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Decorsella arborea, a second species in *Decorsella* (Violaceae), and *Decorsella* versus *Rinorea*

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Abstract: A new species of *Violaceae*, *Decorsella arborea* Jongkind, is described and illustrated. The new species differs from the only other species in the genus, *D. paradoxa* A. Chev., by the larger size of the plants, smaller leaves, more slender flowers, and stamen filaments that are free for a much larger part. Both species are from the Guineo-Congolian forest of tropical Africa. The differences between *Decorsella* and *Rinorea* are discussed. Confirming recent reports, some species of *Rinorea* can have zygomorphic flowers and some of these can be almost equal in shape to *Decorsella* flowers.

Key words: *Violaceae*, *Decorsella*, *Rinorea*, Africa, tropical forest

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Introduction

The genus *Decorsella* A. Chev. (*Violaceae*) is restricted to the Guineo-Congolian region in tropical Africa and was, until now, represented only by *D. paradoxa* A. Chev. When flowering, *Decorsella* at first sight resembles *Rinorea* Aubl., a genus with many species in the Guineo-Congolian forests, because several *Rinorea* species have almost similar zygomorphic flowers. However, the fruit of *Decorsella* is not a capsule as in *Rinorea*. Instead, the ovary of *Decorsella* dehisces shortly after fertilization, with each seed developing a fleshy testa and resembling an orange berry at maturity (Fig. 1). Keay (1953: 75–77) tried to capture this character in the genus name *Gymnorinorea* Keay, a name that became a synonym of the earlier-published *Decorsella*. According to Ballard & al. (2014: 304), the ovary wall of *Decorsella* disintegrates shortly after fertilization, leaving the placental traces behind. The status of *Decorsella*

as a distinct genus was recently confirmed when many genera and species in the *Violaceae* worldwide were compared in molecular phylogenetic studies (Tokuoka 2008; Wahlert & al. 2014).

At first, *Decorsella paradoxa* was known only from Liberia, Ivory Coast and Ghana (Keay 1953: 76). Later, a comparatively small number of plants from Lower Guinea (sensu White 1979) were also identified as belonging to this species (Sosef & al. 2006). While these Upper and Lower Guinean plants all undoubtedly represent *Decorsella*, there are also conspicuous differences between them. The Lower Guinean plants are larger, the flowers are more slender, the sepals are smaller, also compared to the petals, and the free part of the stamen filament is longer (Table 1, Fig. 2). In this publication, these differences are illustrated and the plants from Lower Guinea are described as *D. arborea* Jongkind, sp. nov. After this, *D. paradoxa* will again be endemic to Upper Guinea (sensu White 1979).

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Material and methods

The comparison of the two *Decorsella* species was based on dried and pickled herbarium specimens kept at the BR, P and WAG herbaria (herbarium codes according to Thiers 2017+). *Decorsella paradoxa* was studied and collected by the author in the forest in Liberia.

Results and Discussion

Decorsella versus *Rinorea*

When flowering it is difficult to separate *Decorsella* from *Rinorea*. In several earlier publications all *Rinorea* species are said to have actinomorphic flowers (Munzinger & Ballard 2003: 346, 350; Tokuoka 2008: 258). Most illustrations and photographs from *Rinorea* indeed show more or less actinomorphic flowers. This character would make it easy to separate this genus from the zygomorphic-flowered *Decorsella*. However, more recent reports have documented a zygomorphic corolla in the Latin American *Rinorea zygomorpha* H. E. Ballard & Wahlert (Wahlert & Ballard 2009) and also in a few African species of *Rinorea* (Wahlert & Ballard 2012). The zygomorphic corollas of *R. longicuspis* Engl. and of *R. gabonensis* Engl. (Fig. 4 & 5) also show without doubt that *Rinorea* flowers can in some species be conspicuously zygomorphic and, in the case of *R. longicuspis*, almost equal to *Decorsella*. With its diadelphous stamens, *R. calcicola* Velzen & Wieringa shows that the androecium in certain species of *Rinorea* can also be zygomorphic (van Velzen & Wieringa 2014). *Decorsella* still differs in flower bud from all African *Rinorea* species in the shape of the anterior petal. While in the bud stage, the anterior petal in *Decorsella* is hooded at the apex and covers the tips of the other petals. However, this character is shared by the Latin American *R. zygomorpha* (Ballard, pers. comm.). The number of ovules in *Decorsella* is much larger than in *Rinorea*, especially compared to *Rinorea* from Africa. African *Rinorea* species have, as far as known, 3 or 6 ovules per ovary (Wahlert & Ballard 2012; van Velzen & al. 2015).

