ABOUT THE TYPE LOCALITY OF *MAURITIA MAPPA*

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Abstract: It is shown that the type locality of *M. mappa* is apparently the Indian Ocean, where its populations can be treated as the nominotypical subspecies.
Key words: Mollusca, Gastropoda, Cypraeidae, *Mauritia mappa*, taxonomy, type locality, diagnostic characteristics.

Cypraea mappa Linnaeus, 1758 was related by Iredale (1931) to a separate genus *Leporicypraea.* Later in the Prodrome and in Schilder & Schilder (1971) it was transferred to the genus *Mauritia* subgenus *Leporicypraea.* If subgenera are not treated (as in a Project "Intraspecific variation in living cowries") *mappa* should be mentioned in the genus *Mauritia*.

Several populations of this variable species were described as subspecies.
Four subspecies were distinguished in the Prodrome:

"The North Malayan *mappa* (74.64.25.22) is inflated, with the posterior top of the inner lip acuminate and bent to the left, the brownish lateral spots small or obsolete, and the aperture rather pale yellow. The Pacific *viridis* (71.64.25.22) differs by the callous sides and base, the inner lip thickened behind and less bent, the lateral spots dark brown and large, and the aperture rich orange; *geographica* (62.62.25.23) from Western Malaysia is closely allied to *viridis*, it only differs by the more produced extremities (especially the posterior one), the hind top of the inner lip acuminately bent, and the large dark terminal spots more numerous and extending farther on the margins of the base. The Lemurian *alga* (67.61.25.22) is more cylindrical than these Eastern races, with the hind top of the inner lip short and straight though acuminate, and the numerous small but conspicuous lateral spots tinged with purplish and extending almost to the rich orange aperture; specimens suffused with rosy or green enamel seem to occur in the Eastern races only."

These subspecies cannot be separated by the Vayssière-Schilders formula because their characteristics are too close. Attempts by several students of cowries to use not morphometric shell characteristics for separating *mappa* subspecies failed or are not convincing. The taxonomic identity of numerous *mapp*a populations still remains unclear and deserves a special study for choosing their appropriate diagnostic shell characteristics.
For example, in their descriptions the Schilders did not mention the basal blotch as a separating shell character between *mappa* subspecies. In their earlier work, Schilder & Schilder (1933), in the course of the description of the subspecies *mappa geographica*, three subspecies of *mappa* are compared: *mappa mappa*, *mappa alga* and *mappa geographica.* In this work they mention that a blotch is present in *mappa alga* in the middle of the inner lip but it is absent in *mappa mappa* and *mappa geographica*. Perhaps after studying more than three hundreds *mappa* shells, the Schilders concluded in the Prodrome that a basal blotch is too variable a character and it is not suitable for distinguishing subspecies.

One can conclude from the data given in the Prodrome that there is not much difference in quantitative shell characteristics of different *mappa* populations. Hence, a statistical study of **qualitative** shell characters is needed to check whether *M. mappa* is a monotypic species. Such a work has not yet been undertaken. Several circumstances make it difficult.

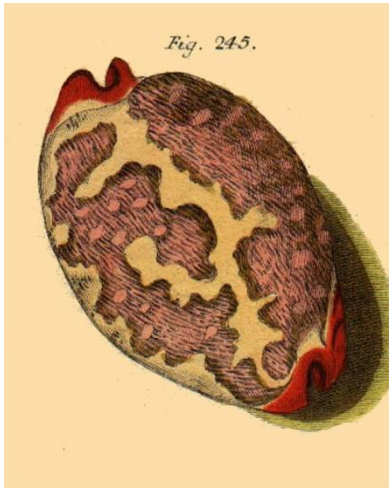
Recycled cowry names
The reader should remember that many names, which the Schilders designated for new subspecies in the Prodrome, refer only to the subject on hand and does not relate to any historical application by the person who originally coined that name. The Schilders merely wanted to revive vacant names (names that originally were applicable but due to lack of usage or other infringements of ICZN rules were no longer applicable to any existing population) instead of creating new names. This practice of recycling old cowry names was discussed in this journal and a list of the recycled names was given in Heiman (2008 + Supplement).
This well meaning but poorly thought out tactic has complicated what on several occasions should have been straight-forward diagnostic exercises.
The procedure used by the Schilders for choosing names has left some cowry students with the erroneous supposition that the specimens and original descriptions, which were relevant to those old taxa, also represent

