

SINGAPORE MOLLUSCA: 5. THE SUBFAMILY PLANAXINAE (GASTROPODA: CAENOGASTROPODA: CERITHIOIDEA: PLANAXIDAE)

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ABSTRACT. — The subfamily Planaxinae, of the family Planaxidae, in Singapore is treated here. The subfamily is currently represented in Singapore by two species: *Fissilabia decollatus* and *Planaxis sulcatus*. Diagnoses, figures, records, and other information on both species are provided as part of an effort to document the diversity of the malacofauna in Singapore. Comments on the current composition of this subfamily in Singapore, as well as remarks on *Monoptygma melanoides*, a subjective synonym of *Fissilabia decollatus*, are also provided.

KEY WORDS. — Mollusca, Gastropoda, *Fissilabia*, *Planaxis*, Singapore, taxonomy, nomenclature, records

INTRODUCTION

The Planaxidae J. E. Gray, 1850, is a family of largely marine gastropods composed of two subfamilies, the Fossarinae A. Adams, 1860, and Planaxinae J. E. Gray, 1850 (Houbrick, 1990; Bouchet & Rocroi, 2005). The subfamily Planaxinae comprises about 20 living species assigned to some five to seven genera (Houbrick, 1987, 1992; Ponder, 1988). They are commonly called clusterwinks owing to their habit of congregating gregariously on rocks during low tide (Fig. 1). The animals are well adapted to rocky, intertidal environments where they graze on microalgae covering rocky substrates. Females brood their young in cephalic brood pouches, usually up to the veliger stage (Houbrick, 1987). Remarkably, a few species are capable of bioluminescence (Houbrick, 1987; Ponder, 1988).

In this part of a series of group-by-group treatments of the molluscs found in the Republic of Singapore (see S. K. Tan & Low, 2013), the subfamily Planaxinae J. E. Gray, 1850, is reviewed. Three planaxine species were listed by S. K. Tan & Woo (2010: 29), namely *Fissilabia decollata* (Quoy & Gaimard, 1833), *Planaxis sulcatus* (Born, 1778), and *Couthouyia styliferinus* (Nevill, 1884). The last-named was described by Nevill (1884: 167) based on material from Singapore, and was listed by S. K. Tan & Woo (2010: 29) based on the records of Chuang (1973b: 198) and Chou et al. (1994: 77). This species is however, currently assigned to the family Vanikoridae Gray, 1840 (see Robba et al., 2007: 34), and is not treated here.

MATERIAL AND METHODS

Relevant literature on the subfamily Planaxinae was reviewed. Records were collated from the available literature, and geographically-relevant material in various collections was examined. Primary synonyms and records mentioning Singapore are listed. Abbreviations of the collections from which specimens were examined in the course of this study are: ZRC = Zoological Reference Collection of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore (NUS); and TSK = collection of the first author. Measurements are given in the form of shell height (SH) × shell width (SW). Shell height is defined as the distance from the apex to the lowest part of the basal side of the peristome, and shell width is the distance between the edges of the widest part of the periphery perpendicular to the coiling axis. All measurements are in millimetres (mm).

SYSTEMATIC ACCOUNTS

SUPERFAMILY CERITHIOIDEA FLEMING, 1822

Cerithiidae Fleming, 1822: 491 (type genus *Cerithium* Bruguière, 1789).

Remarks. — This family-group name was first established as Cerithiidae and emended to Cerithiidae (Bouchet & Rocroi, 2005: 47).



Fig. 1. *Planaxis sulcatus* (Born, 1778), from Singapore (in situ): A, St. John's Island; B, Tanah Merah Ferry Terminal; C, D, Pulau Semakau. See Fig. 2 for detailed locations. (Photographs by: S. K. Tan)

FAMILY PLANAXIDAE J. E. GRAY, 1850

Planaxina J. E. Gray, 1850: 70 (type genus *Planaxis* Lamarck, 1822).

