

Range extensions of two streptaxids in Mozambique (Gastropoda, Pulmonata, Streptaxidae)

A.C. VAN BRUGGEN

National Museum of Natural History, P.O. Box 9517, 2300 RA Leiden, The Netherlands;
bruggen@naturalis.nnm.nl

The streptaxid species *Gulella perissodonta* and *Streptostele herma* are recorded from northern Mozambique close to the border with Tanzania, a considerable range extension for the former and filling in a major geographical gap for the latter, which was also found in northern Tanzania, so far its northernmost occurrence. *G. perissodonta* also probably occurs in the eastern tip of Botswana, another range extension, this time westward.

Key words: Gastropoda, Pulmonata, Streptaxidae, *Gulella*, *Streptostele*, Tanzania, Mozambique, Botswana, size clines, distribution.

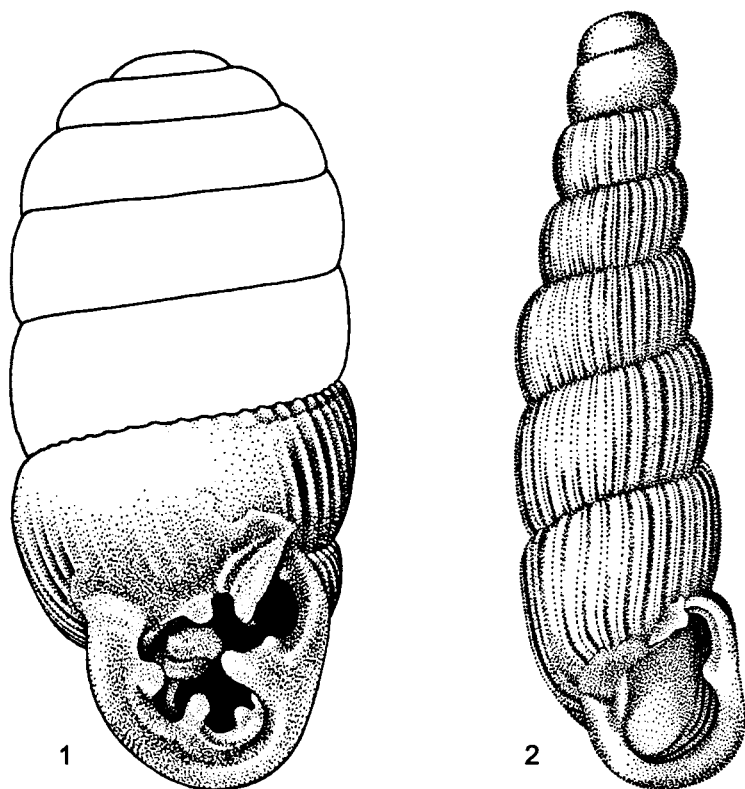
The late Dr H.E. van Hoepen, a Johannesburg psychiatrist and indefatigable shell collector, has contributed a lot of valuable material of southern African land molluscs to the Leiden Museum. Much of this was studied soon after receipt and entered in the collection. However, a residue of material was left that has only recently been evaluated. Included in this are some samples of the family Streptaxidae from Mozambique that warrant attention.

Dr Dai Herbert of the Natal Museum, Pietermaritzburg, South Africa (abbreviated NM), is acknowledged for kindly contributing data and specimens to complete this paper. The abbreviation RMNH stands for National Museum of Natural History, Leiden, The Netherlands, and l/d for the ratio length/major diameter of shells to give an indication of the shape of the shell in question.

Gulella perissodonta (Sturany, 1898)

Ennea perissodonta Sturany, 1898: 562 (26), pl. 1 fig. 18.

