

Preliminary revision of the genus *Sopubia* (Scrophulariaceae) in Madagascar

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ABSTRACT

The Malagasy taxa of the genus *Sopubia* Buch.-Ham. ex D. Don are revised, including a discussion of the type species, *S. trifida*, a variety of which inhabits Madagascar. Two new species are described, *S. lemuriana* and *S. gracilis*, and one new synonym is mentioned. A key to the species is provided, along with descriptions, illustrations, and data on their distribution.

KEY WORDS
Sopubia,
Scrophulariaceae,
Madagascar.

RÉSUMÉ

Les espèces malgaches du genre *Sopubia* Buch.-Ham. ex D. Don sont révisées, avec une discussion du type du genre, *S. trifida*, dont une variété se trouve à Madagascar. Deux espèces sont décrites comme nouvelles, *S. lemuriana* et *S. gracilis*, et un synonyme nouveau est mentionné. Une clé des espèces ainsi que des descriptions, des illustrations et des données sur leur répartition sont présentées.

MOTS CLÉS
Sopubia,
Scrophulariaceae,
Madagascar.

INTRODUCTION

The genus *Sopubia* Buch.-Ham. ex D. Don comprises about 25 to 30 species, most of them in the Old World tropics. The genus is based on a somewhat problematic type species, *S. trifida* Buch.-Ham. from Nepal, first described in 1825. The concept of the genus rests on the structure of the androecium consisting of four stamina, each with two different thecae, one normal-sized and fertile, the other sterile and reduced in size.

BENTHAM (1846) already puts the genus into the tribe Gerardiaceae, in which it is still placed today. However, because of the unequal thecae, he distinguishes within the tribe a group of several genera (besides *Sopubia* *Graderia*, *Harveya*, *Aulaya*, which was later merged with *Harveya*, and *Centranthera*) as "Sopubieae" and opposes them to the "Gerardiaceae verae". Neither VON WETTSTEIN (1891) in his treatment of the Scrophulariaceae in ENGLER & PRANTL's "Natürliche Pflanzenfamilien" nor later authors subscribe to this formal distinction as a subtribe. Nevertheless, the morphology of the antherae is still the taxonomic criterion on the basis of which *Sopubia* is singled out in most taxonomic keys.

The species of *Sopubia* known today are subshrubs or herbs with subtrotate corollae and elegant, linear to lanceolate, simple or dissected leaves. They live as hemiparasites in the dry or moist grasslands at higher altitudes or in or near swampy areas including disturbed or cultivated ground such as rice paddies in the lowlands.

BENTHAM (1846) was the last (and, apart from George DON 1838, the only) author to revise the genus worldwide. He lists six species, among them *S. trifida* var. *madagascariensis* as the only species then known from Madagascar. Subsequently, BAKER (1882 and 1886) described two new species, one of which (*S. stricta* Baker) now turns out to be *Micrargeria filiformis* (Schum. & Thonn.) Hutch. & Dalziel. BONATI (1927) still lists the three species in his catalogue of Scrophulariaceae collected in Madagascar for the Muséum d'Histoire Naturelle at Paris. However, his description of *S. stricta* relates to a plant with a more zygomorphic flower and there-

fore already seems to indicate its true identity as *Micrargeria*.

Since BONATI's catalogue no further study on *Sopubia* in Madagascar has been published. When reviewing herbarium specimens for the treatment of the genus within the "Flore de Madagascar et des Comores" we realized that some of the specimens could not be placed in either one of the three (resp. two) known species. On the other hand, these specimens did not seem to relate to the African specimens of *Sopubia* seen earlier for a planned worldwide revision of the genus. This study consequently identifies two new species of *Sopubia* from Madagascar and investigates the taxonomic relations between the Malagasy species and species of *Sopubia* from neighbouring floral regions.

MATERIAL AND METHODS

This study is based on the investigation of dried specimens mainly from the Paris herbarium (P). In addition, the following herbaria were consulted (abbreviations according to HOLMGREN et al. 1990): BONN, BR, FR, K. M. Material collected by E. FISCHER during a field trip to Madagascar in 1993 and fixed in Ethanol was also studied. All quoted specimens have been seen unless indicated otherwise.

GENERAL CONSIDERATIONS

We set out from BENTHAM's description of *S. trifida* var. *madagascariensis* which is the only description of this species from Madagascar available today. According to BENTHAM, *S. trifida* var. *madagascariensis* is a perennial (as HAMILTON describes the type from Nepal) herb, branched, with simple or rarely trifid leaves and purple flowers. While his description is so general that it matches most of the material seen, it does not fit in particular a number of specimen with white flowers. We noted furthermore that, while there is little variation in leaf characters and flower morphology, the size and number of flowers, the length of their pedicels and the general habit of the plants vary considerably.

HANSEN (1975) describes the type specimen of *S. trifida* in his revision of East African *Sopubia*,

as a slender herb with two or three stems extending from the thickened lower part of the stem. From this he concludes that the plants are likely to be perennials. Based on this character he distinguishes the type and other Asian material from the—annual and yellow-flowered—*S. eminii* Engl. According to HANSEN, all African material named *S. trifida* falls under *S. eminii*, making *S. trifida* a purely Asian species. MIELCAREK (1996) subsequently treated *S. eminii* as a subspecies of *S. parviflora* Engl. We have little doubt that these two taxa are at least very closely related.

BENTHAM, and earlier George DON (1838), describe a second possible colour for the flowers of *S. trifida*, yellow with a purple centre, based on collections by EDGEWORTH and ROYLE (not yet seen by us). BONATI (1927) still mentions both colours, but most modern Asian Florae describe *S. trifida* solely as a yellow-flowered branched annual herb (for example YAMAZAKI 1985, 1990). BENTHAM already suspected a confusion of two species, *S. trifida* sensu HAMILTON and the yellow-flowered species, for which a new name will most probably be required. The Malagasy specimen of *S. trifida* match BENTHAM's description of the variety *madagascariensis* well, whereas *Sopubia* of the yellow type (much branched and with an annual appearance) seem to be missing. *Sopubia trifida* var. *madagascariensis* Benth. is therefore retained as the appropriate name.

BAKER (1882, 1886) described two new species of *Sopubia* from Madagascar, based on acquisitions by R. BARON. The first, *S. stricta* Baker, the type of which (*Baron 2709*) is represented by a duplicate sheet in P, along with other specimens of *S. stricta* from Madagascar, proved to be identical with *Micrargeria filiformis* (Schum. & Thonn.) Hutch. & Dalziel. The name "*stricta*" would have been illegitimate anyway, since George DON already used the same to describe a collection by WALLICH from Burma, which differs in some characters from BAKER's description.

