

**On the identity of *Conus pennaceus sensu stricto* Born, 1778,
Conus pennaceus forma episcopus (Hwass in Bruguière, 1792),
Conus magnificus Reeve, 1843 and *Conus quasimagnificus* da Motta, 1982
from the coastal waters of Egypt, Red Sea**

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Key words: GASTROPODA, CONIDAE, Coninae, *Conus*, Egypt, Red Sea

Abstract: The aim of this paper is an attempt to summarise the conchological variability observed in *Conus pennaceus sensu stricto* Born, 1778 from the coastal waters of Egypt. The holotype of *Conus quasimagnificus* da Motta, 1982, the lectotype of *Conus pennaceus* Born, 1778, *Conus episcopus* Hwass in Bruguière 1792, *Conus colubrinus* Lamarck, 1810 and *Conus magnificus* Reeve, 1843 are cited and illustrated as a primary source the collected specimens are compared with.

Systematics:

Superfamily **Conoidea** Fleming, 1822

Family **Conidae** Fleming, 1822

Subfamily **Coninae** Fleming, 1822

Genus *Conus* Linnaeus, 1758.

Type species: *Conus omaria* Hwass in Bruguière, 1792

Field observations list of collecting localities:

Gulf of Aqaba: Fara un (Coral Island), Ras Murach (the Fjord), Wadi Magresh, Ras Burka, Nuweiba, Dahab (Bleu hole), Dahab-Lighthouse, Dahab-Oasis, Nabq-MariaSchroeder, Nabq-Milton beach, Ras Nasrani, Na'Ama- Bay Near Garden, Marsa el At, Sharm el Sheikh, Ras Umm Sidd and Ras Mohammed.

Gulf of Suez Sinai side: Ras Mohammed, Jubay Island.

Gulf of Suez eastern desert side: (alternate name: Strait of Jubal) Zafarana, Ras Gharib, Ras Shuhier, Gabal el Zeit, Ras el Ush.

Northern part to the proper Red Sea: El Gouna, Gebel 'Esh, Abu Sha'r (hydrobiologic institute), Shadwan Island, Hurghada - Berima, Fanadir Island, Magawish Island, Abu Mingar Island, Jasmin Village, Coral beach, Giftum el Kebir Island, Abu Ramada Island, Sa'l Hashish, Makadic (= Makadi Bay), Sharm el Naga, Ras Abu Söma, Söma bay, Safaga-Lotus bay, Algisos, El Quseir, Ras um Gheig, Port Ghalib, Ras Mubarak – Turtle Bay, Marsa Murena, Abu Dabbad, Marsa Alam, Sharm el Luli, part of the National park of Wadi el Gamal.

Introduction: The status of *Conus pennaceus sensu stricto* is much debated and it is probably the most over-worked species among **Conidae** and therefore probably the most disputed one ever since the description of *Conus pennaceus* Born, 1778 [Mus. Caes., p.152, pl.7, fig.15. (14sic)]. Unfortunately, in following Davila (1767), Born (1778) erroneously designated “China” as type locality, which was corrected to “Coast of Mozambique” by Wils (1986:191) and not Lauer (1990: 15). Numerous discoveries have been made in areas outside the previously designated localities. It leaves no doubt that variability and the geographical distribution of this species are responsible for many names employed by several authors and shell dealers. During all the expeditions to the Red Sea by members of the Royal Belgian Society for Conchology (1971-2012), studying the waters of the Gulf of Aqaba also known as the Gulf of Eilat, lying to the east of the Sinai Peninsula, the southern part of the Gulf of Suez, lying to the west of the Sinai Peninsula and the northern part of the Red Sea as far as the Sudanese border, more than 400 specimens were collected in Egyptian coastal waters. These are partly stored in the collections of the late Mr. Ed Wils, now deposited in the Royal Belgian Institute of Natural Science (RBINS) Brussels, under inventory number (IG. 32174 drawer, 31-32), the late Mr. and Mrs. Wellens-

Hiby, Lode Willems, Jean Tielemans. Roger Pickery, Jan Buijse, Marck Dirkx and the present author.

