

New and overlooked Acanthaceae taxa from the Democratic Republic of Congo (2): the genus *Justicia*

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Background and aims – This second precursor to the Acanthaceae treatment in the *Flore d'Afrique Centrale* deals with the genus *Justicia*.

Methods – The material of BR, BRLU, BM and K was examined. Flowers were boiled in water and dissected under a Wild M5 lens. Other parts of the plants were measured on dry material. Pollen of several species was critical point-dried and studied under a SEM JEOL 5800LV.

Results – Eleven new species are recognized; illustrations and distribution maps are provided. One overlooked species is discussed. The pollen of five species was investigated to allow their placement in the classification of Graham.

Key words – *Justicia*, Acanthaceae, pollen, *Flore d'Afrique centrale*, central Africa, D.R. Congo.

INTRODUCTION

During the revision of the Acanthaceae for the *Flore d'Afrique centrale*, we found in the unidentified material of BR about forty new species, two new subspecies and one new variety in various genera (Champluvier 2011). This second contribution concerns the genus *Justicia*.

Eleven new species are presented; cases of vicariance are highlighted; an additional record concerns a recently published species, *J. scutifera* Champl. All the new species are illustrated. Attention is also drawn to one hitherto overlooked species. Partial keys are composed to compare closely allied or morphologically similar species. Extensive descriptions for each taxon and their distribution maps are given.

The genus *Justicia*, comprising about 600–700 species (Darbyshire et al. 2010), is characterized mainly by its bilabiate corolla, its two stamens bearing bitheous anthers with usually superposed thecae, the lower theca provided with a white membranous basal appendage or spur, its stipitate capsule containing 2–4 usually ornamented seeds and its subprolate to perprolate, bi- or tricolporate pollen grains.

Graham (1988) published an attempt to an infrageneric classification of *Justicia*, mainly based on the pollen characters and those of the corollas, inflorescences and seeds. We have placed every of the cited species in her classification, which is the more recent treatment available for *Justicia*, although the validity of some sections of Graham seems to be doubtful (Darbyshire et al. 2010). To do so, pollen of five new species was investigated here.

Justicia and the closely allied genera

In the recently published volume 2 of Acanthaceae for *Flora of Tropical East Africa* (FTEA 2010), *Monechma* and *Rungia* are merged into *Justicia*. However, preliminary published and current unpublished DNA studies performed in Rancho Santa Ana Botanical Garden, California, by Lucinda Mc Dade and her staff do not speak for that position (Mc Dade, pers. comm.). Nevertheless, it seems preferable, for practical reasons and for an homogeneous treatment of the family in all the tropical African recent Floras, to adopt in the *Flore d'Afrique Centrale* the position of the authors of the family in FTEA, i.e. to merge *Monechma* and *Rungia* into *Justicia*. Morphologically, indeed, it is difficult to find good characters to separate those genera from *Justicia*. Among the closest relatives of *Justicia* in tropical Africa are the genera *Isoglossa*, *Dicliptera* and *Hypoestes*. *Isoglossa* is easily separated by its stamens bearing usually two clearly distant muticous thecae and by its lenticular pollen grains showing a thick exine margin. *Dicliptera* and *Hypoestes*, the first with anthers bearing also two clearly distant muticous thecae, the second with monotheous anthers, are also distinct by the corolla tube which is twisted through 180° and by inflorescences composed of monochasial cymules usually surrounded by two paired opposite bracts.

Taxonomy of *Justicia* and position of the new described species

In *Justicia*, mainly as in other genera of Acanthaceae, the most important diagnostic characters are found in the type

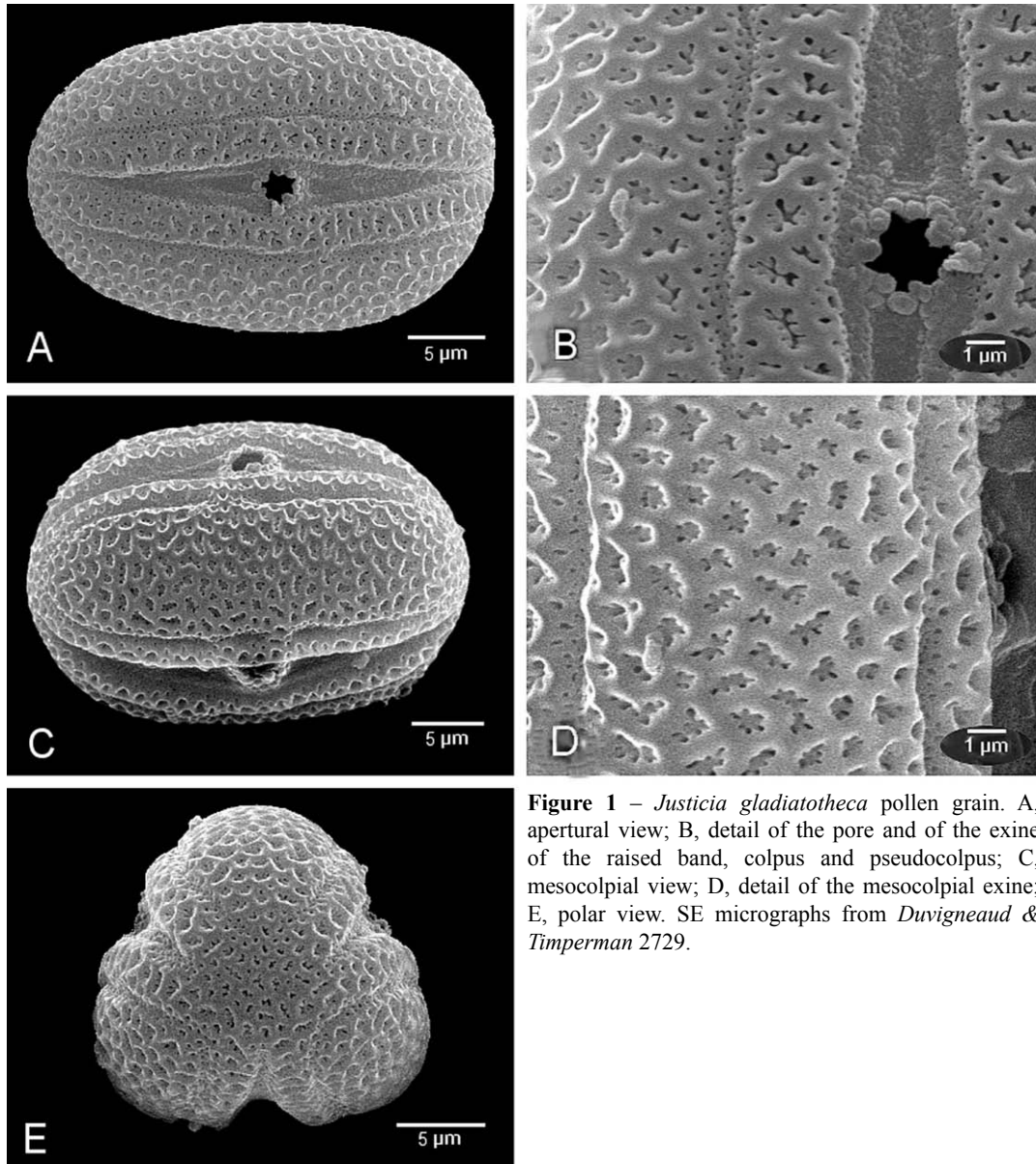


Figure 1 – *Justicia gladiatotheca* pollen grain. A, apertural view; B, detail of the pore and of the exine of the raised band, colpus and pseudocolpus; C, mesocolpial view; D, detail of the mesocolpial exine; E, polar view. SE micrographs from Duvigneaud & Timperman 2729.

of inflorescence and in the shape, colour and size of the corolla and bracts and in the features of the stamens and pollen grains. Graham (1988), in her attempt at an infrageneric classification of *Justicia*, underscores the pollen type and the shape and colour of the corolla as valuable taxonomic characters at the sectional level within the genus: for instance, cucullate upper lip is characteristic of several sections in the genus; three sections (*Vasica*, *Rhaphidospora* and *Justicia*) have greenish purple-marked, cream or white flowers, whereas sect. *Tyloglossa* only shows yellow or purple corollas.

The ornamentation of the seeds is also valuable in taxonomic distinctions (Graham 1988), but seeds are not always available on the collected specimens.

The relationships between the new species and the rest of the genus are partly underscored in the Latin diagnosis, when the new species is compared with the closest one or with a

group of species of the genus, but sometimes, this likeness can be superficial and does not reflect the true relationship of the new species. An analysis of pollen, alongside with inflorescence's and corolla's characters is probably the best way to assess it.

A pollen analysis has been performed for the five species (four new ones and an overlooked one) of which the relationships cannot be assessed surely from the morphological characters of the plant.

The pollen of four species, *Justicia gladiatotheca*, *J. lenticellata*, *J. pedemontana* and the overlooked *J. bequaertii* (figs 1–4) matches the 'type 1' pollen of Graham (1988), i.e. a triporate pollen grain with one raised band of exine and one pseudocolpus on each side of the pore. This type of pollen is characteristic of three sections of *Justicia*, two of which being represented in Africa, sect. *Betonica* and sect. *Rhaphidospora*. sect. *Betonica* includes species with simple spikes

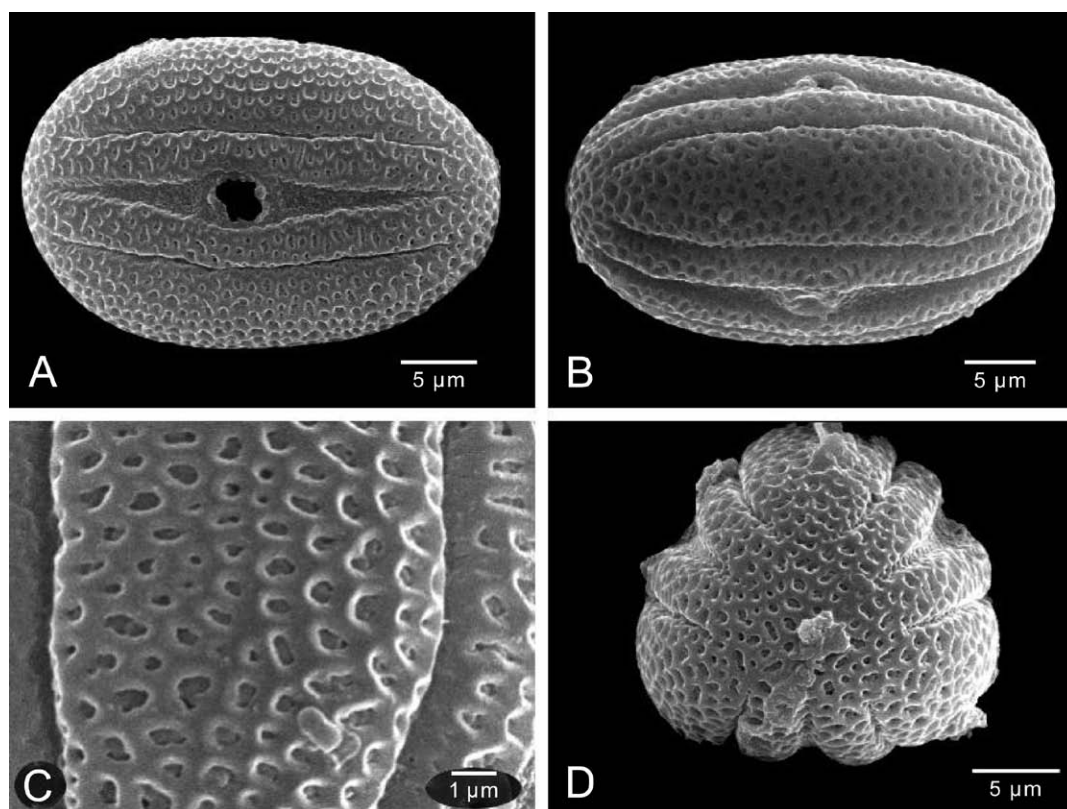


Figure 2 – *Justicia lenticellata* pollen grain. A, apertural view; B, mesocolpial view, C, detail of the mesocolpial exine; D, polar view. SE micrographs from de Witte 5615.

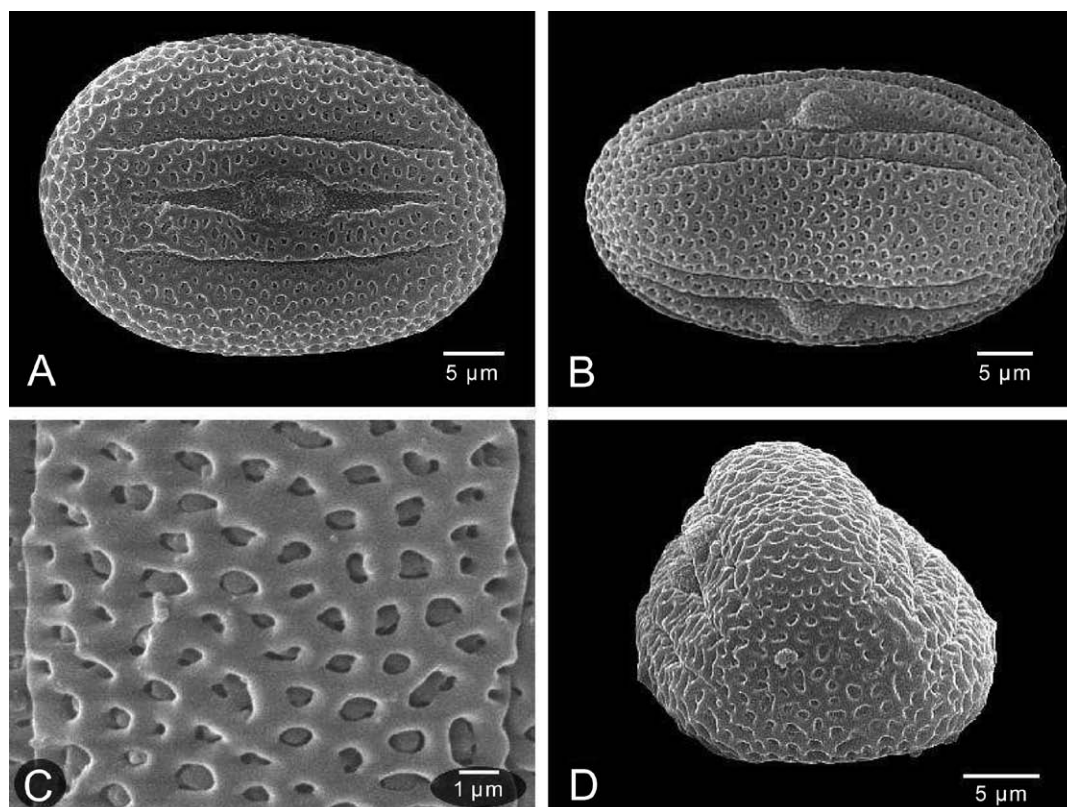


Figure 3 – *Justicia pedemontana* pollen grain. A, apertural view; B, mesocolpial view, C, detail of the mesocolpial exine; D, polar view. SE micrographs from A. Léonard 1531.

