

MEDEDELINGEN LANDBOUWHOGESCHOOL

WAGENINGEN • NEDERLAND

79-9 (1979)

A MONOGRAPH OF MONSONIA L.
(GERANIACEAE)

BIBLIOTHEEK L.H.

0 2 NOV. 1979

ONTV. TIJDSCHR. 1979

H. J. T. VENTER

*Laboratory of Plant Taxonomy and Plant Geography,
Agricultural University, Wageningen, The Netherlands*

ISBN 106178-71

MEDEDELINGEN LANDBOUWHOGESCHOOL
WAGENINGEN • NEDERLAND • 79-9 (1979)

A MONOGRAPH OF MONSONIA L.
(GERANIACEAE)

H. J. T. VENTER

*Laboratory of Plant Taxonomy and Plant Geography,
Agricultural University, Wageningen, The Netherlands*

Received 17-4-1979

Date of publication 14-9-1979

H. VEENMAN & ZONEN B.V.-WAGENINGEN-1979

CONTENTS

Introduction	1
Geographical distribution	3
Ecology	4
Relationship to other genera	4
Relationship of the species (within <i>Monsonia</i>)	4
Citation of specimens	5
Genus diagnosis	5
Key to the species	6
Species descriptions	10
1. <i>M. angustifolia</i> E. Mey. ex A. Rich.	10
2. <i>M. attenuata</i> Harv.	18
3. <i>M. brevirostrata</i> Knuth	23
4. <i>M. burkeana</i> Planch. ex Harv.	26
5. <i>M. deserticola</i> Dinter ex Knuth	32
6. <i>M. drudeana</i> Schinz	35
7. <i>M. emarginata</i> (L.f.) l'Hérit.	39
8. <i>M. galpinii</i> Schltr. ex Knuth	44
9. <i>M. glauca</i> Knuth	47
10. <i>M. grandifolia</i> Knuth	53
11. <i>M. heliotropioides</i> (Cav.) Boiss.	57
12. <i>M. ignea</i> Schinz	62
13. <i>M. ignorata</i> Merxm. & Schreiber	66
14. <i>M. lanuginosa</i> Knuth	69
15. <i>M. longipes</i> Knuth	72
16. <i>M. luederitziana</i> Focke & Schinz	77
17. <i>M. natalensis</i> Knuth	81
18. <i>M. nivea</i> (Dcne.) Webb	84
19. <i>M. parvifolia</i> Schinz	90
20. <i>M. praemorsa</i> E. Mey. ex Knuth	94
21. <i>M. senegalensis</i> Guill. & Perr.	98
22. <i>M. speciosa</i> L.	105
23. <i>M. transvaalensis</i> Knuth	111
24. <i>M. trilobata</i> Kers	114
25. <i>M. umbellata</i> Harv.	117
Nomina nuda	122
Species excluded	122
Acknowledgements	122
Bibliography	123
Index of names	126

INTRODUCTION

The present publication is a monograph of the genus *Monsonia* mainly based on a study of material from 39 herbaria from Southern Africa, Europe and America. Approximately 3000 specimens were examined. The investigation of the herbarium material was supplemented by field studies of some of the species. Pollen were, moreover, collected from all the species for examination with the scanning electron microscope.

The *Monsonia* species are rather uniform in morphology, both vegetatively and generatively, and therefore sound differential characters are seldom present. There is, furthermore, so much variability within each taxon that distinction between species becomes even more difficult. Only through the accessibility of a large number of specimens distinctive patterns or combinations of characteristics became clear, thus permitting the delimitation of the species. In the past much emphasis was laid on a single feature as distinctive characteristic between species, for example the number of flowers in an inflorescence. This resulted in inaccuracy and confusion, as was the case with the epithet '*biflora*' applied in a number of cases.

Leaf form is an important characteristic in the species of *Monsonia*. The various forms were identified and named according to the SYSTEMATICS ASSOCIATION COMMITTEE FOR DESCRIPTIVE BIOLOGICAL TERMINOLOGY (1962). As far as leaf venation is concerned, four main types could be distinguished, viz.

- i) pinnate venation – one midrib from the blade base branching along its length into lateral veins;
- ii) subpinnate venation – as for pinnate, but the midrib at its base accompanied by two or more lateral veins which are, however, less than half as long as the midrib;
- iii) palmate venation – three or more about equal-sized main veins branching from the blade's base;
- iv) subpalmate venation – as for palmate, but the midrib larger than the lateral veins, and these lateral, furthermore, more than half as long as the central vein.

Different indumentum types are present in the *Monsonia* species. These types are identified and named at the hand of LAWRENCE (1951). Although some of the species have only a single indumentum, the majority have a double indumentum, especially on the stem (Fig.'s 1.5 and 4.3).

Monsonia is conspicuously glanduliferous. In every species one or several kinds of glands have been observed. Stalked glands (Fig.'s 1.4, 1.5, 10.2 and 15.5), sessile glands (Fig. 10.2), punctate glands, and glandbased hairs (Fig.'s 1.5 and 15.5) are present. The stalked glands, however, are not uniform in structure, since a columnar type (Fig. 15.5) and an acicular type (Fig.'s 1.4 and 10.2) could be distinguished. The acicular type may be straight and erect (Fig. 10.2) or curved (Fig. 1.4). All these stalked types and even the hair of the glandbased

types are hollow and mostly filled with viscid exudate. The acicular stalked glands may as well be considered as gland-tipped hairs, but that may complicate the already difficult indumentum description even more. The present author thus prefers 'stalked glands' to 'gland-tipped hairs'.

Collections from the following herbaria were studied:

- A Cambridge, Massachusetts, U.S.A.: Arnold Arboretum.
- B Berlin, Germany: Botanisches Museum.
- BLFU Bloemfontein, Rep. of South Africa: Herbarium of the University of the Orange Free State.
- BM London, Great Britain: British Museum (Natural History).
- BOL Cape Town, Rep. of South Africa: Bolus Herbarium, University of Cape Town.
- BR Bruxelles, Belgium: Jardin Botanique de l'Etat.
- E Edinburgh, Great Britain: Royal Botanic Garden.
- FI Firenze, Italy: Herbarium Universitatis Florentinae, Istituto Botanico.
- G Genève, Switzerland: Conservatoire et Jardin botaniques.
- GB Göteborg, Sweden: Botanical Museum.
- GH Cambridge, Massachusetts, U.S.A.: Gray Herbarium.
- GRA Grahamstown, Rep. of South Africa: Herbarium of Albany Museum.
- J Johannesburg, Rep. of South Africa: The Moss Herbarium, University of the Witwatersrand.
- K Kew, Great Britain: The Herbarium and Library.
- KMG Kimberley: Rep. of South Africa: Herbarium, Alexander McGregor Memorial Museum.
- L Leiden, Netherlands: Rijksherbarium.
- LINN London, Great Britain: The Linnean Society of London.
- M München, Germany: Botanische Staatssammlung.
- MA Madrid, Spain: Instituto 'Antonio José Cavanilles', Jardín Botánico.
- NBG Cape Town, Rep. of South Africa: Compton Herbarium, National Bot. Gardens.
- NH Durban, Rep. of South Africa: Natal Herbarium.
- NU Pietermaritzburg, Rep. of South Africa: Herbarium of the Univ. of Natal.
- P Paris, France: Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie.
- PEU Port Elizabeth, Rep. of South Africa: Herbarium University of Port Elizabeth.
- PRE Pretoria, Rep. of South Africa: Botanical Research Institute, National Herbarium.
- PRU Pretoria, Rep. of South Africa: Schweickerdt Herbarium, Univ. of Pretoria.
- PUC Potchefstroom, Rep. of South Africa: Herbarium of the University of Potchefstroom.

- S Stockholm, Sweden: Section for Botany, Swedish Museum for Natural History.
- SAM Cape Town, Rep. of South Africa: South African Museum Herbarium, National Botanic Gardens.
- SRGH Salisbury, Rhodesia: National Herbarium.
- STE Stellenbosch, Rep. of South Africa: Government Herbarium.
- STE-U Stellenbosch, Rep. of South Africa: Herbarium of the University of Stellenbosch.
- UPS Uppsala, Sweden: Institute of Systematic Botany, University of Uppsala.
- US Washington, U.S.A.: National Herbarium, Smithsonian Institution.
- W Wien, Austria: Naturhistorisches Museum.
- WAG Wageningen, Netherlands: Laboratory of Plant Taxonomy and Plant Geography.
- WIND Windhoek, South West Africa: S.W.A. Herbarium.
- Z Zürich, Switzerland: Botanischer Garten und Institut für Systematische Botanik der Universität Zürich.
- ZULU Empangeni, Kwa-Zulu, Rep. of South Africa: Herbarium of the University of Kwa-Zulu.

Specimens collected within the same 1-degree grid are grouped together in the specimen lists following the species descriptions. These grids are indicated as follows: for example 14S25E means 14° South-latitude and 25° East-longitude.

Twenty five species out of a total of 60 species and 8 subspecies or varieties which were described are maintained. No subspecific taxa are distinguished here.

GEOGRAPHICAL DISTRIBUTION

Monsonia occurs in Africa, Madagascar and South West Asia. The main centre of distribution, however, is Southern Africa where 20 species occur, 17 of which are endemic to this region, viz. *M. attenuata*, *M. brevirostrata*, *M. burkeana*, *M. deserticola*, *M. drudeana*, *M. emarginata*, *M. galpinii*, *M. grandifolia*, *M. ignorata*, *M. lanuginosa*, *M. luederitziana*, *M. natalensis*, *M. parvifolia*, *M. praemorsa*, *M. speciosa*, *M. transvaalensis*, *M. trilobata*, and *M. umbellata*. *M. angustifolia*, *M. glauca* and *M. senegalensis* are widely distributed in Africa, the first mentioned is also present in Madagascar and the last of these three is also represented in Asia as far east as India. *M. ignea* and *M. longipes* are endemic to eastern Africa, whilst *M. heliotropioides* and *M. nivea* are endemic to the deserts of northern Africa and Arabia, the first mentioned also occurring as far east as West Pakistan.

ECOLOGY

The species of *Monsonia* inhabit a variety of niches. A number of them are found in deserts, the Namib, Saharan and Arabian deserts, several occur in semi-desert areas, whilst another group inhabit sub-tropical or tropical bushlands or grasslands which may be dry or moderately moist. A small number of species are restricted to cool, high altitude grasslands. A few species, in particular *M. angustifolia*, have a wide ecological amplitude and are encountered under a variety of climatic conditions. One species, *M. speciosa*, is endemic to the South Western Cape region of South Africa where a temperate climate with winter rainfall prevails.

RELATIONSHIP TO OTHER GENERA

Monsonia, together with *Geranium*, *Erodium*, *Sarcocaulon*, and *Pelargonium*, are placed in the tribe *Geranieae* of the *Geraniaceae* (KNUTH, 1912). These five genera have a rostrate schizocarp in common. *Monsonia* and *Sarcocaulon* are distinguished from the other three genera by having 15 stamens instead of 10. According to KNUTH (1912) *Monsonia* and *Sarcocaulon* are separable as follows: *Monsonia* – the stamens in groups of 3 and these connate at the base, the stem more or less herbaceous, and *Sarcocaulon* – the stamens all free, stem thick, succulent, spinescent. His distinction as regards the stamens, however, is wrong, since these are similar in both genera. Therefore the only remaining character to distinguish both genera is vegetative.

RELATIONSHIP OF THE SPECIES (WITHIN *MONSONIA*)

DE CANDOLLE (1824) subdivided *Monsonia* into three sections, *Sarcocaulon*, *Olopetalum* and *Odontopetalum*. BOISSIER (1867) created two sections, the *Plumosae* and *Barbatae*. KNUTH (1912) distinguished seven sections, five of which were new, viz. the *Genistiformis*, *Ovatae*, *Rotundae*, *Biflorae* and *Umbellatae*. He maintained *Plumosae* Boiss. and *Odontopetalum* DC. KERS (1968) criticized KNUTH's classification and reinstated BOISSIER's two sections and added a third, section *Monsonia* (syn: *Odontopetalum* DC.).

The present author considers BOISSIER's classification as is given above as the most satisfactory. Accordingly *Plumosae* thus includes *M. deserticola*, *M. drudeana*, *M. heliotropioides*, *M. ignorata*, *M. luederitziana*, *M. nivea*, *M. parvifolia*, *M. trilobata* and *M. umbellata*, and *Barbatae* comprises *M. attenuata*, *M. angustifolia*, *M. brevirostrata*, *M. burkeana*, *M. emarginata*, *M. galpinii*, *M. glauca*, *M. grandifolia*, *M. ignea*, *M. lanuginosa*, *M. longipes*, *M. natalensis*, *M. praemorsa*, *M. senegalensis*, *M. speciosa* and *M. transvaalensis*. This classification, however, has its discrepancies. *M. trilobata*, for example, which undoubtedly belongs to

Plumosae, does not have the plumose mericarp tail of the section, but instead the plumeless tail of *Barbatae*. Connate sepals with spurs or pouches are present in the majority of *Plumosae*, but also occur in *M. longipes* and *M. speciosa* of *Barbatae*. Similarly the columnar type of stalked gland is typical of *Plumosae*, but is also found in *M. speciosa* and *M. longipes* of *Barbatae* the members of which have the acicular hair-like type of stalked glands.

Geographically and ecologically the members of *Plumosae* listed above inhabit deserts and semi-deserts. The species of *Barbatae*, in general, inhabit less arid bushland or grassland areas.

M. heliotropioides and *M. nivea* of the Saharan and South West Asian deserts are morphologically closely related, but they also reveal close relationship with the other members of *Plumosae* found in the Namib desert of South West Africa, especially with *M. deserticola*. This resemblance suggests a past link between these southern and northern deserts.

It is interesting to note that *M. longipes* of the East African highlands and *M. speciosa* of the South West Cape region in South Africa reveal a remarkable degree of resemblance, although separated by several thousands of kilometers. They are the only two species of *Barbatae* with connate sepals having a spur or pouch, with their mericarps similar, but different from the other species, and with a corresponding and different leaf morphology.

CITATION OF SPECIMENS

All specimens cited in this monograph were seen by the present author, unless marked 'not seen'.

Lectotypes have been chosen by the author from among the isotypes or syntypes available. In one instance a neotype had to be chosen in the place of probably lost type specimens.

GENUS DIAGNOSIS

Monsonia L.

Mant. 14 (1767); Linnaeus, Syst. nat. ed. 12, 2: 508 (1767); Linnaeus, Syst. veg. ed. 14: 697 (1784).

Type: *M. speciosa* L.

Prostrate, decumbent or erect, few- to many-stemmed, suffrutescent or annual, glanduliferous, hairy herb.

Stems herbaceous to woody, subterranean or aerial, terete or somewhat compressed.

Leaves alternate, subopposite or opposite, those of a pair mostly unequal, the smaller with a lateral branch and/or inflorescence in the axil, petiolate, with paired stipules; blade simple or rarely compound, palmately or pinnately veined.

Inflorescence cymose, subumbellate, bracteate, 1–15-flowered.

Flowers 5-merous (Fig. 23.2) actinomorphic, bisexual.

Sepals free or connate, imbricate, navicular, persistent, mostly enlarged under the fruit, membranaceous at the margin, mucronate at the apex, with concealed spurs or pouches when connate.

Petals free, imbricate or contorted, main veins palmately arranged.

Stamens 15, all perfect, exceptionally some sterile, monadelphous in 5 groups which are basally connate, or rarely pentadelphous; each group is composed of 3 basally connate filaments, the central filament long and the 2 lateral filaments short, less often all equal; the filaments, furthermore, subulate, flattened basally, ciliate; anthers glabrous, dorsifix, 2-celled; the cells discrete, parallel, dehiscent throughout by a longitudinal slit.

Pistil with the ovary superior, sessile or subsessile, terminally beaked, deeply 5-lobed, 5-locular, with 2 axile, amphitropous ovules per locule; lower ovule abortive; style obsolete or rarely obscure; stigmas 5, subterete and linear or clavate, or rarely broadly ovoid, inner side with the papillose receptive surface.

Fruit a rostrate schizocarp with 5 mericarps; the mericarps 1-seeded, tapering towards the spinose base, tailed at the apex; the tail as long as the beak and detaching from the beak-axis, helically twisted, crested or crested and plumose; seed brown, smooth or obscurely reticulate, exendospermous; embryo folded.

KEY TO THE SPECIES

1. All leaves alternate, becoming crowded to almost whorled at the stem-apices, blade linear, apex acute or acuminate; petal venation conspicuously reticulate (mountain veld in South Africa and Lesotho). **M. attenuata**
Lower leaves rosulate or alternate and upper opposite or all opposite; blade variously shaped (if linear the apex 3–5-toothed; conspicuously reticulate petal venation only known in plants from the Namib desert in South West Africa). 2
2. Leaves compound or palmately lobed; sepals not ciliate; petals 25–65 mm long, 5-toothed at the apex (southwestern Cape in South Africa). **M. speciosa**
Leaves simple (when palmately lobed (*M. longipes*) the petals crenate, sinuate or entire at the apex, 20–30 mm long and the plant from East Africa); sepals ciliate; petals less than 30 mm long, serrate, crenate, lobed, sinuate, or entire at the apex (when 5-toothed the plant lanuginose – *M. lanuginosa*). 3
3. Leaves pinnately veined (one midrib) or subpinnately veined (midrib at its base accompanied by 2 or more lateral veins which are less than half as long as the midrib). 4
Leaves palmately veined (3 or more equal main veins from the blade base) or subpalmately veined (the midrib larger than the lateral veins, but these

- lateral veins more than half as long as the midrib). 19
4. Sepals connate at the base, the opening of a concealed spur present at the inner side of each sepal base (East Africa). **M. longipes**
 Sepals free, without a spur (sometimes connate in *M. grandifolia*, but never spurred). 5
5. Leaf blade with the indumentum silvery or greyish, sericeous above and lanuginose beneath; the flowers inconspicuous, small and with the sepals only 3–4 mm long (Saharan, Arabian, and Pakistan deserts). 6
 Leaf blade never with a silvery or grey indumentum, not lanuginose or sericeous (if lanuginose or sericeous the sepals at least 8 mm long and the plant from Southern Africa – *M. galpinii*, *M. lanuginosa* and *M. natalensis*) 7
6. Leaf blade narrowly ovate or ovate with the main veins deeply impressed giving the leaf surface a scolloped or pleated appearance, indumentum silvery, mericarp tails 40–50 mm long. **M. nivea**
 Leaf blade angular-ovate, broadly angular-ovate or broadly ovate, never with the veins deeply impressed and the blade surface never scolloped or pleated, indumentum greenish-grey; mericarp tails 60–80 mm long. **M. heliotropioides**
7. Leaf blade lanuginose, at least on the veins beneath. 8
 Leaf blade glabrous, sparsely or variously hairy, but never lanuginose. 10
8. Leaves subpinnately veined, orbicular, ovate or broadly ovate, indumentum so dense as to obscure the leaf surface completely (eastern Cape Province coastland in South Africa). **M. galpinii**
 Leaves pinnately veined, narrowly ovate, narrowly angular-ovate or narrowly elliptic to elliptic, leaf surface visible. 9
9. Leaves narrowly elliptic, apex obtuse and 3- or 5-toothed; petals mauve (mountains in northern Transvaal, South Africa). **M. lanuginosa**
 Leaves very narrowly to narrowly angular-ovate or narrowly ovate, apex acuminate; petals white or creamy (southern Natal, South Africa). **M. natalensis**
10. Leaf blade glabrous above, sepals less than 5 mm long, fruit beak less than 25 mm long (highlands in South Africa, Lesotho and Transkei). **M. brevirostrata**
 Leaf blade hairy above, if glabrous the sepals more than 5 mm long and the fruit beak more than 30 mm long. 11
11. Leaf margin entire in the basal half and serrate in the apical with 3 main veins branching from the base, the 2 lateral running more or less parallel to the midrib for about half the blade's length (if serrate in the basal half as well and if without the 2 lateral veins the leaves will be alternate and often densely clustered around the stem); petals usually auriculate at the base and often dentate at the apex (highlands of eastern Transvaal, South Africa, and Swaziland). **M. transvaalensis**

- Leaf margin never entire in the basal half, venation pinnate or if subpinnate then 5 or 7 (rarely 3) main veins branch from the base and the lateral veins never parallel to the midrib. 12
12. Leaf blade linear, very narrowly elliptic or elliptic, rarely narrowly ovate, venation almost always pinnate, apex obtuse and 3- or 5-toothed. . .13
 Leaf blade very narrowly ovate to ovate or broadly ovate, narrowly triangular, very narrowly angular-ovate to angular-ovate, rarely broadly elliptic; venation subpinnate, apex not 3- or 5-toothed, but acuminate, acute, emarginate or rarely obtuse (rarely 3-toothed in *M. glauca* and then this acute and the margin at the teeth's bases with globular pockets of granules). 15
13. Petals 6–13 × 3–6 mm, 1–1.5 × as long as the sepals, leaf margin serrate and sinuate; an annual herb. **M. angustifolia**
 Petals 12–25 × 6–16 mm, 1.5–3 × as long as the sepals, leaf margin serrate; plants suffrutescent. 14
14. Stems with the long indumentum densely and conspicuously hispid or rarely velutinous, without any stalked glands on stems and leaves; the leaf blade on both sides with some scattered hairs, except on the veins beneath where the indumentum is double, viz. curved-puberulent and with long, usually hispid hairs (humid, subtropical coastland of Natal and Kwa-Zulu in South Africa). **M. praemorsa**
 Stems with the long hairs scattered or absent, with stalked glands; the leaf blade on both sides, and also on the veins, curved pubescent, but never with a double indumentum of long and short hairs. . . . **M. burkeana**
15. Mericarps with a prominent and sharp-edged ridge and rims at the apex; petals white, pink, mauve, purplish, salmon pink or red (when white the petals turn yellow when withering). 16
 Mericarps obliquely domed at the apex, without rims or if these are present then obscure; petals white, creamy or greyish, rarely pink (never withering yellow). 18
16. Petals white or pale pink, withering yellow; the leaf margin mostly with globular pockets of powdery granules in the teeth or at their bases; mericarps narrowly obconical. **M. glauca**
 Petals pink, mauve, purplish, salmon pink, or red; leaf margin not with globular pockets; mericarps narrowly and obliquely obovoid. . . 17
17. Petals salmon pink, or red, obovate to broadly obovate; plants suffrutescent; main stems erect and leaves never rosulate (Ethiopia and Somalia). **M. ignea**
 Petals pink, mauve, or purplish, narrowly obtriangular or obtriangular; plants annual; main stem stunted with the leaves rosulate and the lateral branches prostrate or decumbent. **M. senegalensis**
18. A robust, erect or sub-erect, usually extremely glanduliferous plant; leaf blade mostly with stalked glands; inflorescence 1- or 2-flowered; sepals sometimes connate at the base and covered by stalked glands (Highlands in southern Natal in South Africa and Transkei). . . . **M. grandifolia**

- A decumbent or scrambling plant, if glanduliferous then only moderately so; leaf blade without stalked glands; inflorescence strictly 1-flowered; sepals free and almost always without stalked glands (southern and eastern Cape Province in South Africa and Transkei). . . . **M. emarginata**
19. Flowers inconspicuous, small; petals 2–6 mm long; leaves silvery-white or grey-green due to the dense indumentum which is sericeous above and lanuginose beneath. 20
 Flowers conspicuous, petals 7–28 mm long; leaves green or when grey there will be 7–17 palmately arranged main veins (*M. drudeana* and *M. ignorata*). 21
20. Plants with subterraneous rhizomes; leaves broadly angular-ovate, entire in the basal half and coarsely serrate in the upper half; petal base minutely ciliate; stigmas linear (Namib desert in South West Africa).
 **M. deserticola**
 Plants without rhizomes, leaves very broadly to narrowly ovate, very broadly to broadly angular-ovate or broadly triangular, margin sinuate, crenate, serrate, or lobed, but never as above; petals with a few stiff hairs on the margin at the base, stigmas subobovoid (Saharan, Arabian, and Pakistan deserts). 6
21. Plants with subterraneous rhizomes; fully developed leaves conspicuously pleated along the 7–17 main veins; indumentum grey and very dense. 22

 Plants without rhizomes; fully developed leaves only rarely somewhat pleated along the 5 or 7 main veins; indumentum whitish or straw-coloured. 23
22. Leaf blade with 12–17 main veins; stipules subspinescent; petals 10–15 mm long, with the veins not conspicuously coloured and not reticulate; plant with an ovoid subterraneous tuber (Namib desert in South West Africa). **M. ignorata**
 Leaf blade with 7–9 main veins; stipules papery and deciduous; petals 15–30 mm long, with the veins reticulate and deep red or violet; without a tuber (Namib desert). **M. drudeana**
23. Leaves angular ovate or palmatifid with the incisions shallow or deep; sepals 10–15 mm long; petals 20–30 mm long; mericarps purplish-maroon, 10–15 mm long (East Africa). **M. longipes**
 Leaves broadly ovate, broadly elliptic, or broadly angular ovate, never lobed; sepals 5–10 mm long; petals 5–20 mm long; mericarps brown, 5–10 mm long. 24
24. Petals 3-lobed at the apex, sepals each with a pouch at the base, mericarp tails only crested (South West Africa). **M. trilobata**
 Petals emarginate or rarely obtuse at the apex, sepals each with the opening of a concealed spur at the inside of the base, mericarp tails crested at the base and plumose towards the apex. 25
25. Peduncle 1–3 × as long as the pedicel; sepal mucro triangular and laterally

- compressed (South Africa in the northern Cape Province and in South West Africa). **M. parvifolia**
- Peduncle 5–15 × as long as the pedicel; sepal mucro terete and narrowly triangular at the base. 26
26. Petals 13–20 × 5–10 mm, recurved, 1.7–2.3 × as long as the sepals, white or pink (South Africa in the northern Cape Province and in South West Africa). **M. luederitziana**
- Petals 7–11 × 3–5 mm, not recurved, 1.2–1.7 × as long as the sepals, mostly not protruding beyond the mucro apices, white or creamy (western Angola, South West Africa and South Africa in the Cape Province). **M. umbellata**

SPECIES DESCRIPTIONS

1. *Monsonia angustifolia* E. MEYER ex A. RICHARD

Fig. 1, Map 1.

Tent. Fl. Abyss. 1: 115 (1847); Drège, Zwei Pfl. Doc. 146, 203 (1843), nomen; Oliver, Fl. Trop. Afr. 1: 290 (1868); Saunders, Ref. bot. 1: tab. 4 (1869); Szyszylowicz, Pol. Disc. 6 (1888); Knuth in Engler, Pflanzenr. 4.129: 305 (1912); Müller & Bowden, Fl. Zamb. 2 (1): 140 (1963); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 3 (1966); Kokwaro, Webbia 25: 652 (1971).

Type: Ethiopia: Tigre prov.: Guendepeta, SCHIMPER (P, holotype, not seen; no isotypes seen either). Ethiopia: Tigre prov.: Gafta, SCHIMPER 1222 (P, neotype; iso-neotypes A, BM, E, FI, G, K, L, M, S, UPS, US, W, Z).

Heterotypic synonym: *Monsonia biflora* var. *pygmaea* Chiov., Journ. Bot. Ital. 26: 151 (1919). Type: Ethiopia: Eritrea: Assaorta: Golò, G. DAINELLI 147 (FI, holotype).

Single- or multi-stemmed erect or decumbent annual 15–50 cm high.

Stems herbaceous or sometimes semi-succulent, 3 to about 45 cm long, 1–5 mm in diam., mostly reddish- or purplish-tinged, with a double indumentum the first of which is composed of a pubescence of curved hairs and the second of long straight erect often gland-based hairs which may be few or many, with few to numerous sessile and stalked glands.

Leaves: lower alternate, upper subopposite or opposite; those of a pair unequal; the smaller with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.2–0.6 × as long as the blade, 5–25 mm long, rarely geniculate at the apex and mostly flattened at the base; stipules subulate or acicular, 2–10 mm long, mostly straw-coloured and often subspinescent, with the same indumentum and glands as the stem or with a single indumentum of short hairs which may be curved or straight and erect; blade linear, narrowly elliptic, or narrowly ovate, 2.5–11 × as long as wide, 8–55 × 2–15 mm, emarginate and mucronate or rarely obtuse and 3-toothed at the apex, obtuse to cuneate or less often truncate at the base, sinuate and serrate,

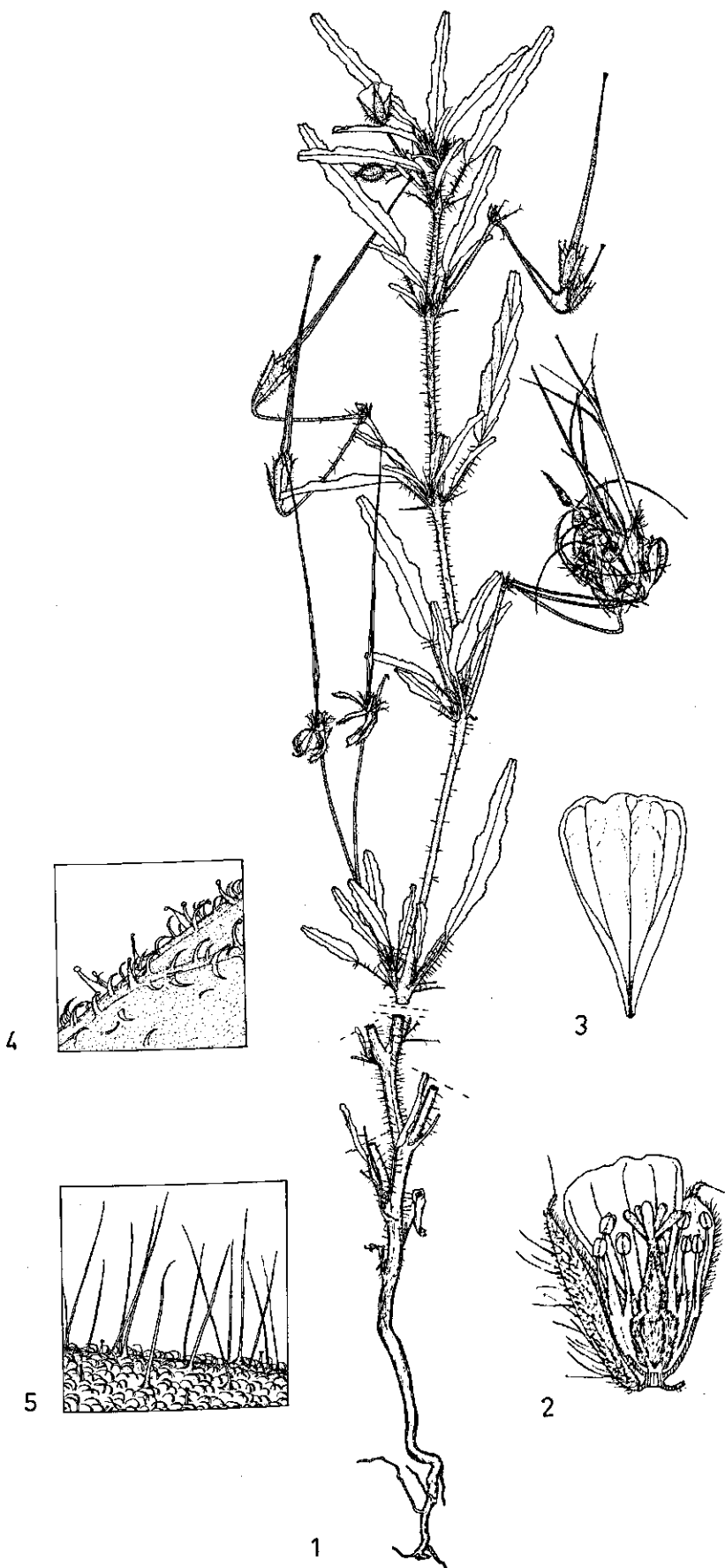


FIG. 1. *Monsonia angustifolia*: 1. Habit, $\times \frac{2}{3}$; 2. flower opened, $\times 4$; 3. petal, $\times 4$; 4. leaf beneath with curved acicular stalked glands, $\times 13$; 5. stem with gland-based hairs, curved hairs, and columnar stalked glands, $\times 8$. (1: Hanekom 1357 (PRE); 2, 3: C. Adams 655 (KMG); 4, 5: De Winter & Giess 7148 (WIND)).

above glabrous, granulate and/or with scattered curved hairs, often with sessile glands, beneath glabrous or granulate, with curved hairs and curved stalked glands on the main veins or rarely on these veins with the double indumentum and glands of the stem, rarely glandular-punctate on both sides; veins pinnate, prominent beneath.

Inflorescence lateral, axillary or not, 1–3-flowered, 15–60 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem and the pedicels, furthermore, with the stalked glands conspicuous. Peduncles often obsolete, when present 0.1–1.1 × as long as the pedicels, up to 25 mm long, pedicels 5–55 mm long and geniculate under the fruit. Involucral bracts 1–3 per flower.

Sepals green, free, narrowly ovate to ovate or narrowly obovate to obovate, 2–4 × as long as wide, 5–10 × 1.5–3 mm, outside with the same indumentum as the stem, with numerous sessile and stalked glands, and, furthermore, with the long hairs more conspicuous than on the stem, inside glabrous, sometimes with 3 parallel main veins; margin ciliate; mucro 0.7–2.5 mm long, terete, dark brown to purplish, straight or frequently curved, with a few scattered short and/or long hairs.

Petals narrowly obtriangular to obtriangular, 1.8–3 × as long as wide, 5–15 × 3–6 mm, 1–1.6 × as long as the sepals, 1–2 × as long as the stamens, white, mauve, pink, blue, purplish, or rarely yellow, glabrous on both sides; venation mostly dark-blue or greyish and with 5 main veins; base winged and obscurely ciliate; apex obscurely 3-lobed, sinuate, or rarely emarginate.

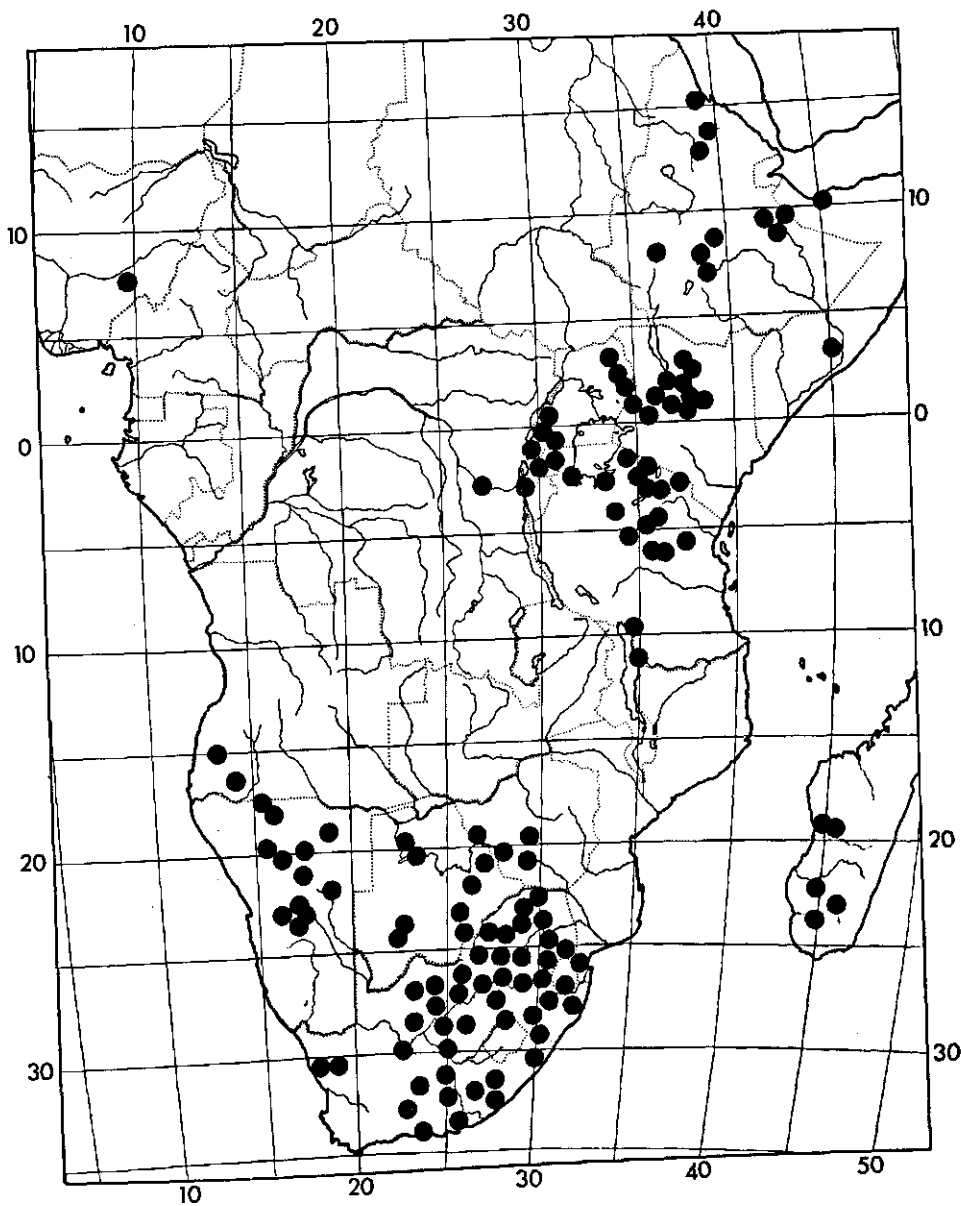
Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 0.5–2 mm; filaments of each group basally connate for 1–3 mm; filaments in the central stamens 5–6 mm and in the lateral 4–5 mm long, all terete towards the apex, glabrous; a triangular or ovate, mostly obscure gland-cavity is situated on the outer side of the base of each group; the gland-cavities mostly with 2 parallel, vertical rims; anthers elliptic to broadly elliptic, 0.5–1 × 0.5–1 mm, subintrorse.

Pistil 4–6 mm long; ovary broadly obovoid, 1.5 × 1.5 mm, hirto-pubescent; beak also hirto-pubescent, 1.5–2 mm long and longitudinally grooved; stigmas linear or clavate, 1–2 × 0.3 mm, outside obscurely pubescent and reddish to purplish, apex acute or obtuse, margin entire to subentire.

Fruit 45–95 mm long; mericarps 9–12 × 1.5–2 mm and beak 35–85 mm long; mericarps narrowly obconical, hirsute, rimmed and ridged at the apex; the rim and ridge prominent and sharp-edged, perpendicular to the tail or oblique; the tail hirsute outside, hispid inside where the tails detach from the beak-axis; these stiff hairs whitish or copper-coloured, and long at the tail's base, forming a crest.

Seed narrowly obovoid, 4–5 × 1–1.5 mm, glabrous.

Distribution: Africa (from Nigeria to Ethiopia and South Africa) and Madagascar.



MAP 1. *Monsonia angustifolia*.

Ecology: A herb that grows under conditions that range from semi-arid and hot to moderately moist and mild. Its habitat varies from grassland, savannah, open forest with sparse grass, low shrubs and grasses, flat treeless country and karooveld to wastelands and roadsides on soils that vary from gravel and sand to silt and clay. Alt. 0–2500 m.

In both hemispheres the main flowering and fruiting periods occur in late

summer and autumn, but in more tropical regions such plants could be found in any month of the year.

Vernacular names: *Cranes' bill*, *Alsbos* and *Teebossie* (South Africa), *Phusana* (Botswana), *Makorokotsoane*, *Malengoana* and *Ramaxungana* (Lesotho), *Lokoi*, *Orutongo*, *Aukole*, and *Zuguru* (Uganda), *Olebbye-Nabo* and *Olaichi pichipi* (Masai).

Economics: Decoctions from the plants are used as medicine against diarrhoea and as an antidote against snake bite.

Representative specimens:

Angola: 15S13E – Huila, Sa da Bandeira (fl. fr. Mar.) *J. Texeira* 901 (BR); Huila (fl. fr. Jan.) *R. Pantrs* 174 (WAG); Huila (fl. fr. Apr.) *Dekindt* 3209 (P); Mossamedes-Humpata (fl. fr. May) *B. Fritzsche* 67 (G, GB, S). 16S14E – South Angola, between Gambos and Cahama, *H. Pearson* 2469 (K).

Botswana: 19S23E – Okavango delta, Xudum river (fl. fr. Feb.) *H. Hiemstra* 143 (SRGH). 20S22E Ngamiland (fl. fr. Dec.) *H. Curson* 497 (PRE); Okavango, Tsau (fl. fr. Mar.) *H. Richards* 14789 (BR, K); Ngami-hills (fl. fr. May) *G. van Son* PRE28846 (PRE). 21S27E – Bakalaka, Mathangwane (fl. fr. Feb.) *A. McClintock* K15 (K). 22S26E – Serowe Distr. (fl. fr. Mar.) *Wild & Drummond* 7288 (K, PRE, SRGH). 23S22E – Kang (fl. fr. Feb.) *H. Wild* 5019 (BM, SRGH). 23S25E – Kalahari Sandveld Research Station, 16 km NW of Lephepe (fl. fr. Nov.) *E. Kelaole* SRGH511 (SRGH). 24S22E – Mahudutlachi pan (fr. May) *T. Cox* 361 (K). 24S25E – Gaborones (fl. fr. Apr.) *H. Humbert* 15309 (P); Gaborone campus (fl. fr. Dec.) *P. Mott* 62a (K). 24S26E – Mochudi (fl. fr. Mar.) *N. Mitchison* 38 (K); Bodungwane, 22 m. W. of Artesia (fl. fr. Mar.) *N. Mitchison* 82 (K); Kumana mountains (fl. fr. Mar.) *A. Schinz* 714 (Z).

Burundi: 03S29E – Valley Ruandi, National Albert Park, *G. de Witte* 13447 (fl. fr. Sep., BR), 13529 (fr. Oct., BR); National Albert Park (fr. May) *Keremera* 352 (BR). Rusisi; between Mpandu and Mecherenge (fr. Dec.) *R. Fries* 1425 (UPS); Rusisi plain, 14 km from Bujumbura (fr. Feb.) *M. Reekman* 1543 (BR); Rusisi, plain at Bujumbura (fl. fr. Feb.) *J. Lewalle* 2800 (BR, K); Rusisi plain (fl. fr. Feb.) *R. Germain* 6091 (BR).

Ethiopia: 04N38E – Mega (fr. Sep.) *R. Corradi* 7264 (FI). 05N39E – Neghelli to Wadera (fl. fr. Nov.) *Westphal* 2750 (WAG); Sidamo Prov., 16 km SE. of Neghelli town (fl. fr. July) *J. de Wilde* 6678 (WAG); Borana (fr. Apr.) *Cufodontis* 493 (FI). 07N38E – Adami Tullu, 167 km S. of Addis Abeba (fr. Sep.) *H. Sanford A/T-56* (FI). 07N39E – Galla Arussi (fl. fr.) *G. Negri* 976 (FI). 08N36E – Amhara-Dambia (fr. Aug.) *Chioventa* 1473 (FI); Shoa Prov., 1 km W. of Birrta (fr. Sep.) *Gilbert & Abata* 3119 (K); Shoa Prov., waterfall near Guder (fl. fr. May) *P. Jansen* 6428 (WAG). 09N39E – Awash Nat. Park, Fontalle Crater (fl. fr. Apr.) *J. de Wilde* 4868 (WAG). 09N41E – Dire Dawa (fl. fr. Aug.) *A. Getahur* C6 (K); Alemaya-Dire Dawa Road (fl. fr. July) *P. Jansen* 1998 (WAG); Borana (fr. Apr.) *Cufodontis* 493 (FI). 07N38E – Adami Tullu, 167 km S. of Addis Abeba Gara Achim (mount Hakam), Harar (fl. fr. July) *J. de Wilde* 5472 (WAG); 8 km on track from Jijiga to Hargeisa (fl. fr. Mar.) *J. de Wilde* 6425 (WAG); 17 km from Adele on road to Gara Mulata (fl. fr. Aug.) *P. Jansen* 6916 (WAG). 13N39E – Tigre Prov., Gafta (fl. fr. Sep.) *Schimper* 1222 (P, neotype; iso-neotypes: E, FI, G, GH, L, M, S, UPS, US, W, Z); Tigre Prov., 67 km N. of Quiha (fl. fr. Sep.) *J. de Wilde* 7015 (WAG). 15N38E – Eritrea, Asmara (fl. fr. Sep.) *I. Baldati* 2635 (FI); Hamasen Godaef (fl. fr. May) *Chioventa* 229 (FI). 15N39E – 15 km on road Asmara to Massawa (fl. fr.) *J. de Wilde* 4549 (WAG); Ocule-Cusai, Deca Meré (fl. fr. Sep.) *A. Pappi* 261 (BM, FI, G, K, P, W). Eritrea, Assaorta, Mount Soyra (fl. fr. Aug.) *A. Pappi* 1086 (FI); Eritrea (fl. Dec.) *G. Dainelli* 147 (FI, holotype of *M. biflora* var. *pygmaea* Chiov.). Brachan (fl. fr.) *Schimper* 63 (US, S, BM). Agrima (fl. fr. Aug.) *Schimper* 449 (G, K, P). Goelleb Prov., Agow (fl. fr. Aug.) *Schimper* 2148 (FI, G, K, P, S, W).

Kenya: 01N38E – Mt. Elgon (fl. fr. Nov.) *E. Lugard* 169 (K); Elgon (fl. fr. Dec.) *Y. Symes* 253

(K); Mt. Elgon (fl. fr. May) *G. Taylor* 3851 (BM); Mt. Elgon, SW. slopes, *D. Tweedie* 220 (K); Isiolo (fl. Dec.) *H. Copley* B496 (K). 02N36E – north side of Mt. Meru (fl. fr. Dec.) *M. Richards* 23522 (K). 03N29E – Moyale (fl. fr. Apr.) *J. Gillett* 12880 (FI, K). 00S35E – Near Soy road (fl. fr.) *Brodhurst-Hill* 193 (K); Mara Masai Reserve, Telek river, *P. Bally* B5296 (K); Mara Masai Reserve, near Keekorok Lodge (fl. fr. Mar.) *Hooper & Townsend* 1592 (K). 00S36E – Naivasha, Ruwensori, *G. Elliott* 6572 (K); Naivasha, W. Rift (fl. fr. Sep.) *E. Polhill* 201 (K); Naivasha, Olongonot Ranch (fl. fr. July) *P. Njoroge* 45 (BR, K); W. end of Lake Naivasha (fl. Apr.) *B. Matthew* 6095b (K); Nakuru Distr. (fl. fr. Sep.) *R. Maas* 6166 (L); Nakuru (fl. fr. May) *J. Snowden* 547 (BM, K); Kijabe (fl. fr. Oct.) *E. Battiscombe* 64 (K); Nyeri Distr., Kiganjo (fl. fr. Apr.) *Hooper & Townsend* 1696 (K); Mt. Aberdare, Coles Mill (fl. fr. Jan.) *C. & R. Fries* 1071 (UPS, WAG); Gilgil (fl. fr. July) *M. Harden-Smith* 28 (K). 00S37E – Naro Moru (fl. fr. Apr.) *A. Strid* 2387 (GB); Machakos Distr., Kiambere (fl. fr. Nov.) *Kittiku* 153 (K). 01S35E – Naroktown W. of Longonot (fl. fr. Aug.) *Kokwaro & Mathenge* 2759 (K); Loita plains (fl. fr.) *A. Curtis* 481 (GH), 782 (GH); Kitale (fl. fr. Mar.) *C. Thorold* 3203 (K). 01S36E – Masailand, near Suzwa, *Glover, Gwynne & Samuel* 2716 (K); Nairobi, SE. of Ngong hills (fl. fr. May) *A. Strid* 4164 (GB); Nairobi, Golf Course (fl. fr. Jan.) *M. Hale* 70 (G, K); Nairobi (fl. fr. Apr.) *Verdcourt* 1129 (L, K); Nairobi (fl. fr.) *A. White* Aug. 1903 (K); Nairobi, Mbaghati plain (fr.) *G. Babault* Sep. 1950 (P); Leroghi, Leggas Ridge (fl. fr. June) *O. Kerfoot* 1110 (K); Kiambu Distr. (fl. fr. June) *K. Kibue* K148 (K); Athi plains (fl. fr. May) *J. Kokwaro* 2581 (K). 01S37E – Machakos Distr., Kilimakiu (fl. fr. Nov.) *J. Gillett* 18365 (FI); Isiolo, Samburu Distr. (fl. fr. Dec.) *J. Newbould* 3231 (FI, K); Machakos Distr., near Lukenya (fr. May) *O. Mwangangi* 802 (K); Machakos, Katumani Exp. Farm (fl. fr. May) *D. Thomas* 1010 (K). 01S38E – Kitui (fl. fr. May) *D. Napper* 1582 (BR, K). 02S37E – Chyulu-north (fl. Mar.) *P. Bally* 7910 (K), 8300 (K). 03S37E – Masai Distr., Oloitokitok (fl. fr. Mar.) *Hooper & Townsend* 1295 (K). 04S39E – Kikuyu & Eldama Ravine (fr. Oct.) *A. White*, Oct. 1898 (K). Kiombere (fl. fr. Nov.) *VrivriVra* 153 (B). Kihina Kiu (fl. fr.) *P. Deecie* 21 (BM). Kenya (fl. fr. Mar.) *R. Dummer* 5134 (K).

Lesotho: 29S27E – Teyateyaneng (fl. fr. Apr.) *D. Collet* 457 (PRE); Hermon (fl. fr.) *Christol* 1907–8 (P); Roma (fl. fr. Feb.) *M. Ruch* 1583 (PRE). 29S28E – Leribe (fl. fr.) *A. Dieterlen* 82a (PRE, P), 82 & 82b (BM, K, PRE, S, STE, Z); Maseru (fl. fr. Mar.) *C. Williamson* 702 (K). 30S27E – Phiri Hlahe (fl. fr. Feb.) *A. Jacot-Guillarmod* 2601 (PRE). 30S28E – White Hill (fl. fr. Jan.) *Jacottet* 270 (Z).

Mosambique: 26S32E – Maputo, Boane (fl. fr. Nov.) *C. Braga* 69 (Z); Bela Vista (fr. Nov.) *A. Torre* 2098 (K, SRGH).

Nigeria: 07N10E – Gombe to Yola road (fl. fr. Oct.) *P. de Leeuw* MG185 (WAG).

