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# *CYPRAEA PANTHERINA RASNASRANIENSIS* NEW SSP. FROM THE EAST COAST OF SINAI (GASTROPODA: PROSOBRANCHIA:CYPRAEIDAE:CYPRAEAINAE)

by E. L. Heiman*) & H. K. Mienis**)



**Abstract:** *Cypraea pantherina rasnasraniensis* new ssp. from the east coast of Sinai, Gulf of Aqaba and north-eastern Red Sea is described.

**Key words:** Mollusca, Gastropoda, Cypraeidae, *Cypraea pantherina rasnasraniensis*, taxonomy, Red Sea, Gulf of Aqaba .

## Introduction

*Cypraea pantherina* Lightfoot, 1786 was originally introduced in the Portland Catalogue – Fig.1 below - without a description but with a reference to a work by Lister (1685:plt. 681). The type locality (the Mediterranean Sea) was wrong but the name for the large, narrow, pyriform shell, characterized by distinct very dark round spots on the dorsum was accepted by all subsequent authors. It was recognized that *C. pantherina* constitutes the oldest name for this well known Erythraean species.

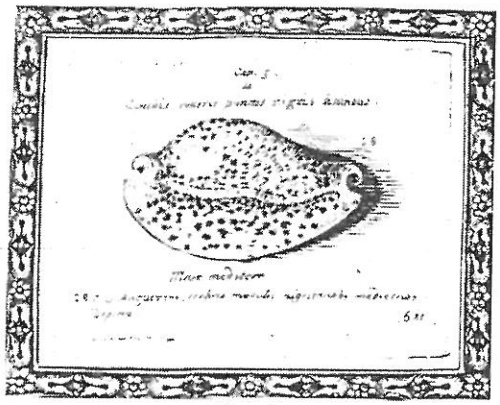

Fig. 1

A chronological review of the numerous synonyms of *C. pantherina* is given in the Appendix.

Three distinct groups can be recognized within this species basing on conchological characters. One of them, *C. pantherina catulus* Schilder, 1924 inhabits the waters of the Gulf of Aden and two others are found in the extreme ends of the Red Sea: one in Eritrea and the other along the east coast of Sinai. As shown by a statistical study (Heiman, 1998), shells of the latter group are considerably larger than shells from the southern Red Sea. Subsequent comparison of these two groups within *C. pantherina* from the Red Sea (Heiman & Mienis, 2000) proved that there is a clear difference not only quantitatively (the shell size) but also in the shell form, weight and pattern of the dorsum. All this together with their geographical isolation allows separating them as two subspecies.

One, C. *pantherina pantherina* Lightfoot, 1786, the nominate subspecies, inhabits waters in Eritrea and adjacent areas and the second, the new subspecies *Cypraea pantherina rasnasraniensis* inhabits waters along eastern Sinai in the Gulf of Aqaba and extreme north-eastern part of the Red Sea proper.

## Diagnosis

The new subspecies differs from the nominate subspecies *C. pantherina pantherina* by the following statistical characteristics (which should be used for each of two compared groups as a whole rather than for single shells from those populations):

- considerable larger size;
- the greater relative shell height (0.52 against 0.51), this difference is small but constant;
- the heavier and more inflated shells;
- slightly different pattern of the shells dorsum; certain color forms (albonitens, badionitens, auricomata) are found in the southern populations and are not found in the populations living in the Gulf of Aqaba.

## Description

Shell is pyriform, large but normal for the genus. The dorsum is rounded and often slightly humped, colored with tinges of different colors and covered with numerous round very dark small spots and flecks. The dorsal line (sulcus) is often visible. Extremities are pointed and accentuated, compressed, especially the anterior one. The posterior extremity is bent upwards. Margins are rounded and slightly thickened, invisible when viewed dorsally, smooth and often colored with a pink, rose, orange or rusty tinge. Colored (not black) dots are always present at the margins and sometimes spread on the base. The base is white with the central part slightly convex. The base as a whole is concave towards the aperture. The aperture is wide, curved posteriorly and dilated anteriorly, white to slightly pink inside. Numerous long columellar white plications (which are considered columellar teeth) are clearly visible, sometimes slightly extending towards the base. The terminal ridge is bordering the outlet and it is not

devided. The fossula is concave, denticulate. Labial teeth are strong. The anterior part of the outer lip is slightly declivous.

