

**CURTIA AYANGANNAE,
A NEW SPECIES OF GENTIANACEAE
FROM THE PAKARAIMA MOUNTAINS, GUYANA**

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SUMMARY

A new species of *Curtia* (Gentianaceae: Saccifolieae), *C. ayangannae* L. Cobb & Jans.-Jac., from Mt Ayanganna, Guyana, is described and illustrated. The relationship between the genera *Curtia*, *Tapeinostemon*, and *Saccifolium* is discussed.

Key words: Gentianaceae, *Curtia*, Pakaraima Mountains, Guyana, South America, taxonomy.

INTRODUCTION

A taxonomic treatment of the Guianan Gentianaceae is currently being conducted by an international group of botanists for inclusion in the Flora of the Guianas. While working on the genus *Curtia* Cham. & Schltdl. and related genera, the authors came across two collections that were clearly different from the already described species with regard to macromorphological characteristics. The growth habit, strongly ridged internodes, stem/branch colour, leaf characteristics, and floral shape and colour distinguished these collections from the other species (Fig. 1). An earlier study at the micromorphological level (Bouman et al., 2002) showed that the seeds also differ from the rest: they are much larger in size (at least 3–4 times), are laterally flattened, and have extended micropylar and chalazal ends. It was evident, therefore, that these two collections comprised a new species. One problem that did arise, however, was the genus – does the new species belong to *Curtia* or to one of the related genera, *Tapeinostemon* Benth. or *Saccifolium* Maguire & Pires? Not only do the specimens share some characteristics with each genus separately (Maguire & Pires, 1978; Grothe, 1981; Maguire, 1981; Simonis, 1984; Struwe et al., 1999, 2002), but they also have characteristics that are found in two or even all three genera (Table 1). As noted below, the pollen of this species fits in both *Curtia* and *Tapeinostemon* (Fig. 2).

Using the data at our disposal, the specimens seem to fit best in the genus *Curtia*. They have, among other things, the same kind of inflorescence (although dense), calycine colleters (absent in *Tapeinostemon*), no obvious connective (present in both *Tapeinostemon* and *Saccifolium*), no appendages present on the anthers/filaments (present in

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Table 1. Distinctive characteristics of *Tapeinostemon*, *Curtia*, and *Saccifolium*. Terms between parentheses pertain to *Curtia ayangannae* L. Cobb & Jans.-Jac.

	<i>Tapeinostemon</i>	<i>Curtia</i>	<i>Saccifolium</i>
Stem winged/ridged	no	yes	yes
Leaves arrangement	along stem	along stem (or clustered at tip)	crowded at tip
Leaf margin	flat	flat (or revolute)	saccate
Leaf venation above	flattened or prominent	inconspicuous (or impressed)	flattened
Inflorescence	paniculate	paniculate	solitary, leaf axil
Calycine colleters (yes/no)	no	yes	yes
Stamen insertion in tube	middle of corolla tube	various	near base
Connective	prominent	inconspicuous or prominent	prominent
Anther appendage	present	present or absent	present
Style	gradually tapering	tapering or distinct	distinct
Altitude	100–2200 m	50–1600(–2040) m	2700–3000 m

Tapeinostemon and *Saccifolium*), and the same leaf shape (suborbicular leaves: *C. obtusifolia* and *C. rotundifolia* have rotund/obtuse leaves). The specimens also share some characteristics with *Tapeinostemon*. They are woody (shrub-like; *Curtia* species are annuals), grow in the same habitats (tepui), and have corolla lobes that are shorter than the corolla tube, a prominent leaf venation, and a filament insertion in the middle of the corolla tube (this is variable in *Curtia*). Some of the species of both *Curtia* and *Tapeinostemon* are heterostylous, as is the monospecific genus *Saccifolium* (Maguire & Pires, 1978; Grothe, 1981; Simonis, 1984; Struwe et al., 2002; Struwe, 2006). Because of the small number of specimens available, it is unknown whether this new species is also heterostylous. The main characteristics the two collections share with the genus *Saccifolium* are probably caused by adaptation to their habitat. The specimens were collected on Mt Ayanganna at altitudes between 1800 and 2040 m. They were found growing in depressions (tepuí bogs) on sandstone together with *Bonnetia*, *Brocchinia*, *Clusia*, Eriocaulaceae, *Podocarpus*, Rapateaceae, and Xyridaceae. Like *Saccifolium*, they have a thick corky bark and leathery leaves with strongly revolute margins (saccate in *Saccifolium*) that are crowded at the branch apices. The wings/ridges on each internode, however, are very characteristic: they pair off decussately, with each pair forming a ‘cushion’ at the top of the internode from which the petiole arises. The wings/ridges of each pair then taper towards each other and sometimes fuse at the base.

