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A revision of *Doxanderina* Dekkers and Maxwell, 2020 (Gastropoda: Neostromboidae: Strombidae): The extant *Doxander* Wenz, 1940 and a new species from Queensland

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ABSTRACT In this study, the extant *Doxanderina* species are addressed. Species contained within *Doxander* are examined based on type material, and a new species from Queensland is recognised. Comparisons are made based on morphology. This revision recognises six species in the *Doxander* complex: *D. campbellii*, *D. entropi*, *D. japonicus*, *D. queenslandicus* nov. sp, *D. operosus*, and *D. vittatus*. *Doxander queenslandicus* is most similar to *D. vittatus* from Indonesia, but differs in the body whorl being more dorso-laterally compressed, having a terminal point of the anterior canal which does not extend past the outer lip as in *D. vittatus*, and the presence of a dorsal knob on the shoulder of *D. queenslandicus*.

KEY WORDS *Doxander*, Indo-Pacific, new species, Queensland, Taxonomy

INTRODUCTION

This study revises the extant *Doxander* Wenz, 1940, a clade of marine molluscs, it is the first in a series of papers examining the *Doxanderini* Dekkers and Maxwell, 2020, which includes extant and fossil species within *Doxander* and *Neodilatilabrum* Dekkers, 2008, as well as the extinct genus *Laevispira* Raven, 2021. Recent revisions at the species level in Strombidae have demonstrated the taxonomic practice of aggregating taxa (Abbott 1960, 1961), lumping, which has led to an underestimation of the potential diversity within the complex (Maxwell *et al.* 2020; Dekkers and Maxwell 2020a; Maxwell and Dekkers 2021a, 2021b). Similarly, stromboidean revisions at the species level have often not addressed the issues of precedence, nor considered type material, giving rise to ongoing taxonomic confusion and misidentification (Man in't Veld and Visser 1993).

Doxanderini and its sister taxon, *Dolomenina* Dekkers and Maxwell, 2020 are contained within *Dolomenini* Dekkers and Maxwell, 2020. The relational definitions that underpin these taxa provide the framework upon which further study can be undertaken, including the recognition and study of fossil taxa (see Maxwell 2021). Raven (2021, p. 40) noted "As their analysis demonstrates all are closely related and fossil material has been excluded from their analysis, they are herein interpreted as subgenera. That will facilitate further analysis at generic level including extinct species". There is no need to relegate the taxonomy to subgenera on the ground of allowing for further analysis that included extinct taxa. The use of higher taxonomy with definitional relationships allows for fossil inclusivity, irrespective of the taxa that were used to define those clades. Understanding what the role of definitions are in taxonomy, and how those definitions are intended to be used to bring relational meaning, and how these names are constructed under the PhyloCode (2020), is

still to permeate the world of mollusca and leads to misunderstandings on inclusivity and exclusivity of the definitions.

With regards *Doxander* Wenz, 1940, again Abbott (1960), collapsed or relegated all but one taxon, under the *Strombus* (*Doxander*) *vittatus* Linné, 1758, leaving *Strombus* (*Doxander*) *campbellii* Griffith and Pidgeon, 1834 and *Strombus* (*Doxander*) *listeri* Gray, 1852 as the three extant members of *Doxander* Iredale, 1931. Okutani (1965) removed *Strombus listeri* Gray, 1852 from *Doxander* and placed it within *Euprotomus* Gill, 1870, later it was moved to the monotypic genus *Mirabilistrombus* Kronenberg, 1998. Man in't Veld and Visser (1993) revised much of the *Doxander* and reinstated, and expanded, the complex at the subspecific level, thus supporting the taxonomy of Abbott (1960) at the species level, noting a number of distinct regional subspecies, and this revision has formed the basis for the taxonomic consensus on the internal content within *Doxander* (Dekkers and Maxwell 2020b). However, it is considered herein too conservative taxonomically to consider these as subspecies; these should be recognised as species based on morphological and geographical conceptuality (Maxwell and Dekkers 2019; Dekkers and Maxwell 2020b) as did Kronenberg and Wieneke (2020).

More recently there has been renewed interest in the typology of the *Doxander* (Kronenberg and Wieneke 2020), which has necessitated a full review of the genus. There has been a mismatch in what is considered "*vittatus*" within revisions (Dodge 1956; Abbott 1960; Man in't Veld and Visser 1993; Kronenberg and Wieneke 2020). The syntype material contained within the Linnaean Collection, London, and the supporting literary references supplied by Linné (1758) (= *Doxander operosus* (Röding, 1798), except for which is not indicative of the current purported species in the literature except for the Rumphius (1705, 1741) figure O that was designated as the lectotype by Man in't Veld and Visser (1993). This designation is reflected in the *Doxander vittatus* (Linné, 1758) herein, and this in agreement with the most recent work that dealt with *Doxander*, Kronenberg and Wieneke (2020). In this revision, I seek to give clarity to the members of the Doxander, examine the types to ensure that they are consistent with the nomenclature, and provide examples of each species.

Abbreviations

SMC Stephen Maxwell Collection, Cairns, Queensland.
VC Valda Cantamessa Collection, Proserpine, Queensland.
SBRF BlueSky Research Foundation, Cairns, Queensland.

Methods

This study uses shell morphology to examine the variability with in the *Doxander* Wenz, 1940 post Abbott (1960) after Man in't Veld and Visser (1993) to identify potential species. This process involved the examination of the nomenclature and a referral back to the type material (Figures 1 - 3) and examined how the nomenclature reflects that type material, and where there is inconsistency or error the nomenclature was determined, the nomenclature was corrected to reflect the systematics. This enabled a list of existing species to be generated upon which to commence the review. The choice in the use of species or subspecies followed Maxwell and Dekkers (2019; Maxwell *et al.* 2021): species are recognised by phenetic differences in morphology irrespective of geographical distribution, while subspecies are only able to be discriminated by genetic diversity (Wei *et al.* 2021).

A total of 586 specimens were examined with five species recognised: *Doxander campbellii* (Griffith and Pidgeon, 1834) (n = 292), *Doxander queenslandica* n. sp. (n = 93), *Doxander japonicus* (Reeve, 1851) (n = 34), *Doxander entropi* (Man in't Veld and Visser, 1993) (n = 74), *Doxander vittatus* (Linné, 1758) (n = 10) and *Doxander operosus* (Röding, 1798) (n = 84). Comparative images of the mid-teleoconch (Figure 4) and upper-outer lip (Figure 5) were provided to illustrate differences between species (Where a literary reference to a location could not be located it has been omitted). Location information for each species was mapped to estimate the known ranges of each species (Figures 6 - 7).

PhyloCode (2020) identification numbers (RegNum) for the taxonomy have been provided where applicable; the names were constructed in order to be compliant with the ICZN (1999) to provide a level of taxonomic stability in their application and use.

SYSTEMATIC PART

Superfamily	Stromboidea Rafinesque, 1815
Epifamily	Neostromboidae Maxwell, Dekkers, Rymer and Congdon, 2019 (RegNum 565, Maxwell 2021)
Family	Strombidae Rafinesque, 1815 (RegNum 566, Maxwell 2021)
Subfamily	Neostrombinae Maxwell and Rymer, 2021 (RegNum 567, Maxwell 2021)
Tribe	Dolomenini Dekkers and Maxwell, 2020 (RegNum 580, Maxwell 2021)
Subtribe	Doxanderina Dekkers and Maxwell, 2020 (RegNum 581, Maxwell 2021)

Doxander Wenz, 1940

Type Species. *Strombus vittatus* Linné, 1758, p. 545, no. 439 (Wenz 1840).
Registration: RegNum 582 (Maxwell 2021).
Definition. The maximum clade consisting of *Doxander vittatus* (Linné, 1758) and all species that share a more recent common ancestor with them than with *Neodilatilabrum marginatum* (Linné,1758), *Dolomena pulchella* (Reeve, 1851), *Labiostrombus epidromis* (Linné, 1758), *Ministrombus minimus* (Linné,1771), *Mirabilistrombus listeri* (Gray, 1852), *Neostrombus fusiformis* (Sowerby II, 1842) or *Laevistrombus vanikorensis* (Quoy and Gaimard, 1834) (Maxwell 2021, p. 197).
Original Description. "Gehäuse groß bis sehr groß, schlank, spindelförmig; Gewinde hoch; Umgänge gewölbt, mit schmalem, glattem Streifen unter der Naht und axialen Rippen; Endwindung fast glatt oder mit mehr oder weniger deutlichen axialen Rippen, auf der unteren Hälfte mit Spiralrillen" (Wenz 1940, p. 945) [Translation: Shell large to very large, slender, spindle-shaped; high spire; whorls rounded, with small spiral line under the suture and axial ribs; body whorl almost smooth or with distinct axial ribs on the lower half with spiral grooves (Dekkers and Maxwell 2020, p. 42)].
Supplementary Diagnosis. The lateral tooth has a peg at the base, while the marginal teeth are thickened ovately. The operculum is strongly serrated. The aperture of the shell is always white. There is a short thin appendage on the posterior part of the mantle.
Synonymy.
Doxander Iredale, 1931, p. 212 (Type – *Strombus vittatus* Gmelin, 1791 = *Strombus vittatus* Linné, 1758), unavailable (Dekkers and Maxwell 2020).
Doxander Wenz, 1940, p. 945 (Type – *Strombus vittatus* Linné, 1758).

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Doxander campbellii (Griffith and Pidgeon, 1834)
(Figures 1A and 8)

Type. Drawing representing the holotype: Griffith and Pidgeon (1834), pl. 25, fig. 6 (Figure 1A), (Man in't Veld and Visser 1993, p. 30).

Type Locality. Abbott (1960) provided Bowen, Queensland, as a population that conformed to the morphology and colour to the type image. However, Man in't Veld and Visser (1993, p. 30) deemed Abbott (1960) lacked explicitly in declaring the type locality, and instead selected Peron Peninsula, Shark Bay, Western Australia.

Original Description. "Brown with obscure bands" (Griffith and Pidgeon 1834, p. 600, index to plate 25).

Supplementary Diagnosis. Shell 40 - 70 mm in height. With nucleus of 3.5 glossy translucent whorls. The subsutural chord is well defined in post nuclear whorls, with strong axials (beading). The teleoconch typically has rounded low varices which vary in number and are typically white. As the shell size increases the sub-sutural chord develops elongated beading axially that become reduced or absent on the final whorl. Dorsum of the body whorl smooth with a pronounced rounded knob preceded by a smaller shoulder axial swelling. Lower body whorl with numerous fine incised spiral lines. The columella is well defined, white, and contains lirae anteriorly, with one or two possible lirae present posteriorly. The aperture with usually weak spiral lirae within the inside of the outer lip. Labrum flattened horizontally outside. On the apertural rim only a midpart swelling. The posterior channel reaches or just passes the subsutural chord. The colour is often white ground colour with messy brown flames, but clear orange and pink to purple specimens are not rare.

Synonymy.