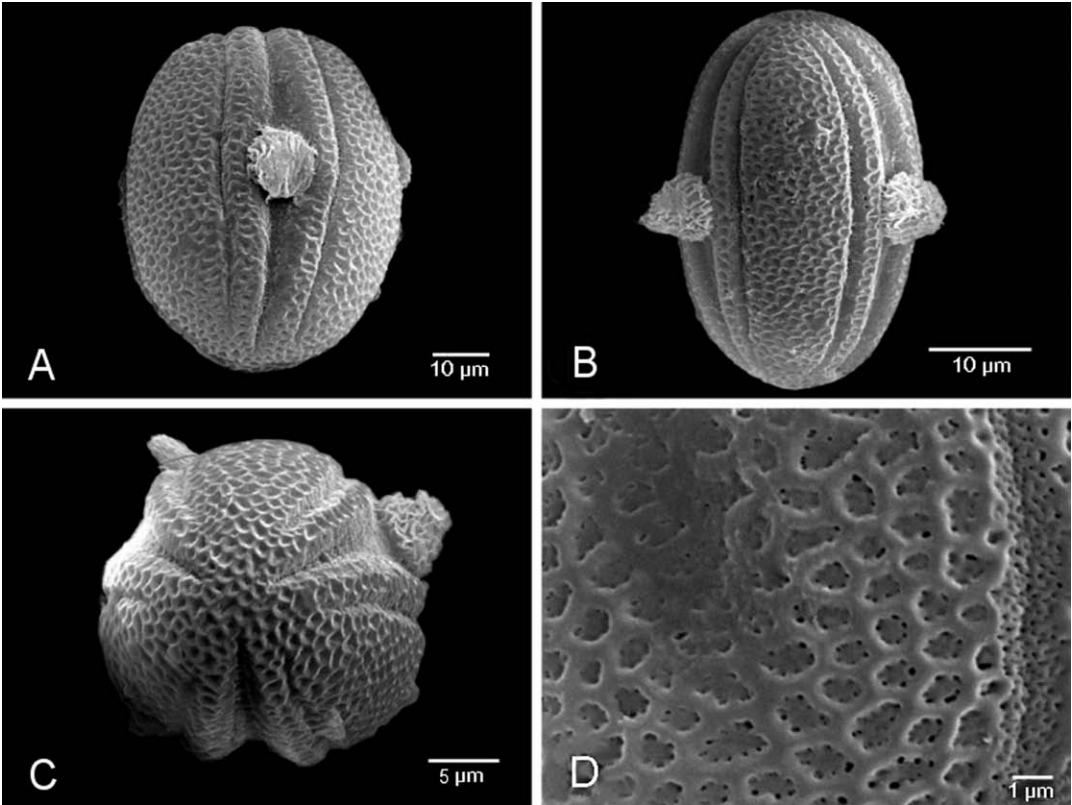


Figure 4 – *Justicia bequaertii* pollen grain. A, apertural view; B, mesocolpial view; C, polar view ; D, detail of the mesocolpial exine. SE micrographs from Schmitz 7443.

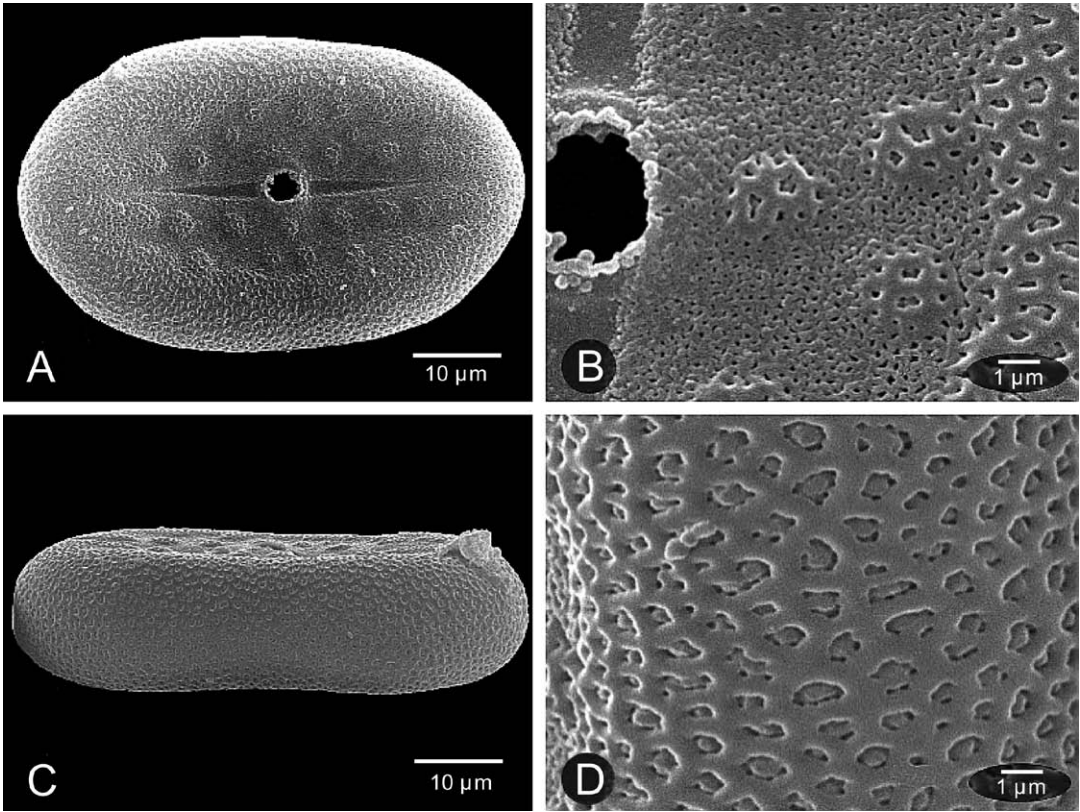


Figure 5 – *Justicia nanofrutex* pollen grain. A, apertural view; B, detail of the pore and of the trema area with insulae; C, mesocolpial view; D, detail of the mesocolpial exine. SE micrographs from de Witte 3785.

and conspicuous, ovate-elliptic bracts; this matches well the characters of *J. gladiatotheca*.

J. lenticellata and *J. bequaertii*, having inconspicuous bracts subtending several flowers (at least at some nodes) and white or whitish corollas, better match sect. *Rhaphidospora*. *J. pedemontana* has also the pollen and inflorescence matching that section, but has obovate conspicuous bracts not encountered in the section, except in *J. ventricosa*, an Asian species considered by Graham as peripheral to the section *Rhaphidospora*; *J. pedemontana* could perhaps be similarly regarded as peripheral to that group.

The fifth species, *J. nanofrutex*, possesses the 'type 5' pollen of Graham, i.e. a biporate pollen grain with the trema area traversed by two rows of 3–6 insulae (fig. 5F). This pollen type characterizes three sections represented in Africa, sect. *Vasica*, sect. *Harnieria* and sect. *Rostellaria*. The section *Vasica* seems the most appropriate to include *J. nanofrutex* as all the species of the section are simple-spiked, shrubby perennials and have mostly large corollas, characters shown by *J. nanofrutex*; all the species have ovate bracts except one which has narrowly elliptic bracts; *J. nanofrutex* possesses narrowly lanceolate-elliptic bracts. Unusual characters like the presence of a second partial row of insulae on each side of the pore and flowers white flushed with mauve opposed to white or cream corollas in the rest of the section could give *J. nanofrutex* a marginal position in the sect. *Vasica*, situation that occurs elsewhere for other species in the classification of Graham.

The relationship of the remaining species is easier to assess using Graham's work, where almost all the known species of *Justicia* are classified: *J. tutukuensis*, close to *J. biokoensis*, and *J. catenula*, (of which the pollen was not studied because the scarcity of the collections), very similar to *J. interrupta*, must belong to the sect. *Rhaphidospora*: this section encompasses mainly shrubby perennials, having a simple or compound dichasial inflorescence – if simple, without conspicuous bracts, and if compound, with conspicuous subulate or ovate bracts shorter to longer than the calyx, with white or cream to yellowish, more rarely pale pink or purple, often purple spotted corolla 9–45 mm long, with a 'type 1' pollen. *J. abscondita*, close to *J. unyorensis*, belongs to the sect. *Harnieria*. This section comprises shrubby or herbaceous, sometimes annual plants with axillary clusters of flowers, a corolla very rarely exceeding 2.5 cm long, often much shorter, with a 'type 5' pollen. *J. alchorneeticola*, close

to *J. betonica*, belongs to the sect. *Betonica*, this section being characterized by an inflorescence consisting in a simple spike, with conspicuous ovate to oblanceolate bracts usually exceeding the calyx and imbricate, and a white or mauve to blue corolla, the pollen belonging to the 'type 1'.

DESCRIPTION OF THE NEW AND OVERLOOKED TAXA

Justicia tutukuensis Champl., sp. nov.

Syn.: *Duvernoia splendens* J. Louis nomen in herbario BR.

J. claessensii De Wild. proxima sed propter calyces, corollas, stylaque pilis glandulosis longis sole munitis et inflorescentiam patentiore axibus longioribus, propter capsulas breviores seminaque tuberculata nec rugulosa bene differt. – Type: D.R.Congo, district Forestier central, Yangambi, île Tutuku, Dec. 1938, fl., *J. Louis* 13114 (holo-: BR; iso-: K)

Sarmentous woody climber up to 6 m high; stem with orange-brown or red-brown bark. Lamina of the leaves elliptic, 6–20 × 2.3–10.5 cm, widely cuneate to rounded at the base, shortly acuminate at the tip, sparsely pubescent above, pubescent on the nerves beneath, median nerve prominent below, 4–12 pairs of lateral nerves; petiole 1.5–6.5 cm long. Inflorescence a spreading short to long panicle 7–23 cm long, up to 10(–14) cm wide, with visible axes; bracts linear-lanceolate, 1–1.5 cm long on the main axis, 0.5 cm long on branchlets; calyx 14 mm long, lobes linear, densely covered with straight glandular hairs on both sides, 12 mm long; corolla 3–4.5 cm long, provided outside with straight glandular hairs; tube very short in relation to the lips, 1.2–1.8 cm long with the cylindric part 0.75–1.1 cm long, and with the throat 1.2–1.8 cm wide; upper lip green, spotted with red-violet and lower lip white-rose, spotted with violet or corolla white striate with violet; upper lip hooded and longitudinally folded, oblong, shortly bilobed at the tip, 25 × 6 mm; lower lip 22 × 23 mm, trilobed, median lobe 12 × 5 mm, lateral ones 12 × 7 mm; filament of the stamens glabrous, 3 cm long, anthers 6 mm long, thecae slightly distant from each other (all measurements given after those of the tube are taken from a corolla 4 cm long); ovary 2 mm, hirsute; style puberulent-glandular, 4 cm long. Capsule densely pubescent and glandular, 32 mm long. Seeds tuberculate, 4 mm in diameter. Fig. 6.

Distribution – A species of the Guineo-Congolian centre of endemism, only known so far from the Congo Basin, D.R.Congo. Fig. 7.

Key to the vicariant pair *J. claessensii* / *J. tutukuensis*

1. Panicle spiciform, at least in the upper half (where the lateral axes are not developed), 4–8 cm wide, dense; axes of inflorescence not visible, hidden by the flowers, except sometimes the lower pairs of branches; calyx lobes pubescent outside, puberulent and with patelliform glands inside; corolla pubescent with a few additional short glandular hairs on the abaxial part; style pubescent; capsule 3.7–4.8 cm, long; seeds rugulate; species almost confined to terra firma forests.....***J. claessensii***
2. Panicle not spiciform, fairly spreading, 8–14 cm wide; axes of inflorescence all developed and clearly visible; calyx lobes densely provided only with straight glandular hairs on both faces; corolla provided only with fairly long straight glandular hairs; style glandular; capsule not exceeding 3.2 cm long; seeds tuberculate; species occurring exclusively in riparian forests.....***J. tutukuensis***



Figure 6 – *Justicia tutukuensis*. A, habit; B, calyx, C, corolla; D, capsule. A & D from *Louis* 12945; B & C from *Louis* 13114.

Other collections – D.R.Congo. District Forestier Central: Yangambi, île Tutuku, Feb. 1979, fl., *Breyne* 3575 (BR); *ibid.*, Jan. 1938, alab., *J. Louis* 7507 (BR); *ibid.*, Aug. 1938, fl. *J. Louis* 10711 (BR); *ibid.*, Jul. 1963, fl. *Yafunga* 225 (BR); Yangambi, Feb. 1952, fl., *Donis* 3557 (BR); *ibid.*, Jul. 1940, fr., *J. Louis* 16405 (BR); Yangambi, île Esali, Oct. 1938, fl., *J. Louis* 11776 (BR); *ibid.*, Dec. 1938, fl., *J. Louis* 12945 (BR); Yangambi, Isalowe, Jan. 1951, fr., *Toussaint* 854 (BR); Yambuya, Mar. 1906, fl., *M. Laurent* 1417 (BR).

Habitat – Riparian forests.

Remark – This species shows the same distribution as *Bridelia ripicola* (Euphorbiaceae) and *Sorindeia ripicola* (Anacardiaceae), which are strictly limited to the banks of the Congo river and its larger tributaries – a pattern discussed by Léonard (1990) and Champluvier (1999). Those riparian species are always closely related to terra firma species and only differ from them by small but correlated and constant characters, for instance *Bridelia ripicola* and *B. micrantha*, *Sorindeia ripicola* and *S. juglandifolia*, *Justicia tutukuensis* and *J. claessensii*, *Justicia alchorneeticola* and *J. betonica* (see further). They can be considered as ecological vicariants.

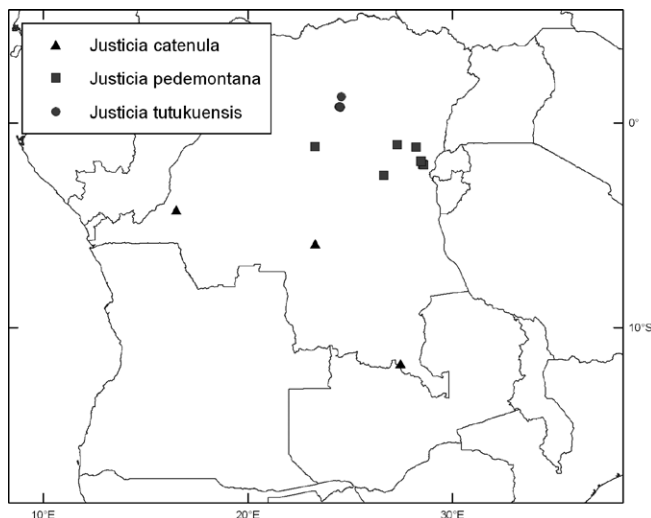


Figure 7 – Distribution map of *Justicia tutukuensis*, *Justicia catenula* and *Justicia pedemontana*.