Remarks. — This family-group name was originally established as Planaxina (see also Bouchet & Rocroi, 2005: 133), and was first proposed in an 1850 work entitled *Figures of Molluscous Animals, Selected from Various Authors*. The authorship of the taxon names in this work is generally attributed to J. E. Gray (e.g., Houbrick, 1987; Bouchet & Rocroi, 2005; Petit, 2012). However, some authors attribute authorship to J. E. Gray in M. E. Gray (e.g., Valdés & Fahey, 2006: 95).

The first eight lines of typeface on the title-page of the work are as follows: “*Figures of Molluscous Animals, Selected from Various Authors. Etched for the Use of Students* by Mary Emma Gray” (the wife of J. E. Gray) appears to have given rise to the attribution of “J. E. Gray in M. E. Gray”, which is accordance with the rules of zoological nomenclature (Article 50.1.1, ICZN, 1999: 52), that require a distinction is to be made between the author who publishes (or makes available) a name and the author who publishes the work in which the name is contained, if they are not the same individual.

From the title-page, it would seem that M. E. Gray was the author of the work, while J. E. Gray was the author of the taxon names therein. However, the preface (pp. iii, iv) was signed by J. E. Gray, and the contents of this preface make it clear that M. E. Gray was simply assisting her husband in etching these plates. The authorship of all the taxa in this 1850 publication should therefore only be attributed to J. E. Gray.

SUBFAMILY PLANAXINAE J. E. GRAY, 1850

Genus *Planaxis* Lamarck, 1822

Planaxis Lamarck, 1822: 50 (type species *Buccinum sulcatum* Born, 1778, by subsequent designation by J. E. Gray, 1847: 138).

Planaxis sulcatus (Born, 1778)

(Figs. 1, 2, 3C–H, 4)

Buccinum sulcatum Born, 1778: 251, 252 (type locality: none stated/traced).

Buccinum pyramidale Gmelin, 1791: 3488 (type locality “Tranquebar”) [see Houbriek, 1987: 5].

Planaxis undulata Lamarck, 1822: 51 (type locality: “l’Océan des Indes orientales”) [see Houbriek, 1987: 5].

Planaxis buccinoides Deshayes, 1828: 13 (type locality: none stated/traced) [see Houbriek, 1987: 5].

Planaxis brevis Quoy & Gaimard, 1833: 488, 489, pl. 33, figs. 30–32 (type locality: “à Guam et à la Nouvelle-Guinée”) [see Tryon, 1887: 276].

Planaxis obscura A. Adams, 1853: 271 (type locality: none stated/traced) [see Tryon, 1887: 276].

Planaxis menkeanus Dunker, 1862: 41, 42 (type locality: “Mari erythraeo” [= Red Sea]) [see Tryon, 1887: 276].

Singapore records:

Planaxis sulcata [sic] – Traill, 1847: 241 [first record]. — Traill, 1858: 174 (after Traill, 1847).

Planaxis sulcatus – Nevill, 1884: 184. — R. D. Purchon & Enoch, 1954: 60 (Raffles Lighthouse). — Chuang, 1961: 153, 205, pl. 59, fig. 1 (Raffles Lighthouse). — Poon, 1962: 17, 18, 22, 24, 40 (Tanjong Teritip). — Chuang, 1973a: 156, 157, 170, fig. 25C (Pulau Salu). — Chuang, 1973b: 188, 200 (Pulau Hantu; Pulau Salu; Raffles Lighthouse; Tanjong Gul; Tanjong Teritip). — Ewing-Chow, 1976: 15, 20, 21, 24 (Labrador; Tanjong Gul). — Way & R. D. Purchon, 1981: 315 (Raffles Lighthouse [see R. D. Purchon & D. E. A. Purchon, 1981: 298]). — Vermeij, 1987a: 110 (Pulau Subar Darat). — Vermeij, 1987b: 317. — Vermeij, 1989: 295 (Pulau Salu; Pulau Subar Darat). — K. S. Tan & Chou, 2000: 13, 73, 3 unnumbered figs. — M. F. C. Ng, 2009: 106 (Pulau Semakau). — S. K. Tan & Woo, 2010: 29. — S. K. Tan & Yeo, 2010: 293 (Pulau Semakau). — Wang et al., 2011: 416. — M. F. C. Ng, 2012: 144 (Pulau Semakau).