Decorsella arborea Jongkind, **sp. nov.** – Fig. 2A–N.
Holotype: Gabon, Ngounié, Missionary Station at Mouya-



Fig. 1. *Decorsella paradoxa* showing berry-like seeds from two fruits. – Photographed by Carel Jongkind in Liberia from Jongkind & al. 11998.

nama, waterfall above the Missionary station, 610 m, fl., 9 Feb 1983, *de Wilde, Arends, Louis, Karper & Bouman* 469 (WAG + in alcohol!; isotypes: AAU, BR!, C, K!, LBV, MA, MO, P!, PRE, SRGH).

Diagnosis — *Decorsella arborea* differs from *D. paradoxa* by its larger size, smaller leaves and more slender flowers with smaller sepals and with a longer free part of the stamen filaments (Table 1).

Description — *Large shrub or tree* (5–)12–25 m tall; *trunk* to 30 cm in diam.; *twigs* smooth, glabrous. *Leaves* alternate; *stipules* early caducous; *petiole* 6–9 mm long, channelled adaxially; *leaf blade* elliptic, 8–17 × 3–6 cm, smooth, glabrous, base cuneate, margin bearing lignified teeth, apex acuminate; midrib prominent on both surfaces; lateral veins in 4–10 pairs. *Inflorescence* axillary, thyrsoid, to 3 cm long, glabrous, with up to 17 flowers; *bracts* ovate, c. 1 mm long. *Flowers* yellow and reddish; *pedicel* above joint 3–7 mm long. *Sepals* 5, orbicular to ovate, concave, c. 3 mm in diam., glabrous. *Corolla* zygomorphic, glabrous; 2 upper and 2 lateral petals c. 10 × 2.5 mm, lower (anterior) petal c. 12 × 2.5–4 mm, widening distally and emarginate at apex, in bud apex of lower petal covers apexes of other petals. *Stamens* 5; staminal tube undulate, with a few small trichomes on edge; *fila-*

Table 1. Morphological differences between *Decorsella arborea* and *D. paradoxa*.

	Plant height	Leaf blade dimensions	Sepals diameter	Lateral petals dimensions	Stamens
<i>Decorsella arborea</i>	(5–)12–25 m	8–17 × 3–6 cm	c. 3 mm	c. 10 × 2 mm	free part of filaments c. 1.5 mm long
<i>Decorsella paradoxa</i>	1.5–6 m	11–23 × 3–8.5 cm	c. 5 mm	c. 10 × 3.5–4 mm	anthers almost sessile on staminal tube