Strombus campbellii "Gray" Griffith and Pidgeon, 1834, p. 600, pl. 25, fig. 6. = *Strombus campbellii* Gray – Kiener 1843, p. 55, pl. 24, fig. 2. *Strombus campbelli* var. Sowerby - Duclos 1844, pl. 14, figs. 6 and 7, pl. 26, fig. 3. Sowerby, 1847, p. 26, pl. 6, figs. 22 and 23. Hedley 1908, p. 460. Hedley 1918, p. M63. = *Strombus campbelli* var. Sowerby - Duclos 1844, pl. 10, figs. 6 and 7. = *Strombus* (*Gallinula*) *campbelli* Griffith and Pidgeon – Chenu 1859, p. 257, fig. 1598. Tryon 1885, p. 115, pl. 5, fig. 46. = *Strombus campbelli* Gray - Reeve 1860, p. 93. Tryon 1885, p. 136. = *Strombus campbellii* Griffith and Pidgeon – Hedley 1908, p. 459. = *Doxander campbelli* Griffith and Pidgeon – Iredale 1931, pp. 201 - 235. Allan 1950, p. 100. De Bruyne 2003, p. 92. = *Strombus* (*Doxander*) *vittatus campbelli* Griffith and Pidgeon – Abbott 1960, pp. 37 and 114, pl. 17, fig. 13, pl. 90. Cernohorsky 1972, p. 80, pl. 18, fig. 3. = *Strombus* (*Doxander*) *campbelli* Griffith and Pidgeon – Rippingale and McMichael 1961, p. 56, pl. 5, fig. 12. Wilson and Gillett 1971, p. 38, pl. 17, fig. 2. Wilson and Gillett 1979, p. 73, pl. 13, fig. 9. Walls 1980, pp. 125, 126 and 188. Man in't Veld and Visser 1993, p. 29. Kreipl *et al.* 1999, pp. 13 and 48, pl. 98. = *Strombus campbelli* Griffith and Pidgeon – Dance 1974, p. 81. Stone and Bawden 1975, pp. 58 and 59. Hinton 1977a, p. 12, no. 3. Hinton 1977b, p. 9, no. 3. Short and Potter 1987, p. 32, pl. 15, fig. 2. 'Sowerby' Man in't Veld and Visser 1993, p. 29. Jansen 1996, p. 17, fig. 52, FC. Potter and Whitehead 1998, p. 82. Deas 1971, unnumbered page/plate, fig. 2. Wilson 2002, pp. 108 and 109. = *Strombus vittatus campbelli* Griffith and Pidgeon –

Oliver and Nicholls 1975, p. 78. Abbott and Dance 1982, p. 79.

Alaba sulcata Watson, 1886, p. 570, pl. 42, fig. 7. Hedley 1908, p. 460. = *Alaba* (*Styliferina*) *sulcata* Watson - Abbott 1960, p. 114. = *Strombus sulcata* Watson - Walls 1980, p. 190. Abbott and Dance 1982, p. 79.

Strombus vittatus Linné - Hinton 1972, p. 6, pl. 3, fig. 16. Gabbi 1999, p. 128.

Distribution. This species ranges across the northern coastline of Australia where is often encountered living in large colonies (Figure 6A). Man in't Veld and Visser (1993) have a record from Indonesia, and Abbott (1960) from the Solomon Islands. These ex-Australian records have yet to be verified. Literary records – *Australia* Weld Island (Man in't Veld and Visser 1993); Dampier (Man in't Veld and Visser 1993); Eighty Mile Beach (Abbott 1960); Monkey Mia, Shark Bay (Man in't Veld and Visser 1993); Broadhurst Bight, Shark Bay (Man in't Veld and Visser 1993); Cape Bossut (Abbott 1960); La Grange Bay (Abbott 1960); Broome (Man in't Veld and Visser 1993); Ridall's Beach, Broome (Abbott 1960); Black Ledge, Broome (Abbott 1960); sand flats, 2½ miles south of Broome (Abbott 1960); North-West Cape (Man in't Veld and Visser 1993); Cape Leveque (Abbott 1960); Lee Point, Darwin (Man in't Veld and Visser 1993); East Point, near Darwin (Abbott 1960; Man in't Veld and Visser 1993); Van Dieman's Gulf (Abbott 1960); Yikkala, Arnhem Land (Abbott 1960); Gulf of Carpentaria ('Roth' in Abbott 1960); off Cape York ('Watson' in Abbott 1960); between Hammond and Wednesday Islands ('Melvill and Standen' in Abbott 1960); Sandy Cape ('Reeve' Hedley 1908); Bedford Beach (Abbott 1960); Cairns (Abbott 1960); Dunk Island (Abbott 1960); Magnetic Island (Abbott 1960; and McMichael 1961; Man in't Veld and Visser 1993); Queens Beach, Bowen (Abbott 1960; Rippingale and McMichael 1961; Man in't Veld and Visser 1993); Kings Beach, Bowen (Man in't Veld and Visser 1993); Dingo Beach (Man in't Veld and Visser 1993); Langford Reef (Man in't Veld and Visser 1993); Mackay (Man in't Veld and Visser 1993); Yeppoon, Keppel Bay (Man in't Veld and Visser 1993); Keppel Island (Abbott 1960); Capricorn Islands (Hedley 1908); Bustard Head (Abbott 1960); Caloundra (Cernohorsky 1972); Moreton Bay (Abbott 1960); Amity Point, North Stradbroke Island (Man in't Veld and Visser 1993); Port Stephens ('Angas' in Hedley); Sydney (Iredale 1931; Allan 1950). *Solomon Islands* (Abbott 1960). *Indonesia* Dobo, Aru Islands (Man in't Veld and Visser 1993). Material examined – *Australia* Alexandra Reef (SMC x 1); Amity Point, Stradbroke Island (SMC x 2); Barrow Island (SMC x 15); Bountiful Island, Gulf of Carpentaria (SMC x 1); Broome (SMC x 9); Cannonvale (SMC x 1); Cape Kerau Dren (SMC x 1); Cape York Peninsula (SMC x 2); Dalrymple Point, Bowen (SMC x 1); Dingo Beach (SMC x 95); Dredged, S.E. Mooloolaba (SMC x 1); Dredged, Shellbourne Bay (SMC x 1); Dundowran Beach (SMC x 2); Fraser Island (SMC x 6); Gloucester Passage (SMC x 5); Herald Bight, Shark Bay (SMC x 6); Horseshoe Bay, Magnetic Island (SMC x 3); Hunter Island (SMC x 5); Jarman Island, Wickham (SMC x 3); Keppel Island (SMC x 8); King Reef (SMC x 6); Kurrimine Beach (SMC x 6); Mooloolaba (SMC x 1); Pallaranda (SMC x 1); Pancake Creek (SMC x 2); Port Headland (SMC x 2); Reginald Bay (SMC x 1); Roebuck Bay (SMC x 1); Rowley Shoals (SMC x 1); Saunders Beach (SMC x 9); Shark Bay (SMC x 3); Shelly Beach (SMC x 12); Shoal Point (SMC x 17); Stradbroke Island (SMC x 1); Tangalooma (SMC x 2);Thursday Islands (SMC x 1); Torres Straits (SMC x 3); Townsville (SMC x 1); Trawled, Townsville (SMC x 18); Wonga Beach (SMC x 2); Yirrkala, Gove (SMC x 1).

Remarks. This species is endemic to northern Australia and the obvious difference to all other

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species in the genus is the strong axially sculptured subsutural chord. The closest fossil ancestor is possibly *Strombus triangulatus* Martin, 1879 from the Upper Miocene of Java, Indonesia. *Strombus triangulatus* shares the triangulate shape, subsutural chord, and sculpture of the body whorl of *D. campbellii*, the fossil species lacks the strongly placated spire of *D. campbellii*. *Doxander campbellii* is sympatric with *D. queenslandica* n. sp. In Queensland and the Northern Territory. Though the species is distributed from North West Australia to East Australia (Queensland), I do not see any morphological differences between shells from the diverse locations.

Doxander japonicus (Reeve, 1851)
(Figures 1B and 9)

Type. Drawing representing the holotype: Reeve 1851, pl. 17, fig. 42 (Figure 1B). According to Abbott (1960), Reeve's type is presumably in the Museum of Natural History in London.

Type Locality. Nagasaki, Japan (Abbott 1960).

Original Description. "Shell fusiformly turreted, spire much exerted, whorls transversely very closely and regularly grooved throughout, slantingly concave round the upper part, somewhat obscurely plicately noduled at the angle, longitudinally finely ribbed towards the apex, columella callous, laminated, lip winged, conspicuously radiately wrinkled within; white, stained and variegated with red-brown, encircled with narrow white zones, interrupted with arrow-headed markings, columella and interior of the aperture ivory-white" (Reeve 1851, sp. 42).

Supplementary Diagnosis. Shell with distinctive fusiform shape with a spire with rounded shoulders with nodules that are axially elongated. The body whorl with distinctive small shoulder knobs. The body whorl with fine spiral striae covering the surface. The columella is well formed, and is uniform the length of the aperture.

Synonymy.

Strombus japonicus Reeve, 1851, pl. 17, fig. 42. Lischke, 1869, pl. 5, fig. 7. Dance 1974, p. 86. = *Strombus* (*Gallinula*) *japonicus* Reeve – Chenu 1859, p. 257, fig. 1598. Tryon 1885, pp. 115 and 140; pl. 5, fig. 48. = *Strombus* (*Labiostrombus*) *japonicus* Reeve - 'Kira' Abbott 1960, p. 113. = *Strombus* (*Doxander*) *vittatus japonicus* Reeve – Abbott 1960, pp. 37 and 113, pl. 17, fig. 18. Walls 1980, pp. 127, 128 and 189. Man in't Veld and Visser 1993, p. 11. = *Doxander vittatus japonicus* Reeve – Kira 1962, p. 35, pl. 16, fig. 13. = *Strombus vittatus japonicus* Reeve – Oliver and Nicholls 1975, pp. 78 and 79. Abbott and Dance 1982, p. 79. = *Strombus* (*Doxander*) *japonicus* Reeve – Man in't Veld and Visser 1993, p. 28, pl. 3, figs. 10 and 11. Kreipl *et al.* 1999, pp. 13 and 47, pl. 95, figs. 1 and 2. Okutani 2000, p. 183, pl. 91, fig. 15.

Distribution. Found from southern Japan to the northern South China Sea (Figure 6B). Literary records – *Japan* Ashiya (Man in't Veld and Visser 1993); Kyoto (Man in't Veld and Visser 1993); Wakayama (Man in't Veld and Visser 1993); Saitosaki (Man in't Veld and Visser 1993); Tsuijasaki (Man in't Veld and Visser 1993); Nonai, Matsu Bay, Honshu Island ('Nomura and Hatai' in Abbott 1960); Oga Peninsula, Honshu Island ('Nishimura and Watabe' in Abbott 1960); Yamagata Prefecture, Honshu Island ('Nomura and Zimbo' in Abbott 1960); Tateyama, near Tokyo Bay, Honshu Island (Abbott 1960); Suruga Bay, Honshu Island ('Oyama' in Abbott 1960); Shirako, Honshu Island (Abbott 1960); Ei, Awaji Island (Abbott 1960); Hiroshima, Honshu Island (Abbott 1960); Isshiki, Hazu-gun, Honshu Island (Abbott 1960); Wakasa Bay, Honshu Island (Abbott 1960); Tosa Bay, Shikoku Island

(Abbott 1960; Man in't Veld and Visser 1993); Chikuzen, Kyushu Island (Abbott 1960); Tomioka, Amakusa, Kyushu Island (Abbott 1960); Nagasaki, Kyushu Island (Abbott 1960); Ise Bay (Abbott 1960); Bonin Islands (Abbott 1960). *South Korea* Chyido? (Man in't Veld and Visser 1993). Material Examined – *China* East China Sea (VC x 1); South China Sea (SMC x 3); *Japan* (VC x 3); Chiba (SMC x 1); Mei, Wakayama (SMC x 1).