***Justicia gladiatotheca* Champl., sp. nov.**

Justiciae ruwenzoriensi C.B.Cl. similis sed propter bracteas ellipticas omnino virides nec rotundatas alboroseasque cum nervis viridibus, nec imbricatas nec cucullatas, radices non crassos lignososque, caules foliaque pubescentes nec dense pubescentes-velutinas bene differt. – Type: D.R.Congo, district du Haut-Katanga, Mitwaba, Sept. 1956, fl., fr., *Duvigneaud & Timperman* 2729 (holo-: BRLU; iso-: BR, K).

Small suffrutescent plant up to 25 cm high with pubescent stems and a thin rootstock. **Lamina of the leaves** small, 1.4–3 × 1–1.8 cm, ovate-elliptic, cuneate to attenuate at the base, obtuse to rounded at the tip, roughly pubescent, shortly petiolate to sessile; petiole up to 3 mm long. **Inflorescence** a spike, rather dense, 3.5–6.5 cm long; **bracts** not imbricate, elliptic, green, puberulent, subacute to subrounded at the tip, 5–7 × 2–4 mm; **bracteoles** oblong, 5 × 2.5 mm; **calyx** 4 mm

long, with five triangular lobes 3 × 1.5 mm, acute at the tip; **corolla** white or cream, infundibuliform, 12 mm long and 4 mm wide at the throat, puberulent outside; tube 6 mm long, inside with two rows of hairs below the stamens and the folds of the rugula hairy at the base; upper lip ovate-triangular, 6 × 5 mm, bilobed at the tip, lower lip obtrapezoidal, 6 × 8 mm at the tip, trilobed, lateral lobes oblong, 5 × 2 mm, median lobe ovate-oblong, 4 × 3.5 mm; **filament of the stamens** glabrous, 4 mm long; thecae inserted at different levels, 1.25 mm long, slightly hairy on the back, the lower one with a 1 mm long acute spur at the base; **ovary** glabrous except on the two narrower sides, 1.75 mm long; **style** 7 mm long, hairy on the lower 2/3 of its length. **Capsule** 10 × 4–5 mm, shortly stipitate, puberulent. **Seeds** tuberculate, dark brown, about 3 mm in diameter. Fig. 8.

Distribution – A species from the Zambezi centre of endemism, only known so far from Katanga, D.R.Congo. Fig. 9.

Other collection – D.R.Congo. District du Haut-Katanga: Mutososa, Aug. 1939, fl., *Bredo* 3408 (BR).

Habitat – Damp savannas, marshes.

Remark – By its habit, *J. gladiatotheca* looks similar, at first sight, although being smaller, to *J. ruwenzoriensis*, reason why it is compared to that species in the Latin diagnosis but they seem actually not closely allied.

J. gladiatotheca differs mainly by its spike bearing non-imbricate, elliptic, green and not nerved nor convex bracts; moreover, its slender roots are very different from the thick woody rootstock of *J. ruwenzoriensis*.

***Justicia catenula* Champl., sp. nov.**

Justiciae interruptae (Lindau) C.B.Cl. proxima sed propter flores duplo parviores, 7–8 mm versus 14–15 mm longas, capsulas parviores, 16 × 4 mm versus 20 × 6 mm, calyces puberulos et vix glandulosos nec dense glandulosos et vix puberulos, axesque inflorescentiae glabros vel breve puberulos vel sparsissime pubescentes nec omnino pubescentes, foliaque valde discoloria, et area distincta incolentem bene distinguitur. – Type: D.R.Congo, district du Bas-Katanga, Lubis, s.d., *Vanderyst* 23188 (holo-: BR).

Suffrutescent plant up to 1 m high, with a thick woody rootstock; stems glabrous. **Lamina of the leaves** ovate to elliptic, 6.5–20 × 3.2–8.5 cm, cuneate to attenuate at base, acuminate at the tip, glabrous, strongly bicoloured, green above, light grey-blue-green below; 6–8 pairs of main lateral nerves; petiole 4–20 mm long. **Inflorescence** a very poorly branched panicle composed of interrupted spikes with two flowers at each node or more rarely each node with two short peduncles each bearing up to three flowers, the terminal spike very variable in size, up to 32 cm long; axis glabrous or shortly puberulent or very sparsely pubescent; **bracts** inconspicuous; **calyx** 2–3 mm long, glabrous to sparsely puberulent and very slightly glandular; **corolla** 7–8 mm long, yellow to pink, densely puberulent and glandular outside; tube glabrous inside, 4 mm long, 3 mm wide at throat; upper lip ovate, 4 × 3.5 mm, lower lip 4 × 4 mm, trilobed, median lobe 1.5 × 1.75 mm, lateral ones 1 × 1 mm; **filament of the stamens** 3 mm long, glabrous except at the insertion on the corolla tube; thecae inserted one above the other, 1 mm long,

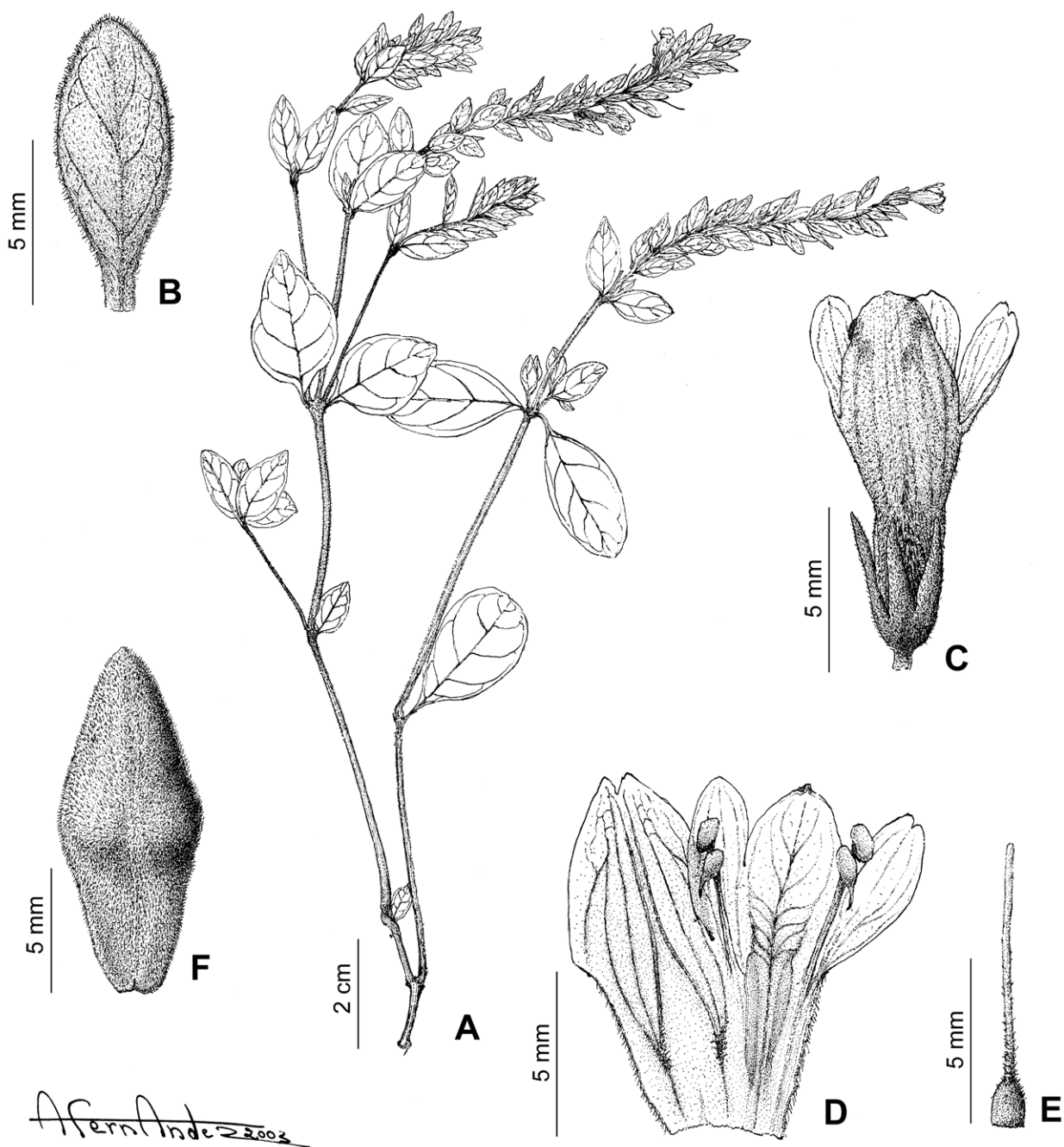


Figure 8 – *Justicia gladiatotheca*. A, habit; B, bract; C, flower; D, opened corolla; E, pistil; F, capsule. From Duvigneaud & Timperman 2729.

Key to the allied species

1. Leaves strongly bicoloured, light grey-blue-green below; corolla 7–8 mm long; calyx puberulent and slightly glandular; capsule 16×4 mm; species limited to D.R.Congo.....*J. catenula*
2. Leaves not or slightly bicoloured, green below; corolla 14–14.5 mm long; calyx slightly puberulent and densely glandular; capsule 20×6 mm; species limited to Tanzania.....*J. interrupta*

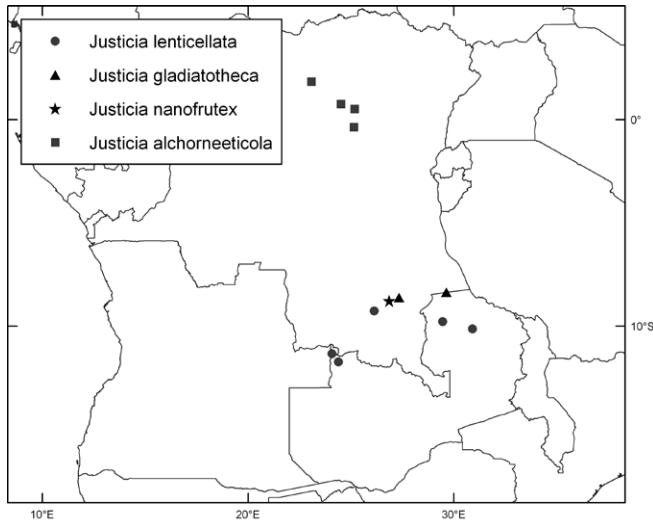


Figure 9 – Distribution map of *Justicia gladiatotheca*, *Justicia lenticellata*, *Justicia nanofrutex* and *J. alchorneeticola*.

the lower one with an acute spur; style 5 mm long, hairy at the base; ovary 1.5 mm long, puberulent and glandular at the tip; disc annular, 0.5 mm high. Capsule 16 mm long, stipitate, densely puberulent and glandular, the swollen fertile upper part 4 mm wide. Fig. 10.

Distribution – A linking species between the Guineo-Congolian/Zambezian regional transition zone and the Zambezian centre of endemism, only known so far from Kasai and Katanga, D.R.Congo. Fig. 7.

Other collections – **D.R.Congo. District du Kasai:** Mue, Kwango, Jun.–Jul. 1915, fl., fr., *Vanderyst & Lambrette* 5585 (BR). **District du Bas-Katanga:** Lubi, s.d., *Vanderyst* 23155 (BR, K). **District du Haut-Katanga:** Mukuen, rivière Matuiti, Aug. 1948, fl., *Schmitz* 1951 (BR).

Habitat – On alluvial deposits of riverbeds in gallery forests.

Remark – Lindau (1897) described *Duvernoia haplostachya*, based on a specimen collected by Descamps in June 1895 at Mtowa, Katanga. The isotype, a very poor specimen, is kept in BR. The species is recorded by Clarke (1900: 223) as an imperfectly known species, which probably indicates that the holotype, later destroyed in Berlin, was not a better specimen than the isotype. Indeed, the BR specimen, although resembling in habit to our species *Justicia catenula*, lacks flowers and shows a damaged poorly developed inflorescence bearing only a very young capsule. This is not enough for recognizing a well defined species, so it seemed preferable to describe a new species, *Justicia catenula*. In any case, *Duvernoia* having been merged into *Justicia* (Graham 1988: 584), and the name *Justicia haplostachya* being

preoccupying as it was given in 1864 to a species from Madagascar by T. Anderson, a new name has to be chosen for the species of Lindau. *Duvernoia haplostachya* will consequently be considered as an imperfectly known species in the *Flore d'Afrique Centrale*.

Justicia interrupta, on its hand, although looking very similar to *J. catenula*, is more robust in all its parts and well separated from the latter by several good characters; moreover, it is strictly restricted to Tanzania, where it grows in evergreen and semi-evergreen forests, but also in riverine forests. The two species can then be considered as vicariants.

Justicia pedemontana Champl., sp. nov.

Speciebus *Tyloglossae* sectioni habitu similis, sed propter spicas longiores, bracteas obovatas nec ovatas nec lanceolatas nec lineares pilis moniliformis non munitas, corollae labium inferiorem magis profunde incisum cum lobis valde longioribus, capsulas majores seminaque tuberculata nec ammonitis similia bene differt. – Type: D.R.Congo, district Forestier Central, Ironga, alt. 1080 m, May 1958, fl., fr., *Gutzwiller* 2840 (holo-: BR; iso-: K).

