl. **S1–S2.** Additional spiral cords on the base. **Sp1.** Additional spiral cord on the peristome. Scale bars: A–B. 1 mm; C–D. 0.5 mm; E. 0.2 mm, F. 0.1 mm; G. 0.04 mm.

culpture of fine threads and weakly axial riblets that are present between the main spiral cords. The last whorl has 34–36 axial ribs. Base with two additional weakly tubercled spiral cords (Fig. 5C, S1–S2).

Description. The shell is rather long, cyrtocoid, flat above and convex below. The teleoconch is yellowish brown with white blotches on the first spiral cord, white granules on the second spiral cord, and reddish brown between spiral cords 1–3; protoconch reddish brown. The protoconch has 6 whorls, the first whorl with hemispherical granules, whorls 2–4 with one median spiral thread, and whorls 5–6

with 2 median spiral threads, uninterrupted axial riblets on protoconch whorls. Teleoconch has 13 whorls, with three spiral cords. First and third spiral cords are smooth, granulated on the first teleoconch whorl. The second spiral cord is weakly granular, appearing on the first teleoconch whorl. Spiral microsculpture of fine threads and weakly axial riblets that are present between the main spiral cords. The last whorl has 34–36 axial ribs. Base with two additional weakly tubercled spiral cords (Fig. 5C, S1–S2). Peristome with an additional tubercled spiral cord (Fig. 5D,