Remarks. A distinctive species with a pronounced radial sculpture on all whorls, that is not commonly found in the seas off the coasts of Japan. There are recent catches of dead material coming from fishermen operating out of China in the East China Sea. Records for the South China Sea are not specific.

Doxander entropi (Man in't Veld and Visser, 1993)
(Figures 1C and 10)

Type. Drawing representing the lectotype: *Strombus sulcatus* var. Chemnitz – Duclos 1844, pl. 25. figs. 5 and 6 (designated herein) (Figure 1C).

Type Locality. Philippines, Stranley Point, Canacao, Manila Bay, Luzon Island (Man in't Veld and Visser 1993).

Original Description. "Posterior channel always reaches the suture and sometimes even the suture of the next whorl. The whorls are more stepped than in other species (originally: subspecies). Axial sculpture never occurs on the body whorl, but it does occur on other whorls, sometimes even on all other whorls. All whorls are radially sculptured, more strongly so on the lower half of the whorls. This radial sculpture is never as pronounced as in *S. japonicus*. Material from the Sulu Sea generally has a somewhat higher spire than specimens from the South China Sea. The colour of this subspecies is often somewhat darker than that of the other species, except where it concerns transition forms. These shells are usually light brown. The height of the shell varies from 50 to c.110 mm" (Man in't Veld and Visser 1993, p. 26).

Supplementary Diagnosis. Shell highly variable in form. Spire stepped with numerous spiral striae and axial plaits in most examples that are most pronounced on the shoulder. The subsutural chord is well developed and continues to the middle of the dorsal body whorl where it fades prior to the formation of the flaring outer lip. The aperture is wide and the columella is well formed being thickened centrally, and continues to the form a posterior canal with the outer lip that terminates between the first and second suture. The body whorl is smooth with occasional specimens having ventral feint axial plaints in some examples. The base of the body whorl has strong spiral threads towards the anterior that continue to the edge of the shell.

Synonymy.

Rostellaria sinuata Perry, 1811, pl. 11. fig. 3.

Strombus vittatus Linné – Kiener 1843, pl. 23, fig. 1b. = *Doxander vittatus* Linné – De Bruyne 2003, pp. 92 and 93. = *Strombus* (*Gallinula*) *vittatus* Linné – Chenu 1859, p. 257, fig. 1601. Tryon 1885, pl. 4, fig. 41. = *Strombus* (*Doxander*) *vittatus vittatus* Linné – Walls 1980, pp. 127 and 128. Springsteen and Leobrera 1986, p. 70, pl. 17, fig. 7a. = *Strombus vittatus vittatus* Linné – Abbott 1960, p. 112; pl 17, fig. 14 right. Abbott and Dance 1982, p. 79. = *Strombus* (*Doxander*) *vittatus* Linné – Okutani 2000, p. 183, pl. 91, fig. 17.

Strombus sulcatus Chemnitz – Duclos 1844, pl. 24, figs. 1 and 2. Sowerby 1847, p. 27, pl. 6, fig. 31. Hanley 1856, p. 124, pl. 25, fig. 29. Tryon 1885, pp. 114 and 145, pl. 4, fig. 44. Dodge 1956, p. 277. = *Strombus sulcatus* var. Chemnitz – Duclos 1844, pl. 25, figs. 5 and 6, pl. 26, figs. 4 and 5. Man in't Veld and Visser 1993, p. 26. = *Strombus sulcatus* Holten, 1802 p. 56.

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Cernohorsky 1965, p. 9. Walls 1980, p. 190. Man in't Veld and Visser 1993, p. 1l.

Strombus (*Doxander*) *vittatus entropi* Man in't Veld and Visser, 1993, p. 26, pl. 2, figs. 7 – 12. Kreipl *et al*. 1999, pp. 13 and 47, pl. 96.

Doxander entropi Man in't Veld and Visser, 1993 – Kronenberg and Wieneke 2020, fig. 28.

Distribution. Records indicate that this species is predominately centred on the Philippines (Abbott 1960; Man in't Veld and Visser, 1993), with only sporadic references to the countries bordering the South China Sea (Abbott, 1960) (Figure 6C). Examples of this species are known from the Queensland Coast (SMC x 2; VC x 1) and northern New South Wales (Nichols Collection), and these are under active consideration. Literary records – *Philippines* Paranaque, Luzon Island (Man in't Veld and Visser 1993); Siasi, Sulu (Man in't Veld and Visser 1993); Stranley Point, Luzon Island (Man in't Veld and Visser 1993); Sulu Archipelago (Man in't Veld and Visser 1993); Sulu Sea (Man in't Veld and Visser 1993); Tayabas Bay, Quezon Island (Man in't Veld and Visser 1993). Material Examined –*Philippines* Aliguat Island (SMC x 1); Bohol Island (SMC x 1); Calituban Island (SMC x 4); Cebu (SMC x 19; VC x 2); Davao (SMC x 21); Mactan Island (SMC x 3); Manila Bay (VC x 2); Molcabuc Island (VC x 1); Negros Island (VC x 1).

Remarks. A species with distinctive strongly angulate spiral whorls. *Strombus sulcatus* Chemnitz, 1795 (p. 142, pl. 195, figs. 1870 and 1871; Chemnitz and Holten 1802, p. 56, no. 34) is considered to be *nomen dubium*. The form of the spire with disjoined sutures, and the lack of typical axial ribbing on early whorls and other distinguishing features makes his figure and description problematic to fix with any of the known members of Strombidae.

Doxander operosus (Röding, 1798)
(Figures 1E, 2A and 11)

Type. Drawing representing the lectotype: Chemnitz 1788, pl. 155, fig. 1482 (Kronenberg and Wieneke 2020; Figure 1E).

Type Locality. Vietnam, Nha Trang (designated here in).

Original Description. "Der künstliche Thurm. Gmel. *Strombus vittatus.* sp. 25. γ. Favanne t. 20. f. A. 8. Chemn. 10. t. 155. f. 1481. 82. 2 St." (Röding 1798, p. 107).

Supplementary Diagnosis. Shell elongated with a high strongly axially plicated spire. The shoulders of the spiral whorls are moderately rounded with a distinctive subsutural chord that extends to the end mid-dorsal whorl. The ventral body whorl with distinctive axial plaits that run form the shoulder to the mid-whorl. The dorsal body whorl typically smooth, with some specimens having residual axial plaits. The base of body whorl with strong deep incised axial striae. The columella is centrally thickened and forms a slight reflected posterior canal with the outer lip that typically does not extend past the first suture.

Synonymy.

Strombus vittatus Linné – Duclos 1844, pl. 23. figs. 1 and 2. Sowerby 1847, p. 26, pl. 6, figs. 28 and 29. Reeve 1851, pl. 17, fig. 44a. Hanley 1855, p. 273. = *Strombus* (*Ampliati*) *vittatus* Gmelin, 1791, 13th edn., p. 3517, no. 25, partly. = *Lambis vittata* Gmelin – Röding 1798, p. 66, no. 838. Man in't Veld and Visser 1993, p. 19. = *Strombus* (*Gallinula*) *vittatus* Linné – Tryon 1885, p. 114, pl. 4, fig. 42. 'Schepman' Man in't Veld and Visser 1993, p. 19. = *Strombus vittatus* Linné – Kiener 1843, pl. 23, fig. 1. Martin 1883-1887, p. 143. 'Reeve (partly)' Man in't Veld and Visser 1993, p. 19. Chim *et al.* 2009, p. 379. = *Doxander vittatus* Linné – 'Habe and Kosuge' Man in't Veld and

Visser 1993, p. 19. = *Strombus (Doxander) vittatus* Gmelin - Beets 1950, p. 245. = *Strombus* (*Doxander*) *vittatus* Linné – 'Ma Siu-Tung' Man in't Veld and Visser 1993, p. 19. = *Strombus vittatus vittatus* Linné – Abbott and Dance 1982, p. 79, right fig. 'Wye' Man in't Veld and Visser 1993, p. 19. = *Strombus* (*Doxander*) *vittatus vittatus* Linné – 'Lindner' Man in't Veld and Visser 1993, p. 19.

Turris operosa Röding, 1798, p. 125, no. 1607. Kronenberg and Wieneke 2020, p. 106.

Strombus australis Schröter, 1805, p. 95 – Abbott 1960, p. 113. Cernohorsky 1965, p. 9. Cernohorsky 1972, p. 80. Walls 1980, p. 188. Man in't Veld and Visser 1993, p. 11. = *Strombus vittatus australis* Schröter – Abbott 1960, p. 113, pl. 17, left fig. 14. Oliver and Nicholls 1975, p. 78. = *Strombus* (*Doxander*) *vittatus vittatus australis* Schröter – Springsteen and Leobrera 1986, p. 72, pl. 17, fig. 7b.

Strombus vittatus angustior Chemnitz, 1788, pl. 155, figs. 1481 and 1482. Dillwyn 1817, p. 671.

Strombus turritus Lamarck, 1822, p. 212. Kiener 1843, p. 42, pl. 24, fig. 1. Duclos 1844, pl. 9, figs. 1 - 4. Sowerby 1847, p. 26, pl. 6, fig. 27. Martin 1883-1887, p. 143. Man in't Veld and Visser 1993, p. 11. = *Strombus vittatus turritus* Lamarck – Tryon 1885, p. 114, pl. 4, fig. 42. 'Eisenberg' Man in't Veld and Visser 1993, p. 19. 'Barney' Man in't Veld and Visser 1993, p. 19. 'Dharma' Man in't Veld and Visser 1993, p. 19. = *Strombus* (*Gallinula*) *turritus* Lamarck – Chenu 1859, p. 257, fig. 1599. Martin 1883-1887, p. 143. = *Strombus turritus* Lamarck – Beets 1950, p. 245. Dodge 1956, p. 277. Abbott 1960, p. 113. Cernohorsky 1965, p. 9. Cernohorsky 1972, p. 80. Dance 1974, p. 86. Walls 1980, p. 190. Man in't Veld and Visser 1993, p. 19. = *Doxander turritus* Lamarck – 'de Latil' Man in't Veld and Visser 1993, p. 19.

Strombus (*Doxander*) *vittatus apicatus* Man in't Veld and Visser, 1993, p. 19, pl. 2, figs. 1 - 6. Kronenberg 1998, p. 3. Kreipl *et al.* 1999, pp. 13 and 47, pl. 97.

Doxander operosus Röding, 1798 – Kronenberg and Wieneke 2020, p. 107, figs. 15 and 16.