Ruanda: 02S30E – Kibungu (fl. fr. June) *G. Troupin* 3606 (BR); Kibungu (fl. fr. June) *M. Alcool* 3606 (K). 03S27E – Kivu Prov., Ruindi (fl. fr. Oct.) *J. Lebrun* 7919 (BR, K, P, WAG).

Rhodesia: 19S27E – Nyamandhlovu Distr. (fl. fr.) *A. Pardy* Feb. 1930 (SRGH); Gwaai Forest Reserve (fl. Nov.) *F. Orpen* 41197 (SRGH). 19S29E – Gwelo Distr. (fl. fr. Apr.) *H. Biegel* 2594 (SRGH), 1992 (K); 26 m. N. of Gwelo (fl. fr. Feb.) *H. Biegel* 4175 (K). 19S32E – Umtali (fl. fr. Mar.) *N. Chase* 7056a (FI, K, SRGH); Tandai river (fl. fr. Feb.) *R. Myres* 690 (K); Inyanga, Manika (fl. fr. Dec.) *E. Cecil* 216 (K); Inyanga Distr. (fl. fr. Jan.) *N. Chase* 695 (BM, K); Inyanga (fl. fr. Jan.) *J. Hopkins* 8604 (SRGH). 20S27E – Plumtree, *R. Davies* 34 (K). 20S28E – World's View (fl. fr. Apr.) *Exell, Mendonça & Wild* 1515 (BM, SRGH); Matopos Distr. (fl. fr. Mar.) *J. Hopkins* 9899 (SRGH); Buluwayo (fl. fr. Jan.) *E. Norman* R48 (K). 20S29E – Masase Miss. Station (fr.) *E. Olson*, Jan. 1947 (S). 21S28E – Matobo, Besna Kobila (fl. fr. Apr.) *O. Miller* 7864 (WAG).

Somalia: 03N45E – Sciao (fr.) *G. Negri* 672 (FI), 1370 (FI). 09N43E – Borana, Rarele mountain (fl. fr. Dec.) *J. Gillett* 4731 (FI, K, P, S); E. of Borana (fl. fr. Oct.) *P. Bally* 9942 (FI, K). 10N45E – Berbera (fl.) *G. Bury* anno 1905 (BM).

South Africa: Transvaal Prov. 22S29E – Soutpansberg, Farm Rietbok (fl. fr. Mar.) *Schlieben & Hartman* 12029 (K); Soutpansberg, Wyliespoort (fl. fr. Apr.) *R. Rodin* 4224 (K, PRE, S, US). 22S30E – Messina (fl. fr.) *Moss & Rogers* 122 (K); Messina, *I. Pole-Evans* 1711 (PRE). 23S29E – Vyeboomspruit, Shoholle's Kraal (fl. fr. June) *H. Breijer* 18368 (K, M, PRE); Houtbos (fl. fr.) *A. Rehmann* 6322 (Z); Pietersburg (fl. fr. Feb.) *F. Rogers* 25451 (K); Pietersburg (fl. fr. Apr.) *D. van Vuuren* 1618 (M, PRE); Rooikop, *Smuts & Gillett* 2080 (PRE, STE; fl. fr. Dec.), 2118

(PRE); Rooikop, *I. Pole-Evans* 1250 (PRE). 23S30E – Letaba, Duiwelskloof (fl. fr. Nov.) *J. Scheepers* 791 (K, M, P, W); Letaba, Hans Merensky Nature Reserve (fl. fr. June) *M. Gilliland* 785 (PRE). 24S25E – Crocodile river (fl. Feb.) *R. Leendertz* 733a (K). 24S27E – Waterberg, near Sentrum (fl. fr. Dec.) *J. Vahrmeijer* 1311 (PRE). 24S28E – Waterberg, Visgat (fl. fr. May) *Strey & Schlieben* 8667 (PRE); Waterberg, Haakdoorns (fl. fr. Feb.) *F. Rogers* 22820 (K); Waterberg Distr., km 43 Nylstroom-Vaalwater rd. (fl. fr.) *A. Leeuwenberg* 10907 (WAG); Naboomspruit, Mosdene (fl. fr. Dec.) *E. Galpin* 11577 (PRE); Nylstroom, *Burt Davy*, Nov. 1903 (PRE); Springbok Flats, Kweeklaagte (fl. fr. Jan.) *Burt Davy* 1193 (PRE); Geelhoutkop (fl. Jan.) *H. Breijer* 18063 (PRE). 24S30E – Lydenburg, Sekukuniland (fl. fr. Jan.) *W. Barnard* 468 (K, PRE). 25S25E – Linokana (fr.) *D. Holmb*, Jun. 1887 (Z). 25S26E – Rustenburg, Vlakfontein, 16 km W. of Koster, *P. Liebenberg* 168 (PRE); North Marico, *W. Louw* 295 (PRE); Groot Marico, Skuinsdrif, *Liebenberg* S28 (PRE); Zeerust (fl. fr.) *J. Thode* A1363 (K, PRE). 25S27E – Johannesburg, Jukskei river, *R. Young* 26411 (PRE); Hartebeespoort (fr.) *Lotsy & Goddijn* 422 (L); Hartebeespoortdam (fl. fr. Apr.) *L. Bernardi* 9071 (G); Magaliesberg near Hartebeespoortdam, Kameeldrif (fl. Nov.) *E. Taat* 201 (WAG); Magaliesberg (fr.) *Burke*, before 1867 (K); Rustenburg Distr. (fl. fr.) *O. Nation* 125 (K); Rustenburg (fl. fr. Feb.) *Watt & Brandwijk* 1815 (PRE). 25S28E – Bronkhorstspuit, *F. Rogers* 4772 (PRE); Bronkhorstspuit (fl. fr. Dec.) *F. Wilms* 178b (BM, K); Warmbad (fl. fr.) *R. Leendertz* 6587 (PRE); Warmbad, *Thode* A1671 (PRE); Stinkwater (fl. fr. Jan.) *S. Cohen* 343 (PRE); Pienaars River Station (fl. fr. Apr.) *L. Codd* 4033 (BM, K, PRE); Pretoria, Kameeldrif (fl. fr. Mar.) *J. Begemann* 11289 (P); Pretoria, Sanadu (fl. fr. Feb.) *C. Brain* 10205 (SRGH); Pretoria, Meintjieskop (fl. Feb.) *Burt Davy* 3955 (PRE); Pretoria, Rooideplaat (fl. fr. Oct.) *Merxmüller* 12 (K, M), 39 (M); Pretoria, Hoornsnek in Magaliesberg (fl. fr. Dec.) *H. Schlieben* (B, BR, G, K, M, US); Kaalfontein, *Pole-Evans* H13550 (PRE); Elands River & Klippan (fl. fr.) *A. Rehmann* 5016 (Z). 25S29E – Middelburg, *J. Hewitt* 10435 (PRE). 25S30E – Waterval Boven (fl. fr.) *E. Masson* 105 (K); Waterval Onder (fl. fr. Jan.) *T. Jenkins* 6699 (PRE); Lydenburg (fl. fr. Oct.) *F. Wilms* 178 (G, L, P, Z), 5871 (PRE); Carolina (fl. fr. Nov.) *Leipoldt* 18634 (PRE); Machadodorp (fl. fr. Feb.) *J. Hutchinson* 2811 (K); Belfast, Witboy (fl. fr.) *J. Thode* 3978 (STE). 25S31E – Kruger National Park, Pretoriuskop (fl. fr. Feb.) *Codd & de Winter* 4928 (K, PRE); Kruger National Park (fl. fr. Apr.) *H. van der Schijff* 2712 (PRE); Nelspruit (fl. fr. Feb.) *H. Breijer* 17963 (K, M, PRE); Witrivier (fl. fr. Apr.) *F. Rogers* 20143 (K); Barberton, Kaapsch Hoop (fl. fr. Mar.) *F. Rogers* 20955 (K); Barberton (fl. fr. Nov.) *J. Thorncroft* 11184 (PRE). 26S25E – Madiaba (fl. fr. Mar.) *R. Schlechter* 209 (PRE). 26S26E – Wolmaranstad, Welgelegen (fl. fr. Apr.) *Hanekom* 1804 (K, WAG); Lichtenburg, Hakboslaagte (fl. fr. Nov.) *H. Kinges* 1978 (K, PRE); Klerksdorp (fl. Nov.) *M. de Victoria* PRE41202 (PRE). 26S27E – Potchefstroom (fl. fr. Mar.) *R. Leendertz* 9469 (PRE); Potchefstroom, Klipdrif (fl. fr. Jan.) *J. Theron* 1189 (PRE); Vereeniging, *J. Leslie* 6495 (PRE). 26S28E – Boksburg, *Watt & Brandwijk* 2317 (PRE); Heidelberg (fl. fr. Nov.) *R. Leendertz* 7748 (PRE); Modderfontein (fr.) *P. Conrath* 75 (Z); Johannesburg, Milner Park (fl. fr. Mar.) *C. Moss* 14086 (BM, Z); Barberspan Nature Reserve (fl. fr. Mar.) *N. Zambatis* 138 (PRE); Crown Mines (fl. fr. Mar.) *A. Lucas* J30695 (J, K); Bryanston/Rivonia (fl. Dec.) *K. Dahlstrand* 1084 (GB). 26S29E – Standerton (fl. fr.) *T. Jenkins* 9941 (PRE). 26S30E – Ermelo (fl. fr. Nov.) *M. Henrici* 1243 (PRE). 27S25E – Christiana, Kameelpan (fl. fr. Jan.) *J. Theron* 521 (PRE); Wolmaranstad, Leeuwfontein (fl. fr. Feb.) *A. van Wyk* 262 (PRE); Wolmaranstad (fl. Feb.) *F. Rogers* 20632 (K). 27S29E – Wakkerstroom, Majuba Hill, *H. Mandy*, Feb. 1907 (PRE). Kouderivier (fl. fr. Nov.) *R. Schlechter* 3729 (B, BR, Z). Orange Free State Prov.: 26S27E – Sasolburg Highveld Garden (fl.) *G. Theron* 613 (PRE); Parys (fl. fr. Apr.) *G. Potts* 509 (BLFU); Parys, Boseiland (fl. fr. Apr.) *A. van Wyk* 24 (PRE). 27S26E – Valsrivier (fl. fr. Mar.) *D. Chennells* 34 (STE); Bothaville (fl. fr. Mar.) *R. Bayliss* 2759a (Z). 27S27E – Vrededorp (fr.) *G. Barrett-Hamilton*, anno 1901 (BM); Kroonstad Distr. (fl. fr. Jan.) *J. Pont* 422 (BLFU, PRE, Z); Kroonstad (fl. fr. Feb.) *J. Scheepers* 1327 (BR, K, L, PRE); Kroonstad Distr., Rhenosterkop (fl. fr.) *Zeyher* 157 (BM, FI, G, K, P). 27S28E – Heilbron (fl. Jan.) *A. Goossens* 506 (BLFU, PRE). 28S25E – Boshoff (fl. fr.) *E. Becker*, July 1879 (K); between Christinana and Smitskraal (fl. fr. Mar.) *Burt Davy* 12896 (PRE). 28S26E – Glen Agric. College (fl. fr. Mar.) *J. van der Berg* 3917 (PRE); Brandfort (fl. fr. Apr.) *A. Haagner* 10758 (PRE). 28S27E – Senekal on Waterloop Rd. (fl. fr. Feb.) *R. Story* 884 (PRE); Willem Pretorius Game Reserve (fl. fr. Feb.) *O. Kok* 72 (PRE). 28S28E – Harrismith, Tafelkop (fr. Mar.) *Krook* 2220 (W); Harrismith,

km 7 on road to Kestell (fl. fr.) *C. Ward 5959* (NU, PRE); Witzieshoek (fr.) *H. Junod, Mar. 1917* (G); Witzieshoek (fl. fr. Jan.) *J. Thode 6281* (STE); Clarens-Cornelia (fl. fr. Feb.) *R. Stam 215* (BLFU, L, PRE, WAG); Clarence (fl. fr. Nov.) *van Hoepen PRE18210* (PRE); Fouriesburg, Dunelm (fl. fr. Jan.) *G. Potts 3273* (BLFU, PRE); Caledon river (fl. fr.) *J. Burke 300* (BM, K, Z). 29S25E – Fauresmith Veld Reserve (fl. fr. Jan.) *M. Henrici 2564* (PRE); Fauresmith Reserve (fl. fr. May) *I. Verdoorn 1369* (K, PRE). 29S26E – Sepani (fl. fr. Apr.) *A. Brierly 111* (BM); ThabaNchu (fl. fr. Jan.) *B. Roberts 2405* (PRE); Bloemfontein, Winter Valley (fl. fr. Mar.) *D. Muller 2926* (PRE); Bloemfontein, Olyvensplaat (fl. fr. Mar.) *G. Potts 2819* (BLFU, PRE, Z); Bloemfontein (fl. fr.) *A. Rehmann 3869* (Z). 30S25E – Bethulie, 11 km on road to Aliwal North (fl. fr. Mar.) *M. Weger 305* (PRE). Draaifontein (fr.) *A. Rehmann 3671* (Z). Natal Prov.: 27S29E – Newcastle (fl. fr. Jan.) *J. Wood 6656a* (G, US). 27S30E – Utrecht Distr., Klipspruit (fl. fr. Mar.) *H. Breijer 17001* (PRE). 27S31E – Ngotshe Distr., south of Pongola River en route Mkuze (fl. fr. Jan.) *Burt & Hilliard 3687* (NU). 27S32E – Mountain Pass near Josini (fl. fr. Dec.) *C. Stirton 501* (K, PRE); Ubombo Distr., 3 km S. of Pongola River on road to Mkuze (fl. fr. Jan.) *Hilliard & Burt 3687* (E). 28S30E – Weenen County (fl. fr.) *J. Wood, Jan. 1891* (E); Umgeni (fl. Mar.) *Rajab 20* (PRE); Muden (fl. fr. Sep.) *O. West 1243* (PRE); Dundee Aerodrome (fl. fr. Apr.) *N. Shirley NU31916* (NU). 28S32E – Umfolozi Game Reserve (fl. fr. May) *C. Ward 4601* (PRE). 29S29E – Estcourt, Bushmens River bank (fl. fr. Feb.) *J. Crass 24* (E); Estcourt-Colenso (fr. Feb.) *Krook 2219* (W); Estcourt (fl. fr. Feb.) *J. Wood 10282* (E, P); Giant's Castle (fl. Jan.) *P. Symons 358* (M). 29S30E – Umvoti Distr., crest of hill above Keate's Drift (fl. fr. Dec.) *Hilliard & Burt 8587* (E, K, NU, S); Pietermaritzburg Distr. (fl. fr. May) *A. Harding NU52351* (NU); Albert Falls (fl. Feb.) *D. Commins 256* (NU). 29S31E – Durban, Clairmont (fl. fr.) *J. Wood, Sep. 1897* (P). 30S30E – Ixopo, Inkunya-Umkomaas (fl. fr. Dec.) *H. Rudatis 1833* (STE); Oriibi (fl. fr. Apr.) *W. Lawson 99* (NU). Cape Prov.: 26S24E – Vryburg, Armoedsvlakte (fl. fr. Feb.) *Herb. U.S. 13682* (STE); Vryburg, Amosse vlakte (fl. fr. Feb.) *A. Mogg 8116* (PRE). 27S23E – Kuruman (fl. Feb.) *R. Marloth 1088A* (STE). 27S24E – Taungs, Mochudi (fl. fr. Jan.) *W. Harbor 17042* (PRE). 28S22E – Hay Distr., Padkloof (fl. fr. Mar.) *J. Acocks 2205* (PRE). 28S23E – Barkley West, Daniëlskuil (fl. fr. Mar.) *J. Acocks 234* (PRE). 28S24E – Vaalhartz (fl. fr. Apr.) *A. Breuckner 831* (PRE); Warrenton (fl. fr. Mar.) *C. Adams 655* (KMG); Kimberley (fl. fr.) *E. Esterhuysen 766* (PRE); Kimberley (fl. fr.) *H. Flanagan 1432* (PRE). 29S23E – Asbestos Mines, *R. Marloth 2078* (PRE). 30S22E – Prieska, bed of Orange River (fl. fr. Apr.) *G. Bryant 1076* (K, PRE). 30S25E – Colesberg (fl. fr. Feb.) *R. Bayliss 3881* (PRE); Oviston Nature Reserve (fl. fr. Nov.) *H. Fourie 375* (PRE). 30S26E – Albert Distr. (fl. fr.) *T. Cooper 683* (BM, E, G, K, PRE, W, Z); Aliwal North, *T. Eale 683* (PRE). 31S23E – Victoria West (fl.) *Whitlock 573a* (PRE). 31S24E – Middelburg, Grootfontein (fl. Feb.) *G. Theron 433* (PRE). 31S25E – Middelburg, Bangor Farm (fl. fr. Jan.) *H. Bolus 117* (BR). 31S26E – Stormberg, near Patriots Klip (fl. Jan.) *J. Ward 2305* (PRE). 31S27E – Cala Distr., Cala commanage (fl. fr.) *A. Pegler 1642* (K). 32S24E – Graaff Reinet (fl. fr.) *Bowker 25* (K); Graaff Reinet (fl. fr. Nov.) *P. Macowan 444* (P). 32S25E – Cradock (fl. fr. Apr.) *Bayliss 1217* (B, Z); Cradock, Mountain Zebra Park (fl. fr. Nov.) *A. Brynard 289* (PRE). 32S27E – Komga, Valley of the Key River (fr. Mar.) *H. Flanagan 2321* (PRE). 33S25E – Port Elizabeth (fr. Dec.) *Drège 5240* (P).

South West Africa: 18S16E – Ondongua, near Oneina Miss. Station (fl. fr. Feb.) *De Winter & Giess 6968* (M, WIND); Ondongua (fr. Dec.) *M. Rauteman 392* (Z). 19S15E – Otjikongo (fl. fr. Dec.) *H. Schinz 258* (L, Z). 19S17E – Otavi, Auros (fl. fr. Feb.) *K. Dinter 5597* (B), 5670 (B). 19S19E – Grootfontein, Farm Stalldorf (fr. Nov.) *S. Rehm, Nov. 1939* (M); Grootfontein, Farm Kumkauas (fl. fr. Mar.) *Merxmüller & Giess 30101* (M). 20S16E – Outjo, Omatjema (fl. fr. Dec.) *O. Volk 12039* (M). 20S17E – Otjiwarongo, Okosongomingo (fl.) *O. Volk 973c* (M); Otjiwarongo, Farm Capricorn (fl. fr. Apr.) *Giess, Volk & Bleissner 6348* (M, WIND); Waterberg, Omuverume Plateau (fl. fr. Apr.) *M. Rutherford 370* (WIND). 21S17E – Okahandja (fl. fr. Mar.) *K. Dinter 458* (B, BM, BR, E, FI, G, K, P, Z); Okahandja, Quickborn (fl. fr. Mar.) *R. Bradfield 403* (PRE). 22S16E – Otjimbingwe, Farm Keres (fl. fr. Mar.) *W. Giess 13692* (M, WIND); Komas Hochland (fl. fr. Apr.) *G. Sassner 120* (M); Auasberge (fl. fr. Feb.) *K. Dinter 326* (Z). 22S17E – Windhoek Distr. (fl. Mar.) *H. Wantrop 224* (S); Windhoek, Rietfontein (fl. fr.) *R. Strey 2541* (B, PRE); Erosberge, Elisenheim (fl. fr. Feb.) *Merxmüller & Giess 30004* (M, WIND); 22S19E – Gobabis, Farm Steinveld (fl. June) *H. Walter 4098*

(M). 23S16E – Nauchas (fl. Mar.) *E. MacDonald* 427 (BM). 23S17E – Rehoboth (fl. fr. Nov.) *W. Giess jun.* 142 (M).

Swaziland: 26S31E – Mankaiana (fl. dr. Mar.) *R. Compton* 27717 (K, M, PRE). 27S31E – Gollel (fl. fr. Mar.) *R. Rodin* 4201 (K, PRE); 3 km E. of Goedgegun (fl. fr. Dec.) *J. Ross* 1763 (K, M, NU).

Tanzania: 01S31E – Nyashoyi, Karagwe (fl. fr. Dec.) *A. Haarer* 2405 (K). 02S31E – Bukone (fl. fr.) *Stuhlmann, Mar.* 1892 (BM, K). 02S33E – Nyambiti, Massanza Is., Mwanza (fl. fr. Mar.) *R. Tanner* 1280 (K). 02S34E – Musoma Distr., Nata resthouse (fl. fr. Apr.) *R. Tanner* 4131 (B, BR, G, K, S); Musoma Distr., Serengeti, Seronera (fl. fr. Apr.) *P. Greenway* 10014 (K, M); Lake Lagaja Distr. (fl. Jan.) *A. Moore* 12 (K). 02S35E – Masai Distr., Seronera, NE. to Naabi Hill (fr. Dec.) *P. Greenway* 9099 (B, K); Lobondo (fl. fr. Nov.) *R. Tanner* 1795 (K); Engaruka, Kawinjiro (fr. July) *A. Peter* 42888 (B); Ngorongoro crater floor (fl. fr. Mar.) *P. Bally* 12127 (G, K). 03S35E – Ngorongoro crater, near Siedentopf, *P. Bally* B2355 (K); Lemunge, *A. Peter* 43112 (B); Mbulu Distr., Aitcho Pass (fl. fr. Aug.) *B. Burt* 4269 (K). 03S36E – Arusha, Lake Duluti (fl. fr. Nov.) *J. Beesley* 174 (K); Tarengire River (fl. fr. Feb.) *H. Lamprey* 343 (K). 03S37E – Kilimandjaro (fl. fr. Apr.) *H. Schlieben* 5023 (B, BM, G, K, M, P, S, Z); Moshi Distr., between Engare Nairobi and Sanya Yuu (fl. fr. Apr.) *Fries & Hansen* 2626 (K); Engare Nairobi, west slopes of Kilimandjaro (fl. fr. June) *Greenway* 6861 (K). 04S33E – Mbutu (fr. Aug.) *A. Peter* 43552 (B). 04S35E – Mbulu Distr., Yaida Valley Game Reserve (fl. fr. Jan.) *M. Richards* 25070 (K); Mbulu, Tanzangeni Park (fl. fr. Feb.) *M. Richards* 25433 (K, M); Kikori (fl. fr. Mar.) *B. Burt* 2692 (K). 05S34E – Singidi Region, Road Itigi-Singida, 14 km from Itigi (fl. fr. Mar.) *M. Richards* 20014 (K); Turu, Higi to Bangayega (fl. fr. Dec.) *A. Peter* 33735 (WAG). 05S35E – Serengeti, Banagi Hill (fr. Feb.) *A. Brooks* 75a (K); Serengeti, Seronera Nat. Park (fl. fr. May) *S. Paulo* 432 (K, M, UPS). 06S35E – Mjere, south end of Rukwa Rift (fl. fr. Feb.) *A. Michelmores* 976 (K); Central Prov., Kongwa (fl. fr. Feb.) *B. Anderson* 353 (K), 597 (K). 06S37E – Magadi, Mgunani River (fr. July) *A. Peter* 43470 (B). 07S31E – Namwele Distr. (fl. fr. Feb.) *A. Bullock* 2581 (BR, K). 09S34E – Njombe Distr., Njombe-Igawo Road (fl. fr. Feb.) *H. Richards* 14233 (K). 11S34E – Mwanza Lake Prov., Mbanka (fl. Mar.) *R. Tanner* 599 (K).

Transkei: 32S28E – Bashee River (fl. fr. Jan.) *Drège* 5240/1b (E, G, K, P, PRE, S).

Uganda: 00S30E – Ruisi River (fl. fr. Nov.) *T. Jarrett* 178 (K); Queen Elizabeth Nat. Park (fl. fr. Dec.) *E. Lind* 514 (K). 01S29E – Chelima (fl. fr. May) *A. Bagshawe* 292 (BM). 00N30E – Fort Portal, Kature Road (fl. Sep.) *E. Lind* 2803 (K). 01N33E – Kature (fl. fr. June) *A. Thomas* 4159 (K). 01N34E – Karamoja, Amudat (fl. fr. May) *A. Thomas* 2834 (K); Karamoja, Chosan (fl. fr. June) *Y. Symes* 548 (K).

Zaire: 01S29E – Kabare (fl. fr. Aug.) *Bequaert* 5341 (BR).

Zambia: 15S27E – Kafue Flats, Mazabuka (fl. fr. Mar.) *W. Astle* 1413 (K, SRGH). 15S28E – Mazabuka, 5 km SW. of Kafue Bridge (fl. fr. Feb.) *L. Leach* 9802 (SRGH); Iolanda, near Kafue Town (fl. fr. Nov.) *E. Robinson* 6424 (B, K, M, SRGH).

Madagascar: 19S44E – Valley of Manambolo and Mount Morahariva (fl. fr. Dec.) *H. Humbert* 13127 (B, G, K, P). 19S45E – L'Isalo, Ranohira (fl. fr. Apr.) *H. Humbert* 28629 (P), 29849 (P). 22S45E – Horombe (fl. fr. Feb.) *P. Morat* 2585 (P). 23S44E – d'Ampandranuava, entrance Bekily and Tsivory (fl. fr. Mar.) *A. Seyrig* 568 (P). 23S46E – Route to Mahabo (fl. fr. Jan.) *J. Bosser* 17896 (P).

2. *Monsonia attenuata* HARVEY

Fig. 2, Map 2.

In Harvey & Sonder, Fl. Cap. 1:255 (1860); Szyszylowicz, Pol. Disc. 7 (1888); Knuth in Engler, Pflanzenr. 4:129:296 (1912); Burt Davy, Fl. pl. & ferns 1:192 (1926).

Type: South Africa: Natal: Mohlamba Range, SUTHERLAND anno 1856 (K, holotype).

Heterotypic synonym: ? *M. belfastensis* Knuth in Fedde, Reprint nov. Spec. Regni veg. 40:220 (1936). Type: South Africa: Transvaal: Belfast, THODE 3979 (Holotype destroyed in B; lectotype: STE).



FIG. 2. *Monsonia attenuata*: 1. Habit, $\times \frac{3}{4}$; 2. petal venation (hairs omitted), $\times 1\frac{1}{2}$; 3. petal-indumentum of the outer side (veins omitted), $\times 1\frac{1}{2}$; 4. petal-indumentum of the inner side (veins omitted), $\times 1\frac{1}{2}$; 5. sepal outside, $\times 3$. (1: Evans 463 (NH), Hilliard & Burt 8611 (E), and Schlechter 6989 (Z); 2, 3, 4, 5: Schlechter 6989).

JW

Erect, single- or few-stemmed perennial, 10–50 cm high.

Roots sometimes with tubers of up to 60 × 10 mm.

Stems herbaceous to sublignose, 2–40 cm long, 1–4 mm in diam., with a double indumentum the first of which is pubescent with curved hairs and the second is composed of long erect straight mostly gland-based hairs which may be few or many, often with stalked and sessile glands, main stems often branching laterally towards their apices forming terminal clusters of short, densely foliated branches.

Leaves alternate, becoming crowded or almost whorled at the stem-apices; petioles with the same indumentum and glands as the stem, 0.1–0.5 × as long as the blade, 10–30 mm long, flattened above and at the base, often geniculate at the apex; stipules subulate to acicular, with the same indumentum and glands as the stem or only with erect hairs of various lengths, 3–25 mm long, mostly reddish; blade simple, linear, 9–20 × as long as wide, 25–75 × 3–10 mm, mostly folded upwards along the midrib, mostly attenuate and mucronate, less often acute at the apex, truncate at the base, acutely serrate, rarely obscurely so, rarely ciliate at the margin, glabrous, granulose or obscurely to conspicuously puberulent or pubescent on both sides, the veins beneath always with few to many long straight gland-based hairs, often with sessile and stalked glands and, furthermore, beneath sometimes glandular-punctate; veins pinnate, only the midrib prominent beneath and impressed above.

Inflorescences terminal and/or lateral, when lateral axillary or not, 1-3-flowered, 20–70 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem, rarely pedicels lanuginose or with the same indumentum as the sepals outside; peduncles obsolete or up to 11 mm long; pedicels 20–65 mm long, geniculate under the fruit; involucre bracts 2–3 per flower, stipule-like, sometimes narrowly triangular and navicular.

Sepals green, free, narrowly ovate to narrowly obovate, 2.3–5.5 × as long as wide, 10–15 × 3–6 mm, outside with the same indumentum as the stem, but this often obscure or denser than that on the stem, with numerous sessile and stalked glands, inside glabrous, with 1 or 3 parallel main veins, ciliate at the margin; mucro 0.5–7 mm long, terete, reddish-brown, curved, with the same indumentum as the sepals outside.

Petals obtriangular to broadly obtriangular, 1.3–2.2 × as long as wide, 20–30 × 9–20 mm, 1.6–2.2 × as long as the sepals, 2–2.3 × as long as the stamens, white to yellow or less often pink, obscurely villose inside and obscurely villose or puberulent outside, often with sessile or stalked glands; venation conspicuously reticulate, greyish-blue to green or blackish, with 5 main veins; base membranously winged and obscurely ciliate; apex crenate to dentate or lobed.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 0.5–1 mm; filaments of each group basally connate for 1.5–2.5 mm; filaments in the central stamens 7–11 mm and in the lateral 5–7 mm long, terete and mostly reflexed at the apex, obscurely hairy outside; an obscure to conspicuous ovate gland-cavity with 2 parallel, vertical rims and

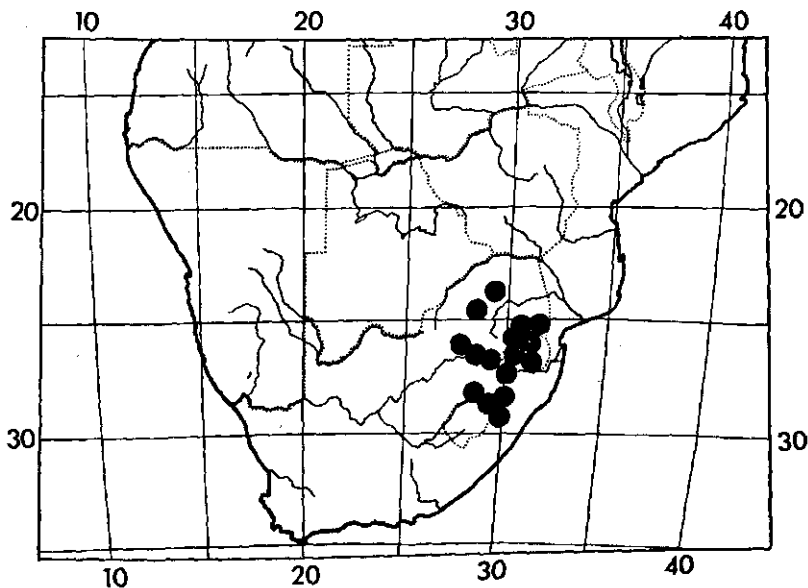
rarely a subulate apical appendage is situated on the outer side of the base of each group; anthers elliptic, those of the long filaments often slightly larger, $2.5-3.6 \times 1.2-2$ mm.

Pistil 10–14 mm long; ovary broadly obovoid, 2×2 mm, hirsute-pubescent; the beak pubescent and at the base with stalked glands, longitudinally grooved, 5–8 mm long; stigmas clavate or linear, $3-4 \times 0.5-0.6$ mm, outside pubescent, acute to obtuse at the apex and entire to subentire at the margin.

Fruit 55–65 mm long, mericarps $11-13 \times 2$ mm, beak 45–50 mm long; mericarps narrowly and obliquely obovoid, brown, hirsute, at the apex coarsely reticulate; tail hirsute outside, hispid inside where the tails detach from the beak-axis; these stiff hairs long at the tail's base, forming a crest.

Seed narrowly obovoid, 4.5×1.5 mm, with a few scattered hairs sometimes present.

Distribution: South Africa (eastern and southern Transvaal, eastern Orange Free State and Natal Midlands) and Lesotho.



MAP 2. *Monsonia attenuata*.

Ecology: A typical herb of mountain sides and of rocky ridges on the highveld of Transvaal. Alt. 1300–2600 m. Flowering and fruiting period from December to March.

Economics: Decoctions of the roots are used to cure dysentery.

Note: The following specimens are atypical: Transvaal–Lydenburg: Luns-Meded. Landbouwhogeschool Wageningen 79-9 (1979)

klip Waterfalls, CODD 10016: leaves more like those of *M. transvaalensis*; Belfast, THODE 3979 (type of *M. belfastensis*): petals and mericarps more like those of *M. transvaalensis*; Belfast, JENKINS 6815; Middelburg, Wonderfontein Station, BOLUS 11732; and Waterberg: Haakdoorn, GALPIN 13388: petals as in THODE 3979; Bronkhorstspuit: Rhenosterkop, YOUNG PRE-36775: petals as in THODE 3979 and leaves, furthermore, atypically pilose; Natal-Weenen: near Lowlands Station, J. ACOCKS 11349: petals like those found in *M. grandifolia*.

Field studies in the above mentioned localities have to be carried out before any final decisions are possible on the taxonomic position of these plants, especially those from Belfast which include *M. belfastensis* placed in synonymy with *M. attenuata* in this present monograph.

Representative specimens:

Lesotho: *Cooper 2044* (E, K, Z).

South Africa: Natal: 27S29E – Majuba, near tunnel Umguela (fl. Aug.) *G. Elliott 1636* (E); Majuba (fl. Mar.) *F. Rogers 720* (GRA); Charlestown, Farm Glen Athol (fr. Jan.) *C. Smith 5634* (PRE); Charlestown (fl. fr. Feb.) *J. Wood 5539* (BM, E). 27S30E – Vryheid Distr., Kambula (fl. Mar.) *F. Gerstner 4624* (PRE). 28S28E – Royal National Park, Mount-aux-Sources (fl. fr. Feb.) *W. Trauseld 195* (NU, PRE); near Tugela Falls (fl. Jan.) *J. Wood 3504* (K, NH). 28S29E – Oliviershoek Pass, *J. Thode 5673* (fl. Jan., STE), 3977 (fl. Mar., STE); Van Reenen (fl. Jan.) *J. Wood 1898* (M), 7831 (P); Van Reenen (fl. fr. Mar.) *R. Schlechter 6989* (BM, G, GRA, K, L, M, S, Z); Van Reenen Distr., Brakwal (fl. Nov.) *J. Wood 6568* (G); Bergville, Cathedral Peak Forest Reserve Station (fl. Jan.) *D. Killick 1274* (PRE), 1308 (BR, FI, K, PRE); Cathedral Peak Organ Pipes Pass (fl. Jan.) *D. Edwards 1172* (PRE). 28S30E – Mhlabamba Range (fl.) *Sutherland anno 1856* (K-holotype); Dundee Distr., Mpati Mountain (fl. Dec.) *O. Hilliard NU31941* (NU); Weenen, near Lowlands Station (fl. fr. Mar.) *J. Acocks 11349* (BR, NH); Weenen Distr., Culvers (fl. fr.) *F. Rogers 28471* (K), 28488 (K). 29S29E – Estcourt Distr., NW. aspect of Kamberg (fl. Feb.) *F. Wright 1646* (NU); Kamberg 'Game Pass' (fl. Dec.) *K. Gordon-Gray 59* (NU); Drakensberg, 'The Cavern' (fl. Jan.) *A. Pascoe 5* (NU); Giants Castle Reserve (fl. Jan.) *N. Garrett 4* (NH); Giants Castle, Highmoor (fl. Jan.) *J. Bos 1001* (WAG, M); Estcourt Distr., near Champagne Castle Hotel (fl. Jan.) *J. Acocks 10079* (NH); Drakensberg, Cathkin Peak (fl. Feb.) *E. Galpin 11725* (BM, K, PRE). Tweekloof, Altemooi (fl. Dec.) *J. Thode A1149* (K, PRE); Drakensberg, Cold Stream, *A. Rehmann 6915* (Z). Natal, *W. Gerrard 1431* (BM, W); Drakensberg, Tiger Cave Valley, *M. Evans 463* (NH). Orange Free State: 28S28E – Witzieshoek (fl.) *H. Junod, Mar. 1917* (G, PRE); Witzieshoek (fl. Dec.) *J. Thode 5741* (STE); Witzieshoek (fl. Dec.) *Hilliard & Burt 8611* (E, K, NU). 28S29E – Harrismith, Catchment Area (fl. Feb.) *E. Phillips 3505* (PRE); Harrismith, Platberg (fl. Feb.) *H. Venter 7053* (BLFU); Swinburne, Rensburgskop (fl. Feb.) *M. Jacobs 380* (K). OFS., *J. Cooper 798* (E, K, Z). Transvaal: 23S29E – Pietersburg (fl. Feb.) *S. Lilian 25463* (Z). 24S28E – Geelhoutkop (fl. Jan.) *Breyer H17820* (M, PRE); Waterberg, Hartbeeslaagte (fl. Dec.) *E. Galpin 13388* (PRE); Waterberg, Haakdoorn (fl.) *F. Rogers 22870* (Z). 25S28E – Bronkhorstspuit, Renosterkop (fl. Feb.) *M. Young PRE36775* (PRE). 25S29E – Middelburg Distr., Wonderfontein Station (fl. fr. Jan.) *H. Bolus 11732* (SAM). 25S30E – Waterval-Boven (fl. Feb.) *F. Rogers 14445* (Z, PRE); Lydenburg, Witklip Forestry Station (fl. Feb.) *J. Kluge 476* (PRE); Lydenburg, Lunsklip Waterfalls (fl. Mar.) *L. Codd 10016* (BM, PRE); Barberton, Nelshoogte Pass (fl. Mar.) *A. Meeuse 10087* (K, PRE); Nelspruit (fl. Feb.) *Breyer H17963* (M); Goede Hoop (fl. Dec.) *R. Pott 4966* (K, PRE); Nelsberg, 32 km E. of Badplaas (fl. Mar.) *L. Codd 10335* (PRE); Belfast, near Wonderfontein (fl. fr. Feb.) *L. Codd 5169* (PRE); Belfast (fl. fr. Jan.) *J. Thode 3979* (STE, lectotype of *M. belfastensis* Knuth); Belfast (fl. Jan.) *T. Jenkins 6815* (K, PRE); Dullstroom, Suikerboskop (fl. Dec.) *E. Galpin 13033* (K). 25S31E – Barberton (fl.) *G. Thorncroft US14280* (US); Barberton (fl.) *F. Rogers 29394* (G, Z); Havelock (fl. Feb.) *Ihlenfeldt 2349* (PRE); Umkomati Valley (fl. Mar.) *E. Galpin 1324* (K, PRE); Komatipoort, 1 km from Agnes Mine (fl. Mar.) *E. Buitendag 488* (NBG); Malelane (fl.) *Phillips PRE41154* (PRE). 26S27E – Roodepoort (fl. Mar.)

E. Moss 8486 (J); Witpoortjie (fl. Jan.) *E. Moss* 16188 (BM, J); Krugersdorp Waterfall, *A. Mogg* 23164 (J). 26S28E – Heidelberg, Suikerbosrand (fl. Dec.) *G. Bredenkamp* 615 (PRU); Suikerbosrand, Schoongezicht (fl. fr. Feb.) *J. Repton* 5351 (K, M, PRE); Heidelberg (fl.) *C. Vandeleur anno* 1901 (BM); Johannesburg, Melville Koppies, *G. Weeks* 73 (J); Johannesburg, Milner Park (fl. Jan.) *E. Moss* 6245 (J, Z); Johannesburg, Observatory, *M. Macnae* J35912 (J). 26S29E – Breyten, *F. Rogers* 11628 (GRA, PRE); Standerton, *A. Rehmann* 6819 (K, Z). 26S30E – Carolina, near The Brook (fl. Feb.) *R. Strey* 8013 (NH); Carolina (fl. Jan.) *F. Rogers* 19136 (K); Machadodorp, 27 km SE. on Slaaihoek Rd. (fl. fr. Jan.) *E. Bruce* 483 (K, PRE); Machadodorp (fl. fr. Jan.) *L. Codd* 8271 (K, PRE); Ermelo, *Leenderitz* 7880 (PRE); Ermelo, Nooitgedacht, *Henrici* 1221 (PRE). 27S29E – Volksrust (fl. Jan.) *T. Jenkins* 9273 (PRE). 27S30E – Piet Retief (fl. Dec.) *T. Jenkins* 10951 (PRE); Wakkerstroom, Groothoek (fl. Jan.) *A. Bührman* 7 (K, WAG); Wakkerstroom, 'North Hill' (fl. Jan.) *E. Galpin* 9815 (K, PRE).

Swaziland: 26S31E – Mbabane, Forbes Reef (fl. Feb.) *R. Compton* 27562 (PRE); Mbabane, Duiker Bush (fl. Feb.) *R. Compton* 25540 (PRE); Usutu Forest (fl. Feb.) *R. Compton* 25638 (PRE). 27S31E – Hlatikulu (fl.) *M. Stewart* 114 (K), 3696 (SAM).

3. *Monsonia brevirostrata* KNUTH

Fig. 3, Map 3.

In Engler, Bot. Jahrb. 40: 67 (1907); Knuth in Engler, Pflanzenr. 4.129: 297 (fig. B), 306 (1912); Burt Davy, Fl. pl. & ferns 1: 192 (1926).

Types: South Africa: Zuurberge, SCHLECHTER 6573 (holotype not seen, destroyed in B; lectotype in B; other isotypes: BR, FI, GRA, K, P, PRE, SAM, US, W, Z). South Africa: between Elliott and Maclear at 1500 m, BOLUS 8725 (paratypes: BOL, GRA, K, NH, PRE, Z).

Prostrate to decumbent, slender, many-stemmed, annual of 10–30 cm high.

Stems: primary stem stunted; the lateral branches up to 40 cm long, 1–2.5 mm in diam., herbaceous, with a double indumentum the first of which is composed of a pubescence of curved hairs and the second of scattered long straight erect mostly gland-based hairs, with stalked glands.

Leaves of the primary stem rosulate and of the lateral branches opposite or subopposite, those of a pair unequal, the smaller with lateral branches and/or inflorescences in the axil; the petiole with the same indumentum and glands as the stem, (0.5)1–2.5 × as long as the blade, (5)10–30(60) mm long, mostly flattened at the base; stipules subulate, with the same indumentum as the stem, 0.5–3 mm long; blade narrowly ovate to broadly ovate, 1–3 × as long as wide, 8–30 × 3–20 mm, obtuse to acute and 3-toothed at the apex, obtuse to truncate at the base, serrate to dentate, glabrous or granulose on both sides, often with sessile glands, on the main veins beneath with curved hairs and also mostly with stalked and sessile glands, sparsely glandular-punctate on both sides; main veins pinnate or rarely subpinnate, often purplish.

Inflorescences lateral, leaf-opposed or axillary, 1–2-flowered, 15–40 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem; peduncles 1–2.5 × as long as the pedicels, 9–20 mm long, pedicels 4–10 mm long and geniculate under the fruit; involucre bracts 1–3 per flower, stipule-like.

Sepals green, free, linear to very narrowly ovate, 3–5 × as long as wide, 4–5



FIG. 3. *Monsonia brevirostrata*: Habit, $\times 1\frac{1}{3}$. (Hilliard & Burt 8005 (E) and 8422 (E)).

JW

× 1–1.5 mm; outside with the double indumentum of the stem, or with the long hairs only, these few or many, both the short and long hairs may be gland-based; inside glabrous to very obscurely pubescent, rarely with 3 parallel veins; margin ciliate; apex acute; mucro terete and 0.1–0.5 mm long.

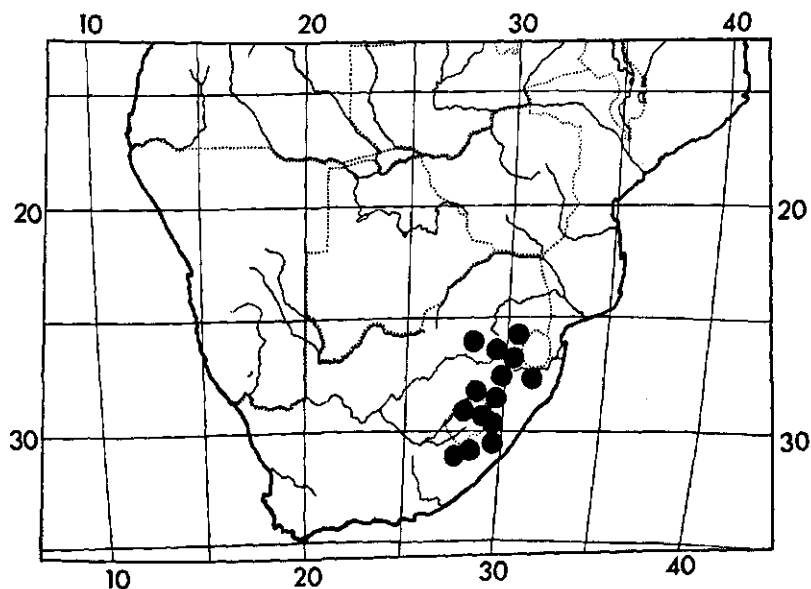
Petals narrowly obtriangular, 2.5–3.5 × as long as wide, 5–7 × 1.5–2.5 mm, 1–1.5 × as long as the sepals, 1.2–1.4 × as long as the stamens, white or mauve, blue or purplish-blue, outside and inside glabrous, venation dark blue or purplish, with 3 or 5 main veins, winged and obscurely ciliate at the base, obscurely sinuate or lobed at the apex.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 0.5–0.6 mm; filaments of each group basally connate for 1–2 mm; the filaments in the central stamens 3.5–4.5 mm and in the lateral 2.5–3 mm long, rarely terete at the apex, glabrous inside and obscurely hairy outside; an obscure, ovate gland-cavity with 2 parallel, vertical rims is situated on the outer side of the base of each group; anthers elliptic to broadly elliptic, 0.8–1 × 0.6–0.7 mm, subintrorse.

Pistil 3.5–4.5 mm long; ovary broadly obovoid, 1 × 1 mm, hirtio-pubescent; the beak also hirtio-pubescent, longitudinally grooved, 1.5–2 mm long; stigmas clavate, 0.5–1 × 0.2 mm, outside glabrous, purplish, apex acute or obtuse, margin entire or subentire.

Fruit 20–30 mm long, mericarps 5–8 × 1–1.5 mm, beak 15–25 mm long. Mericarps narrowly obconical, hirsute, often reticulate, rimmed and ridged at the apex; rim and ridge conspicuous and sharp-edged, oblique; tail hirsute outside, hispid inside where it detaches from the beak-axis; these stiff hairs long at the tail's base and forming a crest.

Seed narrowly obovoid, 3–3.6 × 0.8–1.2 mm, glabrous.



MAP 3. *Monsonia brevirostrata*.

Distribution: Southern Africa in Lesotho, Transkei and South Africa (mountainous areas of the eastern Orange Free State, Natal and the southern and eastern parts of Transvaal).

Ecology: A herb that may be quite common in rocky, turf or sandy grasslands and on bare ground in mountainous habitats. Alt. 1600–3000 m.

Flowering and fruiting from December to March.

Note: This species resembles *M. angustifolia* closely with respect to the flowers and fruits, but in *M. brevirostrata* these are dwarfed. The leaves, however, are quite distinct. The growth system in *M. brevirostrata* is prostrate and in *M. angustifolia* erect or decumbent.

Representative specimens:

Lesotho: 29S27E – Mamathes (fl. fr. Feb.) *W. Lawson* 821 (NH); Teyateyaneng (fl. fr. Apr.) *D. Collett* 480 (PRE). 29S28E – Leribe (fl. fr.) *A. Dieterlen* 1860 (SAM); Potsuane (fl. fr.) *A. Dieterlen* 714 (P, PRE); Sehlabathebe Reserve (fl. Jan.) *R. Bayliss Lesotho* 135 (K, S). Lesotho (fl. fr. Feb.) *A. Jacot-Guillarmod* 2670 (PRE).

South Africa: Orange Free State: 28S28E – Witzieshoek, Bester's Vlei, *H. Flanagan* 2086 (PRE); Golden Gate National Park, Generaalskop (fl. fr. Jan.) *L. Liebenberg* 6922 (PRE), 7426 (K, PRE, S). 28S29E – Swinburne, Farm Grootvlei (fl. fr. Jan.) *M. Jacobsz* 43 (PRE). Natal: 27S29E – Charlestown, Farm Glen Albott (fl. fr. Jan.) *C. Smith* 5736 (PRE); Charlestown (fl. fr. Mar.) *J. Wood* 6311 (BM, PRE). 27S31E – Ngotshe Distr., Ngome (fl. fr. Dec.) *Hilliard & Burt* 8422 (E, K, NU, S). 28S29E – Bergville, top of Bezuidenhouts Pass (fl. Dec.) *Hilliard & Burt* 9445 (E); Bergville, Mount-aux-Sources (fl. fr. Feb.) *J. Thode* 7831 (STE). 29S29E – Underberg Distr., Bushmen's Neck Police Post (fl. fr. Feb.) *Hilliard & Burt* 8005 (E, K, NU); Underberg, Sani Pass (fl. fr. Mar.) *Hilliard & Burt* 9734 (E). 30S29E – Zuurberge (fl. fr. Feb.) *R. Schlechter* (B-lectotype; isotypes, BR, FI, GRA, P, PRE, STE, US, W, Z). Transvaal: 25S30E – Carolina (fl. fr. Dec.) *Moss & Rogers* 1251 (Z). 26S28E – Benoni (fr. Nov.) *P. Bradfeld* 343 (PRE); Johannesburg, Milner Park (fl. fr. Mar.) *E. Moss* 11141 (J, Z). 26S29E – Bethal (fl. fr. Dec.) *L. Leendertz* 9334 (PRE); Dunswart (fl. fr. Mar.) *E. Moss* 13924 (BM, J). 26S30E – Ermelo (fl. fr. Feb.) *L. Leendertz* 7854 (PRE); Ermelo (fl. fr. Feb.) *Burt Davy* 1665 (K). 27S30E – Wakkerstroom (fr. Feb.) *E. Galpin* 9773 (K, PRE). Cape Province: 31S27E – Xalanga, upper part of Cala Pass (fl. Jan.) *J. Acocks* 21877 (PRE); between Cala and Maclear (fl. fr.) *H. Flanagan* 2620 (PRE, SAM); between Elliott and Maclear (fl. fr.) *H. Bolus* 8725 (paratypes: BOL, GRA, K, NH, PRE, Z); Maclear Distr., Tsitsa Footpath, Drakensberg (fl. fr. Mar.) *E. Galpin* 6590 (GRA, K, PRE).

