

Two new species of *Curvella* Chaper (Gastropoda, Pulmonata, Subulinidae)
from the East Usambara Mts., Tanzania

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Curvella myrmecophila and *C. usambarensis* are described as new species from Tanzania, East Africa. A conspectus of East African *Curvella* is added as a guide to naming of shells in this genus.

Key words: Gastropoda, Pulmonata, Subulinidae, *Curvella*, East Usambara Mts., Tanzania, East Africa.

INTRODUCTION

I have been gathering materials for a revision of the *Curvella* species occurring in eastern Africa but although many species are distinctive the majority are small and characterless. As in many subulinids it is often difficult to decide if a specimen is adult or not unless many specimens are available from one population. All major museums holding African material have hundreds of unidentified specimens of the genus, many bearing manuscript names of H.B. Preston which cannot be named at the present time. The two species described below are, however, quite large and distinctive. The first I collected whilst working in Tanzania as long ago as 1950. The second was collected by Frontier Tanzania some 45 years later during a survey of the coastal forests.

For collections the following abbreviations are used: BM, British Museum (Natural History), London; RMNH, National Museum of Natural History (formerly Rijksmuseum van Natuurlijke Historie), Leiden.

DESCRIPTIONS

Curvella myrmecophila spec. nov. (fig. 1)

Curvella caloraphe, Verdcourt, 1957: 41; [1981]: 67. Not Preston, 1910.

Material examined. – Tanzania, East Usambara Mts, Amani, Kiumba, 5°5.5'S 38°38.5'E, 900 m alt., in ants' nest, B. Verdcourt leg., 1950 (RMNH 93498/ holotype, 93499/8 juvenile paratypes [all ex Venmans Colln no. 6400]); Amani, Mavumbi track, B. Verdcourt leg., 1950 (RMNH 93500/1 juvenile paratype [ex Venmans Colln no. 6399]); Amani, in ants' nest, 900 m alt., B. Verdcourt leg., 1950 (RMNH 93501/2 juvenile paratypes [ex Venmans Colln no. 6401]).

Diagnosis. – A typical ovoid-conic *Curvella* of fairly large size, strongly ribbed and with the aperture distinctly produced to left.

Description. – Shell white but often with reddish staining due to laterite soil, ovoid-conic, narrowly but distinctly umbilicate, not very thin; spire produced, obtuse, the apical angle about 60°. Whorls 6, convex, quite rapidly increasing, the apical 1½ smooth, the rest with rather irregular strongly curved (particularly where meeting the suture) ribs at about 8 per mm; suture impressed. Aperture narrowly obovate, distinctly produced to left below the columella; peristome sharp, strongly curved, excised at the apex; columella slightly curved, strongly reflected over the umbilicus. Animal yellow.

Measurements: 12 x 6 mm, length of last whorl 9 mm, aperture 6.5 x 3.5 mm.

Distribution. – Tanzania, Tanga Province, East Usambara Mts.

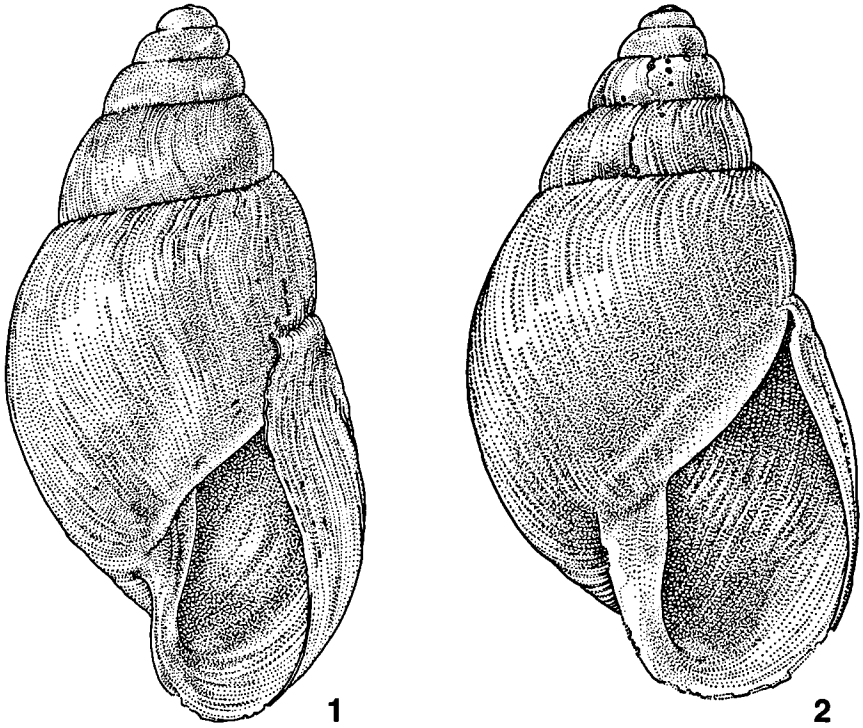
Discussion. – During my early collecting at Amani I designated species by a letter or letters. This *Curvella* was AW and I have a record that material was also sent to H. Watson in spirit and Dr. K.L. Pfeiffer. Watson did not have time to investigate it before his death. His collection is now in the Zoology Museum at Cambridge but this specimen has not been traced. Dr. Pfeiffer's collection is at Frankfurt and a specimen should be there. Dr. Venmans identified the species as *Curvella conoidea* (Von Martens, 1892) but that has a much more obvious umbilicus and compared with juveniles of *C. myrmecophila* of the same size is distinctly broader below the middle which I confirmed when I examined the type in 1959. Later I identified AW as *Curvella caloraphe* Preston, 1910, a species described from the Shimba Hills in Kenya and it is to this species that *Curvella myrmecophila* bears most resemblance.