Distribution. This species ranges from South Myanmar to Vietnam and Central Indonesia (Figure 7A). Literary records – *Bay of Bengal* (Man in't Veld and Visser 1993). *Myanmar* off Sandoway (Man in't Veld and Visser 1993). *Brunei* Kuala Belait (Man in't Veld and Visser 1993); in creek mouth, Anduki (Man in't Veld and Visser 1993); *Thailand* Maikhas Beach Phuket (Abbott 1960); Phuket (Man in't Veld and Visser 1993); Khan Nu Paknam (Abbott 1960); Koh Samet (Abbott 1960; Man in't Veld and Visser 1993); Singora (Abbott 1960); Andaman Sea (Man in't Veld and Visser 1993); Aonang Krabbi (Man in't Veld and Visser 1993); between Si Racha and Pattaya (Man in't Veld and Visser 1993); Chantaburi coast (Man in't Veld and Visser 1993); Kantang (Man in't Veld and Visser 1993); Krabi, Panga Province (Man in't Veld and Visser 1993). *Singapore* (Man in't Veld and Visser 1993); (Chim *et al.* 2009). *Malaysia* Sarawak (Abbott 1960; Man in't Veld and Visser 1993); beach near Luak Bay, Miri, Sarawak (Man in't Veld and Visser 1993); Jesselton, Sabah (Man in't Veld and Visser 1993); Malawalii Channel, Sabah (Man in't Veld and Visser 1993); Maruda Bay (Man in't Veld and Visser 1993); off Sandakan Bay, Sabah (Man in't Veld and Visser 1993). *Indonesia* Biliton (Man in't Veld and Visser 1993); Soengeiliat, Banka (Man in't Veld and Visser 1993); Balikpapan, Borneo (Man in't Veld and Visser 1993); Larantoeka, Flores (Man in't Veld and Visser 1993); Laboean Deli, Sumatra (Man in't Veld and Visser 1993); Atjeh, Sumatra (Man in't Veld and Visser 1993);

Singkep Island, Sumatra (Man in't Veld and Visser 1993); Djurniang Tjerek, Madoera Island (Man in't Veld and Visser 1993); Madoera Strait (Man in't Veld and Visser 1993); Malacca Strait (Man in't Veld and Visser 1993); off Taganak Island (Abbott 1960); Keledjitan, Banten, Java (Abbott 1960); Tjiperwagaran, Banten, Java (Abbott 1960); Ambonia (Abbott 1960; Man in't Veld and Visser 1993); Hitu (Man in't Veld and Visser 1993); Macassar Straits ('Schepman' in Abbott 1960); Madura Straits ('Schepman' in Abbott 1960); Pulu Jedan, Aru Islands ('Schepman' in Abbott 1960); Japan Island (Abbott 1960); 3-4km south of Makassar, Celebes (Man in't Veld and Visser 1993); Moluccas (Man in't Veld and Visser 1993). *Philippines* Manila Bay (Springsteen and Leobrera 1986; Man in't Veld and Visser 1993); Tayabas Bay, Quezon (Man in't Veld and Visser 1993). Material Examined – *China* South China Sea (VC x 2). *Indonesia* (VC x1); Kangean Islands (SMC x 40). North Malacca Straits (VC x 1). *Philippines* Southern Palawan (SMCx 2); *Singapore* (VC x 3); *Sri Lanka* (VC x 1); Galle (SMC x 1); *Thailand* (SMC x 5; VC x 2); Andaman Sea (VC x 2); Phuket Island (VC x 2). *Vietnam* (VC x 1) Nha Trang (SMC x 2; VC x 2).

Remarks. While it is considered at this time to be only species that typically has consistent strong axial plications on all whorls of the spire, as more material is examined and the ranges of the morphological forms of this species are demarcated, it is highly probable that more than species will be recognised and drawn from this taxon. This species has had a varied taxonomic history, with a variety of names being applied. Hanley (1855) recognised the importance of reconciling the shells in the Linnean Collection with those in the Linnean text to provide a definitive example of each and enable clarity to be brought to the early taxonomy, and consequently recognised two specimens in the collection as "marked" *Strombus vittatus* (Figure 2A). Hanley (1855, p. 273) provided an iconographic reference (Sowerby, 1847, pl. 6, fig. 29) to assist with clarity. These two shells identified by Hanley (1855) in the Linnean Collection were referred to by Abbott (1960) as the *Strombus vittatus* types, however, no lectotype was explicitly designated, and thus they remained part of the broader syntype set for that species. Given the lectotype designation of Man in't Veld and Visser (1993) of Rumphius (1705, 1741) fig. O for *D. vittatus* which is not the high spired taxon, *D. operosus* is the first available name for that taxon.

From their text iconographies, Kiener (1843), Duclos (1844) and Reeve (1851) followed the Linnaean intention to name the elongated highly axially plicated spired shell indicative of his syntype specimens in the London Collection labelled "vittatus", others chose to follow Lamarck (1822) substitute name "turritus" (Abbott 1960; Cernohorsky 1965; Dance 1974; Walls 1980). Man in't Veld and Visser (1993) provided the most recent major revision of the substitute name "apicatus" to replace "turritus", they negated to seek out the Linnaean Collection syntype material; notwithstanding, "apicatus" has recently had popularity in the literature based on that revision (Kronenberg 1998; Kreipl *et al.* 1999; Dekkers and Maxwell 2020).

Doxander vittatus (Linné, 1758)
(Figures 1D, 2 and 12)

Type. Drawing representing the lectotype: Rumphius (1705, 1741) pl. XXXVI, fig. O (Man in't Veld and Visser 1993).

Type Locality. Ambon, Indonesia (Abbott 1960).

Original Description. "S. testar labro rotundato brevi, ventre lævi, spira subnodosa" (Linné 1758, p. 745).

Supplementary Diagnosis. The shell is moderately sized and fusiform. The body whorl

is smooth with anterior axial incised lines towards the base. The spire with broad even axial spiral ribs being mostly restricted to upper and mid spire, these may be reduced or absent in some specimens. The subsutural chord varies in strength by is well developed on upper whorls. Upper whorls with distinctive striation which diminish as the shell develops, leaving the penultimate whorl nearly smooth. The ventral anterior of the shell extends beyond the base of the dorsum giving rise to an open canal. The base of the shell is moderately reflected. The columella is well developed moderately raised and white. The aperture is while with lirations towards the outer edge. The outer aperture is thickened posteriorly, the remaining being thin.

Synonymy.

Strombus vittatus Linné, 1758, p. 745, no. 439. Linné 1767, p. 1211, no. 508. Gmelin 1791, p. 3517, no. 25, partly. Man in't Veld and Visser 1993, p. 19.

Doxander vittatus Linné, 1758 – Kronenberg and Wieneke 2020, figs. 29 and 30.

Distribution. Known from central Indonesia however it is probable that it ranges further north given the distribution of other stromboidian taxa (Abbott 1960; Figure 7A). Literary records – Ambon, Indonesia (Abbott 1960). Material Examined – *Indonesia* Sumbawa Island, (SMC x 10).

Remarks. A species with a smooth body whorl and arterial canal that terminated below the dorsal outer lip. The Rumphius (1705, 1741, pl. XXXVI, fig. O) image is clear in that the shell is smooth with a feint subsutural chord on the early to mid-teleoconch, and an anterior that terminates below the dorsal outer lip. The morphological similarity to the type image of material from Sumbawa Island and the Rumphius type destination, and shared regional location designated by Abbott (1960), make the Indonesian material here identified the most suitable fit for that species, thus bring taxonomic stability to the taxon. While most examples of this species exhibit a level of spiral axial sculpture, this can be diminished and restricted to the earliest whorls in some examples, or rare examples absent as with the lectotype. Given the lectotypic designation by Man in't Veld and Visser (1993) as a consequence of the failure of prior authors to do so (Hanley 1855, Dodge 1956, Abbott 1960), the supplementary material in the Uppsala Collection (Dodge, 1956), which also forms part of the now redundant syntype set, while informing on the shells Linné had at hand, will not affect the Man in't Veld and Visser (1993) designation.

Doxander queenslandicus Maxwell, n. sp.
(Figures 3 and 13)

Type. Holotype**:** Dingo Beach, Queensland, Australia, collected 2002, 58.6 mm (SBRF TCMOL0001); Paratype 1 - Dingo Beach, Queensland, Australia, collected 2002, 45.2 mm (SMC16.006a); Paratype 2 - Dingo Beach, Queensland, Australia, collected 2002, 55.9 mm (SMC16.006b); Paratype 3 - Dingo Beach, Queensland, Australia, collected 2002, 53.4 mm (SMC16.006c); Paratype 4 - Dingo Beach, Queensland, Australia, collected 2002, 52.6 mm (SMC16.006d); Paratype 5 - Dingo Beach, Queensland, Australia, collected 2002, 54.5 mm (SMC16.006e).

Type Locality. I designate Dingo Beach, Queensland, Australia.

Description. Shells fusiform with well rounded shoulders that vary from axially plicate with uniform plaits or almost smooth, the penultimate whorl being mostly smooth or with diminished plaits that become obsolete before the smooth body whorl. The shoulder of the dorsal body whorl may have one or two small acute knobs. The ventral body whorl may be flattened and form a large axial fold prior to the dorsum. The columella is well formed and

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centrally thickened, forming a short, shallow canal with the outer lip that does not reach the first spiral whorl.

Synonymy.

Strombus vittatus Linné – Kiener 1843, pl. 23, fig. 1a. Sowerby, 1847, pl. 6, fig. 30. Duclos 1844, pl. 25. figs. 1 and 2. Reeve, 1851, pl. 17, fig. 44b. Hinton 1972, p. 6, pl. 3, fig. 15. Hinton 1977a, p. 12, no. 4. Hinton 1977b, p. 9, no. 4. Short and Potter 1987, p. 32, pl. 15, fig. 2. Jansen 1996, p. 19, fig. 57, BC. = *Strombus* (*Gallinula*) *vittatus* Linné – Chenu 1859, p. 257, fig. 1597. = *Doxander vittatus* Gmelin – Iredale 1931, p. 201-235. Allan 1950, p. 100, pl. 17, fig. 11. *Strombus* (*Doxander*) *vittatus* Linné – Rippingale and McMichael 1961, p. 55, pl. 5, fig. 11. Wilson and Gillett 1971, p. 38, pl. 17, fig. 8. Wilson and Gillett 1979, p. 73, pl. 13, fig. 8. = *Strombus* (*Doxander*) *vittatus vittatus* Linné – Cernohorsky 1965, p. 9, pl. 3, fig. 15. Cernohorsky 1972, p. 80, pl. 18, fig. 4.

Distribution. *Doxander queenslandicus* ranges from the Gulf of Carpentaria along the Queensland coast down into northern New South Wales, as well as the island chains that border the eastern Coral Sea west to Fiji and north into Papua New Guinea (Figure 7B). Literature Records – *Papua New Guinea* Gulf of Papua (Hinton 1972). *Australia* Brampton Reef (Abbott 1960); Cape Upstart (Abbott 1960); Port Douglas (Abbott 1960); Townsville (Rippingale and McMichael 1961; Man in't Veld and Visser 1993); Sydney Harbour (Iredale 1931); Dingo Beach (Man in'T Veld and Visser 1993); Innisfail (Man in'T Veld and Visser 1993); Keppel Bay (Man in'T Veld and Visser 1993); Melville Island (Man in'T Veld and Visser 1993). *Vanuatu* Vila Harbour (Cernohorsky 1972). *Fiji* Viti levu (Cernohorsky 1965); Levuka Island ('Smith' in Abbott 1960); Manava Island (Cernohorsky 1972). Material Examined – *Australia* Bountiful Island, Gulf of Carpentaria (SMC x 1); Cook Reef (SMC x 1); Dingo Beach (SMC x 33; VC x 12); Four Mile Beach (SMC x 2); Hope Island (SMC x 4); Keppel Bay (VC x 1); Kurrimine Beach (SMC x 1); Moon Point, Fraser Island (SMC x 1); Pallarenda (SMC x 1); Palm Island (SMC x 3); Pennefather River (VC x 3); Princess Charlotte Bay (VC x 2); Seaforth (SMC x 1); Shelly Beach, Townsville (VC x 2); Shoal Point (SMC x 3); Trawled off Moreton Bay (SMC x 1; VC x 2); Trawled Shelburne Bay (VC x 1); Trawled Tin Can Bay (VC x 1). *Papua New Guinea* (VC x 1).