Literary history and comments: In literature concerning the Red Sea several names have been added for specimens occurring at the Egyptian side of the Gulf of Aqaba, the northern part, and the proper Red Sea:

In his revision “De Conidae van de Rode Zee”, Wils (1986) mentioned three species: *C. magnificus* Reeve, 1843 (Conch. Icon. 1, *Conus* Spec. 32, pl. 6) collected at Hurgada (fig. 50-53), northern part of the Red Sea, *C. quasimagnificus* da Motta, 1982 (Publ. Ocas. Soc. Por. Malac. 1: 3, f.3) collected at Eilat, Gulf of Aqaba and one juvenile of *C. magnificus* forma *marmoricolor* Melvill, 1900 from the waters of Port Sudan. Concerning the latter, the author only mentioned this species in the explanation of the figures. Unfortunately these figures were printed in black and white, which gives the reader a distorted view and can lead to a misinterpretation concerning colour and tent-like markings. Furthermore, the author mentioned *C. pennaceus*, but concluded that the species did not occur in the Red Sea. Moreover, he considered the species figured in Sharabati (1984: pl.32, fig 4h) as “not likely to come from the Red Sea”. This specimens indeed belongs to the subspecies *C. pennaceus ganensis* Delsaerd, 1988 from the Maldives.

Fainzilber et al., (1992: 9) also reported *C. pennaceus*, but consider the specimens occurring in the Gulf of Eilat as the variety *Conus pennaceus* forma *episcopus* (Hwass in Bruguière, 1792).

In the list of Dekker & Orlin (2000) *C. pennaceus* is accepted as a inhabitant of the Red Sea, thereby referring to Sharabati 1984 pl. 32, fig. 4c.

Heiman (2002: 19) regarded *C. pennaceus* from the Gulf of Aqaba different from other populations outside the Red Sea. He also considered these differences as essential and constant and they could therefore be described as a subspecies. Moreover, he also mentioned that Röckel et al. (1995) preferred to treat Red Sea populations as a different form only.

Verbinnen & Wils (2007: 152, pl.4) mentioned and illustrated the extreme variability of *C. pennaceus*; even within a single population many intermediates exist.

Mary Lyn Rusmore-Villaume (2008:128) depicted one specimen as *C. quasimagnificus* da Motta, 1982. She mentioned this species as common in the Gulf of Aqaba but rare elsewhere.

While working on this manuscript, specimens from “the northern Red Sea, including the entire Gulf of Aqaba and the adjacent Egyptian coast from Sharm el-Sheikh and

Hughada to Safaga were described as *Darioconus bratcheri* Petuch and Berschauer, 2019.

Observations and discussion: Specimens from one location may show an array of remarkable differences in shape and coloration, which suggest that the kind of bottom, depth and temperature of the water may be responsible for producing several ecotypes. In large series, this variation is almost completely linked by intermediates, which show a homogeneity that would not be suspected if a few isolated specimens were studied.

The species was usually collected buried in sandy patches between coral boulders or hidden under hard substrate during the day. At night they become extremely active in front of the reef. On several occasions they were observed feeding on molluscs such as *Turbo radiatus* Gmelin, 1791 and *Turbo petholatus* Linné, 1758 = *Turbo moolenbeeki*, A. Dekker & H. Dekker, 2002. Opisthobranch species and very small fish are occasionally also on the menu.

When active, this species can be dangerous and should be handled with care. The venom is very toxic and the sting is known to have caused human fatalities in the past.

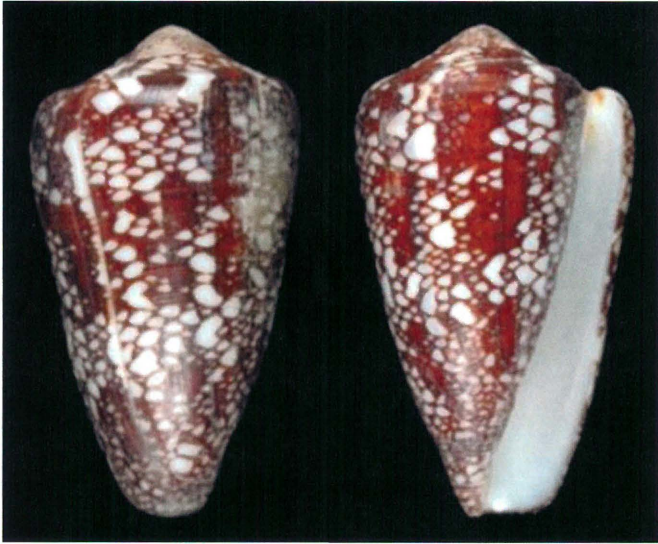
At the Gulf of Aqaba, Gulf of Suez, Sinai side and the Gulf of Suez, eastern desert side, the species was found at nearly all the visited localities, but never in large quantities. They were usually found solitary, but occasionally spotted in congregation while spawning, but such specimens were never collected by the attendees.

