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Redescription of *Strombus labiosus* Wood, 1828 (Gastropoda: Strombidae) with description of a new species

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Keywords: GASTROPODA, STROMBIDAE, *Dolomena*, new species, Indo-Pacific, taxonomy.

Abstract: It is argued that the nominal taxon *Strombus labiosus* Wood, 1828 is a complex of at least two and possibly three species. *Strombus labiosus*, at present attributed to the genus *Dolomena*, is redescribed. *Dolomena abbotti* sp. nov. is described as new to science and thoroughly compared with *Dolomena labiosa* (Wood, 1828). The new species is mainly known from Thailand, the Philippines, Borneo and other parts of the East Indies. The holotype of *Dolomena labiosa* (Wood, 1828) is figured.

Introduction: *Strombus labiosus* Wood, 1828 was illustrated without designation of a type locality and with only one small figure.

Abbott (1960) considered the distribution of *Strombus labiosus* to be continuous from eastern Africa to Dutch New Guinea (Irian Jaya, now part of Indonesia) through Java, Borneo and the Philippines. A subsequent work (Cernohorsky, 1965) enlarged this area to the Fiji islands. Subsequent workers have followed this opinion.

Through a careful observation of several samples both present authors noticed that three distinct species are present in *S. labiosus*, a larger one living along east African coasts, and a smaller one living from the Bay of Bengal, through Indonesia, up to the Philippines. A third one, conspecific with the specimens reported by Cernohorsky (1965) from Fiji has its range from Papua New Guinea to Fiji and will be described by other authors in a later publication.

Faced with three distinct species, the identity of *S. labiosus* needs to be established. Abbott (1960) discussed *Strombus (Dolomena) labiosus* without examination of the holotype, only the small image from the original description by Wood (1828) was considered, besides many samples. The small drawing of the holotype is of little help in deciding whether the holotype belongs to either of the three morphs. The holotype was subsequently figured by Higo & al. (2001, fig. G1048), but the quality of the illustration does not permit an unequivocal identification of this specimen. After a visit to the National History Museum (NHM), London, by Gijs C. Kronenberg, Han Stoutjesdijk and Ulrich Wieneke good quality images of the holotype were made available to us. After careful observations, we came to the conclusion that the shell characteristics of the holotype of *S. labiosus* correspond to the shells of the morph living along the coast of East Africa. Thus, it is assumed that *S. labiosus* is the species from the western Indian Ocean. To stabilise nomenclature, we take the opportunity to redescribe *S. labiosus*, and describe the morph living in the eastern Indian Ocean to the western Pacific Ocean as new to science. The third morph is currently under study and the results will be published in the future (Monsecour & Wiersma, in preparation).

We attribute the species discussed herein to *Dolomena* Wenz, 1940 (see Kronenberg & Dharma, 2005) here used as a full genus, following the modern trends of stromboid systematics based on shell morphology (Kronenberg & Vermeij, 2002), molecular analysis (Latiolais et al, 2006) and anatomical data (Simone, 2005).

Abbreviations:

- Muzee: Muzee, Scheveningen, The Netherlands (formerly Zeemuseum)
 NHM: National History Museum, London, United Kingdom
 ZMA: Zoological Museum Amsterdam, Amsterdam, The Netherlands
 AMD: Aart M. Dekkers, Blokker, The Netherlands
 DM: David Monsecour, Aarschot, Belgium
 GCK: Gijs C. Kronenberg, Eindhoven, The Netherlands
 HD: Henk Dekker, Winkel, The Netherlands
 HS: Han Stoutjesdijk, Numansdorp, The Netherlands
 JW: Joop Wiersma, Kerkrade, The Netherlands
 LG: Leo van Gemert, Zeist, The Netherlands
 VL: Virgilio Liverani, Faenza, Italy

Systematics:

