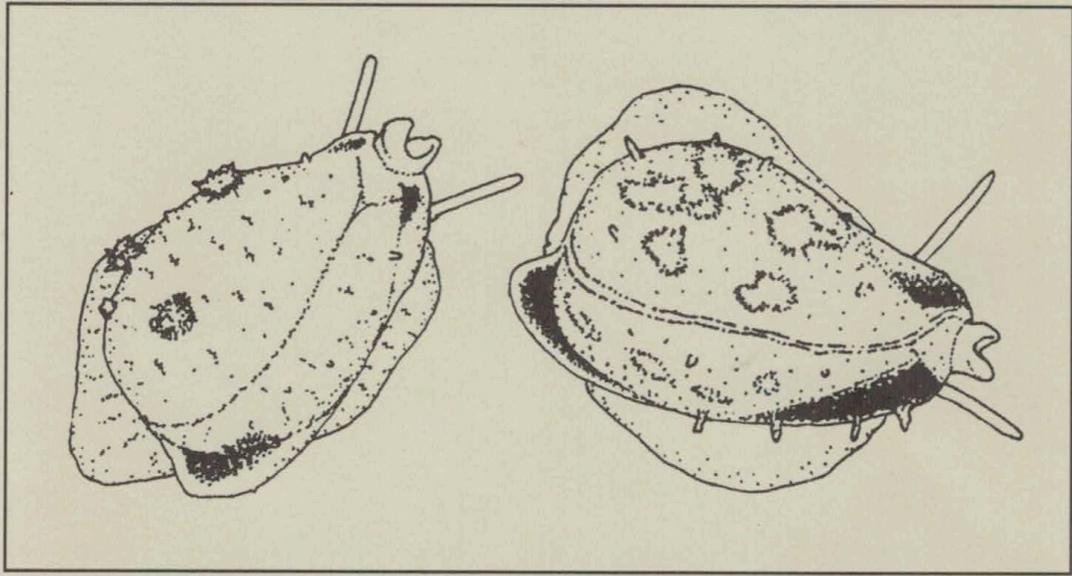


Schriften zur Malakozoologie

aus dem Haus der Natur – Cismar

Heft 3



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A new subspecies of *Erosaria marginalis* with a note on *Erosaria pseudocellata*

(Gastropoda: Cypraeidae).

By
FELIX LORENZ jun. and VOLLRATH WIESE,
Lauenburg and Cismar.

Abstract: A new subspecies of *Erosaria marginalis* (Gastropoda: Cypraeidae) from East Africa is described differing generally in colour, shell structure and radula while although in the same geographic region of typical *E. marginalis*. The taxon *E. pseudocellata* for specimens from Arabia is discussed.

The subspecies described herein is known to collectors as *E. marginalis* forma "rosea", a deep water variation of *E. marginalis* which appeared in the early eighties in several localities in Somalia. Misinformation of dealers had lead workers to the opinion that the paler orange instead of purple colour was a result of darkness in the great depths this form was supposed to come from. Due to the strong monsoon currents along the Somalian coasts, reaching 10 km/h, the waters are always turbid so that in depths where the typical purple *E. marginalis* occurs there is no light either. Furthermore the outer appearance of the "orange form" is not that of a deep water shell: the elongate callous and often depressed shells imply a shallow water habitat. When finally in 1984 several specimens of the "orange form" were collected intertidally in Ras Hafun and on Zanzibar Island we came to the conclusion that these shells could be another non-geographical race of *Cypraea* from the East African coast.

A survey along the beaches of Kenya and Tanzania as well as South Africa together with the data from Somalia, furnished by Capt. F. LORENZ confirmed this impression. Several freshly preserved animals of *E. marginalis* and of the new subspecies were studied and statistical comparisons were made to further support this.

Erosaria marginalis melocellata n. ssp.

Diagnosis: A new subspecies of *Erosaria marginalis* characterized by its lightly reddish-orange or honey-coloured shell, by the better developed fossular teeth and by radular differences.