Because of their overlapping characteristics, the genera *Curtia* and *Tapeinostemon* are difficult, if not impossible, to key out in the field. The authors feel, therefore, that a thorough study of the two genera is necessary. Not only should more specimens be collected and wood and leaf samples (including this new species) investigated, but studies at the molecular level need to be performed. Perhaps these two genera should be combined into one genus. If so, the genus would retain the oldest name, *Curtia*.

Curtia ayangannae L. Cobb & Jans.-Jac., *spec. nov.* — Fig. 1, 2

Frutex cortice argenteo refringente in nodis, ramulis atropurpureis, foliis demum confertis in apice ramulorum suborbicularibus marginibus revolutis; flores in paniculis densis, calyce atropurpureo lobis basi 1/5–1/4 connatis, partibus liberis persistentibus stellam simulantis, corolla urceolata vel campanulata atropurpurea vel aurantiaca. — Typus: *B. Hoffman & T. Henkel 3222* (holo U; iso NY, US), Guyana, Cuyuni-Mazaruni, Pakaraima Mts, 2 km transect along summit ridge of Mt Ayanganna (05° 23' N, 59° 59' W), 3 November 1992.

Shrub, 0.25–0.5 m tall with silvery, corky bark, woody at base, branched. *Branches* to 0.6 cm diam., semiterete, dark purple, rigidly 4-winged (wing-like where leaves are still attached, more ridge-like where leaves have fallen off), pairs of wings/ridges each form a horizontal ridge at the top of each internode from which the petiole grows and taper towards each other sometimes fusing at the base of each internode. *Internodes* 2–10 mm long, shorter at base, stem/branches appear segmented because of the break in the bark at each node. *Leaves* decussate, originally arranged along stem, clustered towards tip of branches at maturity; petioles 0.1–0.5 cm long, flattened, arising from top of ridge; blades subcoriaceous, suborbicular, (0.7–)1–1.5 by (0.5–)0.8–1.2 cm, longer than internode, margin revolute, apex obtuse, base obtuse to acute, attenuate, tripliveined, veins very distinct, impressed above, prominent beneath, continuing into petiole. *Inflorescence* dense panicles, terminal and in upper leaf axils, 1–3 cm long including 0.3–0.6 cm long peduncle; bracts and bracteoles linear, 1–2(–5) mm long (basal bracts often leaf-like, to 5 by 2 mm); pedicels (0.8–)1–2(–4) mm long. *Flowers* actinomorphic, 5-merous, calyx dark purple, 1.5–2.5 mm long, lobes narrowly triangular, c. 1.6 by 0.6 mm, somewhat scarious, apex acute, connate 1/5–1/4 from base, small glands (colleters) at base on inside; corolla urceolate/campanulate, dark purple to orange, 3.5–4 mm long, tube 2.6–3 mm long (longer than calyx lobes), lobes broadly ovate, c. 1 by 0.8–1.2 mm, papillose, apex acute, sometimes somewhat recurved at maturity, connate c. 3/4 from base; stamens c. 1.5 mm long, filament c. 1 mm long, straight, equal in length, inserted ± halfway from tube base, anthers broadly ellipsoid after anthesis, c. 0.5 mm long, pollen in monads, oblate spheroidal, 3-colporate; gynoecium c. 2.5 mm long, ovary narrowly ovoid, 1.8–2 mm long, gradually tapering into short style, style c. 0.5 mm long, stigma capitate. *Fruit* blue-black, narrowly ovoid-ellipsoid (capsule halves incurved after dehiscence giving the capsule a subspherical appearance), 5–6 by 2 mm, including c. 0.5 mm long persistent style, calyx persistent (star-like). *Seeds* irregular in shape, narrowly ellipsoid, laterally flattened, 1.5–2 by 0.5 mm.