Sopubia triphylla Baker as the second of BAKER's new species has simple, unbranched stems, upright, simple, and comparatively short leaves in whorls of three, and flowers in the same disposition. Neither BARON nor BAKER specifies the

colour of the flowers. Neither do they mention the plant's life cycle (annual vs. perennial). However, the name is valid and the description fits a number of Malagasy perennial, pale purple-flowered specimens well.

Among the remaining material, two groups could be identified whose set of characters do not match either the description of *S. trifida* or that of *S. triphylla*. One group has white flowers in a lax inflorescence, few mostly trifid leaves with large internodes, distinctively reflexed bracts, and an annual root system. The second group consists of smaller plants with small pale purple flowers, much branched stems, and simple leaves. Both groups are in the following described as new species.

Some two dozen specimens, mostly older or without the decisive parts for a proper determination, could not be assigned to one of those four species. It cannot be excluded, in the light of the material seen so far, that more than four species exist on Madagascar. Further studies might therefore produce one or two additional new descriptions.

IMPORTANT GENERIC CHARACTERS

We find that, in accordance with previous authors, the genus *Sopubia* is well defined by its anther morphology. The existence of one reduced, sterile theca and the shape, size, and the long-haired margins of the stomium of the fertile theca seem to be very constant throughout the genus. All four anthers are coherent at anthesis. The androecium of *S. gracilis* (Fig. 1) is given as an example. We did not notice any remarkable variations between the African, and Malagasy material and Asian material of *S. trifida* seen. Where the anther structure differs from this pattern, as in *S. delphinifolia* G. Don (treated as synonymous with *S. fastigiata* Bonati by YAMAZAKI 1985, 1990), further studies might lead to the conclusion that this species should not be included in the genus.

Another typical character seems to be the pattern of pilose and glabrous longitudinal rows along the stems and branches. A part of the stem of *S. trifida* (Fig. 2) is given as an example. At

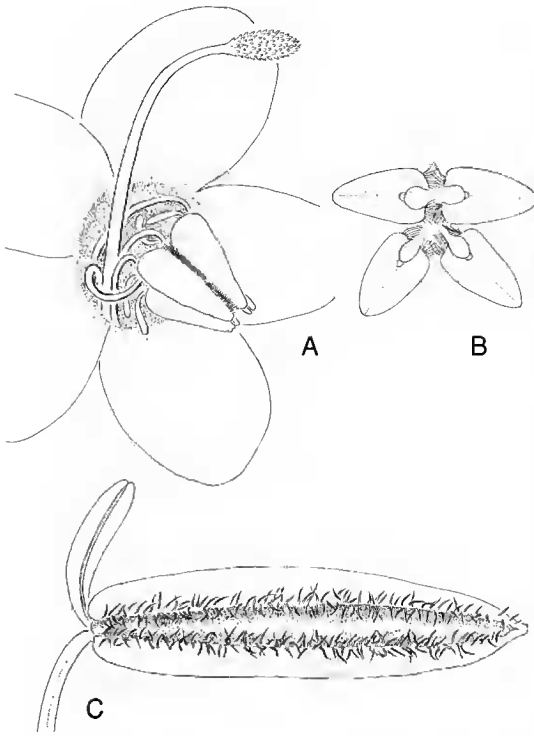


Fig. 1.—A, arrangement of stamens in *Sopubia*; B, frontal view; C, stamen, showing hairy margin of the stomium. All from *S. gracilis*, Keraudren 165).

the nodes, pilose rows split in the middle, each half branching off to, and continuing on the margin of the neighbouring cauline leaf. Glabrous strips end immediately below the insertion point of the leaves at the stem. Above the leaves, new pilose strips continue along the stem. If a leaf axil carries a branch or pedicel, the ad- and the abaxial sides of the branch or pedicel are pilose, too. This pubescence can be rather dense to sparse. In drying, the rows of hairs tend to thin out, sometimes giving the plant a wholly glabrous appearance:

Lastly, the hair pattern of the calyx is distinctive. As in cauline leaves and bracts, the outside margins of the calyx lobes and, to a lesser extent, the midrib are pilose with short, recurved hairs on whitish-hyaline cushions (in all four species these cushions merge into a whitish crust when drying). The inner tips and margins of the calyx

lobes are covered with long woolly-tomentose hairs. The inside of the calyx tube is glabrous.

Some of these characters have been mentioned for one species or another. They have not, however, been recognized as distinguishing characters for the genus (with the exception of the anthers consisting of one fertile and one sterile theca). We feel that a revised concept of the genus should put some emphasis on these characters as well.

PHYTOGEOGRAPHY

The four Malagasy species do not match any of the African species seen by us so far. The Malagasy *S. triphylla* bears some resemblance in its general habit to the pan-African *S. mannii* Skan var. *tenuifolia* (Engl. & Gilg) Hepper, but differs in some leaf and flower characters. A closer study of the Asian material still pending, the Malagasy *S. trifida* as a purple-flowered perennial seems to be very similar to some specimens labeled as *S. trifida* seen from Sri Lanka and India itself. *Sopubia triphylla*, *S. lemuriana*, and *S. gracilis* are most probably Malagasy endemics.

Sopubia is well represented in tropical Africa with approximately 15 to 20 species, and probably has its centre of diversity in the highlands to the East of the continent. The species reported from the Southwest, in particular from Angola and Namibia, seem to deserve a closer look; see for example CUCCUINI (1991). In the North, *Sopubia* reaches up to the borders of the Saharo-Sindic region (Chad, Sudan, Ethiopia), without extending into it. It seems to be missing from the mountains of Yemen and Oman, as well as from the archipelagos of the Indian Ocean. Several species are reported from the Indian subcontinent, as well as from Burma, Thailand, Laos, Cambodia, Vietnam and China. To the south, the annual yellow-flowered species figures as *S. trifida* in BACKER & BAKHUIZEN's Flora of Java (1965). Going on the Pacific Rim, we have seen specimens of *Sopubia* from the Phillipines under the name of *S. trifida* which do not match either HAMILTON's or YAMAZAKI's description, as well as LEICHHARDT's collection from Queensland quoted in BENTHAM's Flora Australiensis (1869),

definitely a *Sopubia* but probably also not belonging to *S. trifida* Buch.-Ham. There are no reports of *Sopubia* from the New World.

Apparently, *Sopubia* occurs in two distinct areas, the first comprising all of tropical Africa (incl. South Africa), the second stretching from India to South East Asia and south to Australia, with the Sahara-Sindic desert belt separating the two ranges.

On Madagascar, *Sopubia trifida* is the most

widespread species, inhabiting most of the central highland between Ambatondrazaka and Ihosy. *Sopubia triphylla* has so far been collected mainly from the Ankaratra mountains between Antananarivo and Antsirabe, with one certain find from the Itremo area. *Sopubia gracilis* seems to be confined to the Itremo mountains. *Sopubia lemuriana* covers a wider range with finds stretching from the Antananarivo area to the Itremo region.