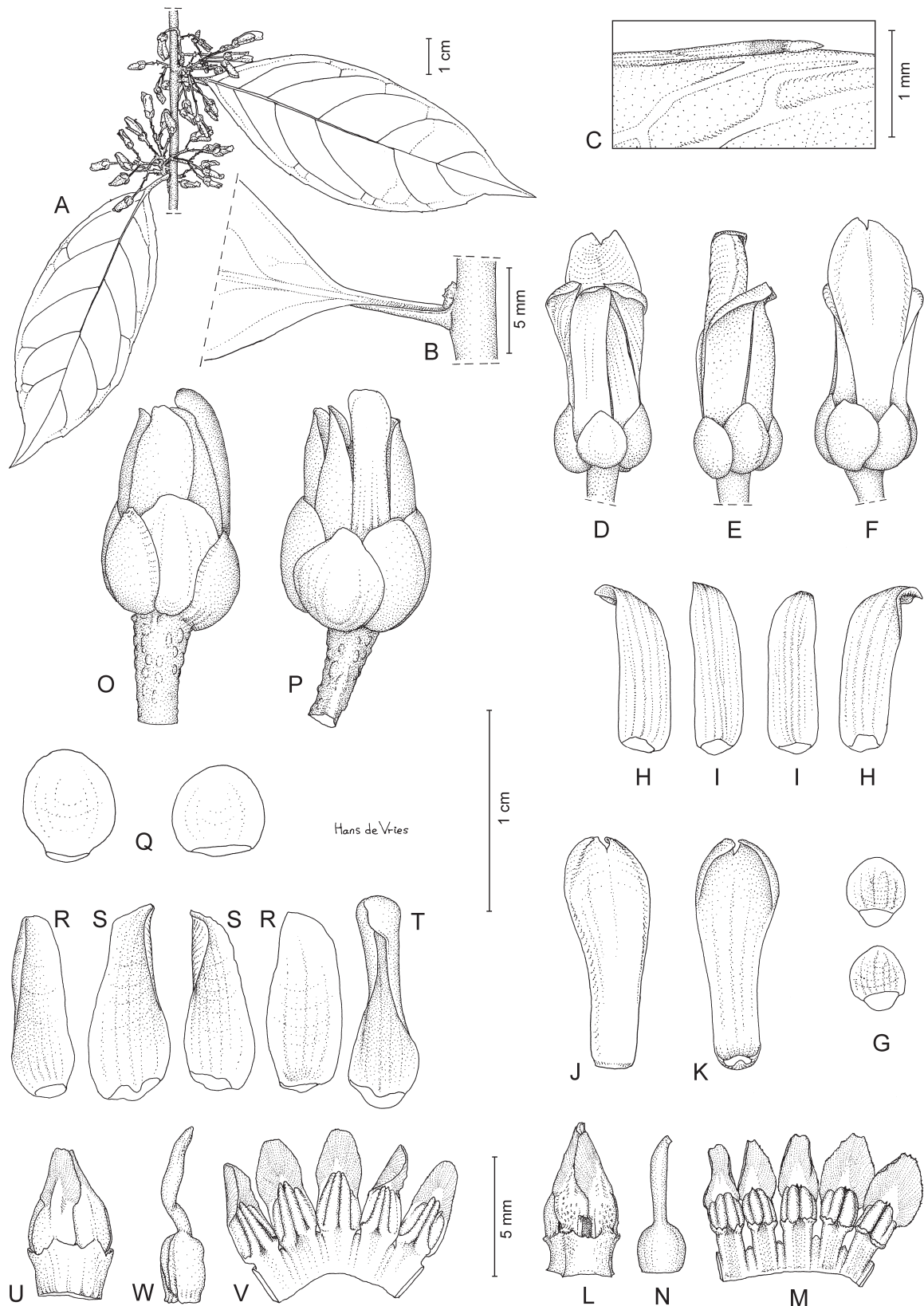


Fig. 2. *Decorsella arborea* (A–N) and *D. paradoxa* (O–W). – A: branch with inflorescences; B: leaf base and petiole; C: leaf margin from below with lignified tooth; D, E, F: flower from different sides; G: sepals from inside; H: lateral petals, inside; I: upper petals, inside; J: lower (anterior) petal, inside; K: lower (anterior) petal, outside; L: androecium, showing staminal tube with free, undulate edge; M: androecium, inside; N: ovary and style. – O, P: flowers from different sides; Q: sepals from inside; R: lateral petals, inside; S: upper petals, inside; T: lower (anterior) petal, inside; U: androecium; V: androecium from inside; W: ovary and style. – A–N from *de Wilde & al. 469* (WAG); O–W from *Jongkind & al. 6270* (WAG). – Drawing by Hans de Vries.

ments c. 3 mm long, fused for c. $\frac{1}{2}$ their length, free part inserted high on inner side of staminal tube, flattened, c. 1.5 mm long, glabrous; *anthers* 1.5–2 mm long, thecae vertical; connective scales ovate, c. 3.5 × 2.5 mm. *Gynoecium* flask-shaped, glabrous; *ovary* superior, 1-locular, dehiscing after fertilization, dividing into 3 rounded lobes; placentation parietal; ovules numerous per carpel; style single, c. 4 mm long. *Fruit* and *seeds* known only in immature, green state.

Distribution and ecology — Undergrowth of lowland forest in Lower Guinea (sensu White 1979) (Fig. 3).

Conservation status — Data deficient (DD). The new species is (or was) clearly relatively widespread and, being an understorey tree, it is probably undercollected. It could be threatened if the forest where it grows is disappearing on a large scale, but I have not enough data to support this.