Material (only some specimens of the type lot listed, all shells in the authors' collections):

Ras Hafun (Somalia)

Holotype: L = 26,1 mm, W = 15,6 mm, H = 12,2 mm, (HNC 24003).

Paratype 1: L = 30,4 mm, W = 17,8 mm, H = 14,4 mm.

Paratype 2: L = 26,6 mm, W = 15,8 mm, H = 12,5 mm.

Paratype 3: L = 22,8 mm, W = 13,1 mm, H = 10,5 mm.

Merca, Somalia

Paratype 4: L = 16,5 mm, W = 10,5 mm, H = 8,1 mm.

Paratype 5: L = 18,4 mm, W = 12,1 mm, H = 9,5 mm.

Paratype 6: L = 18,5 mm, W = 11,3 mm, H = 8,7 mm.

Mogadishu, Somalia

Paratype 7: L = 37,4 mm, W = 22,6 mm, H = 17,9 mm.

Paratype 8: L = 34,2 mm, W = 21,7 mm, H = 16,7 mm.

Zanzibar, Tanzania

Paratype 9: L = 33,7 mm, W = 23,8 mm, H = 17,6 mm.

Paratype 10: L = 30,4 mm, W = 20,9 mm, H = 15,2 mm.

Diani Beach, Kenya

Paratype 11: L = 21,8 mm, W = 13,5 mm, H = 10,7 mm.

Paratype 12: L = 21,0 mm, W = 14,7 mm, H = 11,0 mm.

Mbotyi, Pondoland, South Africa

Paratype 13: L = 28,5 mm, W = 17,5 mm, H = 14,5 mm.

Xora, Transkei, South Africa

Paratype 14: L = 27,0 mm, W = 16,3 mm, H = 13,4 mm.

Nacala, Mozambique

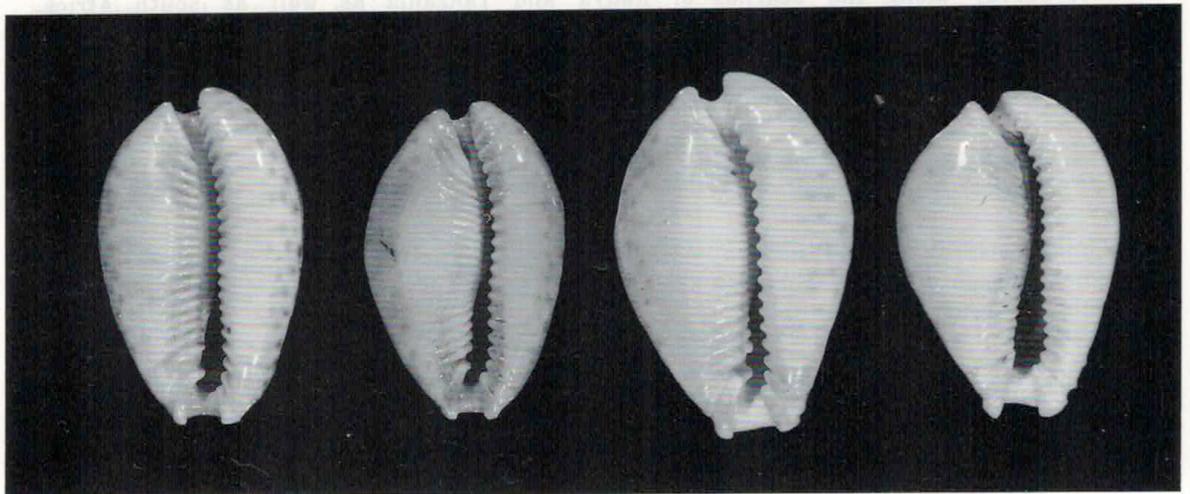
Paratype 15: L = 20,5 mm, W = 15,1 mm, H = 10,3 mm.