Planaxis sp. — L. W. H. Tan & P. K. L. Ng, 1988: 46, unnumbered fig. — L. W. H. Tan & P. K. L. Ng, 2001: 46, unnumbered fig.

Planaxis suleatus [sic] – Chou et al., 1994: 77.

Material examined. — **Singapore.** National Service Resort and Country Club (TSK 3602), Apr.1997; Pulau Semakau (ZRC.MOL.5644), 4 Jan.2011; Pulau Subar Laut (ZRC.MOL.5650), 28 Sep.2011; Pulau Salu (TSK), 25 Oct.2003; Sentosa, Tanjong Rimau (ZRC 1999.1574), 1999; Tanah Merah Ferry Terminal (TSK 3601), 27 Jan.1998. **Indonesia.** Riau, Pulau Batam (ZRC 1999.1556), 8/10 Apr.1989. **Malaysia.** Johore: Tanjong Sedili (ZRC 1999.1576), 12 Apr.1997; Tanjong Penyabong (ZRC 1999.1562), 8 Oct.1991; Tanjong Balau (ZRC 1999.1579), 6 Mar.1996. Kedah, Pulau Langkawi, Kuala Triang (ZRC 1999.1569), 4 Mar.1991. Pahang: Cherating (ZRC 1999.1553), 25 Mar.1989; Kuantan, Tanjong Tembeling, Pantai Teluk Cempedak (ZRC 1999.1555), 31 Jul.1989. **Thailand.** Ko Samui, Ao Taling Ngam (TSK), 31 Jan.2006. Phuket Island: Laem Phan Wa (ZRC 1999.1557), 15 Jan.1994; Rawai (TSK), 14 Feb.2000.

Distribution in Singapore. — See Fig. 2.

Habitat. — Intertidal rocky shores and seawalls, clustering in groups around the mid to low tidal zones during low tides (Houbriek, 1987; unpublished data; Fig. 1A, B, D).

Diagnosis. — The following diagnosis is based on specimens from Singapore and additional information in Houbriek (1987). Shell solid, wide, moderately elongated, to 35 mm in shell height; whorls inflated, each sculptured with 5 to 6 incised spiral lines or grooves, suture deeply impressed; body whorl very large and wide, profile of base moderately concave; aperture ovate, about half the shell height or slightly less; outer lip smooth, slightly scalloped and denticulate within, interior of aperture prominently sculptured with deep grooves, siphonal canal short and wide, columella concave with slight callus and prominent parietal tooth at posterior. Shell dark brown to brownish black with variable amount of white blotches, particularly on the spiral cords; periostracum thin, brown; interior of aperture purplish white, columella white.

Remarks. — This is a very common species that occurs in large populations on rocky shores, seawalls, and breakwaters on the eastern and southern shores of Singapore. It is easily recognisable, partly due to its gregarious habits, and there are no similar looking species that can be possibly confused with it locally.

