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Gulella udzungwensis spec. nov. (Gastropoda, Pulmonata, Streptaxidae), a new species from the Udzungwa Mountains in Tanzania

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A single shell of a species of *Gulella* is described as *Gulella udzungwensis* spec. nov. from the Udzungwa Mountains, forming part of the Eastern Arc mountains in Tanzania. This area is known for its marked endemism in flora and fauna.

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

A spate of interest in the so-called Eastern Arc Mountains, i.e. the chain of groups of forested mountain islands stretching from the tip of Lake Malawi in an oblique East-West line northward to the Taita Hills in Kenya, has recently gained momentum since it was realized that the outstanding biodiversity characterized by a high level of endemism among animals and plants was in danger of being seriously degraded. "As a result of the unusual concentrations of endemic species and their threatened status, the Eastern Arc Mountains have been classified as one of the 17 most threatened tropical forest ecosystems or global hotspots, worldwide" (Newmark, 2002: 1). A profusion of general data on this range of mountains and their biodiversity is found in e.g., Lovett & Wasser (1993), Burgess & Clark (2000), Burgess et al. (2000), and Newmark (2002).

The Udzungwa [alternative spelling: Uzungwa] Mountains in the south-western part of the Eastern Arc Mountains occupy a position of prominence because of the fairly recent discovery (1994) of a new genus and species of galliform bird, *Xenoperdix udzungwensis*. The marked endemism in the vertebrates here (and elsewhere in the Eastern Arc Mountains) is matched by that of the invertebrates, including the land molluscs (see e.g., Tattersfield et al., 2000; Verdcourt, 2000). Part of the Udzungwa Mountains is protected in the Udzungwa National Park (fide Baker & Baker, 2001: 912-913).

More than twenty years ago Dr J. Knudsen of the Copenhagen Museum submitted a number of East African land molluscs for identification. Some were easily identified and a striking new species with a fairly large shell, *Gulella (Primigulella) augur*, was subsequently described from the Udzungwa Mountains (Van Bruggen, 1988). A single shell of a much smaller *Gulella* species, also from the Udzungwa Mountains, was put aside for the time being. Recently there was an opportunity to further study this specimen and, as expected, it was found to represent an undescribed species.

Gulella udzungwensis spec. nov. (figs 1-5)

Material examined. – Tanzania, Morogoro Region, Udzungwa Mountains, Udzungwa National Park, Mwanihana Forest above Sanje [7°46'S 36°55'E], 1650 m, leaf litter, 18.viii.1982, leg. M. Stoltze & N. Scharff (holotype: Zoological Museum, University of Copenhagen, figs 1-5).

Diagnosis. – A species of *Gulella* s.l. characterized by a medium-sized, tapering costulate shell with (seemingly) smooth apex, with seven whorls and five-fold apertural dentition consisting of an angular lamella, a mid-labral tooth, a smallish left basal process, an outer and an insignificant inner columellar lamella.

Description of shell. – Shell (fig. 1) medium-sized, acuminate-ovate or barrel-shaped,

tapering towards the apex, greatest width just below the middle of the shell, (semi)transparent. Umbilicus closed. Spire produced, sides convex, tapering to a subacute apex. Whorls seven, moderately convex, sculptured with well-marked, fairly close, somewhat oblique and fairly coarse, costulae with smoothish interstices (with very faint remains of very fine spiral sculpture); the body whorl in front view exhibits c. 35 costulae. Sutures deeply impressed, crenellate. First two whorls seemingly smooth, but at high magnification with very fine costulation (fig. 2). Aperture (fig. 3) comparatively large, subtriangular, little obstructed by dental processes, peristome well reflected, white and glossy, dentition five-fold (may be interpreted as four-fold). On the right of paries a fairly large, oblique, inrunning angular lamella, not connected to apex of labrum; a bluntly acute mid-labral tooth corresponding to a moderate outside depression (fig. 4); a deeply situated, insignificant left basal process; a half-superficial outer mid-columellar process in the form of a thickening of the columellar lip, opposite the labral process; an insignificant inner columellar lamella, which, however, on the outside is shown as a more or less horizontal line, interrupting the costulae in the umbilical area (fig. 5; this implies that this lamella, which is hardly visible in the aperture, is well-developed inside the body whorl). If the last-mentioned process is not counted, the dentition would be considered four-fold.

Measurements of shell: 6.5 x 3.7 mm; ratio length (height)/major diameter (calculated from micrometer readings) 1.73; length last whorl 3.4 mm; aperture height x width 2.5 x 2.4 mm.

Anatomy. – Unknown.