Statistical parameters of *C. pantherina rasnasraniensis* are as follows: the Schilders' formula reads 78.61.18.19, the relative height – the relation of the height to the length is 0.52; the standard deviation for the length is 6.7 mm, for the relative width and the relative height 0.02, for the labial teeth 1.8 and the columellar teeth 2.1 (not normalized).

**Type locality and known material**

The type locality is Ras Nasrani, 25 km north of Sharm-el-Sheikh, Sinai Peninsula.

The holotype (Plate 1, Figs.1-4), paratypes (Table 1; ELH indicates the collection of the first author) and most of the studied material are from the type locality.

Table 1

| specimen | collection | length, mm | width, mm | height |
|---|---|---|---|---|
| holotype | HUJ #7968 | 81.7 | 52 | 44.7 |
| paratype | coll. ELH | 89 | 55 | 47 |
| paratype | coll. ELH | 96.5 | 58 | 51 |
| paratype | coll. ELH | 93 | 54 | 46 |
| paratype | coll. ELH | 89 | 55 | 46 |
| paratype | coll. ELH | 78 | 44.5 | 39 |
| paratype | coll. ELH | 76.5 | 44.5 | 38 |

Besides the 65 shells studied by Heiman, 1988 and the type material, we have seen 53 additional shells,

all of which conform to the main characteristics of the new subspecies. Known localities in the Sinai area are Elat, Ras Burka, Nuweiba, Dahab, Nabeq, Ras Nasrani and Sharm–el–Sheikh.

**Habitat**

*Cypraea pantherina rasnasraniensis* is usually found in very shallow water (even 20-40 cm) under dead corals, attached to or under stones and even in seaweed. It may be found during the day with the mantle either completely covering the shell or with the mantle withdrawn. It has been found at night crawling upon coral heads near a reef. Though usually found in very shallow water, it is also found by divers in depth of 5 - 10 m and even deeper.

Similar conditions were reported for *C. pantherina pantherina* from Eritrea showing that the conchological differences between the two subspecies are not of ecological origin.

**Etymology**

The subspecies is named after the type locality Ras Nasrani in Sinai (opposite Tiran Is).

**Discussion**

A study of the two groups of *C. pantherina* (Heiman & Mienis, 2000) is in fact a study dealing with geographical variation of the species. It revealed pronounced differences of their quantitative (the shell size and proportions) and qualitative characteristics (presence or absence of certain color forms). The shell size, proportions and patterns of coloration are subject to geographic variation. "But such variation can be significant only if it affects the genetic basis of the visible characters, since the difference between species have a genetic basis. We must ask ourselves, therefore, if the differences between geographic races are phenotypical or genotypical, and what the genetic basis of geographical variation is." (Mayr, 2000). This question is widely discussed in this work and the conclusion is drawn "that any geographic race, is to be regarded a subspecies, whether it owes its principal characters to the selective properties of the local climate or not."

The question often asked by students of conchology is: why split a species into two or more subspecies. Schilder, 1966 gave his definition of a species: "groups of similar shells should be treated as different species if they can be separated by at least one well recognizable character showing no intermediates even in extreme specimens" and explained that "the lower limit of the taxon *species*, however, is rather uncertain, as it is often difficult to decide whether the gradual evolution has transgressed the verge of the unit formally called species or not" and that "...zoologists usually restrict the taxon *subspecies* to morphologically discernible, genetically rather uniform, and geographically or stratigraphically continuous "races" which replace each other in different areas or strata so that their totality composes the next higher taxa, the species."

Mayr (2000:33) explained: "It is now becoming more certain with every new investigation that species descend from groups of individuals which become separated from the other members of the species, through physical or biological barriers, and diverge during this period of isolation. The concept of the isolated population as incipient species is of the greatest importance for the problem of speciation." and "...only by comparing different populations can we determine how and to what extent the difference

between individuals are molded into the difference which exist between races and species".

Several cowry subspecies or species were singled out mostly on the base of difference in the shell size: *Mauritia arabica immanis* Schilder & Schilder, 1938; *Lyncina leviathan* Shilder & Schilder, 1937, *Lyncina titan* Schilder & Schilder, 1962, *Erosaria turdus pardalina* (Dunker, 1852), *Umbilia hesitata beddomei* Schilder, 1930. It is a common practice to use the prominent shell size difference as the distinguishing characteristics between geographically isolated cowry populations (subspecies) and statistical methods should be used for this purpose.