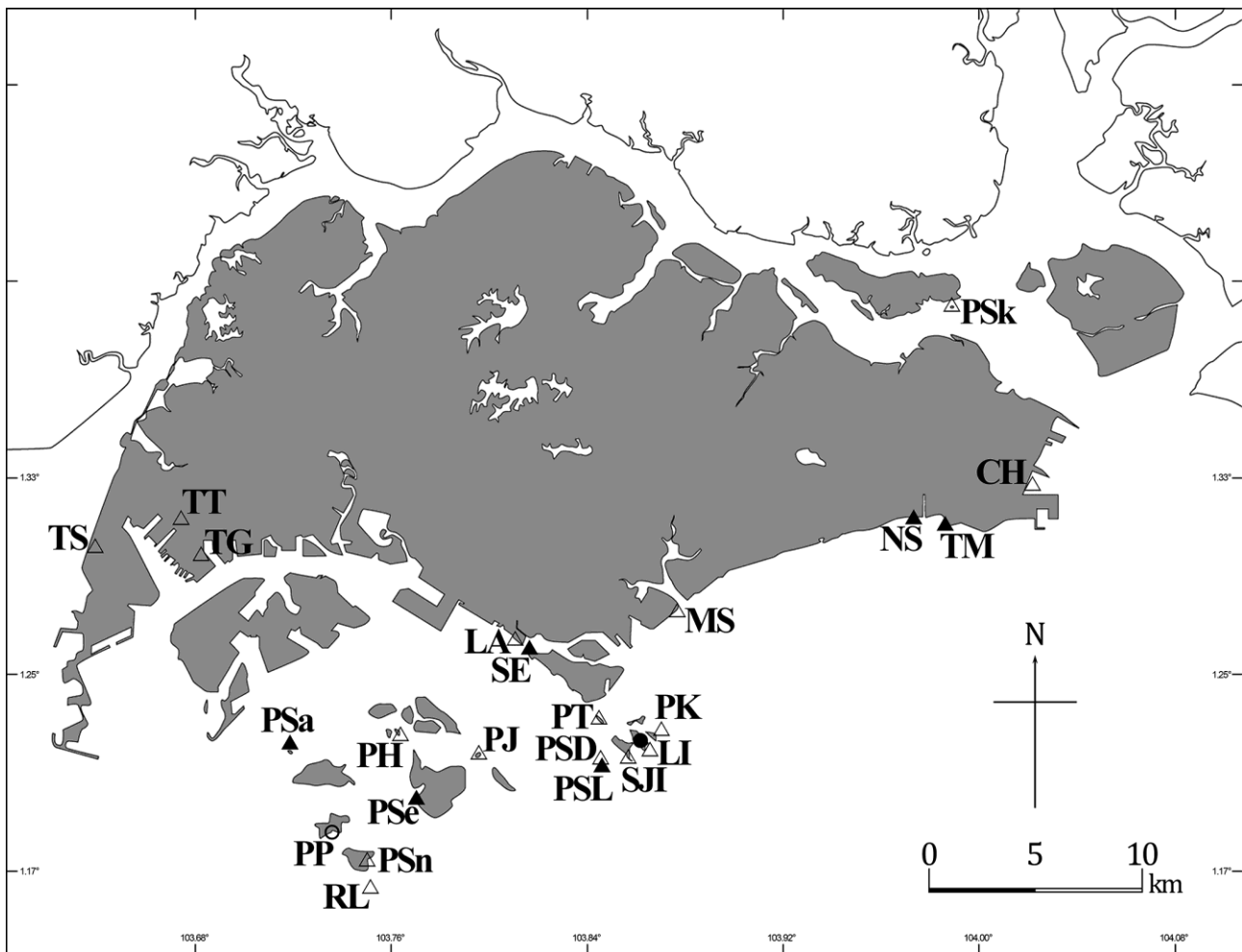


Fig. 2. Distribution of the family Planaxidae J. E. Gray, 1850, in Singapore: ●, *Fissilabia decollatus* (Quoy & Gaimard, 1833); ▲, *Planaxis sulcatus* (Born, 1778). Filled symbols represent records based on material examined, while open ones represent records from both published literature and unpublished data. Abbreviations used: CH, Changi East Bay (Red Cliff Shoal); LA, Labrador (facing Sentosa); LI, Lazarus Island; MS, Marina South; NS, National Service Resort and Country Club; PH, Pulau Hantu; PJ, Pulau Jong; PK, Pulau Kusu; PP, Pulau Pawai; PSa, Pulau Salu; PSD, Pulau Subar Darat; PSe, Pulau Semakau; PSk, Pulau Sekudu; PSL, Pulau Subar Laut; PSn, Pulau Senang; PT, Pulau Tekukor; RL, Raffles Lighthouse (Pulau Satumu); SE, Sentosa Island (Tanjong Rimau); SJI, St. John's Island; TG, Tanjong Gul; TM, Tanah Merah Ferry Terminal; TS, Tuas South; TT, Tanjong Teritip. Note that three of the localities (viz., TG, Tanjong Gul; TS, Tuas South; TT, Tanjong Teritip) have now been reclaimed and are no longer extant; explaining their position on what is now land.

Although this species is currently accepted as a widespread Indo-West Pacific species, two distinct geographically correlated distinct modes of larval development have been noted by Houbrick (1987). In Indian Ocean populations, a viviparous mode of development was reported, while larvae are released as planktotrophic veligers in Western Pacific populations. This led to the suggestion by Houbrick (1987) of the possible existence of two geographically separate sibling species. However, no notable differences in conchological or anatomical characteristics between Indian Ocean and Western Pacific Ocean populations (or different ecoregions) have been reported in the literature.

Based on material that we have seen however, distinct albeit slight differences in shell morphology of populations from different regions appear to be evident. Shells of this species from Singapore and its immediately adjacent areas (e.g., southern part of Peninsular Malaysia and Riau, Indonesia) are predominantly very dark brown to black with sparse white markings (see Fig. 3C–H), while the shells from localities further north (Phuket Island and Ko Samui, Thailand, and Pulau Langkawi, Malaysia) are predominantly white with black markings. Populations from the Gulf of Thailand and the Andaman Sea also seem to show rather distinct and consistent differences in shell patterns (Fig. 4A–D vs. 4E–H). However, we do not have enough material from the entire distribution range to determine if these forms are truly restricted to their respective ecoregions or if other distinct forms occur and/or whether there is intergradation. Future studies supported by molecular analyses will be helpful in resolving this interesting problem.

