

Notes on *Parennea* species from Western Africa, including descriptions of two new species (Gastropoda, Pulmonata, Streptaxidae)

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The distribution and taxonomic status of some species attributed to the (sub)genus *Parennea* in western Africa is discussed. *Parennea circumcisa* (Morelet, 1885) and *P. sulcifera* (Morelet, 1884) are reported for the first time from Gabon, respectively Gabon and Cameroon. Two new species are described: *P. gittenbergeri* from Gabon, and *P. vanbruggeni* from Cameroon.

Key words: land snail, Stylommatophora, taxonomy, distribution, new species, Cameroon, Gabon, Liberia.

INTRODUCTION

Our knowledge of the (sub)genus *Parennea* Pilsbry, 1919 is largely summarized in two important papers. Adam & Van Goethem (1978) revised most of the nominal taxa known to that date and described some 20 new species, mainly from the Democratic Republic of Congo (formerly Belgian Congo, or Zaïre). Van Bruggen (1989) dealt with species not or incompletely covered by Adam & Van Goethem, added eight new species from Malawi, Angola and Uganda, and provided a key to all known species.

According to Pilsbry's (1919) definition, *Parennea* are species of Streptaxidae with a single, deeply entering palatal lamella in the aperture, and a corresponding single external depression. Species exhibiting these characters are quite variable in shell shape, size, sculpture, and in the presence or absence of other apertural dentition, and doubt has been expressed as to whether *Parennea* is a natural taxon (Adam & Van Goethem, 1978; Van Bruggen, 1989). Anatomical data is known of a single species only, *P. pervagatum* (Van Bruggen, 1989).

Consequently the systematic position of *Parennea* is unclear. It is mostly considered a subgenus of *Ptychotrema* L. Pfeiffer, 1853, as originally proposed by Pilsbry (1919). Recently Schileyko (2000) treated *Parennea* as an independent genus, with *Wilmattina* Pilsbry & Cockerell, 1933, as a subgenus, while Adam & Van Goethem (1978) considered the latter, with good reason, a subgenus of *Gulella* L. Pfeiffer, 1856. The distinction between *Parennea* and *Ennea* H. & A. Adams, 1855 (both usually considered subgenera of *Ptychotrema*), is not always clear, since the second palatal fold and corresponding external spiral furrow typical of *Ennea* may be indistinct. Schileyko (2000) placed *Parennea* in the Ptychotrematinae while maintaining the Enneinae as a distinct taxon, but the characters supposedly defining both subfamilies do not seem to hold. Both Adam & Van Goethem (1978) and Van Bruggen (1989) provide examples of species with characters intermediate between *Ennea* and *Parennea*. One species, *P. dubia* (Adam & Van Goethem, 1978) was tentatively attributed by its authors to *Parennea*, although part of the type specimens completely lack a palatal lamella and external furrow, and therefore could be as well assigned to *Gulella* s.l. Since there presently appear to be no convincing arguments in favour of any systematic placement, I treat *Parennea* provisionally as a full genus here. Since this involves a change in gender of the genus name, the ending of some of the known species names change.

According to Van Bruggen's (1989) analysis of the distribution of *Parrennea* species, most species and records are from Central and East Africa, whilst in western Africa *Parrennea* was thought to be represented by three species recorded from very few localities only: *P. circumcisa* (Morelet, 1885) and *P. sulcifera* (Morelet, 1884) from Cabinda; *Ptychotrema (Parrennea) subtusangulatum* Degner, 1934, described from Liberia, was later transferred to *Ennea* by Adam et al. (1994) (for an additional overlooked Liberian record of a *Parrennea* species see below sub *P. sulcifera*).

In recent years it has become clear that *Parrennea* is more diverse and extensively distributed in western Africa; only part of the new records have so far been published. De Winter & Gittenberger (1998) mentioned one (new) species from Cameroon, and Fontaine et al. (2007) four species from Gabon, but none of these have yet been identified or described. In this paper I will deal with part of the *Parrennea* material that has become available from Gabon and Cameroon since Van Bruggen's (1989) paper.

Collection acronyms: MNHN, Muséum National d'Histoire Naturelle, Paris; RMNH, National Museum of Natural History *Naturalis* (formerly Rijksmuseum van Natuurlijke Historie), Leiden. Other abbreviations: H, shell height; D, largest shell diameter perpendicular to the shell axis; W, number of whorls (counted according to Kerney & Cameron, 1978: 13).