Remarks. *Doxander queenslandicus* is remarkably stable in morphology and colour, with the most significant variation coming in the form of a darker pattern and rounder shell of southern Queensland and New South Wales. It differs in morphological form from other members of *Doxander*: lacking the strong axial sculpture of *D. vittatus*; the dorsal striations of *D. japonicus*; the stepped spire of *D. entropi*; and lacks the strong subsutural chord with axial flat ribbing of the sympatric *D. campbellii*. *Doxander queenslandicus* can be differentiated from *D. vittatus* as the anterior canal does not extent beyond the base of the dorsum in *D. vittatus,* the base of the shell is also not reflected in *D. vittatus.* The dorsal knob, typical in *D. queenslandicus* is absent or diminished in *D. vittatus*.

CONCLUSION

This revision brings the number of *Doxander* species to six. The designation by Man in' t Veld and Visser (1993) of the Rumphius (1705, 1741) image for the type of *D. vittatus* is problematic when the physical specimens in the London Collection are considered; further complicating this designation is the rare form of the species where the axial plication are absent in the illustration. Notwithstanding, the image

can be identified from the faint upper subsutural chord, fine spiral lines on the upper spire, the lack of a dorsal knob, and especially the posterior canal which extends past the dorsal lip. The new species *D. queenslandicus* is closely related to *D. vittatus* but differs in the termination of the anterior canal at the base of dorsal outer lip and presence of a distinctive knob on the shoulder are two characters that readily differentiate these species.

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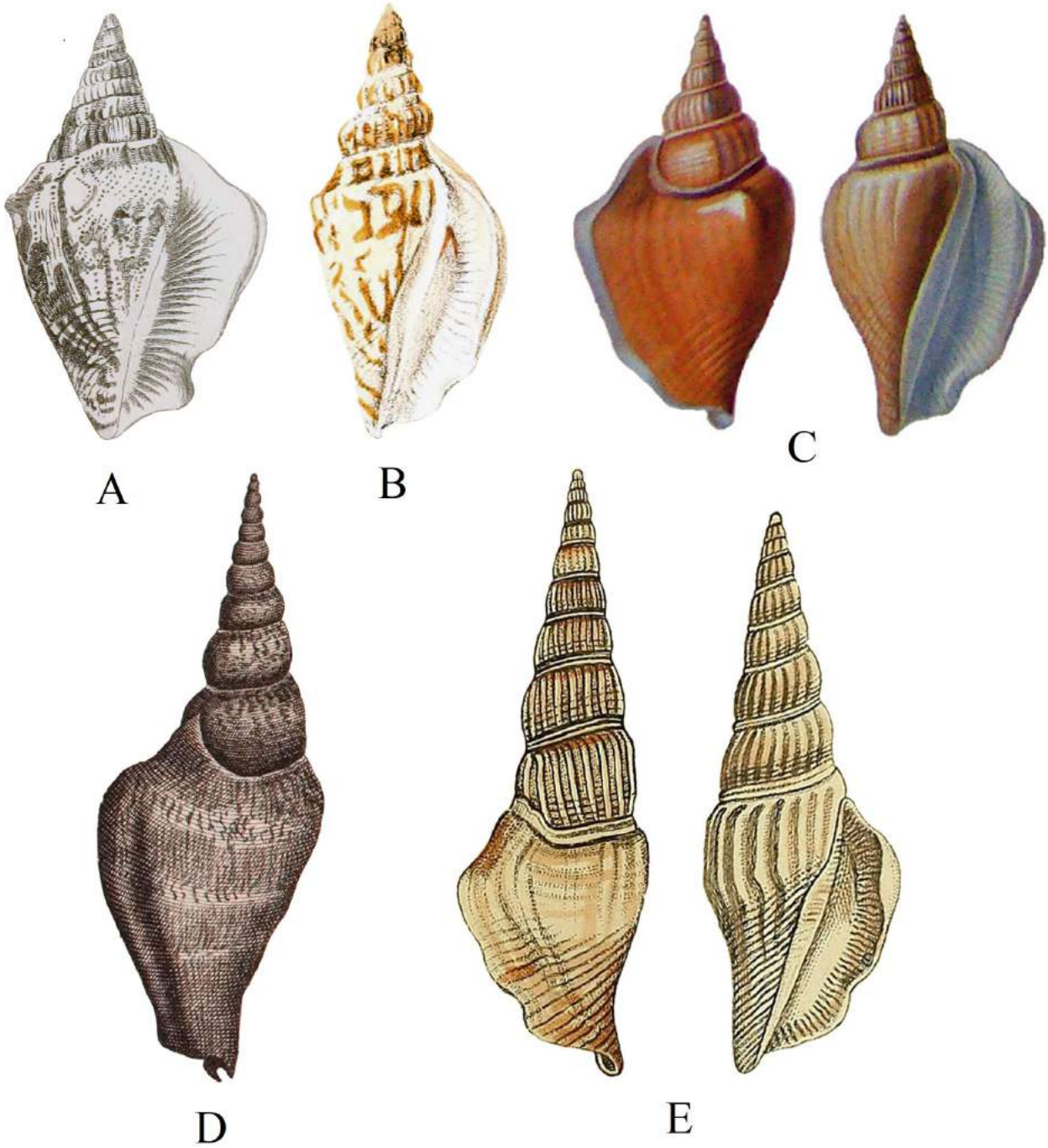

Figure 1. Type material for *Doxander* Wenz, 1940: **A=** Holotype of *Strombus campbellii* Griffith and Pidgeon, 1834, pl. 24, fig. 6; **B=** Holotype of *Strombus japonicus* Reeve, 1851, fig. 42; **C=** drawing representing the lectotype of *Strombus entropi* Man in't Veld and Visser, 1993 (Duclos 1844, pl. 25, figs. 5; **D=** drawing representing the lectotype of *Strombus vittatus* Linné, 1758 (Rumphius 1705, 1741, pl, XXXVI, fig. O), note the fine subsutural chord, spiral lines on the early whorls, the extension of the anterior canal past the edge of the anterior dorsum, and the lack of a dorsal knob. **E=** Drawings representing the lectotype of *Turris operosa* Röding, 1798 (= *Doxander operosus* (Röding, 1798)), Chemnitz (1788, pl. 155, fig. 1482, apertural view; pl. 155, fig. 1481, dorsal view) (Kronenberg and Wieneke 2020, figs. 13a and b).

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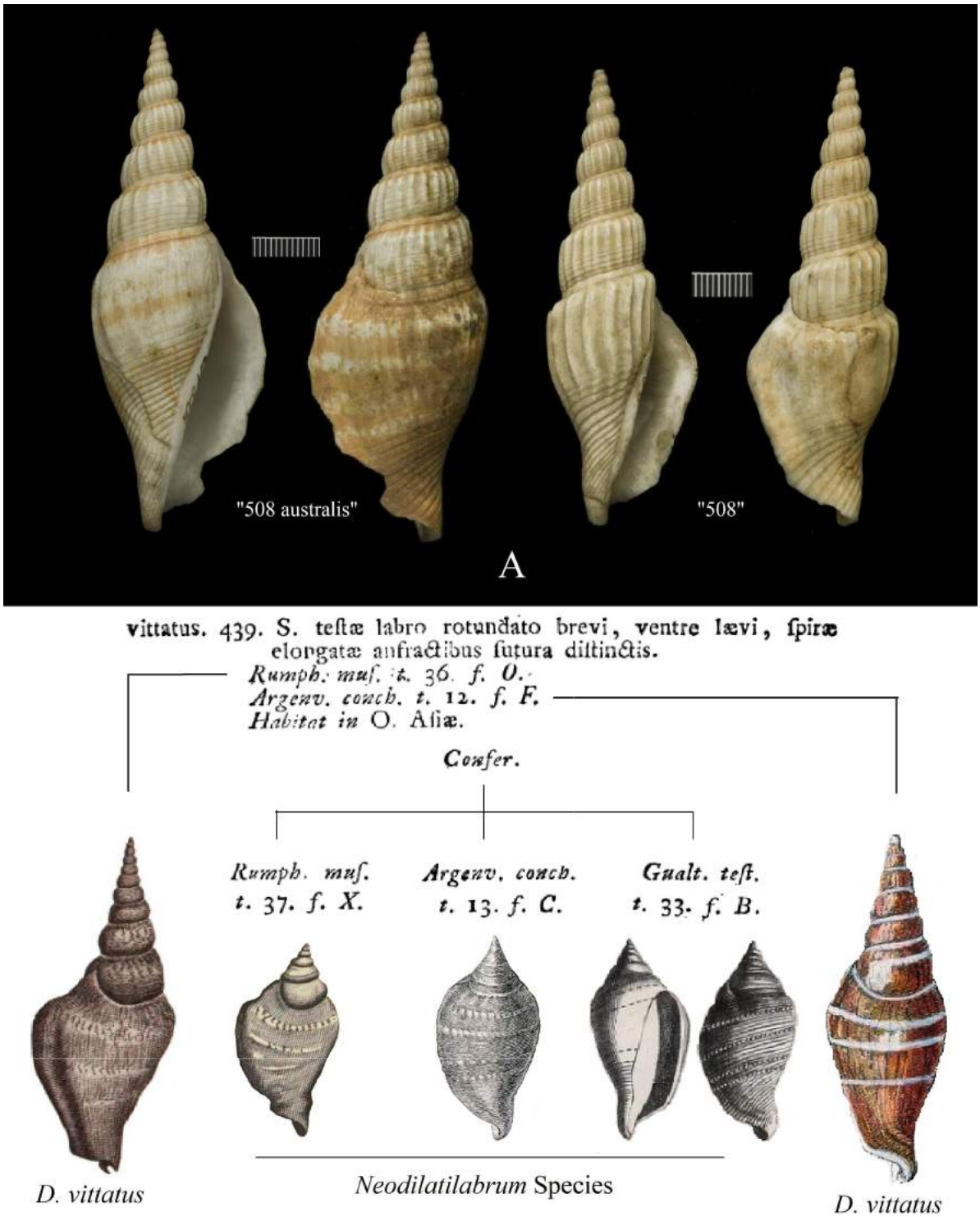

Figure 2. Type material for *Strombus vittatus* Linné, 1758 with the Man in't Veld and Visser (1993) designated Rumphius (1705, 1741) pl. XXXVI, fig. O and others in the type series: **A=** The Linné (Hanley, 1855) syntype material contained in the Linnean Society Collection, London, (LSL 436, PZ 0010906) (= *Doxander operosus* (Röding, 1798)); **B=** The original Linné (1758, p. 745) description with the figures cited in the text with lines indicating the source document.

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Figure 3. Holotype of *Doxander queenslandicus* n. sp., Dingo Beach, Queensland, Australia, collected 2002, 58.6 mm (SBRF TCMOL0001).

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Figure 4. Comparative plate of *Doxander* mid-teleoconchs showing intra-species variability. Note the uniform form of each shoulder, the variability in axial sculpture, which can range from smooth to strongly plicated and should not be considered as a key diagnostic. Note the presence in all specimens of the subsutural chord.

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Figure 5. Comparative plate of *Doxander* upper-outer lips showing intra-species variability. Note the form of the posterior canal and form of the outer lip prior to it reflexing axially and becoming calloused.