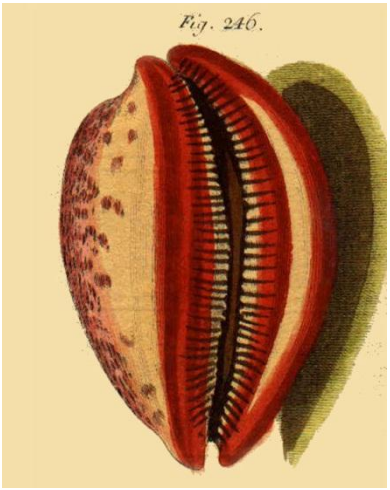
conchological characters of the new cowry populations that now carried these old names. Examples of such confusion are given in Heiman (2002c): many cowry students believe, for example, that the main diagnostic shell character of the Eritrean subspecies *Lyncina lynx wiiliamsi* is the flesh colored base as in a variety of *lynx* described by Melvill (1888). This is not correct and even misleading.
Another example can be seen in works by Marquet & Martin (1992, 1993). They discussed variability of *M. mappa* and compared conchological characters of individual shells belonging to different *mappa* populations with old type specimens and the original descriptions of *C. viridis, C. rosea* and *C. alga.* The original type specimens do not represent the *mappa* subspecies designated in the Prodrome; they are simply not relevant because the Schilders used the name as if it had nothing behind it. It is not surprising that, Marquet & Martin (1992, 1993) following this track did not find any consistent compatibility between specimens from the studied *mappa* populations and the corresponding old types. They concluded (but did not prove) that *M. mappa* is a monotypic species.

The scientific evidence and the type material
Five subspecies of *M. mappa* are described in Lorenz (2002). What prevents me from accepting them at the moment is the lack of the scientific evidence confirming the conchological approach accepted in the latter work.
The type locality of the nominotypical subspecies *M. mappa mappa* is not stated. It is said that in the typical *mappa* from the Philippines, Indonesia and the China Sea "the teeth faint yellow." One can conclude: the nominotypical subspecies of *mappa* is from the above area.

The original description of *Cypraea mappa* Linnaeus, 1758 studied in Dodge (1953) is short and contains only a few diagnostic characters. But it allows tracing the original type locality of *mappa*. It was mentioned as "Oceanus Africae", i.e. the Indian Ocean, not the Pacific Ocean.

According to Schilder (1966) the original type locality of the species mentioned in the work by Linnaeus (Oceanus Africae) is not correct and it is substituted by Amboina (Ambon), near the tropical island Seram (designated by the arrow in Fig. 3). It is situated westward from Papua-New Guinea and can be related to the Pacific Ocean. In this area a border between the Indian and the Pacific Ocean is rather arbitrary. Schilder wrote it is "correct type locality according to the writes opinion in the present paper." This opinion was probably based on works by Iredale and other workers cited by Schilder.
In shells of *mappa* from the Philippines the teeth are yellow indeed. But in a picture of *mappa* given in Martini (1769-1777 vol. 1, plate 25, figs. 245-246) the teeth are not yellow, they are orange to red-Fig. 1.