The majority of the specimens were found intertidally, others by skin and scuba-diving in depths up to about 30 m. However, in an area of approximately 300 square metres in very shallow water near the reef of Port Ghalib, *C. pennaceus* occurs abundantly and more than one hundred specimens were live collected, all in subadult to adult stage and none of them reaching a length exceeding 45 mm.

All of the occurring specimens or intimately related to *C. pennaceus* ss. The vast majority of the collected shells are very polymorphic with a wide intraspecific variation, not only in tent-like markings but also in shape, colour and length.

Various authors have generally regarded *C. quasimagnificus* as one of the species occurring in the Gulf of Aqaba, thereby following the description by da Motta quoted here: “entire surface from spire to base is ornamented with reticulations of ovately- triangular with white spots or chestnut-brown with several large blotches of the same colour forming two interrupted circular bands”. However, none of the collected shells are as da

Motta mentioned, which can also be judged from the depicted holotype.



Holotype of *Conus quasimagnificus*
Size: 68.5 x 38 mm MHNG. Cat., N° 981.736
Courtesy A.J. Kohn.©

<http://biology.burke.washington.edu/conus/recordview>

The type locality of *C. quasimagnificus* is restricted to Khor-Fakkan, Gulf of Oman.

The variability of the collected specimens from Egyptian waters does not correspond with the variability of *C. quasimagnificus* and despite the superficial similarity *C. quasimagnificus* does not occur in the Gulf of Aqaba, nor in the coastal water of Egypt as mentioned in literature.

The specimens of *C. magnificus* mentioned by Wils (1986) and occurring in the vicinity of Hurghada (northern part of the Red Sea) are rather small, slender and relatively subadult (dimensions mentioned are 57.5 mm, 42.0 mm, 54.2 mm, 52.3 mm). In our opinion, the diagnosis and conclusion made by the author are disputable and incorrect; they are in fact specimens of the very variable and slender forms of *C. pennaceus* ss.

C. magnificus generally differs by its larger size, by having a higher spire, a subangulate to rounded shoulder and the relatively concave to straight outline. Some of the collected specimens nearly have the same tent-like pattern, but are distinguished by the relatively low spire, the more angulated to rounded shoulder, the ventricosely conical last whorl and the concave to convex outline.

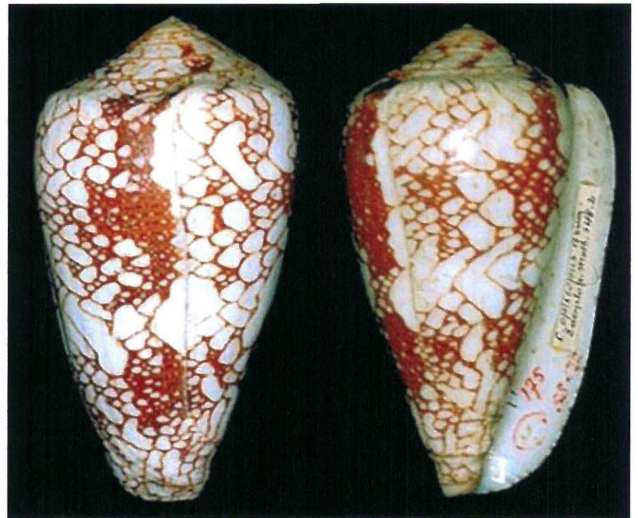
The type locality of *C. magnificus* is restricted to Matnog, Island of Luzon, Philippines. The species is distributed allo over the Indo-Pacific region, but absent in the Red Sea and East-African regions.