Suffrutex 0.50–2 m high; stems puberulent on two opposed bands, rarely all around. Lamina of the leaves 5.5–22 × 2.3–8.5 cm, elliptic to elliptic-oblong, cuneate to rounded at the base, acuminate at the tip, glabrous above, slightly puberulent along the nerves below; 5–7 pairs of lateral nerves; petiole puberulent, 0.5–5.5 cm long. Inflorescence spiciform, dense, on terminal axis and lateral branches, 3–21 cm long; bracts obovate to oblanceolate or elliptic-oblong, puberulent and minutely glandular, 6–12 × (2–)2.5–3.5 mm, acute to acuminate at the tip; bracteoles oblanceolate, 8.5 × 2.25 mm, with the same indumentum as the bracts; calyx 6 mm long, lobes 5 × 0.5–1.25 mm with the same indumentum as that of the bracts outside, puberulent and with numerous sessile glands inside; corolla white, 11–13 mm long, infundibuliform, densely pubescent outside with the longest hairs on the tube, and also minutely glandular; tube 6–7 mm long, 3–4 mm wide at the throat, provided inside with a ventral hairy reversed “V” below the palate and two rows of hairs beneath the stamens, dorsally with two rows of hairs, each running half way down from the crossing-point of a pairs of nerves; upper lip ovate, 5–6 × 4–6 mm, emarginate; lower lip 5–6 × 8–10 mm, with a small nerved palate at the throat, deeply trilobed (the lobes almost as long as the lip), lobes oblong, much longer in relation to the length of the lip than those of *Tyloglossa* species, the median one 5 × 3–3.5 mm, the lateral ones 5 × 2–2.8 mm; filament of the stamens glabrous except ventrally at their base, 4–6 mm long; thecae glabrous or almost so, yellowish, 1.5–1.75 mm long, one above the

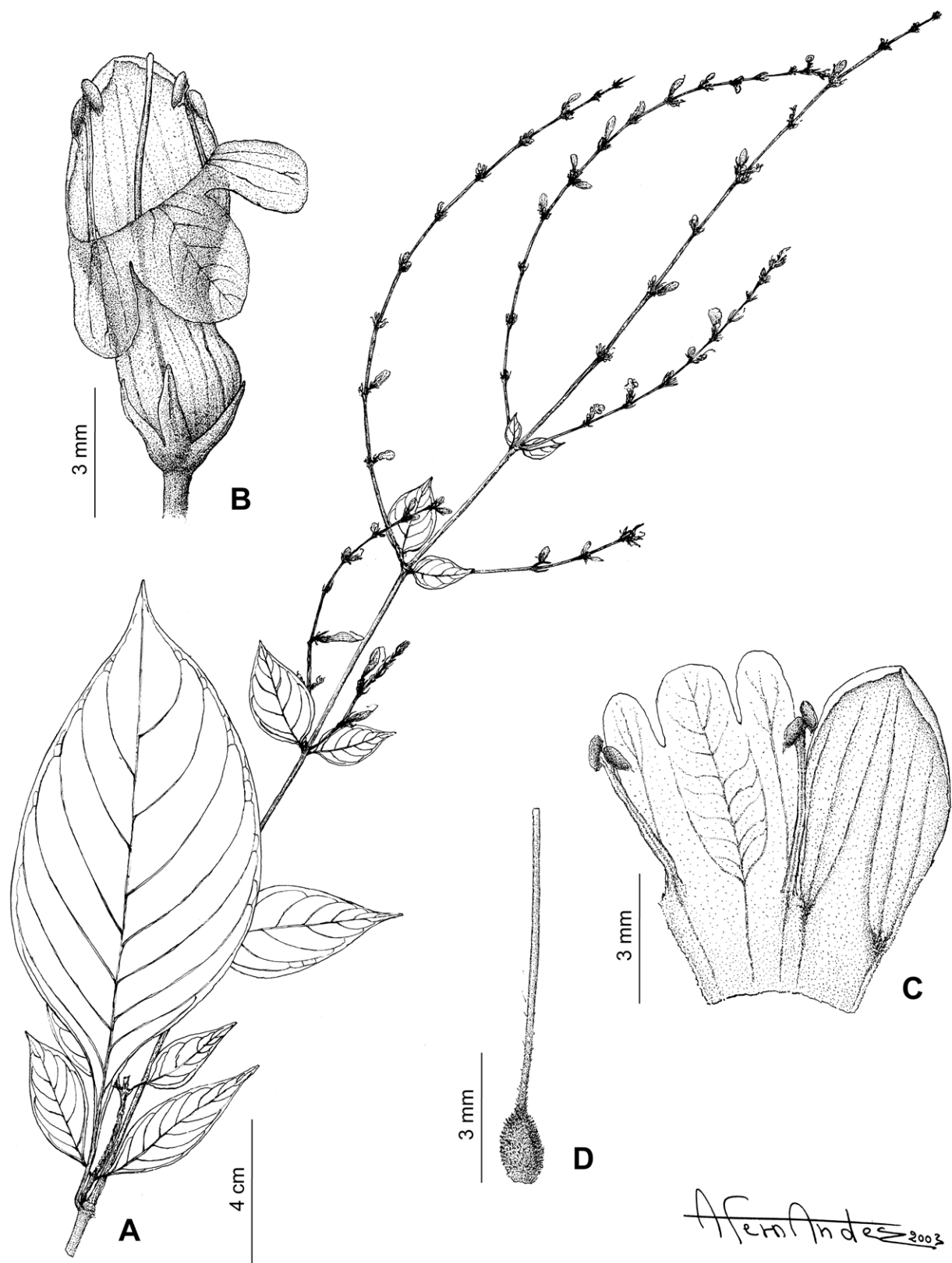


Figure 10 – *Justicia catenula*. A, habit; B, flower; C, opened corolla; D, pistil. A from *Vanderyst* 23188; B–D from *Vanderyst & Lambrette* 5585.

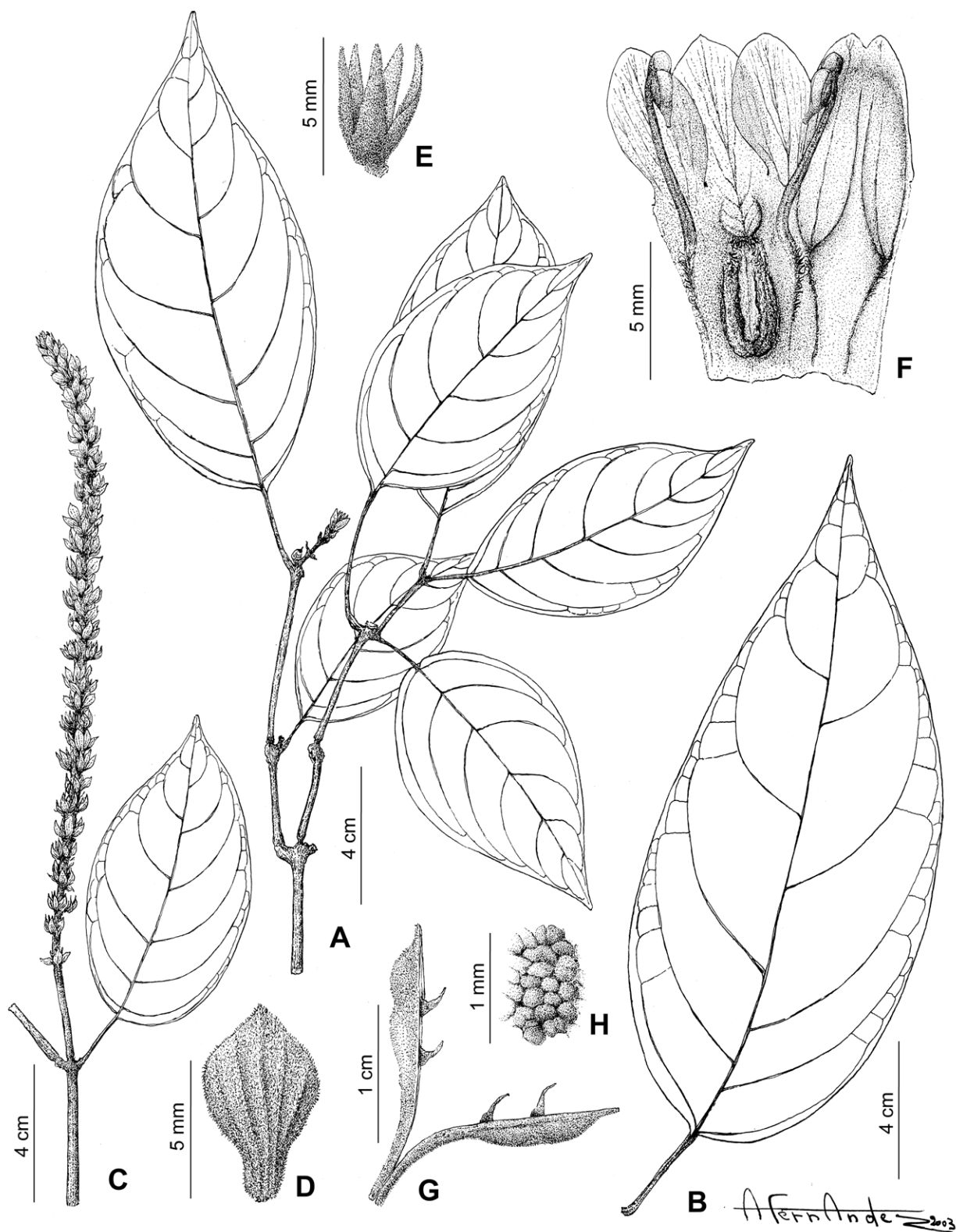


Figure 11 – *Justicia pedemontana*. A, habit of a leafy shoot; B, largest leaf; C, inflorescence; D, outer bract; E, calyx; F, opened corolla; G, opened capsule; H, detail of seed coat. A & C–E from Léonard 153; B from Léonard 1572; F–H from Bequaert 6678.

Key to the new species and section *Tyloglossa*

1. Bracts obovate; moniliform hairs absent; corolla with lobes of lower lip 5/6 of its length; capsule 2.3 cm long; seeds tuberculate.....*J. pedemontana*
2. Bracts lanceolate to linear or more rarely broadly ovate; moniliform hairs present; corolla with lobes of lower lip not exceeding 1/3 of its length; capsule not exceeding 12 mm long; seeds ammonite-like.....sect. *Tyloglossa*

other, the upper one with a tiny spur up to 0.25 mm long, the lower one with a 0.6–0.75 mm long spur; style 7–9 mm long, hairy at least in the lower half; ovary hairy. Capsule stipitate, puberulent, 2.3 cm long. Seeds pale yellow, 2.5 mm in diameter, tuberculate. Fig. 11.

Distribution – A species of the Guineo-Congolian centre of endemism. Fig. 7.

Other collections – D.R.Congo. District Forestier Central: Walikale-Lubutu, Jan. 1915, fl., *Bequaert* 6678 (BR); Ikela, rivière Lukenzu, Jun. 1952, *Germain* 7442 (BR); Bukondo, alt. 1000 m, Sept. 1957, fl., *Gutzwiller* 1421 (BR); Turole, alt. 1000 m, Jan. 1958, fr., *Gutzwiller* 2503 (BR); Kembe, alt. 1000 m, s.d., *A. Léonard* 1572 (BR, WAG); ibid., alt. 950 m, fr., Nov. 1958, *A. Léonard* 1510 (BR, CAS), 1531 (BR); Kalima, alt. 550–600 m, *Kitembo* 8 bis (BR); Irangi, alt. 850–900 m, Sept. 1957, fl., *Troupin* 4435 (BR).

Habitat – Dense forest with *Julbernardia seretii* or with *Gilbertiodendron dewevrei*, transition forest, swamp forests, gallery forests, fallows, alt. 550–1080 m.

Remark – *Justicia pedemontana* superficially resembles in its habit the species of the *Tyloglossa* section, inter alia *J. flava*. There are not any other species of *Justicia* which approaches the habit of *J. pedemontana*, that is the reason why it is opposed to sect. *Tyloglossa* in the Latin diagnosis (see pollen study above in the introduction).

Justicia alchorneeticola Champl., sp. nov.

Justiciae betonicae L. affinis sed propter bracteas angustiores omnino virides nec albas viride nervatas bene distinguitur. – Type: D.R.Congo, district Forestier Central, Kisangani-Lubutu km 68, Nov. 1982, fl., fr., *Pauwels* 6596 (holo-: BR; iso-: MO).

Herbaceous plant 35–100 cm high, ascending to prostrate, rooting at the nodes, glabrous. Lamina of the leaves narrowly elliptic to lanceolate, (1.5–)3–10 × (0.6–)1.2–3.6 cm, subacute at the tip, cuneate to attenuate at the base; 5–7 pairs of lateral nerves; petiole 0.3–3 cm long; bracts not imbricate, lanceolate, entirely green, acuminate at the tip, 5 × 1.5 mm, glabrous; bracteoles similar; calyx 5–6 mm long, lobes minutely glandular and shortly ciliate, 4.5–5.5 × 1 mm; corolla white, sometimes somewhat mauve, 7.5–11.5 mm long; tube 3.5–6 mm long, with hairs at the base of the sides of the rugula and below the stamens; upper lip ovate, 3.5–5.5 × 3.5–5 mm, two-toothed at the top; lower lip trilobed, 3.5–5.5 mm long, median lobe 3–4 × 1.6–2.8 mm, lateral lobes 3–4 × 1–1.8 mm; filament of the stamens 2–4 mm long, hairy at the base; thecae 1.5 mm long, glabrous, the lower one with an acute spur 1 mm long; style 5–7.5 mm long, hairy in the lower 1/2–2/3; ovary glabrous, 1 mm long; disc 0.7 mm

high. Capsule stipitate, 10–12 mm long, the upper swollen fertile part about 5 mm wide. Fig. 12.

Distribution – A species of the Guineo-Congolian centre of endemism.

Other collections – D.R.Congo. District Forestier Central: Yangambi, île Tutuku, alt. 470 m, Mar. 1940, fl., *Germain* 274 (BR); île Esabo, en aval de Basoko, Jun. 1949, fl., *Germain* 4958 (BR); Kisangani, Jan. 1979, fl., fr., *Lejoly* 4725 (BR, CAS); Ubundu, 5 km S de Wanie Rukula, Nov. 1982, fl., *Lejoly* 82/630 (BR); rivière Lindi, à 15 km de Kisangani, May 1983, fl., *Mosango* 586, 644 B (BR); bac de la Lindi, Kisangani-Yangambi, Dec. 1982, fl., *Pauwels* 6636 (BR, K).

Habitat – Riverbanks, *Alchorneetum*, semi-aquatic grasslands.

Remark – Differs from *J. betonica* by its narrower entirely green and not imbricate bracts, by its narrower leaves, spindlier spike and its habitat, being strictly confined to riverbanks and semi-aquatic vegetations. *J. betonica* is known as a very variable species and the specimens from the Congo river could be considered only as an accommodation to that particular environmental conditions. However, there are no intermediates between *J. betonica* and the riparian *J. alchorneeticola* in the area, and the characters of the latter are very constant; otherwise, the complex *J. betonica*, including a lot of species of the section *Betonica*, has not yet been revised carefully; it seems therefore preferable to treat the riparian species as a distinct taxon.

The specific epithet ‘*alchorneeticola*’ meaning inhabiting the *alchorneetum*, is given after the name of the association *Alchoorneetum cordifoliae* Léonard (1950: 378) (syntaxonomic Braun-Blanquet system), which designates a riparian plants association which forms shrubby fringes along the rivers, with as characteristic taxon *Alchornea cordifolia* inter alia.

See remark under *J. tutukuensis*.

Justicia nanofrutex Champl., sp. nov.

Ab omnibus cum corolla maxima *Justiciae* speciebus propter corollae tubum labia aequantem, labium superum nec cucullatum, inflorescentiam unilateralem nec interruptam bracteasque plus minusve imbricatas bene differt. – Type: D.R.Congo, district du Haut-Katanga, Kabwe sur Muye, P.N. Upemba, alt. 1320 m, May 1948, fl., *de Witte* 3785 (holo-: BR; iso-: CAS, K).