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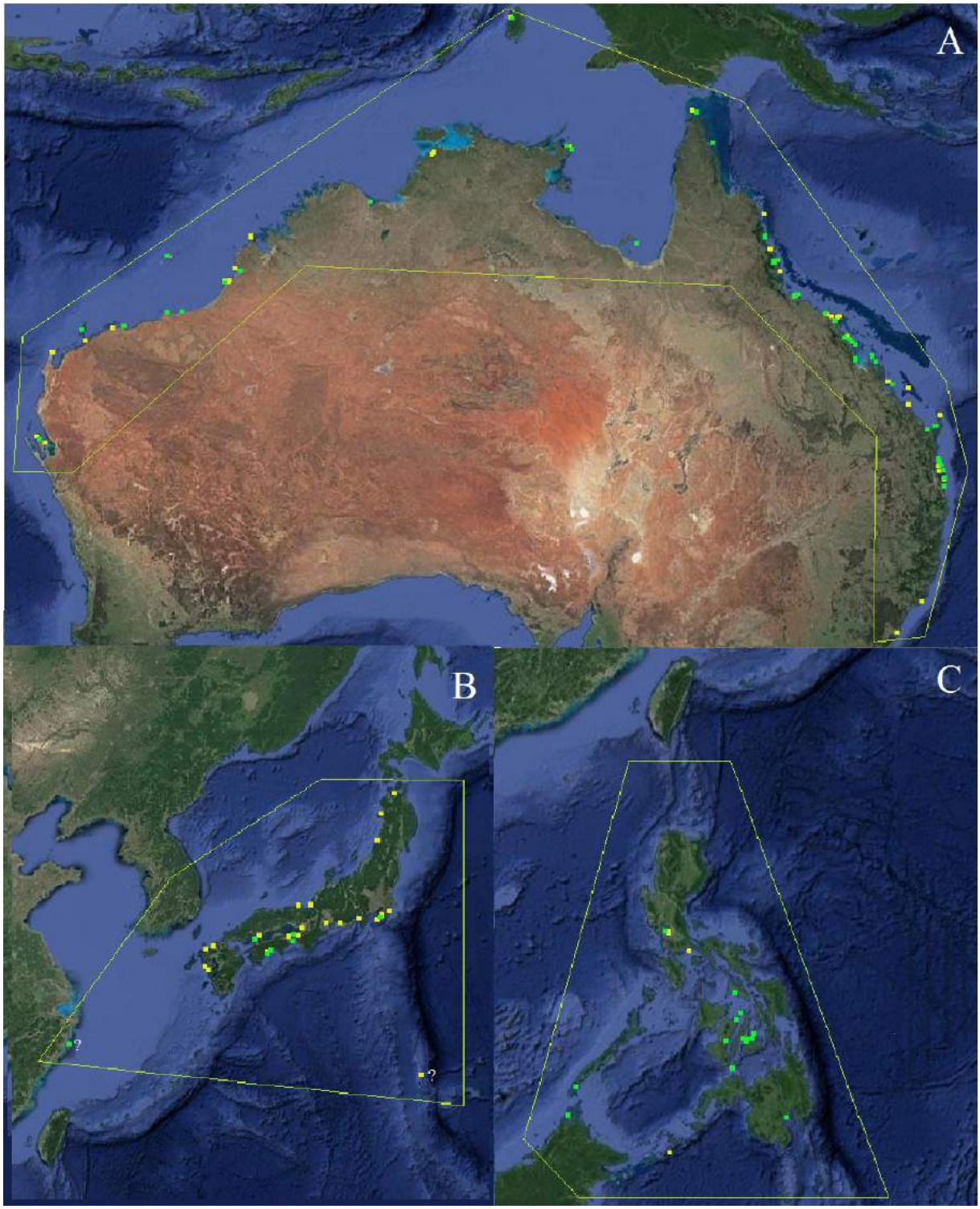

Figure 6. Estimated distribution of with locations for literary references (yellow) and material examined (Green) indicated: **A=** *Doxander campbellii* (Griffith and Pidgeon, 1834); **B=** *D. japonicus* (Reeve, 1851); and) *Doxander entropi* (Man in't Veld and Visser, 1993).

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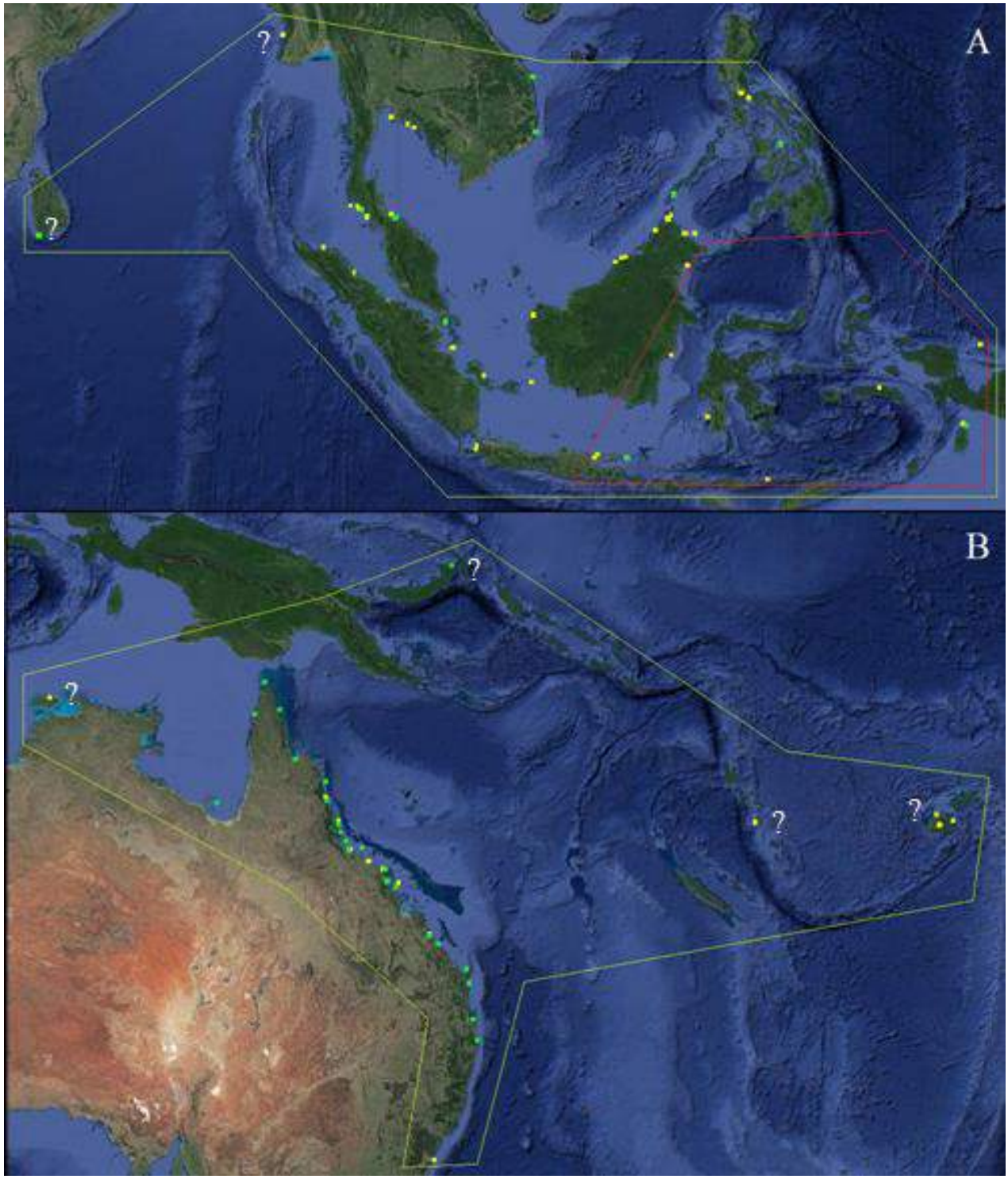

Figure 7. Estimated distribution of, with locations for literary references (yellow) and material examined (Green) indicated: **A=** *Doxander operosus* (Röding, 1798), the estimated distribution of *D. vittatus* (Linné, 1758) is mapped in red; and **B=** *D. queenslandicus* n. sp..

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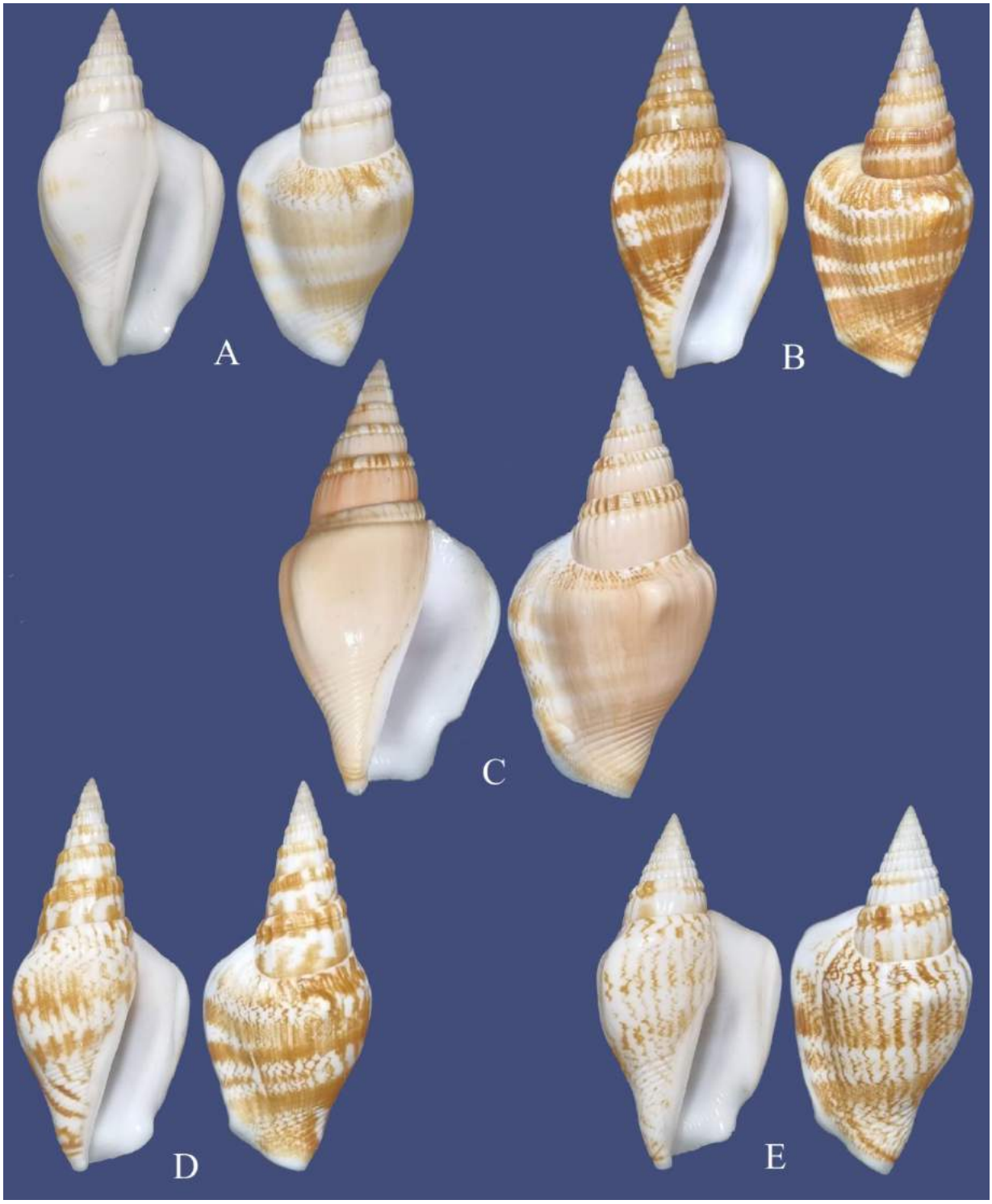

Figure 8. *Doxander campbellii* (Griffith and Pidgeon, 1834) from Dingo Beach: **A=** collected 1992, 42.7 mm (SMC 13.020as); **B=** collected 1992, 42.7 mm (SMC 13.020am); **C=** collected 1992, 53.4 mm (SMC 13.020bf); **D=** collected 1992, 46.9 mm (SMC 13.020b); **E=** collected 2008, 44.0 mm (SMC 13.007g).