Populations of several cowry species are considerably different at the southern and northern parts of the Red Sea not simply because of geographical distance between them. The geological history of the Red Sea as a whole and of the Gulf of Aqaba in particular is not identical to other areas of the Indian Ocean. According to Foin & Ruebush, 1969 "the Red Sea as a shallow, warm-water, marginal sea of the Indian Ocean formed by the flooding of part of the East African rift valley around the Pliocene. Shortly thereafter, the Red Sea and the Gulf of Aden were connected to the Indian Ocean, and the main northward flow through the narrow strait (Bab-el-Mandeb) that marks the mouth of the Red Sea was established. One would expect that the recent origin and isolation of the Red Sea would have marked effects on the cypraeid fauna." Similar natural phenomenon – a temporary separation from the Red Sea-occurred also with the Gulf of Aqaba.

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**Appendix.**

Many synonyms of *C. pantherina* are known (Cossignani & Passamonti, 1991). A chronology of *Cypraea pantherina* names with short comments is presented in a table below.

Notes:

1. Gmelin's description reads: "109. C. testa supraxex albo vinosa: ocellis purpurascentibus circulo nigro cinctis lineaque horizontali alba, intus caerulea. *Bonann.. recr.*3 f. 253 *mus. Kirch.*3 fig. 252. *Habitat in* mari mediterraneo, *testae margine niveo."*

It is based on and follows the Bonanno's description. A copy of Bonanno's illustration is seen below.

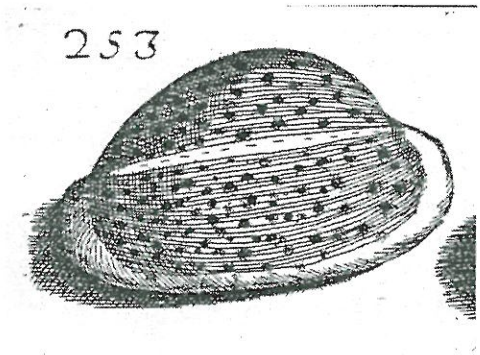


Fig. 2 *C. vinosa* (from Bonanno, 1681)

2. A description of Röding is very short: "C. pardus Die Parder – Porcellane. Gmel. C. sp. 44 Mart. I t. 24 sf. 235 6 st." An illustration from the work of Martini may be seen on Plate 1 Fig.5.

3. Link's description reads: "C. leopardus. Leoparden P. Mart. Conch. I. t.24. f.236. Unterscheidet sich von der vorigen durch die kleinern braunen Flechen, aush ist sie schmaler." Link pointed out the difference between *C. tigris* and *C. pantherina* and cited the work by Martini mentioned above.

4. Perry's description reads: "Shell of a dark red colour, softened at the edges by a rich orange colour; *mouth* and *teeth* white; ends of the shell very obtuse; the *apex* invisible. A native of the Eastern Ocean." Apparently this is a color form of *C. pantherina*, a synonym -see Fig. 3 below.

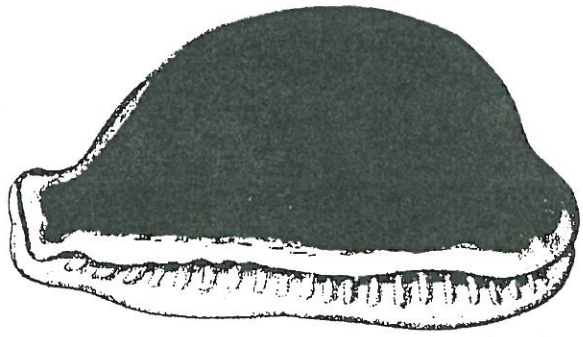

Fig. 3. *Cypraea ovata* Perry, 1811.

5. Menke's description: "alauda, m. (Martin. Conch. Cab. I fig. 234, 235)". An illustration from the Martini work is cited once again.

