

Living in isolation: *Plekocheilus (P.) philippei* spec. nov. from Venezuelan Guayana (Gastropoda, Amphibulimidae)

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Plekocheilus (P.) philippei spec. nov. is described from an isolated mountain top in Venezuelan Guayana. Anatomical details are presented and the relationships with other *Plekocheilus* species from the area are discussed.

Key words: Gastropoda, Stylommatophora, Orthalicoidea, Amphibulimidae, *Plekocheilus*, taxonomy, Venezuela, Pantepui.

INTRODUCTION

In a recent overview of orthalicoid snails from the table mountains ('tepui') in Venezuelan Guayana (also known as Pantepui), Breure (2009) listed 11 species, five of which were described as new to science. Later on, Breure & Schlögl (2010) described two additional *Plekocheilus* species from the Chimantá massif. This massif is formed by a series of tepuis in the eastern part of the Guayana Highlands (Fig. 1). Angasima-tepui is a small tepui to the south of the Chimantá massif, only eight kilometers separated by the Río Apurarán valley from the southern section of the massif. The isolated,

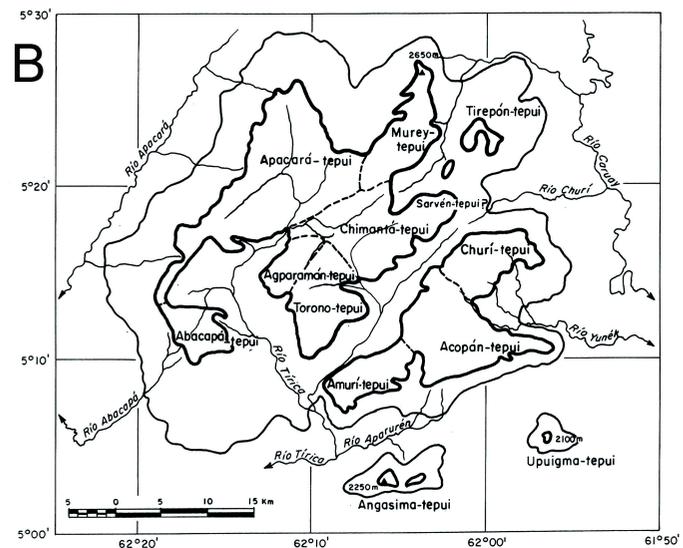
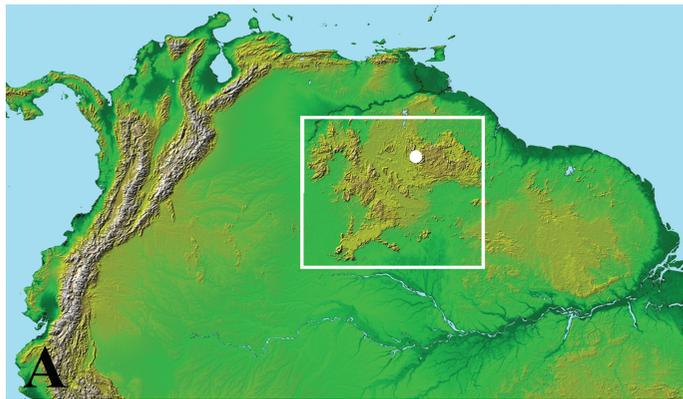
windswept summit of Angasima-tepui reaches an elevation of 2250 m, and consists of a northern high plain covered by low herbaceous vegetation and a southern peak with dense tepui scrub (Huber, 1995).

During a recent visit to the Chimantá massif and surrounding area, Philippe Kok (Free University, Brussels) collected interesting material, part of which proved to represent a new species. In the present paper this taxon is described with details of the shell, anatomy and ecology.

METHODS

Measurements have been taken as described by Breure (1974: fig. 2). Drawings were made with a WILD M-5 stereomicroscope with drawing device.

The following abbreviations are used throughout the text and figures: AG, albumen gland; BC, bursa copulatrix; BCD, bursa copulatrix duct; D, diameter of shell; EP, epiphallus; FL, flagellum; H, shell height; HA, height of aperture; LW, height of last whorl; M, mantle; N, nephridium; n, number of specimens; P, penis; PC, pericard; PD, distal part of penis; PN, pneumostome; PP, proximal part of penis; PV, pulmo-



nary vein; R, rectum; SOV, spermoviduct; U1, adrenal ureter; U2, adrectal ureter; V, vagina; W, number of whorls.

The material has been deposited in the Royal Belgian Institute of Natural Sciences, Brussels (RBINS) and the Mollusca collection of the Naturalis Biodiversity Center, Leiden (RMNH), respectively.