This species, long only represented by its holotype in the Vienna Museum, collected by Dr Arnold Penther in the late 1890s in "Lourenço Marques (= Delagoa bai)" (now Maputo), was discovered to be widely distributed in southern Africa (Van Bruggen, 1966, 1969; see also Herbert & Kilburn, 2004). Published maps (Van Bruggen, 1969: 48, fig. 17; Herbert & Kilburn, 2004: 185) show a comparatively narrow range from Hluhluwe Game Reserve, Zululand, in the south (c. 28°05'S 32°02'E, KwaZulu-Natal) to as far north as the northern tip of the Kruger National Park (c. 22°41'S 31°01'E, Limpopo Province) – this national park also provides the western (i.e. inland) limits of distribution. In Mozambique the species has been recorded only from Maputo and Inhaca Island and it also occurs in Swaziland. Recently more material from the coast of Mozambique north of Maputo (but south of Beira) became available: Bazaruto Archipelago, Benguer(u)a Island (= Ilha de Santo Antonio), 0.5 km SE. of Marlin Lodge, in leaf litter under shrubs and trees, 27.VII.2006, leg./don. E. Gittenberger (4 shells, RMNH 104370).



Figs 1-2. Drawings of shells of (1) *Gulella perissodonta* (Sturany) (half-schematic, fig. 16 in Van Bruggen, 1969: 47, Hluhluwe Game Reserve, Zululand, length 4.6 mm, NM) and (2) *Streptostele herma* Connolly (fig. 14 in Van Bruggen, 1967: 30, Lundi, Zimbabwe, length 3.9 mm, with epiphragm inside aperture, RMNH) H. Heijn del.

Two specimens collected in the seventies of last century by Dr van Hoepen on Vumba Island [Ilha Vumba, 11°07'S 40°37'E (Ilhas Kerimbas), Cabo Delgado Province] in north-eastern Mozambique, almost on the border of Tanzania (RMNH), constitute an enormous extension of the known range. The distance between Maputo and Vumba Island in a straight line amounts to c. 1925 km, that from the northern tip of the Kruger National Park to Vumba Island is c. 1660 km. Occurrence in this part of Mozambique means that the species should be searched for in at least south-eastern Tanzania; the northern limits of this obviously very widely distributed species remain to be established. The coastal areas of this part of Tanzania are poorly known as regards land molluscs. Incidentally, the only (hardly major) interval here is the Ruvuma River on the border of Tanzania and Mozambique. Nothing is known of the biogeographical significance of this interval.

Unfortunately one shell was lost, the remaining one from Vumba Island (not all that different in size) measures 2.7×1.4 mm, l/d 2.00, which makes it the smallest on record (range $3.2\text{--}6.2 \times 1.6\text{--}2.6$ mm, l/d 1.74–2.47, fide Van Bruggen, 1969: 47). Incidentally, the

above Bazaruto Archipelago specimens vary in length from 3.0 to 3.5 mm. Dr Herbert has checked the Natal Museum holdings of this species and the "smallest adult specimen seems to be one from Thembe Game Reserve [on the border of Zululand and Mozambique] which measures 3.07 mm." (e-mail message of 6.X.2005).

In 1990 Mr Andrew Wright of Plaistow (London) sent a series of maps of Botswana with non-marine mollusc records to the author. This was the result of collecting he had done in the period July 1981 to July 1983. At that time he wrote (in litt., 13.III.1990): "I have only used the references in the literature and have not had any access to any material from the area – so all my identifications must be regarded as suspect." One of his maps features one record in the far east of Botswana of *G. perissodonta* (shell 3.0 × 1.3 mm) with the comments "One dead specimen – habitat not known." Literature references are only to Connolly (1939) and Van Bruggen (1966). Mr Wright's records for other species make it clear that he had not referred to Van Bruggen's extended treatment of the species (1969), which implies that he only saw Connolly's adequate figure of this taxon (1939: pl. 1 fig. 16). His other identifications (also) seem to be creditable. Contact with Mr Wright was lost and could not be re-established recently; the whereabouts of the specimen in question are unknown. The locality as shown on the map very probably is Selebi-P(h)ikwe (very roughly 22°S 28°E) where Mr. Wright was stationed. In view of the fact that it is now proven that *G. perissodonta* is much more widely distributed than originally thought, the Botswana record should be kept in mind as it is entirely possible that it has its western limits somewhere in that area. The distance between the northern Kruger National Park and Selebi-P(h)ikwe amounts to more than 300 km in a straight line.