Superfamily: STROMBOIDEA

Family: **Strombidae** Rafinesque, 1815Genus: *Dolomena* Wenz, 1940Type species by monotypy: *Strombus pulchellus* Reeve, 1851***Dolomena labiosa*** (Wood, 1828)1828 *Strombus labiosus* Wood: 54, pl. 4 fig. 31851 *Strombus labiosus* Gray – Reeve [in part]: pl. 18 fig. 501960 *S. (Dolomena) labiosus* Wood, 1828 [in part] – Abbott: 95-97, pl. 69, pl. 18 no 17-191974 *S. (Dolomena) labiosus* Wood, 1828 [in part] – Romagna-Manoja: p.7.1984 *S. (Dolomena) labiosus* Wood, 1828 [in part] – Kronenberg & Berkhout: 318-319, pl. 4 fig. 121999 *S. (Dolomena) labiosus* Wood, 1828 [in part] - De Turk & al.: pl. 81 figs 2,42001 *Dolomena labiosa* (Wood, 1828) [in part] – Higo, Callomon & Goto: fig. G1048 [holotype figured]2008 *Dolomena labiosa* (Wood, 1828) – Robin: 133, fig. 7

Holotype: The holotype is in the Natural History Museum, London, collection number 1953.3.12.1. It measures H 42.0 mm. Wood gave no type locality, and the holotype does not have a locality on the label. The holotype characters correspond to shells of the African species, so the name “*Strombus labiosus*” has to be attributed to the species from East African waters.

Material studied:

Madagascar, Tuléar: AMD STR0711, H 61.6; AMD STR0713, 1999, H 55.8; AMD STR0714, 1999, H 47.0; AMD STR0105, 1999, H 53.2; AMD STR0716, 2003, H 64.2 ; AMD STR0717, 2006, H 54.8; AMD STR0718, 2006, H 51.6; AMD STR0719, 2006, H 51.2; AMD STR0720, 2006, H 47.5; AMD STR0722, 2007, H 51.0; AMD STR0723, 2007, H 65.5; HD nr 11467, 2002, H 55.0; JW 03.24, shallow water, 1999, H 60.5 & H 52.0; DM unnumbered, shallow water, 1995, H 62.0; VL 608-01/10 shells, H 52 to 68 mm. ; ZMA Moll. 4.08.044, 2007, H 53 mm. Madagascar, Nosy Be: VL 608-04/2 shells, H 48-52 mm. Tanzania, Dar-es-Salaam: VL 608-03/11 shells, H 43 to 58 mm. Mozambique: AMD STR0712, Pemba Island, dredged at 12 metres near reef, 1999, H 55.0; AMD STR0724, Nacala Bay area, 2004, H 49.6; AMD STR0725, Nacala Bay area, H 55.4; HD nr 21457, Nacala Bay, shallow water, 1993, H 54.0; DM unnumbered, Nacala Bay, dived on gravel at 3-5 metres, H 54.4; Muzee 62436, H

50.2; Muzee 59474, Nacala Bay, shallow water, 1995, H 61.6 & H 55.0; VL 608-02/3 shells, H 39-59 mm.

Type locality: Abbott (1960: 97) selected as type locality "The Philippines, Luzon Island, Bataan". As it is demonstrated in this paper that the holotype of *D. labiosa* corresponds to shells coming from the coasts of East Africa, a type locality in the Philippines is not correct. We hereby correct the type locality to Tuléar, west Madagascar.

Diagnosis: Shell 40–70 mm., solid and heavy, consisting of thick shell material. Body whorl somewhat triangular in appearance because of the knobbed angulated shoulder. Seen from the dorsum, the outline of the shell slopes smoothly downwards toward the siphonal canal on the right side. Shell with a dull, not shiny dorsum. Spire with 10 whorls plus final whorl. Protoconch of about 2.5 whorls, glossy and smooth. Post-nuclear whorls decorated with distinct axial ribbing (and no knob on the shoulder) and spiral ribbing. The sculpture does not get a cancellate structure as the spiral ribbing is more and more dominating on later whorls, where the axial ribbing gets obsolete. The shoulders on the whorls look round. Last whorl has distinct spiral ribbing crossed only by axial growth lines. The spiral ribbing gets obsolete ventrally, leaving a rather smooth field. Distinct and heavy knobs occur on the shoulder of the body whorl, totally disappearing or with some shallow folds remaining ventrally. Outer lip flaring, attached to the penultimate whorl at the shoulder, then abapically curving outside and adapically only slightly curving again into a small, hardly noticeable forward-pointing tip. Columella with heavy callus, white and shiny, in old specimens with a silver gloss at the outer edge of the callus. Inside of lip thickened, white and in old specimens with a silver gloss. Inside of aperture white with numerous lirae leading deep into the mouth. In the aperture, the lirae get a brown colour. At the side of the columella, the adapical part may have about 4-5 lirae (often absent) forming small knobs at the posterior end. At the abapical end of the columella there are about 4-5 lirae or small teeth. All these lirae are of the same colour as the columella: white. The stromboid notch in the outer lip is rather shallow for the size of the shell, always less deep than the sinus of the siphonal canal.