SYSTEMATICS

Superfamily Orthalicoidea Martens, in Albers, 1860

Family Amphibulimidae P. Fischer, 1873

Plekocheilus Guilding, 1828

Type species (by monotypy): *Caprella undulata* (Leach, 1814)

= *Voluta aurissileni* Born, 1780.

Plekocheilus (P.) philippeii spec. nov. (Figs 2–4)

Type material. — Holotype RBINS/MT2576. Paratypes RBINS/MT2577–8, two specimens (one subadult); RMNH 172353, one specimen. All material from Venezuela, Edo. Bolívar, Angasima-tepui (N 5°02'35" W 62°04'51"), 2121 m, P.J.R. Kok leg., v.2011.

Diagnosis. — A moderately large species of *Plekocheilus* s.str. (H up to 39.3 mm), characterized by a uniform yellowish to dark olive-brown colour, with axial, undulating, reddish brown streaks, with spaces approximately two to four times the width of the streaks, a fine malleation on the last whorl and a weak columellar fold entering the aperture.

Description. — Shell up to 39.3 mm high, 1.84 times as long as wide, imperforate, ovate, sides of spire straight, moderately solid. Colour yellowish- to dark olive-brown, with

Fig. 1. A, Map of northern South America, showing Venezuelan Guayana (white rectangle) and Angasima-tepui (white dot). B, Map of Chimantá massif and surroundings, showing location of Angasima-tepui (after Huber, 1995). C, Aerial view of Churí-tepui and surroundings from the North-east; the locality on Angasima-tepui indicated by an arrow (photo: C. Brewer-Carias).

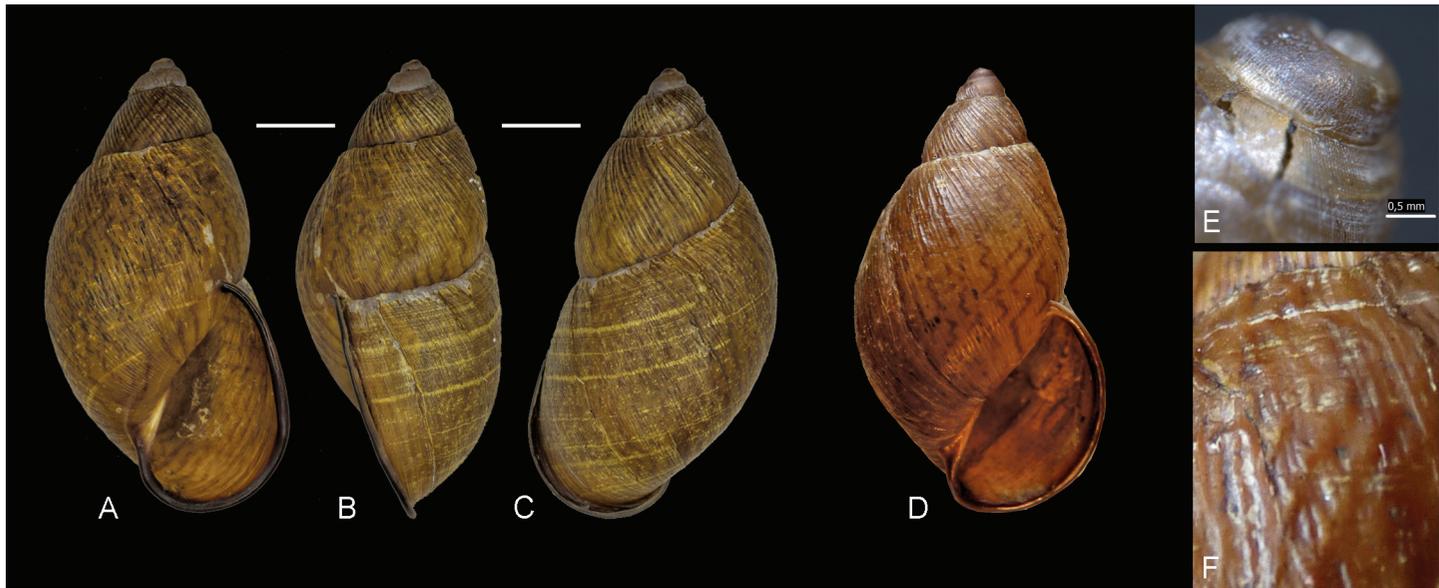


Fig. 2. Shells of *Plekocheilus (P.) philippeii* spec. nov. A-C, holotype RBINS/MT2576. D, paratype RMNH 172353. E, protoconch sculpture (paratype RBINS/MT2578). F, sculpture on dorsal side of last whorl (paratype RMNH 172353).