SYSTEMATIC PART

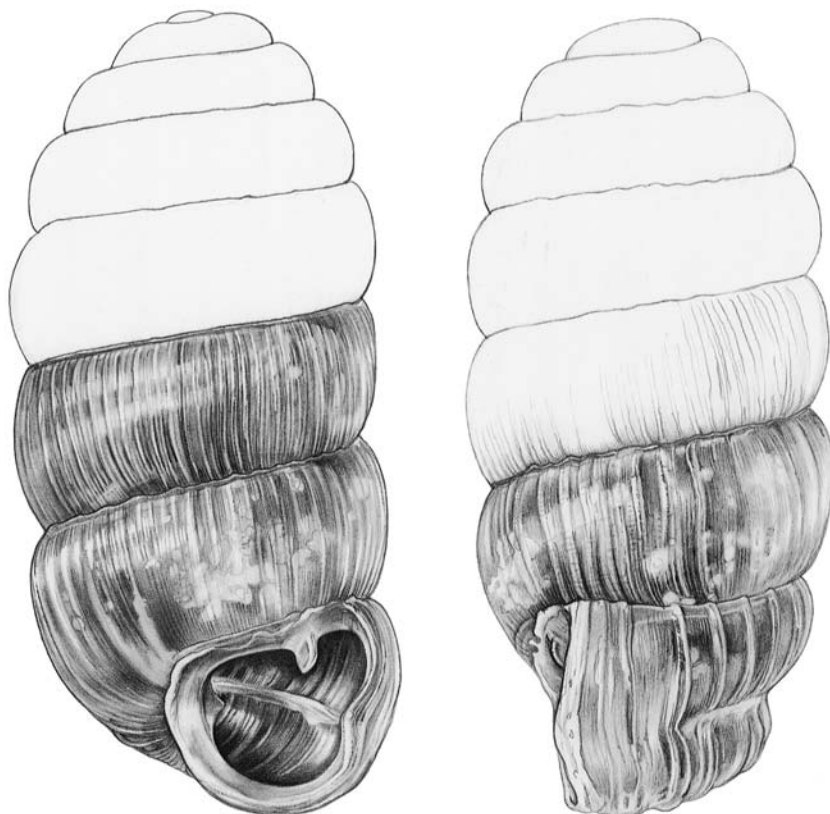
Parrennea gittenbergeri nov. spec. (figs 1-2)

Material.— Holotype shell (RMNH.MOL.109876) Gabon, Province of Ngounié, 5 km on road from Etéké to Ouala; 1°28.5'S 11°27.3'E, 750 m a.s.l., 8.xi.1994; J.J. Wieringa leg., leaf litter of forest on lower slope.

Diagnosis.— Differs from other cylindrical *Parrennea* species by a combination of characters: shape, size, and sculpture of straight, blunt ribs on the teleoconch, comparatively short palatal lamella and corresponding external furrow, and simple suture.

Description.— Shell small (H = 3.5 mm, D = 1.5 mm), semi-transparent, glossy, elongate cylindrical. Shell colour pale-yellowish. Whorls ca. 6½, rather convex, separated by a thread-like, not crenulated suture. Apex slightly raised. Embryonic whorls nearly 2, the first half whorl smooth, the rest with very fine axial riblets. Later whorls with strong but blunt, orthocline ribs over the entire height of the whorl. On the last ¼ whorl, ribs are more widely spaced and higher than on the earlier whorls. Apertural dentition consists of a prominent but short angular lamella, a small pointed protuberance on the mid-columnar wall, and a prominent, high palatal lamella. The latter starts some distance from the peristome and extends for less than half a whorl, not being visible in frontal shell view, neither externally nor on the internal parietal wall through transparency. The corresponding depression on the back of the shell is rather deep. Peristome thick, palatal margin with a tooth-like callus. Umbilicus closed.

Remarks.— Only two ribbed species of *Parrennea* approach *P. gittenbergeri* in size and shape, viz. *P. jacquelinae* (Adam & Van Goethem, 1978) and *P. leloupi* (Adam & Van Goethem, 1978), both from the eastern D.R. Congo. According to their original description, both these species have completely smooth instead of finely ribbed embryonic whorls, and the spiral furrow on the last whorl reaches the peristome. In addition, *P. leloupi* differs by the more distant ribs and crenulate suture. The shell of *P. jacquelinae* is more elongate and the ribs are wider apart. The description of *P. goossensi* (Adam & Van Goethem, 1978) from the D.R. Congo perhaps agrees best, but this species is much smaller (shell height 1.7-2.3 mm).