6. Schilder & Schilder, 1971 considered that the interpretation of this taxon is doubtful.

Table 2
A chronology of synonyms of *C. pantherina* Lightfoot, 1786

| name | author and date | comments |
|---|---|---|
| *pellistigrina* | Argenville, 1742 | it is a pre Linnean name 6) |
| *p. pantherina* | Lightfoot, 1786 | the nominate subspecies |
| *vinosa* 1) | Gmelin, 1791 | a synonym; a description and a picture of the type are discussed below |
| *pardus* 2) | Röding,1798 | a synonym; a picture of the relevant type of Martini is studied 6) |
| *leopardus* 3) | Link, 1807 | a synonym; a description and a picture of the type specimen are studied 6) |
| *guttata* | Lamarck, 1810 | the name is preoccupied (*C. guttata* Gmelin, 1791) 6) |
| *obtusa* 4) | Perry, 1811 | a synonym, a color form 6) |
| *tigrina* | Lamarck,1822 | the name is preoccupied (*C. tigrina* Gmelin, 1791) 6) |
| *guttuta* | Risso,1826 | the name is not established in a valid way 6) |
| *alauda* 5) | Menke, 1830 | a synonym, the Martini' types are cited, see |
| *distorta* | Melvill,1888 | a synonym ( a deformed form), not relevant 6) |
| *badionitens* | Melvill,1888 | a synonym (a color form), type studied by Heiman & Mienis, 2000 6) |
| *theriaca* | Melvill,1888 | a synonym (a color form), type studied by Heiman & Mienis, 2000 |
| *albonitens* | Melvill,1888 | a synonym (a color form), type studied by Heiman & Mienis, 2000 |
| *juvenca* | Melvill,1888 | a synonym (a color form), type studied by Heiman & Mienis, 2000 6) |
| *syringa* | Melvill,1888 | a synonym (a color form), type studied by Heiman & Mienis, 2000 |
| *ventrosa* | Williams, 1914 | the name is not established in a valid way 6) |
| *nigrovinosa* | Vayssiere, 1923 | the name is not established in a valid way 6) |
| *funebralis* | Sulliotti,1924 | synonym (a color form), originally described as a form 6) |
| *auricomata* | Suliotti, 1924 | synonym (a color form), originally described as a form 6) |
| *p. catulus* | Schilder, 1924 | a subspecies from Gulf of Aden, not relevant for the discussed area |

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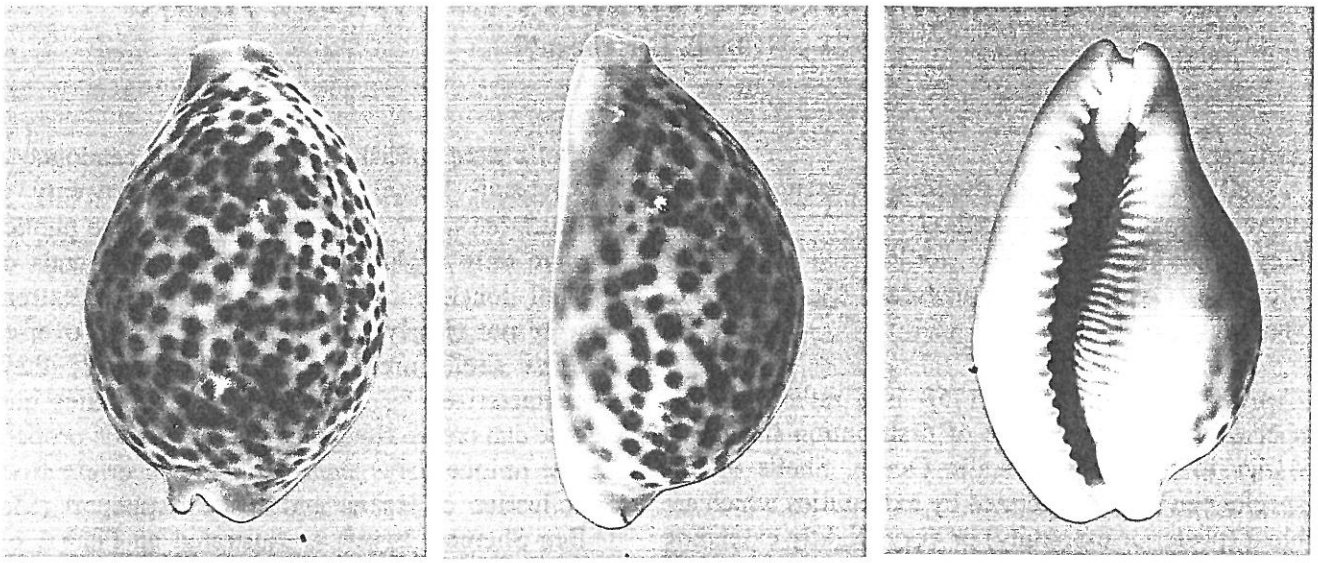
Plate 1



Figs. 1-3. *C. pantherina rasnasraniensis* new ssp., the holotype, HUJ # 7968.