axial, undulating, reddish brown streaks, with spaces approximately two to four times the width of the streaks; upper whorls may be denuded of peristome. Surface somewhat shining, with closely set ribs on the upper whorls, becoming (finely) malleated on the last whorl. Protoconch with fine, anastomosing wrinkles on the upper part, becoming axial riblets on the lower part (Fig. 2E); near the transition to the teleoconch the protoconch is sculptured with dense axial riblets. Whorls 4.9, flat, the last whorl slightly swollen; suture impressed; slightly descending in front. Aperture elongate-ovate, somewhat pointed above, the attachment of the lip right-angled to the last whorl; brownish inside; 1.72 times longer than wide, 0.5 times the total length; peristome thickened and strongly reflexed, dark brown. Columellar margin curved, with a weak, slightly curved fold above, entering the aperture. Parietal wall without callus.

Dimensions. See Table 1.

Genitalia (Fig. 3A-B). — Penis subcylindrical, slightly curved on the transition of the distal to the proximal part of the penis; distal part with longitudinal folds, proximal part

with spongy tissue. Epiphallus slightly more slender than penis, external transition to epiphallus gradually, with contortions; internally with longitudinal folds. Flagellum ca. 1/3 total length of penial complex, narrowly subcylindrical, and tapering towards the end, where a very short retractor muscle is attached to the diaphragma; internally with longitudinal folds. Vas deferens loosely attached to penial complex, rather broad. Vagina short; spermathecal duct subcylindrical, tapering towards the end, where an elongate spermatheca is present. In the specimen examined, the albumen

	H	D	HA	WA	LW	W
Holotype	39.3	20.5	19.2	10.8	31.4	4.9
Paratype RBINS	38.1	22.2	19.6	11.8	31.7	4.7
Paratype RMNH	39.3	20.9	19.7	11.5	32.0	5.0

Table 1. Measurements of *Plekocheilus (P.) philippeii* spec. nov. H, shell height; D, shell diameter; HA, aperture height; WA, aperture width; LW, height of last whorl; W, number of whorls.