4. *Monsonia burkeana* PLANCHON ex HARVEY

Fig. 4, Map 4.

In Harvey & Sonder, Fl. Cap. 1: 255 (1860); Szyszyłowicz, Pol. Disc. 6 (1888); Knuth in Engler, Pflanzenr. 4.129: 299 (1912); Burt Davy, Fl. pl. & ferns 1: 193 (1926); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 3 (1966).

Types: South Africa: Transvaal: Pretoria: Apies River, BURKE (K, holotype; isotype: PRE). Transvaal: Magaliesberg, ZEYHER 158 (paratypes: BM, FI, K, P, PRE, S).

Heterotypic synonyms: *Monsonia biflora* DC., Prodr. 1: 638 (1824) nomen confusum; Steudel, Nomencl. bot. ed. 2, 2: 158 (1841); Szyszyłowicz, l.c.; Knuth in Engler, Pflanzenr. 4.129: 305 (1912) errore; Burt Davy, l.c.; Müller &



FIG. 4. *Monsonia burkeana*: 1. Habit, $\times \frac{1}{2}$; 2. part of stem with erect leaf, $\times 1\frac{1}{2}$; 3. part of stem with double indumentum, $\times 6$; 4. tailed mericarp, $\times 3$. (1: *Pole-Evans 453* (PRE), *Dahlstrand 1184* (GB); 2: *G. Theron 20* (A); 3: *Pole-Evans 453*; 4: *Schlieben 7754* (G)).

Bowden, Fl. Zamb. 2 (1): 137 (1963); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 4 (1966); Kokwaro, Webbia 25: 654 (1971). Type: South Africa: Cape Province: Kalahari: Griqualand West: between Knegt's Fontein and Klip Fontein, BURCHELL 2611 (G, holotype (photo); isotypes: A, K, P).

Monsonia glandulosissima Schinz, Bull. herb. Boiss. sér. 2, 3: 822 (1903); Knuth in Engler, Pflanzenr. 4.129: 306 (1912); Merxmüller & Schreiber, l.c. Types: South West Africa: Great Namaland: Windhoek, DINTER 837 (Z, holotype). South West Africa: Eastern Auasberge, DINTER 856 (Z, paratype).

Monsonia malvaeflora Schinz, Bull. herb. Boiss. sér. 2, 3: 821 (1903); Knuth in Engler, Pflanzenr. 4.129: 299 (1912); Range in Fedde, Reprim. nov. Spec. Regni veg. 36: 244 (1934) as *M. malvaefolia*; Merxmüller & Schreiber, l.c. Type: South West Africa: Eastern Auasberge: south slope at 1800 m, DINTER 802 (Z, holotype).

Monsonia betschuanica Knuth in Engler, Pflanzenr. 4.129: 298 (1912). Type: Botswana: Sogosse, SEINER anno 1906, n. II 57 (holotype not seen, destroyed in B, no isotype seen).

Erect, semi-erect, rarely decumbent, suffrutescent, sometimes aromatic, multi-stemmed, 30–40 cm high.

Stems herbaceous to woody, 5–35 cm long, 2–6 mm in diam., terete, pubescent with curved or straight hairs, less often with a double indumentum the first of which is as above and the second composed of long scattered gland-based erect hairs, mostly with numerous sessile and stalked glands.

Leaves: the lower alternate, the upper sub-opposite to opposite with those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; the petiole with the same indumentum and glands as the stem, 0.2–0.5 × as long as the blade, 4–17 mm long, often geniculate at the apex and flattened at the base; stipules subulate or acicular, 2–10 mm long, obscurely pubescent, rarely subsppinescent; blade narrowly elliptic, elliptic, or narrowly ovate, often erect, 1.5–7.5 × as long as wide, 10–50 × 4–12 mm, obtuse or truncate and with 3 teeth at the apex, obtuse or less often cuneate at the base, serrate; above granulate, obscurely puberulent, or pubescent with the hairs curved or straight, mostly with sessile and stalked glands which may be few or numerous; beneath with the same indumentum and glands but these more conspicuous and with longer more or less appressed hairs on the veins; main veins pinnately or exceptionally subpinnately arranged, impressed above, prominent beneath.

Inflorescences lateral, axillary or not, 1–4(5)-flowered, 50–110 mm long. Peduncles and pedicels slender, with same indumentum and glands as the stem; peduncle 0.7–4 × as long as the pedicels, 10–50 mm long; pedicels 14–30 mm long and sometimes geniculate under the fruit. Involucral bracts 1 or 3 per flower, stipule-like.

Sepals green, free, very narrowly ovate or narrowly obovate, 2.2–4 × as long as wide, 7–11 × 2–4 mm, with 3 parallel veins; outside pubescent with ordinary hairs, some or most of which may be replaced by stalked glands or otherwise with a double indumentum of appressed pubescence and long straight, often gland-

based hairs, with sessile glands; inside glabrous; margins ciliate; mucro 1–2 mm long, terete, dark brown, straight or curved, glabrous to obscurely pubescent.

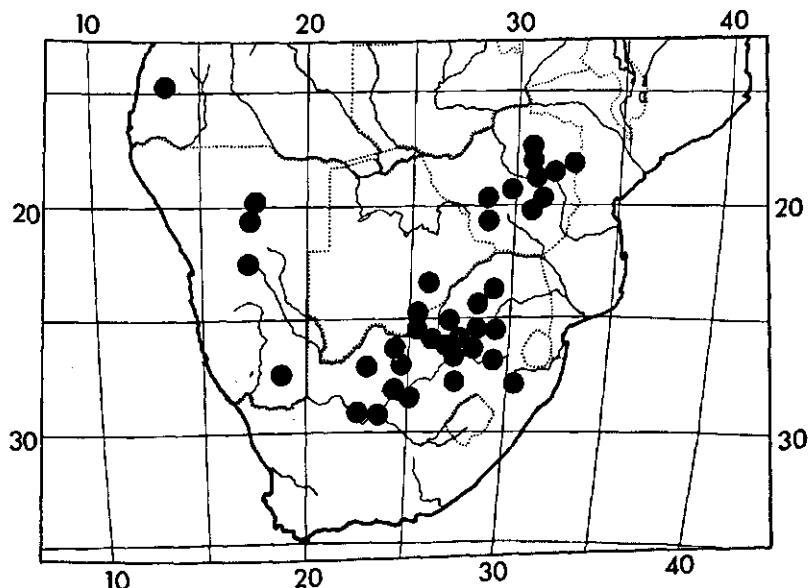
Petals obtriangular to narrowly obtriangular, 1.2–2.3 × as long as wide, 12–22 × 6–16 mm, 1.6–2.5 × as long as the sepals, 1.2–2.2 × as long as the stamens, white, pink, mauve, purplish-blue, or rarely yellow, outside glabrous and inside obscurely villose, sometimes with scattered sessile or stalked glands, with 5 purplish-grey main veins, apex faintly sinuate to obscurely 3–5-lobed, sometimes winged and obscurely ciliate at the base.

Stamens monadelphous, arranged in a cup-shaped column around the pistil, groups connate for 0.5–1 mm, filaments of each group connate at the base for 1 mm; the filaments in the central stamens 8–10 mm and in the lateral 5–8 mm long, terete at the apex, pubescent to obscurely pubescent, a prominent triangular or ovate gland or obscure gland-cavity is situated on the outer side of the base of each group; the gland often with a 1 mm long, ligulate and ciliate, apical appendage; anthers elliptic, all equal, 1.5–2 × 0.5–1 mm, subintrorse or laterotrorse.

Pistil 8–11.5 mm long; ovary broadly obovoid, 2 × 2 mm, hirto-pubescent; the beak also hirto-pubescent, 3–6 mm long and longitudinally grooved; stigmas clavate or linear, 1.5–4 × 0.5 mm, outer surface glabrous or obscurely pubescent, reddish.

Fruit 45–80 mm long, mericarps 9–12 × 2–2.5 mm and beak 40–65 mm long. Mericarps narrowly and obliquely obovoid, hirsute, rimmed and obliquely domed at the apex; the tail hirsute outside, hispid inside where it detaches from the beak-axis; these stiff hairs long at the tail's base and forming a crest.

Seed narrowly obovoid, 4–5 × 1–1.5 mm, glabrous.



MAP 4. *Monsonia burkeana*.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

Distribution: Southern Africa from Angola and Rhodesia to the northern Cape Province in South Africa.

Ecology: In grassland of hot, semi-arid to moderately moist savannah on soils that range from sandy loam to clay derived from granite, dolomite, quartzite. Alt. 800–2000 m.

The flowering season starts in early spring, August/September, and continues until autumn, May/June, whilst fruits are present on the plants from September to June.

Vernacular names: *Cranes' bill*, *Naaldbossie*, *Angelbossie*, *Assegaibossie*, *Keitabossie*, *GaMhana*.

Note: Although *M. biflora* DC. is the oldest and therefore valid name of this taxon, the use of the epithet '*biflora*' caused so much confusion that it is to be regarded as nomen confusum. HARVEY (1860) reduced *M. angustifolia* to a synonym of *M. biflora* and thus gave rise to the confusion.

In the same publication he also described *M. burkeana*. OLIVER (1868), SAUNDERS (1869), ENGLER (1892), EYELS (1916), EXELL & MENDONÇA (1951) and even KNUTH (1912) made the same mistake, probably after HARVEY. BURTT DAVY (1926) complicated the situation even further with his *M. biflora* var. *angustifolia*. The main source of all this confusion must be sought in the vegetative similarity of *M. angustifolia* and *M. burkeana* (*M. biflora*) and is an excellent illustration of the difficulties that often arise in the distinction of the species of *Monsonia*. MERXMÜLLER & SCHREIBER (1966) realised the situation and declared *M. biflora* nomen ambiguum. The present author endorses their resolution.

Comparing the description of *M. betschuanica* with the characteristics of the other species of *Monsonia* the present author concluded that *M. burkeana* and *M. angustifolia* resemble it the most, but *M. burkeana* more so. Therefore, although the type specimen is lost, *M. betschuanica* is herewith reduced to a synonym of *M. burkeana* at hand of the description.

Representative specimens:

Angola: 14S13E – Huila, Sa da Bandeira (fl. fr. Jan.) Santos & Henriques 376 (BM); Huila, between Sa da Bandeira and Humpata (fl. May) Exell & Mendonça 2036 (BM); Huila, Lubango (fl. Dec.) G. Barbosa 10373 (K, SRGH); Huila, Entre Palanca e Huila (fl. fr. Mar.) J. Texeira 3489 (A, BR, SRGH).

Botswana: 23S25E – Kgalagadi, 16 km NW. of Lephepe (fl. fr. Apr.) E. Kelaole 511 (K). 24S25E – Gaborones (fl. Mar.) Van Son PRE28847 (BM, K, PRE); Kanye (fl.) R. Marloth 2177 (PRE); Lobatsi, Farm Springfield (fl. Jan.) Leach & Noel 140 (SRGH). On road from Hamapery to the Great Kosi Fountain, Burchell 2534 (K); Kunene-Sambesi, Minnesera (fl. Jan.) H. Baum 654 (G, W).

Rhodesia: 17S30E – Coquetdale (fl. Aug.) R. Myres 60 (K). 18S30E – Beatrice Distr. (fl. Dec.) J. Rattray 1538 (K); Salisbury, Twentydales Rd. (fl. Feb.) R. Rutherford-Smith 486 (K). 18S31E – Marandellas Grassland Exp. Stat. (fl. fr. Sep.) J. Rattray 717 (K); Marandellas (fl. fr. Jan.) G. Dehm 89 (M); Charter Distr., Featherstone (fl. Nov.) R. Davies 2936 (K); Salisbury (fl. fr. Dec.) R. Rand 95 (BM); Salisbury, 15 km N. on Sinoia Rd. (fl. Nov.) A. Boughy 225 (J); Salisbury, between Wellesky

and Darwendals (fl. Nov.) *R. Drummond* 4875 (BR, S). 18S32E – Mashonaland, Distr. Rusapi, Makoni, St Faith's Mission (fl. Apr.) *E. Norman* R18 (K); Makoni, Headlands Siding (fl. Oct.) *N. Chase* 8311 (K); Rusape, Dunedin (fl. Sep.) *D. Doyle* 64 (K); Rusapi (fl. fr. Sep.) *Eyles* 7939 (BM, K); Inyanga (fl. fr. Dec.) *J. Hopkins* 9519 (K, SRGH); Headlands Distr., De Vos Farm (fl. fr. Nov.) *D. Munch* 43 (K). 19S28E – Shangani, Gwampa Forest Reserve (fl. Mar.) *B. Goldsmith* 115/55 (K). 19S29E – Gwelo, Mlezu Gov. School Farm (fl. Feb.) *H. Biegel* 935 (SRGH). 19S31E – Near Humpata (fl. fr. May) *H. Pearson* 2801 (K); Macheke (fl. Sep.) *F. Rogers* 4049 (BM, K). 20S28E – Bulawayo (fl.) *T. Gardner* 64 (K); Bulawayo, Beacon Hill (fl. fr. Mar.) *E. Best* 472 (K, SRGH); Matobo (fl. fr. Jan.) *O. West* 2621 (K); Matobo, Farm Besner Kobila (fl. Feb.) *O. Miller* 2185 (K). 20S30E – Matabeleland, Ironmine Hill (fl. Nov.) *E. Cecil* 85 (K).

South Africa: Cape Prov.: 26S24E – Vryburg, Armoedsvlakte (fr.) *R. Sharpe* 8144 (PRE); Farm Palmyra, 95 km N. of Vryburg (fl. fr. Feb.) *R. Rodin* 3505 (K, PRE, S, US); Vryburg, Alettasrust (fl. Feb.) *A. Brueckner* 1097 (PRE). 26S25E – Mafeking (fl.) *F. Bolus* 6403 (PRE); Mafeking (fl. Jan.) *R. Duparquet* 47 (P). 27S23E – Kuruman (fl. Feb.) *Marloth* 1088B (STE); Kuruman, Barnaby (fl. fr. Oct.) *J. Acocks* 2494 (KMG, PRE); Broncote, Asbestos Hills (fl. fr. Mar.) *E. Esterhuysen* 781 (BOL, PRE); Kalahari (fl. Oct.) *H. Schinz* 231 (Z); Kalahari (fl. fr. Oct.) *Fleck* 231 (K). 28S22E – Hay Div., Duncurry (fl.) *E. Coote* 2335 (K). 28S24E – Barkley West, Klipvlei (fl. Apr.) *E. Esterhuysen* 2077 (BOL, PRE); Kimberley, Dronfield Station (fl. Dec.) *J. Acocks* 1413 (KMG, PRE). 29S23E – Griqualand West, between Knegt's Fontein and Klip Fontein (fl.) *Burchell* 2611 (G, holotype of *M. biflora* (photo); isotypes: A, K, P); Griqualand, Clydesdale (fl. fr. Mar.) *W. Tyson* 832 (W, Z); Griqualand, Plains of the Vaal (fl. fr.) *J. Bowker* 6 (K). Natal: 28S30E – Between Grey Town & Newcastle (fl. Nov.) *F. Wilms* 1903 (BM, K). Carry's Post, *A. Mogg* 6447 (PRE). Orange Free State: 27S27E – Kroonstad, Old ORC Brewery (fl. fr. Oct.) *J. Pont* 492 (GH, PRE, Z); Vrededorp (fl.) *G. Barrett-Hamilton*, anno 1901-2 (BM). 28S25E – Boshoff, Welgevonden near Smutskraal (fl. fr. Apr.) *Burt Davy* 10103 (PRE); Boshoff Rd., 24 km from Kimberley (fl. fr. Nov.) *P. Badenhorst* 105 (K, KMG, PRE); Boshoff (fl. fr.) *E. Becker*, July 1879 (K). Olifantsfontein (fl.) *A. Rehmman* 3511 (PRE, Z). Transvaal: 23S28E – Potgietersrust, Kwarrieshoek School (fl.) *H. Steyn* PRE41162 (PRE). 23S29E – Pietersburg (fl. fr. Mar.) *F. Rogers* 14649 (A). 24S28E – Waterberg, Vaalwater (fl. Jan.) *E. van der Walt* 24 (PRU); Waterberg (fl. fr. Jan.) *Smuts & Gillett* 3378 (PRE, STE); Sandflats, Zandrivierspoort (fl. fr. Dec.) *J. Smuts* 373 (BM, K, PRE); Naboomspruit, Nooitgedacht (fl. Nov.) *E. Galpin* 13798 (PRE); Nylstroom (fl. fr. Sep.) *F. Rogers* 21554 (FI, K, PRE, Z); Nylstroom (fl. Oct.) *Hafström & Acocks* 735 (PRE). 25S26E – Malmani Oog (fl. fr. Apr.) *Breyer* 15201 (K, M, PRE); Zeerust (fl. Jan.) *J. Thode* A1364 (K, PRE, US); between Zeerust and Mafeking (fl. fr. Feb.) *J. Hutchinson* 2963 (BM, K, PRE). 25S27E – Magaliesberg, Breedsnek, *Lam & Meeuse* 4845 (L); Kommando's Neck near Hartebeespoort Dam (fl. fr. Mar.) *R. Young* PRE26940 (PRE); Magaliesberg, *A. Leeman*, Sep. 1928 (PRE); Magaliesberg, Farm de Kloof (fl. Oct.) *K. Dahlstrand* 1725 (GB); Rustenburg, Marikana (fl. fr.) *Pole-Evans*, Jan. 1936 (K); Rustenburg, Rietvallei Nature Reserve (fl. Jan.) *B. Coetzee* 1471 (K); Rustenburg, *Kässner* 315 (BR). 25S28E – Bronkhorstspuit (fl.) *A. Rehmman* 6571 (BM, K, Z); Pretoria, Aapies River (fl.) *Burke* (K, holotype; isotype: PRE); Magaliesberg (fl. fr.) *Zeyher* 158 (paratypes: BM, FI, K, P, PRE, S); Pretoria, Brummeria (fl. fr. Sep.) *A. le Roux* 15 (K); Pretoria, Aapies River (fl. fr.) *A. Rehmman* 4349 (Z); Pretoria, Ridge at Fountains Drive In Theatre (fl. Feb.) *G. Theron* 20 (A, PRU, PUC); Silverton (fl. Sep.) *H. Schlieben* 10503 (M); Irene (fl. Mar.) *Smuts & Gillett* 507 (STE); Lyttleton (fl. fr. Oct.) *J. Smuts* PRE30870 (STE); Daspoort Range (fl. fr. Oct.) *E. Phillips* 3029 (K, PRE); Sesmylspruit (fl. Oct.) *R. Schlechter* 358 (BM, G, K, PRE, S, W, Z). 25S29E – Loskopdam (fl. Sep.) *G. Theron* 1834 (PRU). 26S26E – Ventersdorp, Somerville (fl. fr. Dec.) *W. Louw* 2478 (PUC); Lichtenburg Town Land (fl. fr. Jan.) *Liebenberg* 71 (PRE); Lichtenburg, Witstinkhoutboom (fl. Jan.) *B. Liebenberg* 31 (PRE). 26S27E – Potchefstroom, Losberg (fl. Dec.) *J. Theron* 929 (PRE); Potchefstroom, Klington (fl. fr. Oct.) *A. Goossens* 1629 (PUC); Bank Station (fl. Oct.) *W. Louw* 367 (PUC). 26S28E – Johannesburg South (fl. Mar.) *R. Rand* 1211 (BM); Johannesburg, Braamfontein (fl. Dec.) *E. Galpin* 6089 (GRA); New Canada (fl. Dec.) *Moss & Rogers* 1869 (Z); Krugersdorp, Giant gorge in Magalies Mountains (fl. Oct.) *K. Dahlstrand* 1184 (GB). 26S29E – Standerton, Val Station, Zandbaken, *Burt Davy* 5593 (PRE). Phoberg (fl.) *Holub*, anno 1887 (Z). Transvaal (fl. fr.) *H. Schinz* 38 (Z). South Africa (fl.) *Burchell* 2332 (A, K).

South West Africa: 19S17E – Sumas, between Otavi and Gaub (fl. fr. Dec.) *E. Nägelsbach* 27 (PRE); Otavi, *Dinter* 5475 (fl. fr. Jan., Z), 5732 (fl. Mar., B). 20S17E – Waterbergplato (fl. Apr.) *Dinter* 560 (Z); Otjiwarongo, Ozondiache Mountains (fl. Dec.) *H. Walter* 313 (M, WIND). 22S17E – Windhoek, Auasberge, top of Moltkeblick (fl. fr. Mar.) *U. Meyer* 109 (M, WIND); Windhoek (fr. Feb.) *Dinter* 837 (Z, holotype of *M. glandulosissima*); eastern Auasberge (fl. Feb.) *Dinter* 856 (Z, paratype of *M. glandulosissima*); south slope of Auasberge (fl. Oct.) *Dinter* 802 (Z, holotype of *M. malvaeflora*). 27S18E – Between Garies and Keetmanshoop (fl. Jan.) *H. Pearson* 9684 (K). Lichtenstein (fl. Apr.) *Dinter* 5974 (B, A). Otjisambaru (fl. fr. Mar.) *O. Volk* 2926 (M, PRE).

5. *Monsonia deserticola* DINTER ex KNUTH

Fig. 5, Map 5.

In Engler, Pflanzenr. 4.129: 304 (1912); Range in Fedde, Reprium nov. Spec. Regni veg. 34: 244; Merxmüller & Schreiber, Mitt. bot. StSamml., Münch. 5: 555 (1965) and Prodr. Fl. S.W.A. 64: 4 (1966).

Type: South West Africa: Lüderitz South: Garub, DINTER 1126 (holotype not seen, destroyed in B; lectotype: SAM).

Heterotypic synonym: *M. depressa* Dinter ex Schinz, Vjschr. naturf. Ges. Zürich 76: 144 (1931); Suessenguth, Mitt. bot. StSamml. Münch. 1: 16 (1950); Merxmüller & Schreiber, l.c. and l.c. Type: South West Africa: Lüderitz South: Camellaager at Aus, DINTER 3687 (Z, holotype; isotypes: B, BM, BOL, K, PRE, SAM).

Prostrate, suffrutescent, 2.5–8 cm high.

Stems subterraneous and aerial; the subterraneous rhizome erect, woody, up to about 8 cm long, 2–5 mm in diam., sometimes branching, with a reddish-brown, papery bark, with few to many aerial stems at the apex; aerial stems herbaceous, up to 15 cm long, 1–1.5 mm in diam., whitish lanuginose or pubescent with some of the hairs sometimes curved or appressed, with subsessile glands.

Leaves crowded and rosulate at the apex of the rhizome, opposite on the aerial stems; petiole pubescent to lanuginose, with subsessile glands, 1–3 × as long as the blade, 10–35 mm long, shorter on the aerial stems than on the rhizome, sometimes geniculate at the apex, often red-tinged; stipules triangular to subulate, 2–5 mm long, reddish to straw-coloured, papery, glabrous or obscurely hairy, deciduous on the aerial stems; blade simple, broadly angular-obovate to very broadly angular-obovate, 0.7–1.1 × as long as wide, 5–20 × 5–20 mm; young leaves pleated along the main veins, cuneate to truncate at the base; apex obtuse; the margin entire in the basal $\frac{1}{3}$ – $\frac{1}{2}$ and serrate-crenate or serrate in the apical part, red-tinged; above sericeous, with sessile glands; beneath lanulose and also with sessile glands; main veins 5, palmate or subpalmate, impressed above, prominent and often red-tinged beneath.

Inflorences axillary, 3–7-flowered, 15–35 mm long. Peduncles and pedicels pubescent to lanulose, slender, with sessile glands; peduncles 1.7–2.3(5) × as long as the pedicels, 5–25 mm long; the pedicels 4–6 mm long, geniculate under the fruit; involucre bracts 2 per flower, deciduous, stipule-like.

Sepals green, free, obovate, 1.5–1.6 × as long as wide, 3–4.5 × 2–3.5 mm;



JW

FIG. 5. *Monsonia deserticola*: 1. Habit, $\times 1\frac{1}{3}$; 2. flower opened, $\times 8$; 3. tailed mericarp, $\times 2$; 4. mericarp with longitudinal slit on inner face, $\times 4$.
 (1, 2: Giess, Volk & Bleissner 5461 (WIND); 3, 4: Giess & Van Vauren 758 (WIND)).

outside sericeous or lanuginose, with sessile glands; inside glabrous, with 3 parallel main veins; ciliate at the margin; the mucro almost apical on the outer side of the sepal; recurved, terete or narrowly triangular and laterally compressed, pubescent, pink-tinged.

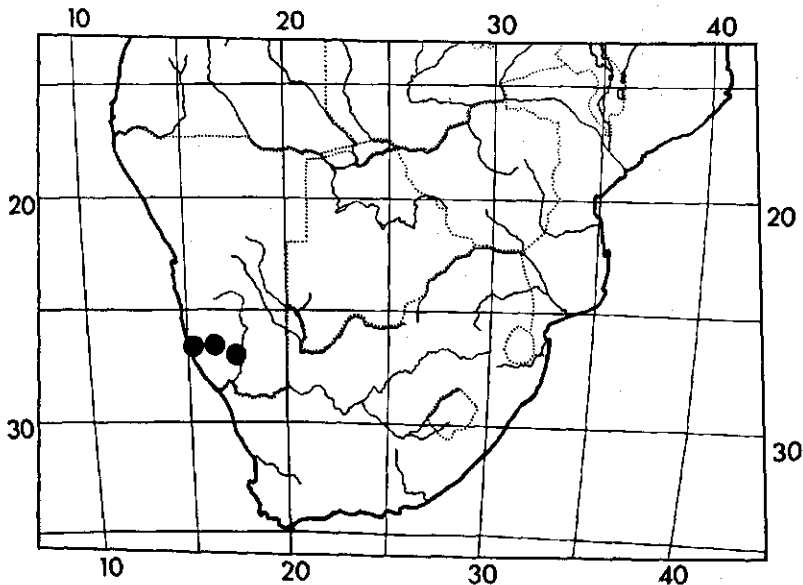
Petals obovate, tapering into a claw at the base, glabrous or obscurely hairy at the claw but not ciliate, obtuse and sinuate or entire at the apex, $2-2.5 \times$ as long as wide, $4-6 \times 2-3$ mm, $1-1.5 \times$ as long as the sepals, $1.4-1.7 \times$ as long as the stamens, white or yellow-white, with 3 or 5 main veins.

Stamens pentadelphous or monadelphous, when monadelphous the groups connate at the base for 0.5–1 mm, filaments of each group connate at the base for 1.5–2 mm; filaments all equal, rarely subequal, 3–4 mm long; the central filament strap-shaped in the basal half, subulate in the apical part; lateral filaments subulate; outside hairy, inside glabrous; gland-cavity none; anthers all equal, elliptic to oblong, $1 \times 0.5-0.6$ mm, subintrorse, each cell with a minute protuberance at the apex.

Pistil 2.5–4 mm long; ovary broadly obovoid, $1 \times 1-1.5$ mm, hirtellous, with subsessile glands; beak terete, 1–2 mm long, densely hirtellous, with subsessile glands; stigmas linear, obtuse at the apex, outside glabrous or obscurely verrucose, margin verrucose.

Fruit 35–55 mm long, mericarps $4-5 \times 1.7-1.8$ mm, beak 30–50 mm long. Mericarps obliquely obovoid, brown, hyalino-hirtellous, ridged, rimmed and coarsely reticulate at the apex; the ridge and rim perpendicular to the tail; the tail recurved and obscurely helically twisted at the base, hirtellous outside, crested at the base and plumose towards the apex on the inner side where the tail detaches from the beak-axis.

Seed obovoid, $3 \times 1.3-1.6$ mm, glabrous.



MAP 5. *Monsonia deserticola*.

Distribution: South West Africa (Lüderitz South District).

Ecology: On gravelly or stony soils in the mountainous area of the Southern Namib Desert.

From the little data available it is impossible to deduce the flowering and fruiting season of this species. It seems, however, to extend from late summer to early spring, April to September, with the peak in August. As the species inhabits desertic localities reproduction is erratic and only occurs after the occasional rain shower.

Note: The diagnosis of MERXMÜLLER & SCHREIBER (1965) of *M. deserticola* was so clear that it was not difficult to find out which species was meant, although the type specimen was not available. The present author was able to verify the latter since a duplicate of the type, DINTER 1126, was found to be present in the collection of SAM, a specimen unknown to these authors at the time of their investigation.

Concerning the question of the name, *M. deserticola*, being a case of 'nomen confusum' the present author upholds the decision of the above mentioned authors. There can be little cause for confusion since this name was used wrongly only by DINTER himself when naming his collections, no's 3815 and 6019. Furthermore, previous to MERXMÜLLER & SCHREIBER (1965), this name was mentioned only once in the literature, viz. by RANGE (1934) who listed four collections of DINTER, no's I.1740, F. XIX.237, 22, and 1126 as belonging to *M. deserticola*. The last mentioned number is of course the type of *M. deserticola* and since the other three numbers seem to be lost, this publication also can be little cause for confusion.

Representative specimens:

South West Africa: 26S15E – Lüderitz South (fl. fr. Aug.) *De Winter & Giess 6127* (WIND); Halenberg (fl. fr.) *Dinter 6611* (A, B, BM, BOL, E, G, K, M, PRE, S, SAM, STE, Z); Tschaukaib Mountain (fl. fr. Oct.) *H. Kinges 2708* (M, PRE). 26S16E – Garub (fl. Jan.) *Dinter 1126* (SAM, lectotype); Garub, *P. Range, July 1907* (BOL); Farm Arutal (fl. fr. Feb.) *Giess, Volk & Bleissner 5312* (M, PRE, WIND); Camellaager at Aus (fl. fr. Apr.) *Dinter 3687* (Z, holotype of *M. depressa*; isotypes: B, BM, K, PRE, SAM); Klein Aus, west of Aus (fl. fr. Aug.) *Giess & van Vuuren 758* (WIND); 64 km S. of Aus (fr. Feb.) *Leippert 4178* (M); Aus, Mountains at Klein Aus (fl. Aug.) *Merxmüller & Giess 2955* (M, WIND); 18 km W. of Aus (fl. fr. Apr.) *B. Nordenstam 2232* (M); near Garub Station (fl. fr. Feb.) *Giess, Volk & Bleissner 5461* (M, WIND).

6. *Monsonia drudeana* SCHINZ

Fig. 6, Map 6.

Verhandl. bot. Ver. Prov. Brandenb. 31: 182 (1890); Knuth in Engler, Pflanzenr. 4. 129: 297 (fig. 37C), 304 (1912); Range in Fedde, Reprim nov. Spec. Regni veg. 36: 244 (1934); Merxmüller & Schreiber, Mitt. bot. StSamml. Münch. 5: 556 (1965) and Prodr. Fl. S.W.A. 64: 4 (1966).

Types: South West Africa: Lüderitz South: Angra Pequena (Lüderitz Bay) SCHENK 33 (Z, holotype); Angra Pequena, POHLE 73 (Z, paratype); Lüderitz South: south of Aus, SCHENK 120 (paratype not seen, probably lost).

Prostrate, suffrutescent, 2–8 cm high.

Stems subterraneous and aerial; the subterraneous rhizome mostly erect, woody, up to about 20 cm long, 2–6 mm in diam., with reddish brown, papery bark that peels off, with 1 to few aerial branches at the apex, sometimes with some adventitious roots; aerial branches herbaceous, 0.5–25 cm long, 1–2 mm in diam., curved- and greyish-puberulent, often lanulose on the nodes, often with stalked glands, mostly stunted.

Leaves opposite, mostly crowded; those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole puberulent to lanulose and also with stalked glands, 1–3(4) × as long as the blade, 15–75(110) mm long, not geniculate at the apex; stipules triangular to subulate, 1–3 mm long, brown, papery, obscurely hairy or glabrous, ciliate, deciduous; blade simple, broadly ovate to orbicular, about as long as wide, 14–30 × 14–30 mm, conspicuously pleated along the veins, obtuse at the apex, cordate at the base; subentire to obscurely crenate or dentate, ciliate and red-tinged at the margin; above subsericeous or curved-puberulent, often with stalked glands; beneath lanulose or curved-puberulent in between the veins and lanulose on the veins, often with stalked glands; main veins 7–9, palmately arranged, deeply impressed above, prominent and reddish beneath.

Inflorescences axillary and terminal, 1–3-flowered, 60–75 mm long. Peduncles and pedicels puberulent to lanulose, slender; peduncles 1.2–2 × as long as the pedicels, 20–35 mm long; pedicels 15–25 mm long, geniculate under the fruit; involucre bracts 2 per flower, deciduous, stipule-like.

Sepals green, reddish-tinged, connate at the base for 2 mm; limb narrowly obovate to obovate, 2.4–2.6 × as long as wide, 13 × 5–5.5 mm; outside pubescent or lanulose, often with stalked glands; inside glabrous except at the pubescent base, with 3 parallel main veins; ciliate at the margin; mucro reddish, recurved, triangular and laterally compressed, 2–2.5 mm long; base spurred; spur 3 mm deep and 1 mm in diam., adnate to the pedicel apex for 2 mm, inside puberulent and glandular, mouth rimmed.

Petals obtriangular, abruptly tapering into a long channelled claw, glabrous, with the claw pubescent on both sides and ciliate, emarginate at the apex, 1.4–1.5 × as long as wide, 18–30 × 13–20 mm, 1.4–2.2 × as long as the sepals, 1.5–2 × as long as the stamens, white, turning yellow when withering, with 5 main veins, the veins deep red or dark violet towards the apex.

Stamens pentadelphous; filaments of each group basally fused for 5–8 mm and also channelled on the outer side; filaments in the central stamens 12–15 mm and in the lateral 10–14 mm long, terete at the apex, pubescent outside at the base directly above the spur, glabrous inside; anthers equal, oblong, 2 × 1 mm, subintrorse.

Pistil 15–21 mm long; ovary obovoid, 2–3.5 × 1.5–2.5 mm, hyalino-hirto-pubescent; beak longitudinally grooved at the base, terete at the apex, 8–10 mm long, pubescent and with some very short stalked glands as well; stigmas linear, acute at the apex, outside glabrous, obscurely ciliate to obscurely verrucose at the margin.

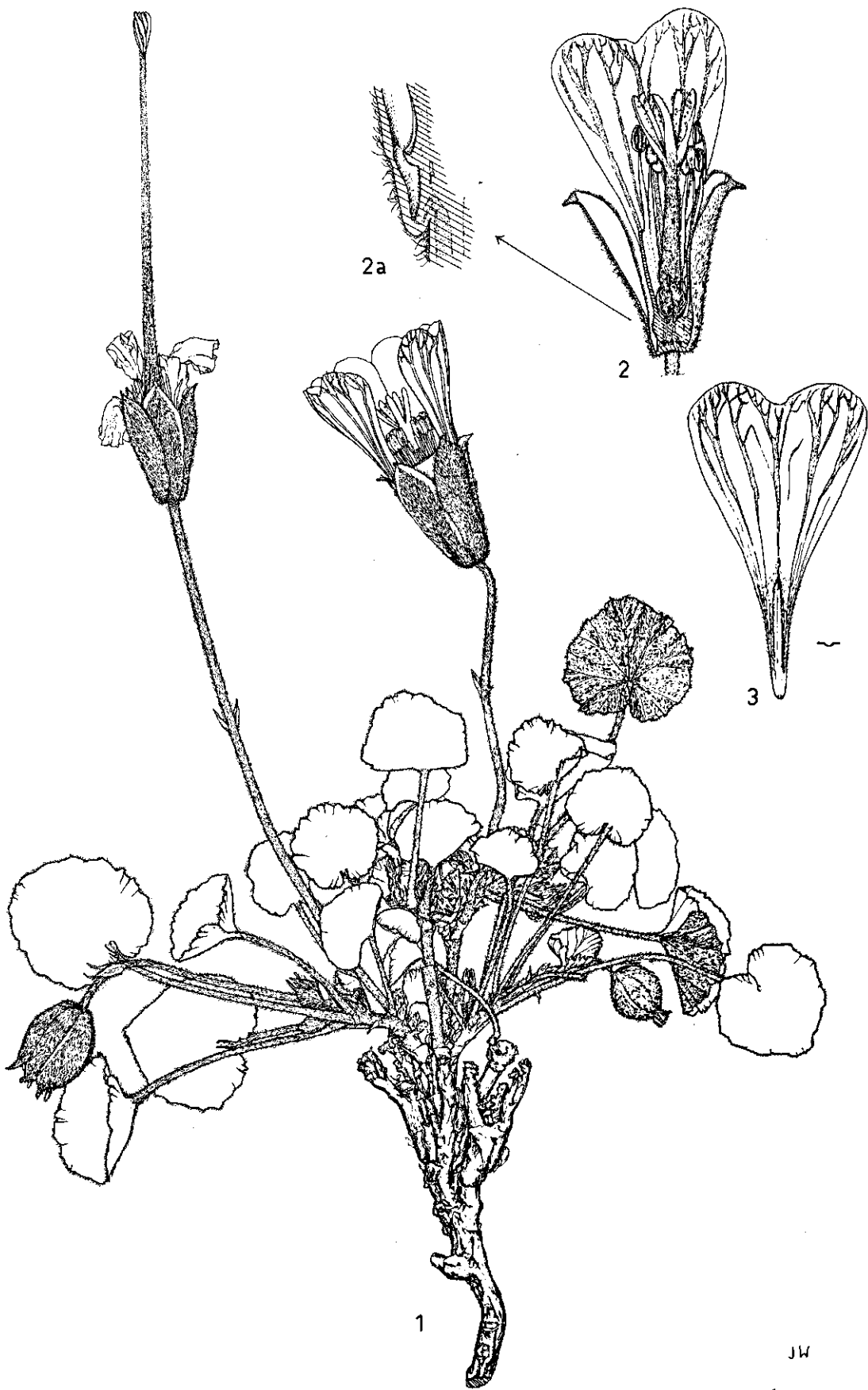
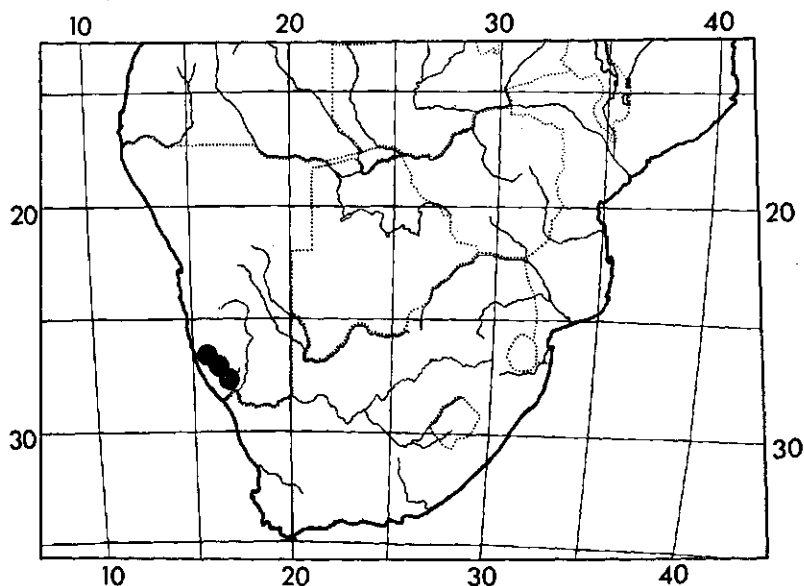


FIG. 6. *Monsonia drudeana*: 1. Habit, $\times 1\frac{1}{3}$; 2. flower opened, $\times 2$; 2a. i.s. of sepal spur, $\times 6$; 3. petal, outer side, $\times 2$. (1: Merxmüller & Giess 3142 (WIND), Giess, Volk & Bleissner 5304 (WIND); 2, 2a, 3: Merxmüller & Giess 3142).

Fruit 60–90 mm long; mericarps 8×2 mm and beak 50–85 mm long. Mericarps obliquely obovoid, brown, hyalino-hirsute, ridged and rimmed at the apex; the ridge and rim perpendicular to the tail; the tail slender, recurved and obscurely helically twisted at the base, hirsute outside, plumose towards the apex on the inner side where the tail detaches from the beak-axis.

Seed obovoid, 5×2 mm, glabrous.



MAP 6. *Monsonia drudeana*.

Distribution: South West Africa: Lüderitz South District.

Ecology: On sand overlying limestone on riversides or riverbeds in the Southern Namib desert.

From the few specimens available there is an indication that the main reproductive period falls in late winter and early spring, August to September.

Note: KNUTH (1912) mentions the presence of root tubers in *M. drudeana*. He undoubtedly confused material of the then undescribed *M. ignorata* Merxm. & Schreiber with that of *M. drudeana*. DINTER 1030, collected at Rote Kuppe, and listed by KNUTH under *M. drudeana*, most probably was a specimen of *M. ignorata* bearing root tubers. Unfortunately this identification can not be verified since DINTER's specimen got lost.

Representative specimens:

South West Africa: 26S15E - Lüderitz South, 9 km W. of Garub (fr. June) Nordenstam & Lundgren 376 (S). 26S16E - Lüderitz South, Arutal (fl. Nov.) Schenk 33 (Z, lectotype); Arutal, Pohle 73 (Z, paratype); Arutal (fl. fr. Feb.) Giess, Volk & Bleissner (M, S, WIND); Arasab (fl. fr.

Aug.) *Merxmüller & Giess 3142* (M, WIND). 27S16E – Lüderitz South, south of Pockenbank (Aug.) *Kraeusel/Wiss 2040*; Udabib (fl. Aug.) *Merxmüller & Giess 3297* (M); 44 km S. of Aus (fl. Feb.) *Leippert 4158* (M); Glimlag (fl. Sep.) *Merxmüller & Giess 28583* (M, PRE); Witpütz, Kolke (fl. Aug.) *Giess, W. 14605* (M, K); Witpütz Nord (fl. Sep.) *Giess 13760* (M, WIND); 46 km S. of Aus along road to Witpütz (fl. fr. Aug.) *H. Venter 7750* (BLFU, PRE).

7. *Monsonia emarginata* (LINNAEUS FIL.) L'HERITIER **Fig. 7, Map 7.**

Geraniologia: tab. 41 (1788); *Salisbury, Prodr.* 311 (1796); *Willdenow, Sp. pl.* 3 (1): 719 (1800); *Steudel, Nomencl. bot. ed. 2, 2*: 158 (1841); *Harvey in Harvey & Sonder, Fl. Cap.* 1: 255 (1860); *Knuth in Engler, Pflanzenr.* 4.129: 302 (1912).

Basionym: *Geranium emarginatum* L.f., *Suppl.* 306 (1781); *Salisbury, l.c.*; *Willdenow, l.c.*; *Dumont du Courset, Le Bot. Cult. ed. 2, 5*: 50 (1811); *Thunberg, Prodr. pl. Cap.* 112 (1794) and *Fl. Cap.* 510 (1823); *Klotzsch, Linnaea* 10: 429 (1836); *Ecklon & Zeyher, Enum.* 1: 57, no. 440 (1836); *Steudel, l.c.*

Type: South Africa: Cape Province: Outeniquas, THUNBERG, *Herb. THUNBERG 15784* (UPS, holotype); *isotypes*: *Herb. THUNBERG 15783* (UPS), THUNBERG anno 1775 (S), *Herb. CAVANILLES*, received 20 Apr. 1787 (MA).

Homotypic synonym: *M. ovata* Cav., *Diss.* 4: 193, Tab. 113 fig. 1 (1787); *Salisbury, l.c.*; *Willdenow, l.c.*; *Willdenow, Enum. pl. Hort. Berol.* 718 (1809); *Du Mont du Courset, l.c.*; *De Candolle, Prodr.* 1: 638 (1824); *Klotzsch, l.c.*; *Ecklon & Zeyher, Enum.* 1: 57, no. 439 (1836); *Steudel, l.c.*; *Harvey in Harvey & Sonder, l.c.*; *Szyszyłowicz, Pol. Disc.* 6 (1888); *Knuth in Engler, l.c.*; *Eyels, Trans. R. Soc. S. Afr.* 5: 386 (1916).

Heterotypic synonym: *M. ovata* var. *biflora* Harv. in *Harvey & Sonder, Fl. Cap.* 1: 255 (1860); *Szyszyłowicz, l.c.* *Type*: South Africa: Cape Province: Albany: Katriviersberge between Grahamstown and Bothasberg, ECKLON & ZEYHER 441 (K, holotype; *isotypes*: FI, G, L, M, P, PRE, S, W).

Decumbent or scrambling, suffrutescent, many-stemmed, 15–40 cm high.

Roots tuberous.

Stems herbaceous to woody, up to about 40 cm long, 1–3 mm in diam., with a double indumentum the first of which is puberulent or pubescent with curved hairs and the second is composed of long hairy erect mostly gland-based hairs which are several to numerous, mostly with sessile and stalked glands, often red-tinged.

Leaves opposite or only the lower sometimes alternate; those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum as the stem, 0.4–1.3(2.2) × as long as the blade, 10–30(48) mm long, often geniculate at the apex, often flattened at the base; stipules subulate or acicular, 3–10 mm long, reddish, often subspinescent, with the same indumentum as the stem, rarely lacking the long hairs or rarely subglabrous; blade simple, narrowly ovate, ovate or broadly elliptic to narrowly triangular or triangular, small ovate leaves often at the plants' bases and large triangular leaves towards their apices, 1–2.5 × as long as wide, 10–40 × 8–25



FIG. 7. *Monsonia emarginata*: 1. Habit, $\times \frac{1}{2}$; 2. flower opened, $\times 3$; 3. tailed mericarp, $\times 3$. (1: Montgomery 12 (STE), Fourcade 6204 (STE); 2: Brink 453 (GRA); 3: Fourcade 6204).

mm, emarginate, obtuse or acute and rarely shortly mucronate at the apex, truncate to cordate at the base, double-serrate or sinuate-serrate, sometimes lobed inbetween the main veins, often ciliate at the margin, above puberulent with curved hairs or rarely granulate, often with sessile glands, beneath with the double indumentum of the stem or with scattered hairs on the main veins, obscurely hairy to granulate or glabrous between the veins, often with sessile glands as well; main veins subpinnate, 5 or 7 branching from the base, impressed above and prominent beneath.

Inflorescences axillary, 1-flowered, 45–150 mm long. Peduncles and pedicels slender, with the same indumentum as the stem; peduncles $0.2\text{--}2 \times$ as long as the pedicels, 4–90 mm long; pedicels 20–50 mm long and geniculate under the fruit; involucre bracts 2–6 per flower, subulate, with the same indumentum as the stem or with scattered erect hairs of various lengths.

Flowers often fragrant.

Sepals green, free, narrowly obovate to narrowly ovate, $2\text{--}4.5 \times$ as long as wide, $8\text{--}12 \times 2\text{--}4$ mm; outside pilose with gland-based hairs or with the same double indumentum as the stem, rarely with stalked glands, but sessile glands mostly present; inside glabrous, with 3 parallel main veins, margin ciliate; mucro terete, 1–4 mm long, mostly curved, greenish to brownish, with a few scattered hairs or with the double indumentum of the stem, rarely with a globuliferous pocket of resinous granules at the base.

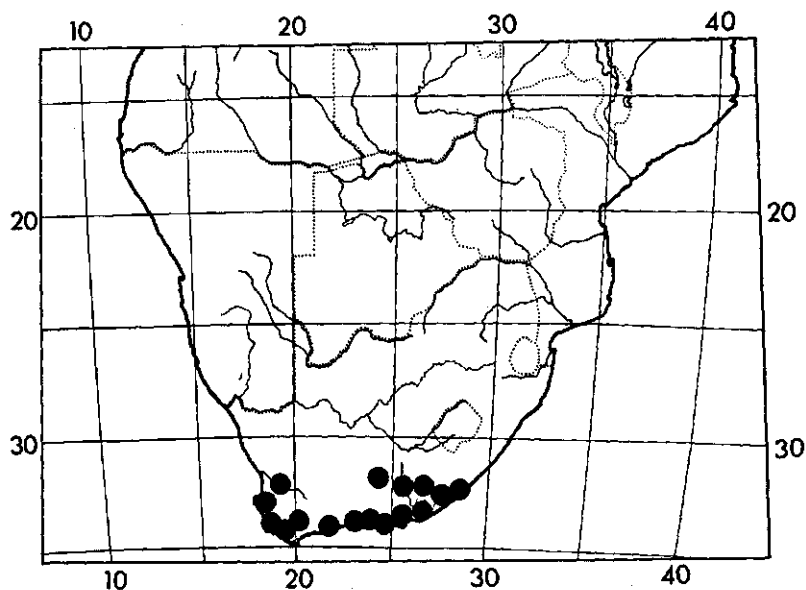
Petals obtriangular, $1.3\text{--}1.6 \times$ as long as wide, $15\text{--}25 \times 10\text{--}16$ mm, $1.5\text{--}2.5 \times$ as long as the sepals, $1.5\text{--}2.5 \times$ as long as the stamens, white, creamy, greyish or pink, venation brownish-green, greyish-blue to greyish-maroon or purplish, with 5 main veins; outside glabrous, with scattered sessile glands; inside obscurely villose; winged, obscurely ciliate and often hairy at the base; crenate, sinuate, or entire at the apex.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 1–2 mm; filaments of each group basally connate for 1–2 mm; filaments in the central stamens 7–10 mm and in the lateral 5–10 mm long, mostly terete and reflexed apically, glabrous or obscurely hairy outside, glabrous inside; a transversely broadly elliptic to broadly ovate, ciliated gland or rimmed gland-cavity is situated on the outer side of the base of each group; anthers oblong, those of the long filaments slightly larger, $1.7\text{--}3 \times 0.9\text{--}1.5$ mm, subintrorse.

Pistil 8–15 mm long; ovary obovoid to broadly obovoid, $1.5\text{--}2 \times 1.5\text{--}2$ mm, hyalino-hirto-pubescent; beak longitudinally grooved, 4–8 mm long, pubescent, also with stalked glands at the base; stigmas linear to clavate, $2\text{--}4 \times 0.3\text{--}0.4$ mm; outer surface glabrous or hairy and greenish to black, acute to obtuse at the apex, entire to obscurely dentate at the margin.

Fruit 50–70 mm long; mericarps $10\text{--}15 \times 2\text{--}2.5$ mm and beak 30–60 mm long. Mericarps narrowly subobovoid, hirsute, obliquely domed at the apex; the tail hirsute outside, hispid inside where it detaches from the beak-axis; these stiff hairs long at the tail's base and forming a crest.

Seed narrowly obovoid, $6\text{--}8 \times 2$ mm, glabrous.



MAP 7. *Monsonia emarginata*.