Sri Lanka

L = 16,7 mm, W = 12,5 mm, H = 8,4 mm.

Description: Holotype - elongate pyriform and slightly inflated posteriorly. Base and margins slightly callous. Marginal pitting distinctly separating dorsum from sides, fading midways on columellar side. Extremities rostrated, extensions of teeth forming distinct spines anteriorly, visible from dorsal view. Aperture moderately narrow widened anteriorly, slightly curved behind. 23 fine labral teeth, slightly extending over the base, columellar teeth very fine, especially midways but distinct throughout, slightly extending. Fossula reduced to 2 denticles. Terminal ridge well formed and slit, distinctly separated from teeth. Base, labral teeth and labrum stained with purplish brown, turning into spots towards the margins and columellar side. Dorsum saturate reddish brown with circular ocellated spots and smaller white ones. Some of the ocellations have a shade of blue. Base and margins paler orange tan coloured.

Paratypes - Some specimens are much paler basally, yellowish grey to pink. The purplish staining of the teeth sometimes reduced to absent. Columellar teeth may extend over one third of the base, 2 to 4 teeth in fossula. Specimens from the Zanzibar Island (Text-fig. 1) are deltoidal and callous, with a distinctly humped dorsum, with the margins callous and angular and showing a better developed fossula. In specimens originating from shallow intertidal waters terminal spines may be bent up and very conspicuously protruding.



Text-fig. 1 (from left to right):
Two specimens of *E. marginalis* and two paratypes of *E. m. melocellata*.

Derivatio nominis: The new subspecies is so named because account of its characteristic honey-coloured dorsum.

Distribution and habitat: The holotype originates from Ras Hafun, Somalia, where it was collected intertidally in 1982. The new subspecies was collected in the northeast of Somalia; off south of Mogadishu; at Shimoni, Kenya; Zanzibar Island, Tanzania; Nacala, Mozambique; off Richards Bay, South Africa (ex pisce) and on the beach at Mbotyi, Pondoland. A single specimen was recently obtained as "*Cypraea ocellata*" from Sri Lanka.

Several fresh dead specimens were collected by the first author in depths of 3-5 m near Shimoni, Kenya and Nungwi, Zanzibar. Many specimens were obtained intertidally along the Somali coast, few specimens originate from deep water (± 300 m) off Mogadishu, others were obtained from the stomachs of the "slinger fish" (*Chrysolephus princeps* GILCHRIST) from approximately 30 m off Richardsbay and Sta. Lucia, South Africa. Three specimens were found beached at Mbotyi by the late NOLAN WEBB and one at Xora by NOGGS NEWMAN. Another was trawled near Durban from 150 m. Inflated deep water specimens were trawled along with *Lyncina broderipii* and *Lyncina leucodon* offshore Somalia. Shallow water specimens are supposed to live on vital reefs because the fresh dead shells in Kenya were mostly lying on sand patches between corals together with many other typical reef species in a fresh dead state.

Animal: Like most species of *Erosaria* the mantle of *E. marginalis melocellata* n. sp. is covered with branched papillae of variable size. The mantle colour of dried animals ranged from pale yellow to chestnut.