Suffrutex 1.20 m high with dense foliage; stem woody, up to 1 cm in diameter at the base, bark brown. Lamina of the leaves glabrous, narrowly elliptic, about five times longer than wide, 4.5–8 × 1–1.5 cm, subacute at the tip, cuneate at



Figure 12 – *Justicia alchorneeticola*. A, habit; B, corolla; C, opened corolla; D, pistil; E, capsule. A from Pauwels 6596; B from Pauwels 6636; C–E from Lejoly 4725.



Figure 13 – *Justicia nanofrutex*. A, habit; B, longitudinally sectioned base of the woody stem with roots; C, bract; D, flower; E, opened corolla; F, pistil. From *de Witte* 3785.

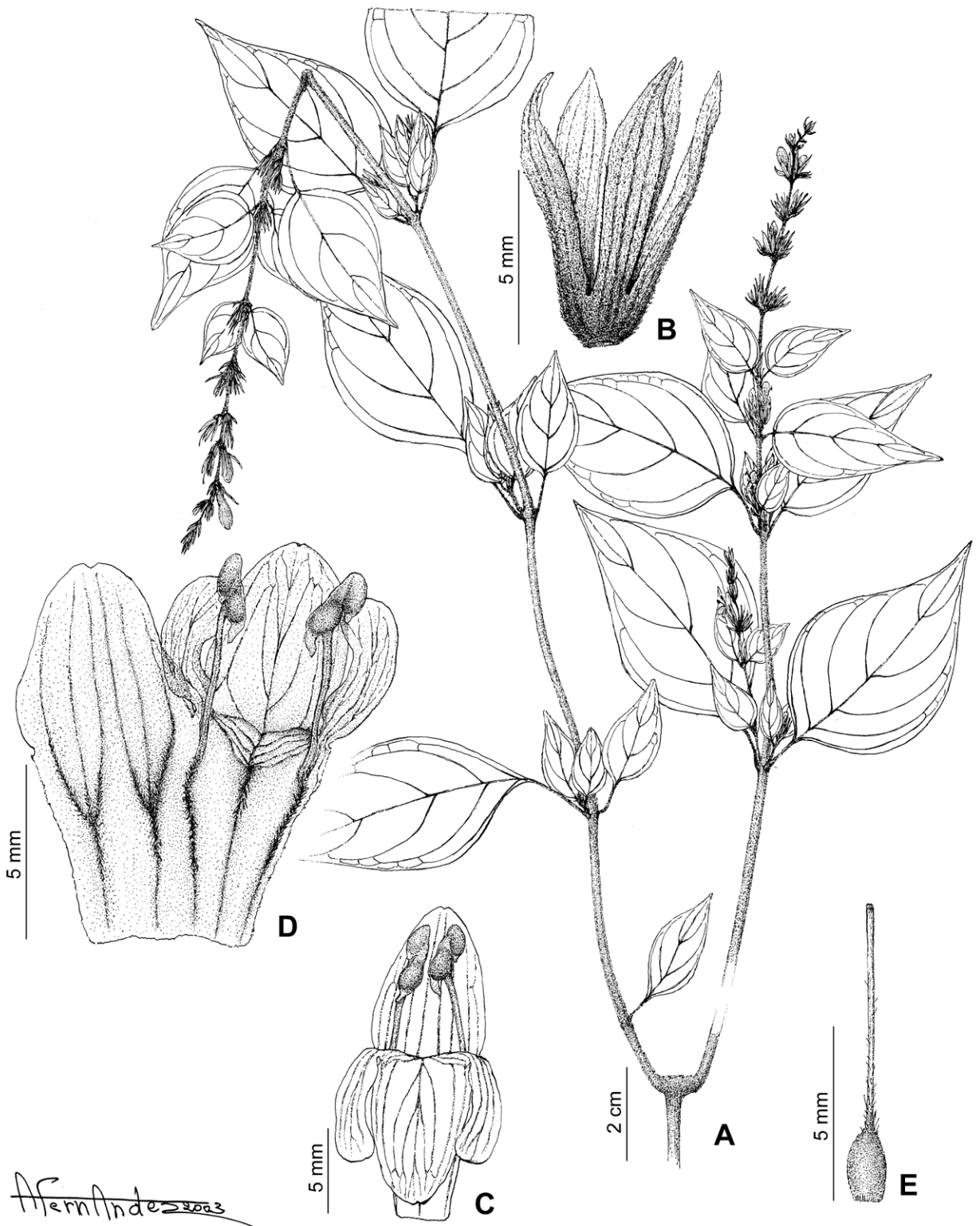


Figure 14 – *Justicia lenticellata*. A, habit; B, calyx; C, corolla; D, opened corolla; E, pistil. From de Witte 5615.

the base, smaller on the short lateral shoots; petiole 0.4–1 cm long. Inflorescence spiciform, one-sided; bracts narrowly elliptic to lanceolate, acuminate, rather scarious, pale green, 11–13 × 3 mm, the outer ones glabrous, the inner puberulent and minutely glandular; bracteoles 13–14 × 1.75 mm, puberulent, minutely glandular and ciliate; calyx 16 mm long, lobes 15 × 1.5 mm, with the same indument as the bracts, long acuminate; corolla white, flushed with mauve, 31 mm long, puberulent outside; tube 15 mm long, 11 mm wide at the throat; upper lip triangular, 16 × 13 mm, two-toothed at the tip; lower lip 16 × 11 mm, trilobed, median lobe 4 × 4.5 mm, lateral ones 3.5 × 3 mm; filament of the stamens glabrous, 14 mm long, thecae 2 mm long, inserted one above the other, the lower one with a 2 mm long, strongly curved spur; style 25 mm long, hairy on two opposed sides in its lower half; ovary glabrous, 4-ovuled, 2 mm long; disc 0.7 mm high. Capsule unknown. Fig. 13.

Distribution – A species from the Zambezian centre of endemism, endemic from Katanga, only known by the type. Fig. 9.

Habitat – Gallery forest, around 1320 m.

Remark – A very particular species, a small shrubby stout suffrutex having large corollas with the tube equalling the lips, the upper one being flat, whereas all the other large-flowered species of *Justicia* in Congo are more or less scandent shrubs with a corolla tube shorter than the lips, and a more or less hooded upper lip.

***Justicia lenticellata* Champl., sp. nov.**

Justicia linearispica C.B. Clarke propter inflorescentiam spiciformem plusminusve similis sed propter folias valde discoloras, ovatas nec lanceolatas, caulem lignosam lenticellis verrucosis valde munitam, antheras flavas nec violaceo-nigras bene differt. – Type: D.R. Congo, district du Bas-Katanga, P.N. Upemba, Kanonga, Feb. 1949, fl., fr., *de Witte* 5615 (holo-: BR; iso-: CAS, K, MO).

Shrublet or shrub 1–1.5(–2.5) m high. Stems with beige bark provided with numerous verrucose creamy lenticellae; young branches dark when dry, densely puberulous-velutinous. Lamina of the leaves ovate, cuneate at the base, acuminate to acute at the tip, strongly bicoloured, much lighter green to light blue-green below with a thin olive-green nervation, thin, fleshy, glabrous to sparsely pubescent above, densely pubescent on the nerves and sparsely so to glabrous elsewhere below, 2.7–9 × 1–4.5 cm; up to 5 pairs of lateral nerves; petiole up to 2 cm long. Inflorescences terminal and axillary, spiciform (2–)3–6 cm long, flowers by 2–3 in the lower part of the inflorescence, solitary in its upper part; axis puberulous and glandular; bracts inconspicuous, up to 4 × 1 mm, puberulous and glandular; bracteoles slightly larger than the calyx lobes; calyx lobes 7 × 1 mm, trinerved, puberulous and glandular; corolla 9.5–12 mm long, greenish white; tube 5 mm long and 3–3.5 mm wide at the throat, puberulent outside, inside pubescent, dorsally with two hairy “V” above and ventrally in its cylindrical part with three rows of hairs, two below the stamens and one central; upper lip ovate, 4.5–5 × 4 mm, emarginate, lower lip 4–4.5 × 4.5 mm, deeply trilobed, lobes very unequal, oblong, rounded at the tip, the median one the broader, 3.5–4 × 2.5–3 mm, the lateral ones

3–3.5 × 1–1.5 mm; filament of the stamens glabrous, 3–3.5 mm long; thecae 1–1.25 mm long, the upper one mucronate at the base, the lower with a spur 0.5–1 mm long; style 6 mm long, hairy at least sparsely in the lower half; ovary glabrous but slightly hairy at the tip, 1.5 mm long; disc 0.7 mm high (dissections of a 9.5 and a 10 mm long corolla). Capsule retorsely puberulent, pale brown, 13–18 × 2.5–3 mm, stipitate. Seeds brown, verrucose (verruces spaced when ripe; verruices close, conspicuous and scabrid when unripe), 3 mm in diameter. Fig. 14.

Distribution – A linking species of the Guineo-Congolian/Zambezian regional transition zone and the Zambezian centre of endemism. Fig. 9.

Other collections – **Zambia**: Kawambwa, Aug. 1957, fr., *Fan-shawe* 3539 (K); Kafweko F.R. near Lisombo River, 18 km SW of Kalene Hill, Mwinilunga distr., alt. 1350 m, Feb. 1975, fl., *Hooper & Townsend* 332 (K); Mwinilunga, May 1969, fr., *Mutimushi* 3201 (K); Chisimba Falls, Luombe River, alt. 1300 m, Mar. 1955, fl., *Richards* 5254 (K).

Habitat – Mateshi (dry evergreen forest or thicket), mushitu (gallery forest), damp woodlands close to streams, 1000–1350 m.

Remark – Superficially resembling *J. linearispica* in its inflorescence, *J. lenticellata* is a shrub with conspicuous creamy lenticellae on the beige bark, not an herbaceous plant. The inflorescence is not a simple spike as in *J. linearispica* but is only partially so as the upper half of the inflorescence bears solitary flowers and the lower half shows bracts subtending 2–3 flowers. The inflorescences are terminal and axillary. Moreover the leaves are ovate, not linear-lanceolate, and their faces are strikingly contrasting in colour.

***Justicia abscondita* Champl., sp. nov.**

Syn.: *Justicia* sp. A (Hedrén 1989: 108).

Justiciae unyorensi S. Moore persimilis sed propter corollas minores, 5–8 mm versus 6–11(–14) mm longas, capsulas minores 3.5–5 mm versus 5–7 mm longas et obtusiores, cum apicis angulo 60–90° versus 45–75°, folia partis superioris caulae multo angustiora, distributionemque zambesiacam bene differt. – Type: Burundi, mont Mutumba, Minago, alt. 1000 m, May 1971, fl., fr., *Reekmans* 598 (holo-: BR).

Erect to procumbent annual to perennial plant 35–130 cm high, stem almost glabrous or provided with appressed hairs and usually sparse to fairly numerous long glandular hairs. Lamina of the leaves lanceolate or narrowly elliptic, more rarely ovate, the upper ones two time narrower than the others, cuneate to shortly attenuate at the base, obtuse to acuminate at the tip, sparsely or more rarely fairly densely pubescent; petiole up to 1 cm long. Flowers few together in axillary completely condensed cymes; bracts ovate or narrowly elliptic to elliptic or oblanceolate, 2–5 × 0.8–2 mm, indument of fairly long stout multicellular hairs as for the leaves and with sparse long glandular hairs; calyx lobes narrowly triangular or narrowly lanceolate, 3–3.8 mm long at anthesis, slightly accrescent in fruit, with a white hyalin margin; corolla white to crimson, 5.2–8 mm long, including a tube 2.9–3.9 mm long; upper lip usually with marked purple nerves. Capsule 3.7–5.3 mm long, acute at an angle of

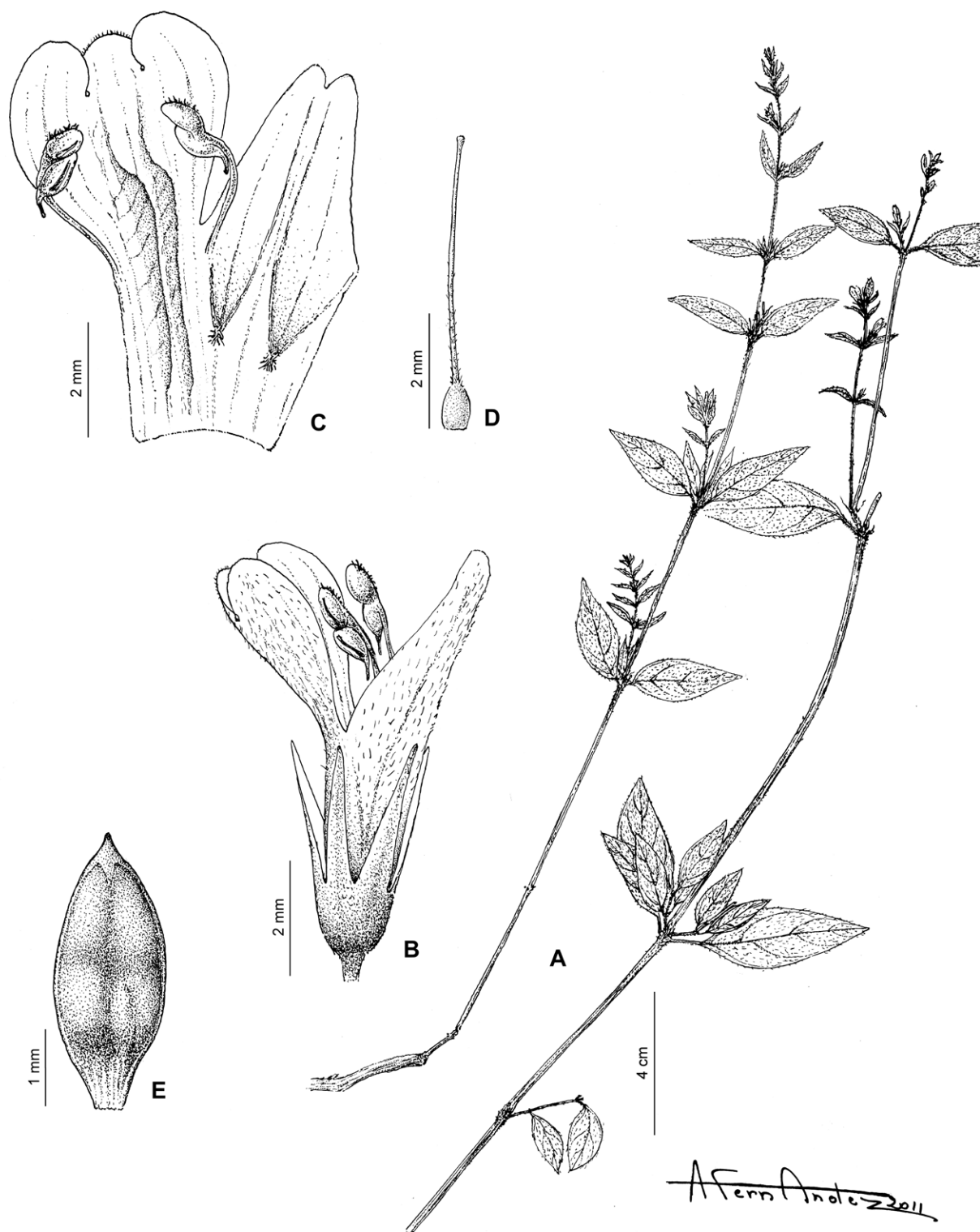


Figure 15 – *Justicia abscondita*. A, habit; B, flower; C, opened corolla; D, pistil; E, capsule. A–D from *de Witte* 3686; E from *de Witte* 454.