Colour golden brown to darker brown, mottled on a hardly visible cream background colour, decorated with a lighter part on the outer edge of the flaring lip, which is bordered by a dark brown band on the outer edge. This brown band continues onto the thickened inner side of the lip (callus).

Habitat: Specimens allegedly live in relatively shallow water: the known depth range is 3-40 m. on sandy bottom.

Comparison: See below with *Dolomena abbotti* sp. nov.

Dolomena abbotti sp. nov.

- 1960 *Strombus (Dolomena) labiosus* Wood, 1828 [in part] – Abbott: 95
 1974 *S. (Dolomena) labiosus* Wood, 1828 [in part] – Romagna-Manoja: p. 7-9-10
 1977 *Strombus labiosus* Wood – Hinton, A.G.: 9, fig.6
 1980 *Strombus (Dolomena) labiosus* Wood, 1828 [in part] – Walls: 112, map 52
 1984 *Strombus (Dolomena) labiosus* Wood, 1828 [in part] – Kronenberg & Berkhout: 318-319
 1986 *Strombus labiosus* Wood, 1828 – Springsteen & Leobrera: 74, pl. 17 fig.16
 1986 *S. labiosus (Canarium)*(sic) Wood, 1828 – Nicolay & Angioy, p.15, fig. p.16.
 1999 *Strombus (Dolomena) labiosus* [in part] –De Turk & al.: 41, pl. 81 figs. 1,3
 2001 *Strombus labiosus* Wood, 1828 – Swennen et al.: fig. 336
 2008 *Dolomena labiosa* (Wood, 1828) – Kronenberg: pl. 255 fig. 6

Holotype: The holotype is deposited in ZMA Moll. 4.10.003, off Phuket Isl., Thailand, H 40.2 (ex coll. AMD).

Paratypes: Thailand: Paratype 1-2 ZMA 2003.05.01, H 24.6-33.5 mm, Sai Buri, from local fishery dumps, leg. R.G. Moolenbeek & H. Dekker; Paratype 3 ZMA 136.0; Paratype 4-8 Muzee nr. 57013, 5 spec., Phuket, H 31.3- 42.2 mm; Paratype 9 AMD STR0705, Korbon Island, H 33.8 mm; Paratype 10 AMD STR0707 off Kantang, West Thailand, by prawn boat nets at 34 fathoms, ex coll. B. Groenendaal, H 32.0 mm; Paratype 11 AMD STR0721 Kantang, SW Thailand, 45-50 m, trawled, ex coll. Eng, H 38.5 mm; Paratype 12 AMD STR0710 Ranong, trawled, H 41.7 mm.; Paratype 13 JW 03.24(05) Phuket H 36,8 mm.; Paratype 14 DM 659B Rawai, Phuket H 42,0 mm.; Paratype 15-24 VL 607-01/9 shells, Phuket area, H 29 to 50 mm.; Paratype 25 LG off Phuket Island H41,2 mm.; Paratype 26-27 ZMA 2003.05.01, H 24.6 and H 33.5 mm.; Paratype 28 HS unnumbered, Phuket, Rawai, in sand at 4 metres, 1971, H 34.4 mm; Paratype 29 HD 26440. Raya Islands, Thailand. H36.5 mm; Paratype 30-44 HD 2010 Pattani, Thailand. H 29-41 mm.