General discussion: In order to understand the position of *Erosaria marginalis melocellata* it is necessary to consider the distribution and geographic modification of *E. marginalis marginalis* and *E. marginalis pseudocellata*. As a matter of fact the "orange form" and the "purple form" of *E. marginalis* have often been found almost on the same spot, in any case in the same geographic regions along the coasts of East Africa. There are two problems in justifying the establishment of a new subspecies of *E. marginalis*: The first problem is, that races of the same species should normally inhabit geographically separated regions, the second is that the variability of both, *E. m. melocellata* and *E. m. marginalis*, from one place to the other is considerable. The existence of two races of the same species in one geographical region evidently occurs in many species of Cypraeidae and predominantly in East Africa. SCHILDER and SCHILDER already noted such "races" in *Erronea caurica* (*E. c. elongata* and *E. c. dracaena*), *Leporicypraea mappa* (*L. m. alga* and *L. m. geographica*) and *Erosaria erosa* (*E. e. erosa* and *E. e. similis*) and recently others were described (*Cribrarula cribraria abaliena*, *Erronea fimbriata quasigracilis*, *Staphylaea limacina clarissa*) (compare LORENZ jun. 1989, 1-38). Mostly such "fellow races" do not occur in exactly the same habitat but merely live in close proximity, they usually have an area where they dominate or occur exclusively. It is striking that such "fellow races" are most distinct in overlapping zones and often less defined in their characteristics in the areas where one of them occurs exclusively. "Fellow races" usually do not form intergrades. Little is known so far about the separating factors that support the distinction where no geographic border exists. In any case the parallel development of two or more clearly defined "races" from one species in one region is understood as a main motor of evolution, as speciation in progress.

This seems to be the case here. When we had finished our statistical and morphological survey, we believed *E. m. melocellata* to represent a valid species. Now that further investigations could be made on account of additional material it is apparent that *E. m. melocellata* represents another "fellow-race" which shares most of its distribution with *E. marginalis* but with a different habitat.

The possibility that the red colour of *E. m. melocellata* is a mere modification due to different food does not explain why *E. m. melocellata* occurs in various depths, even in areas without coral reefs (South Africa). There are also components of blue in the pattern of *melocellata* so that the famous "golden form-phenomenon", which is an abnormal lack of blue pigment in single freak individuals (often seen in tented *Conus* species) cannot be the factor producing the paler reddish colour. Finally there are additional conchological features (apart from colouration) and radular differences

which constantly distinguish *E. m. melocellata* from typical *E. marginalis*. Ecological modifications are usually not constant and should never influence fundamental features which are genetically influenced (such as radula, embryonic shell etc.).

Variation in *Erosaria marginalis*:

In its wide range *E. marginalis* forms a number of different varieties. The taxon *E. m. pseudocellata* shall be discussed herein and some other interesting variants are mentioned and figured (plate 3-4).

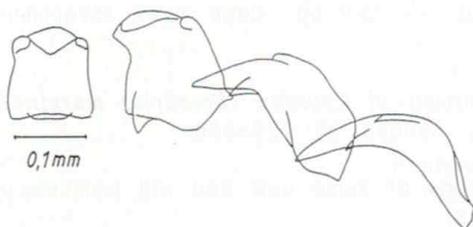
The shells of the Arabian variety (= *E. m. pseudocellata* SCHILDER & SCHILDER 1938) are rather light and often large (more than 20 mm in length) with fine teeth and purple striping on the base. SCHILDER & SCHILDER characterized pseudocellata on the basis of less than 5 specimens: "The northern *pseudocellata* (...) differs from the East African *marginalis* (...) by the narrower aperture, the distinct fossula denticles, the coarser labial [= labral] teeth and the mostly richer colouring of the shell (...) (SCHILDER & SCHILDER 1938, 138). We have had about 150 *E. marginalis pseudocellata* from Alula, Northern Somalia, and a few from Oman and agree on the feature of the richer colouring stated by SCHILDER & SCHILDER. The characteristics of labral teeth and width of the aperture as well as fossula are not constant and not confined to the northern populations.

A more interesting feature found in the Alula specimens is the purple striping of the base which is rarely seen in East African specimens but again in the South African shells. The southern ones are also equally larger on the average than "*pseudocellata*" compared to *E. marginalis* from Southeastern Somalia. Sometimes Tanzanian *E. marginalis* may be very large too. Few giants of *marginalis* also conchologically similar to *pseudocellata* were found at Mogadishu. We are illustrating sets of *E. marginalis* from confirmed localities along with the respective *melocellata* specimens from the same region (where possible).