Distribution: South Africa and Transkei with the main centre of distribution along the coast from Mossel Bay to Port Alfred and inland to Cradock with two outlayers, viz. one westwards to the Cape Peninsula and the other eastwards to Coffee Bay in Transkei.

Ecology: In bushveld or scrubby grassveld under conditions that vary from dry and hot on the inland hills and planes or saline meadows to more moderate with salt spray on sea-facing dunes along the coast. The substratum may be sandy, loamy or even stony. This species is, furthermore, present in the semi-shade of bigger shrub species. Alt. 0–650 m.

It flowers and sets fruit throughout the year, but the main reproductive period extends from September to March.

Vernacular names: *Geitabossie*, *Kaitabossie*, *Naaldebossie* or *Dysentry herb*.

Note: HARVEY (1860) created a new variety, *M. ovata* var. *biflora*, based on ECKLON & ZEYHER 441 which had 2-flowered peduncles. The only specimen among the sheets of this number examined by the present author which has 2-flowered inflorescences is that of the Paris herbarium.

These 2-flowered inflorescences, however, are abnormal since they constitute transition forms between a branch with two 1-flowered inflorescences and a typical 2-flowered inflorescence. Although really exceptional in *M. emarginata* this occurrence certainly has no taxonomic value and *M. ovata* var. *biflora* is therefore reduced to synonym of *M. emarginata*.

The specimens of *M. emarginata* collected between Port Elizabeth and the Kei River and in Transkei are aberrant from the others. Their growth system and indumentum tend to those of *M. grandifolia*, but the plants are less glandular than in the latter species. Some specimens are extremely difficult to identify to the species.

Uses: Applied as medicine for sore eyes, cough and dysentery. Also used together with other herbs as an anti-dote against snake-bite.

Representative specimens:

South Africa: Cape Province: 32S19E – Bidouw river on road to Avontuur (fl. Oct.) *J. Gillett* 1455 (STE). 32S25E – Cradock (fl. fr. Aug.) *R. Bayliss* 7061 (M). 32S26E – Katberg, *E. Young* 14718 (BM); Stockenström, Beuholm (fl. Sep.) *G. Scott Elliot* 299 (E). 32S27E – Tous river station (fl. fr. Feb.) *O. Kuntze*, anno 1894; East London, Fort Jackson (fl. Apr.) *J. Sidey* 635 (S); Stutterheim, fort Cunyunghame (fl. fr. Nov.) *L. Taylor* 4246 (STE); Stutterheim (fl. Sep.) *J. Acocks* 9128 (PRE); Komga (fl. fr. Dec.) *H. Flanagan* 110 (PRE). 32S28E – Kentani Distr. (fl. fr. Dec.) *A. Pegler* 54 (PRE); East London, Gonubie mouth (fl. Oct.) *J. Acocks* 9139 (K, PRE). 33S18E – Cape Peninsula, NE. slopes of Devil's Peak (fl. fr. Mar.) *N. Pillans*, anno 1930; Mowbray, slopes of Devil's Peak (fl. Aug.) *M. Page* PRE41183 (PRE); Cape Peninsula, Roodebloem (fl. July) *A. Dod* 1515 (K); Rondebosch (fl. fr.) *Bonomi*, May 1904 (FI). 33S19E – Robertsons Drift (fl. Dec.) *C. Moss* 15303 (J). 33S22E – Outeniqua (fl. fr.) *Thunberg* 15784 (UPS, holotype), 15783 (UPS, isotype), anno 1775 (S) and MA, isotypes; MA also holotype of *M. ovata* Cav.; George (fl.) *W. Rogers*, anno 1859-62 (BM); George (fr.) *A. Prior* PRE41179 (PRE); Montagu Pass (fl.) *A. Rehmann* 253 (Z). 33S23E – Uniondale, Montagu Pass (fl. Oct.) *J. Gillett* 1603 (STE); Joubertina (fl. Mar.) *E. Esterhuysen* 24236 (K). 33S24E – Humansdorp, Klipdrift (fl. fr. May) *Thode* A2465 (K, PRE); Humansdorp, Clarkson (fl. fr. Nov.) *A. Penther* 2174 (M, S, W); Humansdorp (fl. fr. Sep.) *Galpin* 3832 (GRA, PRE); Humansdorp, Eerste River (fl. fr. Mar.) *Fourcade* 1183 (K); Humansdorp (fl. fr. Mar.) *Burchell* 4906 (K). 33S25E – Redhouse (fl. Aug.) *T. Paterson* 63 (GRA); Uitenhage, *Zeyher* 61 (K), 811 (K); Bethelsdorp (fl. fr. Sep.) *F. Long* 102 (K); Uitenhage, Swartkopsrivier, *Ecklon & Zeyher* 2420 (S); Uitenhage, Van Stadensberg (fl.) *Ecklon & Zeyher* 2036 (FI, G, PRE, S, W, Z); Uitenhage (fl. fr. Apr.) *Ecklon & Zeyher* 2.4 (A, E, L, PRE, UPS, US, Z); Aloes (fl. fr. Sep.) *T. Drège* 3038 (PRE); Addo Nat. Park (fl. July) *L. Liebenberg* 6288 (PRE); Swartkopsrivier and Addo (fl. fr.) *Ecklon & Zeyher* 439 (FI, G, GRA, K, L, P, S, W); Coega, Hougampark (fl. Jan.) *H. Venter* 7457 (BLFU); Hougampark (fl. fr. Feb.) *M. Olivier* 2193; Swartkopsrivier (fl. fr.) *Drège*, 2 Dec. 1829 (P); Port Elizabeth, Swartkopsrivier (fl. fr. Feb.) *F. Long* 538 (K, Mar.) *R. Schlechter* 2384 (GRA, PRE, Z); Port Elizabeth, Parsons vlei (fl. fr. Feb.) *F. Long* 538 (K, PRE); Zuurberge (fl. fr. Nov.) *Drège* 2036 (v, a) (P); Van Stadens River, *Burchell* 4635 (K). 33S26E – Albany, Katriviersberge between Grahamstown and Bothasberg (fl. fr. Jan.) *Ecklon & Zeyher* 441 (K, holotype of *M. ovata* var. *biflora*; isotypes: FI, G, L, M, P, PRE, S, W); Alexandria (fl. May) *E. Galpin* 10633 (K, PRE); Bushmen's River Mouth Village (fl. Jan.) *D. Commins* 962 (BM, GRA, K, PRE); Hillary, near Sandflats (fl. Aug.) *J. Burt Davy* 14211 (PRE); Port Alfred (fl. Aug.) *W. Tyson* PRE41180 (PRE); Port Alfred East (fl. Nov.) *E. Galpin* 3029 (PRE); Bathurst (fl. fr. July) *R. Story* 2678 (PRE); Bathurst (fl. fr. Sep.) *R. Bayliss* 2313 (B, G, Z); Albany (fl. fr.) *Bowker*, before 1867 (K); Albany, Southwell (fl.) *S. Schonland* 3333 (PRE); Albany, Coombes (fl. fr. Apr.) *R. Bayliss* 6377 (Z); Grahamstown, Belmont Valley (fl. fr. Jan.) *H. Venter* 7459 (BLFU); between Grahamstown and Blue Krantz (fl.) *Burchell* 3621 (K); Grahamstown (fl. fr.) *Britten* PRE41181 (PRE); Grahamstown, Manleys Flats (fl. Oct.) *E. Brink* 453 (GRA). 33S27E – East London, Swartkops (fr. Oct.) *Watt & Brandwijk* 1522 (PRE); East London (fl. Mar.) *O. Kuntze*, 5 March 1894; King Williams Town, *T. Sim* 1333 (NU); Kowie Distr., 11 km on road from Three Sisters (fl. fr. Sep.) *L. Britten* 705 (GRA, PRE). 34S18E – Kalk Bay & Simonstown (fl. fr. Dec.) *Bonomi*, Dec. 1903 (FI). 34S19E – Kleinmond (fl. July) *G. White*, July 1899 (Z). 34S20E – Swellendam, Puspas Valley and Kochmans-kloof (fl. fr. Nov.) *Ecklon & Zeyher* 440 (FI, G, GH, K, L, M, P, PRE, S, W); Bredasdorp, Potberg Estates, *E. Oliver* 3219 (STE). 34S21E – Albertinia Village (fl. fr. Oct.) *J. Muir* 770 (PRE); Riversdale

(fl. fr. Oct.) *H. Venter* 7472 (BLFU); Riversdale, *R. Schlechter* 1958 (Z). 34S22E—Mossel Bay (fl. Aug.) *R. Alexander*, Aug. 1847 (K); Brakrivier (fl. fr. Oct.) *A. Penther* 2164 (W). 34S23E—Knysna, The Heads (fl. Jan.) *A. Williamson* 52 (GRA); Knysna, Belveder (fl. fr.) *A. Rehmann* 461 (BR, Z); Knysna, Gaita (fl. Sep.) *Marloth* 7534 (PRE); Plettenbergs Bay (fl. fr. Mar.) *H. Fourcade* 598 (STE); Keurbooms River Mouth, *Gillett* 1411 (STE). 34S24E—Jeffreys Bay (fl. fr. Nov.) *J. Hutchinson* 1453 (K); Tsitsikamma (fl. fr.) *P. Krauss*, Mar. 1839 (G, W). The Cape, *Sparman* (S).

Transkei: 31S28E—Tsolo (fl. fr. Nov.) *J. Acocks* 12164 (PRE). 32S28E—Manubi Forest (fl.) *W. Worsdell*, Jan. 1910 (K). 32S29E—Mquanduli Distr., Coffee Bay (fl. Mar.) *G. Theron* 1469 (BR, K, L, PRE, UPS). Transkei (fl. Feb.) *Watt & Brandwijk* T30985 (J).

8. *Monsonia galpinii* SCHLECHTER ex KNUTH

Fig. 8, Map 8.

In Engler, Bot. Jb. 40: 63 (1907); Knuth in Engler, Pflanzenr. 4.129: 301 (1912).

Type: South Africa: Cape Province: East London: slopes near sea coast, GALPIN 1852 (holotype not seen, destroyed in B; lectotype: PRE; isotype: GRA).

Prostrate or decumbent, several-stemmed, probably perennial, 10–30 cm high.

Stems herbaceous to woody, up to 30 cm long, 1–2 mm in diam., viscid, with a double indumentum the first of which is lanuginose or pubescent with curved or straight hairs, most of which are gland-based, and the second is composed of numerous long straight erect gland-based hairs, with stalked and sessile glands.

Leaves opposite; those of a pair sometimes subequal; petiole with the same indumentum as the stem, 0.4–0.6 × as long as the blade, 9–15 mm long, sometimes geniculate at the apex, sometimes flattened at the base; stipules subulate to acicular, 7 mm long, reddish, frail, with the same indumentum as the stem but sometimes less dense; blade simple, ovate, broadly ovate or orbicular, 1–1.5 × as long as wide, 15–30 × 10–20 mm; emarginate or obtuse at the apex; cordate at the base; crenate to bluntly serrate at the margin; on both sides velutinous, lanuginose or pilose with gland-based hairs, sometimes also granulose beneath, with numerous sessile glands; main veins subpinnate, impressed above and prominent beneath.

Inflorescences axillary, 1-flowered, 30–60 mm long; peduncles and pedicels slender, with the same indumentum as the stem; peduncles 0.2–0.5 × as long as the pedicels, 3–15 mm long; pedicels 15–25 mm long, geniculate under the fruit; involucre bracts 2 per flower, subulate, with the same indumentum as the stem.

Sepals green, free, narrowly ovate, 2.7 × as long as wide, 8 × 3 mm, outside sericeous or lanuginose, with sessile glands, inside glabrous or hairy, with 3 parallel main veins, margin ciliate; mucro terete, 2–4 mm long, greenish, sericeous, with a globuliferous pocket of resinous granules at the base.

Petals obtriangular, 1.2–1.4 × as long as wide, 15–20 × 14 mm, 2–2.5 × as long as the sepals, 2 × as long as the stamens, creamy, venation purplish-grey, with scattered sessile glands, with 5 main veins; outside glabrous; inside ob-

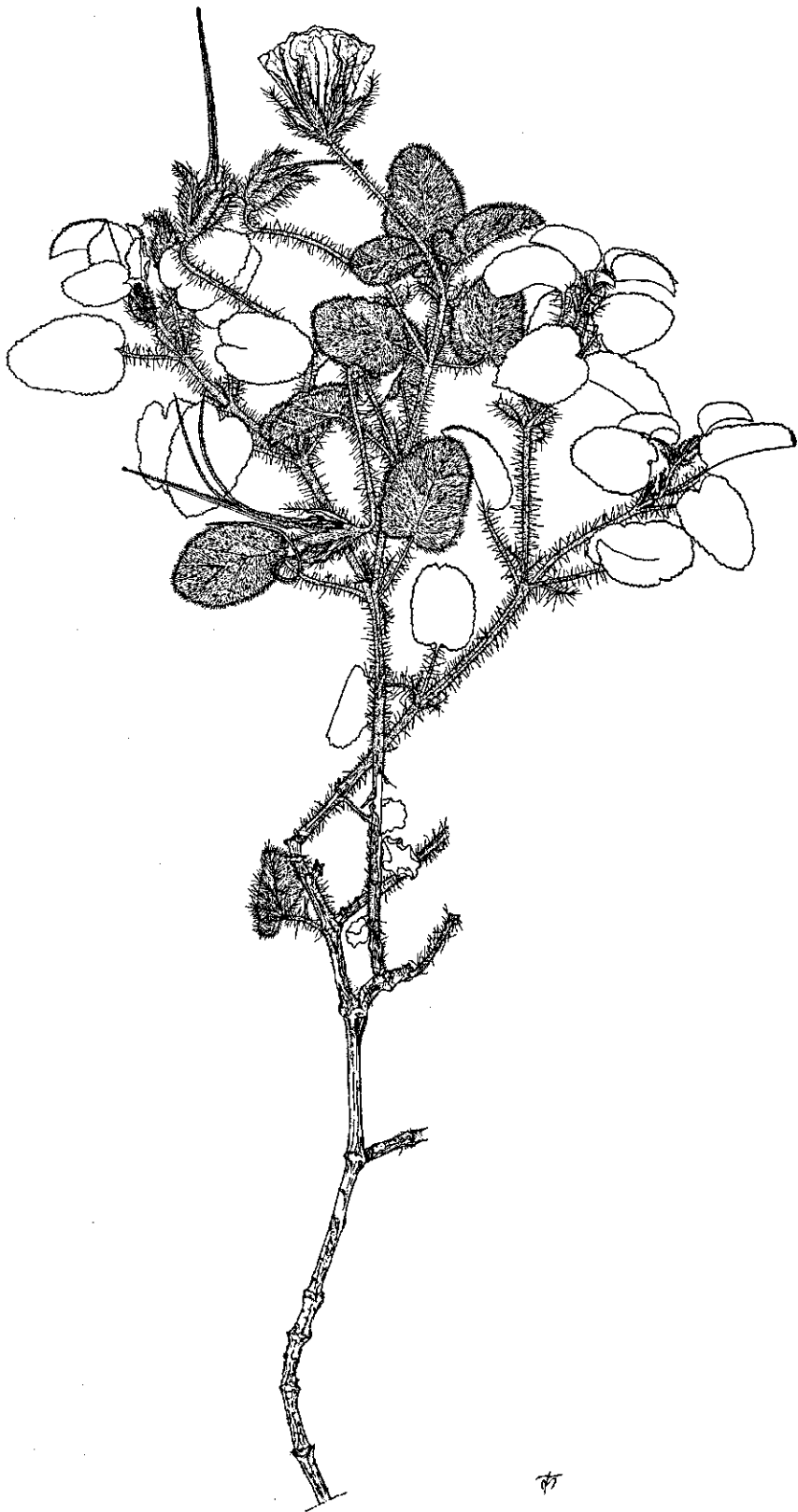


FIG. 8. *Monsonia galpinii*: Habit, $\times \frac{3}{4}$. (E. Galpin 1852 (PRE)).

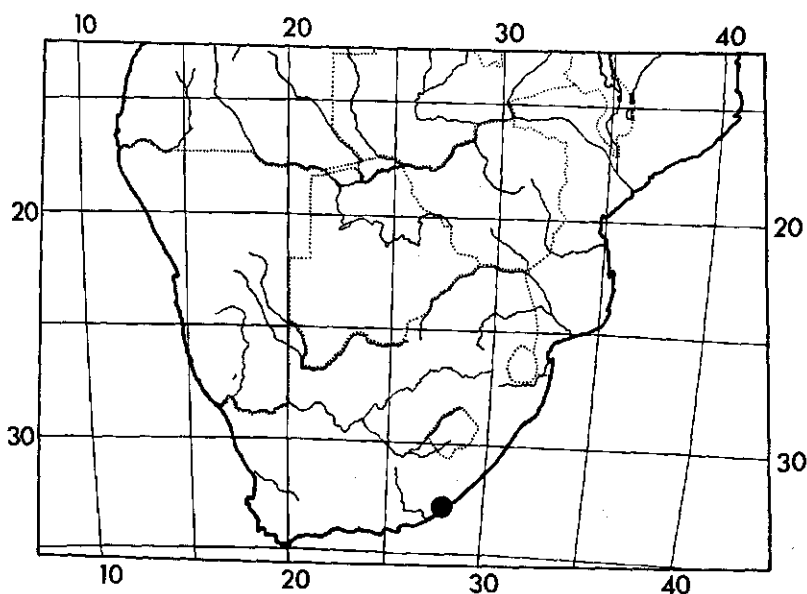
scurely villose; winged, obscurely ciliate and obscurely hairy at the base; sinuate at the apex.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 1.5 mm; filaments of each group basally connate for 2.5 mm; filaments in the central stamens 8 mm and in the lateral 6 mm long, terete and recurved at the apex, glabrous inside, hairy outside; an ovate, rimmed gland-cavity is situated on the outer side of the base of each group; anthers oblong, all equal, 2.4×1 mm, subintrorse.

Pistil 7 mm long; obovoid, 2.5×1.5 mm, hyalino-pubescent; beak longitudinally grooved, 3 mm long, pubescent in the apical part, tomentose and with stalked glands in the basal; stigmas clavate, blackish and obscurely hairy outside, margin obscurely crenate, apex acute.

Fruit 43–45 mm long; mericarps 11×2 mm and beak 33 mm long; mericarps narrowly obovoid, hirsute, obliquely domed at the apex, hirsute outside, hispid inside where the tail detaches from the beak-axis; these stiff hairs copper-coloured and long at the tail's base, forming a crest.

Seed narrowly obovoid, 6×2 mm, villose.



MAP 8. *Monsonia galpinii*.

Distribution: South Africa (East London).

Ecology: Only two collections of this species were made on sanddunes facing the sea where they were 'common'. The one specimen with flowers and fruit was collected in June and the other with only flowers in December.

Note: This species closely resembles *M. emarginata*, except by the different indumentum and the villose seed. The dense lanuginose indumentum may be regarded as being consolidated by salt spray from the adjoining sea since it is known that salt-spray may induce hypertrophic growth in such exposed plants (BOYCE, 1954 and HILLARY, 1947). This indumentum type, however, is not present in ACOCKS 9139 (which was also collected at East London), GILLET 1411, and THERON 1469, all collected under similar salt spray conditions as *M. galpinii*. These specimens have the same indumentum as *M. emarginata*. Both the specimens available of *M. galpinii* were collected in one area, viz. at East London and were, furthermore, collected 24 years apart so that this form was not a peculiar occurrence in a single plant. *M. galpinii* is also the only *Monsonia* species with villose seeds and therefore it is maintained here, although it resembles *M. emarginata*. The present author, however, supposes that further collections may show that *M. galpinii* is nevertheless synonymous with *M. emarginata*.

Representative specimens:

South Africa: 33S27E – Cape Province, East London (fl. fr. June) *E. Galpin 1852* (PRE: lectotype; isotype: GRA); East London, Overton (fl. Dec.) *O. Hilner 165* (GRA).

9. *Monsonia glauca* KNUTH

Fig. 9, Map 9.

In Engler, Bot. Jb. 40: 64 (1907); Knuth in Engler, Pflanzenr. 4.129: 300 (1912); Engler, Pflanzenw. Afr. 3,1: 705 (1915); Eyels, Trans. R. Soc. S. Afr. 5: 385 (1916); Burt Davy, Fl. pl. & ferns 1: 193 (1926).

Types: Tanzania: Kilimandjaro: below Marangu, VOLKENS 2128 (holotype not seen, destroyed in B; lectotype: BM; isotype: K). Paratypes: South West Africa: Sendelingsgrab, FLECK 216a (Z); Daberas, FLECK 218a (Z), 224a (Z); eastern Auasberge, DINTER 823 (Z); Kuiseb, FLECK 756 (Z); Great Namaqualand, SCHINZ 253 (Z) and FLECK 217a (Z); South Africa: Transvaal: Makapansberge at Strydpoort, REHMANN 5498 (Z); Lydenburg, WILMS 177 (BM); Cape Province: Koedoes River, JUNOD 1530 (Z).

Homotypic synonym: *M. ovata* subsp. *glauca* (Knuth) Bowden & Müller, Fl. Zamb. 2: 137 (1963); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 4 (1966); Kokwaro, Fl. E. Trop. Afr., Geraniaceae 14 (1971). Type: VOLKENS 2128 (BM, holotype; isotype: K).

Heterotypic synonyms: *M. ovata* var. *lancifolia* Szysz., Pol. Disc. 6 (1888); Knuth in Engler, l.c. (1907); Burt Davy, l.c. Type: South Africa: Transvaal: Makapansberge at Strydpoort, REHMANN 5498 (Z, holotype; paratype of *M. glauca*). Homotypic synonym: *M. lancifolia* (Szysz.) Burt Davy, Fl. Pl. & Ferns Tvl. 1: 193 (1926).

M. stricta Knuth in Fedde, Reprint nov. Spec. Regni veg. 15: 137 (1918). Type: South Africa: Transvaal: Madsaba, SCHLECHTER 4584 (holotype not seen, destroyed in B; lectotype: Z; isotypes: B, BR, BOL, GRA).

Erect, decumbent or prostrate, few- to many-stemmed, suffrutescent, 5–45 cm high.

Roots often tuberous.

Stems herbaceous to woody, up to approximately 50 cm long, 1–6 mm in diam., with a double indumentum the first of which is pubescent with curved or straight hairs and the second of few to many long erect gland-based hairs, with sessile and stalked glands.

Leaves alternate at the base of the main stems and subopposite to opposite towards their apices and on the lateral branches, those of a pair subequal to unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum as the stem, $0.4-1.3 \times$ as long as the blade, 10–50 mm long, flattened or thickened at the base; stipules subulate or acicular, with the same indumentum as the stem, 6–12 mm long, mostly straw-coloured and subspinescent; blade very narrowly ovate to narrowly ovate, $2.5-5.5(10) \times$ as long as wide, mostly folded upwards along the midrib, $20-70 \times 3-20$ mm; attenuate or acute and sometimes 1–3-toothed at the apex; truncate or rarely cordate at the base; ciliate, serrate, often with globular pockets of powdery granules on or near the teeth' bases, and sometimes red-tinged at the margin; above granulose and obscurely to conspicuously pubescent, with curved or straight hairs, mostly with sessile and stalked glands; beneath pubescent with curved or straight hairs or with the double indumentum of the stem on the veins, mostly with stalked and sessile glands, often glandular-punctate; main veins subpinnate, 5 or 7, branching from the base, obscurely impressed above, prominent beneath.

Inflorescences lateral, axillary or rarely leaf-opposed, 1–3-flowered, 45–150 mm long. Peduncles and pedicels slender, with the same indumentum as the stem and the pedicels, furthermore, with numerous stalked glands; peduncles $1-3 \times$ as long as the pedicels, 10–85 mm long; pedicels 10–75 mm long and geniculate under the fruit; involucre bracts 1–4 per flower, subulate, appressed-pubescent, and with a few scattered long hairs as well.

Sepals green to purplish-black, free, narrowly ovate to very narrowly ovate, $2.5-5 \times$ as long as wide, $7-11 \times 2-3$ mm; outside with a double indumentum the first of which is composed of short curved or straight hairs and the second of few to many long straight erect hairs, mostly with sessile and stalked glands; inside glabrous, with 3 parallel main veins; margins ciliate; mucro terete, with a globular pocket of powdery granules at its base, 0.5–2.5 mm long, greenish, reddish or purplish-black, with the same indumentum as the sepals.

Petals obtriangular, $1.3-2.1 \times$ as long as wide, $15-21 \times 8-15$ mm, $1.7-2.5 \times$ as long as the sepals, $1.5-2 \times$ as long as the stamens, white or creamy, withering yellow, often with scattered sessile glands, venation greenish to greyish, with 5 main veins, glabrous or inside obscurely villose, ciliate, winged and sparsely pubescent at the base, straight or somewhat obtuse and obscurely crenate or sinuate at the apex.

Stamens monadelphous; groups basally connate for 0.7–1 mm; filaments of each group connate for 2–3 mm; filaments in the central stamens 7–10 mm and



FIG. 9. *Monsonia glauca*: 1. Habit, $\times \frac{2}{3}$; 2. tailed mericarp, $\times 2$. (1: Giess 13528 (WIND), 13686 (WIND); 2: Cooke 6434 (KMG)).

in the lateral 5–9 mm long, terete at the apex and obscurely to moderately hairy outside; an ovate, 0.5 × 0.5 mm gland-cavity with two vertical rims is situated on the outer side of the base of each group; anthers elliptic, 1.5–2.1 × 0.7–1 mm, subintrorse.

Pistil 7–10 mm long; ovary obovoid to broadly obovoid, hyalino-hirto-pubescent, terminally rimmed and ridged; beak longitudinally grooved, 4–5 mm long, lanulose with stalked glands in the basal part, pubescent and sometimes also with stalked glands in the apical part; stigmas clavate, 1.7–2 × 0.4–0.7 mm, outside glabrous or obscurely hairy; margin entire or subcrenate; apex acute to obtuse.

Fruit 75–130 mm long; mericarps 12–16 × 2 mm and beak 65–115 mm long. Mericarps narrowly obconical, hirsute, with whitish or copper-coloured hairs, some of which, furthermore, have red or purplish spots around their bases; ridged, rimmed, and reticulate at the apex; the rim and oblique ridge conspicuous and sharp-edged; tail hirsute outside and hispid inside where it detaches from the beak-axis, these stiff hairs whitish or copper-coloured, and long at the tail's base, forming a crest.

Seed narrowly obovoid, 5–6 × 1.4–1.8 mm, glabrous.

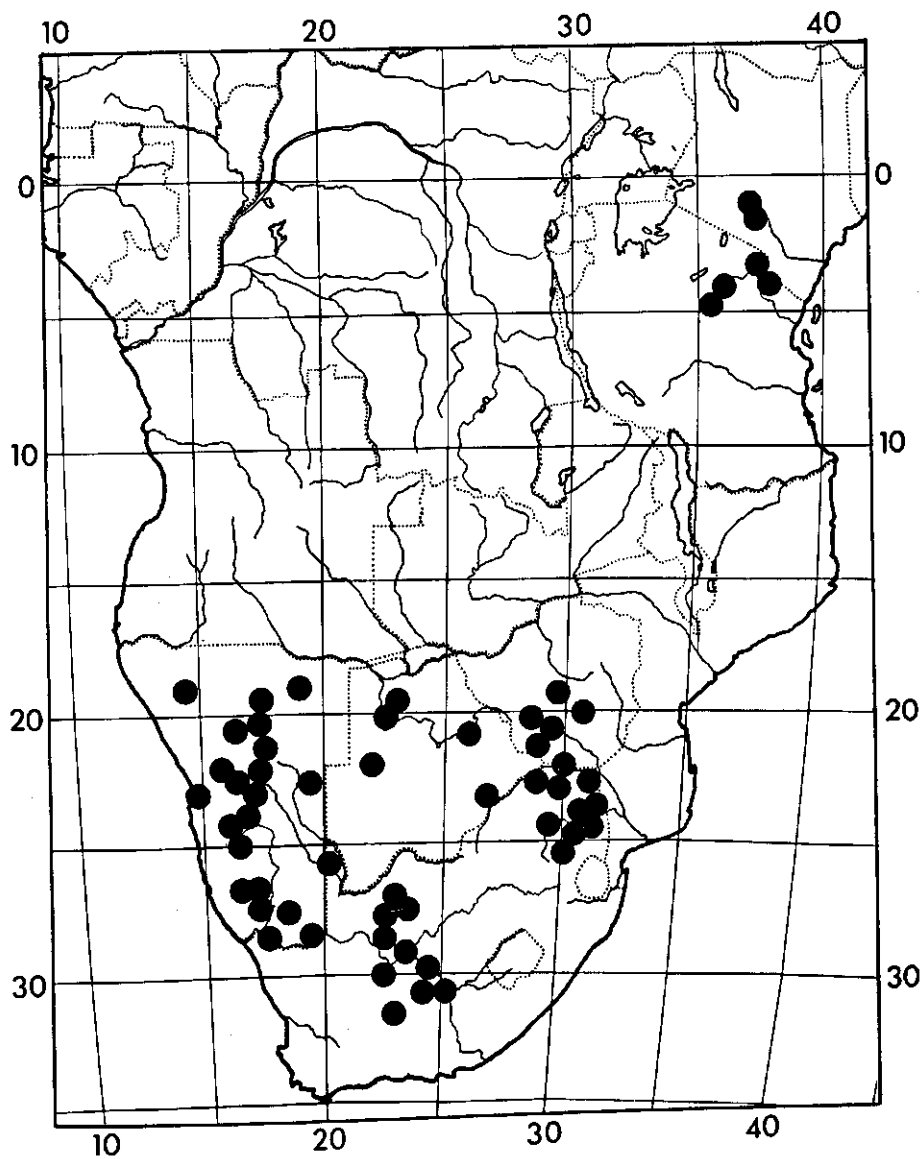
Distribution: Eastern and southern Africa.

Ecology: A herb of hot, semi-arid to moderately moist bushveld or scrubby grassveld. Often found in the shade of shrubs or trees. Occasionally a weed of cultivated lands. Alt. 600–1600 m.

In the southern hemisphere the reproductive period of this species stretches from spring to autumn, October to May. No information exists for the northern hemisphere.

Note: BOWDEN & MÜLLER (1963) reduced *M. glauca* to a subspecies of *M. ovata* (= *M. emarginata*) on the basis of overlapping characteristics, mainly at hand of ROGERS 6067 collected at Francistown in Botswana. This opinion, however, is not shared by the present author as these species have important differences in the indumentum, fruit, geographical distribution and ecological niche.

Geographically the two species are separated by the arid Karroo of the Cape Province and the cold highland grassveld of the eastern Cape Province and Orange Free State. ROGERS 6067 from Francistown, Botswana, is a long leaf form of *M. emarginata* and was possibly incorrectly labelled by ROGERS since he also collected extensively in the Cape Province, no less than 7 specimens of *M. emarginata* amongst these. The most important difference, however, is to be found in the fruits which belong to two very distinct types. The mericarps of *M. emarginata* are obovoid with an obliquely domed apex, while the mericarps of *M. glauca* are obconical with a conspicuously and sharply rimmed and ridged apex. The fruit of the latter species is also consistently more robust than that of *M. emarginata*.



MAP 9. *Monsonia glauca*.

KNUTH (1918) mentioned in his description of *M. stricta* that he did not have the full details of the locality where SCHLECHTER collected the type specimen. He also did not know the number of the specimen. Only one of the many numbers collected by SCHLECHTER agrees with the description of *M. stricta*. It is for all practical reasons quite sure that this number is the type. SCHLECHTER 4584 from Z is therefore designated lectotype by the present author. The other sheets cited then automatically become isotypes. As SCHLECHTER 4584 belongs to *M. glauca*, *M. stricta* is thus reduced to a synonym of *M. glauca*.

Representative specimens:

- Botswana: 19S23E – Okavango, Tsau-Maun Road (fl. Mar.) *H. Richards* 14854 (K). 20S22E – Kwebe Hills (fl. Dec.) *E. Lugard* 117 (GRA, K). 20S26E – Flalamabele-Mosu area near Soa Pan (fl. fr. Jan.) *J. Ngoni* 294 (SRGH). 22S22E – Ghanzi, Eaton's Farm (fl. fr. Apr.) *R. Brown* 1258 (K, SRGH). 23S26E – Mahalapye (fl. Nov.) *F. Rogers* 6688 (K). Olifantshoek (fl. fr.) *G. Lawson* PRE41175 (PRE).
- Kenya: 01S37E – Lukenia, Athi River (fl. fr. May) *J. Williams* EA12325 (K); Machakos Distr., 40 km NE. of Nairobi (fl. fr. May) *Verdcourt & Napper* 2171 (K).
- Rhodesia: 19S29E – Chishawasha near Gwelo (fl. Mar.) *F. Kolbe* 31458 (Bol). 22S30E – Beitbridge Distr., Muli Range (fl. fr. Feb.) *H. Wild* 5429 (BM, K, SRGH); Beitbridge, Muli Hill 40 km ENE. of Beitbridge on Chiturupadzi Road (fl. fr. Mar.) *S. Mavi* 261 (K, SRGH). 21S28E – Gwanda Distr., Chafuchas Area (fl. Dec.) *R. Davies* 2383 (SRGH); Gwanda Distr. (fl. fr. May) *R. Davies* 1290 (SRGH). 20S28E – Matoppos, *F. Eyels* 986 (BM, K, SRGH); Rhodes Dam between Matoppos and Bulawayo, *F. Eyels* 1174 (SRGH); Bulawayo (fr. Feb.) *F. Rogers* 5929 (SRGH); Bulawayo (fr. Jan.) *F. Orpen* 41219 (K); Bulawayo (fr. Oct.) *Eyels & Johnson* 40 (GRA). 20S29E – Matabeleland, Balla Balla, Glenlatagen (fl. Dec.) *E. Leesman* 64 (BM). 20S30E – Victoria Distr., Fort Victoria-Flesk (fl. fr. Mar.) *I. Cannell* 558 (SRGH).
- South Africa: Cape Prov.: 25S20E – Kalahari Gemsbok Park, 16 km N. of Mata Mata (fl. Dec.) *O. Leistner* 1008a (KMG); Kalahari Gemsbok Park, Tween Dabas Dunes (fl. fr. Apr.) *P. Barnard* 792 (PRE). 27S22E – Kuruman, Tierkop (fl. fr. Apr.) *O. Cooke* 6434 (KMG); Sishen (fl. fr. June) *S. Collins* 25(J, PRE). 27S23E – Kuruman, Wolhaarkop (fl. fr. Apr.) *E. Ferrar* 6664 (KMG); Kuruman River, 22 km W. of Gordonia/Kuruman boundary (fr. Apr.) *O. Leistner* KMG8305 (KMG). 28S22E – Postmasburg (fl. fr. Mar.) *E. Esterhuysen* 5400 (K, KMG); 22 km from Postmasburg on Sunnyside Rd. (fl. Mar.) *J. Acocks* 3616 (KMG); Postmasburg (fl. fr. Mar.) *J. Acocks* 411 (KMG, PRE); 5 km NW. of Bergenaars Pass, Langeberge (fl. Dec.) *O. Leistner* KMG8252 (KMG). 29S23E – Asbestos Mountains (fl. fr. Dec.) *R. Marloth* 2078 (PRE); Hay Distr., Paarde Kloof (fl. fr. May) *D. Cooke* 6436 (KMG); Herbert Distr., Maselsfontein (fl. fr. Mar.) *E. Anderson* 722 (GRA); Douglas, St. Clair (fl. Feb.) *K. Orpen* 229 (K). 29S24E – Fluitjieskraal, 8 km W. of Orania (fl. fr. Apr.) *M. Werger* 1392 (PRE). 30S22E – Prieska (fl. May) *Schlieben* 8800 (PRE); Prieska (fl. fr. Apr.) *E. Bryant* 271 (PRE); Prieska, Kliphuis (fl. fr. Apr.) *E. Bryant* J271 (PRE). 30S24E – De Aar (fr. Apr.) *Friedlander*, Apr. 1916. 30S25E – Colesberg (fl. fr. Feb.) *R. Bayliss* 3881 (PRE). 31S23E – Victoria West, *Whitlock* 573a (PRE). Transvaal: 22S28E – Soutpansberg, Magalakwin (fl. Oct.) *J. Smutz*, Oct. 1926 (PRE); Pietersburg, 24 km S. of Magalakwin River Bridge (fl. Jan.) *H. Schlieben* 9205 (PRE). 22S30E – Messina (fl. fr. Jan.) *F. Rogers* 20057 (K); Messina (fl. May) *R. Young* PRE26415 (PRE); Soutpansberg, 5 km W. of pan (fr. Apr.) *Schweickerdt & Verdoorn* 640 (PRE). 22S31E – Kruger National Park, S. of Punda Milia (fl. fr. Jan.) *H. Schlieben* 9290 (PRE); Punda Milia, *H. Ihlenfeldt* 2236 (PRE). 23S28E – Pietersburg, between Leipzig and Bochum (fl. Jan.) *Bremekamp & Schweickerdt* 144 (G, PRE). 23S29E – Shoholle's Kraal, Vyeboomspruit (fl. June) *H. Breyer* 18369 (PRE). 24S29E – Makapansberge, Strydpoort (fl.) *A. Rehmann* 5498 (Z, holotype of *M. ovata* var. *lancifolia* and *M. lancifolia*, paratype of *M. glauca*). 24S30E – Olifants River Tank (fl. fr. Jan.) *Pole-Evans* H17019 (PRE); Mica, *W. Louw* 2199 (STE); Ohrigstad Nature Reserve (fl. Jan.) *G. Theron* 3454 (PRU); Pelgrimsrust, Branddraai (fl. Nov.) *R. Young* A645 (PRE). 24S31E – Hermansberg, Timbavati (fl. fr. May) *N. Zambatis* 676 (PRE); Hoedspruit (fr. Nov.) *N. Zambatis* 493 (K). 25S30E – Belfast, Draaikraal (fr. fl.) *R. Strey* 3012 (K, PRE); Lydenburg (fl. Jan.) *Wilms* 177 (BM, paratype of *M. glauca*); Lydenburg (fl. Jan.) *Barnard & Mogg* 1024 (PRE). 26S25E – Madsaba (fl. fr. Mar.) *R. Schlechter* 4584 (Z, lectotype; isotypes: B, BR, BOL, GRA of *M. stricta*). Koedoes River (fl. Jan.) *H. Junod* 1530 (Z, paratype of *M. glauca*). Kruger National Park, Robelois (fl. fr. Feb.) *H. van der Schijff* 2354 (PRE). Kruger National Park (fl. May) *L. Codd* 5503 (K, PRE). N-Tvl, Dongola, Erfrust (fl. Mar.) *Bruce* 61 (PRE). South African Gold Fields (fl. fr.) *T. Baines*, anno 1870 (K).
- South West Africa: 19S14E – Rote Sande, 21 km N. of Otjikware (fl. fr. Jan.) *Merxmüller* 1350 (M). 19S17E – Guchab (fl. fr. Jan.) *K. Dinter* 694 (B); Otavi (fl. fr. Jan.) *K. Dinter* 5430 (BOL, PRE, Z); Otavi, Auros (fl. fr. Feb.) *K. Dinter* 5655 (B, GH, Z); Farm Kombat, 40 km E. of Otavi (fl. Apr.) *L. Kers* 2888 (S); Farm Wolfshaag 45 km SW. of Otavi (fl. fr. Mar.) *L. Kers* 2753 (S); Farm

Foggenburg 18 km WNW. of Grootfontein (fl. Apr.) *L. Kers* 2836 (S); Tsumeb, Farm Otjirukaku (fl. fr. Mar.) *R. Seydel* 2094 (L, WIND). 19S18E – Grootfontein (fl. Dec.) *E. Schoenfelder* S321 (PRE); Grootfontein, Rietfontein (fl. fr.) *S. Rehm*, anno 1950 (M); Grootfontein, Farm Askevold (fr. Feb.) *Giess & Smook* 10616 (WIND). 19S19E – Grootfontein Distr., Asis (fl. fr. Sep.) *S. Volk* 666 (M). 20S16E – Kalkberg, Okongawe (fl. Feb.) *Dinter* 6932 (K); Omaruru Distr., Ozondati, 26 km NW. of Omatjette (fl. fr. Apr.) *L. Kers* 3066 (S). 20S17E – Otjiwarongo, Paviansklippe (fl.) *O. Volk* 633 (PRE); Road Otjiwarongo to Otavi, Farm Wolfshaag (fl. Mar.) *H. & H. Wanntorp* 441 (S); Waterberg Plateau (fl. fr. Dec.) *G. Boss* 34996 (PRE). 20S20E – Nama Pan (fl. fr. Jan.) *R. Story* 6304 (PRE). 21S17E – Hereroland (fr. Apr.) *Dinter* 699 (Z); Okahandja Distr., Farm Ongombombero (fl. fr. Apr.) *H. & H. Wanntorp* 855 (S). 22S15E – Usakos (fl. Mar.) *L. Kers* 659 (WIND). 22S16E – Karibib (fl. fr. Jan.) *Dinter* 6891 (B); Karibib, Okomitundu (fl. fr. Dec.) *R. Seydel* 5553 (WIND); Omaruru Distr., Farm Onduruquea (fl. Apr.) *H. & H. Wanntorp* 848 (S); Khomas Hochland (fl. Mar.) *G. Sassner* 48 (M); Windhoek Distr., Farm Kaan Damm (fl. fr. May) *W. Giess* 13528 (M, WIND); Windhoek Distr., Farm Keres (fl. Mar.) *W. Giess* 13686 (M, WIND); Otjimbingwe, Farm Otjozondu (fr. Feb.) *R. Seydel* 3285 (WIND). 22S17E – Okahandja, Farm Midgard (fl. fr. May) *R. Seydel* 2836 (WIND); Okahandja, Ongombeanavika (fl. fr. Apr.) *O. Volk* 5198 (M); Windhoek Distr., Farm Krumhoek (fl. Dec.) *R. Strey* 2432 (PRE); Windhoek (fl. fr. Mar.) *L. Kers* 2694 (S); Windhoek Bergland, *R. Seydel* 3897 (BR); Auasberge (fl. fr. Apr.) *Dinter* 4652 (B); eastern Auasberge (fl. Feb.) *Dinter* 823 (Z, paratype of *M. glauca*). 22S19E – Gobabis, Farm Oas (fl. fr. Nov.) *R. Seydel* 3751 (L, PRE, WIND). 23S14E – Kuiseb (fl. May) *Fleck* 756 (Z, paratype of *M. glauca*). 23S16E – Rehoboth Distr., Farm Namibgrems (fl. fr. Mar.) *H. Walter* 1816 (M). 23S17E – Rehoboth (fl. fr. Feb.) *O. Volk* 11436 (M); Rehoboth, Rietfontein (fl. Mar.) *R. Strey* 2543 (PRE). 24S16E – Naukluft, Blesskrans (fl. fr. Mar.) *E. MacDonald* 483 (BM). 25S16E – Malta-Höhe (fl. fr. May) *O. Volk* 12651 (M); Duwisib (fl. fr. May) *O. Volk* 12639 (M). 26S16E – Schakalskuppe (fl. fr. Feb.) *H. Pearson* 4249 (K). 26S17E – Buchholzbrun, *H. Pearson* 3673 (K). 27S18E – Garies (fr. Oct.) *Dinter* 5013 (B); Klein Karas (fl. fr. Apr.) *I. Örtendahl* 25 (GB, PRE, S, UPS); Klein Karas (fl. fr.) *A. Örtendahl*, anno 1925; Karasberg, Naruda Süd (fl. fr. Jan.) *H. Pearson* 7897 (BM, GRA, K, PRE); Klein Karas (fl. fr. Oct.) *Dinter* 5066 (B); Daberas, Fish River (fr. Apr.) *Fleck* 218a & 224a (Z, paratypes of *M. glauca*). 28S19E – Gründoorn, *H. Pearson* 4357 (K). Great Namaland (fl. fr. Feb.) *H. Schinz* 253 (Z, paratype of *M. glauca*). Great Namaland, Sendelingsgrab (fl. Apr.) *Fleck* 216a (Z, paratype of *M. glauca*). Great Namaland (fl.) *Fleck* 217a (Z, paratype of *M. glauca*). Lichtenstein (fl. fr. Jan.) *Dinter* 4403 (B, GH, PRE, Z). Omlenga Ambali, *N. Rautaner* 75 (Z). Warmbad Distr., Farm Blinkoog (fl. fr. Apr.) *H. Walter* 2372 (M).

Tanzania: 03S37E – Kilimandjaro, below Marangu (fr. Apr.) *Volkens* 2128 (BM, lectotype of *M. glauca*; isotype: K); Kilimandjaro Distr., Taveita (fl. fr. Oct.) *H. Johnson*, Oct. 1884 (BM, K); Taveita (fl. fr. Nov.) *Da Beccari*, Nov. 1887 (FI); Kilimandjaro Distr., Himo River-Taveita Road (fl. Jan.) *Greenway* 4502 (K); Himo to Taveita on Kenya-Tanzania Boundary, Moshi Distr. (fl. Apr.) *P. Greenway* 8722 (K); Himo Road, Moshi Distr. (fl. fr. July) *A. Haarer* 1501 (K). 04S35E – North Sambala Hills, Lankasese path (fl. Mar.) *B. Burt* 1983 (K). 04S36E – Mbulu Distr., Tarangire National Park, Mfete (fl. fr. Mar.) *M. Richards* 24363 (K). 04S37E – Pare Distr., near Samé (fl. Oct.) *A. Haarer* 869 (K).

10. *Monsonia grandifolia* KNUTH

Fig. 10, Map 10.

In Engler, Bot. Jb. 40: 63 (1907); Knuth in Engler, Pflanzenr. 4.129: 303 (1912).

Type: South Africa: Natal: Richmond: SCHLECHTER 6731 (holotype not seen, destroyed in B; lectotype: P, isotypes: GRA, K, M, Z).

Heterotypic synonyms: *M. attenuata* var. *lanceolata* Schinz, Vjschr. naturf. Ges. Zürich 49: 194 (1904). Type: Natal: Mt. West, SCHLECHTER 6827 (Z, holotype; isotypes: FI, GRA, P, US, W). Homotypic synonym: *M. lanceolata*

(Schinz) Knuth in Engler, Bot. Jb. 40: 65 (1907); Knuth in Engler, Pflanzenr. 4.129: 298 (1912); Burt Davy, Fl. pl. & ferns 1: 192 (1926).

M. alexandraensis Knuth in Fedde, Reprum nov. Spec. Regni veg. 15: 137 (1918). Type: Natal: Alexandra District: Dumisa Station: Fairfield, RUDATIS 1342 (holotype not seen, destroyed in B; lectotype: Z; isotypes: BM, E, G, K, L, P, S, STE, W).

M. rudatisii Knuth in Fedde, Reprum nov. Spec. Regni veg. 15: 138 (1918). Type: Natal: Alexandra District: Dumisa Station: Campbellton, RUDATIS 1880 (holotype not seen, destroyed in B; lectotype: W; isotypes: G, NU, Z).

Robust, erect, suberect or rarely decumbent, suffrutescent, few-stemmed, 15–40 cm high.

Roots sometimes tuberous.

Stems herbaceous to woody, often ribbed and laterally compressed, up to approximately 50 cm long, 1–4 mm in diam., mostly with a double indumentum the first of which is pubescent with curved hairs and the second of few to many long erect gland-based hairs, mostly profusely glandular, with both stalked and sessile glands.

Leaves alternate at the base of the main stems, and subopposite to opposite towards their apices and on the lateral branches, those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum as the stem, 0.2–0.7 × as long as the blade; stipules subulate to acicular, with the same indumentum as the stem, 7–17 mm long, mostly reddish; blade ovate to very narrowly ovate, angular-ovate, rarely elliptic, 1.3–5 × as long as wide, mostly folded upwards along the midrib, (22)30–75 × (9)13–35 mm, thick-textured; attenuate to acute, sometimes 1–3-toothed or shortly mucronate at the apex; truncate, obtuse or cordate at the base; margin serrate or serrate-crenate, often sinuate or lobed, sometimes ciliate, mostly red-tinged; above granulose and pubescent or with the indumentum of the stem, with numerous sessile glands and often also with stalked glands; beneath densely granulose, with the indumentum and glands of the stem all over or only on the veins and then pubescent with erect hairs in between; main veins pinnate or subpinnate, with 5 or 7 branching from the base, impressed above, prominent beneath.

Inflorescences axillary, rarely terminal, 1–2-flowered, 55–130 mm long. Peduncles and pedicels with the same indumentum and glands as the stem, the pedicel, furthermore, mostly extremely glandular and lanulose; peduncles 0.5–1.6(3) × as long as the pedicels, 15–55 mm long, mostly spirally twisted; pedicels 15–60 mm long and geniculate under the fruit; involucre bracts 2–4 per flower, subulate or very narrowly ovate, with the same indumentum as the stem.

