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A prediction come true: Gulella augur n.sp., a species of Primigulella from the Uzungwa Mountains in Tanzania (Gastropoda Pulmonata: Streptaxidae)

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Gulella (Primigulella) augur n.sp. is described from the Uzungwa Mountains in Tanzania; the subgenus is widely distributed in the uplands of East Africa (eastern Tanzania, Mt. Kenya complex and Ruwenzori complex). The new species extends the distribution southward as predicted by Verdcourt in 1984.

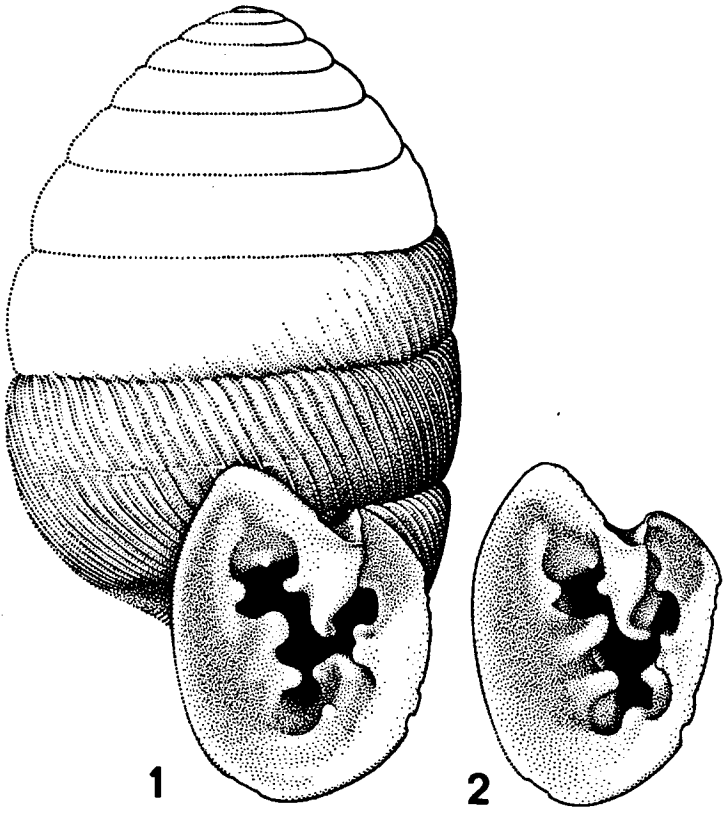
Key words: Gastropoda, Pulmonata, Streptaxidae, *Gulella*, taxonomy, Tanzania.

The subgenus *Primigulella* Pilsbry, 1919, of the genus *Gulella* L. Pfeiffer, 1856, of the pulmonate family Streptaxidae, has been treated in detail by Verdcourt & Venmans (1956). Additional data on this subgenus are contained in Adam (1965) and Verdcourt (1953, 1957, 1961, 1962, 1963, 1983, and 1984). The last-mentioned paper contains a very interesting discussion on the biogeography of *Primigulella* (Verdcourt, 1984: 149, 152) in the context of discontinuities in the distribution of terrestrial molluscs in East Africa.

Primigulella (type species *Ennea linguifera* Von Martens, 1895) is mainly characterized by the peculiar angular lamella in the aperture of the shell. This lamella is arcuate when viewed from the bottom of the shell and somewhat elevated at the top end, so that the sinulus, which is most strongy marked, has a lateral rather than a frontal opening. In addition, the aperture exhibits a comparatively large number of folds and denticles. As regards shell characters *Primigulella* seems to be a monophyletic taxon and the known biogeographical data (distribution limited to the north-eastern forests of the Tanzanian arc, the Mt. Kenya and Mt. Ruwenzori complexes, with a Miocene record from Songhor/Koru, see fig. 4) do not contradict this. Unfortunately anatomical data are available only for *G. (P.) grossa* (Von Martens, 1892) and *G. (P.) usagarica* (Crosse, 1885) (see Verdcourt & Venmans, 1956: 71-73), and for *G. (P.) pilula* (Preston, 1911) (see Verdcourt, 1961). Perhaps some characters of the penis (presence of a penial appendix) and of the radula (see Verdcourt, 1953, 1961; Verdcourt & Venmans, 1956) are of systematic value here.

In his 1984 paper Verdcourt suggests that further research will complete the picture that he has given for the various taxa he has studied; in fact, as early as 1956 Verdcourt & Venmans had stated on p. 67 "The most likely place to find new species would probably be the montane forests of Sth. Tanganyika." Therefore it was no great surprise to detect a new species of *Primigulella* among some East African material sent for identification by Dr. J. Knudsen of the Universitetets Zoologisk Museum, Copenhagen.