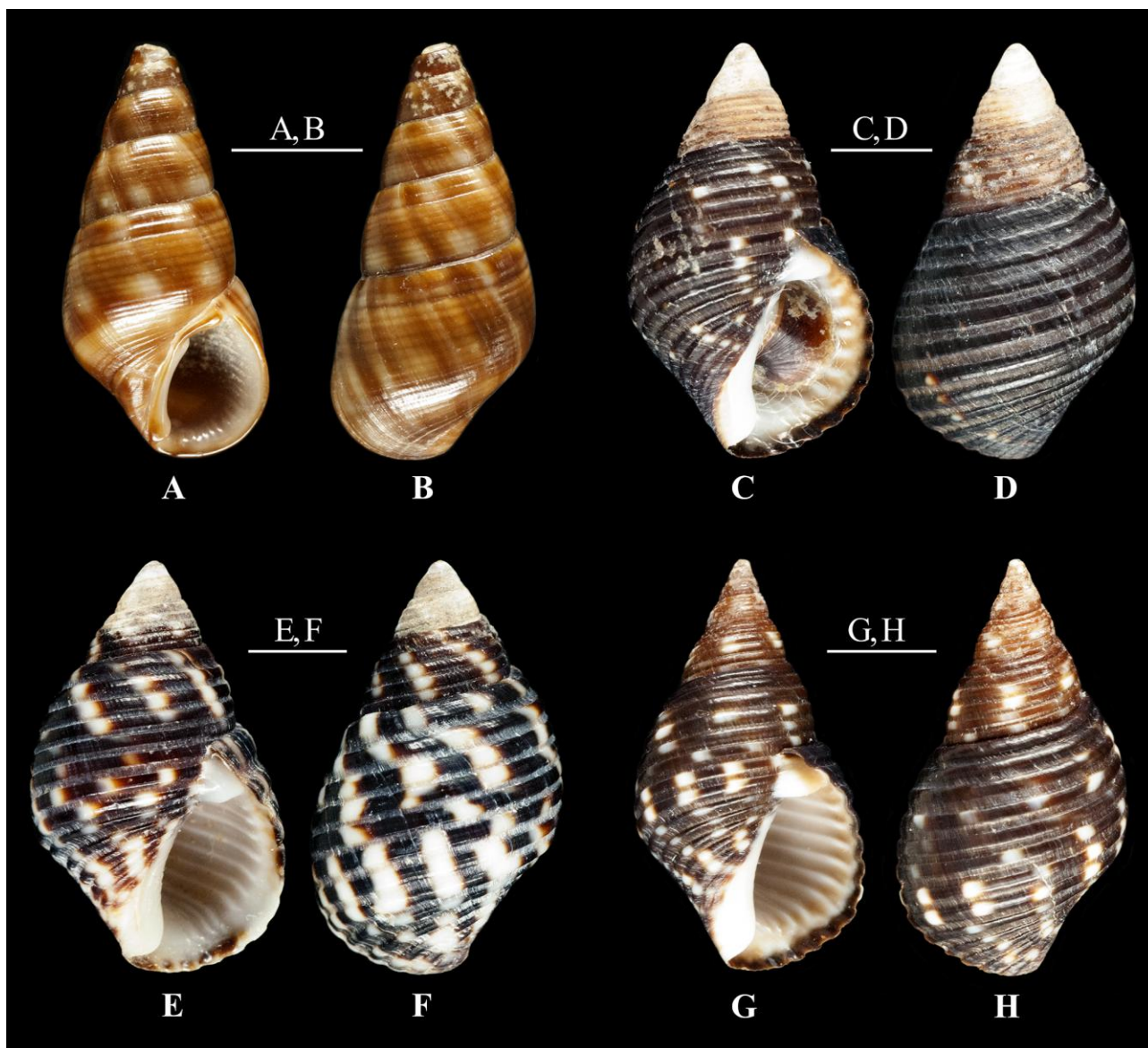


Fig. 3. Specimens of the family Planaxidae J. E. Gray, 1850, from Singapore: A, B, *Fissilabia decollatus* (Quoy & Gaimard, 1833) (SH 15.3 × SW 7.6 mm; TSK); C–F, *Planaxis sulcatus* (Born, 1778) (C, D, SH 20.5 × SW 12.2 mm; E, F, SH 20.6 × SW 12.9 mm; G, H, SH 20.0 × SW 11.2 mm; TSK 3601). Scale bars = 5 mm. (Photographs by: S. K. Tan).

Genus *Fissilabia* MacGillivray, 1836

Fissilabia MacGillivray, 1836: 42 (type species *Fissilabia fasciata* MacGillivray, 1836 [= *Planaxis decollata* Quoy & Gaimard, 1833 (see Iredale, 1911: 259; Houbbrick, 1987: 10, 11)], by monotypy).

Remarks. — See Iredale (1911: 259) for a discussion on the authorship and synonymy of the genus-group name *Fissilabia* MacGillivray, 1836.

Fissilabia decollatus (Quoy & Gaimard, 1833)

(Figs. 2, 3A, B)

Planaxis decollata Quoy & Gaimard, 1833: 489–491, pl. 33, figs. 33, 37 (type locality: “Dorey, à la Nouvelle-Guinée”).

Monoptygma melanoides I. Lea, 1833: 185, footnote (type locality: “Calcutta”?) [see Tryon, 1887: 280].

Fissilabia fasciata MacGillivray, 1836: 42 [see Houbbrick, 1987: 11].

Quoyia michau Crosse & Fischer, 1863: 375, pl. 13, fig. 6 (type locality: “in insula Poulo-Condor dicta, Cochinchinae”) [see Tryon, 1887: 280; Houbbrick, 1987: 11].

