

Notes on some East African Gulellae
by
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The Usambara Mountains in northern Tanganyika are fairly rich in species of *Gulella*, and I found 22 species during under a year's stay at Amani. Five of these belonged to the section under *Primigulella*, perhaps the only section worth a name on conchological characters alone. The determination of these 22 species has proved very difficult and the majority must remain undetermined until further work has been carried out by the several authorities to whom specimens have been sent. It is a disturbing fact that one gets different determinations back from different authorities even in the case of the larger species! Even some of the commonest species appear to be new. This paper deals chiefly with species about which no doubt exists as to their names.

1. *Gulella grossa* (Von Martens)

Ennea grossa Von Martens, 1898, Beschalte Weichtiere Ost-Afrikas, p. 23, t. 2 fig. 17, 18.

This is a very distinct and uncritical species, but specimens are rare in collections. It was figured very accurately by its describer. It is a characteristic and fairly common shell in the E. Usambaras rain forest - Mt. Bomole, Ndarema, Ngua, Ngambo, and Monga, all at 3000—3400 ft. VON MARTENS records it from near Tanga, but apart from a single very old shell discovered on Mt. Mlinga (a peak between the coast and the E. Usambaras) I have not seen it outside of the E. Usambaras. Living specimens are seen only rarely. The shell is strongly ribbed, pale greyish white, the aperture being very polished. The apical whorls are obscurely striate, but the rest are conspicuously ribbed (3 per mm). There is little variation in shell size. The normal apertural dentition is shown in Fig. 1a and the numbering of the denticles in Fig. 1b. All with the exception of 12 and 13 are plates entering the mouth, but 12 and 13 are at right angles. Denticle 12 shows up very well in shells with the peristome unfinished. Variation is slight, denticles 2, 4, and 8 are sometimes absent but 2 and 4 are never missing in the same shell; 5 is often a bigger bulge and 8 is sometimes more marked. There is occasionally a small denticle between 8 and 9 nearest to 9. The animal is long and narrow, whitish-translucent. The adult radula is 6.3 mm long and 1.3 mm broad. The teeth are of normal aculeate shape, in curved V-shaped rows. There is a plainly marked central

tooth with a narrow cusp, from a broad base. The formula is $36 : 1 : 36$. The first lateral tooth has a 45μ simple cusp from a narrow oblong base 90μ long, which has a waist about one third of the distance from the anterior margin.

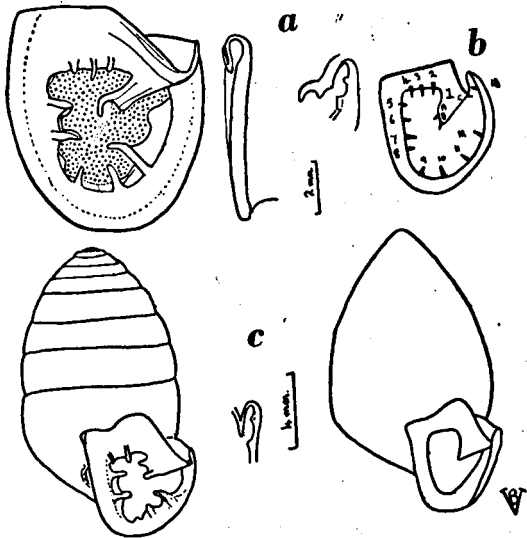


Fig. 1a—c. East African *Gulellae*, explanation see text.

2. *Gulella foliifera* (Von Martens)

Ennea foliifera Von Martens, 1898, Beschalte Weichthiere Ost-Afrikas, p. 24, t. 2 fig. 20.

This *Primigulella* is also accurately figured by VON MARTENS. It is a much rarer species than *G. grossa*, and although recorded from near Tanga I have only seen 7 shells, all from the Amani area, Amani, Ndarema, and Kihui. The shell is 11 — 12 mm long and 6.5 — 7 mm broad, and the aperture is 5 — 5.5 mm tall and 4 — 4.5 mm wide. The species can be confused with a small unnamed *Primigulella* which occurs in the W. Usambaras, but can be distinguished by the distinct downward curving of the two parallel mid-columellar lamellae. Using Fig. 1b the following teeth are present or, if in brackets, sometimes absent, 1 A, B, C, 3, (5), 6, 7, 8, 9, 10, 11, 12, 13, and another sometimes present below 13.