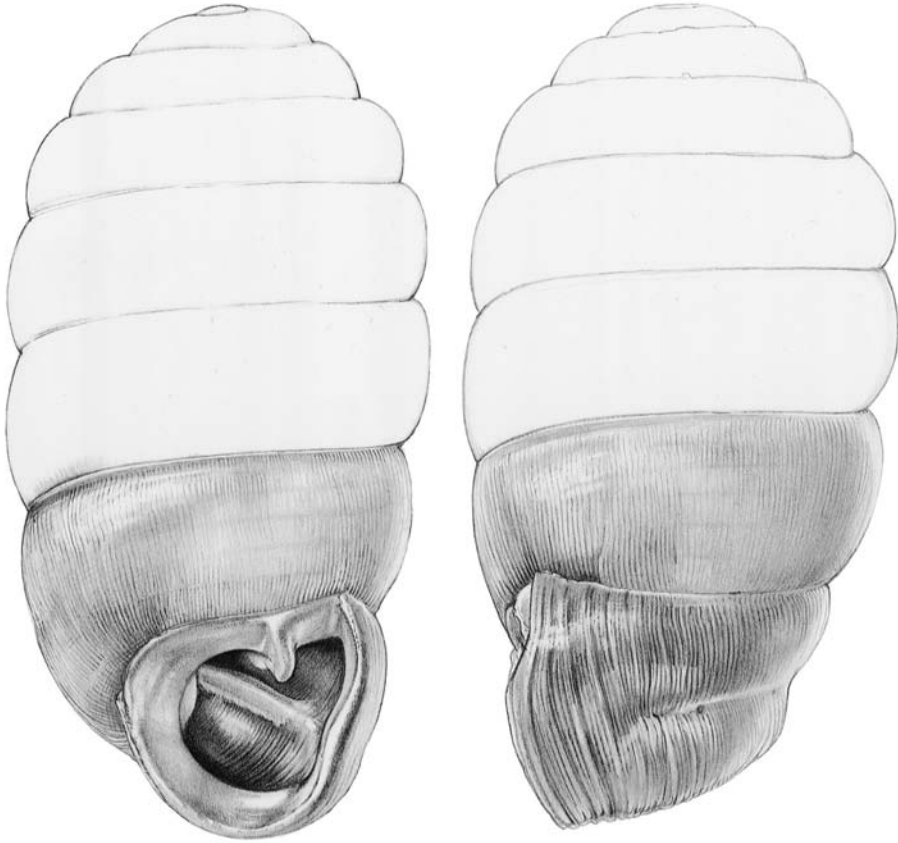


Figs 1-2. *Parennea gittenbergeri* nov. spec., different views of holotype shell (RMNH). Actual shell height 3.5 mm. Drawing by Inge van Noortwijk.

Etymology.— This species is dedicated to my colleague, teacher and friend Prof. Dr Edmund (Edi) Gittenberger, at the occasion of his formal retirement.

***Parennea vanbruggeni* nov. spec. (figs 3-4)**

Material.— (all collected by A.J. de Winter & E.-J. Semengue). Holotype (RMNH.MOL.109877): Cameroon, Sud Province, Meka'a-II, W of Nyangong, undisturbed forest patch, 2° 58'N 10° 44'E, alt. 640 m, 18.v.1996 [Sta. CAM111]. Paratypes: Nyangong, undisturbed high forest, 2° 56.6'N 10° 44.2'E, alt. 650 m, 9.v.1996 [Sta. CAM101] (RMNH.MOL.109878/1 adult, 1 juv. shell). Meka'a-II, W of Nyangong; undisturbed forest on N-facing slope with large boulders, 2° 57.7'N 10° 44.8'E, alt. 790 m, 18.v.1996 [Sta. CAM109] (RMNH.MOL.109879/1 adult shell). Meka'a-II, W of Nyangong, undisturbed forest on very steep, N-facing slope; 2° 58'N 10° 44'E, alt. 920 m; 17.v.1996 [CAM108] (RMNH.MOL.109880/1 adult shell).



Figs 3-4. *Parennea vanbruggeni* nov. spec., different views of holotype shell (RMNH). Actual shell height 2.8 mm. Drawing by Inge van Noortwijk.

Diagnosis.— A small (about 3 mm high), elongate, tightly coiled species of *Parennea* without major ribs (except for a few ribs immediately behind the peristome), but with regular, fine, close-set vertical striae. Suture without crenulations.