Sepals narrowly ovate to narrowly obovate, green, free, or basally connate for 1–2 mm and then with a shallow pouch at the base of each sepal, 2.4–4 × as long as wide, 10–15 × 3–5 mm; outside with the indumentum of the stem and very glandular; inside glabrous, with 3 parallel veins; ciliate at the margin; mucro terete with a globular pocket of yellowish, resinous granules at its base, 4–5.5

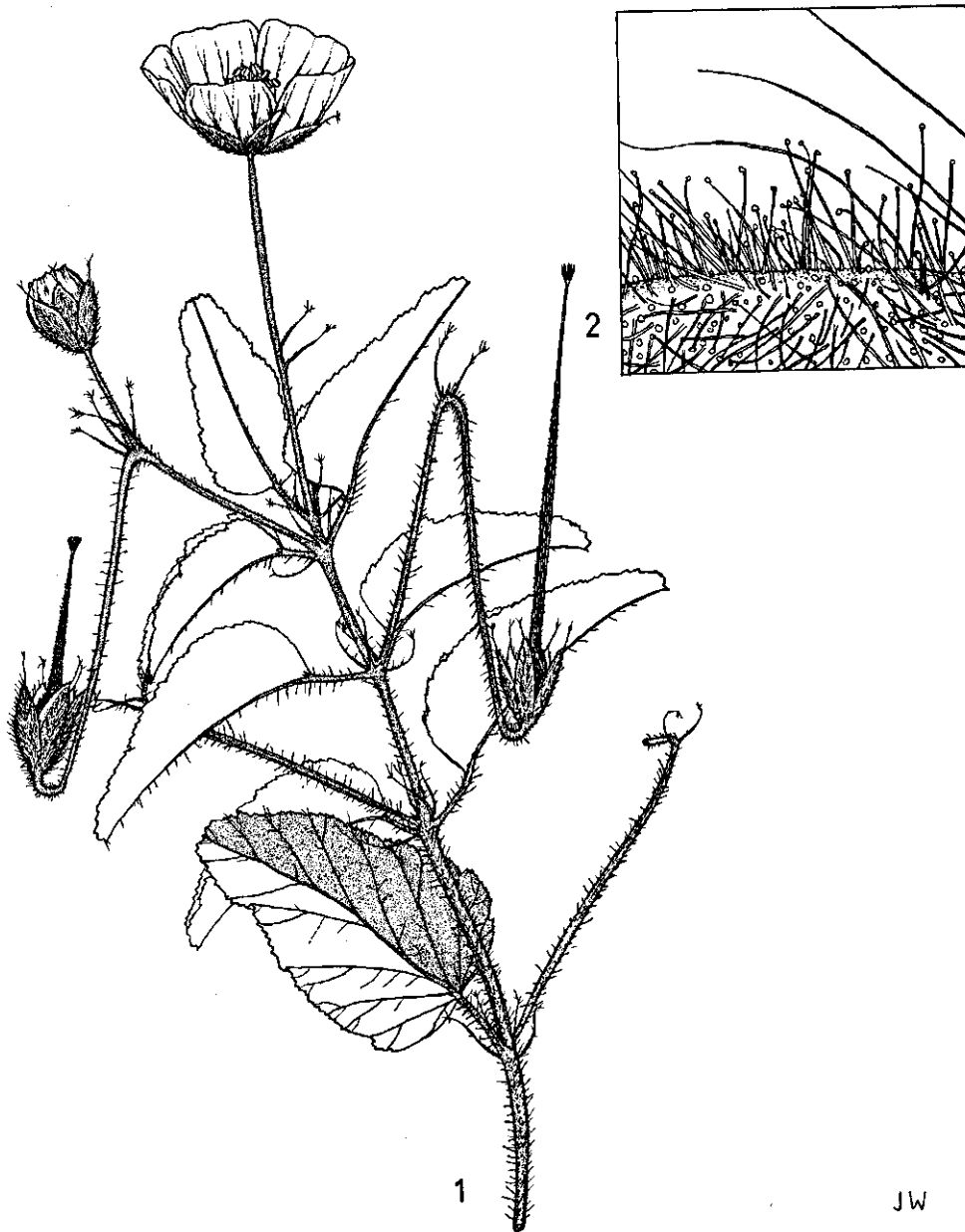


FIG. 10. *Monsonia grandifolia*: 1. Habit, $\times \frac{1}{2}$; 2. sepal outside with sessile and acicular stalked glands, $\times 15$. (1: Hilliard 5468 (E), Hilliard & Burt 8890 (NU); 2: Wright 1426 (NH)).

mm long, greenish to reddish, with the same indumentum as the sepals.

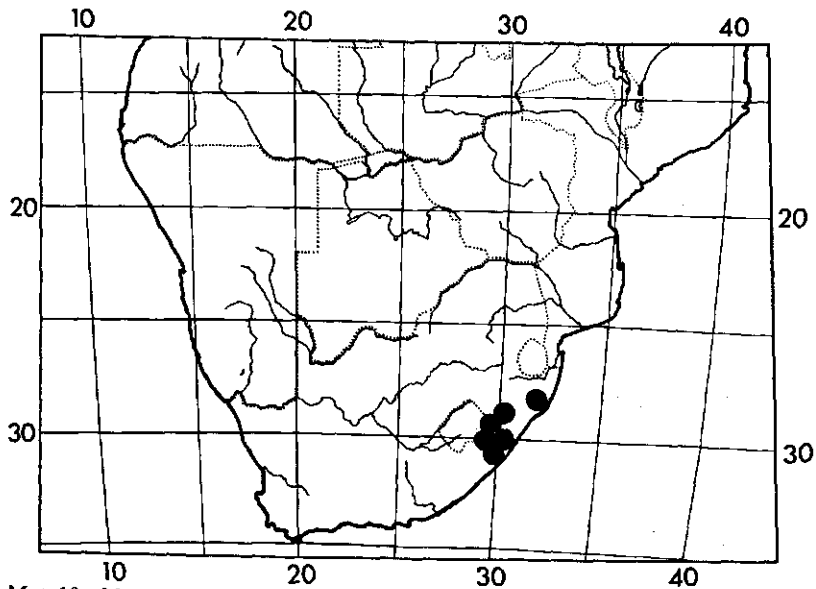
Petals obtriangular, often recurved, $1.5-2.5 \times$ as long as wide, $20-30 \times 10-20$ mm, $1.5-2.5 \times$ as long as the sepals, $1.5-2 \times$ as long as the stamens, white, pale yellow or creamy; venation greyish-blue; main veins 5 and with few to many sessile glands outside and sparsely villose or rarely also pubescent inside; winged, ciliate and pubescent at the base; apex obscurely dentate, crenate, sinuate or lobed.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 1–2 mm; filaments of each group basally connate for 1.5–4 mm; filaments in the central stamens 9–13 mm and in the lateral 5–11 mm long, pubescent basally, terete at the apex; a transversely ovate to ovate, rimmed gland-cavity is situated on the outer side of the base of each group; anthers oblong to narrowly oblong, $2.5-4 \times 1-2$ mm, those of the long filaments slightly larger, subintrorse.

Pistil 10–15 mm long; ovary obovoid to broadly obovoid, $2-3 \times 2-2.5$ mm, hyalino-hirsute; beak longitudinally grooved, 6–8 mm long, pubescent, with stalked glands all over or only in the basal part; stigmas clavate to spatulate, $2.5-4 \times 0.4-0.7$ mm, blackish and glabrous to pubescent outside; the inner side with the lanulose or papillose receptive surface, obscurely to conspicuously serrate to dentate or crenate at the margin, obtuse or acute at the apex.

Fruit 65–80 mm long; mericarps $10-15 \times 2$ mm and beak 50–65 mm long. Mericarps narrowly obovoid, brown, whitish-hirsute, some of the hairs with red spots around their bases, obliquely domed and obscurely rimmed at the apex; hirsute outside, hispid inside where the tail detaches from the beak-axis; these stiff hairs straw-coloured and long, forming a crest at the tail's base.

Seed narrowly obovoid, 6×2 mm, glabrous.



MAP 10. *Monsonia grandifolia*.

Distribution: South Africa in Natal.

Ecology: Found in rocky or stony grassveld of mountain or hillsides. Rarely in swampy meadows. Alt. 800–1800 m.

The species bears flowers and fruits in summer from December to March.

Note: This species seems to set fruit and seed poorly. In many plants most flowers wither without producing even an immature fruit. In others the fruit starts to develop but soon withers. Very few mature fruits were seen by the present author, and although their seeds seem to be mature the embryos lack reserve foodstuffs.

This species resembles *M. emarginata* to some extent, but can be distinguished from it by its robustness, and the very glandular appearance of the stems and leaves. Hybridisation between these two species may occur, since specimens from Transkei have characteristics of both species.

The specimens cited by KNUTH with *M. lanceolata*, here reduced to a synonym of *M. grandifolia*, are atypical and may represent a hybrid of *M. grandifolia* × *M. attenuata*.

Representative specimens:

South Africa: Natal: 28S30E – Weenen (fl. Mar.) *J. Wood* 6724 (BOL). 28S31E – Hlabisa Distr., Emgangado (fl. fr. Oct.) *J. Gerstner* 5047 (PRE). 28S32E – Hluhluwe Game Reserve (fl. Sep.) *C. Ward* 2691 (NH). 29S29E – Near Lowlands Station (fl. fr. Mar.) *J. Acocks* 11349 (BR, NH); Coleford Nature Reserve, above Ngwagwane (fl. Dec.) *Hilliard & Burt* 9585 (E); south of Coleford above Endavana river (fl. fr. Feb.) *Hilliard & Burt* 8890 (E, K, NU); Hidcote (fl. Jan.) *T. Sim* 16940 (BOL); Mooi River, Meteor Ridge (fr. Apr.) *A. Mogg* 4060 (PRE), 7072 (PRE); Mooi River (fl. Feb.) *H. Johnson* 510 (E); Mooi River, Westtown, *Rehmann* 7351 (Z, part type excluded from *M. natalensis*); Ntabamhlope (fl. Feb.) *Miller* 176 & 210 (NH); Mt West (fl. fr. Feb.) *R. Schlechter* 6827 (Z, holotype; isotypes: FI, GRA, P, US, W of *M. lanceolata*); Himeville (fl.) *Bewes* 32 (PRE). 29S30E – Richmond (fl. Feb.) *R. Schlechter* 6731 (P, lectotype; isotypes: GRA, K, M, Z of *M. grandifolia*); Lions River Distr., Drayton (fl. Feb.) *F. Wright* 1426 (E, NU); Lions River (fl. fr. Mar.) *A. Mogg* 7139 (K, PRE); Lions River Distr., Silverdale (fl. Mar.) *F. Wright* 1439 (E, NU). 29S30E – Greytown Distr. (fl. fr. Apr.) *J. Wylie* NH20493 (NH). 30S29E – Weza, Ingele Forest Reserve (fl. Jan.) *H. Venter* 7460 (BLFU); Weza, Suurberg (fl. fr. Mar.) *O. Hilliard* 5468 (E, M, NU); Harding, Farm Rooivaal (fl. fr. Feb.) *O. Hilliard* 1252 (NU); Nottingham Road (fl. Mar.) *A. McClean* 824 (K, NH, PRE); Nottingham Rd (fl. Nov.) *M. Franks* NH12976 (NH); Mt. Currie (fl. Nov.) *A. Goossens* 294 (PRE); Kokstad (fl. fr. Feb.) *H. Nicholson* 974 (PRE); Kokstad, Farm Thornham (fl. Dec.) *T. Coleman* 729 (K); Kokstad, Newmarket (fl. fr. Jan.) *Krook* 2174 (S), 2197 (W); Kokstad, between Riverside and Franklin (fl. Mar.) *A. Mauve* 4846 (K). 30S30E – Alexandra, Dumisa Station, Fairfield (fl. Feb.) *H. Rudatis* 1342 (Z, lectotype; isotypes: BM, E, G, K, L, P, S, STE, W of *M. alexandraensis*); Dumisa Station (fl. Jan.) *H. Rudatis* 1880 (W, lectotype; isotypes: G, NU, Z of *M. rudatisii*); Dumisa, Campbellton (fl. Jan.) *H. Rudatis* 1882 (NU, STE); Ixopo (fl. Feb.) *Krook* 2141 (W); Natal? (fl.) *Drège* 2261 (B, G).

11. *Monsonia heliotropioides* (CAVANILLES) BOISSIER Fig. 11, Maps 11a, b.

Fl. Orient. 1: 897 (1867); Edgeworth & Hooker in Hooker, Fl. Brit. India 1(2): 428 (1874); Knuth in Engler, Pflanzenr. 4.129: 294 (1912); Cufodontis, Bull.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

Jard. bot. Etat. Brux. Suppl. 26: 348 (1956); Täckholm, Stud. Fl. Egypt ed. 2: 300 (1974).

Basionym: *Geranium heliotropioides* Cav., Diss. 4: 220, tab. 113, fig. 2 (1787).

Type: D. PAULO USTERI s.n., herb. CAVANILLES 71682 (MA, holotype).

Homotypic synonym: *Erodium heliotropioides* (Cav.) Willd., Spec. pl. 3: 638 (1800); De Candolle, Prodr. 1: 648, no. 40 (1824).

Heterotypic synonyms: *M. asiatica* Vicary, Journ. As. Soc. Beng. 16(2): 1161 (1847); Knuth in Engler, Pflanzenr. 4.129: 301 (1912) – (wrongly cited as synonym of *M. senegalensis*). Type: West Pakistan: Sind: Border of desert and Hala Range, VICARY s.n. (K, holotype).

M. hispida Boiss., Diagn. pl. sér. 2, 2(8): 120 (1849). Type: Arabia: Thebaidis: Gebel Gareb and Gebel Dara, HUSSON s.n. (G (?), type not seen).

M. mallica Edgew., Journ. Linn. Soc. (Bot.) 6: 200 (1862); Knuth in Engler, Pflanzenr. 4.129: 294 (1912). Type: West Pakistan: Punjab: Sind: near Multan, EDGEWORTH 1056a (K, holotype), 1056b (K, isotype).

Prostrate or decumbent, often suffrutescent, single- to several-stemmed, 2 to about 20 cm high.

Roots up to 20 cm long and 10 mm in diam., woody.

Stems herbaceous to woody, up to 80 cm long, often stunted, 1–6 mm in diam., with a double indumentum the first of which is obscurely to densely puberulent with curved hairs or tomentose and the second obscurely to densely pilose, with numerous sessile glands, often reddish.

Leaves greyish-green, lower rosulate, upper subopposite to opposite; those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.5–2.5 × as long as the blade, 10–50(85) mm long, sometimes geniculate at the apex, often widened at the base, often reddish; stipules subulate, 3–4 mm long, green or reddish, obscurely hairy, with sessile glands, ciliate, sometimes persistent and subspinescent after the leaves have been shed; blade simple, elliptic, broadly ovate to very broadly ovate, angular-ovate to broadly angular-ovate, or very broadly angular ovate, 1–2 × as long as wide, 10–45 × 9–30 mm; obtuse to acute and often mucronate at the apex; truncate or cordate at the base; serrate to serrate-crenate, often sinuate to lobed, red-tinged at the margin; above whitish-sericeous, with numerous sessile glands; beneath whitish-lanuginose or lanulose, with the veins often densely pilose, with numerous sessile glands; main veins subpalmate or subpinnate, 5 or 7 branching from the base, impressed above, prominent and red-tinged beneath.

Inflorescences axillary, 2–7(15)-flowered, 50–170 mm long. Peduncles and pedicels with the same indumentum and glands as the stem, often red-tinged; the peduncles 3.5–13.5(22) × as long as the pedicels, 30–145 mm long; the pedicels 6–15 mm long, mostly geniculate under the fruit; involucre bracts 1–2 per flower, stipule-like, but not persistent.

Sepals free, ovate to obovate, 1.5–2 × as long as wide, 3–4 × 2–2.5 mm;

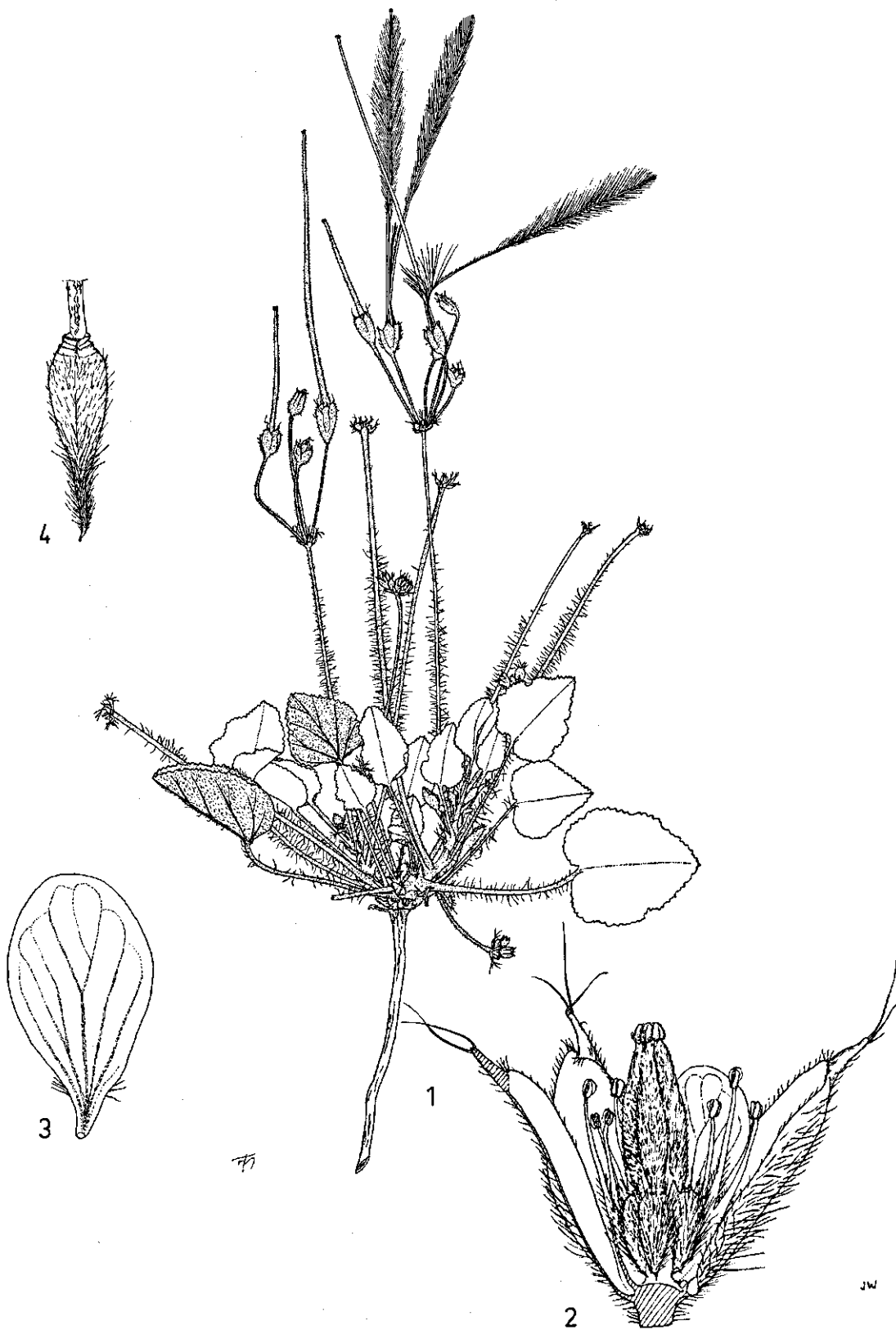


FIG. 11. *Monsonia heliotropioides*: 1. Habit, $\times \frac{3}{4}$; 2. flower opened, $\times 9$; 3. petal inside, $\times 15$; 4. mericarp, $\times 6$. (1, 3, 4: Rechner 27984 (B); 2: Maire 383 (G) and Rechner 27902 (B)).

outer side lanuginose, lanulose or sericeous, with few to many sessile glands; inner side glabrous, with 3 prominent, parallel main veins; margin ciliate; mucro reddish, terete, 0.5–1 mm long, always with a few long hairs at the apex, further glabrous or with a few short, curved hairs.

Petals soon deciduous, obovate to broadly obovate, often oblique, $0.5-2 \times$ as long as wide, $1.5-3.5 \times 1-2$ mm, $0.5-0.8 \times$ as long as the sepals, $0.4-1.1 \times$ as long as the stamens, mauve or crimson, glabrous, clawed at the base, main veins 5, ciliate and with a few stiff hairs at the margin near the claw, obtuse or acute and obscurely sinuate at the apex.

Stamens monadelphous or pentadelphous, cup-shaped around the pistil; groups free or basally connate for 0.1–0.2 mm; filaments of each group basally connate for 0.5–1 mm; the filaments in the central stamens 2.5–5 mm and in the lateral 2–4 mm long, sometimes terete at the apex, glabrous; with an obscure, ovate, rimmed, often ciliate gland-cavity on the outer side of the base of each group; anthers transversely broadly elliptic, equal, $0.3-0.4 \times 0.5-0.6$ mm, subintrorse, the cells separate in the basal half, each cell with 8 (rarely 10) relatively large, spherical pollen grains.

Pistil 2.6–4.6 mm long; ovary broadly obovoid, $1-1.6 \times 1-1.6$ mm, hyalino-hirsute or -pubescent; terminally rimmed; beak terete, sometimes longitudinally grooved, 1.5–2.5 mm long, lanulose or puberulent; stigmas broadly ovoid, $0.3-0.5 \times 0.3-0.5$ mm, receptive surface papillose and covering all of the stigma except for a narrow, vertical, glabrous line in the centre outside.

Fruit 65–90 mm long; mericarps $5-6 \times 1-1.5$ mm and beak 60–85 mm long. Mericarps narrowly obconical, brown with some red spots, shortly to rather longly hirsute, with copper-coloured hairs, ridged and conspicuously rimmed at the apex; the rims 4, the lower 2 of which obscure and the upper 2 well-developed; the upper rim cup-shaped with a diameter of about the width of the mericarp, perpendicular to the tail; tail shortly hirsute outside, hispid and silky inside where it detaches from the beak-axis; these stiff hairs long and forming a crest at the tail's base; the silky hairs long, shaping a plume together; all hairs copper-coloured.

Seed narrowly obovoid, $3 \times 0.8-1.2$ mm, glabrous.

Distribution: South West Asia in the desert regions of West Pakistan, Iran and Arabia and in the desert regions of North Africa.

Ecology: A herb of cultivated desert sand, or a plant of rocky, hilly, arid habitat. Alt. 0–1700 m.

Flowering and fruiting occur from October to May. In West Pakistan these reach a peak in April.

Note: *M. hispida* Boiss. (1849) was reduced by BOISSIER himself to a synonym of *M. heliotropioides* in 1867 although apparently the type specimen is not preserved. The description of *M. hispida* covers at least some specimens of *M. heliotropioides*. Therefore his conclusion is followed here.

M. heliotropioides is very variable in leaf-shape and size, but these differences are not geographically distinct. Therefore, no subspecies or varieties are to be distinguished in the taxon.

Representative specimens:

Africa:

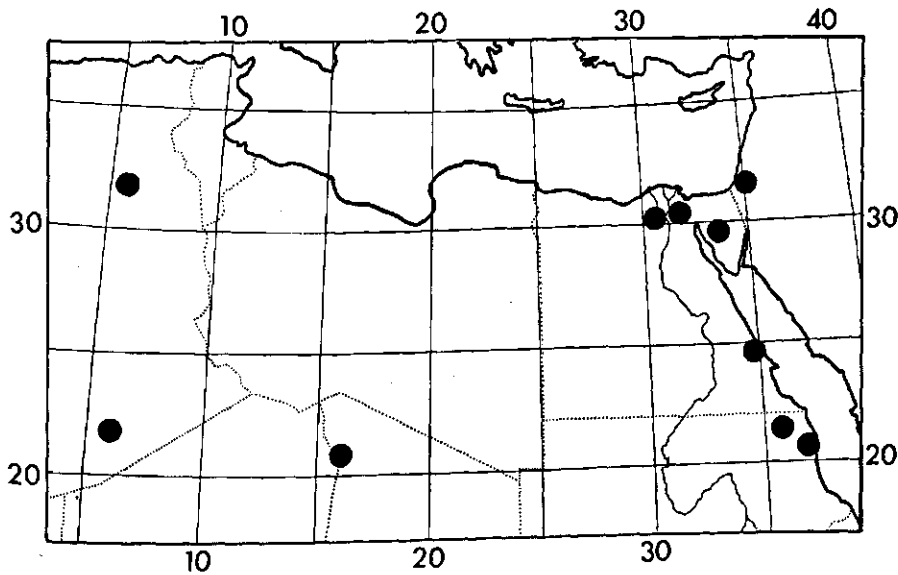
Algeria: 23N05E – Hoggar (fl. Sep.) *T. Monod* 48 (P); Ahaggar Mountains (fl. fr. Mar.) *R. Maire* 383 (G); Ahaggar, In-Amgelet Tit (fr. Mar.) *R. Maire* 377 (P); Ahaggar, In-Iker and In-Amgel (fl. fr.) *R. Maire* 378 (P). 33N06E – Moggar (fl. fr. Nov.) *T. Monod* 214 (P).

Egypt: 24N35E – Near W. Gemal (fl. fr.) *G. Murray* 2975 (K). 30N31E – Giza Pyramids (fl. fr. Nov.) *G. Täckholm*, Nov. 1926 (S). 30N32E – Ismäilya (fl. Mar.) *W. Barbey* 213 (G, Z). 30N33E – Between Keneh and Kossër, Wady Hammamat (fl. fr. Mar.) *G. Schweinfurth* 2407 (BM, K, P, W). Upper Egypt, Trigani (fl. fr.) *Parlatni*, anno 1847 (K). Egypt (fl. fr.) *Gavron UPS3201:8* (UPS). Egypt (fr.) *Da Figari*, May 1867 (FI).

Sudan: 22N36E – Wadi Châb route Abrag to Elba Mountain (fl. fr. Jan.) *J. Shabetai* F1014 (K). Sudan, *J. Bent* (K).

Tschad: 21N16E – Tibesti Mountains, Tarso Tousside (fl. fr. Aug.) *Grove & Johnson* 33a (K); Tarso Tousside (fl. fr. Oct.) *H. Scholz* 222 & 223 (B); Tarso Tousside, Wadi Bou Sama (fl. fr. Feb.) *H. Scholz* 224 (B). Central Sahara, Taharauet (fr. Mar.) *Meinertzhagen* 52 (K), 53 (BM, K).

Africa (fl. fr.) *D. Ulsteri s.n.*, herb. *Cavanilles* 71682 (MA, holotype of *M. heliotropioides*).



MAP 11a. *Monsonia heliotropioides*.

South West Asia:

Egypt: Sinai (fl. fr.) *L. Jöngerskiöld*, anno 1902 (UPS).

Iran: 16N48E – Prov. Lar, between Ginau and Sarzeh (fl. fr. Apr.) *Rechinger, Aellen & Esfandiari* 3419a (E, G, K, US); Bander Abbassy (fl. fr. Apr.) *Aucher-Eloy* 4297 (BM, FI, G, K, P, UPS, W). 27N58E – Jaz Murian (fl. Apr.) *J. Léonard* 5704 (K).

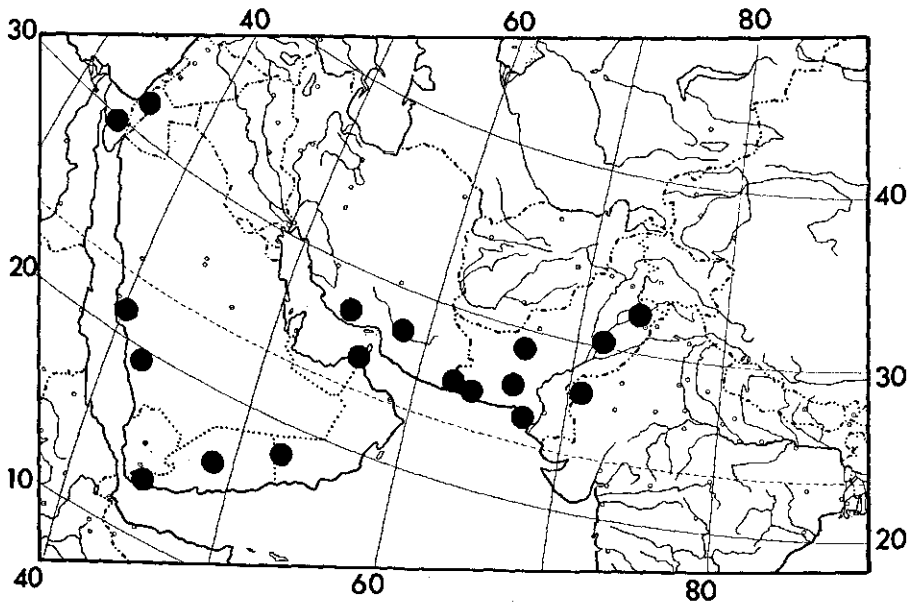
Jordan: 31N35E – Hebron (fr. Feb.) *Hochstetter* 306 (K); Hebron Mountain (fl. fr.) *W. Schimper* 306 (BM, G).

Oman: 17N53E – Plateau east of Wady Aidam, SW. of Rub el-Khali, *W. Thesiger*, 22 Jan. 1946 (BM). 24N56E – Safah to Suhar (fr. Dec.) *J. Fernandez* 272 (K). Wadi Quriyat (fl. fr. Feb.) *C. Parker* 0.125 (BM). Wadi Aun (fl. fr. May) *G. Popov* GP/57/94 (BM).

Saudi Arabia: 19N42E – Asir, Wady Harjab (fl. fr. Apr.) *D. Vesey-Fitzgerald* 16984/7 (BM). 21N40E – Al Sharayeh (fr. Jan.) *A. Khattab* 1213 (BM).

South Yemen: 13N44E – Er-Riyeda el Kathiri (fl. Nov.) *D. Ingrams* 98 (BM). 15N48E – Near Musna, Wadi Bin Ali (fl. fr. Aug.) *K. Guichard* KG/HAD/147 (BM).

West Pakistan: 24N67E – Karachi, Drig Road (fr. Mar.) *S. Jafri* 1267 (K). 25N62E – Makran, between Kappar and Gwadar (fl. fr. Apr.) *K. Rechinger* 27902 (B, G, K, M); Makran, Suntsar (fl. fr. Apr.) *K. Rechinger* 27984 (B, G, M); Tank-Baunu Road (fl. fr. Apr.) *A. Rahman* 25909 (BM, GH); Makran, Kappar to Gwadar (fl. fr. Apr.) *J. Lamond* 470 (E). 25N63E – near Pasni (fl. fr. May) *G. Popov* 17 (BM). 26N66E – Kalat, 30–50 km W. of Bela (fl. fr. Apr.) *K. Rechinger* 27633 (B, G, K, M, US); Zinde, border of desert and Hala Range, *Vicary* (K, holotype of *M. asiatica*); Kalat, 30 km W. of Bela (fl. fr. Apr.) *J. Lamond* 314 (E). 30N71E – Multan (fl. fr. Jan.) *Edgeworth* 1056a (K, holotype of *M. mallica*), 1056b (K, isotype of *M. mallica*); Multan Distr. (fr. Jan.) *J. Duthie*, Jan. 1892 (BM, K). 32N70E – Trans Indies, Waziristan, Kohut (fl. fr.) *KWK* 591a (K); Waziristan, Zam, *KWK* 591b (K). 32N73E – Arrarar (fl. fr. Apr.) *Qaiser, Raza & Hussain* 732 (E). Coast of Baluchistan, Sichin Kah (fr. Nov.) *E. Pierce*, 10 Nov. 1880 (K).



MAP 11b. *Monsonia heliotropioides*.

12. *Monsonia ignea* SCHINZ

Fig. 12, Map 12.

Bull. herb. Boiss. 3: 399 (1895); Knuth in Engler, Pflanzenr. 4.129: 295 (1912); Cufodontis, Bull. Jard. bot. Etat Brux. Suppl. 26(3): 348 (1956); Kokwaro, Webbia 25: 657 (1971).

Type: Africa: Somalia: Laku, KELLER 49 (Z, holotype).

Heterotypic synonym: *M. uniflora* Chiov., Fl. Som. 1: 121, tab. 10, fig. 1 (1929); Cufodontis, l.c.: 349; Kokwaro, l.c.: 656. Type: Somalia: Golol: Highlands between Nogal and Darror, PUCCIONI & STEFANINI 959 (FI, holotype).



FIG. 12. *Monsonia ignea*: 1. Habit, $\times \frac{1}{2}$; 2. petal, $\times 3$; 3. tailed mericarp, $\times 1\frac{1}{2}$; 4. mericarp, $\times 3$. (1, 2: Ellis 184 (K); 3, 4: Keller 49 (Z)).

Erect, suffrutescent, one- to several-stemmed, up to about 25 cm high.

Roots sometimes with subglobose tubers.

Stems herbaceous to woody, 4–15 cm long, 1–3 mm in diam., reddish-tinged, with a double indumentum the first of which is obscurely to densely pubescent or puberulent with hairs most of which are curved, the second is composed of long scattered erect hyaline often gland-based hairs, with numerous sessile and stalked glands.

Leaves often rosulate, lower alternate, upper subopposite to opposite; those of a pair equal or subequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 1–2 × as long as the blade, 15–60 mm long; stipules acicular, 3–4 mm long, with the same indumentum and glands as the stem, ciliate; blade simple, broadly ovate, narrowly ovate, triangular or narrowly triangular, 1.4–2.5 × as long as wide, 15–40 × 10–20 mm; acute and sometimes shortly acuminate at the apex, cordate at the base; conspicuously to obscurely serrate and sometimes sinuate or lobed at the margin; above granulose, glabrous or obscurely hairy, glandular-punctate and with sessile glands; beneath granulose, with the short indumentum and glands of the stem, or on the veins and margin as above and obscurely hairy between them, glandular-punctate; main veins subpinnate, 5 or 7 branching from the base, impressed above, prominent beneath.

Inflorescences axillary, 1–4-flowered, 60–180 mm long. Peduncles and pedicels with the short indumentum and glands of the stem; the peduncles 2–5.5 × as long as the pedicels, 30–120 mm long; the pedicels 10–50 mm long, geniculate under the fruit; involucre bracts 2–3 per flower, subulate, navicular, obscurely hairy, ciliate, 2–4 mm long.

Sepals green to reddish, free or connate at the base for 0.5 mm, narrowly ovate to narrowly elliptic, 3–3.5 × as long as wide, 7–8 × 2–2.5 mm; outside with the same indumentum and glands as the stem, or with the short indumentum lanuginose; inside glabrous, with 3 parallel main veins; margin ciliate; mucro 1–1.5 mm long, terete, with the same indumentum as the sepal outside.

Petals obovate or broadly obovate, 1.3–2 × as long as wide, 10–20 × 5–15 mm, 1.7 × as long as the sepals, 1.5–2 × as long as the stamens, red or salmon pink, with 5 main veins, glabrous; winged and ciliate at the base; obtuse at the apex.

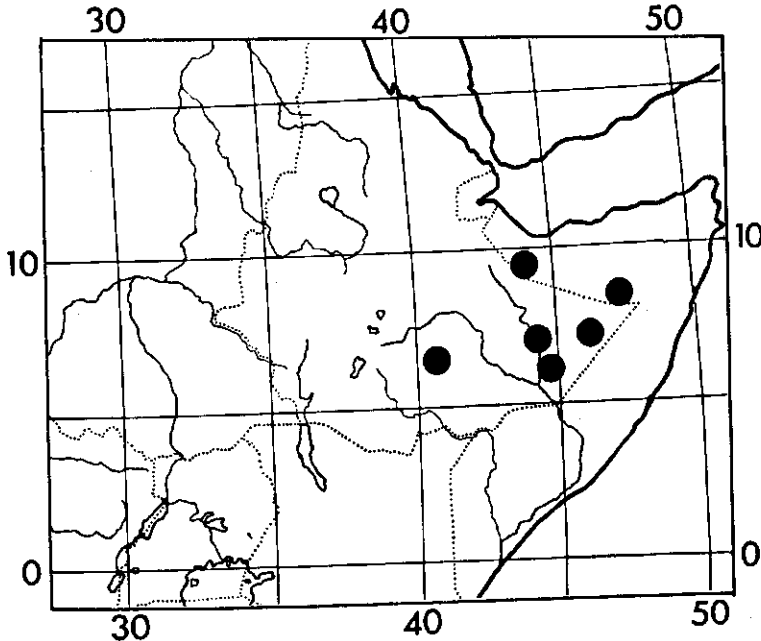
Stamens monadelphous, groups basally connate for 0.5 mm; filaments of each group basally connate for 1–1.5 mm; filaments in the central stamens 6–7 mm long and in the lateral 5 mm, reddish, sometimes pubescent outside, glabrous inside; with an obscure, ovate gland-cavity with 2 vertical parallel rims on the outer side of the base of each group; anthers elliptic, 1–1.5 × 0.6–0.8 mm, those in the longer stamens somewhat larger, subintrorse.

Pistil 7 mm long; ovary broadly obovoid, 1.5–2 × 1.3–1.5 mm, hyalino-hirto-pubescent; beak longitudinally grooved, 3–4 mm long, lanuginose and with stalked glands; stigmas reddish, linear or clavate, 1.5–2 × 0.3 mm, obtuse or acute at the apex, outside obscurely hairy, margin entire or subentire.

Fruit 65–85 mm long; mericarps 9 × 2 mm and beak 60–75 mm long. Me-

ricarps brown, hirsute, red-dotted around the bases of some of these hairs, narrowly obovoid, ridged, rimmed and reticulate at the apex; the ridge and rim prominent and at an oblique angle to the tail; tail hirsute outside, hispid inside where it detaches from the beak-axis; these stiff hairs straw-coloured, and long at the tail's base, forming a crest.

Seed obovoid, 4.5 × 2 mm, glabrous.



MAP 12. *Monsonia ignea*.

Distribution: Africa in Ethiopia and Somalia.

Ecology: Frequent or common in medium-sized open bush country. There seems to be a correlation between the presence of this species and red sandy soil. The climate is dry and hot. Alt. 500–1000 m.

Flowering from July to early December.

Vernacular name: 'Baram bali' (Somalia).

Representative specimens:

Ethiopia: 06N44E–Ogaden, Scillave (fl. Apr.) *Simmons* S76 (K). 06N45E–Ogaden, SW. of El Rago (fl. fr. Nov.) *P. Ellis* 184 (FI, K); Ogaden (fl. fr. Nov.) *P. Bally* B12991 (K). 07N44E–Ogaden Distr., Wardere Wells (fl. fr. Nov.) *Glover & Gilliland* 331 (BM). 08N46E–Bohotleh, South Border Road (fl. Dec.) *C. Ashall* EAH11888 (K); Laku (fl. fr.) *Keller* 49 (Z, holotype of *M. ignea*); Warandab (fl.) *Keller* 50 (K).

Somalia: 06N48E–Golol (fl. Jun.) *Puccioni & Stefanini* 959 (FI, holotype of *M. uniflora*). 08N47E–Las Anod South along Bihen Road (fl. June) *Glover & Gilliland* 1045 (BM, K). 09N44E–Hargeisa, 40 km NE. of Bododleh (fl. fr. Oct.) *C. Hemming* 2151 (K). Somalia (fl. fr. July) *Appleton*, July 1903 (K).

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

13. *Monsonia ignorata* MERXMÜLLER & SCHREIBER

Fig. 13; Map 13.

Mitt. bot. StSamml., Münch. 5: 557 (1965) and Prodr. Fl. S.W.A. 64: 4 (1966).

Type: South West Africa: eastern Lüderitz: Halenberg: in sand below the red dunes, MERXMÜLLER & GIESS 3124 (M, holotype).

Erect, suffrutescent, 4–10 cm high.

Stems subterraneous and aerial; the subterraneous rhizome erect, 2–30 cm long, 1–8 mm in diam., with a silvery papery bark peeling off, sometimes with lateral rhizomes, often with narrowly ovate bracts and adventitious roots, with 1 to few aerial stems at the apex, with a root-tuber at the base; the tuber globose, brown, up to 18 × 15 mm; aerial stems subligulate, up to 8 cm long, 1–4 mm in diam., stunted, whitish-tomentose to lanuginose, viscid and with numerous sessile glands.

Leaves alternate and crowded in a rosette; petiole with the same indumentum as the stem, 1–2.5 × as long as the blade, 10–90 mm long, not geniculate at the apex, sometimes thickened at the base; stipules subulate or triangular, terete at the apex, subspinescent, 5–10 mm long, tomentose or obscurely so, often ciliate, persistent after the leaves are shed; blade simple, broadly ovate to very broadly ovate, 0.9–1.2 × as long as wide, 10–45 × 10–50 mm, conspicuously pleated along the veins, obtuse to acute at the apex, cordate at the base, pleated and crenate to dentate or serrate at the margin, above whitish-puberulent or tomentose, and with numerous subsessile glands, beneath whitish-lanulose or lanuginose, and also with numerous subsessile glands; main veins 12–17, palmately arranged, deeply impressed above, prominent beneath.

Inflorescences axillary and terminal, 2–12-flowered, 20–50 mm long. Peduncles and pedicels tomentose to lanuginose; peduncles 5–8.5 × as long as the pedicels, 10–35 mm long; pedicels 2–6 mm long, sometimes geniculate under the fruit; involucre bracts about 3 per flower, stipule-like, 2–6 mm long.

Sepals green, sometimes red-tinged, connate at the base for 1 mm; limb narrowly obovate to obovate or narrowly elliptic to elliptic, 2–2.5 × as long as wide, 6–8 × 2.5–3.5 mm; outside lanuginose or sericeous, with some of the hairs gland-based, with sessile glands, with 3 parallel, prominent main veins; inside glabrous or pubescent with appressed hairs; membranaceous and ciliate at the margin; mucro terete, 1–2 mm, hairy; spurred at the fused bases; the spur pouch-like, 1 × 1 mm, partly adnate to the pedicel apex, obscurely hairy inside, glandular on the inner wall.

Petals narrowly obtriangular, 2.9–3.5 × as long as wide, 10–15 × 3–4 mm, 1.3–2.7 × as long as the sepals, 1.4–1.6 × as long as the stamens, white, creamy, or orange-yellow, glabrous in the terminal half, downy inside and obscurely hairy outside and ciliate in the basal part, emarginate at the apex, veins numerous.

Stamens monadelphous; groups basally connate for 0.2–0.3 mm; filaments of each group connate at the base for 2–4.5 mm, channeled directly above the spur; filaments equal, rarely subequal, 7–9 mm long, subulate or oblong with the apex terete, membranaceous at the margin; with some of the marginal cilia often

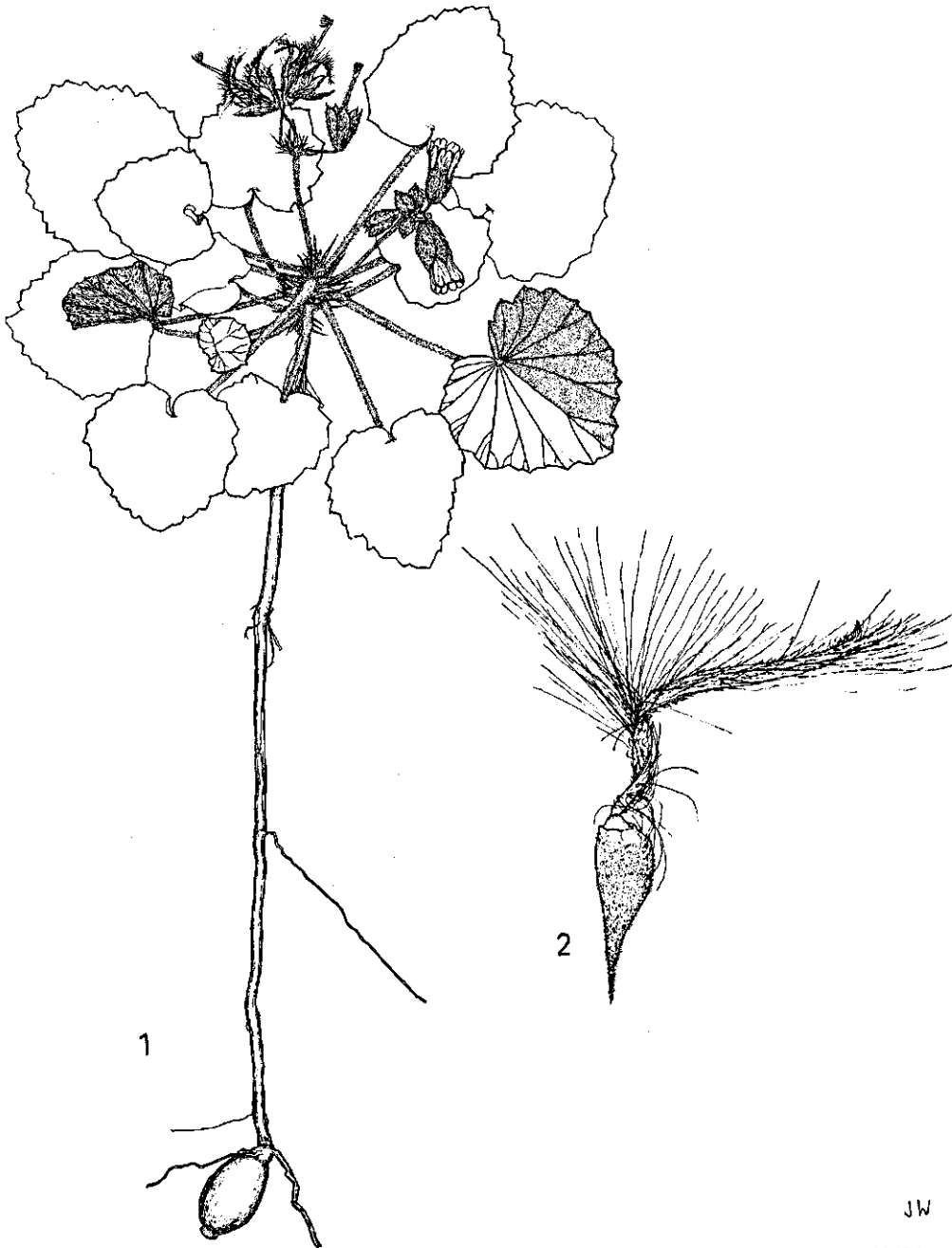


FIG. 13. *Monsonia ignorata*: 1. Habit, $\times \frac{3}{4}$; 2. tailed mericarp, $\times 6$. (1: *W. Giess 13423* (WIND); 2: *Kers 1971* (S)).

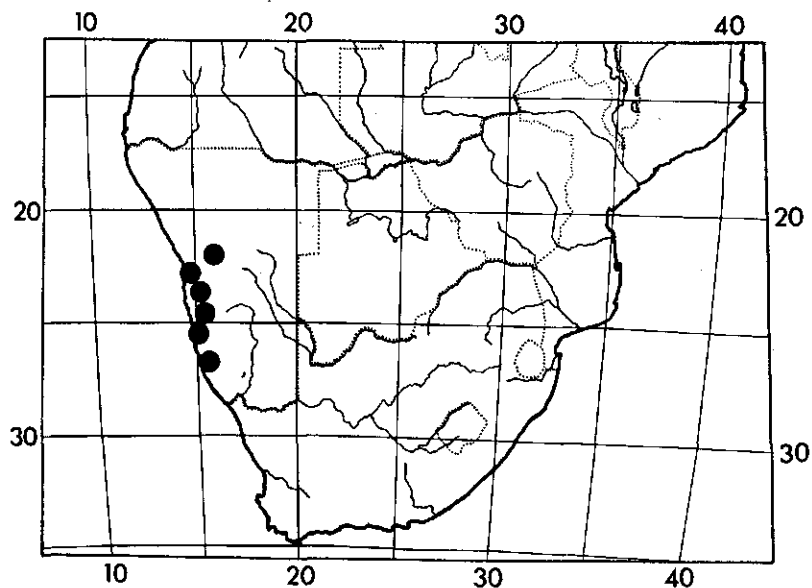
JW

gland-based; pubescent outside and glabrous inside; anthers oblong, equal, $2-3 \times 0.5$ mm, rarely some of the anthers sterile and then 1×0.3 mm, subintrorse.

Pistil 6.5–9 mm long; ovary obovoid, $2-3 \times 1.8-2.3$ mm, puberulent, with some stalked glands at the apex; beak sericeous or pubescent, obscurely longitudinally grooved, 1.5–3 mm long; style 0.3–1 mm long or obsolete, pubescent; stigmas $2-2.5 \times 0.5$ mm, clavate, yellow, acute or acuminate at the apex, obscurely hairy outside, entire at the margin.

Fruit 10–15 mm long; mericarps $4-5 \times 1.5-2$ mm and beak 6–8.5 mm long. Mericarps brown, obliquely obovoid, puberulent; the apex ridged and rimmed; the ridge- and rim-apices sharp and perpendicular to the tail; hirsute on both sides, the hairs long and forming a crest over the whole length inside where the tail detaches from the beak-axis.

Seed obliquely obovoid, $2-3 \times 1.3-1.5$ mm, glabrous, embryo with the radicle suborbicular.



MAP 13. *Monsonia ignorata*.

Distribution: South West Africa: Namib Desert in the Lüderitz South District around Lüderitz Bay and inland as far as Halenberg, at Spencer Bay and as far north as the Kuiseb River at Gobabeb Scientific Station in the Swakopmund District.

Ecology: A plant of the sand dunes. Alt. 0–200 m.

Specimens with flowers were collected virtually the year round. The only specimen with fruits was collected in February.

Note: The subterraneous tuber is edible and also forms a source of water for the desert wanderer.

Representative specimens:

South West Africa: 22S14E – Swakopmund/Walvis Bay, *W. Giess* 9048 (M, PRE, W, WIND). 22S16E – Karibib, Haus, *H. Kinges* 3534 (M). 23S14E – Swakopmund Distr., Kuiseb River area, Gobabeb Scientific Station (fl. fr. Feb.) *W. Hamilton* 1971 (S). 23S15E – Namib Desert Park, Natab Dune Street (fl. Dec.) *J. Ward* 164 (WIND). 24S15E – Sossusvlei (fl. June) *W. Giess* 13423 (M, PRE, S, WIND). 25S14E – Spencer Bay, Nordhuk (fl. Jan.) *Giess & Robinson* 13187 (WIND), 13203 (WIND). 26S15E – Lüderitz South, Halenberg (fl. Aug.) *Merxmüller & Giess* 3124 (M, holotype); Lüderitz, Schwarze Klippe (fl. Sep.) *H. Kinges* 2685 (M, PRE); Lüderitz, Kowis Mountains (fl. Oct.) *H. Kinges* 2721 (M, PRE); Lüderitz, east of Nautilus, *E. Metz*, anno 1947 (WIND); east of Nautilus, *Giess & Van Vuuren* 727 (M, K, PRE, WIND); Nautilus, *Merxmüller & Giess* 3058 (M, WIND); Rote Kuppe, *Dinter* 3815 (B, BM, BOL, GH, K, Z); Nautilus (fl. Feb.) *Dinter* 6019 (B, BM, BOL, E, G, GH, K, M, S, STE, Z). 26S16E – 100 km W. of Aus (fl. Apr.) *B. Nordenstam* 2239 (M).

14. *Monsonia lanuginosa* KNUTH

Fig. 14, Map 14.

In Engler, Bot. Jb. 40: 62 (1907); Knuth in Engler, Pflanzenr. 4.129: 296 (1912); Burt Davy, Fl. pl. & ferns 1: 192 (1926).

Types: South Africa: Transvaal: Mpomi Mountains at 2200 m, SCHLECHTER 4737 (holotype not seen, destroyed in B; lectotype: Z; isotypes: BOL, BM, G, GRA, K, PRE, S, W). Transvaal: Houtbosch, REHMANN 6323 (paratypes: BM, K, Z).

Erect, suffrutescent, single- to few-stemmed, 20–30 cm high.

Roots woody.