Key to the species of *Sopubia* in Madagascar

1. Flowers white, corolla 12 to 15 mm in diameter. Plant up to 60 cm high. Cauline leaves few **S. lemuriana**
- 1'. Flowers dark or pale purple 2
2. Flowers large, corolla 15 to 18 mm in diameter, calyx up to 6 mm long. Stems simple or only lightly branched 3
- 2'. Flowers smaller, corolla 8 to 10 mm in diameter, calyx 3-4 mm long, stems normally much-branched **S. gracilis**
3. Cauline leaves mostly in whorls of three, simple, 20 to 25 mm long, 1.5 to 3 mm wide, upright. Flowers pale purple, mostly in whorls of three **S. triphylla**
- 3'. Cauline leaves alternate, opposite (decussate) or in whorls of three or four, lower ones (rarely some bracts as well) dissected, with three (sometimes two) linear segments, or simple, 25 to 40 mm long, 1.5 to 1.8 mm wide, spreading. Flowers more or less dark purple, alternate, opposite or in whorls of three or four **S. trifida**

Sopubia trifida Buch.-Ham. var. *madagascariensis* Benth.

In DC., Prodr. 10: 522 (1846).

TYPE.—*Lyll* 231, Madagascar (holo-, K).

Perennial, 45 to 60 cm high. Stems ascending to erect, one or more from the same root stock. The axils of the cauline leaves carry shoots that normally stay short. Only if the main axis is disturbed do the shoots immediately below the point of disturbance grow to normal-sized branches and form inflorescences. If the main axis remains undisturbed and able to terminate its growth with an inflorescence, it stays without branches or develops only a few (two to three) branches immediately below the inflorescence.

Stem 2.5 to 3 mm in diameter, woody at the base, the lower part cylindrical, angular above, with the characteristic pattern of longitudinal rows of hairs alternating with glabrous strips.

Leaves few to many, alternate, opposite (decussate) or in whorls of three or four, on branches mostly opposite, fewer than on the main axis. Internodes 10-15 mm long (sometimes longer into the upper part of the stem).

Cauline leaves below mostly three-fid (sometimes only two segments) or simple, above and in the inflorescence mostly simple (although two-fid or even three-fid bracts occur), linear or with linear segments, 25 to 40 mm long, 1.5 to 1.8 mm wide, margins slightly revolute, midrib and margins pilose.

Inflorescence a lax raceme, internodes mostly longer than the flowers on their pedicels. Bracts resemble smaller cauline leaves, spreading to reflexed. Pedicels 12 to 14 mm long, shorter than the bracts (in drying, bracts and cauline leaves become rather brittle and tend to break off easily). Flowers alternate, opposite (decussate) or in whorls of three or four.

Flowers more or less dark purple. Bracteoles linear to narrowly lanceolate, 2 to 3 mm long,

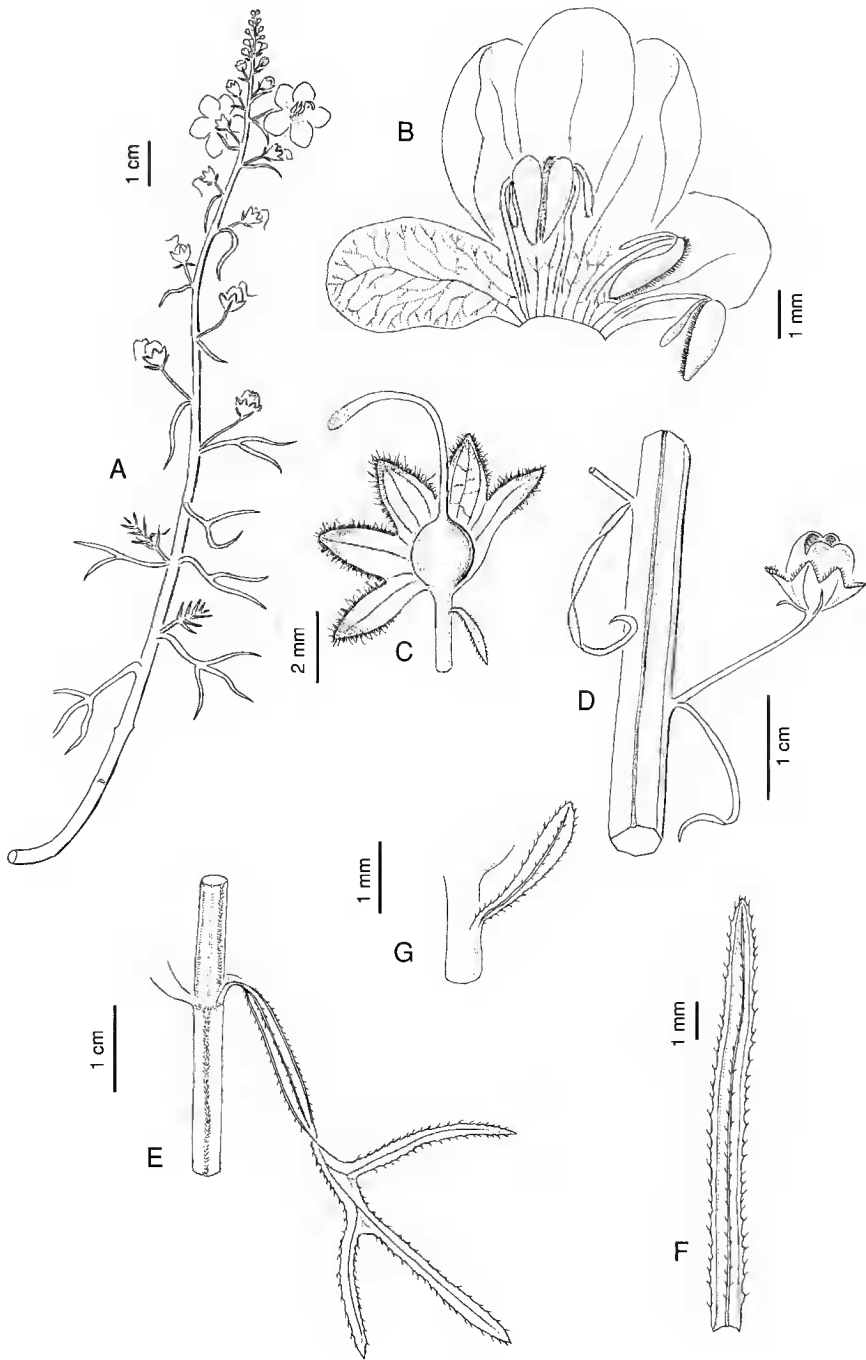


Fig. 2.—*Sopubia trifida*: A, habit; B, dissected corolla; C, dissected calyx showing ovary and style; D, part of stem with fruit; E, stem leaf; F, bract; G, bracteole. A, D from *Viguier & Humbert 1213*; B-C from *Waterlot 716*; E-G from *Lowry 4515*.

margins and midrib densely pilose, not protruding over the calyx tube. Calyx up to 6 mm long, its teeth obtuse, their length equalling the tube. Inner tips and margins of the teeth densely woolly, midrib and outer margins of the teeth sparsely pilose. Corolla 15 to 16 mm in diameter, its segments subequal.