3. *Gulella usagarica* (Crosse)

Ennea usagarica Crosse, 1885, Journ. de Conchyl., vol. 33, p. 310.

I have had two distinct species referred to this species by various

authorities, but the one which I have distributed under the letter Q appears to be true *E. usagarica*, which was not figured by its author. I have compared Q with specimens in the British Museum and other collections, and Dr. DARTEVELLE has kindly compared the duplicates which I sent to him with material at Tervuren. Q is figured in Fig. 2h and the other species collected in the E. Usambaras is shown in Fig. 1c. *G. usagarica* is very common in dry forest at Mkusi and Shume in the W. Usambaras but no living specimens were found. The shell is subject to considerable variation both in shape and size but always has a characteristic facies. The apical $2\frac{1}{2}$ whorls form a conspicuous smooth mamillate tip. The shell has transverse irregular striae and growth lines and some spiral striae round the umbilical area. The umbilicus is usually closed.

The following table gives some idea of the variation.

Locality	Height	Breadth	Aperture	Shape
Mkusi	15.5 mm	8 mm	6 × 5 mm	cylindric
id.	14.5	9	6.5 × 5	ovoid
Sungwe (Shume)	14	9.5	6 × 5	ovoid-
id.	15.5	9	6.5 × 5	globose ovoid-
id.	17.5	10	7.5 × 5.5	cylindric id.

A further species (distributed as DH) is very similar to *G. usagarica*, but is much smaller, 11 mm tall, 6 mm wide, and the aperture 4.5×3.5 mm. A few shells were found on Mt. Ndamanyilu, W. Usambaras. It is related to the Kenyan *G. jombeensis* (Preston) and *G. pilula* (Preston) as well as to *G. linguifera* Marts., but differs in details and will probably prove to be a new species. It is shown in Fig. 2f. *G. satura* Haas from Bumbuli in the W. Usambaras needs comparison with *G. usagarica*.

4. *Gulella usambarica* (Craven)

Pupa usambarica Craven, 1880, Proc. Zool. Soc., p. 218, t. 22 fig. 2.

This species (distributed under the letter AM) is the largest of the species occurring at Amani, with the exception of the *Primi-gulellae*. The identification has been confirmed by comparison with the types in the British Museum (Nat. Hist.). It is widely distributed and I have found it at Ndarema and Amani, in the E. Usambaras, Mkusi in the W. Usambaras, and on the lower slopes of Mt. Tongwe, a small isolated mountain near the coast in north Tanganyika. At Amani it was found to be abundant alive under old rotten logs on the north bank of the R. Kwamkuyu in rain forest in August 1950. Both adults and juveniles were present. The apical

whorls of the shell are smooth, but the rest are strongly ribbed. There is some variation in size, shells from Mt. Tongwe measured 9.5 mm in height and 5 — 5.5 mm in breadth, but those from Mkusi were 11×6.5 , and Amani specimens $10.5 - 12 \times 5.5 - 6$ mm. The dentition of the aperture varies a little. The parietal tooth is well marked and bifurcate. The columellar teeth are very close and partly fused. They usually diverge slightly but in one instance the fusion was almost complete. The single basal denticle is sometimes missing. There are two denticles on the outer wall and also one at the bottom corner near the basal, but much more deeply situated than any of the rest. Occasionally there is an additional small tooth just in front of the deeply situated tooth. The body of the animal is pale, but the tentacles are bright vermilion. The radula shows a feature of considerable interest which may or may not be of value when the genus is subdivided on anatomical grounds. It is about 3 mm long and 0.27 mm wide and the formula is $26 : 1 : 26$. The rows are actually V-shaped. The central tooth bears a single cusp and the lateral tooth a single one. The third tooth and the remainder, marginals, are very peculiar and not like any *Gulella* radula which I have seen figured. HUGH WATSON has also informed me that he knows of no *Gulella* radula like it. The single cusp bears 4 cones on its inner side, which appears coarsely serrated. The central tooth is about 30μ long and 6μ broad. The first marginal measures about 60μ in length and a part of the radula is shown diagrammatically in fig. 2e.

5. *Gulella fortidentata* (Smith)

Ennea fortidentata Smith, 1890, Ann. Mag. Nat. Hist., (6), vol. 6, p. 162, t. 6 fig. 6.