Other material studied: Sri-Lanka: GCK 814, Trincomalee, local fishermen, 1 shell. Indian Ocean: ZMA 3 unnumbered shells, H 43.5, H 40.2 and H 40.2 mm, ex. coll. L. de Priester (54)1995; Malaysia: AMD STR0704, Sedili Johor, West Malaysia 20-25 metres, trawled, ex coll. Eng, Singapore, H 37.0 mm; AMD STR0706, same data as previous, H 35.0 mm; Philippines: AMD STR0708 Ligid Island, Samar, Philippines, scuba dived at 10-20 metres H 26.0 mm; AMD STR00833 Bohol, Philippines H 39.3 mm.; AMD STR1489 Masaging Island H49,4 mm.; AMD STR1490 Balabac Island, Palawan H 26,3 mm.; VL 607-02/4 shells, H 34-38 mm; Indonesia: ZMA 1992.07.00, 2 shells, H 34.4 and 34.0 mm, Indonesia, West Coast of Borneo, from fishing nets, coll. B. Dharma; ZMA unnumbered, 2 shells, H 28.2-31.8 mm, Indonesia, Djakarta Bay [subfossil]; AMD STR0104 Irian Jaja, off Sarni, 1995, H 37.4 mm.; VL 607-07/2 shells, NW Borneo, near wreck "Bluebird", H 26-30 mm.; VL 602-03, Sumatra, off Tanjung Pandan, H 26 mm.; Vietnam: VL 607-05 Nha Trang area, H 36 mm.; Papua New Guinea: ZMA 1962.04.00, 2 shells, H 29.0-33.4 mm, New Guinea, Biak, Leg. S. Crans.

Type locality: off Phuket Island, west Thailand.

Distribution: Known from the eastern Indian Ocean and the western Pacific Ocean, the material studied originated from eastern Indian Ocean to Papua New Guinea, through Indonesia and the Philippines.

Habitat: Dredged in 10 to 80 metres on muddy sand or broken shells bottom (Abbott, 1960). It probably lives in silty-muddy bottoms at 10-50 m.

Description: Shell of medium size (average between 25 and 38 mm), solid, with a largely flaring outer lip, body whorl somewhat squarish in appearance because of the knobbed angulated shoulder and the second row of nodules between the shoulder and the siphonal canal. Shell dull. Spire with 9 whorls plus final whorl. Protoconch very small, about 2.5 whorls, glossy and smooth. Postnuclear whorls decorated with spiral threads leading to spiral lines on later ones. Distinct axial ribbing generally occurs on later whorls; knobbed on the shoulder. The sculpture does not get a cancellated structure as the axial sculpture is dominant. Final whorl with distinct spiral ribbing crossed by axial ribbing, with small to rather large knobs on the shoulder. On the ventral side the ribbing gets obsolete and the shield gets glossy and smooth. Outer lip flaring, attached to the penultimate whorl at the shoulder, then abapically curving outside and adapically again curving into a slightly forward pointing tip of the outer lip.

There is a deep furrow along the entire outside of the lip, about 4 to 8 mm from the border, which climbs up to the suture to form a big ridge. Columella with heavy callus, white and shiny, in old specimens with a silver gloss at the outer edge of the callus. Inside of lip thickened, white and with a silver gloss in old specimens. Inside of aperture white with numerous lirae leading deep into the mouth. In the mouth, the lirae get a brown colour. The adapical part of the columella has about 6-8 lirae forming little knobs at the posterior end. There are also some 10 lirae on the abapical end. All these lirae are of the same colour as the columella: white. The stromboid notch in the outer lip is deep, generally deeper than the sinus of the siphonal canal.

Shell colour mostly cream or light tan, with a white outer edge of the flaring lip.

Etymology: The species is named in honour of R. Tucker Abbott, author of many shell books, and the first modern author who monographed the family **Strombidae**.

Comparison: *Dolomena abbotti* can only be confused with the Indian Ocean species *Dolomena labiosa* (Wood, 1828), and with a third species in this group, to be described in the future (Wiersma & Monsecour). *D. abbotti* can most easily be distinguished from *D. labiosa* the locality data; the smaller size; the thinner shell material; the squarish shaped right side of the dorsum, instead of a gently sloping shape; the thin enamel on the inside and outer end of the wing, which is thicker in *D. labiosa* and the upward pointing tip of the wing, which is less upwards in *D. labiosa*. Also see table 1.