Capsule 6 to 7 mm long, glabrous. Seeds truncate, their surface reticulate.

Wet and dry grasslands up to 2300 m, borders of swamps, rice paddies, and other moist places.—Figs. 2, 6.

MATERIAL STUDIED.—*Académie Malgache s.n.*, Ambatondrazaka, Mar. 1905 (P); *Académie Malgache s.n.*, Imerina, Dec. 1908 (P); *Baron 142*, Madagascar (P); *Benoist s.n.*, Tananarive, Antsirabe, Apr. 1951 (P); *Benoist 646*, Antsirabe, 22 Dec. 1950 (P); *Boissieu s.n.*, s.loc., s.d. (P); *Bosser 18856*, Ankaratra, Rte. d'Ambatolampy à Faratsiko, 2200-2300 m, Feb. 1964 (P); *Bosser 19419*, Andringitra, Apr. 1964 (P); *Campeyron s.n.*, Imerina, 1887 (P); *Cours 130*, Ankaroka (Ambatondrazaka), 30 Jan. 1938 (P); *d'Alleizette 70*, Ivohibe, Nov. 1924 (P); *d'Alleizette 832M*, Tananarive, lieux humides, Oct. 1906 (P); *Deans Cowan s.n.*, Ankafana, 1880 (P); *Decary s.n.*, Ambatolaona, Mar. 1919 (P); *Decary 643*, Ambohimanga, 27 Mar. 1921 (P); *Decary 13411*, Tsiafajarana, Sep. 1938 (P); *Decary 17208*, Manankazo, Lampokotsa d'Ankazobe, 3 Jan. 1942 (P); *Geneaud 8*, environs de Tananarive, Apr. 1892 (P); *Guillaumet 2021*, Anjozombe, 28 Mar. 1968 (P); *Hildebrandt 3713*, Andrangoloaka (Ost-Imerina), Nov. 1880 (K, M); *Homolle 1200*, Mt. Boby, 1946 (P); *Humbert 1324*, Tananarive, Ambrahi, Nov. 1935 (P); *Humbert 28218*, montagnes à l'Ouest d'Iremo (West Betsileo), 1500-1700 m, Jan. to Apr. 1955 (P); *Humbert 29985*, montagnes à l'Ouest d'Iremo (West-Betsileo), 1500-1700 m, Jan. to Apr. 1955 (P); *Humbert 30016*, montagnes à l'Ouest d'Iremo (West-Betsileo), 1500-1700 m, Jan. to Apr. 1955 (P); *Humbert 623*, Madagascar, s.d. (P, K); *Jard. Bot. Tananarive 3190*, s.loc., Jan. 1938; *Jard. Bot. Tananarive 4749*, Mt. Tsitondroina, 15 Apr. 1941 (P); *Keraudren 40*, Angavokely (Tananarive), Feb. 1960 (P); *Keraudren 260*, Ambatofiterahana, entre Ambositra et Fianarantsoa, 1500 m, Mar. 1960 (P); *Lowry 4515*, Andringitra Res., Antanifotsy (Ambalavao), 1400 m, 5 Mar. 1989 (P); *Morat 1289*, Andringitra, June 1965 (K, P); *Réserves Naturelles 3038-RN, Radafindrakolo*, Sendrisoa (Fianarantsoa), 6 May 1951 (P); *Réserves Naturelles 3990-RN, Radafindrakolo*, Vohitsaoka (Ambalavao), 30 Mar. 1934 (P); *Réserves Naturelles 5587-RN, Randriamiera*, Sendrisoa (Ambalavao), 15 June 1953 (P); *Réserves*

Naturelles 9627-RN, Rakotovo, Ambatosoratra (Ambatondrazaka), 16 Dec. 1958 (P); *Réserves Naturelles 11298-RN, Rakotovo*, Momaka (Ambatondrazaka), 19 Nov. 1960 (P); *Peltier 1060*, Tananarive, July 1959 (P); *Peltier 1182*, Amboasary (Ambatolampy), 22 Oct. 1959 (P); *Peltier 1558*, Sabotsy, Massif de l'Antongona, 4 Dec. 1959 (P); *Peltier 1612*, Ambatofotsy (Tananarive), 18 Dec. 1959 (P); *Peltier 3444*, s.loc., s.d. (P); *Perrier de la Bâthie 11405*, Ambositra, prairies, Sep. 1911 (P); *Perrier de la Bâthie 14995*, Andilamena, marais, Nov. 1922 (P); *Viguière & Humbert 1213*, Ambatolaona (Manjakandriana), 1400 m, 11 Nov. 1912 (P); *Viguière & Humbert 1490*, Ambohiponana (Antsirabe), 1400 m, 20 Nov. 1912 (P); *Viguière & Humbert 1641*, Itasy, Massif d'Ankaratra, 2600 m, 27 Nov. 1912 (P); *Waterlot s.n.*, Tananarive, Dec. 1917 (P); *Waterlot 716*, Angavo (Manjakandriana), Mar. 1923 (P).

Sopubia triphylla Baker

J. Bot. 20: 220 (1882).

TYPE.—*Baron 141*, Central Madagascar (holo-, K; iso-, P)

Perennial, but somewhat delicate, stems erect, 35 to 40 cm high, one or more from the same root stock. The axils of the cauline leaves carry shoots that normally stay short. Only if the main axis is disturbed do the shoots immediately below the point of disturbance grow to normal-sized branches and form inflorescences. If the main axis remains undisturbed and able to terminate its growth with an inflorescence, it normally stays without branches.

Stem 2 to 2.5 mm in diameter, slightly woody at the base, the lower part cylindrical, angular above, more densely leaved than the preceding species. Leaves mostly in whorls of three, at times alternate.

Cauline leaves rather erect, simple, narrowly triangular to linear, 20 to 25 mm long, 1.5 to 3 mm wide, margins slightly revolute, midrib and margins pilose.

Inflorescence a lax to dense raceme, internodes mostly shorter than the flowers on their pedicels. Bracts resemble smaller cauline leaves, upright. Pedicels 12 to 18 mm long, mostly longer than the bracts. Flowers in whorls of three, rarely alternate.