The specimen figured (fig. 2b) was collected by P. R. HESSE Esq. in forest, in a log at Pienaar's Heights on the Kondoa Road near Babati. The body is pale yellow-brown with the sole and tail slightly darker. The radula is 3 mm long and 0.5 mm wide and there are about 60 rows of teeth arranged according to the formula $12 : 1 : 12$. The central tooth is well-marked and obpyriform, 156μ long.

6. *Gulella gouldi* (Pfr.) subsp. *amaniensis* subsp. nov.

Ennea gouldi Pfeiffer, 1855, Mal. Blätt., vol. 2, p. 174.

Specimens of this form sent to the British Museum (Nat. Hist.) were identified as *G. gouldi*, a South African species, but it is so very much smaller than *G. gouldi* and has such a different distribution that it is best considered to be at least a new subspecies. The teeth are arranged in an identical manner to those of typical *G. gouldi*, the labral triad being very characteristic. The shell (Fig. 2g)

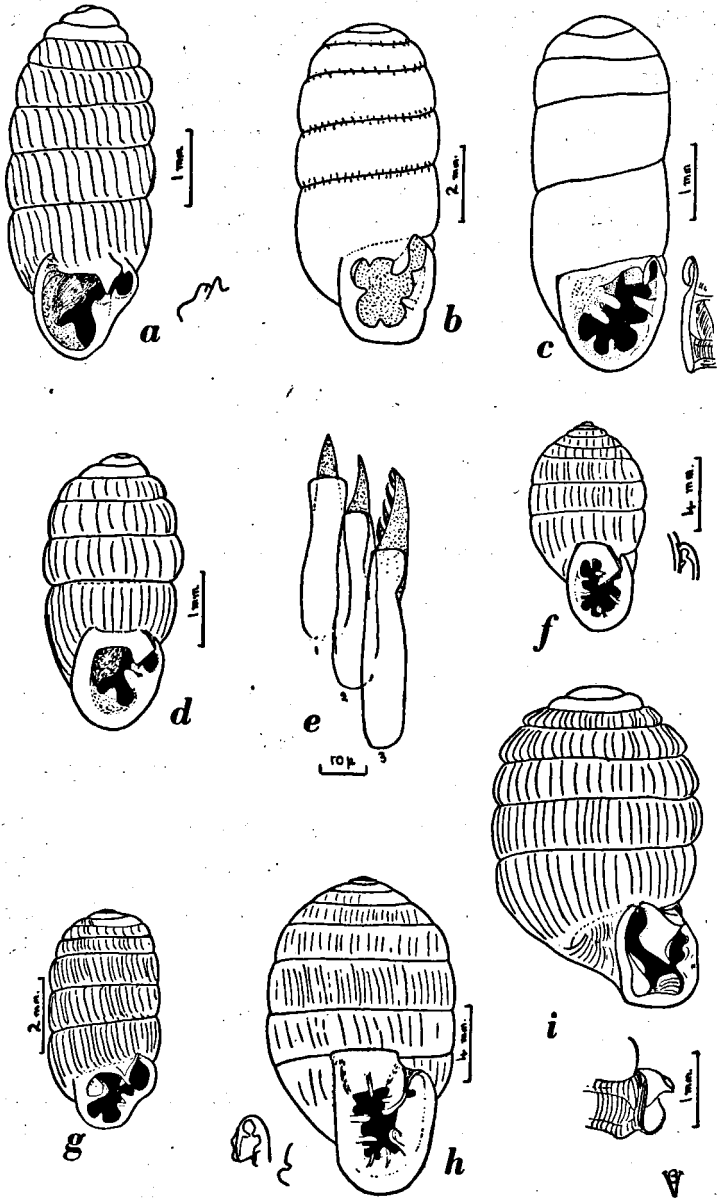


Fig. 2a—i. East African *Gulellas*, explanation see text.

is cylindrical and consists of $7\frac{1}{2}$ whorls. The apical $2\frac{1}{2}$ are smooth but the remainder are very strongly ribbed. The shell is 4.75 — 5.5 mm tall and 2.75 — 3.3 mm broad. The body is entirely white. This subspecies has been collected under sticks and debris on Mt. Bomole, Amani, E. Usambaras (distributed as AD), at Kiumba, Amani, and at Mkusi in the W. Usambaras (distributed as X, J, and ADv respectively). The specimens of AD in the British Museum are chosen as Types, and Paratypes are in the collections of Dr. L. A. W. C. VENMANS, Dr. PFEIFFER, and Harvard University.