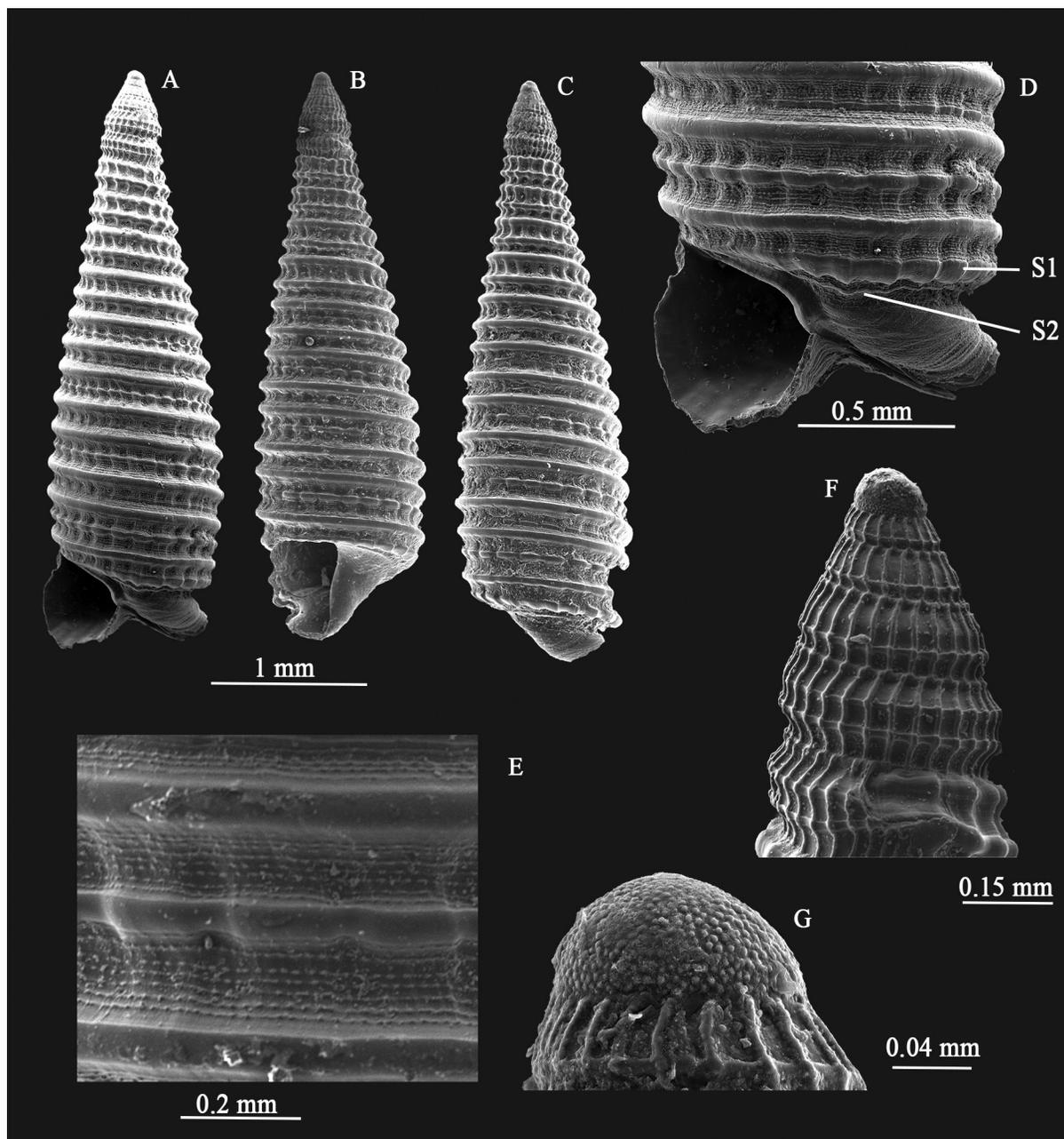


FIG. 6. *Viriola intergranosa* (Hervier, 1898), Barque Canada Reet, Vietnam, 12 m, 29.5.2019, BL – 3.81 mm. A–B. Front view. C. Dorsal view. D. Last whorl. E. Teleoconch microsculpture. F. Protoconch. G. First protoconch whorl. S1–S2. Additional spiral cords on the base. Scale bars: A–C. 1 mm; D. 0.5 mm; E. 0.2 mm, F. 0.15 mm; G. 0.04 mm.

Sp1). Outer lip thick and flared. Anterior siphonal canal oblique, subtubular, long.

Measurements. SH: 7.4–8.4 mm; SW: 2.1–2.5 mm (n = 2).

Distribution. This species is known from Spratly Islands, Khanh Hoa province, Vietnam.

Ecology. This species collected under stones and on dead corals.

Remarks. *Viriola namyitensis* n. sp. is superficially similar to *V. cancellata* (Hinds, 1843). However, *V. namyitensis* n. sp. differs from *V. cancellata* in having the shell cyrtconoid, flat above, convex

below, base rather wide (vs. the shell cyrtconoid with flat sides); the first whorl of protoconch has numerous hemispherical granules (vs. the first two whorls of protoconch have numerous hemispherical granules); the second spiral cord appears on the first teleoconch whorl (vs. the second spiral cord appears on the second teleoconch whorl); spiral microsculpture of fine threads and axial ribs (vs. axial ribs); the last whorl has 34–36 axial ribs (vs. 28–30 axial ribs); the base with two additional weakly tuberculed spiral cords (vs. the base with an additional granulated spiral cord and a small, smooth spiral cord).

Viriola intergranosa (Hervier, 1898)
(Figs 2 K–N, 6; Table 1)

Triphoris intergranosa Hervier, 1898: 266.

Sinistroseila incisa Oliver, 1915: 523.

Viriola intergranosa – Brook, 1998: 223; Okutani, 2000: 313, pl. 155, fig. 61; Poppe, 2017: pl. 1555, figs 9–10; Dumrongrojwattana *et al.*, 2016: 286, fig. 3V.

Type locality. Lifou Island, New Caledonia.

Type material. Syntype: MNHN-IM-2000-1314.

Other material. South China Sea, Spratly Islands, Vietnam: Barque Canada Reet, on dead corals and under stones, 08°16'35.3"N, 113°21'10.7"E, depth: 12 m, coll. Tai-Tu N., 29.5.2019, VRTCM.Ga 27051019.03 (2 shells); Namyt Island, on dead corals and under stones, 10°11'03.8"N, 114°22'05.2"E, depth: 16–18 m, coll. Tai-Tu N., 11.10.2020, VRTCM.Ga 27051920.03 (1 shell).

Diagnosis. The shell is short, cyrtoconoid. First few teleoconch whorls are white, subsequent whorls white with brown streaks; protoconch reddish brown. Protoconch of 6 whorls, first whorl with hemispherical granules, whorls 2–4 have 1 median spiral thread, whorls 5–6 have 2 median spiral threads, uninterrupted axial riblets on protoconch whorls. Teleoconch has 8–9 whorls, with three spiral cords. The first and third spiral cords are smooth, appearing as granulated spiral cords on the first 3 teleoconch whorls. The second spiral cord is granular, developing later on the fifth teleoconch whorl. Spiral microsculpture of strings of granules and axial ribs between the main spiral cords. The last whorl has 22–24 axial ribs. Base with an additional granulated spiral cord and a small, smooth spiral cord. Peristome with an additional tubercled spiral cord. Outer lip rather thin and flared. Anterior siphonal canal oblique, subtubular, rather short (Figs 2 K–N, 6).

Dimensions. SH: 3.8–3.9 mm; SW: 1.2–1.3 mm.

Distribution. In Vietnam, known from Barque Canada Reet, Namyt Island of the Spratly Islands. Elsewhere: Christmas Island, Cocos Islands, Polynesia, Japan, Marshall Islands, New Caledonia, Kermadec Islands, Philippines, Taiwan, Thailand [Bakker, Albano, 2022; Albano *et al.*, 2023].