Flowers pale purple. Bracteoles linear to narrowly lanceolate, 2 to 3 mm long, margins and midrib densely pilose, not protruding over the calyx. Calyx up to 6 mm long, its teeth triangular, more acute than in the preceding species, their length equalling the tube. Inner tips and margins of the teeth densely woolly, midrib and outer margins of the teeth sparsely pilose. Corolla 15 to 18 mm in diameter, its segments subequal.

Capsule 6 to 7 mm long, glabrous. Seeds truncate, their surface reticulate.

Mountainous regions up to 2200 m.—Figs. 3, 6.

MATERIAL STUDIED.—*Baron 141*, Central Madagascar, 1889, type (K, P); *Baron 242*, Madagascar, s.d. (P); *Baron 5242*, NW Madagascar, 1887 (K); *Bosser 18349*, Tananarive, Iarindriana (P); *Catat 287*, Ankaratra, 2200 m, 2 May 1889 (P); *Catat 299*, Ankaratra, 2 May 1889 (P); *Catat 300*, Ankaratra, 2000 m, 2 May 1889 (P); *Catat 349*, Ankaratra (versant Est), 1889 (P); *Catat 1264*, Miantsoarivo, 13 May 1889 (P); *Decary 17433*, Valozoro, Ambohimahaso, 6 Feb. 1942 (P); *Decary 17655*, Antsampsandrano (Ankaratra), 1700 m, 10 Feb. 1942 (P); *Jard. Bot. Tananarive 2362*, Votovorona (Antsirabe), 4 July 1935 (P); *Jard. Bot. Tananarive 3173*, Behenjy, 12 Feb. 1938 (P); *Le Myre de Viliers s.n.*, s.loc. (P); *Perrier de la Bâthie 11496*, Mt. Ambona jusqu'à 2200 m (Antsirabe), May 1912 (P).

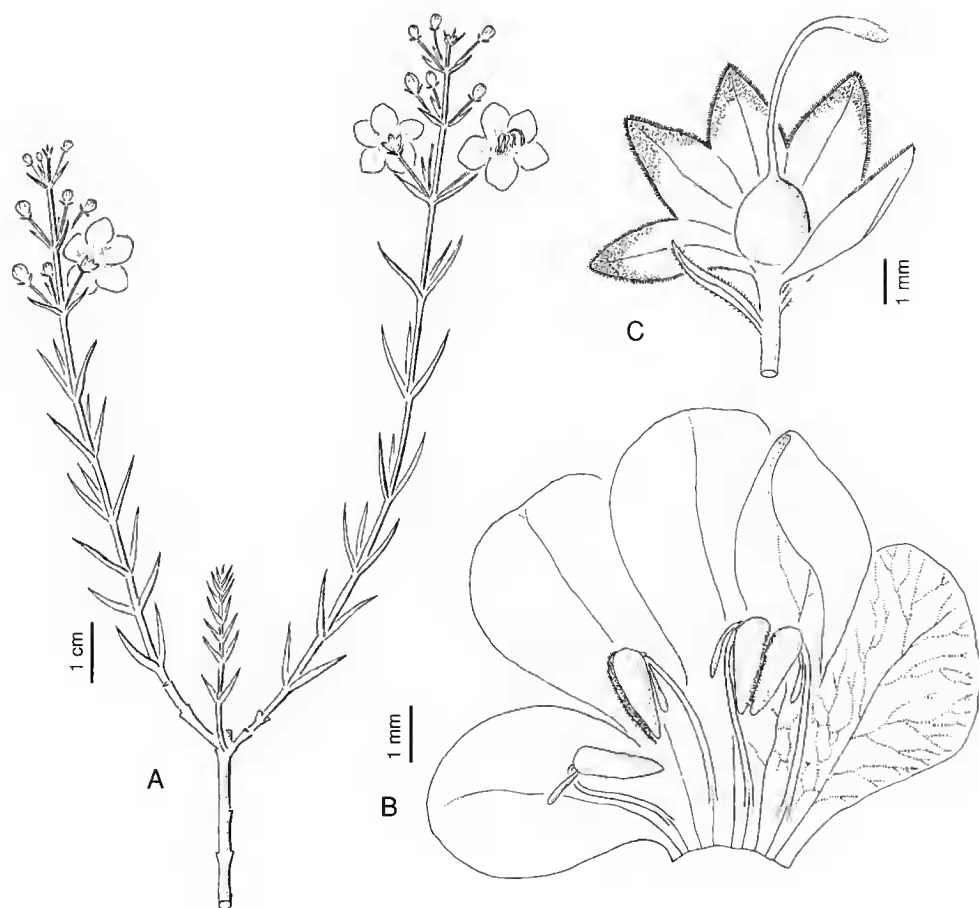


Fig. 3.—*Sopubia triphylla*: A, habit; B, dissected corolla; C, dissected calyx showing ovary and style. All from *Perrier de la Bâthie 11496*.