Lectotype of *Conus magnificus*
Size: 92 x 41 mm. BMNH Cat., N° 1988055/1
Courtesy A.J. Kohn. ©

<http://biology.burke.washington.edu/conus/recordview>

Conus pennaceus forma *episcopus* (Hwass in Bruguière, 1792): we hereby regard the consideration of Fainzilber et al. (1992) as incorrect: *C. episcopus* must be regarded as a variety of *C. pennaceus* occurring in the Mauritius region. The variety differs in size: generally smaller, with a conical to ovate body. The ground colour is light to dark brown, ornamented with white tentlike marks forming two interrupted circular bands. The specimens strongly resemble *C. quasimagnificus*, but are generally speaking lighter in colour.



Lectotype of *Conus episcopus*
Size: 58 x 33 mm MHNG Cat N° 1108/70
Type locality: Mauritius

Courtesy A.J. Kohn. ©

<http://biology.burke.washington.edu/conus/recordview>

Conus pennaceus ss. is widely distributed throughout the East-African waters. Several authors made an attempt to clear the problem and divided them in forms or subspecies. In the coastal waters of Egypt, the collected

specimens exhibit considerable variability and have no constancy in shape, nor in colour pattern. However, the appearance of several geographical patterns lead to the present conclusion that only a single species is involved.



Lectotype of *Conus pennaceus*
Size: 40 x 23 mm NHMW Cat N°. 14169
Type locality Coast of Mozambique
Courtesy A. Eschner. ©

<http://biology.burke.washington.edu/conus/recordview>

All the expeditions the present author took part in (1989 to 2012) and studying Red Sea material related to the subject allow us to conclude that *C. pennaceus* s.s. indeed occurs in the coastal waters of Egypt: between Gebel Esh and Abu Sha'r (1990) (Hydro-biological institute), about 20 km north of Hurghada Center, three specimens of which one could be considered the typical *C. pennaceus* were collected. They were found alive in front of the reef in relatively shallow water, partly hidden in whitish coral sand. One of these specimens (subadult) was collected by the late Mr. Wellens and is stored in the collection of the present author. Another one was in the collection of the late Mr. Lode Willems. Unfortunately, it is impossible to trace this specimen's whereabouts at the moment, it is presumed that it is lost to science. The third specimen is stored in the collection of the present author and is considered a homeotype (a biological specimen that has been carefully compared with and identified with an original or primary type). The minor differences between both specimens are the more expanded shoulder and the broader last whorl of the lectotype, which give that shell a broadly conical appearance, but the natural colour has perished over time, while the collected specimen has a more cylindrical shape and is fresh coloured.



Coll., N°. 236 Size: 55 x 28.4 mm.

These differences are common within the *C. pennaceus*-group (see Pl.3, Fig.9) and in the family **Conidae**. When the animal reaches complete adulthood, some species tend to build the body whorl upwards, which gives the shell a broadened last whorl with a low spire. This can also be noticed with specimens of *Conus omaria* Hwass in Bruguière, 1792, *Conus textile neovicarius* da Motta, 1982 etc. At Hurghada in 1990, Marc Dirckx, one of the expedition's attendees, collected several specimens while diving at a depth of 10 to 15 metres. All of them were empty shells and orange to yellowish coloured. In some aspects, they resemble *Conus colubrinus* Lamarck, 1810 (Ann. du Mus Hist. Nat. (Paris), XV, p.433, n. 163). The colouration of such a specimens comes from lacking direct sunlight, which does not invade such depths and therefore the colour pollution does not have a great impact on colourisation of these shells.



Lectotype of *Conus colubrinus*
Size: 53.5 x 24.5 mm MNHN
Cat N°. IM-2000-2571
Type locality: Mer des Grandes Indes



Coll. N°. 234k Size: 62.3 x 27.2 mm

Conclusion: Confusion in identifying *Conus pennaceus* s.s. specimens within the Gulf of Aqaba and northern part and partly the proper Red Sea near the Egyptian border is attributed to the variability of the shells from this region. As already mentioned, the great biodiversity of the species in the Red Sea is enormous and all of this has led to a misinterpretation of this species. As there are several geographical and transitional forms, we conclude that only a single species is involved and there is no reason to describe these species as a new valid taxa nor as subspecies as some authors and shell collectors require and generally do. Species must have stable characteristics and subspecies do not occur in the same geographic area as typical specimens of the nominal species, therefore there are no transitional forms, even though some authors apparently doubt this nowadays.