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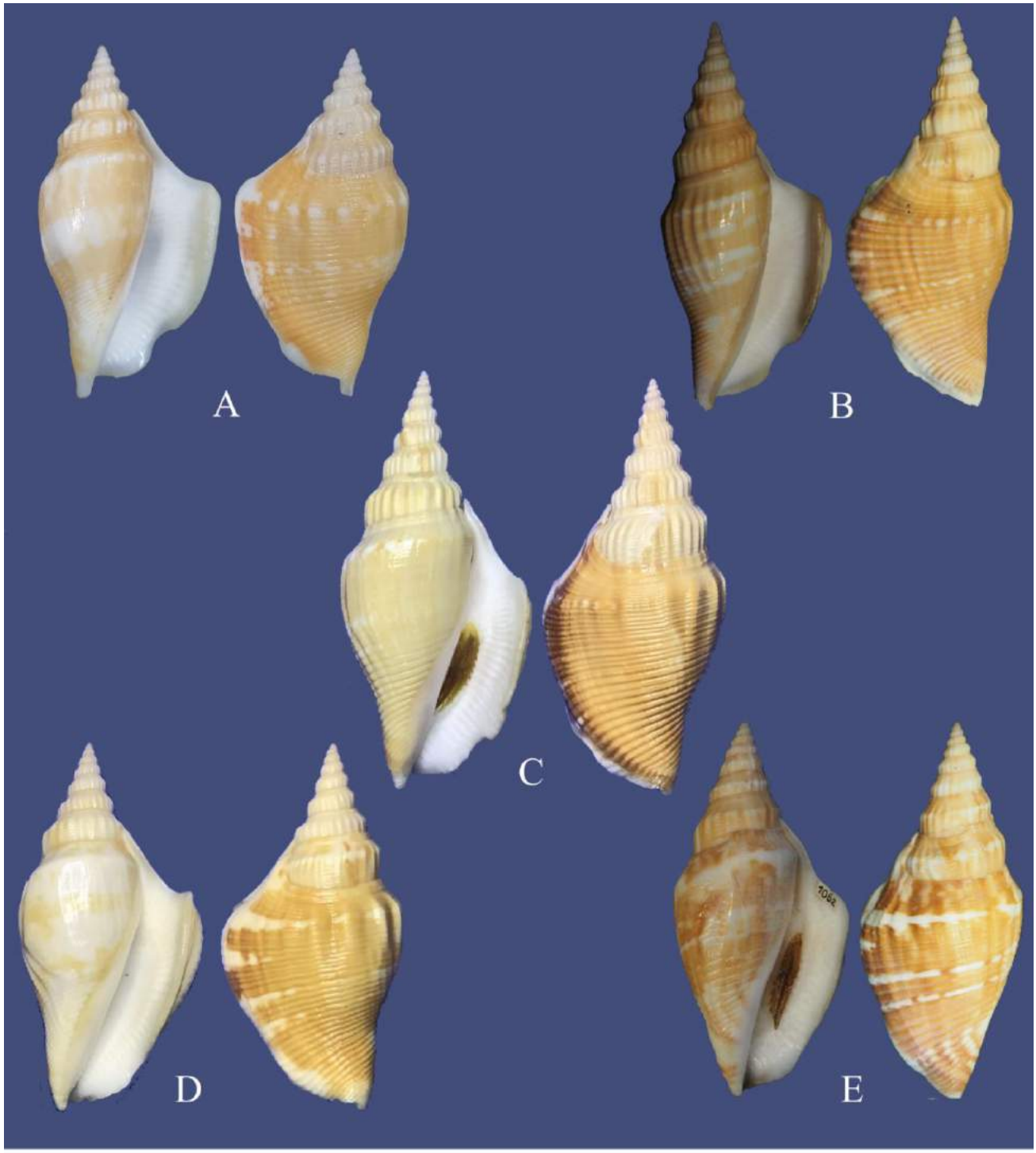

Figure 9. *Strombus japonicus* (Reeve, 1851): **A=** Chiba, Japan, 55.5 (SMC 17.001); **B=** Honshu, Japan, 63.1 mm (Aart M. Dekkers Collection STR1057); **C=** East China Sea, 67.7 mm (VC); **D=** Japan, 58.3 mm (VC); **E=** Mikawa, Japan, 62.8 mm (Aart M. Dekkers Collection STR0540).

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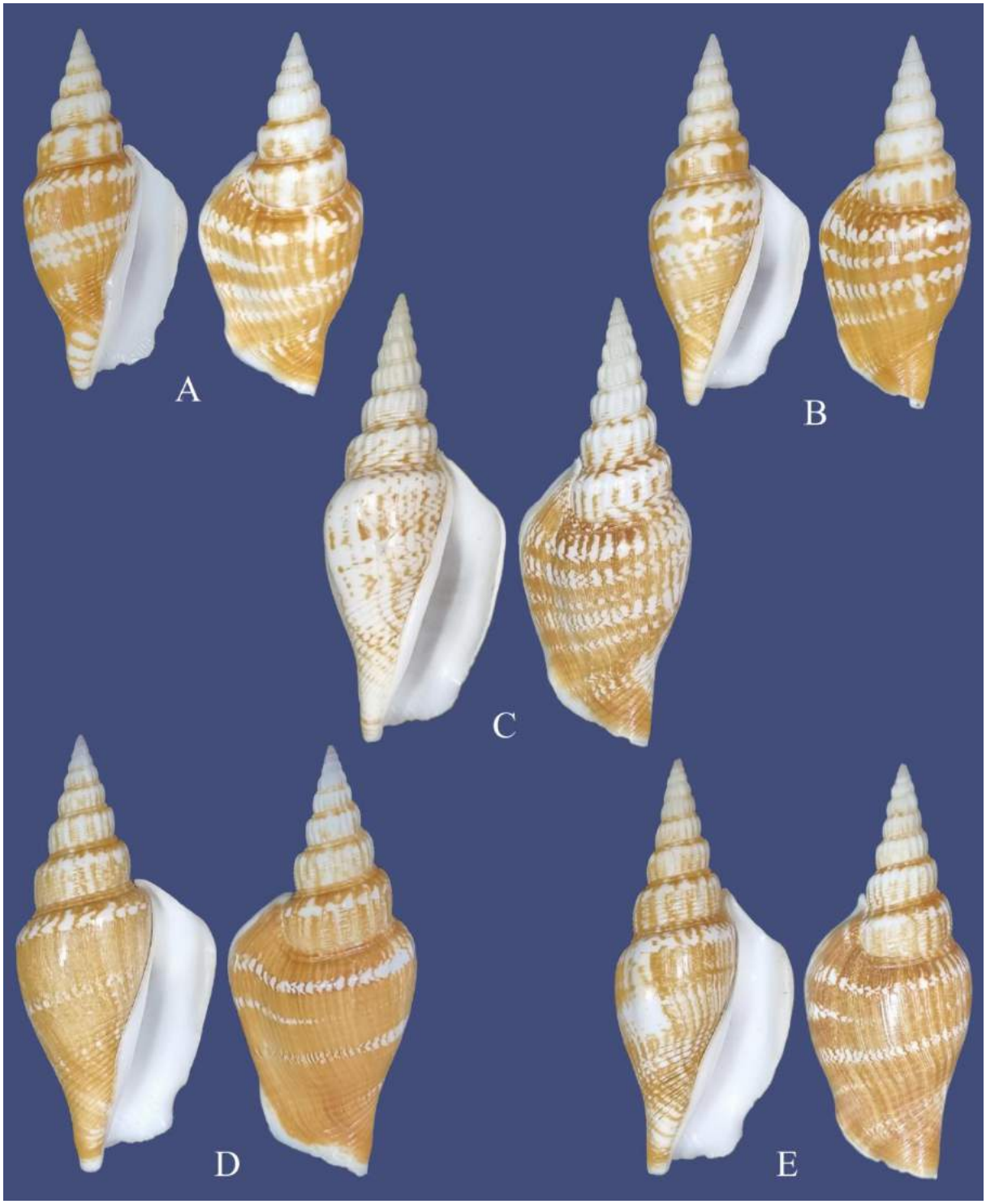

Figure 10. *Doxander entropi* (Man in't Veld and Visser, 1993): **A=** Cebu Island, Philippines, collected 2020, 54.8 mm (SMC 15.004l); **B=** Cebu Island, Philippines, collected 2020, 56.9 mm (SMC 15.004i); **C=** Calituban Island, Philippines, collected 2019, 69.0 mm (SMC 15.003d); **D=** Cebu Island, Philippines, collected 2020, 66.6 mm (SMC 15.004c); **E=** Calituban Island, Philippines, collected 2019, 63.6 mm (SMC 15.003b).