Stems herbaceous to woody, up to about 20 cm long, 2–3 mm in diam., with a double indumentum the first of which is lanuginose and the second consists of scattered long, gland-based hairs, with numerous stalked and sessile glands.

Leaves petiolate, densely clustered around the stems, sometimes becoming subopposite or opposite at the apices of the stems or on the lateral branches born at the apices, those of a pair sometimes unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; the petiole with the same indumentum and glands as the stem, 0.3–0.5 × as long as the blade, 6–12 mm long, geniculate at the apex, flattened at the base; stipules acicular, 4–8 mm long, with the same indumentum and glands as the stem; blade simple, narrowly elliptic to elliptic, 3–5 × as long as wide, 15–35 × 4–10 mm, 3- or 5-toothed at the apex, truncate at the base, serrate and sinuate at the margin, above pubescent or pilose, with numerous sessile and stalked glands, beneath with the double indumentum of the stem on the veins and often most of these hairs gland-based, pubescent or pilose inbetween the veins, with numerous sessile and stalked glands, main veins pinnate, impressed above and prominent beneath.

Inflorescences axillary and terminal, 1–3-flowered, 40–65 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem, but the pedicels becoming more densely covered by the stalked glands towards



FIG. 14. *Monsonia lanuginosa*: 1. Habit, $\times \frac{3}{4}$; 2. leaf beneath, $\times 1\frac{1}{2}$; 3. petal outside, $\times 3$. (1: Rehmann 6323 (Z) and Schlechter 4734 (Z); 2, 3: Rehmann 6323).

the apex; peduncles $0.5-1 \times$ as long as the pedicels, 9–25 mm long, flattened; pedicels 20–25 mm long, flattened basally and becoming terete towards the apex, geniculate at the base and apex, involucre bracts 2 per flower, 8–12 mm long, acicular or very narrowly obovate and navicular, with the same indumentum and glands as the stem.

Sepals green and purplish-tinged, free, narrowly ovate to ovate, $2-3 \times$ as long as wide, $8-10 \times 2-4$ mm; outside with the indumentum of the stem and with numerous stalked glands, inside glabrous and with 3 parallel main veins, margins ciliate; mucro terete, 3 mm long, purplish, with the same indumentum and glands as the stem, sometimes with a globular pocket of yellow, resinous granules and also a small tuft of white hairs at the base.

Petals obtriangular or broadly angular-obovate, $1-2 \times$ as long as wide, $10-15 \times 7-8$ mm, $1-1.5 \times$ as long as the sepals, $1-2 \times$ as long as the stamens, pale mauve, venation purplish, with 5 main veins, outside pubescent towards the base, inside mostly villous on the limb, pubescent at the base; the base winged and ciliate; the apex sharply or bluntly toothed, or deeply lobed.

Stamens monadelphous, arranged in a cup-shaped column around the pistil, basally connate for 0.5–1 mm; the filaments of each group basally connate for 1–2 mm, purplish, filaments in the central stamens 6–7 mm and in the lateral 4–5 mm long, glabrous inside, an obscure broadly ovate gland-cavity is situated on the outer side of each group; anthers yellow, elliptic or oblong, those of the long filaments slightly larger, $2-2.5 \times 1-1.5$ mm, subintrorse; pollen grains many per cell.

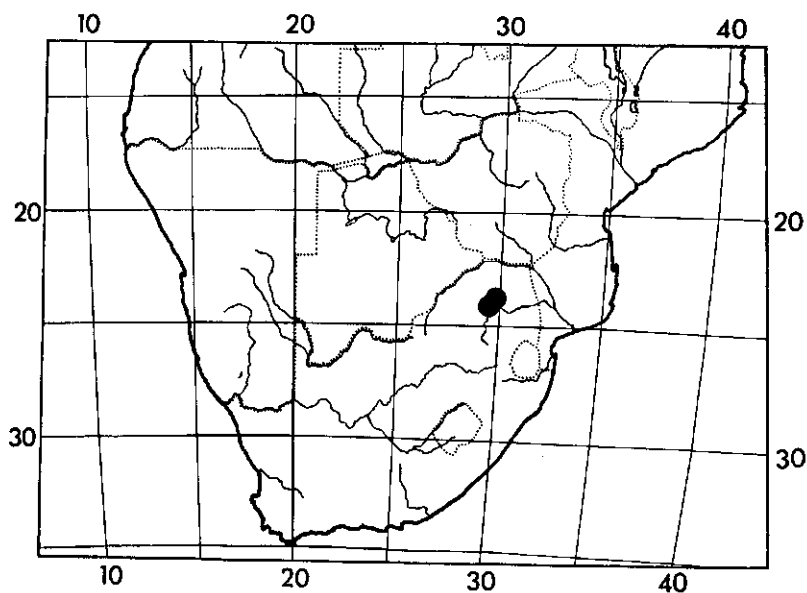
Pistil 7–10 mm long, ovary broadly obovoid, 2×2 mm, whitish-hirtopubescent; beak terete, 3–5 mm long, pubescent and, furthermore, also with stalked glands at the base; stigmas clavate, 3×0.5 mm, purplish, outer surface sparsely to moderately pubescent, acute at the apex, subcrenate at the margin.

Fruit 45–60 mm long, mericarps $10-15 \times 2$ mm, beak 35–50 mm long; mericarps narrowly subobovoid, hirsute, obliquely ridged and rimmed at the apex; the rim and ridge apices shortly hirsute; the tail hirsute outside, hispid inside where it detaches from the beak-axis; these stiff hairs copper-coloured, and long at the tail's base, forming a crest.

Distribution: South Africa: Northern Transvaal in the Zoutpansberg mountains between Houtbosch and Chuniespoort.

Ecology: A herb of montane *Protea* savannah or grassveld. The presence of *Protea* in the habitat indicates a cool climate and most probably south-facing slopes. Alt. 1750–2000 m.

Due to the limited number of specimens available little is known of the flowering and fruiting period of this species. This, however, seems to occur in summer, November to April.



MAP 14. *Monsonia lanuginosa*.

Representative specimens:

South Africa: Transvaal: Houtbosch (fl. fr.) *A. Rehmann* 6323 (BM, K, Z, paratypes); Houtbosch Mountain (fl. Aug.) *W. Nelson* 536 (K). 24S29E – Zebediela, Donkerkloof near Chuniespoort *J. Vahrmeijer* 2446 (PRE). Mpome Mountain (fl. fr. Mar.) *R. Schlechter* 1308 (= *austroriparica* 4734) (Z, lectotype; isotypes: BM, BOL, G, GRA, K, PRE, S, W).

15. *Monsonia longipes* KNUTH

Fig. 15, Map 15.

In Engler, Bot. Jb. 40: 66 (1907); Knuth in Engler, Pflanzenr. 4.129: 294, 308 fig. 38B (1912); Kokwaro, Webbia 25: 655 (1971) and Fl. Trop. E. Afr., Geraniaceae 13 (1971).

Type: Kenya: Makindu at 1000 m, KÄSSNER 538 (holotype not seen, destroyed in B; lectotype: Z; isotypes: BM, K).

Heterotypic synonyms: *M. longipes* var. *boranensis* Cuf., Reale Aca. D'Italia 17: 90, 91, fig. 20 (1939). Types: Ethiopia: Borana: Neghelli, CUFODONTIS 220 (FI, holotype); Borana: Javello, CUFODONTIS 489 (W, paratype).

M. pumila Standley, Smithson. Misc. Coll. 68(5): 8 (1917). Type: Kenya: Southern N'guasoNyiro River: 'Sotik Country', MEARNS 540 (US, holotype).

M. keniensis Knuth & Mildbraed in Fedde, Reprium nov. Spec. Regni veg. 28: 89 (1930). Type: Kenya, A. G. CURTIS 989 (A, holotype).

M. orientali-africana Knuth in Fedde, Reprium nov. Spec. Regni veg. 28: 90 (1930). Type: Kenya: West Magad: Soda Lake, UHLIG 2021 (holotype not seen, destroyed in B; no isotype seen).

Decumbent, suffrutescent, aromatic, few- to several-stemmed, 8–30 cm high.
Roots sometimes tuberous.

Stems herbaceous to woody, up to 30 cm long, 2–5 mm in diam., hirsute or pubescent, or with a double indumentum the first of which is composed of few to numerous short curved hairs and the second of few to numerous long erect gland-based hairs which are often stiff, with the nodes sometimes velutinous, with sessile glands.

Leaves: lower alternate, upper subopposite or opposite; those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum as the stem, $0.5-1.5 \times$ as long as the blade, 10–60 mm long, often geniculate at the apex, often widened and swollen at the base; stipules subulate, 8–22 mm long, green, with the same indumentum as the stem or with few scattered long hairs only, ciliate; blade simple, angular-ovate to palmatifid, $1-3 \times$ as long as wide, $25-70 \times 9-50$ mm, acute to acuminate and mostly mucronate at the apex; truncate or obtuse at the base; subentire to serrate or serrate-crenate, shallowly to deeply lobed, mostly undulate, mostly pubescent and red-tinged at the margin; often with red markings; above granulose with scattered hairs or obscurely pubescent, glandular-punctate, often with sessile glands; beneath with the indumentum of the stem on the veins or rarely these with scattered hairs only, between the veins granulose, glandular-punctate and with scattered hairs or obscurely pubescent, with sessile glands; main veins palmate, subpalmate or subpinnate, 3, 5, or 7 branching from the base, impressed above, prominent beneath.

Inflorescences lateral, leaf-opposed or axillary, 1–4-flowered, 70–180 mm long. Peduncles and pedicels stiff, erect, with the same indumentum as the stems or sometimes scabrous; the peduncles $5-25 \times$ as long as the pedicels, 50–145 mm long; the pedicels 4–15 mm long, exceptionally geniculate under the fruit; involucre bracts 2–3 per flower, subulate, 8–20 mm long, with the same indumentum as the stipules.

Flowers sweet-scented.

Sepals green to reddish, connate at the base for 1.5–2 mm; limb narrowly ovate, ovate, obovate or elliptic, $2-3 \times$ as long as wide, $10-15 \times 5-6$ mm; the outer side with a double indumentum the first of which is pubescent with curved hairs, and the second consists of scattered long erect gland-based hairs with these glands mostly red, with numerous stalked glands; the inner side glabrous except at the puberulent base, sometimes also with sessile glands, many-veined; margin ciliate; mucro laterally compressed at its base but terete at the recurved apex, with the indumentum of the outer side of the sepal, with a tuft of downy hairs at the base, 4–5 mm long; the base puberulent inside, spurred; the spur 1.5–2 mm deep and 0.5 mm in diam., connate with the pedicel-apex and the base of the stamens, inner side glandular and downy or obscurely setose, aperture rimmed or with a ligulate appendage, directly opposite the filament-channel.

Petals obovate to angular-obovate, often oblique, $1.5-2.5 \times$ as long as wide, $20-30 \times 10-12$ mm, $1.5-2 \times$ as long as the sepals, $1.5-2.5 \times$ as long as the stamens, yellow, greenish-yellow or pink, glabrous, but ciliate and puberulent

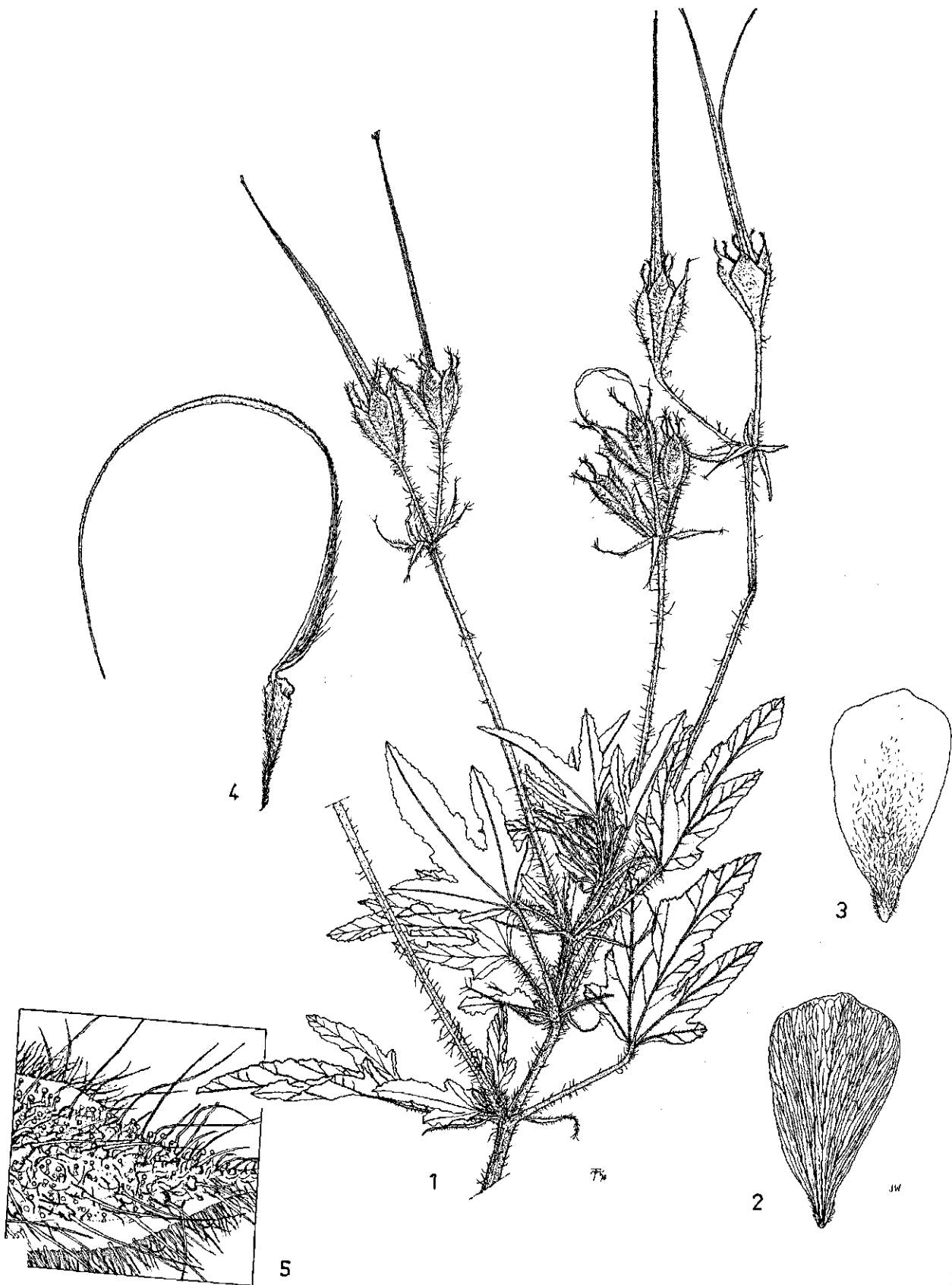


FIG. 15. *Monsonia longipes*: 1. Habit, $\times \frac{2}{3}$; 2. petal outside (indumentum omitted), $\times 2$; 3. petal outside (veins omitted), $\times 2$; 4. tailed mericarp, $\times 2$; 5. sepal outside with gland-based hairs and columnar stalked glands, $\times 11$. (1: De Wilde 6691 (WAG); 2, 3: Polhill & Paulo 1012 (BR); 4: C. Rogers 561 (K); 5: Napper 1905 (K)).

at the base and with scattered sessile and stalked glands; the apex obtuse, obscurely sinuate or crenate; main veins several.

Stamens monadelphous or pentadelphous, arranged in a cylindrical column around the pistil, groups basally free or connate for 0.2–0.3 mm; filaments of each group basally connate for 2–3.5 mm and channelled outside; the channel at its base confluent with the mouth of the spur or with the rim around the spur-mouth; filaments in the central stamens 8–11 mm and in the lateral 7–10 mm, puberulent outside and glabrous inside; anthers oblong, equal, 1.5–2 × 0.5–1 mm, subintrorse.

Pistil 10–12 mm long; ovary obovoid or broadly obovoid, 2–3 × 2–2.5 mm, hyalino-hirto-pubescent, terminally rimmed; beak longitudinally grooved, 6–7 mm long, pubescent, and also with some stalked glands at the base; stigmas spatulate, 2 × 0.5–0.6 mm, outer side sparsely hairy, margin entire, apex acute to obtuse.

Fruit 65–100 mm long, 10–15 × 2.5–3 mm, beak 50–90 mm long; mericarps purplish-maroon, hirsute or setaceous, obconical, conspicuously rimmed and ridged at the apex; the rim sharp-edged and cup-shaped, enclosing the ridge, perpendicular to the tail; tail hirsute outside, hispid inside where it detaches from the beak-axis, these stiff hairs copper- or straw-coloured and long at the tail's base, forming a crest.

Seed narrowly obconical, 5 × 2 mm, glabrous except for a few villous hairs.

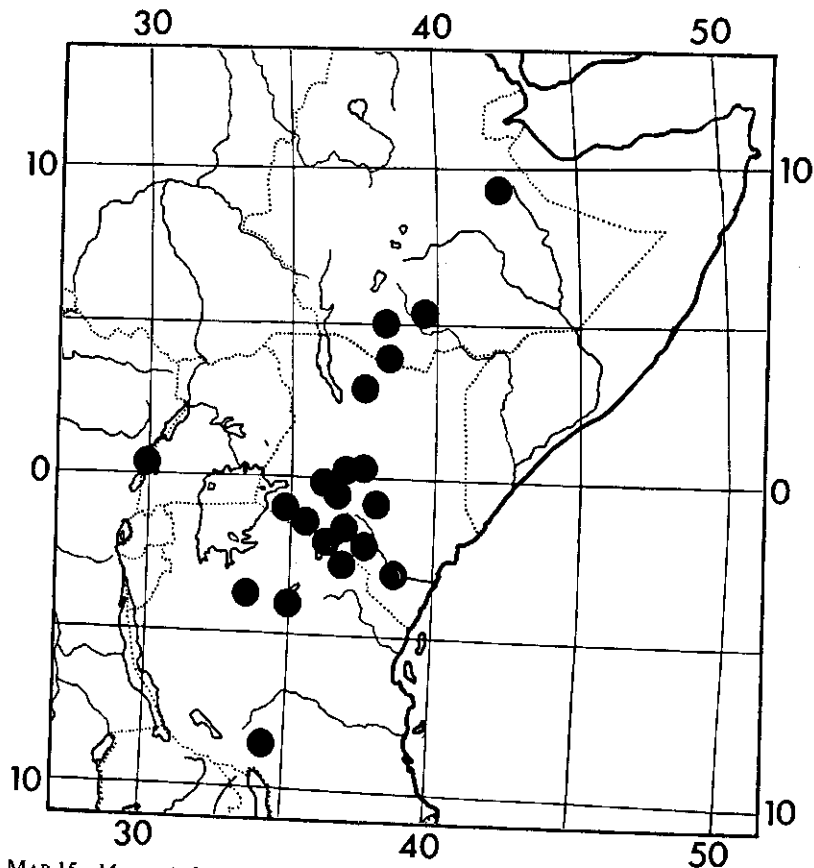
Distribution: Eastern Africa in Ethiopia, Kenya and Tanzania.

Ecology: In wet to dry grassland or in open savannah scrub on soils that may be clayey, loamy or even sandy. Alt. 1000–2400 m. Flowering and fruiting throughout the year, with peak periods in January, and April to July.

Note: The specimens cited by CUFODONTIS as *M. longipes* var. *boranensis* Cuf. are distinguished from the remaining specimens of the species by the deeply dissected leaves. This character, however, only represents one extreme of the range of leaf forms found in *M. longipes*. Therefore no distinction for this variety remains.

Fig. 38B of KNUTH (1912) resembles *M. ignea* much more than *M. longipes* for which the drawing is intended. The pedicel is never so long in relation to the peduncle and, furthermore, a geniculate pedicel rarely occurs in *M. longipes* and then it is certainly not so prominently geniculate as in this figure.

The indumentum, leaf form, flowers and fruit of *M. orientali-africana* as described resemble that of a weak or poor specimen of *M. longipes*. As the description does not fit that of any other species of *Monsonia*, *M. orientali-africana* is herewith reduced to a synonym of *M. longipes*, even though it was not possible to study the type material any more.



MAP 15. *Monsonia longipes*.

Representative specimens:

Ethiopia: 03N38E - Moyale-Mega Rd. (fl. fr. Nov.) *J. Gillett* 14193 (K). 05N38E - Borana, Taruba, 32 km N. of Yaballo (fl. fr. May) *W. Theisger* 2062 (BM). 05N39E - Borana, Neghelli. *G. Cufodontis* 220 (FI, holotype of *M. longipes* var. *boranensis*); Borana, Javello (fl. Apr.) *G. Cufodontis* 489 (W, paratype of *M. longipes* var. *boranensis*); Borana (fr. Apr.) *G. Cufodontis* 555 (FI, W); Neghelli-Uadane (fl. Sep.) *A. Vatova* 418 (FI); 18 km NW. of Neghelli (fl. fr. July) *H. Mooney* 7359 (K); 32 km E. of Neghelli on road to Filtu (fr. Nov.) *Friis, Gilbert, Rasmussen & Vollesen* 1026 (BR, K); 10 km from Neghelli to Filtu (fl. fr. July) *J. de Wilde* 6691 (WAG); Sagan Omo, monte Pelato (fr. Sep.) *R. Corradi* 7263 (FI), 7260 (FI); 75 km S. of Debra-Magist en route Neghelli (fl. Apr.) *J. Ash* 778 (K). 09N42E - Road to Bedeno, 14 km from road Kulubi Longhe (fl. fr. Oct.) *Westphal & Westphal-Stevens* 2381 (WAG).

Kenya: 00N36E - Lake Kelele, 1 km S. (fl. fr. Apr.) *A. Magor* 63 (K); Rumuruti-Baringo (fl. fr. May) *E. Napier* 16 (K). 03N37E - Marsabit (fl. July) *P. Bally* B1859 (K); 6 km from Marsabit to Isiolo (fl. fr. Mar.) *F. Magogo* 1313 (K). 00S34E - Masailand, Olemboiya-Nabo (fl. fr. June) *Glover, Gwynne & Samuel* 2851 (K). 00S36E - NE. slopes of Aberdare mountains (fl. fr. Sep.) *W. Dowson* 546 (K); Nairobi, Bahati Plain (fl. fr.) *Babault, June* 1950 (P); Nairobi-Magadi Road, 80 km from Nairobi (fr. Apr.) *Greenway* 8986 (K). 00S38E - Kakiani, Migwani Location, N. Kitui (fl. fr. May) *D. Napper* 1580 (BR, K); Lukeyna (fl. May) *D. Napper* 542 (K). 01S38E - Loita Plains (fl. fr. July) *A. Curtis* 779 (GH), 488 (GH), 628 (GH); Loitokitok (fl. fr. Nov.) *C. Rogers* 561 (BR, K). 01S36E - Nairobi Royal National Park (fl. fr. Jan.) *Verdcourt* 3262 (BR, K); Masai Distr., foot of Ngong Hills (fl. fr. Apr.) *Verdcourt, Henning & Polhill* 2656 (BR, K). 01S37E - Machakos Distr.,

Mua Hills (fl. fr. Jan.) *J. Gillett* 16618 (BR, K, S); Machakos Distr., Kilima Kiu (fl. fr. Nov.) *J. Gillett* 18363 (B); Kilima Kiu (fl. Feb.) *J. Kokwaro* 3019 (K); Kapiti Plain, W. of Maka (fr. July) *J. Gregory* 102 (BM). 02S36E – Between Namanga and Kajiado, 120 km from Nairobi (fl. fr. Dec.) *Polhill & Paulo* 1012 (B, BR, FI, K, S); Kajiado-Namango (fl. fr. Aug.) *P. Bally* 7446 (K); Plains W. of Kajiado (fl. fr. July) *J. Stewart* 737 (K). 02S37E – Makindu (fl. fr. Apr.) *T. Kässner* 538 (Z, lectotype of *M. longipes*; isotypes: BM, K); Chyulu foothills (fl. May) *P. Bally* 7909 (K); Emali (fl. fr. Jan.) *P. Bally* 8606 (FI, K); Kajiado Distr., Iltoroto Hill (fr. Feb.) *Napper & Abdallah* 1905 (FI, K); Machakos Distr., Kiboko Res. Station (fl. fr. May) *Muriithi* 102 (K). 03S38E – Mbulu Distr., Mt. Hanang (fl. fr. Feb.) *P. Greenway* 7689 (K). Kenya, 1500–2300 m (fl. fr.) *A. Curtis* 989 (A, holotype of *M. keniensis*); Kenya, Southern Nguaso Nyiro River, 'Sotik Country' (fl. July) *E. Mearns* 540 (US, holotype of *M. pumila*).

Tanzania: 02S36E – Longido, track through Lisingita, Masailand (fl. fr. Jan.) *M. Richards* 23690 (K, M). 03S33E – Shinyanga (fr. Apr.) *B. Burt* 3741 (K); Shinyanga on Seseku Aerodrome (fl. fr. Jan.) *B. Burt* 3517 (K). 04S35E – Yaida Valley (fl. fr. Jan.) *M. Richards* 25188 (K, M); Mbulu/Singida Distr., Yaida Valley (fl. Jan.) *M. Richards* 25149 (K). 08S34E – Mbeya Distr., Usanga Plain near Utencile (fl. fr. Jan.) *M. Richards* 17590 (BR, K).

Uganda: 00N29E – Ruwenzori, Languru (fl. Dec.) *G. Elliott* 6377 (BM, K).

16. *Monsonia luederitziana* FOCKE & SCHINZ

Fig. 16, Map 16.

In Schinz, Verh. bot. Ver. Prov. Brandenb. 29: 60 (1888); Knuth in Engler, Pflanzenr. 4.129: 309 (1912); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 5 (1966); Schreiber, Mitt. bot. StSamml., Münch. 12: 381 (1976).

Type: South West Africa: southern border of Lüderitz in the lower basin of the Orange River, STEINGRÖVER 105 (Z, holotype).

Heterotypic synonym: *Monsonia namaensis* Dinter in Fedde, Reprium nov. Spec. Regni veg. 16: 344 (1920); Merxmüller & Schreiber, l.c.; Schreiber, l.c. Type: South West Africa: Seskamelbaum, Satansplatz, DINTER 2040 (SAM, lectotype; isotype: SAM).

Decumbent or prostrate, suffrutescent, many-stemmed, aromatic, about 10–25 cm high.

Stems herbaceous to woody, the primary stem stunted and the lateral branches up to about 40 cm long, 1–5 mm in diam., with a double indumentum the first of which is puberulent to pubescent with curved hairs and the second is composed of few to numerous pilose long straight erect gland-based hairs, the second indumentum rarely absent, with stalked and rarely also sessile glands, often reddish- or purplish-tinged.

Leaves of the primary stem alternate and crowded, those of the lateral branches opposite or subopposite, those of a pair unequal, the larger 2–3 × as big as the smaller, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.5–2 × as long as the blade, 9–60 mm long, often flattened or swollen at the base, often geniculate at the apex; stipules triangular to subulate, obscurely hairy, ciliate, brown or reddish, papery; blade broadly ovate, 1–1.5 × as long as wide, 8–40 × 7–35 mm, acute or rarely obtuse and shortly mucronate at the apex, cordate or rarely truncate at the base, the margin dentate to subserrate, sometimes pleated and ciliate; both sides appressed-puberulent or obscurely puberulent, with stalk-

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

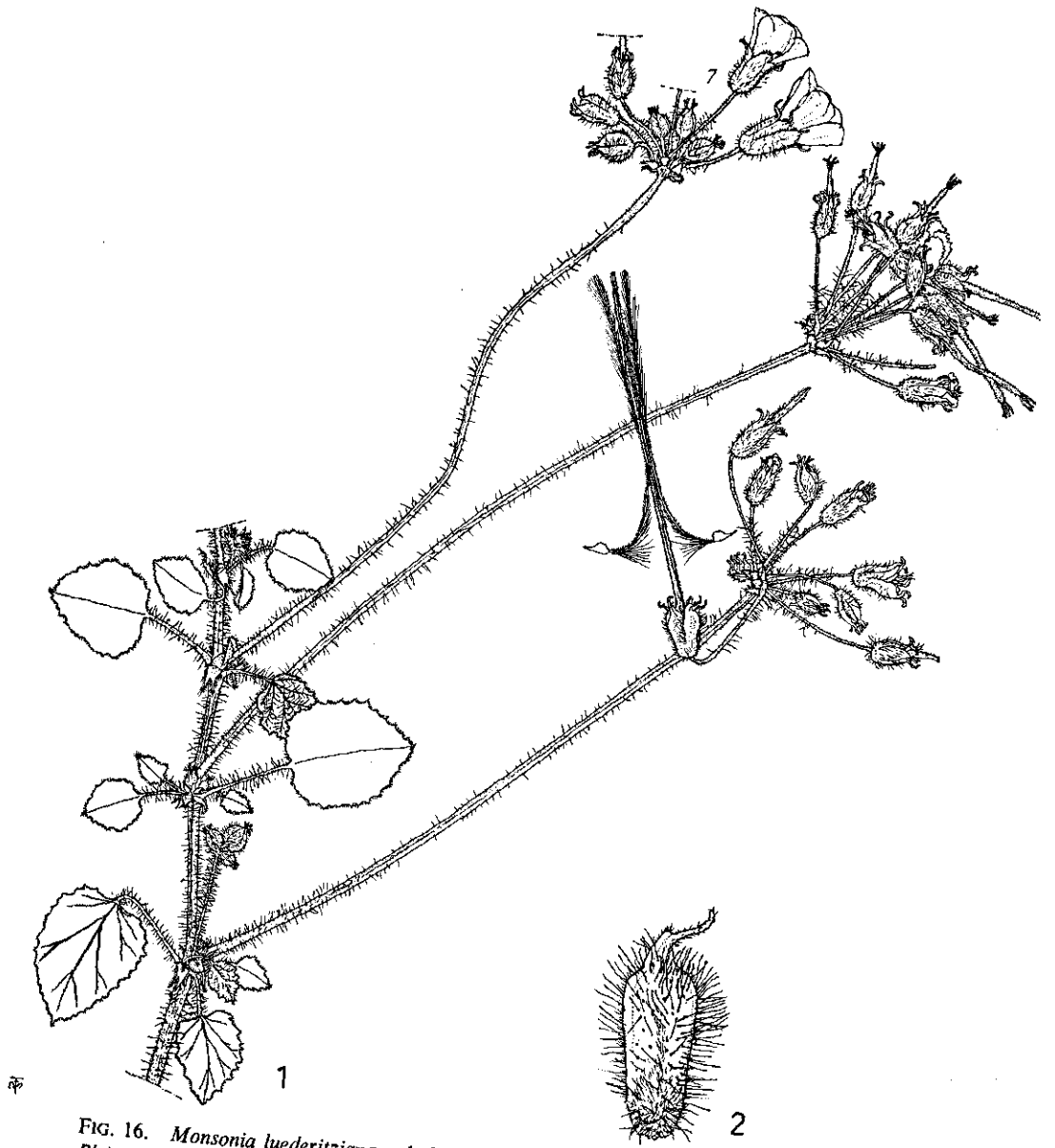


FIG. 16. *Monsonia luederitziana*: 1. Habit, $\times \frac{1}{4}$; 2. sepal outside, $\times 3$. (1, 2: Giess, Volk & Bleissner 6825 (WIND)).

ed and rarely also sessile glands, glandular punctate; the veins-beneath with the same indumentum as the stem; main veins palmate or subpalmate, 5 or 7 branching from the base, impressed above, prominent beneath.

Inflorescences axillary or rarely terminal, 2–12-flowered, 95–175 mm long. Peduncles and pedicels with the same indumentum and glands as the stem; peduncles erect, stout, 6–15 × as long as the pedicel, 70–150 mm long; pedicels slender, 5–25 mm long, geniculate under the fruit; involucre bracts 2–3 per flower, stipule-like.

Sepals green to reddish-pink, connate at the base for 1–2 mm, obovate; limb 1.8–2.5 × as long as wide, 7–9 × 3–4 mm, outside pubescent or puberulent, often also with scattered long straight hairs, with stalked and rarely also sessile glands, inside glabrous except at the pubescent base, with 3–5 parallel main veins, ciliate at the margin, with a terete mucro with narrowly triangular base, 1–3 mm long, puberulent, sometimes also with stalked glands and a few long hairs, spurred at the base, the spur 1 mm deep and 0.5 mm in diam., connate with the pedicel apex and the base of the stamens, inside puberulent and glanduliferous, aperture rimmed and directly opposite the filament channel.

Petals obtriangular, recurved, tapering into a long claw at the base, emarginate to obtuse at the apex, white, white with pink apices, pink, or pink with deep pink apices, 1.5–2.5 × as long as wide, 12–18 × 5–10 mm, 1.7–2.3 × as long as the sepals, 1.4–2 × as long as the stamens; main veins 5; the limb glabrous; the claw puberulent and channelled outside, pubescent inside with the hairs turned towards the apex.

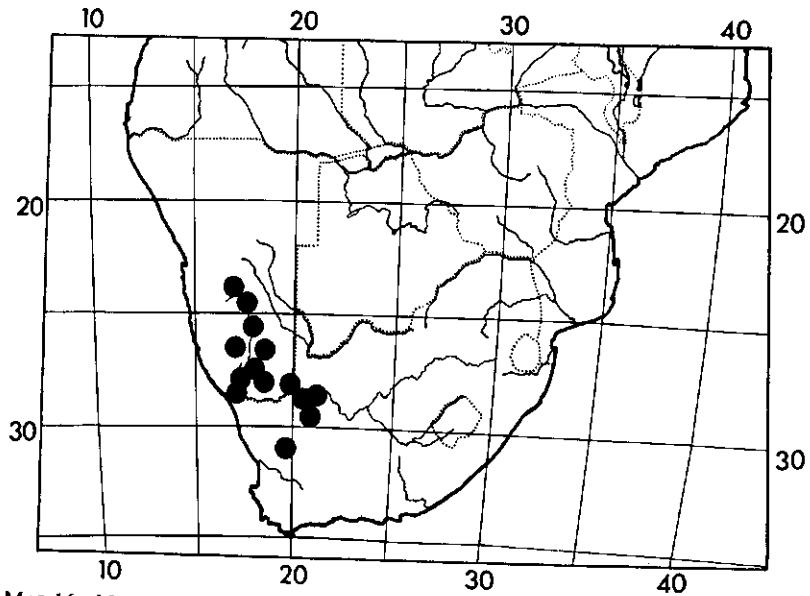
Stamens monadelphous, arranged in a cylindrical column around the pistil, groups basally connate for 0.2–0.5 mm; filaments of each group basally connate for 3–5 mm; filaments in the central stamens 8–12 mm and in the lateral 7–11 mm long, inside glabrous, outside puberulent and channelled; the base of the channel with 2 parallel, vertical rims which are confluent with the rim around the spur-opening; anthers all equal, oblong to elliptic, 1.5–2.5 × 0.8–1 mm, subintrorse.

Pistil 9–14 mm long; ovary broadly obovoid to very broadly obovoid, 2–2.2 × 1.5–2 mm, pubescent; beak longitudinally grooved, 4–6 mm long, puberulent or lanulose and with stalked glands; stigmas yellow, 3–5 × 0.3–0.9 mm, outside glabrous, verrucose to papillose at the margin.

Fruit 50–70 mm long, mericarps 5–6 × 1.5–2.5 mm, beak 45–65 mm long; mericarps narrowly obconical, brown, often dotted dark brown around the hair-bases, shortly hirsute with the hairs white or copper-coloured, ridged and rimmed at the apex; the rim prominent and perpendicular to the tail; the tail shortly hirsute outside; the inner side where it detaches from the beak-axis crested at the base and plumose towards the apex.

Seed obovoid, 3–4 × 1.8–2 mm, glabrous.

Distribution: South West Africa (districts of Warmbad, Keetmanshoop, Gibeon and Bethanië) and South Africa (northern Cape Province, district of Gordonia).



MAP 16. *Monsonia luederitziana*.

Ecology: A plant that may be occasional, common or abundant on a variety of substrates that range from kalahari sand, coarse calcareous sand, dry sandy riverbeds and pans to roadsides, hard gravelly flats and stony mountain sides. Alt. 500–1200 m.

This species flowers and sets fruit the year round with a peak period in late summer and autumn, February to June. The plants may flower and fruit three weeks after germination.

Vernacular names: *Teebos, Doedra or Rabbas.*

Uses: Used as a tea when boiled with milk. The fruit is used as fowls food, and as insect repellent (the plants are said to have the unpleasant odour of goats).

Note: The collecting locality of *M. namaensis* is indicated as 'Seskamelbaum, Satansplatz' in the type description. On the labels of the two specimens of DINTER 2040 from SAM, however, the collecting locality is given as 'Palansplato'.

Representative specimens:

South Africa: *Cape Province*: 28S17E – Richtersveld, Tatasberge (fl. Oct.) *H. Herre* STE12158 (STE). 28S20E – Kenhardt Distr. Kakamas-Kenhardt Road (fl. fr. July) *E. Wasserfall* 1044 (K, PRE); Augrabies National Park (fl. May) *M. Werger* 330 (K, PRE); Kakamas, Rooipad (fl. May) *O. Leistner* 3327 (K, WIND); Kakamas Veld Reserve (fl. Aug.) *J. Acocks* PRE41196 (PRE); between Upington and Keimoes (fl. fr. May) *R. Glover* 10421 (K, Z); between Upington and Kenhardt (fl. Sep.) *G. Lewis* PRE41197 (PRE). 28S21E – Gordonia Distr., 27 km from Upington (fl. fr. Apr.) *I. Pole-Evans* 2148 (PRE, Z); Areachap, 26 km NW. of Upington (fl. fr. Apr.) *O. Leistner* 2265 (BM, K, M). 29S20E – Boomrivier in Central Cape, 54 km from Kenhardt on Brandvlei Road (fl. fr. Apr.)

H. Taylor 8447 (K, STE). 29S21E – Kenhardt, 32 km east (fl. fr. May) *Schlieben 8806* (B, BM, BR, K, M, PRE, S, W, Z); 65 km N. of Kenhardt on road to Keimoes (fl. fr. Dec.) *R. Moffett 1002* (STE-U); south of Kenhardt (fl. Oct.) *J. Hutchinson 954* (K). 31S19E – Calvinia Distr., between Brandvlei and Kenhardt (fl. fr. Oct.) *E. Esterhuysen 4004* (Pre); between Kenhardt and Brandvlei (fl. Dec.) *C. Leipoldt BOL31451* (BOL).

South West Africa: 23S17E – Rehoboth (fl. fr. Apr.) *Fleck 220a* (K). 24S17E – Mariental, Swarttrand (fl. Feb.) *P. Basson 167* (PRE); Jorrovlaakte, Haribes (fl. Apr.) *O. Volk 12274* (M); Haribes, Rote Kuppen (fl. fr. Mar.) *O. Volk 6263, 6264* (M); Gibeon, Farm Orab (fl. fr. May) *Giess, Volk & Bleissner 6825* (M, WIND); Gibeon (fl. fr.) *J. Boss 36161* (K, PRE). 25S17E – Gibeon, 32 km N. of Asab (fl. fr. May) *S. Bleissner 241* (M). 25S18E – Tses Reserve (fl. fr. May) *Giess & Müller 11833* (M, K). 26S17E – Bethanië, Farm Huns, *Merxmüller & Giess 28839* (M); Bethanië, Farm Kanas (fl. fr. May) *U. Meyer 1* (M, WIND); Bethanië, 20 km W. of Fish River on road to Konkiep (fl. fr. Apr.) *B. Nordenstam 2192* (M, S). 26S18E – 30 km S. of Keetmanshoop (fl. fr. Apr.) *G. Theron 1995* (PRE); 13 km S. of Narubis (fl. Apr.) *A. Wilman 338* (GB, BR, PRE); 60 km N. of Keetmanshoop on road to Windhoek (fl. Feb.) *L. Kers 2136* (S); Keetmanshoop, Gellap Ost, 15 km NW. of Keetmanshoop (fl. fr. Oct.) *J. Acocks 15611* (PRE); 10 km W. of Aroab (fl. May) *B. de Winter 3376* (K, M, PRE, WIND). 27S17E – Farm Kwaggasnek (fl. fr. Aug.) *Giess 14550* (K); Holoog in Klein Karas Mountains (fl. Jan.) *H. Pearson 9755* (K); Warmbad Distr., 15 km on road from Ai-Ais (fl. June) *Nordenstam & Lundgren 163* (S). 27S18E – 52 km S. of Grunau (fl. fr. May) *P. Goldblatt 1875* (M, S, WIND); Klein Karas, *Örtendahl UPS3201-4b* (UPS). 28S17E – Slopes between Modderdrif and Sjambok River (fl. fr. Sep.) *Pillans 6451* (K); Warmbad Distr., 31 km N. of Vioolsdrif (fl.) *A. Schelpe 215* (BM, BOL); 10 km N. of Vioolsdrif Bridge (fl. Apr.) *B. Nordenstam 3888* (M, S); 15 km along road from 'Main Viewpoint' at Fish River Canyon (fl. fr. June) *Nordenstam & Lundgren 220* (S); Nature Park, Fish River Canyon (fl. May) *U. Meyer 10* (M, WIND); lower Fish River Canyon (fl. fr. Mar.) *H. Walter 2265* (K, M); bed of Fish River Canyon, *H. Pearson 9275* (K). 28S18E – 42 km east of Karasburg (fl. fr.) *Leach & Bayliss 13084B* (A, Z). 28S19E – Between Ariamsvlei and Karasburg (fl. fr. Aug.) *H. Schweickerdt 2585* (K, PRE); Road Ariamsvlei-Karasburg, 15 km W. of Kums (fl. fr. Feb.) *L. Kers 2290* (S); Road Ariamsvlei-Karasburg, 12 km from Ariamsvlei (fl. Feb.) *L. Kers 2297* (S). Between Kums and Nakop (fl. fr. Jan.) *H. Pearson 9708* (BOL, K). Southern border of Lüderitz in lower basin of the Orange River (fl.) *Steingröver 105* (Z, holotype of *M. luederitziana*). Palansplato (fl. Mar.) *Dinter 2040* (SAM, lectotype of *M. namaensis*; isotype: SAM).

17. *Monsonia natalensis* KNUTH

Fig. 17, Map 17.

In Engler, Pflanzenr. 4.129: 296 (1912).

Type: South Africa: Natal: Highland Station, O. KUNTZE anno 1894 (holotype not seen, destroyed in B; lectotype: K); the paratype, Natal: Westtown at Mooi River, REHMANN 7351, is excluded here as it belongs to *M. grandifolia*.

Decumbent to prostrate, many-stemmed, suffrutescent, approximately 10–25 cm high.

Roots woody and sometimes tuberous.

Stems herbaceous to woody, up to 50 cm long, 1–3 mm in diam., with a double indumentum the first of which is pubescent with curved hairs and the second is composed of few to many long erect straight gland-based hairs, sometimes with stalked glands, always with sessile glands.

Leaves alternate at the base of the main stems, opposite towards their apices and on the lateral branches, those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same in-

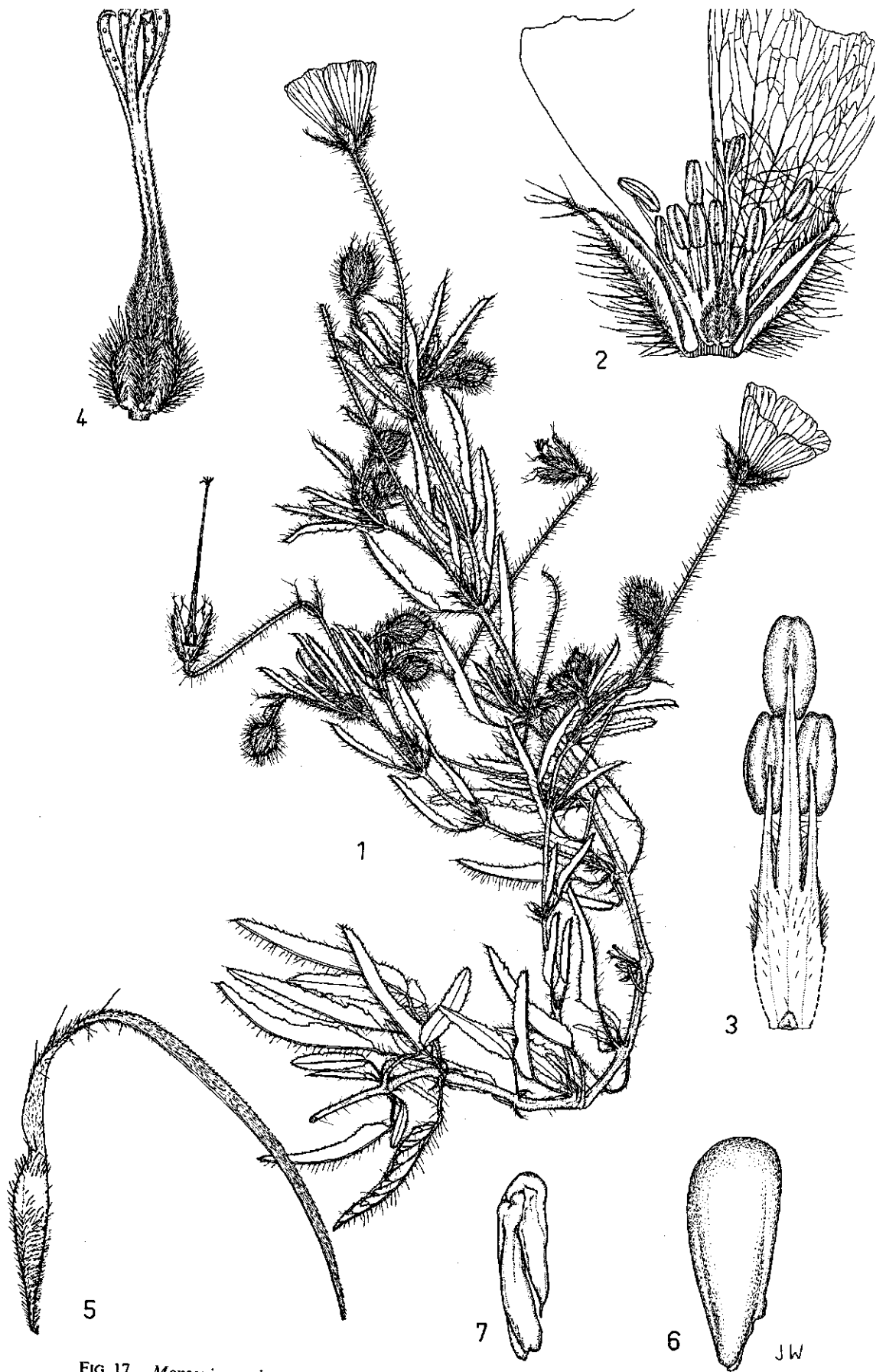


FIG. 17. *Monsonia natalensis*: 1. Habit, $\times \frac{3}{4}$; 2. flower opened, $\times 3$; 3. group of stamens with basal gland, $\times 6$; 4. pistil, $\times 6$; 5. tailed mericarp, $\times 3$; 6. mature seed, $\times 6$; 7. embryo, $\times 6$. (1: Strey 8080 (NH), McClean 336 (PRE); 2, 3, 4: Strey 8080; 5, 6, 7: McClean 336) JW

dundentum as the stem or sometimes with the short indumentum lanuginose, 0.3–0.6 × as long as the blade, 8–20 mm long, flattened at the base; stipules acicular to subulate, with the same indumentum and glands as the stem or velutinous, 5–11 mm long, reddish; blade very narrowly angular-ovate to narrowly angular-ovate, rarely narrowly ovate in the basal leaves, 3.5–6 × as long as wide, mostly folded upwards along the midrib, 20–45 × 5–10 mm, acuminate and mucronate or toothed at the apex; truncate at the base; unevenly serrate at the margin; the teeth with short and long straight erect hairs and furthermore, often thickened by globular pockets of resinous granules; above granulose, obscurely to moderately sericeous and, furthermore, often also with scattered long straight erect gland-based hairs, with sessile glands; beneath lanuginose or velutinous with scattered long straight erect often gland-based hairs on the main veins, densely granulose and pubescent or sericeous inbetween the veins, with numerous sessile glands; main veins pinnately arranged, impressed above, prominent beneath.

Inflorescences axillary and terminal, 1–2-flowered, 50–105 mm long. Peduncles and pedicels slender; the peduncles with the same indumentum and glands as the stem, 15–35 mm long, 0.7–0.8 × as long as the pedicels; the pedicels with a double indumentum the first of which is lanuginose, curved-pubescent or sericeous and the second is composed of long erect gland-based hairs, with numerous stalked and sessile glands, 20–40 mm long and geniculate under the fruit; involucre bracts 2–3 per flower, very narrowly ovate to very narrowly obovate, with the indumentum of the pedicels.

Sepals narrowly ovate to ovate, green, free, 2–3.5 × as long as wide, 10–15 × 4 mm; outside with the indumentum and glands of the pedicels and with the long hairs, furthermore, even more dense; inside glabrous, with 3 parallel main veins; margins ciliate; the mucro terete with a globular pocket of resinous granules and a tuft of hairs at its base, 2–3 mm long, greenish, with the same indumentum as the sepals.

Petals obtriangular, 2–3.5 × as long as wide, 20–30 × 10–20 mm, 2–3.5 × as long as the sepals, 2–2.5 × as long as the stamens, white or yellow, with venation purplish-brown, with 5 main veins, outside glabrous or rarely obscurely villous, with sessile and subsessile glands, inside obscurely villous, winged, obscurely ciliate and hairy at the base, obscurely crenate or entire at the apex.

Stamens monadelphous, arranged in a cup-shaped column around the pistil, groups basally connate for 1.5–2.5 mm; filaments of each group basally connate for 2.5–4 mm; filaments in the central stamens 9–10 mm and in the lateral 7 mm long, apically terete, obscurely hairy inside, more clearly so outside; a narrowly triangular or triangular, rimmed gland is situated on the outer side of the base of each group or on the receptacle outside each group; anthers oblong, equal or subequal, those of the long filaments slightly larger, 2.5–3.5 × 1.3–1.4 mm, subintrorse.