Singapore records:

Planaxia (*Fissilabia*) *decollata* – Chuang, 1973b: 188, 200 [first record].

Quoyia decollata – Way & R. D. Purchon, 1981: 315 (Pulau Pawai). — Chou et al. 1994: 77.

Fissilabia decollata – S. K. Tan & Woo, 2010: 29.

Material examined. — Singapore. Lazarus Island (TSK), 12 Sep.2004.

Distribution in Singapore. — See Fig. 2.

Habitat. — High intertidal zone of rocky habitats; found at bases and crevices of large rocks and boulders on exposed rocky shores, and under rubble and debris in the upper littoral zone of more protected areas, clustering in moist areas during low tide and generally away from bright light (Houbrick, 1987).

Diagnosis. — The following diagnosis is based on specimens from Singapore and additional information in Houbrick (1987). Shell thick and solid, tall and narrow, typically decollate in adults, to 30 mm in shell height; whorls weakly inflated, each sculptured with about 8–10 incised spiral lines, suture impressed; body whorl large, moderately inflated, periphery angulate, sculptured with numerous spiral lines, profile of base moderately concave and constricted towards siphonal canal; aperture ovate, about one-third of shell height; outer lip smooth, siphonal canal short, columella concave, with a thickened prominent parietal plait that extends into the aperture. Shell tan to dark brownish-grey, usually with faint whitish blotches and irregular dark streaks; periostracum thick, tan; inside of aperture purple-brown, edges and columella whitish.