Key to the allied species

1. Leaves with lamina ovate-elliptic, including the upper ones; corolla 6–11(–14) mm long; capsule glabrous, 5–7 mm long, acute at an angle of 45–75° at the apex; afro-montane species occurring in sub-montane and montane forests, grasslands and fallows between 750 and 2950 m.....***J. unyorensis***
1. Leaves with lamina narrowly lanceolate to narrowly oblanceolate to lanceolate or oblanceolate, at least the upper ones; corolla not exceeding 8 mm long; capsule 3.5–5.3 mm long, pubescent or usually glabrous, acute at an angle of 60–90° at the apex; species occurring around Tanganyika Lake and Katanga, or in C and SW Tanzania, up to 1950 m2
2. Perennial plant; moniliform hairs absent of all parts; corolla white to crimson, usually with marked nerves on the upper lip, 5–8 mm long; capsule usually glabrous, 3.5–5.3 mm long, acute at a angle of 60–90° at the apex; upper leaves much narrower than the ovate-elliptic lower ones, lanceolate to linear; species occurring around Tanganyika Lake and in Katanga, in dry evergreen forest, woodlands, gallery forest or savannas between 700 and 1950 m.....***J. abscondita***
2. Annual plant; numerous moniliform hairs present, especially in the inflorescence; corolla white, sometimes with crimson markings, 6.9–7.9 mm long; capsule fairly densely pubescent, up to 4.3 mm long, acute at an angle of 60° at the apex; leaves all narrowly lanceolate to oblanceolate or lanceolate to oblanceolate; species occurring in SW and C Tanzania, in *Brachystegia* woodlands of grasslands, up to 1500 m.....***J. boaleri***

60–90° at the apex, glabrous to pubescent with retrorse hairs. Fig. 15.

Distribution – A linking species of the Guineo-Congolian/Zambezian regional transition zone, the Afro-montane and the Zambezian centres of endemism. Fig. 16.

Species also occurring in Tanzania around the Tanganyika lake.

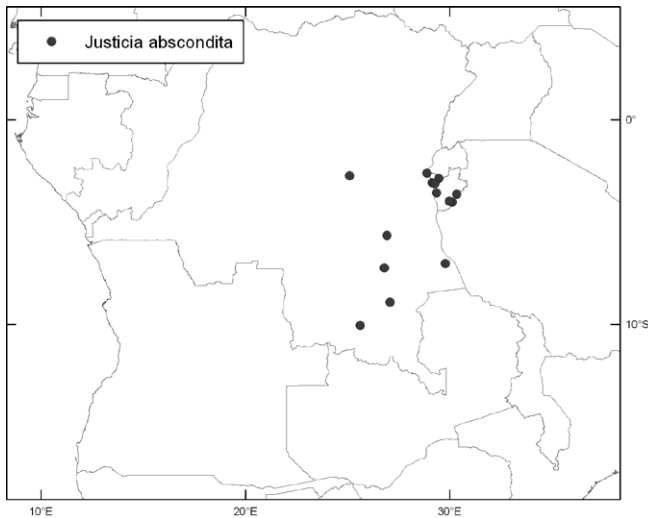


Figure 16 – Distribution map of *Justicia abscondita*.

Other collections – **D.R.Congo. District du Bas-Katanga:** Lukuga, alt. 710 m, May 1935, fl., *De Saeger* 67 (BR, CAS, K); Kiala, alt. 700 m, March 1955, fl., fr., *Thiébaud* 496 (BR, K, WAG). **District des lacs Edouard et Kivu:** Plaine de la Ruzizi, Kilima, Feb. 1950, fl., *Germain* 6345 (BR); Plaine de la Ruzizi, Sange, May 1950, fl., *Germain* 6975 (BR); Mumoshio, Apr. 1951, fl., *J. Laurent* 118 (BR). **District du Haut-Katanga:** Km 114 Kolwezi-Luena, alt. 785 m, Jan. 1986, fl., fr., *Bamps & Malaisse* 8215 (BR); Moba, Jun. 1931, fl., fr., *de Witte* 454 (BR); P.N. Upemba, riv. Mukelengia, alt.

1750 m, Apr. 1948, fl., *de Witte* 3686 (BR, CAS, K); Mpumba, Apr. 1988, fl., fr., *Pauwels* 7049 (BR).

Burundi: Gihanga, alt. 900 m, Feb. 1968, fl., *Lewalle* 2852 (BR); Cibitoke, alt. 850 m, Feb. 1968, fl., *Lewalle* 2879 (BR); Kininya, Jun. 1952, fl., fr., *Michel* 2985 (BR); Kioki, Mar. 1952, fl., fr., *Michel & Reed* 1539 (BR); Malagarasi, May 1952, fl., *Michel & Reed* 1783 (BR); Kininya, May 1952, fl., *Michel & Reed* 1868 (BR); Butetsi, May 1952, fl., fr., *Michel & Reed* 1995 (BR); Muberure, alt. 1300 m, May 1985, fl., fr., *Ndabaneze* 1780 (BR); Musongati, alt. 1700 m, May 1974, fl., fr., *Reekmans* 3346 (BR); Cibitoke, alt. 850 m, Dec. 1976, fl., fr., *Reekmans* 5622 (BR); Gihungwe, alt. 850 m, Apr. 1981, fl., fr., *Reekmans* 9950 (BR); Butare, alt. 1300 m, May 1981, fl., *Reekmans* 10275 (BR).

Tanzania: Mpanda Distr., 1 km on Kaream road from Mpanda-Uvinza road, alt. 1100 m, May 1997, fl., *Bidgood, Sitoni, Vollesen & Whitehouse* 3897 (BR); Uvinza, N of Lugufu-Kigamba, Feb. 1926, fl., fr., *Peter* 36728 (BR).

Habitat – Muhulu (dense dry forest), gallery forests, swamp forests, *Brachystegia* woodlands, savannas, 700–1950 m.

Remark – *J. abscondita* has only weak differences with *J. unyorensis* S.Moore as their diagnostic characters overlap in some degree, which is illustrated by the Latin epithet ‘*abscondita*’ meaning ‘hidden, mysterious, unclear’; *J. abscondita* should perhaps be considered only as a subspecies, but as Hedrén (1989), who revised the whole *Harnieria* section, considered it as a distinct species under *Justicia* sp. A, pertaining to its *J. striata*-group, we have decided to keep it at the specific rank. The two species could be considered as vicariant.

J. boaleri Hedrén, placed by Hedrén in the *J. mollugo*-group, resembles *J. abscondita*, but it has incompletely contracted partial inflorescences, some of them topping short lateral leafless branches reaching 2 cm long; it shows numerous moniliform hairs on the outer face of the bracts and on the corolla’s bud, the other hairs being twice shorter than those of *J. abscondita*. The bracts are rather larger and more conspicuous than those of *J. abscondita*, the stems are not provided with long glandular hairs and the leaves are much narrower. Moniliform hairs (made of a long cell topped with

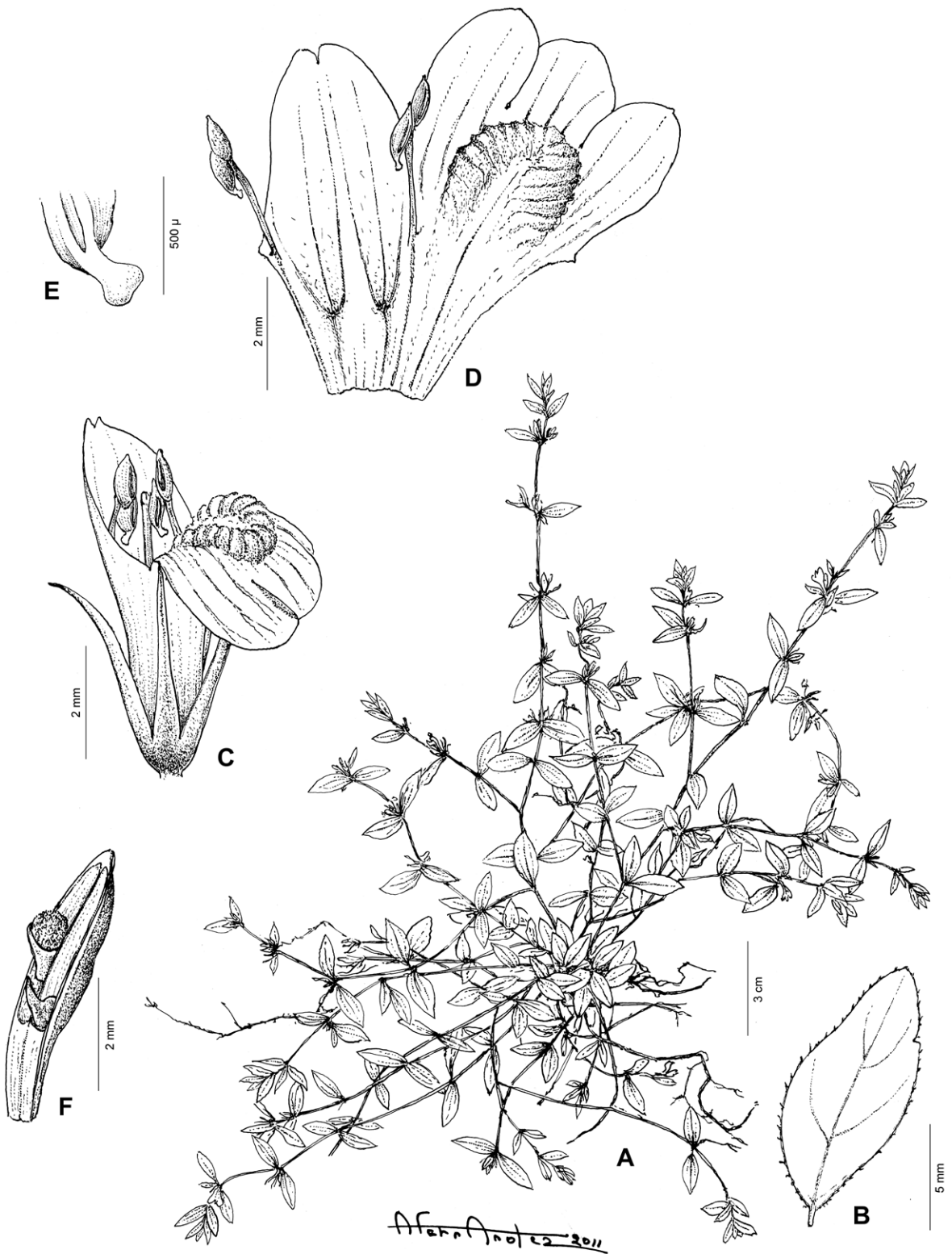


Figure 17 – *Justicia sejuncta*. A, habit; B, flower; C, opened corolla; D, pistil; E, capsule. From *Luxen* 561.

several superposed tiny cells above) are totally absent from all parts in *J. abscondita*, but are found in other species of the *J. mollugo*-group, as for instance *J. syncollotheca* Milne-Redhead.

***Justicia sejuncta* Champl., sp. nov.**

J. mariae propter thecae appendiculos discoideos proxima, sed propter habitum multicaulem decumbentem, caules duplo tenuiores sed duriores plusminusve radiantes et folia breviora elliptica-ovata nec linearia-lanceolata; propter corollam minorem, labio superno nec inferno atropurpureo-striato et antheras atropurpureas nec flavidas bene differt; propter illos duo characteres et thecae appendiculos discoideos, habitumque ab omnibus alteribus speciebus *J. molluginis* affinibus bene differt. – Type: D.R.Congo, district du Bas-Katanga, vallée de la Mulavudi, Aug. 1945, fl., fr., *Luxen* 561 (holo-: BR; iso-: K, MO, P).

Small decumbent herb with thin but hard stems 1 mm in diameter, rooting at the nodes, subquadrangular, retrorsely and shortly pubescent mainly on the angles or on two opposed sides; internodes 18–33 mm, the two or three uppermost ranging upwards between 10 and 3 mm long. **Leaves** small, lamina ovate or ovate-elliptic to elliptic-lanceolate, 9–16 × 3–10 mm, cuneate to subrounded at the base, obtuse at the tip, slightly coriaceous at least when dry, glabrous except the slightly revolute shortly ciliate margin; petiole 1–3 mm long, absent in the upper leaves. **Flowers** few together in the leaf axils, with bracts and calyx shortly ciliate at the margin; **bracts** about 4 × 1 mm, oblanceolate; **calyx** 4 mm long, slightly accrescent in fruit, with narrowly triangular lobes 3 × 0.4 mm, green with a hyalin basis and a faint hyalin margin in the lower one third of their length; **corolla** deep pink, 6.5–7.5 mm long, slightly puberulent outside; tube 3.5 mm long, 2.5 mm wide at the throat, inside with two adaxial hairy protuberances at 1.5 mm from the base and one abaxial median patch of hairs at the same level than the adaxial ones; throat black-purple spotted; upper lip 3.5 × 2.5 mm, oblong, emarginate at the tip, with longitudinal black purple streaks; lower lip 4 × 5.5 mm, usually unspotted, sometimes pink-

red spotted, trilobed, median lobe 2 × 2 mm, lateral ones 2 × 1.5–1.75 mm; base of the lower lip strongly gibbous, with a deep central furrow dividing it into two parts which are in turn transversely wrinkled; **filament of the stamens** glabrous, 1.5–2 mm long; **anthers** glabrous, 1.5 mm long, lower theca 1 mm long, upper theca 0.75 mm long, inserted 0.5 mm higher than the lower, both thecae bearing a membranous appendix at the tip, the lower theca with a basal white disc-like appendage 0.25 mm in diameter; **style** 3.5 mm long, sparsely hairy in the lower half. **Capsule** glabrous, 5.5–6 mm long, very shortly stipitate. **Seeds** 1 mm in diameter, cocoa brown, with more or less elongated transversely placed tubercules. Fig. 17.