All specimens collected during our expeditions are in fact the well-known and very variable *Conus pennaceus* s.s.

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Plate 1

1-1a: *Conus pennaceus episcopus* (Hwass in Bruguère, 1792)
Port Louis Mauritius. 4.8 x 22.6 mm.

2-2a: *Conus magnificus* Reeve, 1848
Nha Trang, Vietnam. 81.7 x 34 mm.

3-3a: *Conus pennaceus quasimagnificus* (da Motta, 1982)
Oman. 53.2 x 27.5 mm
Coll. A. Delsaerd N°. 311

4-4a: *Conus pennaceus*
Lectotype. 40 x 23 mm.

5-10a: *Conus pennaceus s.s.*

5-5a: Between Gebel Esh and Abu Sha'r, Egypt
Homeotype. 55 x 28.4 mm.

6-6a: Between Gebel Esh and Abu Sha'r, Egypt.
(Leg. W. Wellens)

7-7a: Dahab (Bleu hole), S. Sinai, Egypt.
41.8 x 19.4 mm.

8-8a: Dahab (Lighthouse), S. Sinai, Egypt.
37.8 x 19.2 mm.

9-9a: Nabq (Milton beach), S. Sinai, Egypt.
Local variation. 55 x 30.3 mm.

10-10a: Nabq (Maria Schroeder) S. Sinai, Egypt
Local variation. 55 x 30.2 mm.

Plate 2: *Conus pennaceus* s.s. from Egypt

1-1a: Ras Umm Sidd, S. Sinai.
Local variation. 64 x 32.4 mm.
(regarded as *C. quasimagnificus* by some authors)

2-2a: Ras Gharib, Gulf of Suez, eastern desert side.
Local variation. 57.5 x 29.9 mm

3-3a: Ras Burka, S. Sinai.
Local variation. 64 x 32.4 mm.

4-4a: Hurghada, northern part.
Local variation. 46.8 x 24.2 mm.

5-5a: Hurghada, northern part.
Local variation. 51.7 x 25.6 mm.

6-6a: Sal Hashish, northern part.
Local variation. 45.7 x 24 mm.

7-7a: Hurghada (Berima), northern part.
with periostracum. 66.7 x 32.4 mm.

8-8a: Ras Abu Söma, northern part.
66.2 x 30.6 mm.

9-9a: Safaga, northern part.
Local variation. 53.2 x 27.8 mm.

10-10a: Safaga, northern part.
46.2 x 23 mm.

11-11a: Marsa Alam (shipwreck).
Local variation. 50.4 x 26.4 mm.

Plate 3: *Conus pennaceus* s.s. from Egypt.

1-1a: Safaga (Lotus Bay).
Local variation. 47.3 x 23.3 mm.

2-2a: Marsa Murena. 46.1 x 22.8 mm.

3-3a: Hurghada (Coral Beach). 20.6 x 11 mm.

4-4a: Hurghada (Coral Beach). 22.8 x 11.2 mm.

5-5a: Ras Abu Söma. 17.6 x 8.9 mm.

6-8a: Hurghada.

Discoloured shells resembling *Conus colubrinus*
Lamarck, 1810

6: 62.3 x 27.2 mm.

7: 54.8 x 24.4 mm

8: 53 x 25.5 mm.

9: Variation within the collected shells at Port Ghalib.

Plate 1



1 - 1a



2 - 2a



3 - 3a



4 - 4a



5 - 5a



6 - 6a



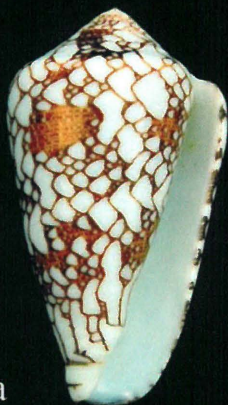
7 - 7a



8 - 8a



9 - 9a



10 - 10a



Plate 2



1 - 1a



2 - 2a



3 - 3a



4 - 4a



5 - 5a



6 - 6a



7 - 7a



8 - 8a



9 - 9a



10 - 10a



11 - 11a



Plate 3