Etymology — The specific epithet *arborea* refers to the more robust habit of the new species compared to *Decorsella paradoxa*.

Remarks — Between the two species of *Decorsella* there is a gap of c. 1500 km. The *Decorsella* specimen that was sampled as representative of the genus by Tokuoka (2008) and later used also by Wahlert & al. (2014) was *de Wilde & al.* 495 (MO), a specimen here included in *D. arborea*. In the line drawing with the two *Decorsella* species (Fig. 2), only the lower petal of *D. arborea* shows an emarginate apex. The illustration of *D. paradoxa* published by Keay (1953: 77) suggests that the lower petal of the other *Decorsella* species can also be emarginate.

Additional specimens examined — CAMEROON: SOUTH PROVINCE: Campo-Ma'an area, Ebianemeyong, fr., 24 May 2002, *Elad, Tchouto Mbatchou, Ekwadi & Nnangah* 1564 (WAG); *ibid.*, fr., 16 Jan 2002, *Tchouto Mbatchou, Elad & Nnangah* 5a (WAG). — GABON: NGOUNIÉ: Mimongo, fl., 4 Jul 1926, *Le Testu* 5985 (BR, P, WAG); Région de Mouila, Pongui Essouma, fl., 16 Mar 1927, *Le Testu* 6419 (BR, P, WAG); 13 km along road from Mimongo to Koulamoutou, fl., 10 Feb 1983, *de Wilde, Arends, Louis, Karper & Bouman* 495 (BR,

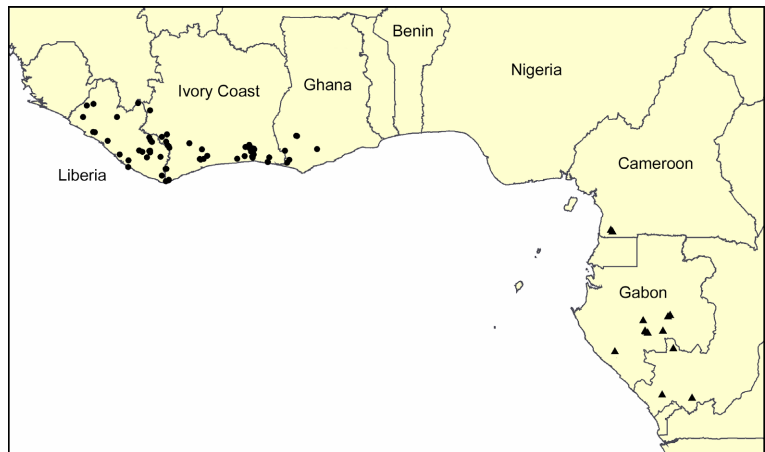


Fig. 3. Distribution map of *Decorsella paradoxa* (circles) and *D. arborea* (triangles).



Fig. 4. *Rinorea longicuspis* showing zygomorphic flowers with longest (anterior) petal ending straight and flat. — Photographed by Carel Jongkind in Liberia from Jongkind & al. 9192.



Fig. 5. *Rinorea gabonensis* with four petals reflexed and anterior petal erect. — Photographed by Ehoarn Bidault in Gabon from Bidault 784.

C, MO, P, WAG). OGOUÉ-LOLO: Région de Lastoursville, Miledi, fl., 17 Feb 1930, *Le Testu* 7925 (BR, P); Région de Lastoursville, Bangoussou, fl., 31 Mar 1931, *Le Testu* 8714 (P); Région de Lastoursville, Poupa, fl., 27 May 1931, *Le Testu* 8832 (BR, P, WAG). NYANGA: Doudou Mountains Reserve, c. 20 km à O.S.O. de Dousala, 655 m, fr., 30 May 2000, *Sosef* 1586 (LBV). — CONGO BRAZZAVILLE: Mayombe, Kouilou, chantier forestier S.B.B. Makaba, fl., 11 Jun 1971, *Sita* 3129 (BR, P); District de Mayoko, Niari, versant Est du Mont Lekoumou, fl., 8 Mar 1973, *Sita* 3497 (P, WAG); Région de Mayombe, chantier forestier Aubreville, fl., 15 Mar 1973, *Sita* 3540 (P).

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