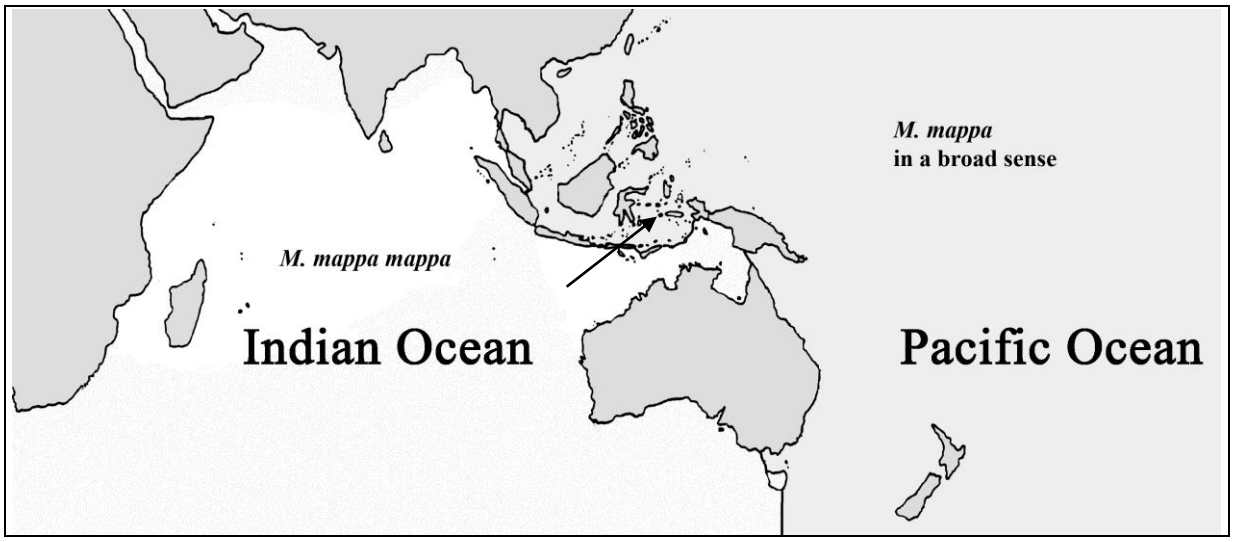
1. *Cypraea mappa* pictured in Martini (1769-1777) v.1.pl. 26

2. A shell from Mozambique

"These are characteristic of the species in color and shape and are the first post-Linnaean figures, being published only two years after the appearance of the twelfth edition of the "Systema" mentioned in Dodge (1953). The description of the five subspecies in Lorenz (2002) is based a great deal on the presence of the basal blotch in shells of *M. mappa*. The blotch is not always present in shells of *mappa* and it is not seen in Martini's figs. 245-246 mentioned above. The basal blotch must be proven to be a good diagnostic shell characteristic of *mappa* populations before being used.

The teeth color given in a work by Martini indicates that the type locality of *M. mappa* is the Indian Ocean (Oceanus Africae) as considered also Gmelin (1791).
In shells of *Cypraea alga* Perry, 1811, which is a synonym of *M. mappa*, teeth are orange. Dodge (1953) considered that *Cypraea alga* is the correct representative of the species described by Linnaeus.
The latter name was recycled in the Prodrome for a Lemurian subspecies of *M. mappa*. Then the presence of *mappa* in the Red Sea and in other areas of the western Indian Ocean was unknown.
As is shown in Heiman (2001) the teeth are distinctly orange colored in shells from the following areas of the Indian Ocean: the Gulf of Aqaba, Red Sea, Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, Mauritius, Reunion, Diego Garcia, Maldives Is., India, Thailand (Phuket), Indonesia (western Sumatra) Fig. 2.
Populations of the species in the Indian Ocean should be treated as the nominotypical subspecies *M. mappa mappa* (Linnaeus, 1758). The **MDSCharacteristic** of this subspecies is the orange colored teeth.
So a color of the teeth in shells of *mappa* may be a distinguishing characteristic of the subspecific level.
In *mappa* populations living in the Pacific Ocean teeth may be colored not as homogeneous as in the Indian Ocean. For example, in the Guam, shells of *M. mappa* having yellow color and orange color were found in the same place. A question whether populations of the species in the Pacific Ocean can be further split into subspecies using this characteristic can be answered in the future in a conchological study using large batches of authentic shells. Meanwhile, these populations can be treated as *M. mappa* in a broad sense.

So two subspecies of *M. mappa* can be currently recognized as can be seen in Fig. 3:
⇨ *M. mappa mappa* (Linnaeus, 1758), the nominotypical subspecies in the Indian Ocean-Fig. 10.1.2.
⇨ *M. mappa* in a broad sense in the Pacific Ocean.



3. *Mauritia mappa* in the Indo-Pacific region.

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