7. *Gulella conradti* (Von Martens)

Ennea conradti Von Martens, 1898, Beschalte Weichthiere Ost-Afrikas, p. 25, t. 2 fig. 21.

This species was found on several occasions at Amani, but is rare, only three having been found on the summit of Mt. Bomole (6.5.1950) and one under rotting wood on the banks of the R. Kwamkuyu, Amani (23.8.1950). The body is yellowish and the tentacles are pale orange in colour. There are 7 whorls, the apical $2\frac{1}{2}$ having a series of papillae in spiral rows, and the rest very strongly ribbed (13—14 per mm). The height varies from 4.25—4.75 mm and the breadth from 2.5 — 2.75 mm.

8. *Gulella aenigmatica* (Smith)

Ennea aenigmatica Smith, 1890, Ann. Mag. Nat. Hist., (6) vol. 6, p. 164, t. 6 fig. 11.

The figure that SMITH gives of this species is not very good. The specimens I collected at Amani have been compared with the types and one is refigured (fig. 2i). Many specimens have been distributed under the serial letter Gg. This species comes in a group of peculiar „pagodiform” species which contains *G. spatium*, *G. adjacens*, *G. pretiosa*, *G. mirifica* and *G. lacuna*. It is common under mossy debris near the summit of Mt. Bomole, Amani, E. Usambaras. There are several races varying in size, occupying the same area. The shell is 3.75 — 4.5 mm long and 2.25 — 3 mm broad and the small aperture is 1.25 — 1.75 mm long and broad. The two apical whorls are smooth but the rest have 8 strong striae per mm. The animal is pure white. The radula is 1 mm long and 0.1 mm wide and has the following formula: 17 : 1 : 17.

9. *Gulella gwendolinae* (Preston) subsp. *mkuslensis* subsp. nov.

(*Ennea gwendolinae* Preston, 1910, Ann. Mag. Nat. Hist. (8), vol: 6, p. 527).

This subspecies differs from the typical form in the dentition, there being an extra denticle on the outer lip. The shell is very smooth 4.75 — 5.25 mm long and about 1.8 mm wide. There is

no umbilicus, but only a depression. The shell is cylindrical, slightly narrowed at the middle. There are five whorls, the two body ones being almost equal in size. The parietal lamella is strong and there are 3 denticles on the outer lip and two at the base. The columellar denticle is massive and prominently bifid. This subspecies is rare in the dry forest at Mkusi, in the W. Usambaras. Two specimens only were found. The type is in the collection of Dr. PFEIFFER, Rammelsberg, Kassel, Germany, and is figured in Fig. 2c. The other specimen is at Harvard University.

10. *Gulella laqueus* (Preston)

Ennea laqueus Preston, 1913, Proc. Zool. Soc., p. 207, pl. 34 fig. 5, 5a.

Two small *Gulellae* which are frequent in the Karura forest near Nairobi, seem to belong to this species. One form is a little taller than the other, but the dentition is very similar. A description of these forms is given here. *G. disseminata*, *ingeziensis*, *commoda*, and *peculiaris* are all related to this species and 3 or 4 new species in the same group were found at Amani but will not be described until further research has been carried out. Shell small oval, sides slightly convex, apex obtuse. Initial $2\frac{1}{2}$ whorls smooth, the rest of the $6\frac{1}{2}$ with strong fairly close ribs, most distantly placed on the body whorl where there are about 10 per mm. Aperture oval-quadrate, peristome continuous, a little reflexed. Behind the peristome there is a deep fovea in the right hand side of the body whorl and another at the base. The umbilicus is a narrow slit. Angular denticle strong, concave and excavated on the side facing the sinulus. Sinulus well-marked demarcated above by a tiny denticle and below by an upwardly directed emergence of the labral slab. The latter is well developed, situated in the middle of the outer edge of the labrum, grooved in the middle. This slab corresponds to the large fovea. To the left of the base is a rather deeply immersed denticle corresponding to the basal fovea. The other form is more elongated and larger but the dentition is identical. Both are figured in fig. 2 (a and d).