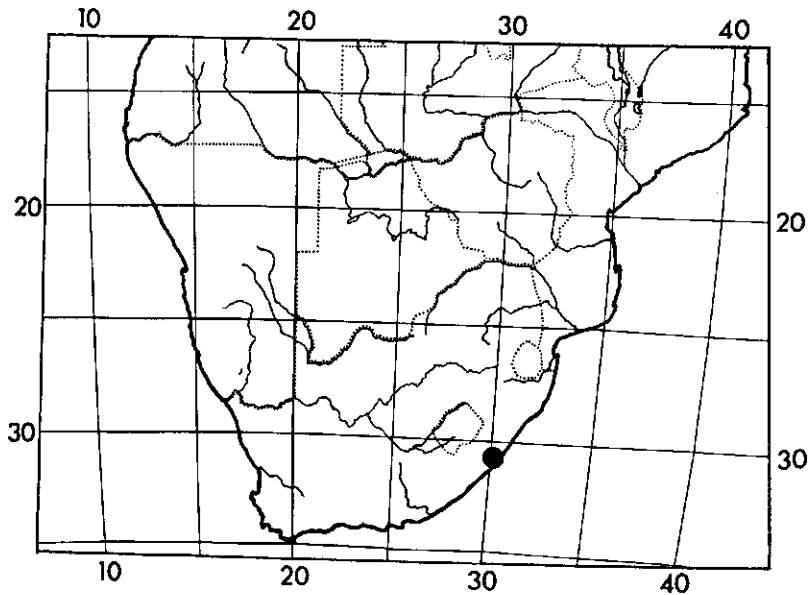
Pistil 10–12 mm long; ovary broadly obovoid, 2 × 2 mm, hyalino-hirto-pubescent; beak longitudinally grooved, 5–7 mm long, pubescent, and also with stalked glands in the basal part; stigmas linear to clavate, 2–3 × 0.4–0.6 mm,

outside sparsely hairy and blackish, obscurely crenate at the margin, acute or acuminate at the apex.

Fruit with the mericarps 9×2 mm and the beak 45 mm long; mericarps narrowly obovoid, hirsute, obliquely domed and reticulate at the apex; the tail hirsute outside, hispid inside where the tails detach from the beak-axis; these stiff hairs somewhat longer at the tail's base, forming a crest.

Seed obovoid, 5×1.5 mm, glabrous.

Distribution: South Africa, southern Natal.



MAP 17. *Monsonia natalensis*.

Ecology: A plant of mountainous grassland where the climate is hot to very hot and often dry. The soils may be shallow and shaly. Alt. 400–700 m.

The reproductive period falls in late summer, March to April.

Representative specimens:

South Africa: Natal: Highland Station (fl. Mar.) *O. Kuntze*, 15 March 1894 (K, lectotype). 30S30E – Paddock, on Murchison Flats near Oribi Gorge (fl. fr. Apr.) *McClellan* 336 (K, NH, PRE), 345 (NH); Port Shepstone Distr., Oribi Flats (fl. Apr.) *A. Harding* NU52352 (NU); Izotsha (fl. Mar.) *R. Strey* 8080 (NH); Port Shepstone, Beacon Hill (fl. Apr.) *R. Strey* 6549 (NH); Izingolweni-Port Edward Road (fl. Mar.) *C. Ward* 184 (NU). 31S30E – Port Edward, above Umtamvuma River (fl. Mar.) *H. Nicholson* (NH).

18. *Monsonia nivea* (DECAISNE) WEBB

Fig. 18, Maps 18a, b.

Fragm. Flor. Aeth.-Aegypt. 2: 59 (1854); Boissier, Fl. Orient. 1: 897 (1867) (superfluous combination); Battandier & Trabut, Fl. L'Alg. 118 (1888) (superfluous combination); Knuth in Engler, Pflanzenr. 4.129: 293 (1912).

Basionym: *Erodium niveum* Dcne, Ann sc. nat. sér. 2(3): 285 (1835).

Type: Egypt: Desert de Tor, BOVÉ 154 (P: holotype; isotypes: A, BR, G, K, L).

Heterotypic synonym: *Monsonia commixta* Rech. fil., Aellen & Esfandiari, Anz. Österr. Akad. Wiss. Math.-Nat. 87: 300 (1948). Type: Iran: Lar Province: desert between Ginau and Sarzeh: ca. 60 km from Bandar Abbas; RECHINGER, AELLEN & ESFANDIARI 3419b (W: holotype; isotype: G).

Decumbent or semi-prostrate, suffrutescent, few- to several-stemmed, 1.5–15 cm high, rarely up to 30 cm high.

Tap-root woody, rarely with lateral roots, up to 20 cm long, erect, often tuberous.

Stems herbaceous to woody, up to 30 cm long, 1–3 mm in diam., white-lanuginose, lanulose, velutinous, appressed pubescent or rarely with a double indumentum the first of which is an appressed pubescence and the second composed of long straight erect scattered hairs, often with sessile or subsessile glands.

Leaves: lower alternate and crowded, the upper subopposite to opposite; those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.5–2 × as long as the blade, 9–50 mm long, sometimes geniculate at the apex, flattened and often swollen at the base, the basal part often persistent and subspinescent; stipules subulate, obscurely to densely hairy, ciliate; blade simple, narrowly ovate to ovate, rarely elliptic, subcoriaceous, pleated along the veins, 1.5–3 × as long as wide, 10–30 × 5–15 mm; acute or rarely obtuse at the apex; truncate at the base; serrate or serrate-crenate and undulate or pleated, sometimes reddish-tinged at the margin; above densely white-sericeous or rarely lanulose, with sessile or subsessile glands; beneath densely white-lanuginose or rarely lanulose, with sessile or subsessile glands; main veins pinnately arranged, deeply impressed above, prominent beneath.

Inflorescences axillary, 3–12-flowered, 20–140 mm long. Peduncles and pedicels with the white indumentum of the stem or appressed-pubescent, with sessile or subsessile glands; the peduncles 5–18 × as long as the pedicels, 15–130 mm long, the base swollen, often persistent and then subspinescent and straw-coloured; the pedicels 3–20 mm long, often geniculate under the fruit, involucrel bracts 1–3 per flower, stipule-like, sometimes narrowly ovate.

Sepals free, broadly elliptic, elliptic, broadly ovate or obovate, 1–2 × as long as wide, 3–4 × 2–3 mm, outside densely white-sericeous, inside glabrous or with some appressed hairs on the midrib or at the apex, with 3 parallel, prominent main veins; margin ciliate; mucro terete, 0.1–0.6 mm long, white-appressed hairy and also with a few long erect hairs.

Petals elliptic to broadly elliptic, 1.5–2 × as long as wide, 1.5–3 × 1–2 mm, 0.4–1 × as long as the sepals, 0.5–1.5 × as long as the stamens, glabrous, pink, mauve, purple, or white, shortly clawed, ciliate and also with a few stiff hairs at the base, with 5 main veins, obtuse at the apex, soon deciduous.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

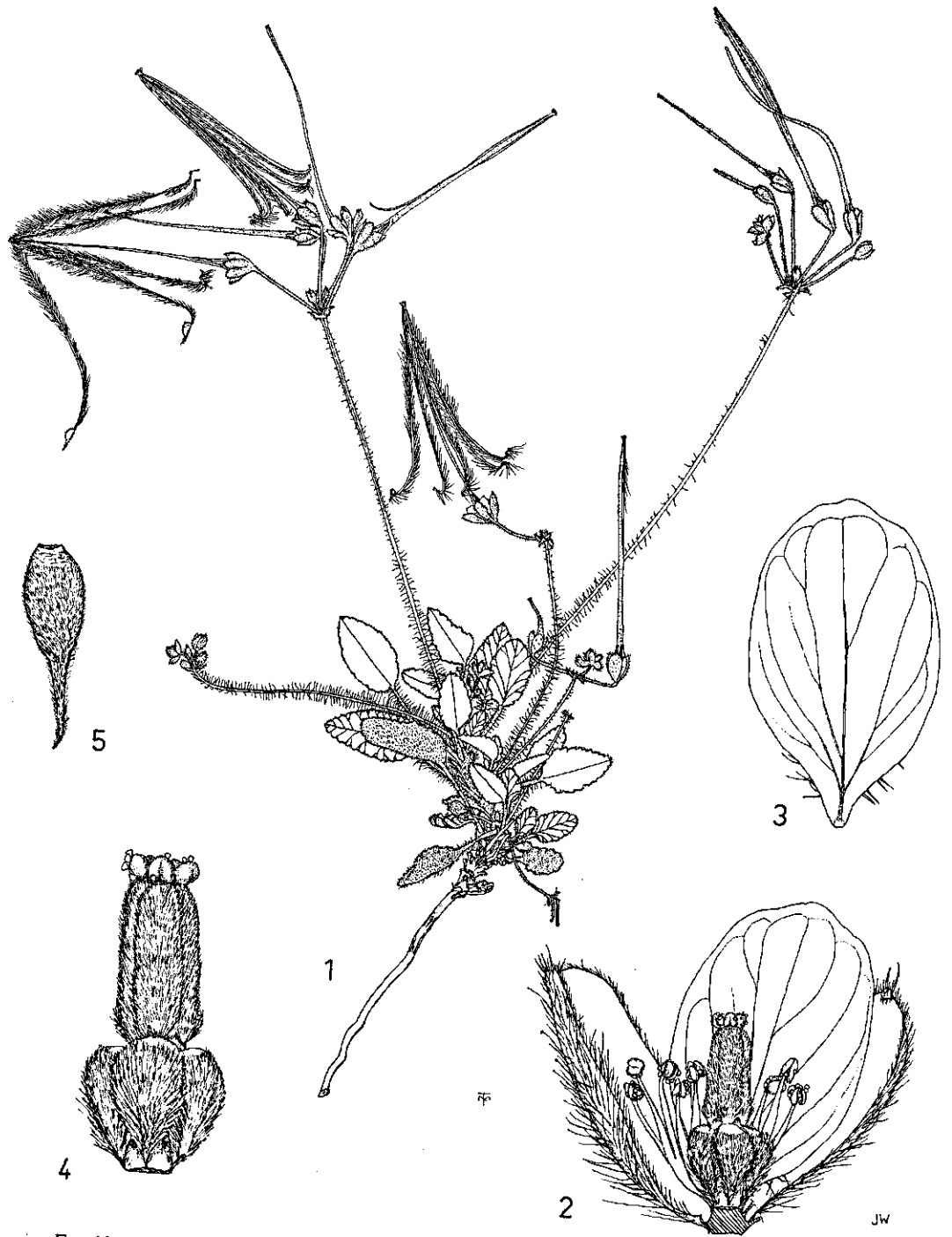


FIG. 18: *Monsonia nivea*: 1. Habit, $\times \frac{3}{4}$; 2. flower opened, $\times 9$; 3. petal inside, $\times 9$; 4. pistil, $\times 15$; 5. mericarp, $\times 6$. (1: E. Burdet 147 (G); 2: *Hunting Tech. Surv.* 9 (E₂) (E), Mandaville 102 (US); 3: Mandaville 102; 4: *Hunting Tech. Surv.* 9 (E₂); 5: E. Burdet 147).

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 0.1 mm; filaments of each group basally connate for 0.5–1.1 mm; the filaments equal, rarely subequal, 2–4 mm long, often terete at the apex, glabrous; an obscure ovate, ciliate gland-cavity on the outer side of the base of each group; anthers transversely broadly elliptic, equal, 0.3–0.4 × 0.4–0.5 mm, subintrorse, 2-celled; cells separated in the basal half, with 8 relatively large spherical pollen grains per cell.

Pistil 2.4–3.1 mm long; ovary obovoid to very broadly obovoid, 1–1.2 × 1–1.2 mm, hyalino-puberulent to -pubescent; beak terete, 1.2–1.8 mm long, lanulose; stigmas ovoid, 0.2–0.4 × 0.2–0.4 mm, receptive surface papillose and covering all of the stigma except for a narrow, vertical, glabrous line in the centre outside.

Fruit 40–55 mm long; mericarps 5–6 × 1.8–2 mm and beak 35–50 mm long; mericarps narrowly obovoid, brown to pale brown, sometimes red-spotted, shortly hirsute, with the hairs copper- to straw-coloured, rimmed and obliquely domed; the rims 1–3, obscure except the upper one the diameter of which is at the most $\frac{1}{2}$ the width of the mericarp; the rims perpendicular to the tail; the tail as long as the beak, shortly hirsute outside, hispid and silky inside where the tail detaches from the beak-axis; these stiff hairs long at the tail's base, forming a crest; the silky hairs long and shaping a plume all together towards the apex of the tail; all hairs copper- or straw-coloured.

Seed obovoid, 3–3.5 × 1.5–2 mm, glabrous.

Distribution: The desert regions of Asiatic Arabia and northern Africa.

Ecology: Sand, especially of wadi's in the desert. Alt. 0–1300 m.

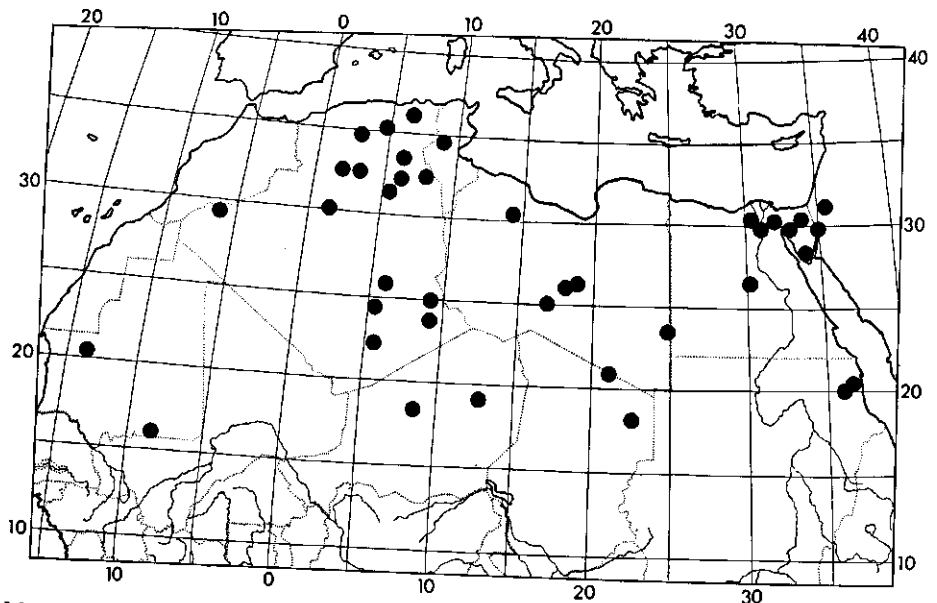
The main reproductive period extends from late winter to early summer, January to May. The peak periods of flowering and fruiting differ for the two continents on which the species is represented. In Africa it is in April and in Arabia in March, a month earlier.

Vernacular names: *Ghirna* or *Gurna* (Arabia), *Souzenouek* (Iran) and *Dahami* (Egypt).

Representative specimens:

Africa:

Algeria: 22N05E – Haggat Mountains (fl. fr.) *Hunting Tech. Services Ltd. 9E2* (E); Haggat, T. Monod 36 (P). 23N08E – Tiririne (fl. fr. May) *Feroune & Janet 155* (P). 24N05E – Timelaine (fl. fr. Apr.) *R. Maire 381 or 6096* (G, P, Z). 25N09E – Region of Djanet (fr.) *H. Lhote 165* (P). 26N06E – Tassili (fl. Mar.) *F. Fuge 116* (G). 30N02E – Beni-Abbei (fl. fr. May) *Ducros, 25 May 1935* (G). 30N03E – El Golea (fl. fr. Apr.) *L. Chevalier, 20 April 1902* (P), *31 March 1902* (A, P); between El Golea & the Grand Erg (fl. fr. Mar.) *T. Chipp 142* (K). 32N03E – Oued Mzab, Hassi El Djund (fr. May) *Cosson, 6 May 1858* (P); Mzab, El Ateuf (fl.) *Cosson, 17 May 1858* (P); Ghardaia to El Golea (fl. fr.) *L. Chevalier, 8 April 1904*. 32N05E – Ggoussa (fl. fr. May) *L. Chevalier 168* (G, GB, Fl. P, Z); Ngoussa, between Hassi el Djual and Oued N'Uzab (fl. fr.) *E. Cosson, 7 May 1858* (G, K, P, S, W); Ngoussa, between Hassi el Djual and Oued N'Uzab (fl. fr.) *L. Kralik, 7 May 1858* (Fl. G, K, P, UPS, W). 33N06E – About 80 km SSW. of Touggourt on the road to Ouargla, *Kramer & Kramer*



MAP 18a. *Monsonia nivea*.

- 5256 (Z); Constantine Prov., Oued R'ir (fr.) *Cosson*, 22 April 1858 (P). 34N02E - El Hadjira, *H. de la Perraudière*, 29 April 1858 (W). 35N04E - Sitione Souf, Ogl el Ouibed (fl. fr.) *E. Cosson*, 14 April 1858 (BM, GH, W); Sitione Souf, Ogl el Souf (fl. fr.) *L. Kralik*, 14 April 1858 (G, GH, P, UPS, US, W). 36N06E - Constantine Prov., Sabler a Yumar (fl. fr.) *E. Cosson*, 17 April 1858 (BR, G, P).
- Egypt: 29N31E - Gebel Khashab (fl. Mar.) *C. Davies* 8492 (E, K); Gebel Khashab (fl. fr. Apr.) *N. Simpson* 1185 (K). 30N30E - Wadi Natrun (fl. fr. Mar.) *C. Davies* 8461 (K); Wadi Natrun (fl. fr. Jan.) *R. Meinertzhagen*, Jan. 1928 (BM). 30N31E - Cairo (fl. fr. Feb.) *E. Drabble*, 9 Feb. 1900 (BM); Cairo, Montagne Rouge (fl. Apr.) *F. Cramer*, 9 Apr. 1880 (Z); Cairo, Giza-Faiyum Road (fl. fr. Oct.) *Ibrahim, Madhi & Sisi*, 1 Oct. 1971 (M); Cairo, Aratarich (fl. fr. Apr.) *J. L.*, 9 Apr. 1900 (L); Wadi at Cairo (fl. fr. Apr.) *A. Keller* 86 (BM, K, P, Z); Abu Za'bal (fl. fr. Mar.) *N. Simpson* 884 (K); Heliopolis (fl. fr. May) *E. Burdet* 145 (G, Z). 30N32E - Desert of Tor (fl. fr. June) *N. Bové* 154 (P); holotype of *M. nivea*; isotypes: A, BR, G, K, L; desert of Cairo, Suez and Tor (fr.) *N. Bové* 155 (P); Ismaïlia (fl. fr. Apr.) *J. Ball* 422 (G, K); between Ismaïlia and Suez (fl. fr. May) *J. Bornmüller* 10479 (E, P); Ismaïlia, west bank of Suez Canal (fr. Apr.) *F. Lupton*, 13 April 1946 (BM); Nefich (fl. fr.) *C. Marchesetti*, Apr. 1880 (FI); Wadi Ansuri (fr. Apr.) *P. Ascherson* 318 (Z); Suez Road and Wadi Angabya, *C. Davies* 8198 (K); Wadi el Eschra (fl. fr. Apr.) *G. Schweinfurth*, 29 Apr. 1879 (US, Z). 30N33E - Wadi el Hammam, *E. Fielding*, anno 1869 (BM); Gebel Yammum el Abraquein, *C. Davies* 8306 (E, K). Egypt (fl.) *E. Boissier*, anno 1846 (P). Egypt, *Gavron* UPS-3201:7 (UPS). Egypt interior (fl. fr. Apr.) *Hochstetter* 646 (K). Egypt (fl. fr.) *R. Muschler*, 11 Apr. 1903 (WAG). Chibaida (fl.) *L. Kralik*, anno 1847 (P). Habuah at Orugah (fl. fr. May) *P. Ascherson* 1549 (P). Great Perrazies Forest (fl. Feb.) *C. Davies* 8239 (K). Gebel Assar (fl. Apr.) *C. Davies* 10320 (K). Central Egypt, Wadi Mor (fl. fr. Apr.) *G. Schweinfurth* 238 (K, P). Wadi Ibib (fl. Jan.) *M. Drar* 107a (S). Wadi el Humur (fl. fr. Apr.) *J. Shabetai* 309.797 (K). Wadi Asabah (fl. fr. Mar.) *N. Simpson* 5817 (K).
- Libya: 22N25E - Gilt Kebir (fl. fr. Jan.) *W. Shaw* 13 (K). 25N13E - Tirrhe, Edeyen Mourzbuk (fl. fr. Apr.) *K. Guichard KG/Lib/352* (BM). 25N17E - Fessan, west margin of Sirrer Tibesti, south of Wau el Kebir (fl. fr. Apr.) *H. Scholz* 70077 (M). 26N18E - Cyrenaika, southeast of Thamad Bu Hashishah (fl. fr. Apr.) *H. Scholz* 70115 (M). 30N09E - Hamada, Ghadames (fl. Feb.) *Sargean* 32a (P). 40 km S. of Ben Ngem (fl. fr. Mar.) *K. Guichard KG/Lib/195* (BM). Chargeh to Esneh (fl. fr. Mar.) *P. Asherson* 306 (FI, G, K, M, P, Z). Wadi Gmogmo (fl. Oct.) *W. Shaw* 41 (K).

Mauritania: 16N07W – Ragem (fl. fr. Feb.) *M. Charles* 25536, 28875 (P). 20N13W – Bateau de Tonyerma, Adrar (fl. fr. May) *T. Monod* 415 (P). Mauritania (fl. fr. May) *M. Chudeau*, 10 May 1911 (P).

Morocco: 29N06W – Hamada du Dra, 30 km NE. of Tinfouchy (fl. Feb.) *Guinet & Sauvage* 311 (P). Basse Daoura, Hassi Chaamba (fl. fr. Feb.) *Guinet & Sauvage* 252 (P).

Niger: 18N12E – Oasis of Bilma (fl. Feb.) *Ducellier* 28642 (P). 18N08E – Tchsiderak, Air (fl. Jan.) *A. Buchanan*, 6 Jan. 1923 (BM). Air Mountains, Wadi under Issiguiddi (fl. Mar.) *P. Bradley* 36 (K). Bermit Sud (fl. fr. Sep.) *B. Peyre de Fabrègues* 2428 (P).

Sudan: 20N36E – Red Sea Prov. (fl. fr.) *P. Newbury* 364 (BM); Sea Coast (fl. fr.) *J. Bent* (K).

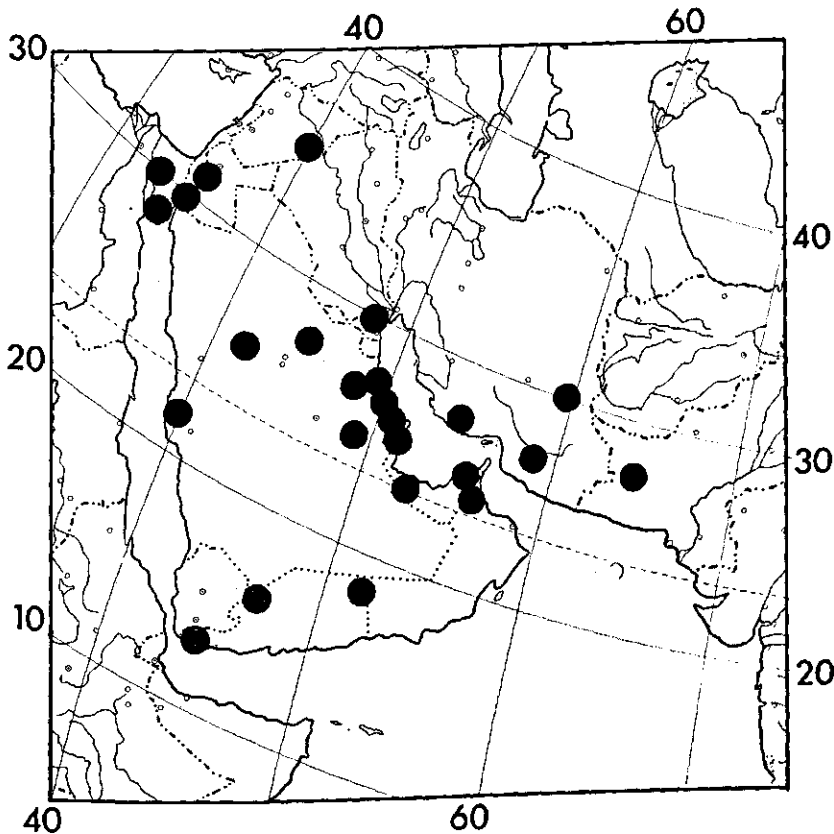
Tschad: 17N22E – Mourdi, *M. Monod* 13837 (P). 21N16E – Tibesti, Tarso Tousside (fl. Aug.) *Grove & Johnson* 33b (K).

South West Asia:

Bahrain Islands: 26N50E – Jebel Duhkan (fl. fr. Mar.) *R. Good* 54 (BM, K); Jebel Duhkan (fr. Feb.) *J. Fernandez* 495 (K); SE. of Jebel Duhkan (fl. fr. Mar.) *R. Good* 53 (BM, K).

Egypt: 28N33E – Sinai, Wady Feiran (fl. fr. Jan.) *R. Muschler*, Jan. 1903 (G). 30N32E – Sinai, Ouadi Wardar and Ouadi Gazundel (fl.) *C. Petit*, 26 Feb. 1873 (P). Sinai, Wadi Lurwik (fl. fr.) *Colleg. Syriens Protest*, 15 Mar. 1882 (BM). Sinai, Duedar (fl. fr. Mar.) *P. Stammwitz*, 27 Mar. 1917 (BM). Sinai peninsula (fl. fr.) *Botta* 102 (P). Desert of Sinai (fl. fr.) *Aucher-Eloy* 2087 (G, P). Sinai (fl. fr.) *A. Kaiser* 850 (S, Z). Sinai (fr.) *Bové*, anno 1832 (P).

Iran: 27N54E – Prov. Lar, between Ginau and Sarzeh (fl. fr. Apr.) *Rechinger, Aellen & Esfandiari* 3419b (W, holotype of *M. commixta*; isotype: G). 27N58E – Jaz Murian (fl. fr. May) *G. Popov*



MAP 18b. *Monsonia nivea*.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

GP/51/197 (BM). Jaz Murian (fl. fr. Apr.) *J. Léonard* 5740 (K). 30N59E – Dasht-e-Lut (fl. fr. May) *J. Léonard* 6087 (K).

Israel: 30N35E – Arava Valley near Hatseva (fl. Mar.) *Zohary & Wendelbo* 6229 (GB).

Jordan: 29N35E – University Marine Biological Station, 6 km S. of Aqaba (fl. fr. Apr.) *J. Hemsley*, 20 Apr. 1976 (K); Wadi facing the Marine Biological Station, 8 km S. of Aqaba (fl. fr. Mar.) *Boulos & Jallad* 7436 (E); Wadi um Ishin (fr. May) *J. Gillett* 16106 (K). 30N35E – Debbet er Ramleh & Wady Huwar (fl. fr. Nov.) *H. Hart*, Nov. 1883 (K); Wadi Araba near Ghor, *H. Hart*, Nov. 1883 (BM). Jordan (Palestine) (fl. fr. Mar.) *Schubert*, 2 Mar. 1885 (M).

Kuwait: 29N47E – Kuwait (fl. fr. Jan.) *V. Dickson* 63 (K), 63a (K).

Oman: 23N53E – Ramlat al Hamra & Saruq (fl. fr.) *R. Codrai* 17, 18 (K); Liwa (fl. fr.) *F. Lee-Oldfield* 32 (BM). 24N55E – Abu Dhabi, south of Al Ain (fl. fr. May) *C. Wilcox* 233 (K). 25N51E – Qatar, Dukhan (fl. fr. Mar.) *C. Wilcox* 79 (K). 25N55E – Dubai (fl. fr. Mar.) *L. Holmes* 335 (K); Dubai, Jabal Ali (fl. fr. July) *E. Guest*, 19 July 1952. Qarn Sahmah (fl. fr. Mar.) *J. Parker* 19 (BM).

Saudi Arabia: 21N39E – Road to Madraka, 112 km NE. of Jedda (fl. fr. Mar.) *A. Trott* 190 (K). 24N48E – As Summan (fr. Feb.) *J. Mandaville* 2163 (BM); Dahana (fl.) *S. Pelly*, 27 Feb. 1865 (K). 25N41E – Between Hanakiyah & Nugra, on Medina/Burayah Road (fl. fr. Mar.) *S. Collenette* 28 (K). 26N47E – Eastern province (fl. fr. Mar.) *J. Mandaville* 2848 (BM). 26N50E – Eastern Province, Dhahran (fl. fr. Mar.) *J. Mandaville* 102 (US); between Audhur & Wadi Afur, SE. of Rub-el-Khali, *W. Thesiger*, 2 Jan. 1946 (BM); Wadi Bershit, SW. of Rub-el-Khali (fl. fr.) *W. Thesiger*, 4 Feb. 1946 (BM). 27N44E – Arq el Madhua (fl. fr. Mar.) *D. Vesey-Fitzgerald* 15620/1 (BM). 27N49E – W. of Jubayl (fl. fr. Mar.) *Huhson* 572 (K). Central Arabia, near Windigat at Tirvah (fl. fr.) *W. Shakespear*, anno 1914 (BM).

South Yemen: Shabwa area, Ramlet Sabatein (fl. fr. Feb.) *Popa, Tillin & Gilliland* 4165 (K). 15N46E – Arain (fl. fr. Sep.) *H. Philby* 19 (BM). 18N52E – West of Wadi Mitán (fl. fr. May) *D. Stewart* 685 (BM, K).

Syria: 32N40E – Syrian desert (fl. fr.) *T. Kotschy* 886 (P). El Aryseh at Oasis Nache (fl. fr. Mar.) *T. Kotschy* 688 (W).

West Pakistan: 27N64E – Baluchistan, near Panjgur (fl. fr. May) *G. Popov* 138, 138a (BM).

Yemen: Sinai of Yemen? (fl.) *Wetsted*, anno 1908 (G).

19. *Monsonia parvifolia* SCHINZ

Fig. 19, Map 19.

Verh. bot. Ver. Prov. Brandenb. 29: 61 (1888); Knuth in Engler, Pflanzenr. 4.129: 307, 308, fig. 38C (errore) (1912); Range in Fedde, Reprim nov. Spec. Regni veg. 36: 244 (1934); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 5 (1966); Kers, Bot. Notiser 124: 208 (1971); Schreiber, Mitt. bot. StSamml., Münch. 12: 382 (1976).

Type: South West Africa: Orange River: south border of Lüderitz, STEINGRÖVER 106 (Z, holotype).

Heterotypic synonym: *M. senegalensis* var. *hirsutissima* Harv. in Harvey & Sonder, Fl. Cap. 2: 591 (1862). Types: South Africa: Namaqualand: sandy flats near AuAags River, ATHERSTONE 12 (K, holotype) Namaqualand: sandy flats near Orange River, *A. Wiley SAM-14521* (SAM, paratype).

Aromatic, decumbent or prostrate, many-stemmed, suffrutescent, 2–20 cm high and up to 1 m in diam.

Stems herbaceous to woody, the primary stem stunted and the lateral branches up to about 40 cm long, 1–6 mm in diam., pilose or rarely pubescent with curved hairs, with numerous stalked glands, which are rarely also sessile, often reddish-tinged.

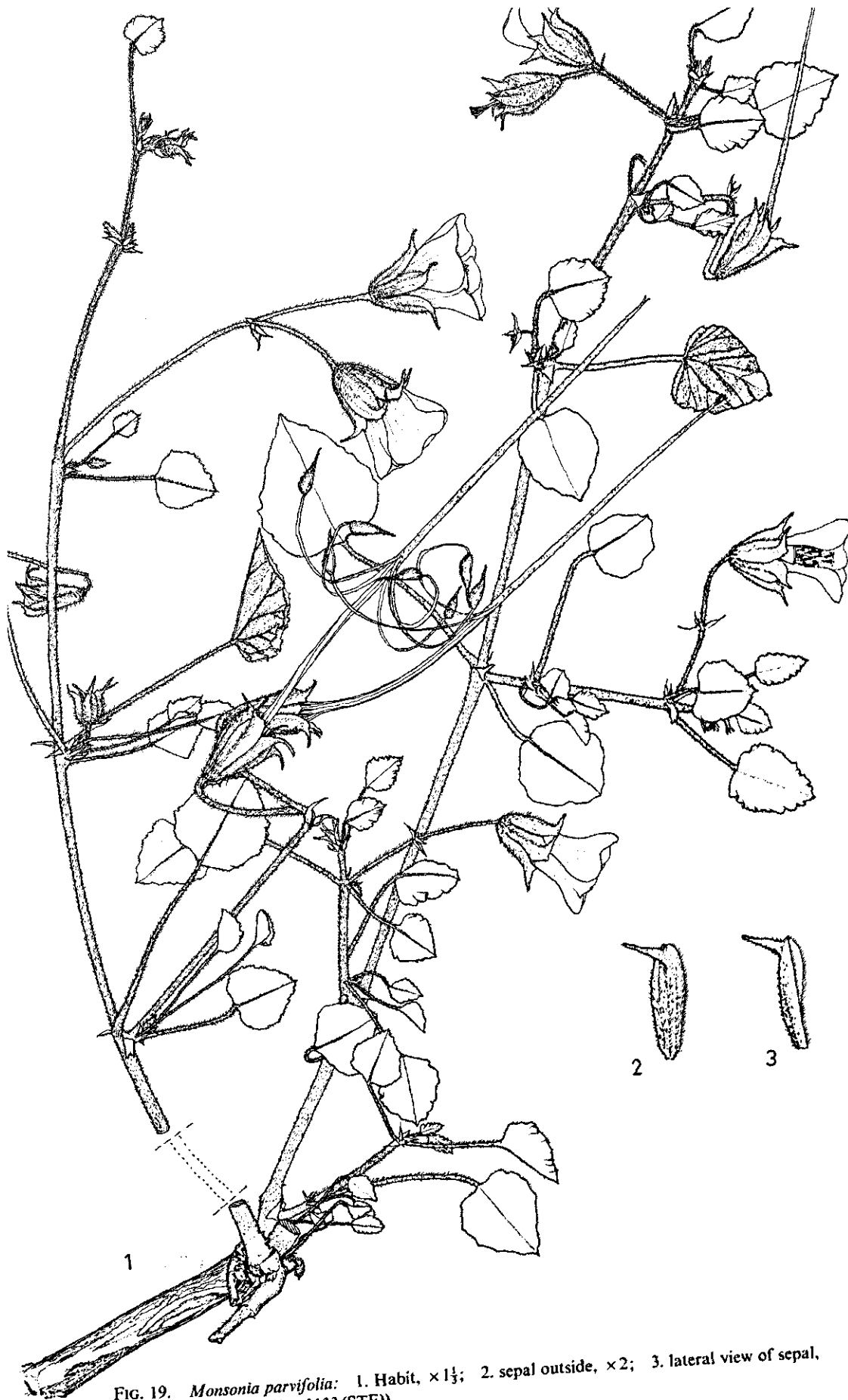


FIG. 19. *Monsonia parvifolia*: 1. Habit, $\times 1\frac{1}{3}$; 2. sepal outside, $\times 2$; 3. lateral view of sepal, $\times 2$. (1, 2, 3: R. Moffett 1133 (STE)).

Leaves on the primary stem alternate and crowded and on the lateral branches opposite, when opposite those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 1–4.5 × as long as the blade, 5–40 mm long, sometimes flattened or thickened at the base, often geniculate at the apex; stipules triangular to subulate, obscurely hairy, ciliate, pinkish or brown, papery; blade broadly ovate or broadly angular-ovate, 1–1.5 × as long as wide, 5–25 × 5–20 mm, sometimes folded upwards along the midrib, acute and mucronate at the apex, cordate or truncate at the base, the margin serrate to subentire, sometimes pleated and also pinkish-red, above pubescent with appressed hairs, obscurely pubescent, obscurely puberulent, or lanuginose, with stalked glands which are rarely also sessile, beneath pubescent with curved hairs or obscurely hairy in-between the veins, with the veins pilose or lanuginose, glandular-punctate and also with stalked glands which are rarely also sessile; main veins palmate or sub-palmate, 5 or 7 branching from the base, impressed above, prominent and pinkish-red beneath.

Inflorescences axillary, 1–3-flowered, rarely up to 5-flowered, (27)50–80 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem, but the pedicels less hairy, sometimes with gland-based hairs as well; peduncle 1–3 × as long as the pedicel, 10–45 mm long; pedicel 5–20 mm long, geniculate under the fruit; involucre bracts 2–4 per flower, stipule-like.

Sepals green to pinkish-red, connate at the base for 1 mm, obovate, with limb 1.5–2 × as long as wide, 6–8 × 3–4 mm, outside pubescent or pilose, mostly with stalked glands, with 3 parallel, prominent main veins, inside glabrous except at the pubescent base; mucro almost apical, triangular and laterally compressed, recurved, pinkish-red, 2–4 mm long, pubescent or with a few scattered long hairs at its apex, with stalked glands; each sepal spurred at the connate base; the spur 1 mm deep and 0.5 mm in diam., adnate to the pedicel-apex and to the base of the staminal groups, inside puberulent and glanduliferous, aperture rimmed.

Petals obtriangular, tapering into a long claw at the base, emarginate at the apex, white to bright yellow or pink, when pink the veins on the limbs reddish, 1.5–2.5 × as long as wide, 12–20 × 7–11 mm, 2–3 × as long as the sepals, 1.5–2.5 × as long as the stamens, with 5 main veins; the limb puberulent outside and glabrous inside, recurved; the claw pubescent on both sides with the hairs on the inner side directed towards the apex, channelled on the outer side.

Stamens monadelphous, arranged in a cylindrical column around the pistil; the groups basally connate for 0.2–0.3 mm; the filaments of each group basally connate for 2–5 mm; filaments in the central stamens 7–11 mm long and in the lateral 6–10 mm, sometimes terete at the apex, inside glabrous, outside puberulent and channelled; the channel-base with 2 parallel vertical ciliated rims which grade into the rim of the spur-opening; anthers all equal, elliptic to oblong, 1.8–2.5 × 0.8–1 mm, subintorse.

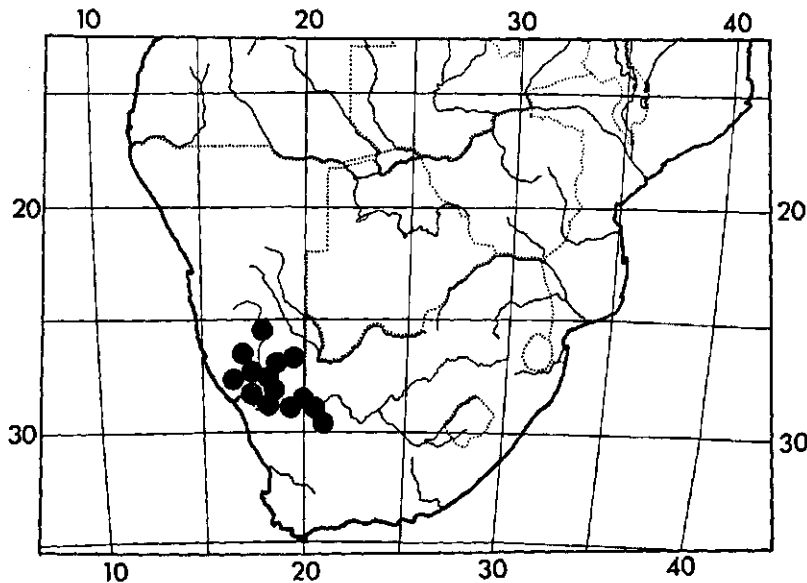
Pistil 5–12 mm long; ovary broadly obovoid, 1.5–2 × 1.5–2 mm, pubescent; beak longitudinally grooved, 3–7 mm long, lanulose and glandular to obscurely pubescent and very glandular; the glands shortly stalked; stigmas linear to

clavate, yellow, 1.5–3.5 × 0.4–0.5 mm, acute to obtuse at the apex, outside glabrous, entire to verrucose at the margin.

Fruit 55–80 mm long; mericarps 4–7 mm and beak 45–75 mm long; mericarps narrowly obconical, brown or pale brown, often dark brown-dotted around the hair bases, shortly hirsute with white or copper-coloured hairs, ridged and rimmed at the apex, with the rim prominent and perpendicular to the tail, shortly hirsute outside, crested at the base and plumose towards the apex on the inner side where the tail detaches from the beak-axis.

Seed obovoid, 3–3.5 × 2 mm, glabrous.

Distribution: Southern South West Africa and the northwestern Cape Province in South Africa.



MAP 19. *Monsonia parvifolia*.

Ecology: Various habitats that range from vlei-margins, sandy soils of riverbeds, roadside banks and flats to stony mountain sides. Alt. 0–1000 m. Locally abundant and very showy when flowering.

The main reproductive period extends from autumn to spring, May to October.

Notes: MERXMÜLLER & GIESS (3681) and collectors of various other specimens state that the plants of this species have the unpleasant goats' odour.

KNUTH (1912) named his fig. 38C *M. parvifolia*. The latter is, however, an error since the drawing undoubtedly depicts a specimen of *M. luederitziana*.

Representative specimens:

South Africa: Cape Province: 28S17E–Vioolsdrif (fl. Aug.) H. van der Schijff 8200 (PRE);

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

Vioolsdrif (fl. fr. Oct.) *L. Taylor 1187* (BOL); 5 km S. of Vioolsdrif (fl. Sep.) *Merxmüller & Giess 3681* (M, WIND); Richtersveld, Tatas Mountains (fl. Oct.) *H. Herre STE12062* (STE). 28S19E – Schmidtdrif, 70 km W. of Augrabies (fl. Feb.) *M. Werger 162a* (K, PRE, WIND). 28S20E – Kakamas, Augrabies Falls Nat. Park (fl. May) *O. Leistner 3341* (K, WIND); Kakamas-Pofadder Road (fl. Aug.) *H. van der Schijff 8073* (A). 29S19E – Kenhardt Distr., 21 km N. of Pofadder (fl. fr. Feb.) *D. Comins 659* (K, PRE). 29S21E – Kenhardt Distr., *J. Nieuwoudt STE-11261* (STE). Namaqualand, sandy flats near Orange River (fl.) *A. Wyley SAM-14521* (SAM, paratype of *M. senegalensis* var. *hirsutissima*). Near Au Aags River which runs into the Orange River (fl.) *Atherstone 12* (K, holotype of *M. senegalensis* var. *hirsutissima*).

South West Africa: 25S17E – Gibeon (fl. fr. Sep.) *Leach & Cannell 14048* (BR, PRE, WIND). 26S17E – Konkiep, (fl. July) *J. Boss TM-35895* (PRE); Bethanië, Buchholzbrunn (fl. fr. Dec.) *Dinter 8269* (B, BM, BOL, G, K, M, S, WIND, Z); Farm Umub 13 km N. of Bethanië (fl.) *W. Giess 10312* (S, WIND); Bethanië, Farm Schwarzkuppe (fl. fr. Feb.) *Giess, Volk & Bleissner 5490* (M, PRE, S, WIND); Bethanië, Sorosmas Reserve (fl. fr. June) *W. Giess 13388* (M, S, WIND); at turn off to Sandverhaar between Goageb and Aus (fl. June) *R. Moffett 1138* (STE-U); 15 km W. of Konkiep on Lüderitz Road (fl. fr. Apr.) *B. Nordenstam 2193* (M, S). 26S18E – 24 km SW. of Keetmanshoop (fl. fr. Aug.) *Leach & Cannell 13812* (PRE); between Keetmanshoop & Seeheim (fl. Feb.) *H. Pearson 4345* (K). 26S19E – 48 km WNW. of Aroab (fl. fr. Oct.) *J. Acocks 15579* (PRE). 27S17E – Chamaites, Farm Nuichas (fl. Aug.) *W. Giess 14593* (M); Bethanië, Inachab near entrance of Farm Feldschuhhorn (fl. Sep.) *Merxmüller & Giess 28886* (K, M); Nuichas (fl. Aug.) *P. Range 710* (BOL). 27S18E – Garies (fl. Nov.) *Dinter 4231* (B); Garies (fl. fr. Oct.) *Dinter 5015* (B, BOL, G, K, KMG, PRE, STE, Z); Klein Karas (fl. fr.) *A. Örtendahl UPS-3201:5* (UPS). 27S19E – Naroep (fl. fr. Dec.) *M. Schlechter 51* (BM, BOL, BR, E, G, GRA, K, L, P, S, W, Z). 28S17E – Slopes between Modder Drift and Sjambok River (fl. Sep.) *N. Pillans 6452* (BOL), 6437 (BOL, K); 5 km E. of Ai-Ais (fl. fr. Aug.) *W. Giess 14565* (K, M); 12 km SW. of Nabus on Ganna Gouriep Road (fl. Sep.) *D. Hardy 2599* (PRE); Vioolsdrif, between Noordoewer and Aussenkjer (fl. fr. Jun.) *R. Moffett 1133* (STE-U); Warmbad, 21 km SW. of Farmhouse Witpütz where the Haib River mouths into the Orange River (fl. Sep.) *Merxmüller & Giess 3631* (M); 62 km on Ai-Ais Road from road junction 41 km N. of Vioolsdrif (fl. June) *Nordenstam & Lundgren 121* (S). 28S18E – 20–30 km N. of Ramani's Drift (fl. fr. Jan.) *H. Pearson 4018* (K); 5 km on road from Ai-Ais (fl. fr. June) *Nordenstam & Lundgren 141* (S); 42 km E. of Karasburg (fl. fr. July) *Leach & Baylis 13084* (K, PRE, WIND); S. of Warmbad (fl. Jan.) *H. Pearson 4373* (K); Warmbad, Farm Graywater (fl. fr. May) *Giess, Volk & Bleissner 7046* (M, WIND); Warmbad, Farm Udabis (fl. fr. May) *Giess, Volk & Bleissner 7101* (M, WIND). 28S19E – Ariamsvlei, Farm Vellor (fl. fr. May) *Giess & Müller 12097* (K, M, WIND); Ariamsvlei, Farm Kaimas (fl. fr. May) *Giess & Müller 12163* (M); Keimasmund (fl. May) *W. Jankowitz 230* (PRE). Great Namaland, Orange River, south border of Lüderitz South (fl.) *Steingröver 106* (Z, holotype of *M. parvifolia*).

20. *Monsonia praemorsa* E. MEYER ex KNUTH

Fig. 20, Map 20.

In Engler, *Pflanzenr.* 4.129: 298 (1912); E. Meyer in Drège, *Zwei Pfl. Geogr. Docum.* 159 (1843) nomen; Harvey in Harvey & Sonder, *Fl. Cap.* 1: 255 (1860); Szyszyłowicz, *Pol. Disc.* 6 (1888).

Type: South Africa: Natal: Durban: near the Bay at a small stream, DRÈGE 5241 (holotype not seen, destroyed in B; lectotype: P; isotypes: G, S, W).

Heterotypic synonym: *M. senecioides* Knuth in Engler, *Pflanzenr.* 4.129: 301 (1912). Types: South Africa: Natal: Durban, SZYSZYŁOWICZ in REHMANN 8871 (holotype not seen, destroyed in B; lectotype: Z); Transkei: Pondoland, BACHMANN no. 214, sheet 207 (paratype not seen, destroyed in B); South Africa: Transvaal: Sand River, JUNOD 1590 (paratype not seen, destroyed in B).

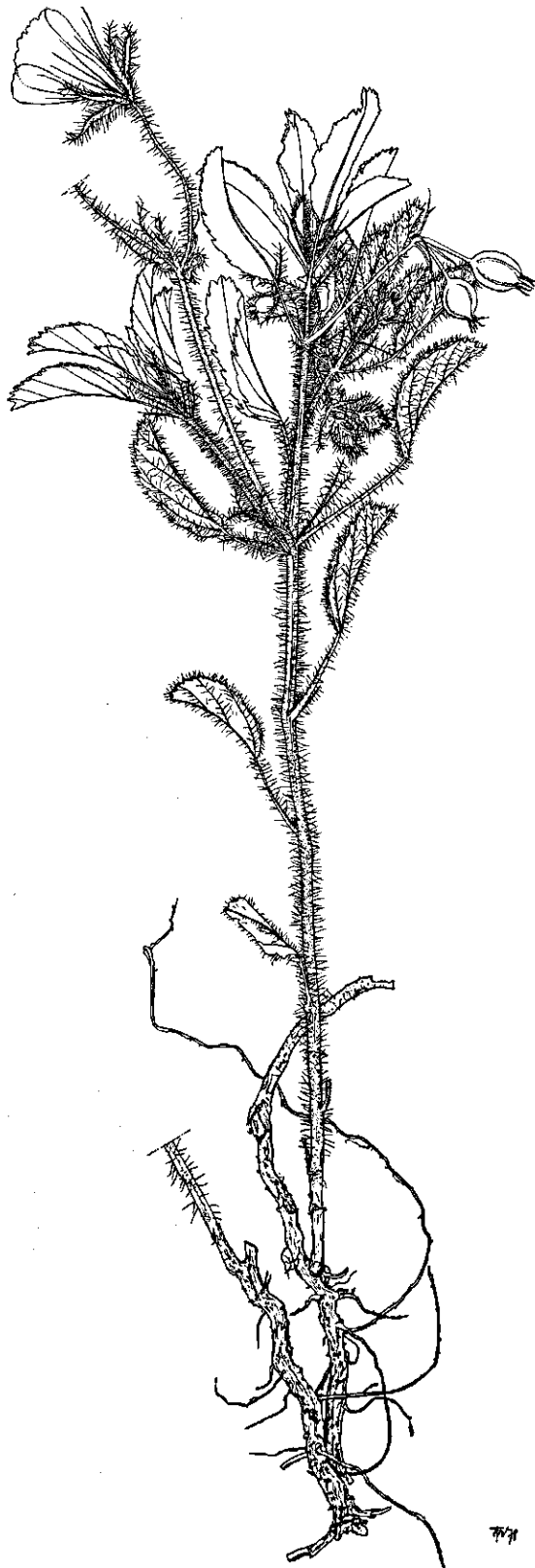


FIG. 20. *Monsonia praemorsa*: Habit, $\times \frac{2}{3}$. (Venter 2466 (ZULU)).

Erect, rarely decumbent, suffrutescent, few- to several-stemmed, 10–30 cm high.

Roots up to 7 mm in diam., sometimes tuberous and then thicker.

Stems herbaceous to woody, up to approximately 25 cm long, 1–3 mm in diam., with a double indumentum the first of which is puberulent with curved hairs, and the second hispid or rarely velutinous with gland-based hyaline or copper-coloured hairs, with numerous sessile glands.