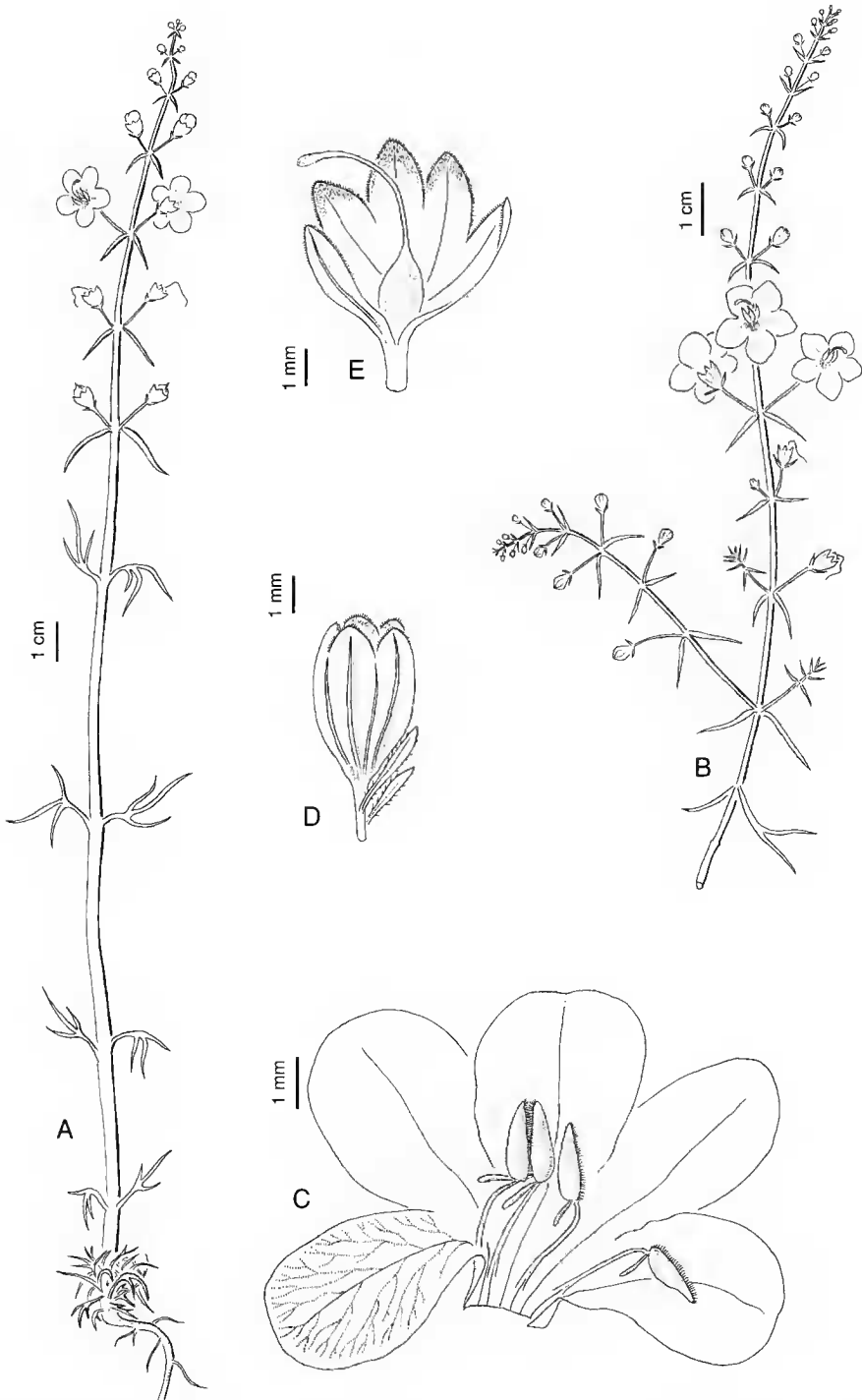


Fig. 4.—*Sopubia lemuriana*: A, habit; B, inflorescence; C, dissected corolla; D, calyx; E, calyx dissected. A from Schlieben 8192; B-E from Fischer 197.

Sopubia lemuriana H.-P. Hofmann & Eb. Fisch.,
sp. nov.

Herba annua, caulis erectus. Folia pauca, inferiores trifida laciniis linearibus, superiores integra, lineari-angustissima. Inflorescentia racemosa, laxa. Bracteae distincte reflectae. Flores albi. Corollae 12 usque ad 15 mm diametro. Ab S. trifida differt floribus albis internodiisque distincte longioribus.

TYPE.—*Schlieben* 8192, Madagascar, Ambalamanaka, 18 Dec. 1959 (holo-, M; iso-, BR, K).

Annual plant, 50 to 60 cm high. Stems erect, simple to strongly branched. Stem 2.5 to 3 mm in diameter, slightly woody at the base, the lower part cylindrical, angular above, with the characteristic pattern of longitudinal rows of hairs. Cauline leaves few, sometimes crowded at the base of the stem, widely spaced in the middle section of the stem with internodes approaching 30 mm, opposite (decussate) or alternate, sometimes in whorls of three or four.

Cauline leaves below mostly three-fid (sometimes with only two segments), delicate, segments linear, 25 to 35 mm long, 1.5 mm wide, above undivided and shorter. Margins slightly revolute, midrib and margins pilose.

Inflorescence a lax raceme, internodes more or less equalling the flowers on their pedicels. Bracts undivided, linear to narrowly triangular, distinctively reflexed. Pedicels up to 15 mm long, mostly longer than the bracts. Flowers decussate or rarely alternate.

Flowers white. Bracteoles linear to narrowly lanceolate, 2 to 3 mm long, margins and midrib densely pilose, rarely protruding over the calyx. Calyx 5 to 6 mm long, its teeth obtuse, shorter than the tube. Inner tips and margins of the teeth densely woolly, midrib and outer margins of the teeth sparsely pilose. Corolla 12 to 15 mm in diameter, its segments subequal.

Capsule 4 to 5 mm long, glabrous. Seeds truncate, their surface reticulate.

Mostly dry grasslands up to 1900 m, probably higher.—Fig. 4, 7.

PARATYPES.—MADAGASCAR: *Benoist* 459, Manjakatempo (Ankaratra), 19 Dec. 1950 (P); *Benoist* 1643, Manjakatempo (Ankaratra), 20 Dec.

1951 (P); *Bosser* 7912, Ambatomenaloha (Itremo), Sep. 1956 (P); *Catut* 1117, Managary, 9 June 1889 (P); *Croat* 29776, Fianarantsoa, Itremo, Jan. 1975 (P); *Decary* 13105, environs d'Ambatofinandrahana, 1600-1800 m, 20 Feb. 1938 (P); *Decary* 17205, Manankiazao, s.d. (P); *Decary* 17610, Antsampsandrano (Ankaratra), 1900 m, 9 Feb. 1942 (P); *Fischer* 197, Ambalamanaka, secondary grassland in mountain forest, 29 Mar. 1993 (BONN); *Guillaumet* 2042, Andringitra, along RN 7, 8 Mar. 1968 (P); *Humbert & Capuron* 28052, Betsileo, Ambatofinandrahana, bois des pentes occidentales sur grèss, 16 Jan. 1955 (P); *Jacquemin* 1303, Tananarive, Mt. Iharanandriana, Mar. 1973 (P); *Leenwenberg & Rafimanantsoa* 14435, Fianarantsoa, Ambalamanaka, Feb. 1994 (K, P); *Phillipson et al.* 3875a, 50 km W of Ambatofinandrahana (Itremo), 1670 m, 13 Mar. 1992 (MO, not seen, P); *Schlieben* 8192, Ambalamanaka, 18 Dec. 1959, type (BR, K, M).

Sopubia gracilis H.-P. Hofmann & Eb. Fisch.,
sp. nov.

Suffrutex perennis, caules plures ex eadem radice, erecti, ramosi. Rami caulinum principalium non superandi. Folia integra, lineari-angustissima. Inflorescentia racemosa, laxa usque ad densa. Ab aliis speciebus madagascariensis generis Sopubia flores minores, purpurei pallidi. Corollae 8 usque ad 10 mm diametro. Ab S. triphylla differt floribus minoribus, caule valde ramificato et foliis rare tri-verticillatis. Ab S. trifida differt foliis integris.

TYPE.—*Keraudren* 165, Madagascar, Rte. d'Ambositra à Ambatofinandrahana, Feb. 1960 (holo-, P).