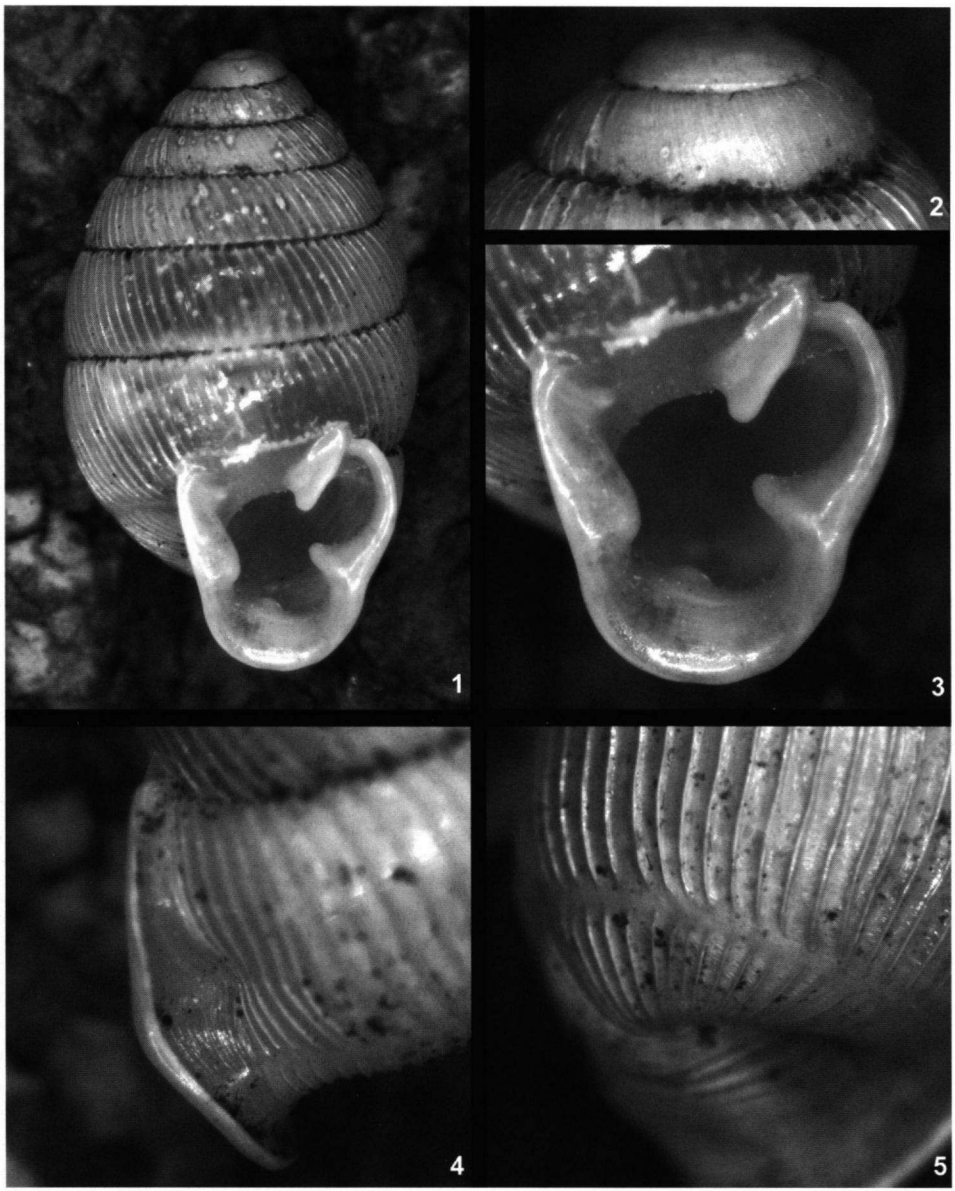
Distribution. – The new species is so far only known from the Mwanihana Forest (Udzungwa National Park) in Central Tanzania. The location of the Mwanihana Forest is shown on the map in Scharff (1993: 117, fig. 7.3; in addition, his figs 7.1 and 7.2 give an impression of what this forest looks like).

Etymology. – The new species is named after the Udzungwa Mountains as a reference to the local endemism in the fauna and flora.

Discussion. – The formula of the apertural dentition (system according to Verdcourt, 1962) is 1, 1, 1, 2 (or 1, 1, 1, 1, if the inner columellar process is ignored). Checking through Verdcourt's paper, running down Keys 10 (aperture with five processes) and 9 (aperture with four processes) does not lead to anything like a satisfactory conclusion. Subsequently described or recorded species are included in Verdcourt's checklist (1983); none of these taxa nor the ones recognized from 1983 to date does seem to match *Gulella udzungwensis* spec. nov. A search through kindred taxa described from the Democratic Republic of the Congo (to begin with Pilsbry, 1919) and of Malawi (vide Van Bruggen & Meredith, 1984; Van Bruggen, 1993; described and undescribed taxa in the Leiden Museum) also was of no assistance in classifying the present species.

The following combination of characters, (1) shape and size of shell, (2) apical sculpture and sculpture on the whorls, and (3) apertural dentition, once again appears to be unique. In fact, the variation of the shell of *Gulella* s.l. is almost endless – the shell of *G. udzungwensis* spec. nov. obviously is another expression of the general characters within this range (see e.g. Van Bruggen & Van Goethem, 1997: 7). Special attention is drawn to the somewhat unusual character of the inner columellar lamella showing on the outside of the shell as a more or less horizontal line interrupting the costulae in the umbilical area.