Discussion: Examination of several private and public collections, and of the available literature, showed that there are no intermediate forms, and few records between the east Africa and the west Pacific populations. It is therefore assumed that the distribution areas of both forms are separated, and the two taxa are to be considered as separate species.

Both taxa seem to be absent from the central Indian Ocean. One subfossil shell of *D. labiosa* was reported from Mauritius Isl. (Loïc Limpalaër, pers. comm. with the second author). *D. labiosa* was not reported from eastern Arabia by Bosch & al. (1995), nor from the Seychelles by Jarrett (2000) or Sri Lanka by Kirtisinghe (1978). The only report of *D. labiosa* from that area is by E.A. Smith, 1903, who lists *Strombus labiosus* Wood among the species recovered in the Maldives and Sri Lanka. There is no image, but Smith refers to the image in Reeve (1851), which is a good drawing, similar to the African species despite the locality given by Reeve: the Philippines. The specimen of GCK from Sri Lanka belongs to *D. abbotti*. If these records are reliable, then the

distribution pattern may be comparable to that of some other stromboid species like *Harpago arthritica* (from east Africa to the Maldives) and *H. chiragra* (Sri Lanka to central Pacific Ocean), or to the area of *Dolomena columba* (east Africa to Seychelles) and *Dolomena pulchella* (south India to central Pacific Ocean).

Table 1. Comparison of shells of *Dolomena abbotti* sp. nov. with *D. labiosa*.

Shell characteristic	<i>Dolomena labiosa</i>	<i>Dolomena abbotti</i> sp. nov.
Min-Max length	Shells 39-65 mm	Shells 21-42 mm
Ridge at the conjunction of body whorl into the flaring lip	Not present or when present not very elevated	Present with a deep furrow along its side
Tip of wing	Slightly upwards	More upwards
Wing	With thick enamel inside and strongly thickened at the outer edge; inside lirae are smoothed by the enamel covering it	Lacking the thick enamel on the inside; the outer end less thickened; lirae sharper
Number of whorls	11	10
Last whorl, dorsal view	Slender, smoothly dropping at the right side towards the siphonal canal	Squarish, has a sharp corner at the right side from the shoulder downwards
Sculpture last whorl, ventrally	Faint axial lines; axial folds, in the part from the central part to the siphonal canal clear and broad, flat spiral ribbing	Smooth except for the almost obsolete axial folds; only a few spiral lines near the siphonal canal
Sculpture of early whorls	Dominant spiral ribbing with more pronounced axial ribbing (cancellated effect) on earlier whorls. On later whorls, the axial structures get obsolete. Hardly any early varices	Dominant axial ribbing on all whorls, several spiral ribs visible; earlier varices present more often, but not always
Form of early whorls	Angulated with a round shoulder	More angulated, not round
Stromboid notch	Shallow	Deep
Basic colour	Cream to dark brown, sometimes mottled. Outer edge of flaring lip bordered with a dark brown band	White to cream; end of lip always with broad white band towards the outer end

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Plate 1:

1, 2, 5: *Dolomena labiosa* (Wood, 1828)

Pemba Island, North Mozambique. Dredged at 12 metres near reef, 1997. H 55 mm, W 33 mm. AMD STR0712.

3: lateral side of *Dolomena labiosa* (Wood, 1828)

Nacala Bay, Mozambique. On rocks at 5 metres. By local diver, 2004. H 55,4 mm, W 33.5 mm. AMD STR0725.

4: dorsal side of *Dolomena abbotti* sp. nov. Paratype 13.

Phuket, Thailand. H 36.8 mm. JW 03.24(05). Photo taken by JW.

6: view from the apex of *Dolomena abbotti* sp. nov.

Holotype. H 41.2 mm. Taken off Phuket Island, Thailand.

Plate 2:

7-9: *Strombus labiosus* Wood, 1828. Holotype, NHM 1953.3.12.1, H 42.0 mm.

Photos taken by Kathie Way, Natural History Museum, London.

10-12: *Dolomena abbotti* sp. nov.. Holotype. H 41.2 mm.

Taken off Phuket Island, Thailand.

Unless mentioned otherwise, all photos were taken by the first author.