Description.— Shell whitish, partly transparent, elongate-ovoid to subcylindrical in shape; the greatest width of the shell lies at the penultimate whorl or even the one before, giving some shells a somewhat club-shaped appearance. Protoconch not well demarcated from the teleoconch (although some specimens show a distinct growth stop at 2½ whorls), first half whorl smooth, the later ones with very fine orthocline striae (or riblets) that continue (and become somewhat coarser) on the later whorls. Up to 5 little-prominent ribs are present immediately behind the peristome, with ca. 5 striae in the interstices. On the apical whorls, as well as on the later whorls, a very fine and superficial spiral element may be seen over the axial striae. Whorls approx. 7, very regularly increasing, moderately convex. Peristome thick, outer lip slightly reflected. Aperture obstructed by few barriers: a prominent but short, bi-lobed angular lamella, a palatal lamella which does not reach the

peristome, and an inconspicuous short, broad and rounded, mid-columellar process. Palatal lamella extends for about half a whorl; the corresponding deep, external depression ends at the same point as the internal lamella. In lateral view, the extending mid outer lip slightly reflexes, giving the impression of a blunt palatal process in frontal view. Umbilicus closed. The juvenile paratype shell of $2\frac{1}{2}$ whorls has a round-oval, edentate aperture, and a round and shallow umbilicus that takes up 14% of the shell width. Shell dimensions ($n = 4$): $H = 2.8\text{--}3.0$ mm; $D = 1.4\text{--}1.5$ mm; $W = 6\frac{1}{2}\text{--}7$. Holotype: $H = 2.8$ mm; $D = 1.4$ mm; $W = 6\frac{3}{4}$.

Ecology.— The species was collected from leaf-litter collected on the forest floor in undisturbed rainforest between 640 and 930 m altitude, sympatric with *P. sulcifera* (Morelet, 1884).

Remarks.— This species differs from all known congeners by the tightly coiled shell and by lacking coarse ribs (except immediately behind the peristome) or a crenulate suture. Also the sculpture of fine, but extremely regular radial incisions is typical, though in some other species this sculpture occupies the space between coarser ribs. The internal palatal lamella and the corresponding external depression end at the same point; in many other species the lamella extends further on the inner parietal wall than the external furrow.

Etymology.— This species is named after Dr A.C. (Dolf) van Bruggen, recognized authority on the family Streptaxidae and other sub-Saharan African molluscs.

Parrennea circumcisa (Morelet, 1885) (figs 5-6)

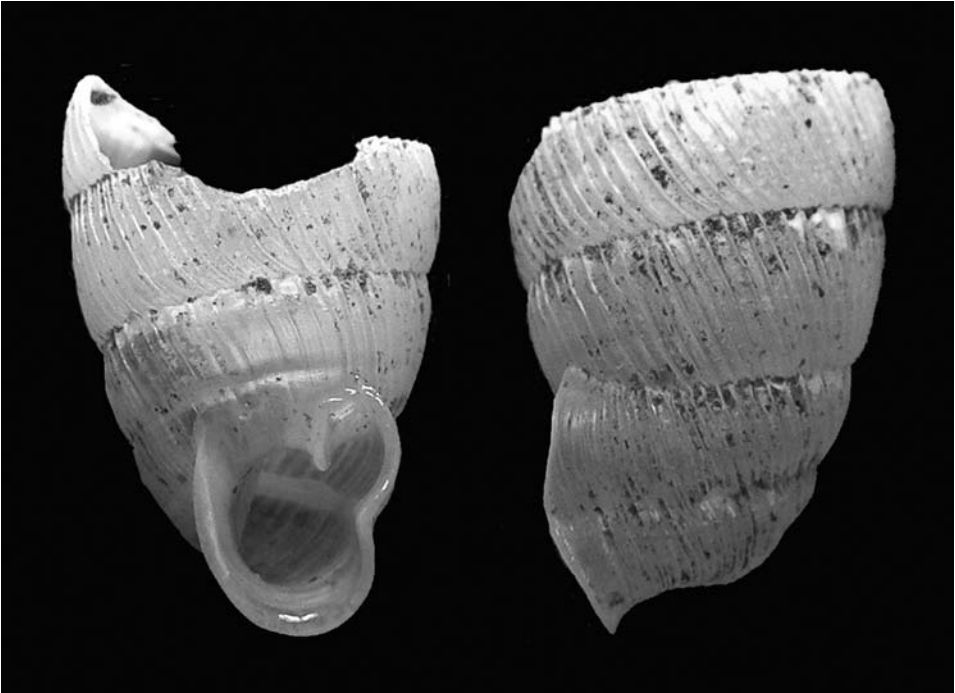
Material.— 1 damaged adult shell, 1 juv. shell (RMNH): Gabon, Prov. Ngounié, forest near entrance of Bongolo caves; $2^{\circ}14.3'S$ $11^{\circ}27.8'E$, alt. 130 m; in leaf-litter; 10.xi.1994; J.J. Wieringa leg.