The abbreviation l/d is used for the ratio length/major diameter of the shells in order to give an indication of the shape. The professional figures 1-3 have been made by H. Heijn of the zoology department of Leiden university. Acknowledgements are



Figs. 1-2. Holotype shell of *Gulella (Primigulella) augur* n.sp. (half schematic), Uzungwa Mts., Tanzania (museum Copenhagen). Fig. 1 is in front view, fig. 2 shows the shell slightly tilted to the left to expose the sinus. Actual size 13.2 x 7.6 mm. H. Heijn del.

due to Dr. B. Verdcourt (The Herbarium, Royal Botanic Gardens, Kew, U.K.) for reading the manuscript, and to Dr. J. Knudsen for submitting the interesting material.

Gulella (Primigulella) augur nov. spec., figs. 1-3

Diagnosis. — A species of *Primigulella* characterized by a comparatively small and squat shell with the aperture noticeably constricted apically, the sinulus in a laterofrontal position, and the apertural dentition with a single parietal denticle and a squarish, deeply situated, palatolabral process.

Description. — Shell (figs. 1-3) comparatively small and squat, solid, ovate, umbilicus closed to at most (sub)rimate. Spire produced, sides convex, apex obtusely conical. Whorls 8½-9, regularly increasing, the last one ascending towards the end,

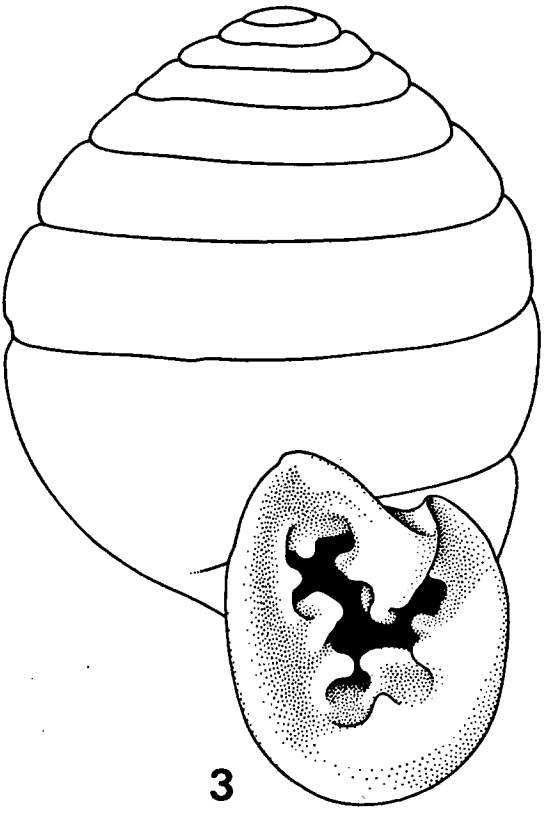


Fig. 3. Paratype shell of *Gulella (Primigulella) augur* n.sp. (outline), Uzungwa Mts., Tanzania (Rijksmuseum van Natuurlijke Historie, Leiden); note shape different from that of the holotype. Actual size 11.5 x 7.7 mm. H. Heijn del.

hardly convex, covered with well-marked, coarse, oblique and somewhat sinuous costulae, interstices wider than costulae, smooth or slightly pitted as are the apical whorls; sutures impressed, crenellate. Aperture vertical, ovate, with the apex on the left and noticeably constricted, much obstructed by twelve-fold dentition. Angular lamella strong and deeply entering, concave towards the outer lip, on the convex side with a small, almost horizontal, lamella in the middle; parietal process in the form of a small, deeply situated denticle; sinulus with a small denticle; palatal complex consisting of a little prominent tricuspid process of which the apical cusp is most pronounced, while the second cusp is situated below the apical one and the third, poorly developed and more superficial, is situated to the right and slightly below the other two; below this and more deeply situated, there is a squarish palatolabral process; a right basal denticle; a columellar complex with two almost horizontal, prominent lamellae about equal in size or the upper slightly larger than the lower, above which

there is a small upper columellar denticle; the outside of the aperture exhibits three shallow depressions corresponding to respectively the palatal, the labral cum palatolabral, and columellar complexes.