Distribution — Guyana, Pakaraima Mts, Mt Ayanganna.

Habitat & Ecology — In low sclerophyllous community in depressions on organic soils on sandstone/in tepui bogs on sandstone (together with *Bonnetia*, *Brocchinia*, *Clusia*, Eriocaulaceae, *Podocarpus*, Rapateaceae, and Xyridaceae). At elevations between 1800 and 2040 m.

Phenology — Flowering: November; fruiting: June and November.

Etymology — The specific epithet is derived from the only known collection site, Mt Ayanganna (NW Guyana).

Additional specimen examined:

H.D. Clarke et al. 9470 (U, US), Guyana, Potaro-Siparuni Region, Mt Ayanganna, camp on summit plateau (05° 23' 18" N, 59° 59' 08" W), 23 June 2001.

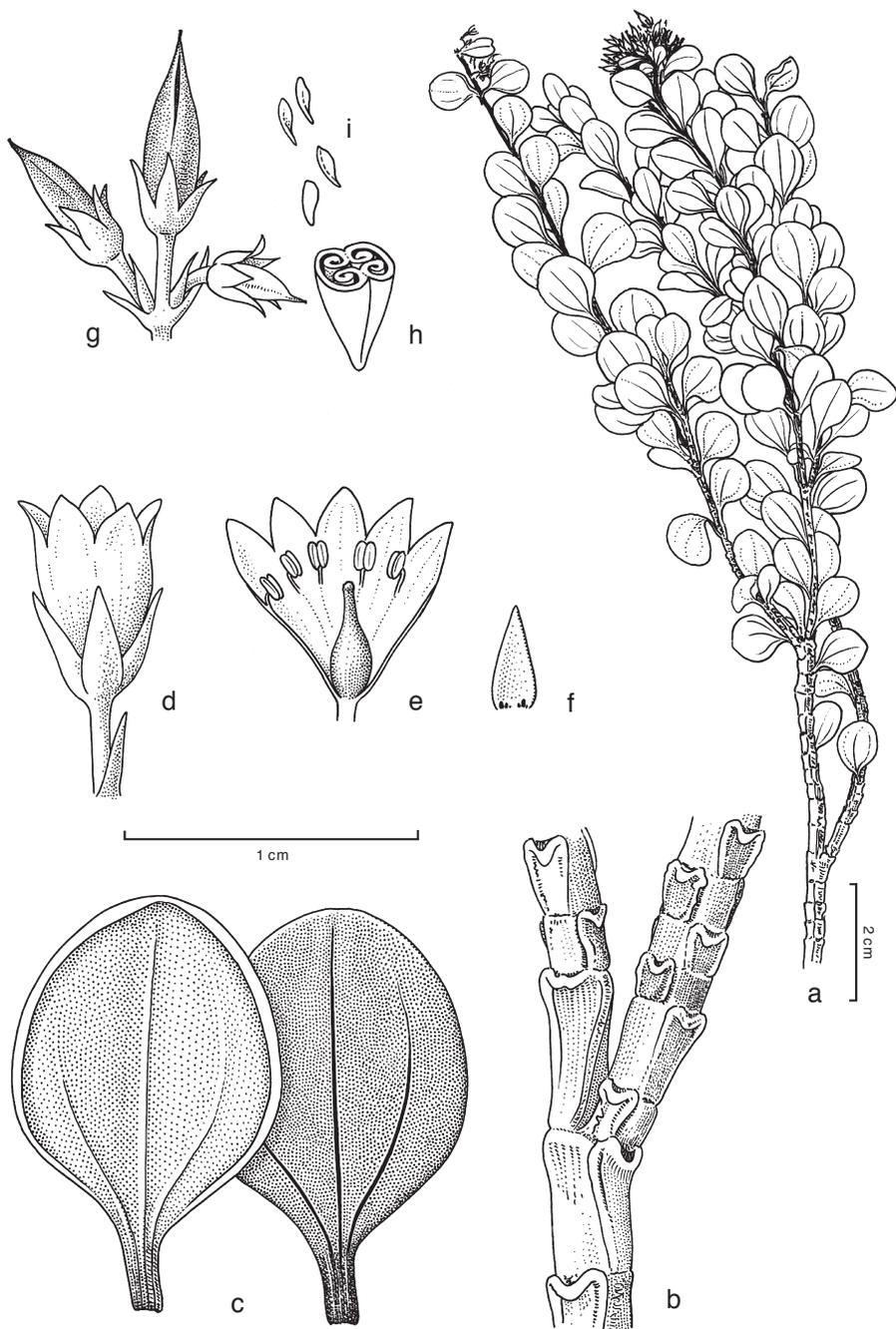


Fig. 1. *Curtia ayangannae* L. Cobb & Jans.-Jac. a. Habitus; b. detail of branch, leaf base, and tapering ridges; c. detail of leaf, note revolute margin; d. flower + bracteole; e. flower – internal characteristics; f. calyx lobe with colleters at the base on the abaxial side; g. capsule + persistent calyx; h. cross section capsule; i. seed (a–f: Hoffman & Henkel 3222; g–i: Clarke et al. 9470).

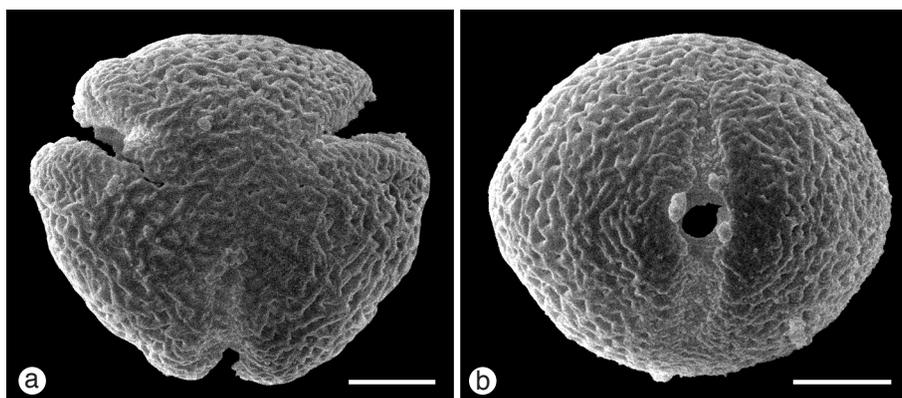


Fig. 2. Scanning electron micrographs of the pollen of *Curtia ayangannae* L. Cobb & Jans.-Jac. a. Polar view; b. equatorial view. Bar = 5 μm (all: *Hoffman & Henkel 3222*).

POLLEN