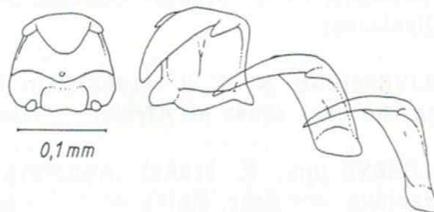
Discussion of the differences between *E. m. marginalis* and *E. m. melocellata*:

E. marginalis and *E. m. melocellata* are distinguished at once by the colouration which remains an absolutely reliable feature with hundreds of shells examined. Even in an eroded state it is possible to tell them apart. Furthermore *E. m. melocellata* is smaller on the average than *E. marginalis* in most regions. The columellar teeth of *E. m. melocellata* are usually more numerous and longer than in *marginalis* although this is not always the case. The fossula of *E. m. melocellata* is much better developed than in *E. marginalis*: while most *E. marginalis* have no or less than 2 denticles reaching the fossula, in *E. m. melocellata* there are usually 2 to 4 denticles even in subadult shells. The statistical investigation of length-width ratios is only sensible when shells from one geographic region are compared. The infraspecific variability in *E. marginalis* and *E. m. melocellata* is considerable so that all available shells of both subspecies put in only one diagram produce a crowd of spots that would not serve at all, whereas each locality separately illustrated produces two distinct crowds of spots representing either *marginalis* or *melocellata*.

The comparison of the radulae showed that the conformation of the denticles of *E. marginalis* and *E. m. melocellata* is significantly different. An illustration of the radula of *marginalis* published in 1968 (LIVERSIDGE 1968) was found to match exactly a radula taken from a *marginalis* collected near Dar es Salaam in 1985 - both showed a peculiar asymmetric median tooth. The radula of *E. m. melocellata* was found to vary little from Zanzibar to Ras Hafun.



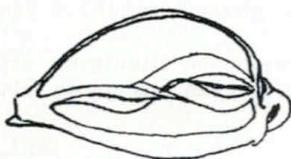
Text-fig. 2: Radula of *E. m. marginalis*



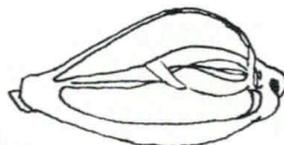
Text-fig. 3: Radula of *E. m. melocellata*

Another interesting feature was noted in shells from Merca, Somalia, in which the left portion of the dorsal dome was removed: The conformation of the columella in *E. m. melocellata* was quite different from that in *E. marginalis*. These differences are especially interesting as the internal structure of a shell is genetically influenced whereas external features may to some extent be subject to ecological modification.

Internal structure of shells.



Text-fig. 4: *E. m. marginalis*



Text-fig. 5: *E. m. melocellata*

The status of the northern *E. m. pseudocellata* remains unclear. A certain constancy in the features noted can be found, furthermore there are several races in Cypraeidae split from their East African relatives in this area. Good examples to be compared here are *Erronea felina felina* which ranges from East Somalia to South Africa and *Erronea felina fabula* which takes over at northern Somalia and ranges as far as Oman, the same area in which *pseudocellata* lives. Incidentally *E. felina* is found alongside with the very similar but much rarer *E. listeri* (which is very common only in the Indopacific areas where *felina* does not occur). Whether *listeri* in its biological function towards *felina* is comparable to *melocellata* in its relation to *marginalis* remains a question that will be difficult to answer. In any case we understand *melocellata* as another East African "fellow-race" whose status towards *marginalis* may be clarified with better understanding of ecological barriers and separating factors in marine biotops.

Acknowledgments: We wish to thank our families for the neverending patience towards our studies and the friendly support given to us by the following persons: WILLIAM R. LILTVED, Cape Town, GRAHAM MELVIN, Johannesburg, NOGGS NEWMAN, East London, the late NOLAN WEBB, Grahamstown and ULF ERDMANN, Eschweiler. Special credit must be given to Captain FELIX LORENZ, Lauenburg, for his attentive on-the-spot studies in Somalia and Tanzania and for the supply of extensive shell material from his matchless collection. Special thanks are given to DAVID HINGSTON, Hamburg, for rereading the english manuscripts of this journal.