Van Bruggen (1969: 49) has shown that in southern Africa seemingly there is a size cline from south to north with an increase in mean length from 4.2 to 5.0 mm. However, his material varied from 4 to 118 shells per area so that there is no really defensible statistical background (see also Van Bruggen, 1980: 56, there is already a hint of doubt here). The additional Mozambique shells contradict this hypothesis so that it can now be laid at rest, although the possibility of local size clines does exist.

Good figures are found in Herbert & Kilburn (2004: 184) and Van Bruggen (1969: 47, fig. 16, here reproduced as fig. 1).

Streptostele (Raffraya) herma Connolly, 1912

Streptostele (Raffraya) herma Connolly, 1912: 89, pl. 2 fig. 3.

The genus *Streptostele* Dohrn, 1866, is widely distributed in tropical Africa and encompasses a large number of not easily recognized taxa. In many cases identification is well-nigh impossible (see e.g., Adam, 1965) and the genus is certainly due for revision.

Streptostele reaches its southern limits in South Africa. The southernmost published locality of *S. herma* is in the Kruger National Park [Limpopo Province, Van Bruggen, 1966: 383 (fig. 62), 385 (fig. 63), type locality of *S. meridionalis* Van Bruggen, 1966, syn. of *S. herma*: c. 24°23'S 31°47'E]. It has so far not been recorded from northern Zululand, southern Africa's tropical corridor (fide Herbert & Kilburn, 2004). The distribution in southern Africa may be summarized as northern South Africa ["Kruger National Park (two localities)"] and central and north-western Zimbabwe ["Lundi (both sides of the river), Victoria Falls"] (Van Bruggen, 1967: 33). A new locality in Zimbabwe is Mtare (formerly Umtali) Dist., Vumba Circular Drive, Burma Valley, Nyamakari River causeway, leaf litter, c. 900 m, 17.II.1963, leg. A.C. & W.H. van Bruggen (NM). Verdcourt (1978: 24, see also his checklist: Verdcourt, 1983: 231; new edition of do., 2006: 44) recorded the species from south-