Measurements of shell: 11.5-13.2 x 7.6-7.7 mm, 1/d 1.48-1.74, length last whorl 6.4-6.9 mm, aperture 5.0-5.6 x 4.0-4.2 mm. Holotype (figs. 1-2): 13.2 x 7.6 mm, 1/d 1.74, last whorl 6.9 mm, aperture 5.6 x 4.2 mm, 9 whorls. Paratype (fig. 3): 11.5 x 7.7 mm, 1/d 1.48, last whorl 6.4 mm, aperture 5.0 x 4.0 mm, 8½ whorls.

Animal unknown.

Distribution. — Tanzania, Uzungwa Mountains.

Material examined. — Tanzania, Iringa Region, Uzungwa Mountains, "Uzungwa Scarp Forest Res. above Chita Village, 1600-1650 m, 8-13.xi.1984 Pitfall Traps in Montane Rain Forest", leg. N. Scharff (Universitetets Zoologisk Museum, Copenhagen: holotype; Rijksmuseum van Natuurlijke Historie, Leiden, Moll. No. 56232: paratype).

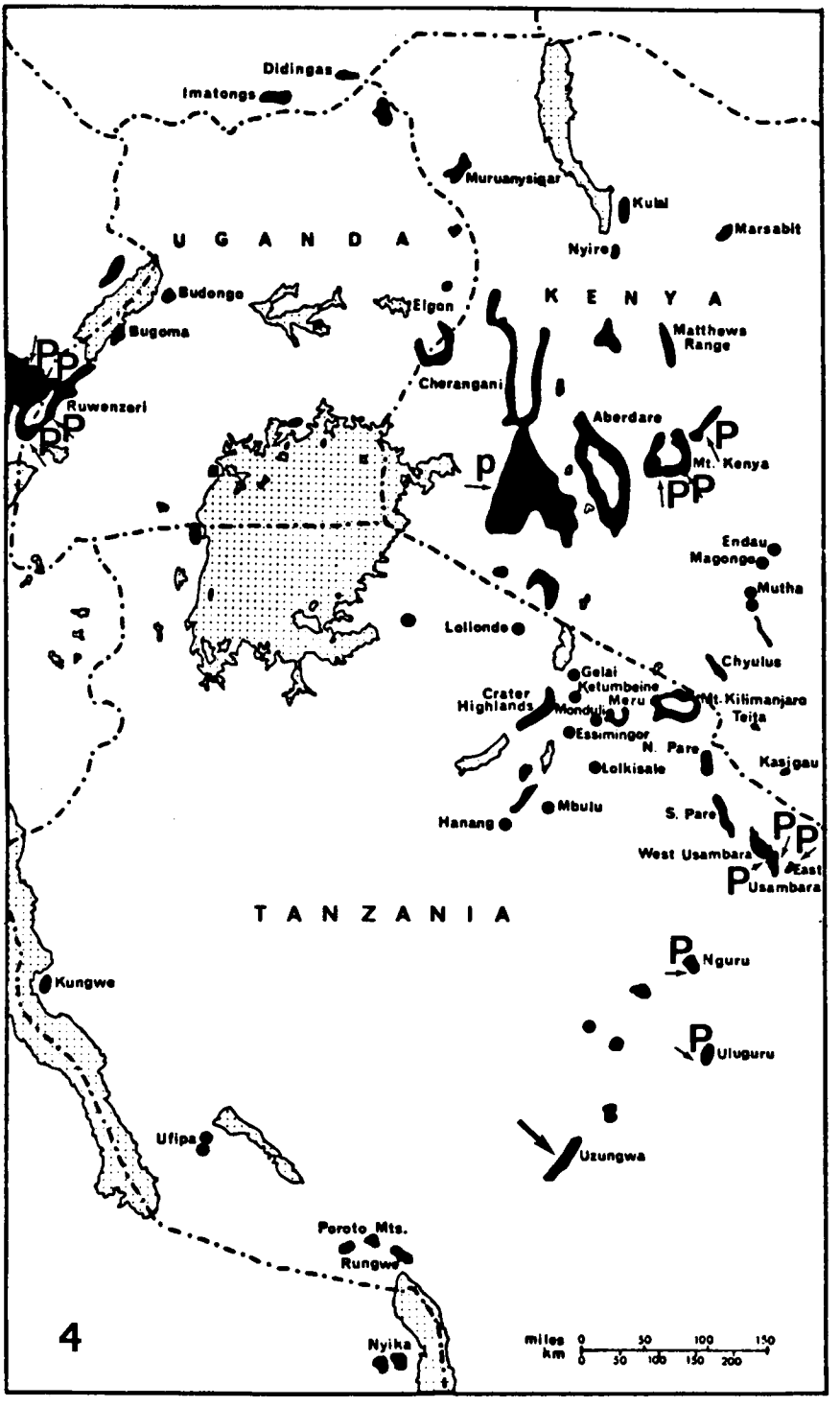
Derivatio nominis. — *augur*, Lat. = prophesier or prophet, as a noun in apposition, particularly referring to Dr. Bernard Verdcourt, who in 1956 and 1984 predicted that more *Primigulella* would be found in the mountains of southern Tanzania. In view of the existence of *Gulella verdcourti* Van Bruggen, 1966 (South Africa: Transvaal), the here proposed new name seems a fitting tribute to a much appreciated colleague.