Remarks. The specimens collected in this study are smaller in size than the syntype (MNHN-IM-2000-1314). *Viriola intergranosa* is superficially similar to *Viriola thochuensis* n. sp.

Viriola thochuensis n. sp.
(Figs 2 O–U, 7; Table 1)

Zoobank registration: urn:lsid:zoobank.org:act:591BB4BE-3E3A-4E36-8C2D-AF6B93055085

Type material. Holotype VNMN M-000.002.349 (shell height 6.2 mm, shell width 2.2 mm, Figs. 2 S–T). Paratypes: VRTCM.Ga 27051019.04 (4 shells), Tai-Tu N. (10 shells), same data as holotype.

Type locality: Hon Xanh Island, Tho Chu Islands, Kien Giang province, Vietnam, 09°16'45.4"N, 103°29'16.0"E, depth 12 m.

Etymology: This species is named after the type locality, where the type species was found Tho Chu Islands, Kien Giang province, Vietnam.

Material examined. South China Sea, Spratly Islands, Khanh Hoa Province, Vietnam: Barque Canada Reet, on dead corals and under stones, 08°16'35.3"N, 113°21'10.7"E, depth: 12 m, coll. Tai-Tu N., 29.5.2019, VRTCM.Ga 27051019.04 (2 shells); on dead corals and under stones, 08°16'54.4"N, 113°21'51.8"E, depth: 8–9 m, coll. Tai-Tu N., 30.10.2020, VRTCM.Ga 27051019.05 (3 shells); Namyt Island, on dead corals and under stones, 10°11'03.8"N, 114°22'05.2"E, depth: 16–18 m, coll. Tai-Tu N., 11.10.2020, VRTCM.Ga 27051920.04 (2 shells); Tho Chu Islands, Kien Giang Province, Vietnam: Hon Xanh Island, on dead corals and under stones, 09°16'45.4"N, 103°29'16.0"E, depth: 12 m, coll. Tai-Tu N., 13.6.2023, VRTCM.Ga 38080923.02 (7 shells).

Diagnosis. The shell is short, conoid, rather flat sides, base wide. Protoconch has 5–5½ whorls. Teleoconch has 8–9 whorls, with three spiral cords. The first and third spiral cords are smooth, appearing as granulated spiral cords on the first 2 teleoconch whorls. The second spiral cord is granular, developing later on the second teleoconch whorl. Spiral microsculpture of fine threads and axial ribs between the main spiral cords. The last whorl has 26–28 axial ribs. The shell has a white background with patches of brown to dark brown. The third spiral cord on the teleconch whorls is more brightly colored than the first and second spiral cords.

Description. The shell is short, conoid, rather flat sides, base wide. The shell has a white background with patches of brown to dark brown. The third spiral cord on the teleconch whorls is more brightly colored than the first and second spiral cords. Protoconch is reddish brown, with 5–5½ whorls. First protoconch whorl has hemispherical granules; protoconch whorls 2–3 have one median spiral thread, protoconch whorls 4–5½ have 2 median spiral threads; uninterrupted axial riblets on protoconch whorls. Teleoconch has 8–9 whorls, with three spiral cords. The first and third spiral cords are smooth, granulated on the first 2 teleoconch whorls. The second spiral cord is granular, developing later on the second teleoconch whorl. Spiral microsculpture of fine threads and axial ribs between the main spiral cords. The last whorl has 26–28 axial ribs. Base with an additional granulated spiral cord (Fig. 7C, S1) and a small, smooth spiral cord (Fig. 7C, S2). Peristome with an additional tubercled spiral cord (Fig. 7D, Sp1). Aperture subquadrate. Outer lip rather thick and flared. Anterior siphonal canal oblique, subtubular, rather short.

Measurements. Shell height 3.6–6.3, shell width 1.1–2.2 (n = 14).

Distribution. This species is known from Tho Chu islands and Spratly Islands islands.

Ecology. This species collected under stones and on dead corals.