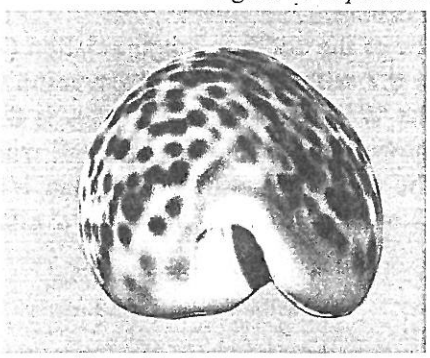


Fig. 4 The holotype.

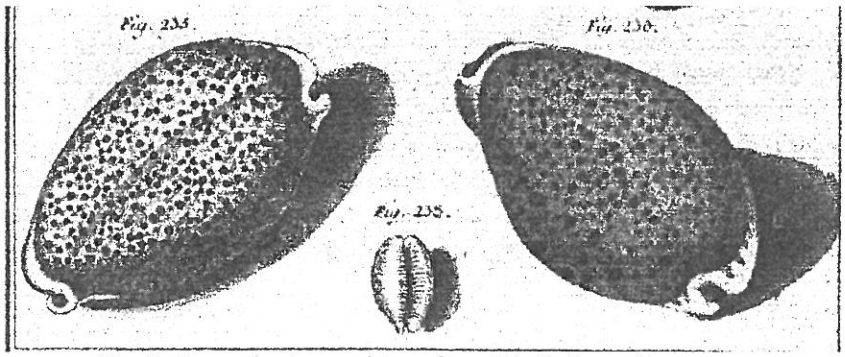
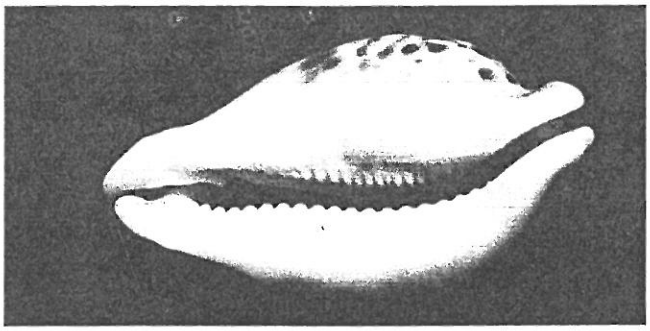
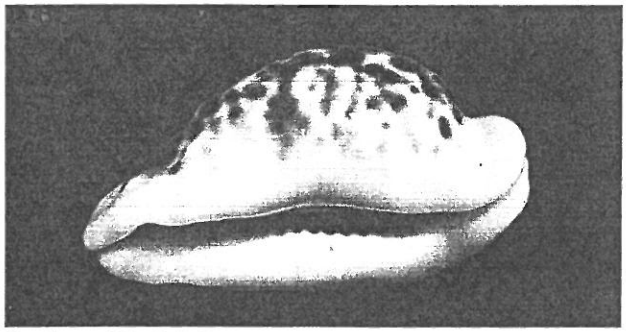


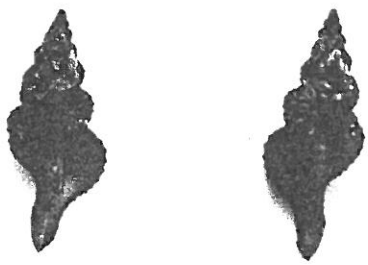
Fig. 5. *C. pantherina*, a picture from Martini's work.





Figs. 6, 7 *Cypraea tigris* f. rostrata. Collection of H. & J. Rappoport.

Figs. 8-10 *F.dalpiazi*, the holotype, a collection of the HUJ..



Figs. 11,12 *F. dalpiazi*, Lagoon of