I found the species in loose soil around the ants' nest and in it; a juvenile was also seen being carried by an ant. At the time using Stadelmann (1898) I thought it very likely that the black ant concerned was *Myrmecaria eumenoides* (Gerstäcker, 1859) known in Kishambaa as 'Korokoro'. I sent some of the ants to Horace Donisthorpe who mislaid them. He died shortly after receiving the second batch but determined them as a new species of *Myrmecaria*. This may be correct since Gerstäcker (1859) describes his ant as 'obscurus rufus'.

It is undoubtedly closest to *C. caloraphe* but that differs in having a concave depressed area below the suture where the transverse ribs are strongly bent. *C. nyasana* E.A. Smith, 1899, is similar in size and shape to *C. myrmecophila* but the aperture is much less spout-like at the left, ribbing stronger, columella straighter, shell thicker and umbilicus larger; other species with spout-like apertures eg. *C. campyla* Connolly, 1923, and *C. blacklocki* Connolly, 1928, are smaller and narrower. *C. disparilis* (E.A. Smith, 1890) is larger with stronger striae but clearly related and also from the Eastern Arc forests; *C. subvirescens* (E.A. Smith, 1890) also from the Eastern Arc forests is much narrower with a straighter columella.

Curvella usambarica spec. nov. (fig. 2)

Material examined. – Tanzania, Tanga Province, East Usambara Mts., Kwamgumi Forest Reserve, Plot 39/111, 4°57'S 38°44'E, Frontier Tanzania leg., 1996 (RMNH 93502/ holotype, 93503/two juvenile paratypes; BM/paratype).



Figs 1, 2. *Curvella* spec. 1, *C. myrmecophila* spec. nov., holotype (RMNH 93498); Tanzania, East Usambara Mts, Amani, Kiumba, 5°5.5'S 38°38.5'E, 900 m alt., in ants' nest, B. Verdcourt leg., 1950 (actual shell height 12 mm); 2, *C. usambarica* spec. nov., holotype (RMNH 93502); Tanzania, Tanga Province, East Usambara Mts., Kwamgumi Forest Reserve, Plot 39/111, 4°57'S 38°44'E, Frontier Tanzania leg., 1996 (actual shell height 14.5 mm). I. van Noortwijk del.

Diagnosis. – A typical, rather broadly ovoid-conic *Curvella* of fairly large size, ribbed, the peristome deeply excised near junction with body whorl and aperture not produced to left.

Description. – Shell white, glossy, rather broadly ovoid-conic, distinctly rather narrowly umbilicate, the fissure oblong in section, not very thin; spire produced, obtuse, the apical angle about 53°. Whorls 6, convex, rapidly increasing, the first 2 practically smooth, the rest with close curved ribs 7–8 per mm, strongly bent to right just below the suture and entering the umbilicus; under very high powers there are very close wavy-lines; suture moderately impressed. Aperture oblong-pyriform, not produced to left below the columella; peristome sharp, with outer margin not strongly projecting at middle but deeply excised at junction with body whorl to form a well marked sinuous slit; columella straight, very strongly reflected over the umbilicus which is not visible in frontal view. Animal not known.

Measurements: holotype – 14.5 x 8.5 mm, length of last whorl 11.5 mm, aperture 8.5 x 5.3 mm; paratype – 14 x 7.5 mm, aperture 8 x 5.2; juvenile paratype of 4 whorls measures 5.3 x 3.3 mm and of 5 whorls 9 x 5 mm.