Remarks.— The damaged adult shell agrees well with Van Bruggen's (1989: 26, figs 23-24) description and illustration of the holotype, even though the linear distance between the Gabonese locality and the locus typicus in Cabinda is about 400 km. The adult specimen has a deep, narrow but open umbilicus. The juvenile shell ($H = 2.5$ mm, $D = 3.0$ mm, $W = 4$) has a quadrangular, edentate aperture and an open, round umbilicus that takes up 14% of the shell width. Embryonic shell with $1\frac{3}{4}$ whorls, well demarcated from later whorls by a sudden change in coarseness of the axial ribbing. First $\frac{1}{2}$ whorl eroded, remainder of protoconch with fine axial striae, crossed by fine spiral lines. First neanic whorls with fine, close-set radial ribs that gradually become more distant and prominent on later whorls.

Parrennea sulcifera (Morelet, 1884*) (figs 7-8)

Material.— (all Cameronian specimens collected by A.J. de Winter & E.-J. Semengue in the Sud province) Nyangong, swamp forest, $2^{\circ}56.9'N$ $10^{\circ}45.3'E$, alt. 600 m, 14.iv.1996 [Sta. CAM086] (RMNH, 1 ad., 1 juv.). Nyangong, old secondary forest on W-facing slope, $2^{\circ}57.8'N$ $10^{\circ}45.1'E$, alt. 640 m, 7.v.1996 [Sta. CAM097] (RMNH/1 adult shell). Nyangong, primary high forest, $2^{\circ}56.6'N$ $10^{\circ}43.9'E$, alt. 675 m [Sta. CAM099] (RMNH/1 juv.). Meka'a-II, W of Nyangong, undisturbed high forest, $2^{\circ}58'N$ $10^{\circ}44'E$, alt. 950 m, 17.v.1996 [Sta. CAM107] (RMNH/1 ad.). Meka'a-II, W of Nyangong, undisturbed forest on steep N-facing slope with large boulders, $2^{\circ}57.7'N$ $10^{\circ}43.8'E$, alt. 790 m, 18.v.1996 [Sta. CAM109] (RMNH/1 ad.). Gabon, Prov. Ogooué-Ivindo, Forêt des Abeilles, $0^{\circ}37.24'S$ $12^{\circ}48.01'E$, alt. 209 m, B. Fontaine & O. Gargominy leg. 20.vii.2000 (MNHN/1). Gabon, Prov. Ogooué-Lolo, relict forest on calcareous soil near entrance of Paouen Cave; $0^{\circ}48.56'S$ $12^{\circ}45.82'E$, alt. 283 m, B. Fontaine & O. Gargominy leg. 3.vii.2000 (MNHN/1 ad., 3 damaged shells). Gabon, Prov. Haut-Ogooué, Franceville, secondary vegetation, between roots of *Uapaca*; $1.6158^{\circ}S$ $13.58553^{\circ}E$, alt. 320 m, B. Fontaine leg. 15.v.2001 (MNHN/1 ad.).