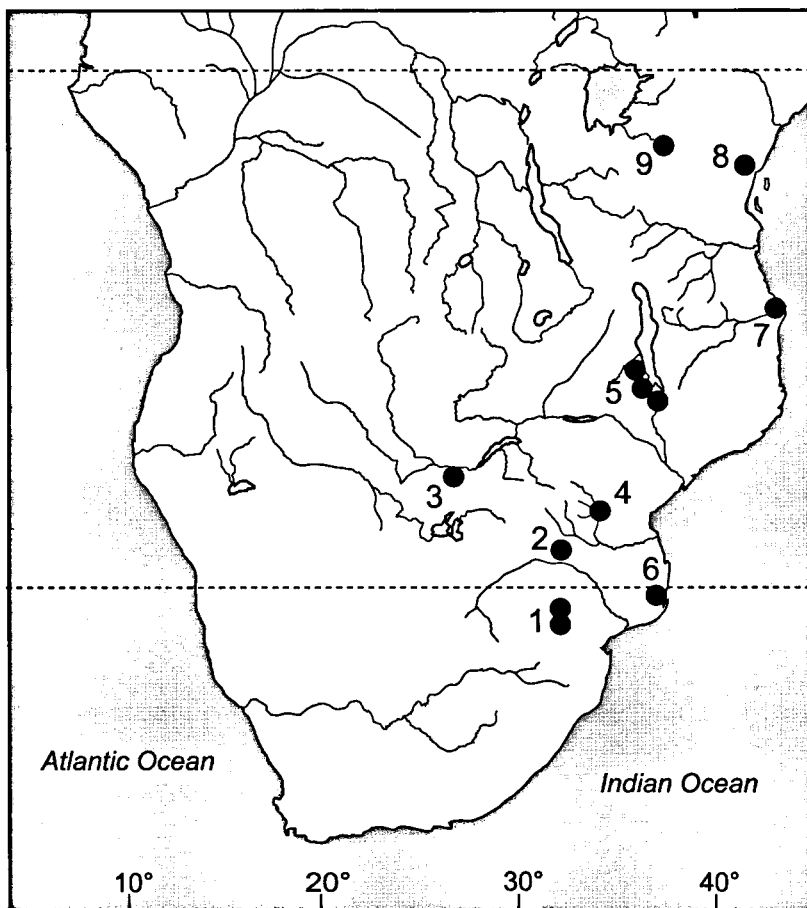


Fig. 3. Records of *Streptostele herma* Connolly; the scattered localities (nos. 1-9) suggest a very large range. Localities nos. 7 and 9 fill in gaps in the distribution of this species, and at the same time loc. no. 7 constitutes a considerable range extension for *Gulella perissodonta* (Sturany), thus far not known to reach further north than the Kruger National Park (loc. no. 1). Map drawn by Erik Bosch (RMNH).

eastern (i.e. coastal) Kenya.

The species is new to Mozambique, but this is not surprising in view of the known distribution. A sample of five specimens from Vumba Island (RMNH, the freshest two shells measure 4.0×1.1 mm, l/d 3.55) collected together with the above *Gulella perissodonta*, fills in the gap between Kenya and Malawi. The Natal Museum's collections contain more material of *Streptostele* from the central parts of Mozambique. Material submitted by Dr Herbert is all from Inhambane Province, Pomene area, and contains the following: Pomene Bay (N. of Inhambane), inland of southern end of lagoon ($22^{\circ}58.342'S$, $35^{\circ}31.673'E$), miombo woodland beside wetland, leaf litter, leg. D. Herbert, X.2002 (1 shell: NM L5821); Pomene Bay ($22^{\circ}55.746'S$, $35^{\circ}35.844'E$), coastal forest, leaf litter, leg. do., X.2002 (2 shells: NM L5963); Pomene Bay ($22^{\circ}55.746'S$, $35^{\circ}35.844'E$), coastal forest near mangrove swamp, leaf litter, leg. do., X.2002 (4 shells: NM L6773). All specimens appear

to belong to *S. herma*; the shells measure $3.5\text{--}4.1 \times 1.0\text{--}1.1$ mm, l/d 3.33–3.81 and a specimen with damaged apex (L5821) is >4.4 mm long.

Another new record establishes occurrence in northern Tanzania at approximately 3°S: Tanzania, Gibb Farm (Ngorongoro Safari Lodge) N. of Karatu, in forest near waterfalls, leaf litter, c. 2000 m, 17.I.1976, leg. A.C. & W.H. van Bruggen, don./det. A.C. van Bruggen 2006 (1 defective shell, RMNH). This does not fill up the gap between north-eastern Mozambique and south-eastern Kenya, but represents extension northwestward and may constitute its northern limits.

S. herma is obviously sparsely distributed throughout a very large range and is certainly under-recorded because of its small size and cryptic lifestyle. The total range so far known is now as follows (fig. 3, the numbers below are shown on this map):

South Africa [northern parts: Mpumalanga and Limpopo Provinces – Kruger National Park (1)]; Zimbabwe [central and north-western parts: Lundi (2), Victoria Falls (3, type locality), Vumba area (4)]; Malawi [restricted to the south-central parts of the country (5) – so far this taxon has not yet been recorded from Zambia, fide Van Bruggen, 1988]; Mozambique [Pomene area (6), Vumba Island (7)]; Kenya [south-eastern coastal area, almost on the border with Tanzania: Shimoni (8)]. Tanzania [southern edge of Ngorongoro Crater (9)].

Good figures are found in Van Bruggen (1967: 30, fig. 14, here reproduced as fig. 2) and Verdcourt (1978: 23, fig. 6).

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