Remarks. *Viriola thochuensis* n. sp. is super-

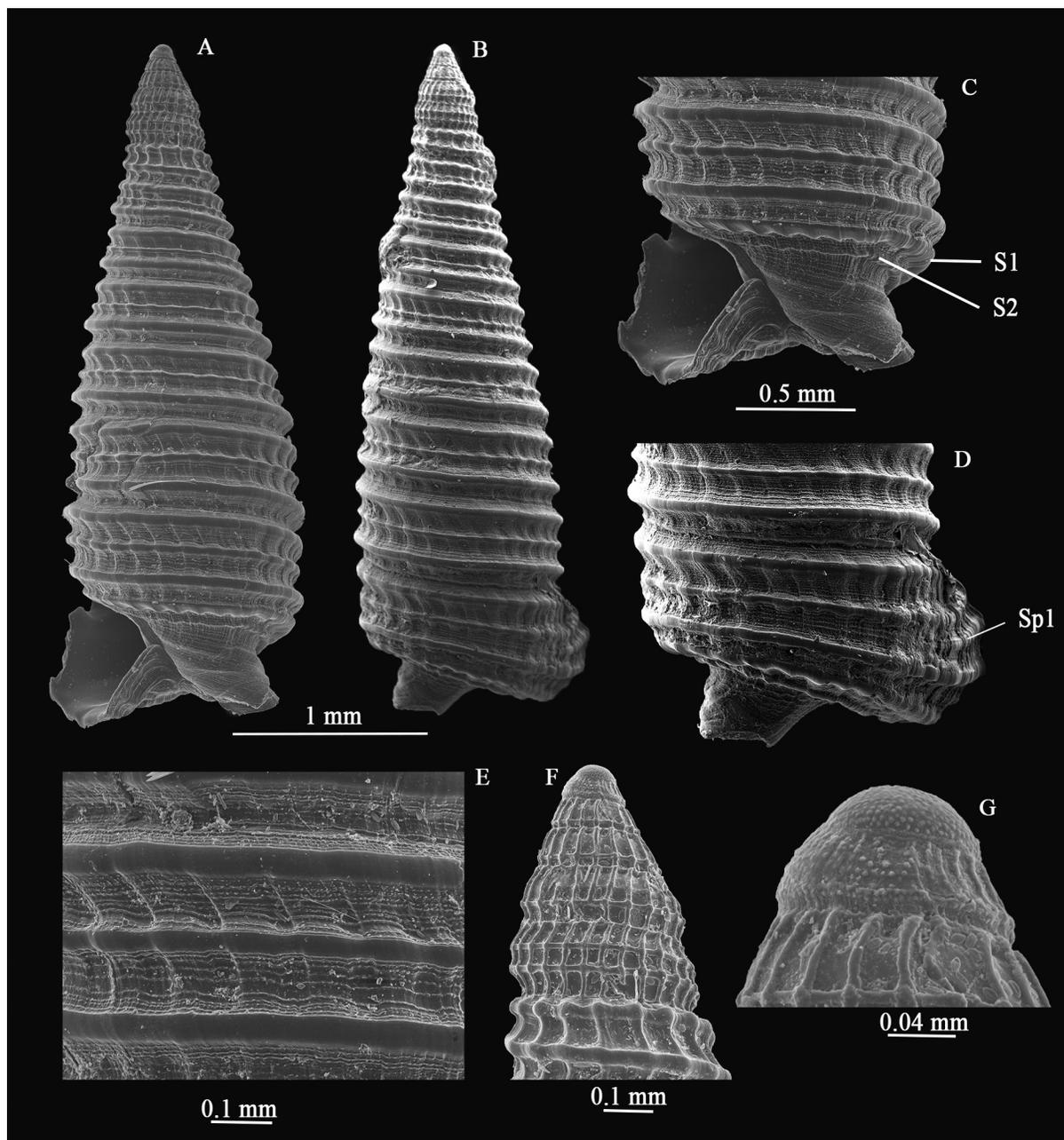


FIG. 7. *Viriola thochuensis* n. sp., Hon Xanh Island, Tho Chu Islands, Kien Giang province, Viet Nam, 12 m, 13.6.2023, BL – 6.22 mm. **A.** Front view. **B.** Dorsal view. **C.** Last whorl. **D.** Peristome. **E.** Teleoconch microsculpture. **F.** Protoconch. **G.** First protoconch whorl. **S1–S2.** Additional spiral cords on the base. **Sp1.** Additional spiral cord on the peristome. Scale bars: A–B. 1 mm; C–D. 0.5 mm; E–F. 0.1 mm; G. 0.04 mm.

ficially similar to *V. intergranosa*. However, *V. thochuensis* n. sp. differs from *V. intergranosa* in having the shell short, conoid, with rather flat sides, base rather wide (vs. the shell short, cyrtococonoid); protoconch with 5–5½ whorls (vs. 6 whorls); the first and third spiral cords appeared as granulated spiral cords on the first 2 teleoconch whorls (vs. appeared as granulated spiral cords on the first 3 teleoconch whorls); the second spiral cord appears on the second teleoconch whorl (vs. appears on the fifth teleoconch whorl); spiral microsculpture of fine threads and axial ribs (vs. strings of granules and axial ribs); the last

whorl has 26–28 axial ribs (vs. 22–24 axial ribs); outer lip rather thick (vs. rather thin).

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