In many respects the single shell is so characteristic that I have not hesitated to describe it as representing a new species, also in view of the fact that Dr B. Verdcourt did not recognize it and that Dr Peter Tattersfield, who has recently (again) worked in the Udzungwa Mountains, does not know it. The latter literally wrote (e-mail message of 6 March 2003): "I have now checked my material and cannot find anything that matches your *Gulella* with the pointed apex. This is perhaps a bit surprising since I thought we



Figs 1-5. Holotype shell of *Gulella udzungwensis* spec. nov., Mwanihana Forest, Udzungwa National Park, Tanzania (Zoological Museum, Copenhagen), actual size 6.5 x 3.7 mm. 1, shell; 2, apex with embryonic shell (note transition of types of sculpture); 3, aperture more highly enlarged; 4, view behind right labral side of aperture (note depression corresponding to labral process in aperture); 5, view behind columellar side of aperture (note line corresponding to inner columellar lamella interrupting costulation). Electronic photographs by Dr E.J. van Nieukerken, Leiden.

had a pretty good sample from Udzungwa. Neither does your species ring a bell with me, at least at first glance." All this leads to the preliminary conclusion that *Gulella udzungwensis* spec. nov. is a local endemic.

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REFERENCES

BAKER, N.E., & L.M. BAKER, 2001. Tanzania. In: L.D.C. FISHPOOL & M.I. EVANS, eds, Important bird areas in Africa and associated islands. Priority sites for conservation: 897-945. Newbury/Cambridge.

BRUGGEN, A.C. VAN, 1988. A prediction come true: *Gulella augur* n. sp., a species of *Primigulella* from the Uzungwa Mountains in Tanzania (Gastropoda Pulmonata: Streptaxidae). – Basteria 52: 127-132.

BRUGGEN, A.C. VAN, 1993. Studies on the terrestrial molluscs of Malawi, an interim progress report with additions to the check-list. – Archiv für Molluskenkunde 122: 99-111.

BRUGGEN, A.C. VAN, & H.M. MEREDITH, 1984. A preliminary analysis of the land molluscs of Malawi. In: A. SOLEM & A.C. VAN BRUGGEN, eds, Worldwide snails. Biogeographical studies on non-marine Mollusca: 156-171. Leiden.

BRUGGEN, A.C. VAN, & J.L. VAN GOETHEM, 1997. Dr William Adam's iconography of Central and West African *Gulella* species (Gastropoda Pulmonata: Streptaxidae). Part 1: nominal taxa. – Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Biologie 67: 5-30.

BURGESS, N.D., & G.P. CLARKE, eds, 2000. Coastal forests of eastern Africa: i-xiii, 1-443. Gland/Cambridge.

BURGESS, N.D., M. NUMMELIN, J. FJELDSÅ, K.M. HOWELL, K. LUKUMBYZYA, L. MHANDO, P. PHILLIPSON & E. VAN DEN BERGHE, eds, 2000. Biodiversity and conservation of the Eastern Arc mountains of Tanzania and Kenya [Proceedings of Eastern Arc Conference, Morogoro, Tanzania, 1st-5th December 1997]. – Journal of East African Natural History 87 [1998]: i-xxii, 1-367.

FISHPOOL, L.D.C., & M.I. EVANS, eds, 2001. Important bird areas in Africa and associated islands. Priority sites for conservation: i-xvi, 1-1144. Newbury/Cambridge.

LOVETT, J.C., & S.K. WASSER, eds, 1993. Biogeography and ecology of the rain forests of eastern Africa: i-ix, 1-341. Cambridge.

NEWMARK, W.D., 2002. Conserving biodiversity in East African forests. A study of the Eastern Arc Mountains: I-XII, 1-197. Berlin/Heidelberg/New York.

PILSBRY, H.A., 1919. A review of the land mollusks of the Belgian Congo chiefly based on the collections of the American Museum Congo Expedition, 1909-1915. – Bulletin of the American Museum of Natural History 40: i-x, 1-370.

SCHARFF, N., 1993. The Linyphiid spider fauna (Araneae: Linyphiidae) of mountain forests in the Eastern Arc mountains. In: LOVETT, J.C., & S.K. WASSER, eds, 1993. Biogeography and ecology of the rain forests of eastern Africa: 115-132. Cambridge.

TATTERSFIELD, P., M.B. SEDDON, C. MEENA, N. KAYUMBO & P. KASIGWA, 2000. Ecology and conservation of the land-snails of the Eastern Arc Mountains. – Journal of East African Natural History 87: 119-138.

VERDCOURT, B., 1962. Preliminary keys for the identification of the species of the genus *Gulella* Pfr. occurring in East Africa excluding the sections *Primigulella* Pilsbry and *Plicigulella* Pilsbry. – Annales du Musée Royal de l'Afrique Centrale (8°), Sciences Zoologiques 106: 1-39.

VERDCOURT, B., 1983. A list of the non-marine Mollusca of East Africa (Kenya, Uganda, Tanzania, excluding Lake Malawi). – Achatina 11: 200-239.

VERDCOURT, B., 2000. Molluscs. In: BURGESS, N.D., & G.P. CLARKE, eds, 2000. Coastal forests of eastern Africa: 219-224, (checklist) 413-415.