Pollen grains isopolar monads, oblate spheroidal. Amb subcircular. $P = 22.7 \mu\text{m}$, $E = 23.3 \mu\text{m}$, $P/E = 0.97$. Aperture system 3-colporate. Ectoapertures long colpi with \pm acute ends. Endoapertures \pm circular, costate pori of 3–4 μm , often at one side with a small triangular extension through the costa. Exine c. 1.5 μm thick. Sexine thinner than nexine; infratectum distinct, columellate. Ornamentation perforate-reticulate to indistinctly rugulate; lumina irregular in shape, up to 1.5 μm , relatively small along the colpi; muri up to 1.5 μm wide.

Material

Hoffman & Henkel 3222.

Methods

Acetolysed pollen studied with LM and SEM.

Comment

The pollen of *Hoffman & Henkel 3222* fits in *Curtia* as well as in *Tapeinostemon*. Both genera have rather diverse pollen, especially with regard to the exine surface. *Curtia* pollen is perforate/scabrate or perforate-reticulate to rugulate, while *Tapeinostemon* pollen is perforate to reticulate, sometimes indistinctly rugulate (Maguire, 1981, and own observations). Remarkably, the pollen of *Tapeinostemon spenneroides* shows perforate and reticulate ornamentation (Maguire, 1981) as well as rugulate ornamentation (own observation). Therefore, pollen morphology should be included in a comprehensive treatment of both genera (see also Maguire, 1981: 351).

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