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Addresses of the authors:

FELIX LORENZ jun., Ginsterweg 6, D-2058 Lauenburg/Elbe.

Dr. VOLLRATH WIESE, Haus der Natur - Cismar, D-2433 Cismar.

Explanations of plate 3.
(page 18, life size)

(From left to right).

First row:

- Erosaria marginalis* (Merca, Somalia, shallow water).
Erosaria marginalis (Merca, Somalia, shallow water).
Erosaria marginalis (Merca, Somalia, shallow water).
Erosaria marginalis (Merca, Somalia, shallow water).

Second row:

- Erosaria marginalis melocellata* n. ssp.
Paratype 4 (Merca, Somalia, shallow water).
Paratype 5 (Merca, Somalia, shallow water).
Paratype 6 (Merca, Somalia, shallow water).

- Erosaria marginalis pseudocellata* (Muscat, Oman).
Erosaria marginalis pseudocellata (Muscat, Oman).

Third row:

- Erosaria marginalis* cf. *pseudocellata* (Ras Hafun, Somalia).
Erosaria marginalis cf. *pseudocellata* (Ras Hafun, Somalia).

- Erosaria marginalis pseudocellata* (Alula, Somalia, shallow water).
Erosaria marginalis pseudocellata (Alula, Somalia, shallow water).

Fourth row:

- Erosaria marginalis melocellata* n. ssp.
Holotype (HNC 24003, Ras Hafun, Somalia, moderately shallow water).
Paratype 1 (Ras Hafun, Somalia, moderately shallow water).
Paratype 2 (Ras Hafun, Somalia, moderately shallow water).
Paratype 3 (Ras Hafun, Somalia, moderately shallow water).
Paratype (off Ras Hafun, Somalia, 200 m).

Fifth row:

- Erosaria marginalis melocellata* n. ssp.
Paratype 7 (Mogadishu, Somalia, 30-50 m).
Paratype 8 (Mogadishu, Somalia, 30-50 m).

- Erosaria marginalis* similar to *pseudocellata* (Mogadishu, Somalia, 30-50 m).
Erosaria marginalis similar to *pseudocellata* (Mogadishu, Somalia, 30-50 m).



F. LORENZ jun. & V. WIESE: A new subspecies of *Erosaria marginalis*.



Address of the Author

F. LORENZ jun. & V. WIESE: A new subspecies of *Erosaria marginalis*.

Explanations of plate 4.
(page 19, life size)

(From left to right).

First row:

Erosaria marginalis (Mombasa, Kenya, shallow water).

Erosaria marginalis (Mombasa, Kenya, shallow water).

Erosaria marginalis melocellata n. ssp.

Paratype 11 (Diani Beach, Kenya, 3-5 m, dead under corals).

Paratype 12 (Diani Beach, Kenya, 3-5 m, dead under corals).

Second row:

Erosaria marginalis melocellata n. ssp.

Paratype 15 (Nacala, Mozambique, ex pisce).

Variation (Sri Lanka).

Erosaria marginalis var. (Lamu, Kenya).

Erosaria marginalis var. (Lamu, Kenya).

Third row:

Erosaria marginalis (Dar es Salaam, Tanzania).

Erosaria marginalis (Zanzibar, Tanzania).

Erosaria marginalis melocellata n. ssp.

Paratype 9 (Zanzibar, Tanzania).

Paratype 10 (Zanzibar, Tanzania).

Fourth row:

Erosaria marginalis (Tugela River, South Africa, 35 m, by diver).

Erosaria marginalis (Mbotyi, Pondoland, South Africa, beach).

Erosaria marginalis melocellata n. ssp.

Paratype 13 (Mbotyi, Pondoland, South Africa, beach).

Paratype 14 (Xora, Transkei, South Africa, beach).