Distribution. – Known from the type locality only.

Discussion. – This species is distinctive by its rounded contour and rather large size, and very deep excision at junction of peristome and body whorl. It differs from *C. myrmecophila* in the aperture lacking the projection to the left and wider contour. The forest has some other endemics, notably the Annonaceous genus *Sanrafaelia* Verdcourt, 1996, only recently discovered.

CONSPECTUS OF EAST AFRICAN *CURVELLA*

Although it is not possible to give a key to the species of *Curvella* occurring in East Africa the following conspectus may help to limit the number of types which need to be looked at.

1. Body whorl/spire ratio over 42
Body whorl/spire ratio under 43
2. Shell broadly ovate-conic, 7.6 x 5.5 mm with deep suture and open umbilicus; body whorl/spire ratio 4.1 (Zaire, near Masisi)*C. bathytoma* Pilsbry, 1919
Shell broadly ellipsoid (ie widest near middle), 8.5–9.2 x 5.2–5.5 mm; body whorl / spire ratio 5.6 (E. Zaire/W. Uganda)*C. dautzenbergi* Pilsbry, 1919
3. Shell large, 31 x 13 mm with spire 1/3 the length of the body whorl (Ethiopia) ..
.....*C. aethiopica* Thiele, 1933
Shell much smaller4
4. Shell small, 3.1 x 1.7 mm with very deep suture and wide umbilicus; body whorl / spire ratio 2.07 (Zaire, Tschibinda)*C. bathyrhaphé* Pilsbry & Cockerell, 1933
Shell not as above, usually larger with shallower suture5
5. Body whorl/spire ratio over 26
Body whorl/spire ratio under 211
6. Shell ovoid with ratio 3.3, 8.5 x 3.5 mm; montane species at 2700–3000 m (Mt. Kenya)*C. deliciosa* Preston, 1911
Not a montane species or if so then ratio under 2.57
7. Shell imperforate when adult; Uganda or E. Congo8
Shell perforate or distinctly umbilicate10
8. Body whorl/spire ratio 2.79–2.48; 9.1 x 4.3 mm, incised sculpture (W. Uganda)*C. campyla* Connolly, 1923
Body whorl/spire ratio 2.2–2.23; sculpture of rather fine arcuate costulae9
9. Shell ovoid, 7.75 x 4 mm (Uganda)*C. entebbensis* Preston, 1912
Shell ovoid-conic, 10–11 x 4.7–4.8 mm (E. Zaire)*C. langi* Pilsbry, 1919
10. Multiple entry in order of size:
 - a. Shell ovoid-conic, 6.1 x 3.2 mm; ratio 3.14 (Tanzania, Kilwa District, Matumbi Hills)*C. sp.*
 - b. Shell elongate-conic, 7.75 x 4 mm; ratio 2.2 (Uganda) *C. entebbensis* Preston, 1912
 - c. Shell ovoid-conic, 9.2–10 x 5.5 mm; ratio 2.3, openly umbilicate; submontane species at 2000 m (W. Uganda, Ruwenzori)*C. conoidea* (Von Martens, 1892)
 - d. Shell ovoid-conic, 9.5 x 4.5 mm; ratio 2.17 (Tanzania, Kilwa District, Matumbi Hills)*C. sp.*
 - e. Shell ovoid, 11.5 x 6.5 mm; ratio 3.09 (Kenya, coastal) (A specimen from Kenya, Kilifi District, Vipingo collected and identified by me as this is probably yet another new species)*C. calorhaphé* Preston, 1910