Perennial little subshrub, 35 to 45 cm high. Stems erect, one or more from the same root stock, much-branched in a pyramidal fashion, the branches not protruding over the (undisturbed) main axis.

Stems 2 to 2.5 mm in diameter, woody at the base, the lower part cylindrical, angular above, with the characteristic pattern of longitudinal rows of hairs, more or less densely leafed. Leaves subopposite (decussate), sometimes in whorls of three or four, rarely alternate.

Leaves simple, linear, 15 to 20 mm long, 1 mm wide, margins slightly thickened or revolute (in drying, margins curl upwards, giving the leaves a grooved appearance), midrib and margins pilose.

Inflorescence a lax to dense raceme, internodes equalling the flowers on their pedicels. Bracts

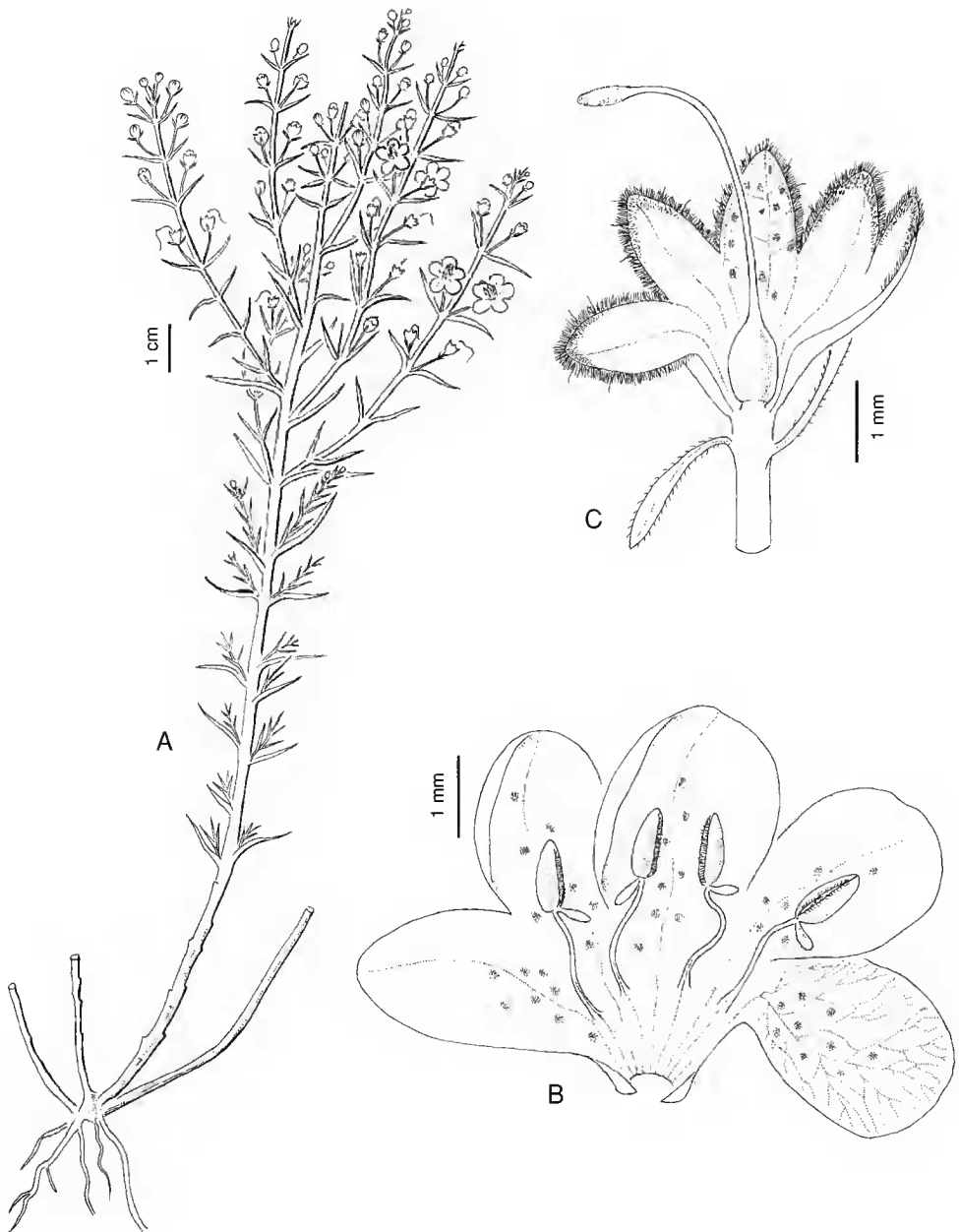


Fig. 5.—*Sopubia gracilis*: A, habit; B, dissected corolla; C, dissected calyx showing ovary and style. All from *Keraudren 165*.

resemble smaller cauline leaves, upright to spreading, appressed to the pedicels at least for 1 mm of their length. Pedicels up to 8 mm long, mostly longer than the bracts. Flowers opposite (decussate), in whorls of three, rarely alternate.

Flowers pale purple (probably sometimes even whitish). Bracteoles resembling small bracts, linear, 2 mm long, not protruding over the calyx tube. Calyx 3 to 4 mm long, its teeth obtuse to rounded, shorter than the tube. Inner tips and margins of the teeth densely woolly, midrib and outer margins of the teeth sparsely pilose.

Corolla 8 to 10 mm in diameter, its segments subequal.

Capsule 3 to 4 mm long, glabrous, at maturity not protruding over the calyx. Seeds truncate, their surface reticulate.

Mostly dry places on open ground, up to 1800 m, probably higher.—Fig. 5, 7.

PARATYPES.—MADAGASCAR: *Catat* 1150, Ambohipronana, 20 May 1889 (P); *Decary* 12918, env. d'Ambatofinandrahana, 1600-1800 m, 15 Feb. 1938 (P); *Decary* 12966, env. d'Ambatofinandrahana,