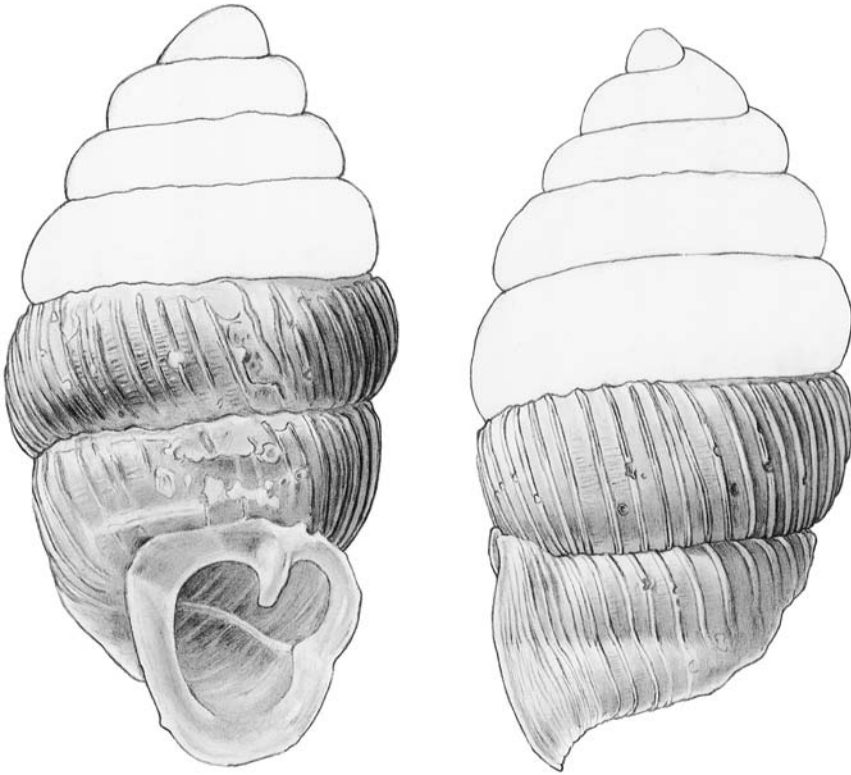
* According to Fisher-Piette (1937), the species was published in 1884 instead of 1883, as has so far generally been accepted (Adam & Van Goethem, 1978; Van Bruggen, 1989).



Figs 5-6. *Parennea circumcisa* (Morelet, 1885), different views of damaged shell from Gabon, Prov. of Ngounié (RMNH). Maximum shell width 4.0 mm.

Remarks.— This species was previously reported from few localities that embrace a huge area in West and Central Africa: Liberia (Degner, 1934b), Cabinda, NE Angola and Uganda (Van Bruggen, 1989). Degner's record from Liberia (which was not mentioned in the two *Parennea* revisions) constitutes a misidentification; the illustrated shells are larger and differ considerably from the holotype of *P. sulcifera* by their elongate shape and rounded apex. Degner's Liberian material represents an additional, possibly undescribed, species.

Specimens from Cameroon agree reasonably well with the description and drawing of the holotype shell by Van Bruggen (1989: 24, figs 21-22), but they differ in some aspects both from the type and from the shell reported from Cuango (NE Angola) by Van Bruggen (1989, specimen in RMNH). The Uganda specimen could not be examined. The Cameroon shells are relatively more tightly coiled than the holotype, the crenulation at the suture seems weaker, and the umbilicus is closed. The umbilicus of the Cuango specimen (in RMNH) is open, as seems to be more or less the case in the holotype ("T. superficialiter rimata"; Morelet, 1884). The palatal lamella in the Cameroon material is longer (extends somewhat further on the parietal wall, as seen by transparency) than in the single Cuango specimen; in the drawing of the holotype this character is not visible. The specimens from Cameroon are fairly uniform. The specimens from Gabon all have an open umbilicus, and the palatal lamella seems shorter. Specimens from the Gabonese locality differ from each other in shape of shell and aperture, and in the development of the palatal tooth. Fontaine et al. (2007) referred to these as different species [as *Parennea* (*P.*) sp. 2, *P.* sp. 3 and *P.* sp. 4, respectively]. The conchological differences between populations are subtle, however.



Figs 7-8. *Parennea sulcifera* (Morelet, 1884), different views of shell from Cameroon, Sud province, Nyangong (RMNH). Actual shell height 4.8 mm. Drawing by Erik-Jan Bosch.

Confirmation of the preliminary conclusion that all material discussed here belongs to a single species, requires evaluation of shell characters of a much larger material, preferably in conjunction with anatomical and molecular studies.

Parennea species with an acuminate apex, like *P. aequatoriale* (Pilsbry, 1919), *P. splendens* (Adam & Van Goethem, 1978), *P. stuhlmanni* (Von Martens, 1892), *P. subaequatoriale* (Adam & Van Goethem, 1978) and *P. sulcifera*, have a similar shape and sculpture, and one could consider these part of a taxon independent from other species attributed to *Parennea*.

Ecology.— In Cameroon the species appears to be very local, and was only found at 5 nearby localities (out of >130 localities sampled in southwest Cameroon by the same methods) in a hilly area around Nyangong between 600 and 950 m a.s.l.; here specimens were collected among leaf-litter on the forest floor (sympatric with *P. vanbruggeni* nov. spec.) as well as in the understory vegetation in undisturbed rainforest. In Gabon the species was collected at lower altitudes (200-320 m. a.s.l.).

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