Distribution – A species from the Guineo-Congolian regional transition zone, endemic to Katanga, only known from the type-locality in Bas-Katanga. Fig. 18.

Habitat – Savanna on loamy soil in valley.

Vernacular name – Pempa (dial. Tshiluba).

Remark – *Justicia sejuncta* belongs to the section *Harnieria*, *J. mollugo*-group. This group encompasses small slender herbs, with condensed axillary inflorescences to solitary flowers, relatively closed corollas which never produce the 1-seeded weakly spiny fruits typical of the *J. striata*-group.

J. sejuncta is close to *J. mariae* with its discoid thecae's appendage, but seems to be outcrossing (stamens bending out of the corolla after pollen release) like *J. richardsiae* it also resembles in its habit. *J. sejuncta* is one of the three species of the group which has black-purple anthers, one of them, *J. amanda*, differing in its solitary flowers with much larger corollas (at least 15 mm long) and thecae provided with an acute spur, and the other, *J. lovoiensis*, with thecae bearing also a basal discoid appendage but differing in its erect habit, its very narrow, linear leaves and in its much larger corolla.

The epithet *sejuncta*, meaning separate, refers to the wide areal disjunction of this species in relation to the other members of the group, which all inhabit the Zambezian centre of endemism.

The first dichotomy of the key to the *J. mollugo*-group species given by Hedrén (1988) can be modified as herewith.

Modification of key to species of *J. mollugo*-group

1. Appendix of lower theca short, broad and flattened.....2
1. Appendix of lower theca rather long and narrow.....other species of the *J. mollugo*-group
2. Anthers pale yellow; lamina of the leaves narrowly lanceolate to lanceolate, 24–26 × 4–7.5 mm, pubescent only in the lower 1/5–1/4; corolla 8.5–13 mm long, bluish-purple with a purplish/white pattern on the lower lip near the throat; capsule hairy at the tip, obtuse at an angle of 120° at the apex; seeds about 1 mm in diameter, with radially arranged ridges.....***J. mariae***
2. Anthers dark purple; lamina of the leaves ovate to ovate-elliptic or linear to linear-elliptic, ciliate or glabrous to entirely pubescent; corolla pink or deep pink to bluish-pink, with purple streaks on the upper lip; capsule glabrous, acute at an angle less than 100°.....3
3. Lamina of the leaves ovate or ovate-elliptic to elliptic-lanceolate, ciliate, 9–16 × 3–10 mm; corolla 6.5–7.5 mm long, deep pink; capsule 5.5–6 mm long; seeds 1 mm in diameter, cocoa brown, with more or less elongated transversely placed tubercules.....***J. sejuncta***
3. Lamina of the leaves linear to linear-elliptic, glabrous to entirely pubescent, 15–35 × 1–2 mm; corolla 12–12.5 mm long, pink to bluish-pink; capsule 9 mm long; seeds 2–3 mm in diameter, blackish, tuberculate.....***J. lovoiensis***

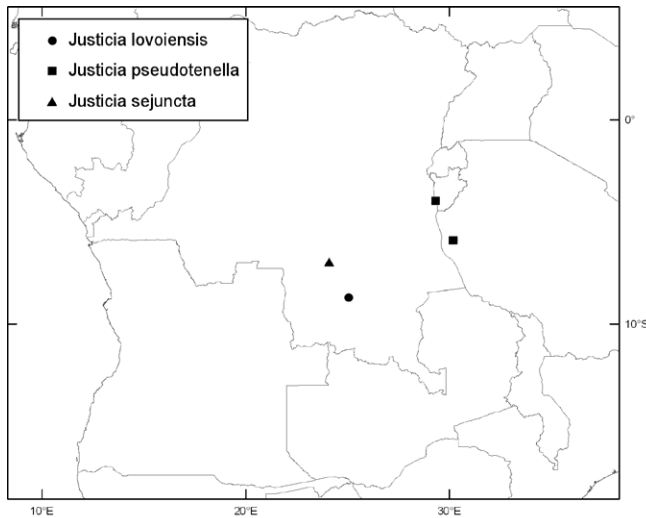


Figure 18 – Distribution map of *Justicia sejuncta*, *Justicia lovoiensis* and *Justicia pseudotenella*.

Justicia lovoiensis Champl., sp. nov.

Justicia mariae proxima sed foliis linearibus nec lanceolatis, glabris vel pubescentis nec cum pilosis sole ad laminae basim limitatis, floribus semper solitariis nec aliquando aggregatis, bracteis angustioribus, corolla maiora; antheris atropurpureis nec pallide flavis bene distinguitur. – Type: D.R.Congo, District du Bas-Katanga, Kamina, riv. Lovoi, fl., May 1932, *Quarré* 3045 (holo-: BR; iso-: CAS, K, MO).

Herbaceous erect plant 25–55 cm high; stems few together, slender, glabrous to pubescent. **Leaves** sessile with lamina linear to very narrowly elliptic, 1.5–3.5 × 0.1–0.2 cm, glabrous to pubescent. **Flowers** axillary, solitary; bracts linear to narrowly oblanceolate, 6–10 × 0.7–0.9 mm; **calyx** pubescent or glabrescent, 6–7 mm long, with acuminate lobes about 0.6 mm wide; **corolla** pink or bluish pink, with the upper lip paler and more or less strongly striped with dark purple; tube 6.5 mm long and 4 mm wide at the throat; upper lip ovate-oblong, 5.5–6 × 4.5 mm, shortly slitted at the tip; lower lip elliptic-obtrapezoidal, 7–8 × 6–8 mm, with a strong swelling bearing herring-bone venation at the base, trilobed; median lobe 3 × 2.5–3 mm, the lateral ones 3 × 2–2.5 mm; **filament of the stamens** glabrous, 3.5–4 mm long; **anthers** dark purple, with upper theca 1 mm long and dorsally pubescent, and lower theca 1.5 mm long, provided at the base with a broadened flattened, trapezoidal spur truncate and slightly bilobed at the tip, 0.3–0.4 mm wide; **style** 7 mm long, pubescent with antrorse hairs. **Capsule** 8.5–9 × 3 mm, including the stipe 2 mm long. **Seeds** 2–3 mm in diameter, blackish, verrucose and slightly rugulose. Fig. 19.

Distribution – A linking species between the Guineo-Congolian/Zambezian regional transition zone and the Zambezian centre of endemism. Endemic to Katanga in Congo. Fig. 18.

Other collection – D.R.Congo. District du Haut-Katanga: Plateau des Bianco, à 40 km entre le N et le NNW de Tenke, alt. 1600 m, Jan. 1984, fl., *Schajjes* 2193 (BR).

Habitat – Steppic savannas, dambos, in very wet mud, up to 1600 m.

Remark – The species belongs to the section *Harnieria* and is close to *J. mariae*, which grows in the same kind of habitats.

J. lovoiensis differs from the latter by its dark purple, not pale yellow anthers, its trapezoidal spur, its larger corollas and narrower bracts and leaves which are either glabrous or entirely pubescent, whereas they are pubescent only in the lower 1/5–1/4 in *J. mariae*. In addition, the flowers are always solitary in *J. lovoiensis*, whereas *J. mariae* can show clusters of several flowers (flowers axillary in both species).

Justicia pseudotenella Champl. & Vollesen

Justicia sp. E (Darbyshire et al. 2010: 552)

Justicia tenellae in summo similis sed bracteis ellipticis apice acutis, duplo quam latis longioribus nec rotundatis apice rotundatis tam sed fere tam latis quam longis; foliis corollisque valde maioribus, stylo pubescente nec glabro; *Justicia (Rungia) congoensis* similis sed bracteis ellipticis apice acutis, duplo quam latis longioribus nec rotundatis apice rotundatis tam sed fere tam latis quam longis; corolla plus quam duplo maiora, stylo pubescente nec glabro, placentis nec cum intentione ab capsulae parietibus abscindientibus bene distinguitur. – Type: Tanzania, Mpanda Distr., Ntakatta Forest, alt. 1100 m, Jun. 2000, fl., *Bidgood et al.* 4657 (holo-: K; iso-: BR).

Erect ascendant herbaceous plant 19–40(–45) cm high, rooting at the lower nodes; stem more or less retrorsely puberulent. **Lamina of the leaves** thin, ovate, 2–8 × 1.3–3.5 cm, cuneate-attenuate at the base, acuminate at the tip, sparsely and shortly pubescent above, shortly pubescent on the nerves below; 3–6 pairs of lateral nerves; petiole 0.6–3 cm long. **Inflorescence** a short spike 2.5–3.5 cm long with laxly imbricate bracts; **bracts** narrowly elliptic to obovate, puberulous, 3.5–4.5 × 1–2 mm, with a narrow hyaline white margin up to 0.5 mm wide; **bracteoles** linear, 2 mm long; calyx 3 mm long, puberulous; **corolla** white, 6–6.5 mm long, externally puberulous; tube 3–3.5 mm long and 2 mm wide at the throat; upper lip triangular, strongly attenuate towards the tip, 3 × 2 mm, slightly emarginated; lower lip obtrapezoidal, 3 × 3 mm, with median lobe 1.5–2.5 × 1.5–2 mm, rounded, lateral lobes 2 × 1 mm; **filament of the stamens** glabrous, 1.5 mm long; **anther** with upper theca 0.6 mm long, the lower one 0.9 mm long with a 0.5 mm long thin spur; **style** 3.5–4 mm long, pubescent in the lower half with retrorse hairs; ovary glabrous. **Capsule** unknown. Fig. 20.

Distribution – A species from the Afromontane centre of endemism. Fig. 18.

Other collection – Burundi: Vallée de la Siguvyaye, alt. 1900 m, Sept. 1974, fl., *Reekmans* 3575 (BR, LG).

Habitat – Evergreen forest along stream, gallery forests, 1100–1900 m.

Remark – The species shows the same distribution as *Anisosepalum lewalliei* Bamps, which was first discovered in the Siguvyaye Valley in Burundi and a long time considered as endemic to that locality but was recently found in NE Tanzania, Mpanda Distr., Uzondo Plateau, at 5°29'S 30°32'E. *Justicia pseudotenella* was collected in the same general area as

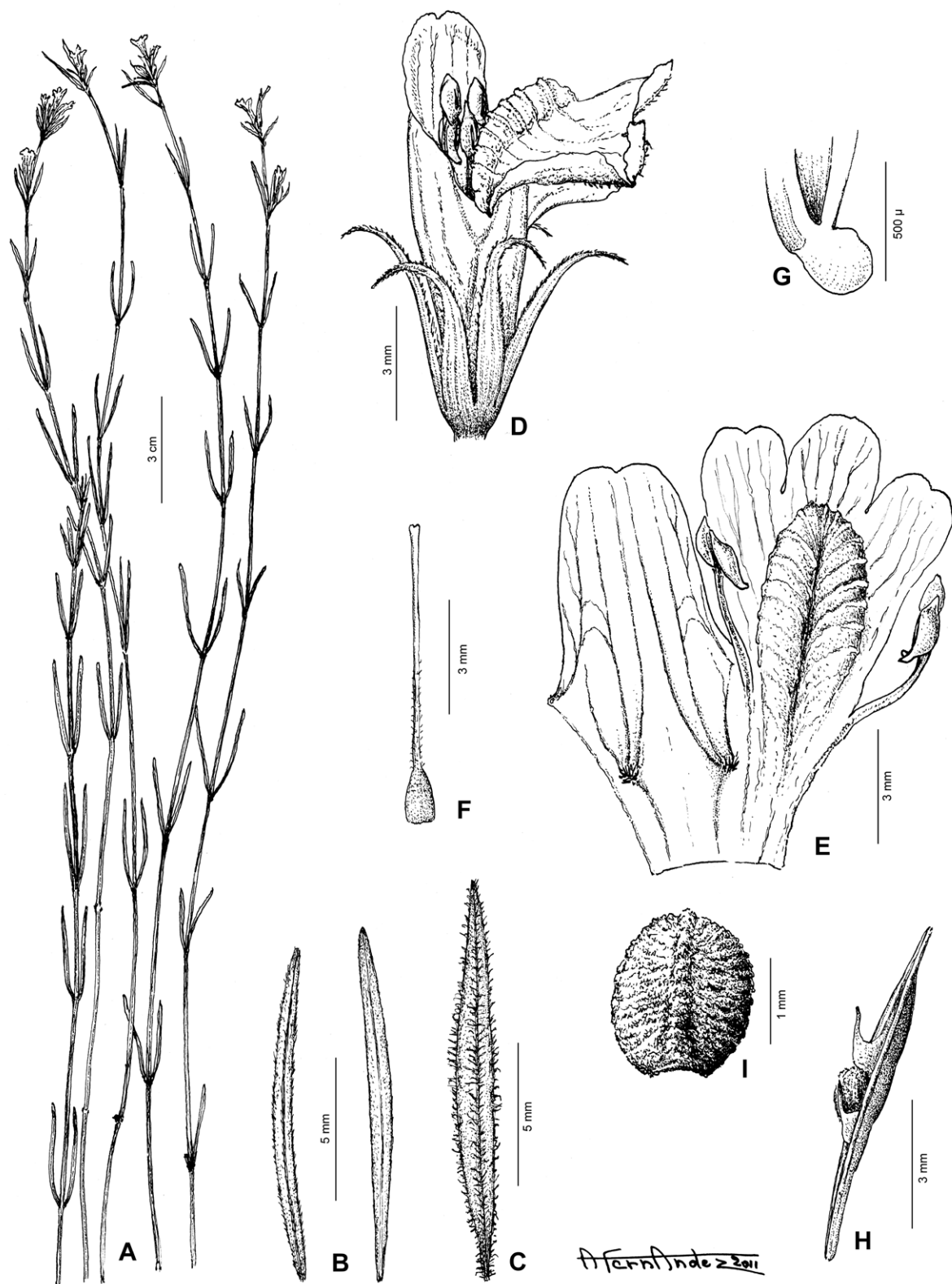


Figure 19 – *Justicia lovoiensis*. A, habit; B, two leaves of two different stems; C, leaf of another plant; D, flower, E, opened corolla, F, pistil, G, detail of the spur; H, one valve of the capsule; I, seed. A, B & D–I from *Quarré* 3045; C from *Schaijes* 2193.