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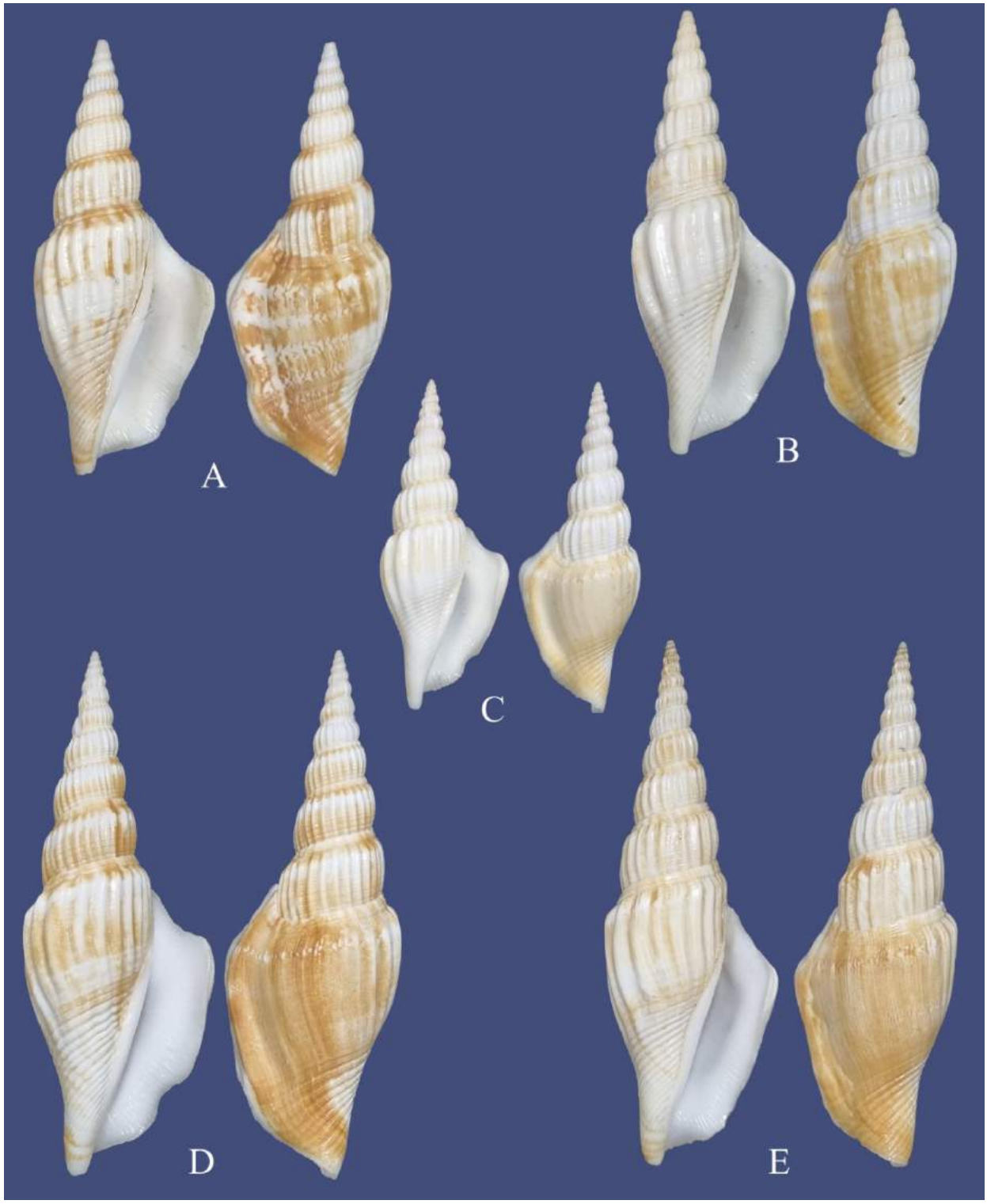

Figure 11. *Doxander operosus* (Röding, 1798): **A=** Galle, Sri Lanka, collected 1982, 67.3 mm (SMC 14.005); **B=** Kangean Islands, Indonesia, collected 2020, 68.5 mm (SMC 14.006h); **C=** Palawan Island, Philippines, collected 2020, 50.5 mm (14.007a); **D=** Eastern Thailand, collected 1993, 80.8 mm (SMC 14.002); **E=** Kangean Islands, Indonesia, collected 2020, 81.5 mm (SMC 14.006l).

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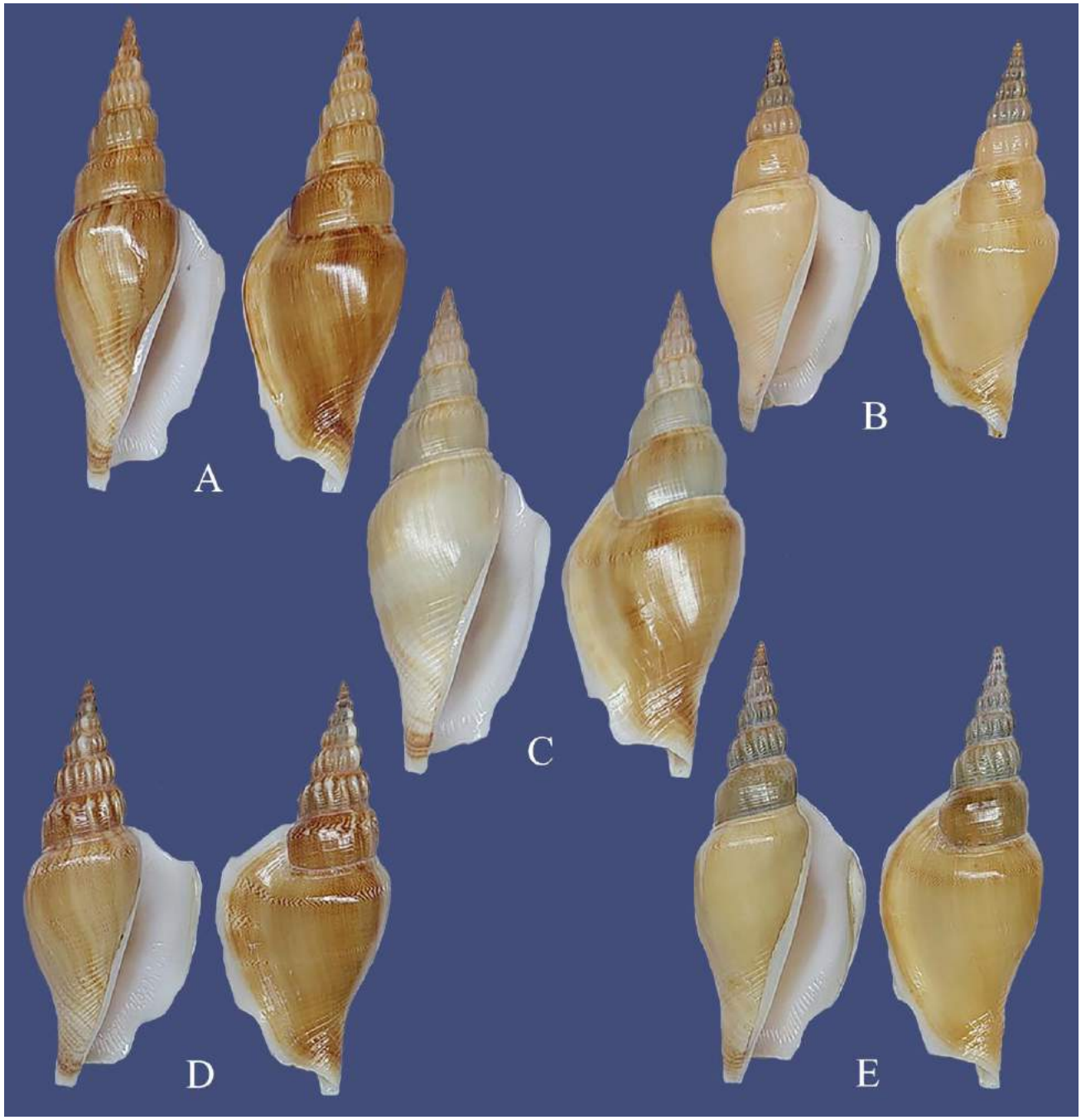

Figure 12. *Doxander vittatus* (Linné, 1758): **A=** Sumbawa Island, Indonesia, 2022 (SMC 14.001a); **B=** Sumbawa Island, Indonesia, 2022 (SMC 14.001b); **C=** Sumbawa Island, Indonesia, 2022 (SMC 14.001c); **D=** Sumbawa Island, Indonesia, 2022 (SMC 14.001d); and **E=** Sumbawa Island, Indonesia, 2022 (SMC 14.001e), size range 55.3 - 69.5 mm.

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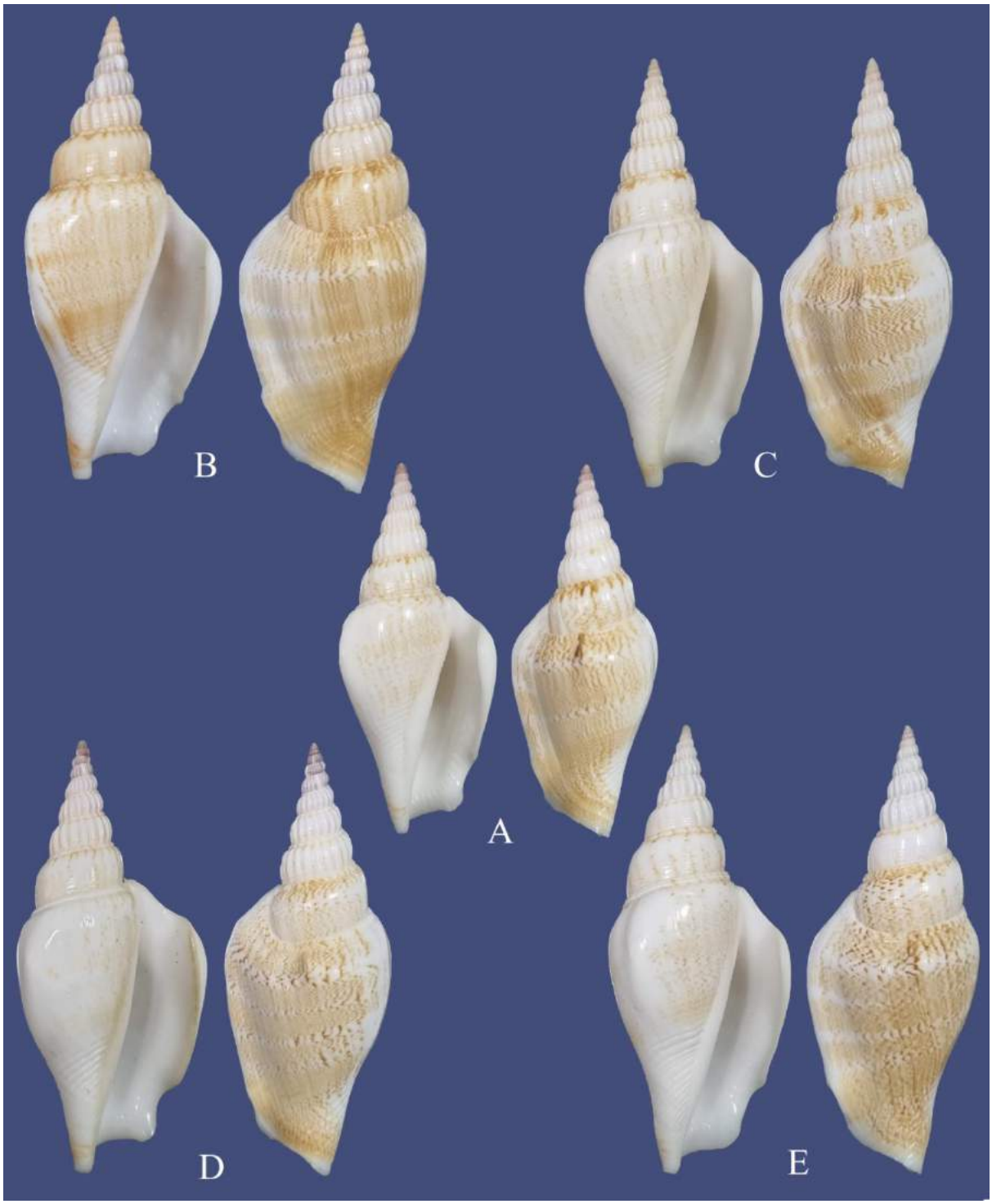

Figure 13. Paratypes of *Doxander queenslandicus* n. sp.: **A=** Paratype 1 - Dingo Beach, Queensland, Australia, collected 2002, 45.2 mm (SMC16.006a); **B=** Paratype 2 - Dingo Beach, Queensland, Australia, collected 2002, 55.9 mm (SMC16.006b); **C=** Paratype 3 - Dingo Beach, Queensland, Australia, collected 2002, 53.4 mm (SMC16.006c); **D=** Paratype 4 - Dingo Beach, Queensland, Australia, collected 2002, 52.6 mm (SMC16.006d); **E=** Paratype 5 - Dingo Beach, Queensland, Australia, collected 2002, 54.5 mm (SMC16.006e).