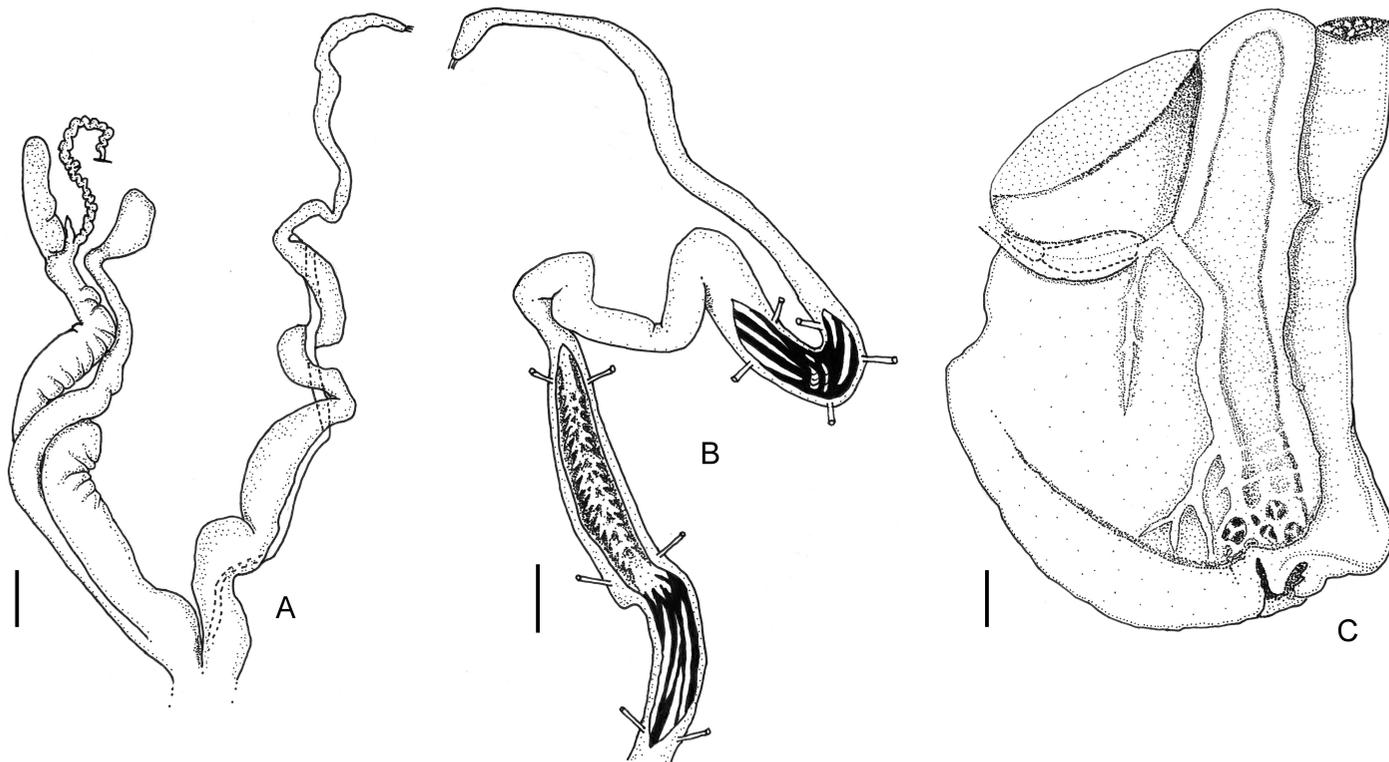


Fig. 3. *Plekocheilus (P.) philippe* spec. nov. A, Genitalia. B, Idem, schematic longitudinal section of penial complex. C, Palleal organs. Scale line equals 5 mm.

gland was reduced.

Palleal organs (Fig. 3C). — Kidney broadly triangular and short, extending ca. 1/4 the pulmonary roof length, partly overlapping the laterally disposed pericard. Secondary urether closed. Pulmonary vein becoming strongly ramified towards the mantle edge; a single vein branching off near the pericard, extending half the pulmonary roof length.

Exterior of animal. — Living snails (Fig. 4A-B) greyish, with three blackish, longitudinal stripes on the head, one median and two on the sides; a darker rim along the foot; tentacles dark grey.

Ecology. — The snails were found in a dwarf forest of *Bonnetia roraimae*, with many *Brocchinia hechtioides* growing on the ground (Fig. 4C). During the day the snails were found aestivating inside the bromeliads.

Comparison with other taxa. — This species differs from *Plekocheilus (P.) vlceki* Breure & Schlögl, 2010, by (1) being larger (H 39.3 vs. 30.9 mm); (2) having the sides of the spire straight; (3) the lack of spiral lines in the sculpture of the last whorl. From *P. (P.) alticola* Haas, 1955 this new taxon differs by (1) having the suture not descending in front; (2) being smaller (H 39.3 vs. 44.3 mm); (3) the slightly less strong sculpture on the last whorl.

Remarks. — All adult specimens show on the last whorl one or more small, yellowish or whitish spiral bands, which are denude of the peristome. These bands all start at an axial

Fig. 4. A-B, Living specimens of *Plekocheilus (P.) philippe* spec. nov. C, Habitat where the snails were found (All photos: P.J.R. Kok).



growth line, and may be the result of either an irregularity in growth or attempts of predation. One of the paratypes has the suture ascending behind the reflexed peristome. Unlike the specimens of *Plekocheilus (P.) vlceki* and *P. (Eurytus) breweri* Breure & Schlägl, 2010, the specimens of this new taxon show no sign of erosion at the upper whorls, although the protoconchs are worn. Only in the subadult paratype the protoconch is somewhat preserved (Fig. 2E).

Etymology. — Named in honour of the collector, Philippe J.R. Kok (Brussels).

DISCUSSION

Plekocheilus (P.) philippei spec. nov. closely resembles two species inhabiting neighbouring tepuis, viz. *P. (P.) alticola* and *P. (P.) vlceki*, both occurring on the Chimantá massif. Although the distances are not great (as the crow flies), the lowland of the Río Aparurén valley separates Angasima-tepui from the Chimantá massif (Fig. 1B). With the exception of two *Plekocheilus* species which are widespread on this massif — *P. (Eurytus) mundiperditi* Haas, 1955, which has also been reported from nearby tepuis outside the Chimantá massif (Breure, 2009), and *P. (E.) juliani* Haas, 1955 — all species of this genus seem to be very range restricted. As Breure (2009) has pointed out, the tepuis may be seen as ecological “islands in the air”. So far, each tepui in the eastern Guayana Highlands which has been malacologically explored yielded a new species. Additional new taxa may be expected when other te-

puis, hitherto not explored for their snail fauna, are visited. This may especially be the case in the western part of the Pantepui area (Edo. Amazonas), which is less accessible.

ACKNOWLEDGEMENTS

The author is highly indebted to Philippe J.R. Kok for extending his herpetological skills to collecting land snails during field work in Venezuela, making this material available for study, and supplying information and photographs. C. Brewer-Carias kindly provided an aerial photograph of the area. I am grateful to A.J. de Winter for assistance with a photograph of the protoconch.

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