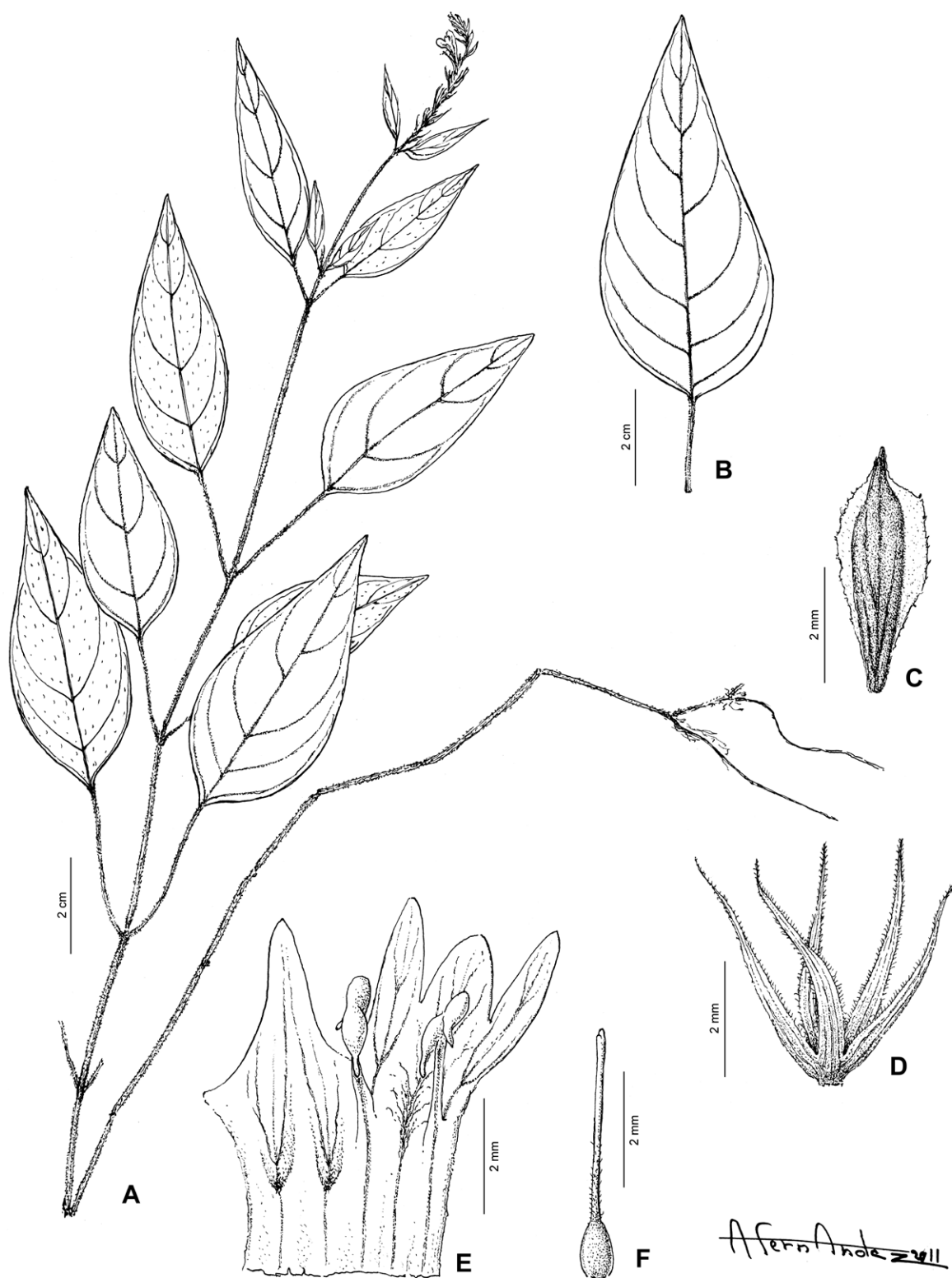


Figure 20 – *Justicia pseudotenella*. A, habit; B, larger leaf; C, bract; D, calyx; E, opened corolla; F, pistil. A & C from *Reekmans* 3575; B & D–F from *Bidgood et al.* 4657.

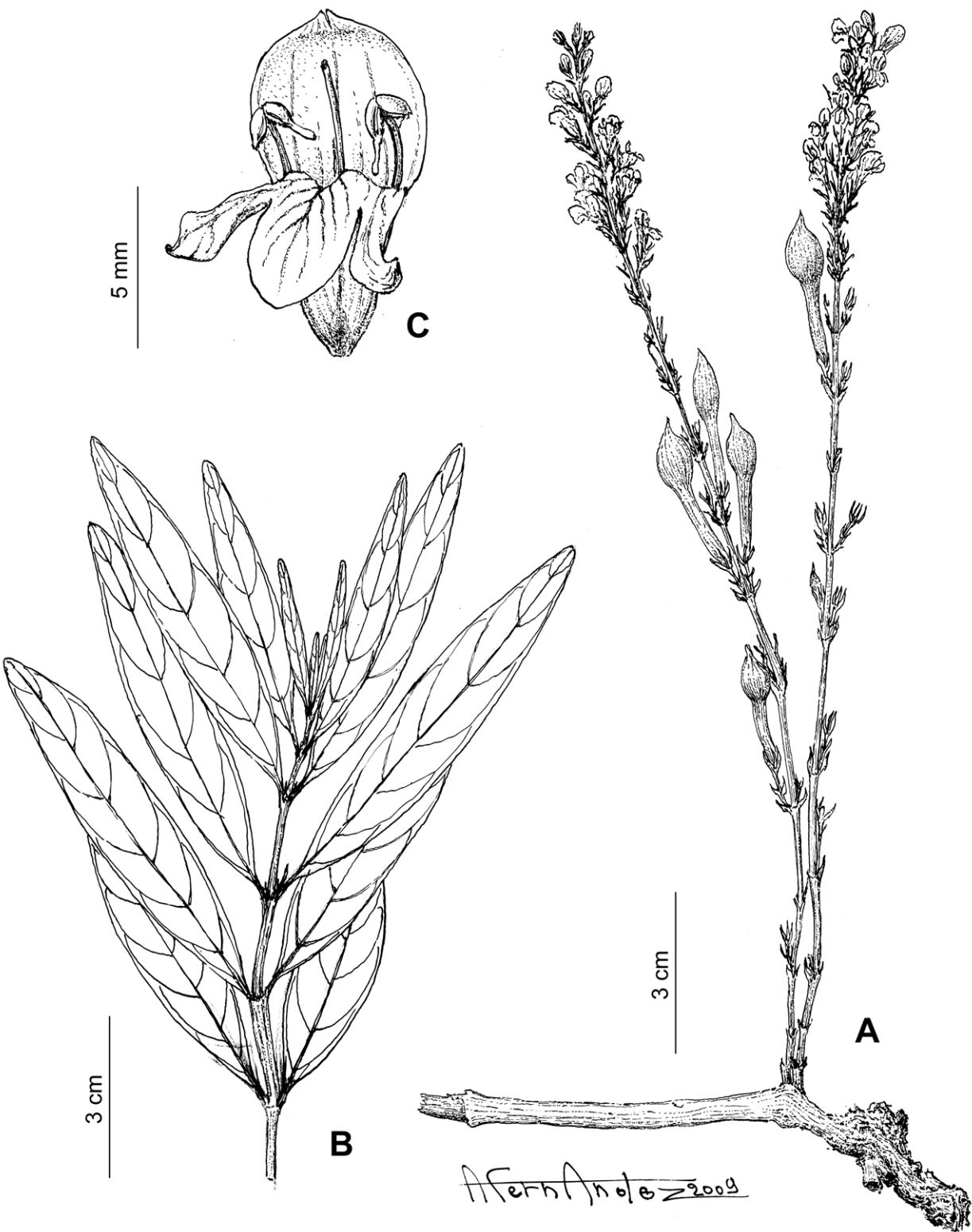


Figure 21 – *Justicia bequaertii*. A, habit of a leafless flowering/fruiting stem; B, leafy stem; C, corolla. From Schmitz 7443.

A. lewallei, in Tanzania at 5°56'S 30°13'E and in the Siguvy-aye Valley in Burundi.

Overlooked species and new synonymy

Justicia bequaertii De Wild. (De Wildeman 1914: 429). – Type: Congo, District du Bas-Katanga, Bukama, Jun. 1911, fl., fr., *Bequaert* 108 (holo-: BR).

Justicia praecox (Milne-Redhead) Milne-Redhead (Milne-Redhead 1953: 444), **syn. nov.** – *Monechma praecox* Milne-Redhead (Milne-Redhead 1937: 430), **syn. nov.** – Type: Zambia, Solwezi, Sept. 1930, fl., *Milne-Redhead* 1150 (holo-: K).

A very characteristic suffrutescent plant up to 40 cm high with very large capsules in relation to the size of the plant. The plant rarely shows leafy flowering stems; it occurs mostly in frequently burned savannas and, after fire, the plant produces leafless flowering sprouts and afterwards new purely vegetative leafy shoots. In the field, tufted leafless flowering and fruiting shoots are the most common form of the species; less often both leafless and leafy shoots are produced at the same time and can be seen on the same thick rootstock, the rarest form being the leafy flowering shoot (see holotype), which can apparently develop only in case of absence of fire. The species blossoms en masse after savanna fires.

J. bequaertii has been overlooked in BR, as it was only represented by the type, a flowering leafy shoot. All the other specimens were kept in the unidentified material probably because having for the main part of them only leafless flowering stems, they do not look similar to the holotype at first sight; a few specimens only have separate vegetative and flowering stems. Only two specimens bearing leafy flowering stems have been seen, one from Zambia and one from Katanga.

The species was described as *Monechma praecox* by Milne-Redhead because it produces only two seeds, but the seeds in *Monechma* are always smooth whereas in *Justicia* they are ornamented, and there are four ovules; two of them can abort before maturity, which is the case here.

Description of the species – *Leaves* subsessile or shortly petiolate, lamina oblanceolate to narrowly elliptic, 2.2–8 × 0.8–2.2 cm, rounded or more rarely acute at the tip, light green to yellowish green when dry. *Inflorescence* a loose panicle of long spikes or narrow spiciform branches most often on leafless stems resprouting after fire (one or several flowers at the axils of the bracts: often one flower per bract in the upper part of the inflorescence and 2–3 flowers, sometimes in shortly pedunculate condensed fascicles, at the axils of the lower bracts); *corolla* white or cream to yellow, normally with a red-brown blotch or purple to brown spots at the throat, 8.5–12 mm long, upper lip hooded, lower lip deeply trilobed, the median lobe twice as broad as the lateral ones; *anthers* green-yellow. *Capsule* densely puberulent, yellow brown, 2.2–3.7 cm long, held parallel to the axis of the inflorescence, as the flowers. *Seeds* 2.6–8 × 5–7 mm, rugulose-tuberculate, greenish-cream, with a vertical median ridge. Fig. 21.

Distribution – A linking species of the Guineo-Congolian/Zambezian regional transition zone and the Zambezian centre of endemism. Fig. 22.

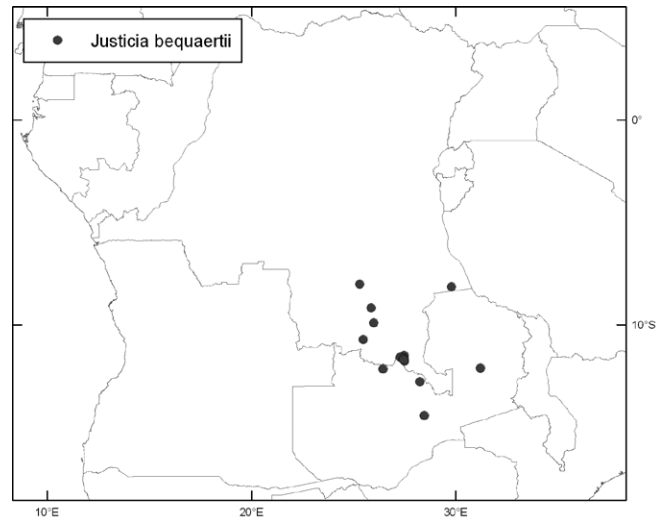


Figure 22 – Distribution map of *Justicia bequaertii*.

Other collections – **D.R.Congo. District du Bas-Katanga:** Km 31 Kamina-Kabongo, leafy shoots, Sept. 1957, fl., *Schmitz* 5644 (BR, K). **District du Haut-Katanga:** Luiswishi, alt. 1208 m, Aug. 1973, fl., fr., *Bulaimu* 692 (BR); *ibid.*, Sept. 1982, fl., *Malaisse* 12349 (BR, WAG); *ibid.*, Sept. 1984, *Malaisse* 13159 (BR); Lubudi, 1937, fl., *Cabu* 20 (BR); Munama, Oct. 1932, fl., *Kerkvoorde* 183, 190, 208 (BR); Mine de Luiswishi, alt. 1320 m, Nov. 2001, *Lefèbvre, Leteinturier & Malaisse* 30 (BR); Lubumbashi, alt. 1250 m, fl., fr., Oct. 1970, fr., *Malaisse* 6687 (BR); Lupoto, Oct. 1978, fl., fr., *Malaisse* 9582 (BR); Lubumbashi, Oct. 1927, fl., leafy shoots, *Quarré* 740 (BR, CAS, K); Munama, Oct. 1928, fr., *Quarré* 1372 (BR); Lubumbashi, Oct. 1935, fl., *Quarré* 4703 (BR, K, MO, P, WAG); *ibid.*, Dec. 1937, fl., *Quarré* 4981 (BR, K, MO, PRE, WAG); km 10 piste Kolwezi-ancien bac de la Lualaba, alt. 1350 m, Aug. 1988, fl., *Schajjes* 4039 (BR); Lubumbashi, Sept. 1951, fr., *Schmitz* 3686 (BR); *ibid.*, Sept. 1954, fl., *Schmitz* 4729 (BR); *ibid.*, Sept. 1954, *Schmitz* 5201 (BR); Karavia, Oct. 1961, fl., fr., leafy shoots, *Schmitz* 7443 (BR); Keyberg, alt. 1200 m, Oct. 1956, fl., fr., *Symoens* 2938 (BR).

Zambia: Mporokoso-Mkupa, Oct. 1949, fl., fr., *Bullock* 1385, 1362 (K); Kitwe, Nov. 1966, fl., fr., *Fanshawe* 9826 (K); Chingololo-Solwezi, Sept. 1947, fl., fr., *Greenway & Brenan* 8128 (K); Kambya, Kawambwa, Oct. 1963, fl., *Mutimushi* 392 (K); Broken Hill, July 1920, fl., *Rogers* 26153 (K).

Habitat – In regularly burnt vegetations: damp savannas on sand, savannas on red clayish soil, dambos, *Imperata cylindrica* loamy fallows, degraded woodlands, more rarely copper deposits (probably in poisoned dambos), around 1200–1350 m (Congo); dambos, chipya scrubs, *Brachystegia* woodlands (Zambia).

Additional record

An additional specimen of *Justicia scutifera* (Champluvier 2002) has been found in the unidentified material of *Di-cliptera* in BR: D.R.Congo, district du Kasai, Panzi, 1925, *Vanderyst* 16937 (BR). The species is now represented in BR

by five specimens from Kasai, one from Katanga (holotype) and in K by one specimen from Angola.

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