In the key supplied by Verdcourt & Venmans (1956: 67-68) the new species keys out to *G. linguifera* (viz., 1 — smaller size and single parietal process lead to 2; more or less straight columellar lamella leads to 3; smaller size leads to 4; noticeably contracted aperture leads to *G. linguifera*). This species has been well figured by Pilsbry (1919: 215, fig. 84) and it is at once obvious that *G. augur* and *G. linguifera* are utterly different as regards apertural dentition, particularly in the palatal and basal regions. This was confirmed by examination of the two specimens of the latter in the Leiden museum (Mt. Ruwenzori, Uganda, purchased from H. C. Fulton). In addition, *G. linguifera*, restricted to the Ruwenzori complex on the borders of Uganda and Zaïre, is geographically widely separated from the new species. The closest ally of *G. augur* should be looked for in Central and eastern continental Tanzania. The nearest locality is the Uluguru Mts. area (roughly 200 km to the NE. from the Uzungwa Mts.), where *G. usagarica* s.l. occurs. Shells of this assemblage are usually larger and wider than those of the new species, but the main difference is in the palatal teeth in the aperture. In *G. augur* these form a tricuspid process, while in *G. usagarica* there are two small denticles, below which there is a large inrunning lamella, particularly well depicted in Verdcourt & Venmans (1956: 70, fig. 3).[1]

It is entirely fitting that the single paratype of the new species is deposited in the Rijksmuseum van Natuurlijke Historie, because it beautifully completes the series of *Primigulella* already available here. Much of this material was acquired in 1972 when

[1] A line has been transposed on p. 73 in Verdcourt & Venmans (1956). The bibliographic reference to the original description of *G. satura* below the paragraph devoted to that taxon, should appear directly under the heading "2b *Gulella usagarica* ssp. *satura* (Haas)" just below the middle of the page.

Fig. 4. Distribution of the subgenus *Primigulella*, after Verdcourt, 1984: 149, fig. 12, with the new locality (Uzungwa Mts., S. Tanzania, see large arrow) added. P = Recent records, p = Miocene record.


Didingas
Imatongs
Muruanysigar
Kulal
Marsabit
Nyiro
U G A N D A
K E N Y A
Budongo
Bugoma
Elgon
Matthews Range
Cherangani
Ruwenzori
Aberdare
Mt. Kenya
Endau
Magonge
Mutha
Lelionde
Chyulus
Gelai
Ketumbeine
Crater Highlands
Meru
Mt. Kilimanjaro
Mondulia
Teita
Essimingor
N. Pare
Loikisale
Kasigau
Hanang
Mbulu
S. Pare
West Usambara
East Usambara
T A N Z A N I A
Kungwe
Nguru
Uluguru
Uzungwa
Ufipa
Poroto Mts.
Rungwe
Nyika
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miles 0 50 100 150
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the L. A. W. C. Venmans collection was incorporated in the museum; all taxa enumerated by Verdcourt (1983: 232) are present except for *G.* (*P.*) *usagarica satura* Haas, 1936. The nominal taxa *G.* (*P.*) *usagarica msambaa* Verdcourt, 1956, and *G.* (*P.*) *ndamanyiluensis* Venmans, 1956, are represented by paratypes.

As fig. 4 shows, the distribution of the new species fits naturally into Verdcourt's map (1984: 149, fig. 12). Unfortunately, few (if any) data are available for the mountains further south, such as the Poroto Mts. and Rungwe. Up to August 1988, no specimens of *Primigulella* have turned up in (northern) Malaŵi; if this group does occur in the above-mentioned mountains, it would most likely be the southernmost occurrence of *Primigulella.*[2]

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[2] In an unpublished manuscript by Dr. Martin Pickford (Johannes-Gutenberg Universität, Mainz, West Germany, and Muséum National d'Histoire Naturelle, Paris), Fossil landsnails of East Africa and their palaeoecological significance, there is a map depicting the distribution of *Primigulella*; this is essentially the same as that of Verdcourt (1984). The author is grateful to Dr. Pickford for sending him a copy of this most valuable manuscript.