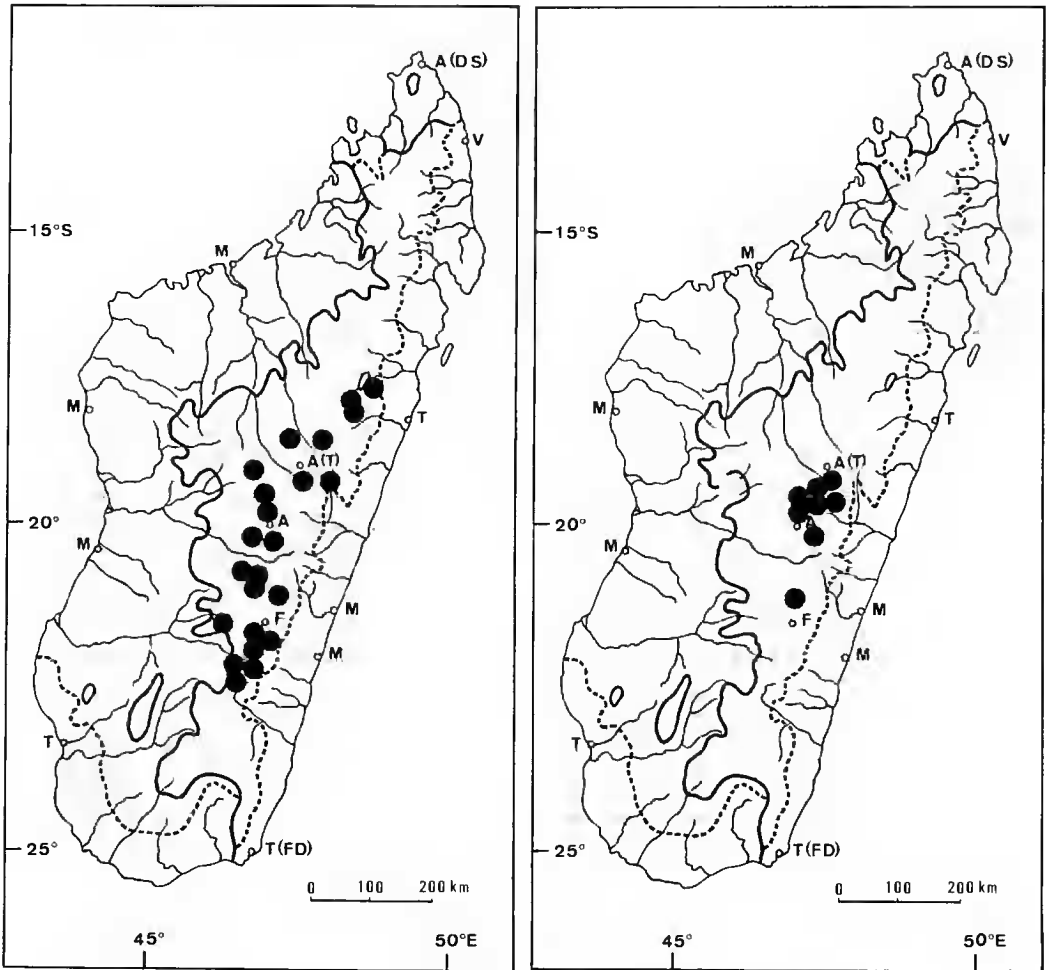


Fig. 6.—Geographic distribution of *Sopubia*: left *S. trifida*; right *S. triphylla*.

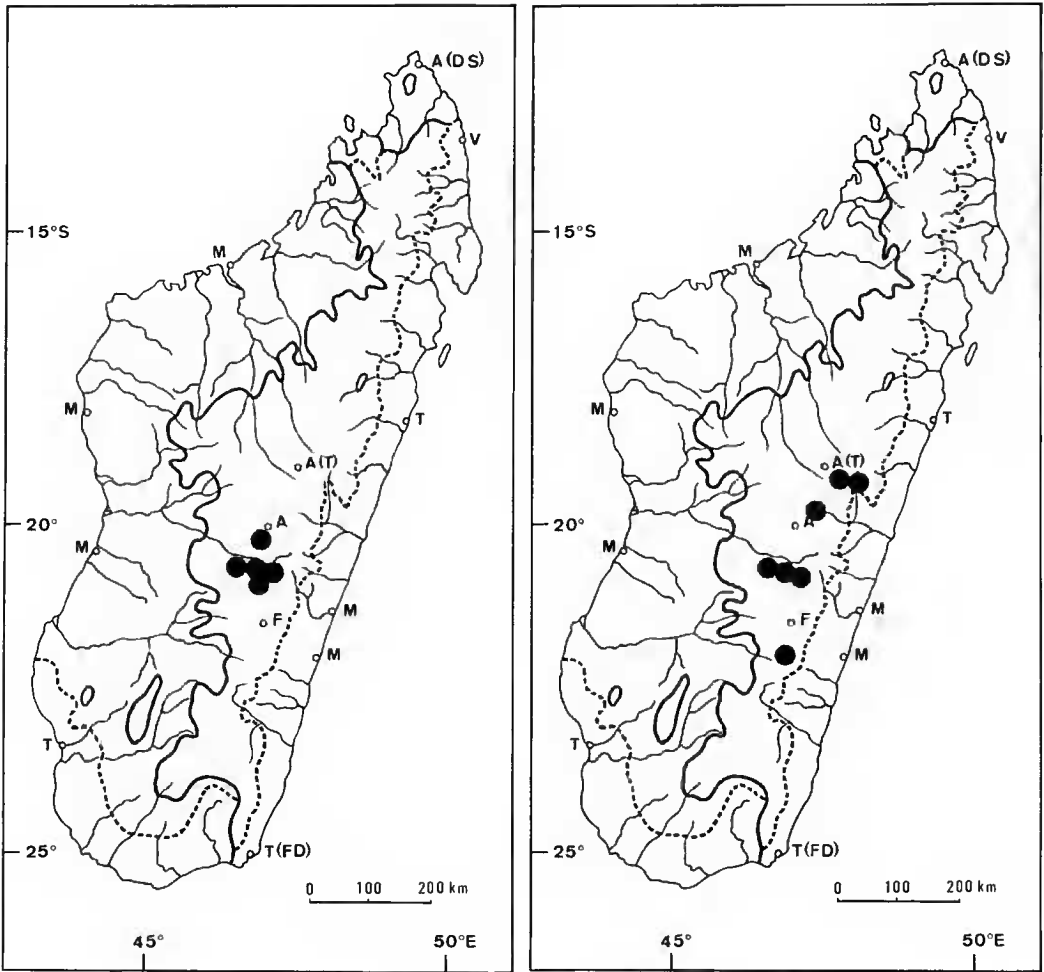


Fig. 7.—Geographic distribution of *Sopubia*: left *S. gracilis*; right *S. lemuriana*.

1600-1800 m, 16 Feb. 1938 (P); *Decary 13075*, env. d'Ambatofinandrahana, 1600-1800 m, 19 Feb. 1938 (P); *Decary 13127*, env. d'Ambatofinandrahana, 1600-1800 m, 20 Feb. 1938 (P); *Dorr 3871*, Mt. Ibity (south), Fianarantsoa, 6 Feb. 1985 (MO, not seen, BR, K); *Keraudren 165*, Rte. d'Ambositra à Ambatofinandrahana, March 1960, type (P); *Perrier de la Bâtie 12366*, entre l'Ivato et la Mania (Itremo), 1500 m, Feb. 1919 (P).

Excluded species:

Sopubia stricta Baker = *Micrargeria filiformis* (Schum. & Thonn.) Hutch. & Dalziel.

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