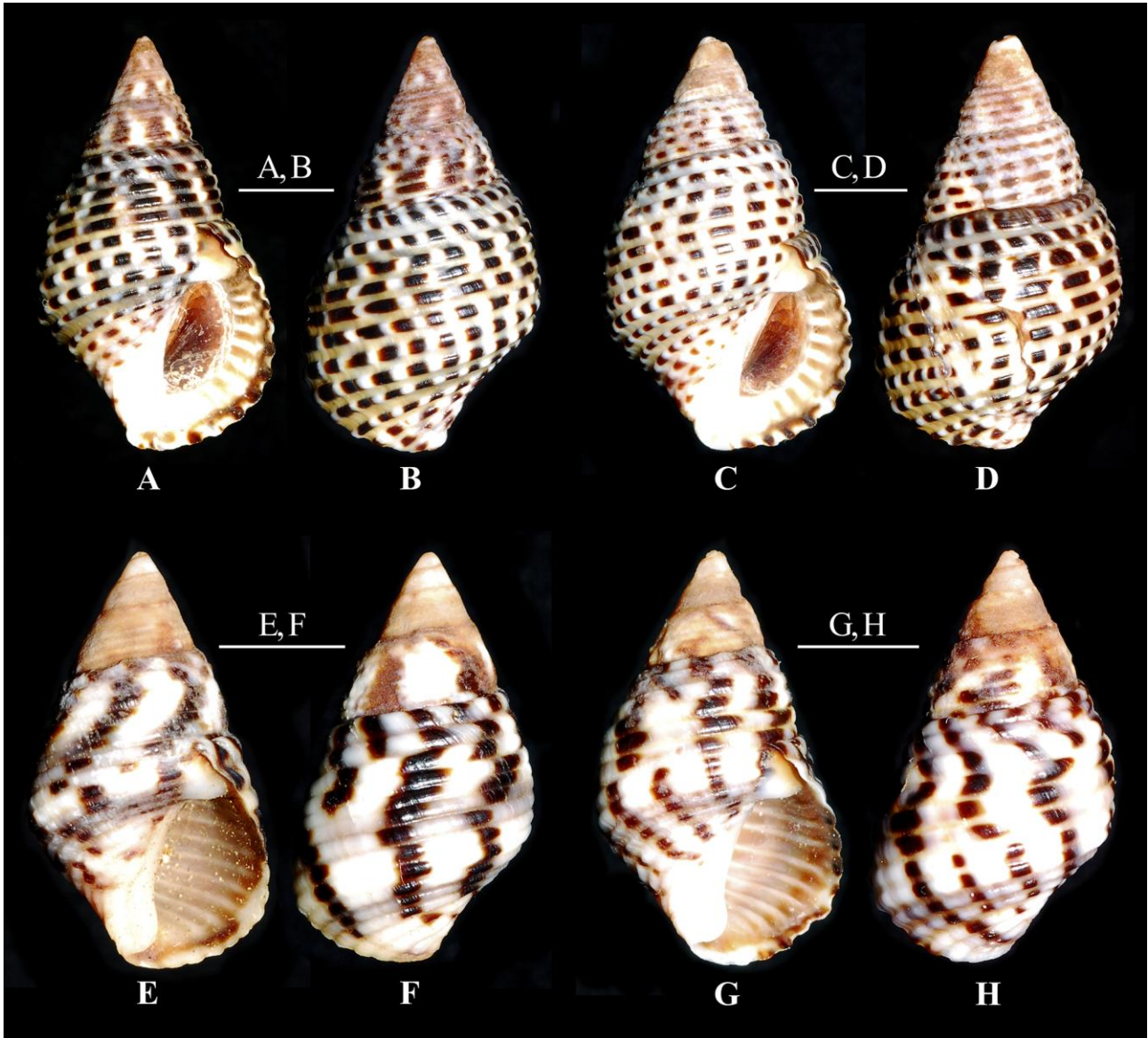


Fig. 4. Variations of *Planaxis sulcatus* (Born, 1778), from the eastern and western coasts of Thailand for comparison: A–D, Koh Samui (A, B, SH 22.2 × SW 12.1 mm; C, D, SH 23.0 × SW 13.9 mm; TSK); E–H, Phuket Island (E, F, SH 17.3 × SW 10.2 mm; G, H, SH 16.8 × SW 9.6 mm; TSK). Scale bars = 5 mm. (Photographs by: S. K. Tan).

Remarks. — This species belonging to a monotypic genus is easily recognised by its strong shell with a typically truncated apex. It has thus far been found only on the rocky shores of the southern islands of Singapore. This species appears to be rare locally with no confirmed records reported in the past decade.

The date of publication of *Planaxis decollatus* is sometimes cited as “1834” (e.g., Way & R. D. Purchon, 1981: 315; S. K. Tan & Woo, 2010: 29), however, the portion of text (pp. 489–491) in which this name was described was published in 1833 (as determined by Sherborn & Woodward, 1901: 333).

I. Lea (1833: 185, footnote) proposed the name *Monoptygma melanoides* based on a specimen probably originating in Calcutta, India. Tryon (1887: 280) (and followed by Adams & Leloup, 1938: 98), considered this name to be synonymous with *Fissilabia decollatus* (Quoy & Gaimard, 1833), an opinion with which we agree. The description of *Monoptygma melanoides* agrees well with the current concept of *Fissilabia decollatus* (Quoy & Gaimard, 1833) (see also Houbriek, 1987: 11).

The rules of zoological nomenclature (ICZN, 1999: 24–31) require that the oldest name is the valid (correct) name that has to be used for a species. Although the names *Fissilabia decollatus* and *Monoptygma melanoides* were both published in 1833, the relative precedence of both names is not known. We have not been able to determine an exact date of publication for Quoy & Gaimard (1833), and nothing is known about the date of publication of I. Lea (1833) apart from it being published at some point after 1 Nov. 1833 (see Coan, 1966: 135). It should also be noted that even if *Monoptygma melanoides* were to be found to be the earlier name, it should not automatically replace *Fissilabia decollatus* (see Article 23.9, ICZN, 1999: 28, 29). Herein, we maintain prevailing usage of the name *Fissilabia decollatus* (Quoy & Gaimard, 1833), and consider it to be the valid (and correct) name for this species.

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