- f. Shell ovoid-conic, 12 x 5.5 mm; ratio 2.04 (Tanzania, Ulunga District, Mahenge, Kwiro) *C. afra* C.R. Boettger, 1917
- g. Shell ovoid-conic, 12 x 6 mm; ratio 2.96 (Tanzania, East Usambaras) (see above) *C. myrmecophila* spec. nov.
- h. Shell ovoid-conic, 11–12.2 x 6.2–6.5 mm; ratio 1.86–2.13 (W. Uganda) *C. masakana* Connolly, 1923
- i. Shell narrowly bulimoid, 13 x 6.5 mm; ratio 2.5 (Tanzania, Morogoro District, Nguru Mts., Mamboia; also recorded from W. Uganda/Zaire; some so-named from Tanzania, Usagara are imperforate) *C. disparilis* (E.A. Smith, 1890)
- j. Shell broadly ovoid-conic, 14–14.5 x 7.5–8.5 mm; ratio 3.83 (Tanzania, East Usambaras) (see above) *C. usambarica* spec. nov.
11. Shell imperforate 12
- Shell perforate, rimate or distinctly umbilicate 13
12. Multiple entry in order of size:
- a. Shell narrowly bulimoid, 7.5 x 3.3 mm; ratio 1.72 (Tanzania, Morogoro District, Nguru Mts.) *C. associata* (E.A. Smith, 1890)
- b. Shell narrowly ovoid-conic, 11.4–14 (–16?) x 5–5.3 mm; ratio 1.5 (Tanzania, Morogoro District, Nguru Mts.) *C. subvirescens* (E.A. Smith, 1890)
- c. Shell very narrowly bulimoid, 12.5 x 3 mm; ratio 1.25 (Malawi, Mt. Chiradzulu and Zomba; material from Tanzania, Uluguru Mts is probably correctly named but that from Kenya, Naivasha is probably *Opeas lamoense*) *C. whytei* E.A. Smith, 1899
- d. Shell turreted, 13.2 x 5 mm; ratio 1.23; 71/3 whorls (E. Zaire) *C. chapini* Pilsbry, 1919
13. Multiple entry in order of size:
- a. Shell narrowly bulimoid, 4 x 1.6 mm; ratio 1.86; narrowly umbilicate (Kenya, Kakamega) (? adult) *C. babaulti* Germain, 1923
- b. Shell 'elongate-ovate', 8 x 3.2 mm; ratio not known but body whorl said to be under half the length of shell (Tanzania, Arusha District, base of Mt. Meru) *C. subgradata* D'Ailly, 1910
- c. Shell narrowly bulimoid, 9.4 x 4.1 mm; ratio 1.43–1.76 (Uganda, ... Elgon and Entebbe) *C. elgonensis woodhousei* Connolly, 1923
- d. Shell bulimoid, 10.2 x 4.9 mm; ratio 1.83–1.87; minutely rimate (Uganda, Elgon) *C. elgonensis* Connolly, 1923
- e. Shell ovoid-conic, 10.25 x 6 mm; ratio 1.46; shell solid, very coarsely sculptured (Uganda, Entebbe to Mbarara) *C. solidula* Preston, 1912
- f. Shell narrowly bulimoid, 11 x 4.25 mm; ratio 1.55 (Kenya, widespread but type locality Shimba Hills – some material is 8–9 x 4 mm) *C. pertranslucens pertranslucens* Preston, 1910
- g. Shell elongate-conic, 12 x 5 mm; ratio 1.36; striae weak, slightly curved, columella thick, reflected into a tube (Kenya/Tanzania border, Kilimanjaro, Lake Chala) (perhaps an *Opeas*) *C. kretschmeri* (Von Martens, 1897)
- h. Shell ovoid-conic, 11–12.2 x 6.2–6.5 mm; ratio 1.86–2.13 (W. Uganda) *C. masakana* Connolly, 1923
- i. Shell conic, 12.5 x 6.5 mm; ratio 1.86 (Malawi; a Tanzania, Tukuyu specimen leg. Fülleborn compares with this) (note a variety from Zomba Mt. is 18.5 x 11 mm) *C. nyasana* E.A. Smith, 1899
- j. Shell narrowly bulimoid, 13 x 4.5 mm; ratio 1.25–1.4 (Central Kenya, Nairobi etc) *C. pertranslucens fallooni* Connolly, 1923

- k. Shell narrowly conical, 13.2–13.5 x 5.8–6.1 mm; ratio 1.4 (W. Zaire)
 *C. thysvillensis* Pilsbry, 1919
- l. Shell narrowly bulimoid 14 x 5.5–6 mm; ratio 1.64; suture bordered; very strongly
 curved columella (Tanzania, Lindi District, Rondo Plateau)
 *C. suturalis* (Von Martens, 1897)
- m. Shell narrowly bulimoid-conic, 18–18.5 x 6 mm; ratio 1.16 (Kenya, Machakos
 District, 'Ukamba') *C. sinulabris* (Von Martens, 1878)

There are many specimens at Berlin, Brussels and The Natural History Museum (London) bearing manuscript names of Preston. Some of these are *Opeas*, *Pseudopeas* or *Euonyma* (sensu Connolly) but others have been identified by Connolly with described species of *Curvella* and the material annotated. These Preston manuscript species are in a separate drawer at the Natural History Museum with a card index. Connolly did not see material from Berlin or Brussels some of which is not duplicated in London and there appear to be several undescribed species of *Curvella* there. *Curvella shimbiense* Preston and *Curvella alabastrina* Preston, non Da Costa, are both *Opeas lamoense* (Melvill & Ponsonby, 1892).

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