Leaves alternate at the base of the main stems, but subopposite to opposite towards their apices and on the lateral branches, those of a pair often unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.2–0.7 × as long as the blade, 7–20 mm long, often flattened at the base, mostly geniculate at the apex; stipules subulate, with the same indumentum and glands as the stem, 4–16 mm long, mostly reddish; blade very narrowly elliptic, narrowly elliptic, or elliptic (exceptionally narrowly obovate or narrowly ovate), 1.5–4.5(6.3) × as long as wide, mostly folded upwards along the midrib, 20–45 × 5–20 mm; obtuse or emarginate, mucronate or 3-toothed at the apex; truncate or rarely cuneate at the base; serrate and mostly with short stiff hairs at the margin; globular pockets with resinous granules sometimes present on the teeth; above glabrous to granulose and with scattered stiff hairs; beneath with the double indumentum of the stem or with only one of both indumenta on the main veins, granulose with scattered long and/or short hairs between the veins, with sessile glands; main veins pinnate, impressed above, prominent beneath.

Inflorescences lateral, leaf-opposed or axillary, 1–2-flowered, (34)50–110 mm long. Peduncles and pedicels slender, with the double indumentum of the stem and, furthermore, sometimes also with obscure to conspicuous stalked glands; peduncles (0.6)1–2.5 × as long as the pedicels, 15–60 mm long; pedicels (10)20–35 mm long, geniculate under the fruit; involucre bracts 2–3 per flower, subulate, with long and short stiff erect hairs.

Sepals green, free, ovate, narrowly ovate, narrowly obovate, or narrowly elliptic, 2.5–3 × as long as wide, 10–12 × 3–5 mm, outside velutinous or with a double indumentum the first of which is as above and the second is composed of short curved hairs, with numerous stalked and/or sessile glands, inside glabrous, or with stalked and/or sessile glands, with 3 parallel main veins, with ciliate margin, with mucro terete, 1–4 mm long, sometimes curved, greenish to reddish, with scattered long and short hairs, with a globular pocket of white, resinous granules at the base.

Petals obtriangular, 1–1.5 × as long as wide, 20–25 × 15–20 mm, 1.8–2.2 × as long as the sepals, 1.5–3 × as long as the stamens, white or creamy, venation bluish-grey to purplish, with 5 main veins, outside glabrous or rarely with stalked glands, inside obscurely villose, winged, mostly obscurely ciliate and often also hairy at the base, obscurely lobed or crenate at the apex.

Stamens monadelphous; groups basally connate for 1–2 mm; filaments of each group basally connate for 1–2.5 mm; filaments in the central stamens 8–11 mm and in the lateral 6–8 mm long, mostly terete and reflexed at the apex,

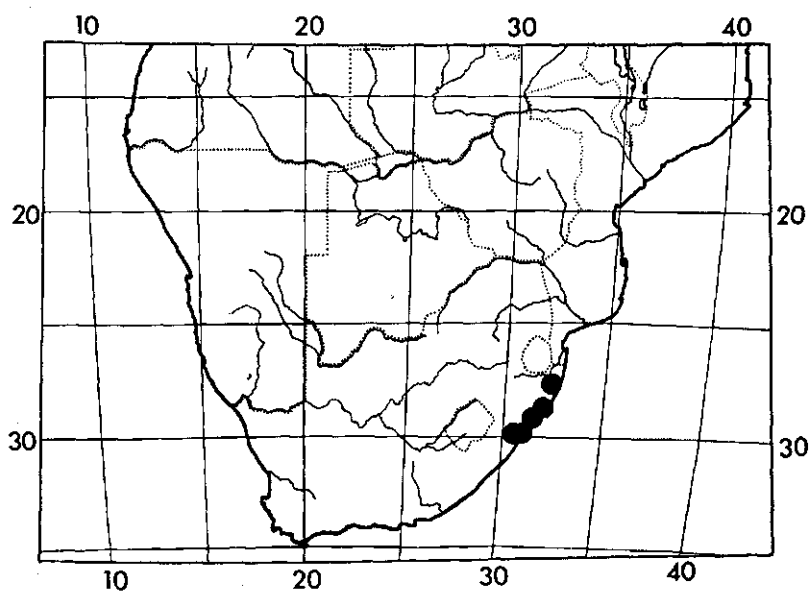
glabrous inside, glabrous or hairy outside; a rimmed, mostly obscure gland-cavity is situated on the outer side of the base of each group; anthers oblong, those of the long filaments slightly larger, $2.5-4 \times 1-2$ mm, subintrorse.

Pistil 9–12 mm long; ovary obovoid to broadly obovoid, $2-3 \times 2$ mm, hyalino-hirto-pubescent; beak longitudinally 5-lobed, 5–6 mm long, pubescent or sometimes lanulose at the base, with stalked glands; stigmas linear or clavate, $2-4 \times 0.4-0.6$ mm, outside hairy and greenish to maroon, entire or obscurely crenate at the margin, obtuse or acute at the apex.

Fruit 60–75 mm long; mericarps $13-15 \times 1.7-1.8$ mm and beak 50–60 mm long; mericarps hirsute, narrowly and obliquely obovoid, rimmed and obliquely domed or ridged at the apex, with the dome or ridge hirsute, hirsute outside, hispid inside where the tail detaches from the beak-axis; these stiff hairs copper-coloured, and long at the tail's base, forming a crest.

Seed narrowly obovoid, $3-5 \times 1-2$ mm, glabrous.

Distribution: South Africa in the coastal region of Natal.



MAP 20. *Monsonia praemorsa*.

Ecology: *M. praemorsa* is restricted to the grasslands of the humid subtropical coastbelt of Natal and Zululand where it grows on sandy or granitic soils. Alt. 0–300 m.

Flowering and fruiting occur the year round with a peak period from late winter to summer, July to November.

Note: KNUTH mentioned three type specimens with his diagnosis of *M. senecioides*. Only one of these specimens was seen by the present author. This

specimen belongs to *M. praemorsa*, but it is very doubtful whether the other two specimens JUNOD 1590 and BACHMANN 214 belong to *M. praemorsa*, especially JUNOD's specimen from the Transvaal. These specimens were from localities outside the normal geographical and ecological range of *M. praemorsa*.

Representative specimens:

South Africa: Natal: 27S32E - Mkuze Game Reserve (fl. fr. Nov.) *Wilcox 14* (PRE). 28S32E - Umhlatuzi Swamp (fl. July) *P. Kotze 59* (PRE); Mtunzini, Umlalazi Nat. Res., C. Ward 4333 (PRE); Mtunzini, entrance to University of Zululand (fl. Aug.) *H. Venter 2466* (ZULU); Mtunzini (fl. fr. Aug.) *J. Wood 11372* (NU); Mtunzini (fl. Sep.) *J. Lawn 2128* (NH); Hluhluwe Game Reserve (fl. Sep.) *C. Ward 2691* (NU, PRE); Hluhluwe Game Reserve (fl. Nov.) *P. Hitchins* (NH); Hluhluwe area (fl. Sep.) *E. Thorp NH30869* (NH). 29S30E - Ndedwe (fl. Oct.) *White 948* (K); Ndedwe (fl. Oct.) *J. Wood 948* (NH); Pinetown, Cowies Hill (fl. fr. Sep.) *W. Lawson 1233* (NH); Umzinyati Falls (fl. fr.) *J. Wood 896* (BM, BOL, GRA, K, NH); Umzinyati (fl. fr. Nov.) *J. Wood 11581* (PRE). 29S31E - Durban (fl. Apr.) *Drège 5241* (P, lectotype of *M. praemorsa*; isotypes: G, S, W); Inanda (fl. June) *J. Wood 310* (K); Durban (fl. Sep.) *J. Thode 6503* (STE); Durban (fl.) *Gueinzus 313* (W), 453 (G, W, S); Durban (fl. Mar.) *J. Wood 6316* (BM, E, PRE, US), 7503 (BM), 10567 (NH), 10568 (NH); Clairmont (fl. Mar.) *J. Wood, 12 Mar. 1904* (G); Westville, Athal Heights, *A. Feldman NU-57966* (NU); Sheffield Beach near Umhlali (fl. fr. Sep.) *C. Ward 1190* (NU); Chakaskraal (fl. fr. Nov.) *J. Thode 4350* (STE); Groutville, Lower Tugela (fl. Oct.) *E. Moll 2552* (K, NH, NU); near Tugela River (fl. Nov.) *J. Wood 10090* (PRE, NH); Zululand, Emoyeni (fl. Mar.) *J. Wood 9339* (L, US); Zululand, Amatikulu (fl. Nov.) *A. Mogg 5756* (PRE); Durban (fl.) *Rehmann 8871* (Z, lectotype of *M. senecioides*). Pietermaritzburg Road, Mawby's Hill (fl. fr.) *J. Sanderson 912* (K). Natal (fl.) *H. Gerrard 388* (W). Natal (fl.) *W. Gerrard 398* (BM, K). Merebank in Natal (fl. fr. July) *J. Wood 12710* (PRE, NH). Natal, Victoria County (fl. fr. May) *J. Wood 11196* (E, PRE). Natal, Mt Moreland (fl. Nov.) *J. Wood 8419* (E, NH).

21. *Monsonia senegalensis* GUILLEMIN & PERROTTET Fig. 21, Maps 21a, b.

Fl. Seneg. 4: 131 (1831); Richard, Tent. Fl. Abyss. 1: 115 (1847); Boissier, Fl. Orient. 1: 898 (1867); Oliver, Fl. Trop. Afr. 1: 290 (1868); Edgeworth & Hooker in Hooker, Fl. Brit. India 1 (2): 427 (1874); Knuth in Engler, Pflanzenr. 4.129: 301 (1912); Engler, Pflanzenr. Afr. 3 (1): 705 (1915); Burt Davy, Fl. pl. & ferns 1: 193 (1926); Range in Fedde, Reprum nov. Spec. Regni veg. 36: 244 (1934); Andrews, Fl. Pl. Sud. 1: 131 (1950); Exell & Mendonça, Consp. Fl. Ang. 1: 258 (1951); Keay, Fl. W. Trop. Afr. ed. 2, 1(1): 157 (1954); Bowden & Müller, Fl. Zamb. 2: 139 (1963); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 5 (1966); Kokwaro, Webbia 25: 651 (1971) and Fl. Trop. E. Afr. Geraniaceae: 10 (1971); Faria & Macedo, Agron. Mozamb. 8: 95 (1974).

Types: Senegal: Lampsar: near Saint Louis, PERROTTET 195, 10 Dec. 1824 (P, holotype; isotype: G). Saint-Louis, PERROTTET 148, Sep. 1824 (G, W, paratypes). Lampsar, PERROTTET 7 & 8 Dec. 1824 (P, paratype). Lampsar: Saint Louis, LEPRIEUR May 1829 (G, paratype). Lampsar, LEPRIEUR Dec. 1824 (BR, paratype).

Heterotypic synonyms: *M. chumbalensis* (Munro) Wight in Wight & Walker-Arnott, Ic. pl. Ind. or. 3(4): 5, Tab. 1074 (1846). Basionym: *Erodium chumbalense* Munro in Wight l.c. Type: West Pakistan: Chumbal: near Agra in ravines, MUNRO 435 (K, holotype).



FIG. 21. *Monsonia senegalensis*: 1. Habit, $\times \frac{1}{4}$; 2. mericarp, $\times 1\frac{1}{2}$. (1: De Aguiar Macêdo 5002 (SRGH), Barnard 88 (WIND) and Lynes 518 (US); 2: Seydel 3285 (B)).

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

JW

99

M. lawiana Stocks in Wight, Calc. Journ. Nat. Hist. 7: 19 (1846). Type: India: Baikur District: northwest of Deesa on hilly grounds, STOCKS (K, holotype).

Prostrate or decumbent, multi-stemmed, sometimes aromatic, annual, 5–30 cm high.

Stems herbaceous to semi-woody or rarely semi-succulent, up to approximately 50 cm long, 1–4 mm in diam., pubescent to pilose with straight erect hairs or rarely with curved hairs, with few to many stalked and sessile glands.

Leaves alternate on the short primary stem, but subopposite to opposite on the lateral branches, those of a pair unequal, the smaller leaves with lateral, often stunted branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 1–2 × as long as the blade, 10–70 mm long, mostly flattened or thickened at the base; stipules with the same indumentum and glands as the stem, 2–10 mm long, mostly straw-coloured, deciduous; blade ovate, 1–2 × as long as wide, mostly folded upwards along the midrib, 10–40 × 5–35 mm, acute and mostly shortly mucronate at the apex, cordate at the base, ciliate, conspicuously to obscurely serrate or dentate and often pink-tinged at the margin, above granulose, glandular-punctate, with sessile glands, often obscurely pubescent, beneath obscurely pubescent or with the main veins moderately pubescent and with stalked glands; main veins subpinnate, 5 or 7 branching from the base, impressed above and prominent beneath.

Inflorescences axillary, 1-flowered, 20–45 mm long. Peduncles and pedicels slender, with the same indumentum and glands as the stem or pedicel more pilose; peduncles 8–25 mm long, 1–3 × as long as the pedicels; pedicels 4–15 mm long, geniculate under the fruit, sometimes pink-tinged; involucre bracts 2, opposite, subulate, with the indumentum and glands of the stem, 3–9 mm long.

Sepals green to pinkish, free, narrowly elliptic to elliptic or narrowly ovate to ovate or obovate, 1.5–3 × as long as wide, 5–7 × 2–4 mm, outside with a soft double indumentum the first of which is pubescent with erect hairs and the second is composed of few to many long, straight erect hairs, with sessile and stalked glands, inside glabrous, mostly with 3 parallel main veins, ciliate margin; with mucro subulate throughout or subulate at the base and terete towards the apex, 1–4 mm long, mostly curved, greenish to deep pink, with stalked glands and often also with a few scattered long hairs.

Petals narrowly obtriangular to obtriangular, 1.5–3 × as long as wide, 6–12 × 3–6 mm, 1–2 × as long as the sepals, 1–2 × as long as the stamens, pink to deep pink, rarely mauve to violet, glabrous, sometimes with sessile and subsessile glands, with dark or maroon venation, with 3, 4 or 5 main veins, winged and obscurely ciliate at the base, obscurely lobed to sinuate and rarely obtuse or emarginate at the apex.

Stamens monadelphous, arranged in a cup-shaped column around the pistil; groups basally connate for 0.5–1 mm; filaments of each group basally connate for 1–3 mm; filaments in the central stamens 5–7 mm and in the lateral 4–6 mm long, rarely terete at the apex, glabrous inside and glabrous or sparsely hairy outside; an obscure to conspicuous triangular or ovate gland-cavity with 2

parallel, vertical ribs is situated on the outer side of the base of each bundle; anthers elliptic to broadly elliptic, 0.6–1 × 0.5–0.8 mm, subintrorse.

Pistil 4–7 mm long; ovary broadly obovoid, 1–2 × 1–2 mm, hyalino-hirsute with the longer hairs gland-based, ridged and rimmed; beak longitudinally grooved, 2–3 mm long, lanulose throughout or lanulose at the base and pubescent towards the apex, with numerous stalked glands; stigmas clavate, creamy-yellow, 0.8–1.1 × 0.3–0.4 mm, outside pubescent and with stalked glands; margin entire or subentire; apex acute or obtuse.

Fruit 60–130 mm long; mericarps 9–11 × 1.8–2 mm and beak 55–120 mm long; mericarps narrowly and obliquely obovoid, brown, with a double indumentum, long-strigose with red-based hairs and shortly hirsute; ridged and rimmed at the apex, with the ridge and rim conspicuous and at an oblique angle to the tail, hirsute outside, hispid inside where the tail detaches from the beak-axis; these stiff hairs whitish, and long at the tail's base, forming a crest.

Seed narrowly obovoid, 4–5 × 1–1.5 mm, rarely obscurely hairy.

Distribution: Virtually throughout the savannah regions of Africa and also in south west Asia.

Ecology: Hot, more or less arid conditions in grasslands and savannahs such as *Acacia*-, *Combretum*- and *Mopane*-woodlands in habitats that range from sand and dunes, sandy granite flats and banks of dry water courses to lava and granite soils of hills and mountainous areas. Alt. 0–1600 m.

The main flowering and fruiting periods are from January to June in the southern and from August to October in the northern hemisphere, although nearer to the equator this is not so seasonal.

Vernacular names: *Pink flowered Cranes' bill*, *Musamu* and *Wakubi* (Rhodesia), *Golóss* (Ethiopia), *Storchnabelkraut* (South West Africa), *Gerin* or *Guernfenti* (Sudan), *Guerné* (Chad), *Murghâd* (Egypt) and *Rajputana* (India).

Note: WIGHT (1846) named the author of *M. lawiana* Stokes. This spelling, however, is incorrect. It should be STOCKS as is written on the label of the type specimen at K. In the present monograph the author's name of *M. lawiana* is therefore corrected as STOCKS.

Representative specimens:

Africa:

Angola: 12S16E – Espinheira-Iona (fl. Apr.) Bamps, Martins & Matos 4549 (BR). 15S12E – Mocâmedes, Caraculo (fl. fr. Mar.) A. Menezes 3097 (SRGH); Caraculo (fl. Apr.) Barbosa & Correia 9097 (BM); Mocâmedes, Danuba dos Guelengues (fl. fr.) Exell & Mendonça 2334 (BM, M); Mocâmedes, along road to San Nicolau (fr. Apr.) L. Kers 3612 (S); Cahinde, Gossweiler 10985 (BM, K); Tampa (fl. June) Exell & Mendonça 2441 (BM). 15S13E – Bandeira Distr., Huila, Chipia (fr. May) Teixeira 2165 (SRGH); Chipia (fr. May) Gossweiler 11008 (BM); km 107 on Mocâmedes Railway (fl. Apr.) H. Pearson 2068 & 2069 (K). 17S14E – Kunene River, Ruacana (fl. June) Exell & Mendonça (BM).

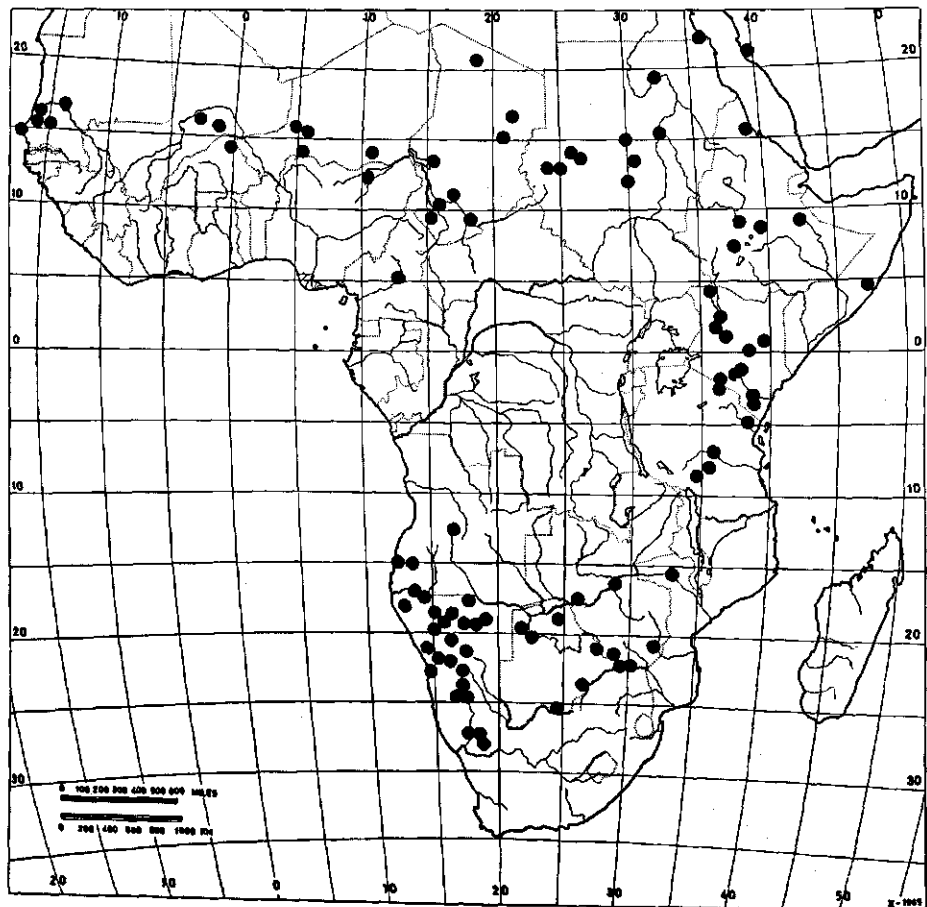
Botswana: 18S21E - Northern Distr., Tsodilo (fr. May) *Biegel, Müller & Gibbs Russell* 5074 (SRGH). 19S23E - Northern Distr., Maun (fl. fr. Apr.) *C. Lambrecht* 156 (K, PRE, SRGH). 20S22E - Ngamiland, Mawake Pan (fl. Jan.) *A. Buerger* 1046 (PRE). 21S27E - Ngamiland, Mosetse River, 110 km from Francis Town (fl. fr. Mar.) *H. Richards* 14601 (K, SRGH). 22S22E - Ghanzi, Eaton's Farm (fl. fr. Apr.) *R. Brown* 1258 (K, SRGH). 23S26E - Dekar Pan (fl. fr.) *R. Brown*, 5 May 1969 (K). 25S24E - Kwebe Hills (GRA, K) *E. Lugard* 173 (GRA, K), 110 & 153 (K).

Cameroons: 05N12E - Garua to Golombe (fl.) *P. Talbot* 549 (BM).

Tschad: 09N15E - South of Fama (fl. fr. Oct.) *Zolotarevsky, Murat & Dupont* 582 (P). 09N18E - Guerne, 3.5 km from al'Ouest, *H. Gillett* 3115 (P). 10N16E - Mailoa, Sables (fl. fr. Oct.) *Fotius* 1777 (P). 11N17E - Baguirmi-Kolkele (fl. fr. Sep.) *Chevalier* 9703 (BR, G, K, P). 13N15E - Soya (fl. fr. Sep.) *Zolotarevsky, Murat & Dupont* 539 (P). 15N20E - 8 km W. of Arada, *A. Gaston* 922 (P). 16N21E - Tuda-Archei (fr. Sep.) *Zolotarevsky, Murat & Dupont* 343 (P); Ouadi Sini (Korko-Biskeri) (fr. Sep.) *Zolotarevsky, Murat & Dupont* 471 (P); Koalga (fr. Sep.) *Zolotarevsky, Murat & Dupont* 505M (P). Ranch 6 km SSE. of D'Iffenat (fr. Aug.) *H. Gillett* 2265 (P).

Egypt: 22N36E - Wadi Heib, Gebel Elba (fl. Feb.) *J. Shabetai* F1689 (K). East of the well on the road, Gebel Elba (fr. Mar.) *Khattab* 6319 (K). Wady Agilhôq (fl.) *G. Murray* 3883 (K).

Ethiopia: 07N37E - Basse, Valley of l'Omo (fl. July) *R. Bonnefille* 37 (P). 08N39E - Shoa Prov.,



MAP 21a. *Monsonia senegalensis*.

37 km NE. of Nazareth (fl. fr. Feb.) *J. de Wilde* 6324 (WAG); between Nazareth and Awash, *Jansen* 5860 (WAG). 09N38E – Borana, Sagan-Omo (fr. July) *R. Corradi* 7253, 7254, 7255 (FI). 09N42E – Error Valley, 22 km SE. of Harrar (fr. Oct.) *W. Buerger* 1150 (K). 15N38E – Eritrea, Keren (fr. Nov.) *A. Tellini* 873 (FI). 16N40E – Harmamat (fr. Oct.) *A. Pappi* 175 & 192 (FI). Eritrea, Wadi Melekte (fl. fr. Mar.) *P. Bally* B6795 (K). Eritrea, Maragus (fr. Oct.) *A. Pappi* 968 (FI). Melata (fl. fr. Aug.) *W. Schimper* 418 (P). Dseha-Dseha (fl. fr. Feb.) *W. Schimper* 1261 (BR, G, P, W). Agow, Gageros (fl. fr. Nov.) *W. Schimper* 2271 (BM, G, K, P, S, W). Gageros (fl. fr. Sep.) *W. Schimper* 239 (FI, G, W). Togodele (fl. fr. Apr.) *C. Ehrenberg* 160 (BR, G, L, P, UPS, W). Bagos (fl. Sep.) *J. Hildebrandt* 560 (BM).

Kenya: 00N38E – Meru National Park (fr. Dec.) *J. Gillett* 20125 (K). 01N36E – Lorukon (fl. Aug.) *J. Wilson* 1270 (K). 02N36E – South Turkana (fl. June) *B. Matthew* 6680 (K). 04N35E – Jurhove Prov., Lokitaung (fl. fr. Mar.) *S. Padwa* 208 (K). 00S38E – Eyasi, Mongala, *B. Verdcourt* 4014B (K). 01S36E – Lorgasaille (fl. fr. July) *Bally* 5142 (FI, G, K); near Magadi (fr.) *P. Greenway*, anno 1958 (K); Nairobi to Magadi Road (fl. fr. June) *A. Bogdan* AB3477a (K); 40 km from Nairobi on Magadi Road (fl. fr. Apr.) *P. Greenway* 8994 (K); Masai Distr., road to Engaruka (fl. Feb.) *M. Richards* 25489 (K). 03S38E – Teita Distr., Tsavo National Park East, Lugards Falls (fl. fr. Jan.) *J. Larsson* 36 (BR, UPS); Tsavo Nat. Park, Sala, *B. Hucks* 1199 (K); Tsavo East National Park, 35 km N. of Voi Gate to Lugards Falls (fl. Mar.) *Hooper & Townsend* 1268 (K); Manyani area (fl. fr. Dec.) *S. Hall* 7 (BR, K).

Mali: 15N00E – Ansonga (fr. Sep.) *J. Hutchinson* 381 (BR, P, S). 15N01W – Gossi-Rharous (fl. fr. Oct.) *G. Boudet* 6731 (P). 16N02W – Tombouctou (fl.) *M. Chudeau*, anno 1909 (P). Famabougou, 4.9 km W. on road to Nara (fl. fr. Oct.) *H. Breman* BRE193 (WAG).

Mauritania: 17N14W – Hassei, Babouk (fr. Nov.) *D. Dupont* 103 (BR).

Mosambique: 15S33E – Tete Distr., N. of Zambesi River at Barragem (fl. Mar.) *de Aguiar Macêdo* 5002 (SRGH).

Niger: 13N10E – Gouré (fr. Aug.) *P. de Fabriques* 577 (P). 14N05E – 100 km N. of Tahaua (fl. fr. Aug.) *G. Popov* 60/22 (BM). 16N04E – Amongo (fl. fr. Sep.) *O. Hagerup* 381 (K).

Nigeria: 12N10E – Katagum Distr. (fl. fr. Sep.) *Dalziel* 60 (K, P, Z).

Rhodesia: 16S28E – Kariba, Charare Fish Camp (fl. fr. Apr.) *P. Jarman B + C* 13 (K, SRGH). 17S25E – Victoria Falls (fl. Mar.) *R. Martineau* 724 (SRGH). 20S31E – Ndanga, near entrance to Lundi Gorge (fl. fr. Mar.) *R. Goodier* 1046 (BM, K, M, SRGH). 21S28E – Gwanda, Mambali Tribal Trust Land, 8 km N. of Shashi River (fl. Feb.) *O. West* 7427 (SRGH); Gwanda, Tuli Exp. Station (fl. fr. Jan.) *A. Norris-Roger* 564 (SRGH). 21S30E – Beitbridge (fl. fr. Feb.) *Exell, Mendonça and Wild* 461 (BM, SRGH). 22S29E – Beitbridge, Shashi Drift, Tuli (fl. fr. Mar.) *R. Drummond* 5897 (BM).

Senegal: 14N17W – Cape Verdi Insula, Port Grande, St Vincente (fl. Nov.) *E. Krause* 14908 (B). 15N14W – Dodji (fr. Sep.) *A. Diallo* 988 (P). 15N15W – Bobobi-gobel-Dongil Tombabi (fl. Aug.) *M. Mosnier* 2142 (P); Linguere Kolkol (fr. Oct.) *J. Trochain* 4936 (P). 16N16W – Lampsar, near St Louis (fl. Dec.) *Perrottet* 195 (P, holotype of *M. senegalensis*; isotype: G); Saint Louis (fl. fr. Sep.) *Perrottet* 148 (G, W, paratypes of *M. senegalensis*); Lampsar (fr. Dec.) *Perrottet*, 7 & 8 Dec. 1824 (P, paratype of *M. senegalensis*); Lampsar, Saint Louis (fr. May) *Leprieur*, May 1829 (G, paratype of *M. senegalensis*); Lampsar (fl. Dec.) *Leprieur*, Dec. 1824 (BR, paratype of *M. senegalensis*); Ovalo (fl. fr.) *Leprieur*, anno 1825 (G, P); Uvalo & Cayor (fl.) *J. Ceudelot* 435 (G, P); Saint Louis, Maka (fl. fr. Sep.) *J. Trochain* 4783 (P); North Savoigne (fr. Sep.) *Audru* 2602 (P). Hlassarafoulane (fl. fr. Oct.) *R. Berhaut* 2451 (P). Lauma (fl. fr. Dec.) *R. Berhaut* 1309 (BR, P, Z). Chany?, *Leprieur*, 9 Sep. 1824 (G). Plains of Labloneuser, *Perrottet*, 25 Sep. 1824 (G). Senegal (fl. fr. Sep.) *Perrottet* 149 (P). Senegal (fl. fr.) *Perrottet* 136 (BM, G). Senegal (fr.) *Leprieur*, anno 1825 (P). Senegal (fr.) *G. Schimper*, anno 1853 (P).

Somalia: 04N47E – Harradera (fl. Mar.) *H. Aknupp*, March (K).

South Africa: Transvaal: 22S29E – Messina Distr., Greefswaldt (fl. fr. Jan.) *G. Theron* 2796 (PRE, PRU); Greefswaldt, 100 km NW. of Messina (fl. fr. Jan.) *J. Pienaar* 299 (PRE); Dongola, Erfrust (fl. fr. Mar.) *Bruce* 65 (PRE). 22S30E – Messina (fl. fr. Oct.) *R. Turner* 11 (PRE); Messina (fl. fr. Mar.) *F. Rogers* 20981 (A, BM, FI, K, J); Messina, Soutpansberg (fl. Feb.) *F. Rogers* 22565 (Z); Messina (fl. fr. Mar.) *F. Rogers* 20794 (K, PRE). Tschobethal (fr.) *Holmb*, anno 1887 (Z).

South West Africa: 17S14E – Ovamboland, between Border Road and Ruakana (fl. fr. Feb.)

De Winter & Giess 7091 (K, M, PRE, WIND). 18S13E – Kaokoveld, 10 km E. of Ohopoho (fl. fr. Apr.) *De Winter & Giess 5333* (B, K, M, PRE, WIND). 18S14E – Etosha Distr., 80 km W. of Okaukuejo (fl. Jan.) *Merxmüller 1337* (M). 18S15E – Etosha Pans, Okaukuejo, flats between Leeubron and Grünwald (fl. fr. Mar.) *Giess, Volk & Bleissner 6043* (WIND). 18S16E – Etosha Pans Distr., Twee Koppies (fl. fr. May) *B. Nordenstam 2632* (M). 19S15E – Outjo, Farm Otjitambi (fl. May) *Schwadtfeger 2/98* (WIND); Farm Otjitambi (fl. fr. Mar.) *Merxmüller & Giess 30338* (M); Outjo Distr., Farm Hazeldene (fl.) *De Winter & Leistner 5106* (PRE); Ovamboland (fl. fr. Apr.) *Volk & le Roux 772* (PRE). 19S17E – Bobos (fl. fr. Apr.) *Dinter 7529* (B, BM, BOL, G, K, M, PRE, S, WIND, Z). 19S18E – Guinab (fl. fr. Apr.) *Schoenfelder S860* (K, PRE). 19S19E – Grootfontein, Okorusberg (fl. Mar.) *O. Volk 1440* (M). 20S15E – Outjo, 30 km SE. of petrified forest (fl. fr. May) *B. Nordenstam 2581* (M). 20S16E – Omaruru, Otjihorong Reserve, Omatjene (fl. Mar.) *Giess, Volk & Bleissner 5970* (WIND). 21S14E – Omaruru, Brandberg, Numasschlucht (fl. fr. June) *W. Giess 3585* (WIND); Uis, Messumberge (fl. Mar.) *W. Giess 9677* (PRE, WIND); Brandberg (fl. fr. Mar.) *L. Kers 124* (PRE, S, WIND); Brandberg, valley between Naib & Karoab (fl. fr. July) *Nordenstam & Lundgren 848* (S); Brandberg, Tsisab Valley mouth (fr. May) *B. Nordenstam 2500* (M). 21S15E – Omaruru Distr. (fr. Feb.) *L. Kers 2021* (S). 21S17E – Okahandja (fl. fr. Mar.) *Dinter 36* (B, BM, BR, E, FI, G, GRA, K, P, Z); Hereroland (fl.) *Lüderitz 141* (Z). 21S18E – Spitzkoppe (fl. fr. Apr.) *MacDonald 558* (BM). 22S15E – Road Windhoek-Swakopmund, Farm Donkerhuk (fl. fr. Mar.) *Ihlenfeldt, de Winter & Hatdy 3036a* (M, WIND); Karibib, 4 km NE. of Usakos on road to Omaruru (fl. fr. May) *B. Nordenstam 2436* (M). 22S15E – Swakopmund (fl. fr. Apr.) *R. Seydel 782* (Z). 22S16E – Karibib (fl. fr. Apr.) *H. Schlieben 10304* (PRE); Karibib, Farm Auschulz (fl. fr. Mar.) *S. Bleissner 13* (M); Namibrand Karibib Otjosundu, on the Marble Mountain (fl. fr. Feb.) *R. Seydel 3285* (A, B, G, K, L, WAG, WIND); Karibib, Farm Habis (fl. fr. Feb.) *Giess, Volk & Bleissner 5094* (M, PRE, WIND); Ustakus, Otjimbingwe (fl. fr. May) *R. Marloth 1301* (PRE). 22S17E – Windhoek Bergland, Midgard (fl. fr. Apr.) *R. Seydel 2730* (BR, M, WAG). 23S14E – Kuiseb (fl. fr. June) *Fleck 655* (Z); Kuiseb Canyon (fr. Apr.) *A. Jensen PRE41170* (PRE). 23S15E – Namib Area, 105 km SE. of Walvis Bay (fl. fr. Mar.) *S. Barnard 88* (M, PRE, WIND). 23S17E – Wortel (fl. Apr.) *R. Strey 2532* (PRE); Rehoboth (fl.) *Fleck 813* (Z); Rehoboth, *H. Schinz 254* (Z); Rehoboth, Gravenstein (fl. fr. Feb.) *O. Volk 11556* (M). 24S16E – Maltahöhe, Hammerstein (fl. Feb.) *Leippert 4075a* (M). 24S17E – Rehoboth/Kalkrand (fl. fr. May) *J. Acocks 18163* (PRE); Gibeon, Haribes (fl. fr. Apr.) *O. Volk 12359* (M). 27S17E – Witpütz (fr.) *E. Rusch, jun. 7911* (B). 27S18E – Daberas, Fleck 219a (Z). 28S18E – Karasburg, Dassiefontein River bed (fl. fr. Jan.) *H. Pearson 7898* (BM, BOL, K).

Sudan: 13N24E – Jebel Marra, Darfur Prov. (fl. fr. Jan.) *H. Lynes 108* (BM, K, US); Jebel Marra, Kalakitting (fl. Sep.) *G. Wilkens 2551* (K). 13N25E – Darfur Prov., Kulme (fl. fr. Sep.) *H. Lynes 518* (BM, K, US). 13N26E – Jebel Kasbag, el Abyad el Obew (fl. fr. Oct.) *G. Wilkens 662* (K); Kordofan, Jebel Kalti, NW. of el Obew (fl. Sep.) *G. Wilkens 315* (K). 13N30E – Jebel Abu Cud, NE. of El Obeid (fl. fr. Sep.) *J. Jackson 4013* (BR, K). 14N25E – Darfur Prov., Plaius, 65–130 km NE. of Fasher (fl. fr. Feb.) *H. Lynes 315b* (K). 15N32E – Jebel Silitat, 10 km N. of Khartoum (fl. fr. Sep.) *A. Peltet 46* (K). 19N32E – Kordofan, Abu Harras Marhaka (fr. Aug.) *Pfund 140* (K). Darfur Prov., Umm Keddada NW. of El Hilla (fl. fr. Jan.) *J. Dandy 217* (BM). Cordofan, Arasch-Cool (fl. fr. Oct.) *Kotschy 95* (BR, G, GH, L, M, P, S, UPS, W, Z). Cordofan (fl. fr. Sep.) *Kotschy 104* (BM, E, FI, G, K, L, P, W). Cordofan, Araschkar (fr. Oct.) *A. Steudel 975* (K). Cordofan (fr. Aug.) *Pfund 723* (K). Gidaref Distr., Um Suqura (fl. Sep.) *B. Beshir 139* (K). Hombari Ojosse (fl. fr. Nov.) *A. Leclercq 42787* (P). Gamma-Haoursa-Auranje (fl. July) *G. Rogeon 486* (P).

Tanzania: 02S36E – North Prov. Monik Plateau on N. wall of Rift near Lake Natron (fr. July) *J. Newbould 6204* (K). 04S38E – West Usambara, Ukomasi (fl. fr. June) *A. Peter 10676, 10736, 41040* (B); Pare, Pangeniwilse to Buiko, *A. Peter 10888* (B); Pare, Buiko (fr. May) *A. Peter 10399* (B). 05S38E – Makuyoni, 80 km W. of Arusha (fl. fr. Mar.) *J. Beesley 263* (K). 07S34E – Iringa Distr., Ruaha Nat. Park (fr. Aug.) *Thullon & Mharo 584* (K, UPS). 07S35E – Iringa Distr., Mtera where the Great North Road crosses the Great Ruaha River (fl. fr. Apr.) *Polhill & Paulo 2068* (B, BR, K); Iringa Distr., Ruaha Nat. Park at Ibuguziwa (fr. Feb.) *A. Bjørnstad AB 1383* (K, UPS). 08S35E – Msembe-Kiriramatonge Circuit, 3 km from Msembe (fl. fr. Feb.) *Greenway & Kanuri 13934* (K); Iringa Distr., Msembe-Mbagi Track (fl. fr. Feb.) *P. Greenway 13984* (K).

Upper Volta: 14N00W – Ein Arkachen (Dori) (fl. fr. Nov.) *A. Gaston* 2785 (P).
 Zambia: 17S26E – Livingstone (fl. fr. Apr.) *D.B.F. F11439* (K).

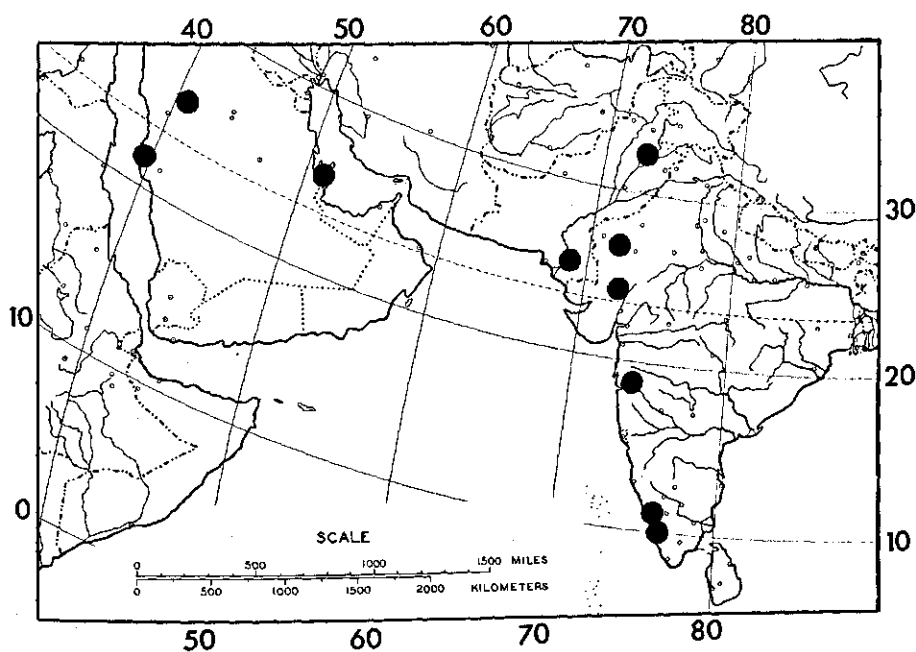
South West Asia:

Saudi Arabia: 21N39E – Near Bureiman, 16 km E. of Jeddah (fr. Apr.) *A. Trott* 1343 (K);
 Bureiman near Jeddah (fl. fr. May) *P. Kercher* AL95 (BM); Wadi Fatme (fr. Feb.) *W. Schimper* 1005
 (G, K, P, W); Sidr Mountains (fl. fr. Mar.) *S. Fischer* 195 (BM, BR, K, M, W). 24N40E – Gallabat,
 area of Matamma (fl. fr. Oct.) *G. Schweinfurth* 2408 (BM, G, K, P, W).

South Yemen: 15N51N – Wadi Darfour (fl.) *G. le Testu* 48 (P).

India: 11N76E – Malabar Concan (fl. fr.) *Stocks & Law, Sep. 1841* (BM, FI, G, GH, L, M, P, S,
 W). 18N73E – Bombay, Chattersengh Hill, Poona (fl. Aug.) *Kristina, Aug. 1887* (E). 24N72E –
 Baikur Distr., northwest of Deesa (fr.) *Stocks* (K, holotype of *M. lawiana*); Baikur Distr., near
 Deesa (fl. fr.) *Stocks* (K); Baikur, near Deesa (fr.) *Stocks, Sep. 1845* (BM); Baikur, near Deesa (fl. fr.)
Stocks 53 (K). 26N71E – Jodgarh, Merwara (fl. fr. Sep.) *A. Lowrie* 4570 (G, K). Indostan, Nil-
 Gherries, *M. Perrottet, anno 1838* (G). Concan (fr.) *Stocks* (K).

West Pakistan: 32N73E – Chumbal, near Agra, *Munro* 435 (K, holotype of *M.*
chumbalensis). 25N69E – Kurrachee, Sindh (fr.) *J. Stocks, anno 1851*.



MAP 21b. *Monsonia senegalensis*.

22. *Monsonia speciosa* LINNAEUS

Fig. 22, Map 22.

Mantissa 105 (1767); Syst. Nat. ed. 12, 2: 508 (1767); Syst. Veg. ed. 14: 697
 (1784); Linnaeus filius, Suppl. pl. 342 (1781); Curtis, Bot. mag. 3, tab. 73 (1792);
 Salisbury, Prodr. 311 (1796); Willdenow, Spec. pl. 3 (1): 718 (1800); Enum. pl.
 hort. Berol. 717 (1809); Thunberg, Prodr. pl. Cap. 2: 112 (1800); Dumont du
 Courset, Le Bot. Cult. ed. 2, 5: 49 (1811); Sweet, Ger. 1, tab. 77 (1821); De
 Candolle, Prodr. 1: 638 (1824); Ecklon & Zeyher, Enum. 1: 58, no. 444 (1836);
 Steudel, Nomencl. Bot. ed. 2, 2: 158 (1841); Harvey in Harvey & Sonder, Fl.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

Cap. 1: 256 (1860); Szyszylowicz, Pol. Disc. 7 (1888); Knuth in Engler, Pflanzenr. 4.129: 310 (1912).

Type: South Africa, the Cape (LINN no. 936.3, holotype).

Heterotypic synonyms: *M. lobata* Mont., Gothob. Samk. Handl., Wet. Afd. 1 (1780); Curtis, Bot. mag. 2, tab. 385 (1797); Willdenow, l.c.; Dumont du Courset, l.c.; Aiton, Hort. Kew. ed. 2, 4: 192 (1812); De Candolle, l.c.; Sweet, Ger. 3, tab. 273 (1825); Ecklon & Zeyher, Enum. 1: 58, no. 442 (1836); Harvey in Harvey & Sonder, Fl. Cap. 1: 255 (1860); Knuth in Engler, Pflanzenr. 4.129: 308, Fig. 38, 309 (1912). Type: Cape Province: Swartland: Bergriver: Vierentwintig rivieren, THUNBERG (S, holotype; isotype: Thunberg herb. 15786 (UPS)).

M. filia L.f., Suppl. 1. 341 (1781); Thunberg, l.c.; Dumont du Courset, l.c.; Thunberg, Fl. Cap. 510 (1823). Type: Cape Province: Piketberg, THUNBERG 15785 (UPS, holotype).

M. pilosa Willd., Enum. pl. hort. Berol. 717 (1809); De Candolle, l.c.; Sweet, Ger. 2, tab. 199 (1824); Ecklon & Zeyher, Enum. 1: 58 no. 443 (1836); Steudel, l.c.; Harvey, l.c.; Knuth, l.c. Type: Cult. Berlin from seeds collected in the Cape Province, WILLDENOW 12600 (B-WILLD, holotype (microfiche reproduction seen); isotype: BR).

M. incisa Dum.-Cours., l.c. Type: non indicated.

M. dregeana Presl, Bot. Bemerk. Prag 26 (1844). Types: The Cape, DRÈGE a (G, holotype); the Cape, DRÈGE b (G, paratype).

Rosulate, decumbent or suberect, suffrutescent, up to about 30 cm high.

Roots often tuberous.

Stems aerial and often also subterranean; the subterranean rhizome, when present, almost woody, erect, branched or not, up to approximately 10 cm long and 6 mm in diam., bracteate. The main aerial stem stunted, at the apex of the rhizome or root, without or with a few lateral branches only; the lateral branches decumbent or suberect, up to about 16 cm long and 4 mm in diam., herbaceous, with a single or a double indumentum or sometimes glabrous; the single indumentum puberulent or pubescent with curved or appressed hairs and these scattered to dense, or velutinous, pilose or hirsute with the hairs scattered to dense; the double indumentum with the first puberulent or pubescent, with appressed or curved hairs and the second pilose, velutinous or hirsute with the hairs scattered or dense; the hairs whitish to straw-coloured; often with few to numerous stalked and sessile glands, the nodes often purplish or reddish.

Leaves: Lower alternate and rosulate, upper subopposite or opposite, those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 1–4(7) × as long as the blade, 40–225 mm long, not geniculate at the apex, widened at the base; stipules paired, subulate or acicular, 4–9 mm long, often purplish or reddish, ciliate, glabrous or with a few scattered short or long hairs, sometimes also with stalked and/or sessile glands; blade simple or compound, 0.5–1.2 × as long as wide, 15–60 × 14–60 mm, above glabrous, obscurely puberulent to pubescent all over or only between the main veins and appressedly so with the

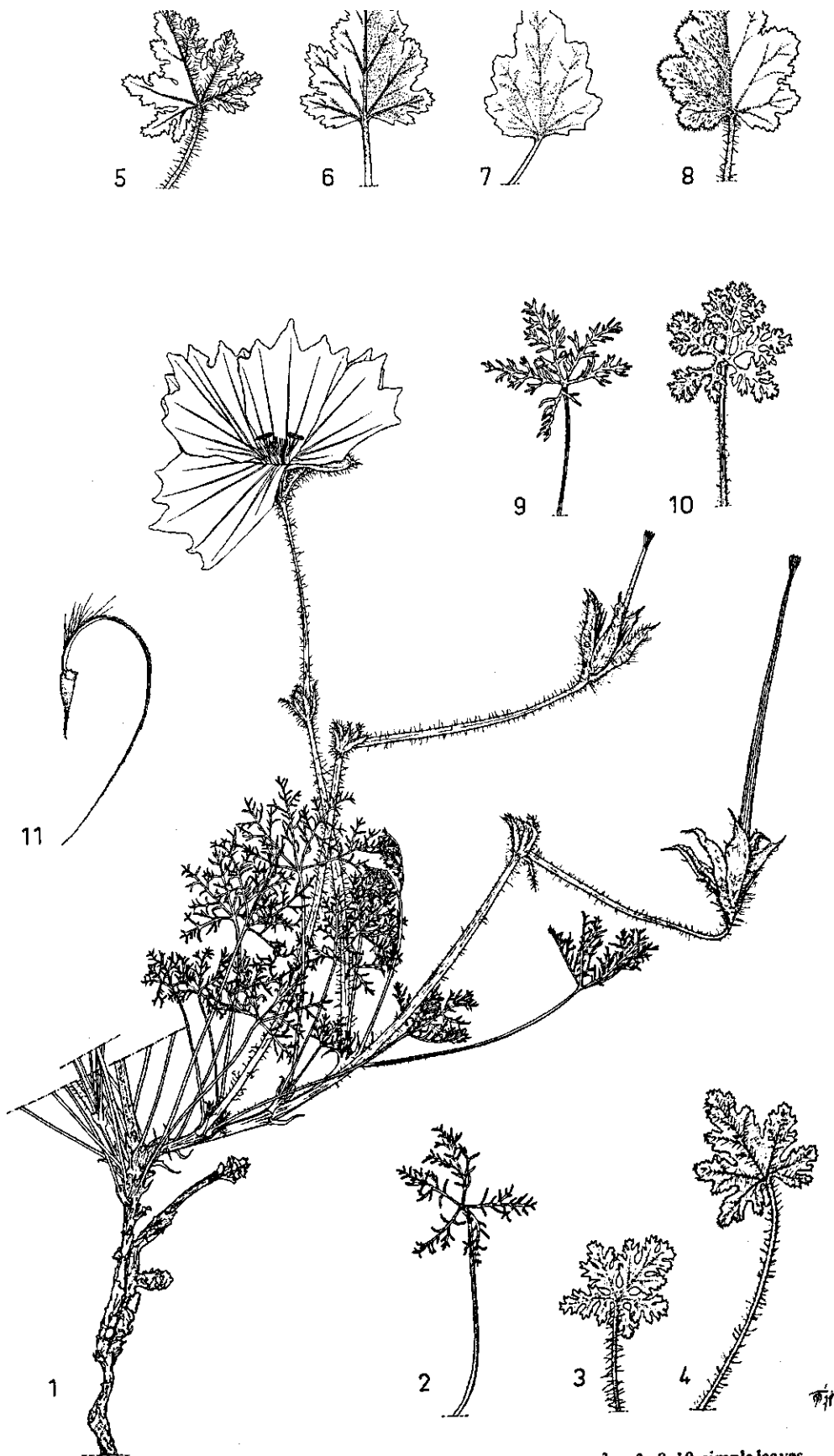


FIG. 22. *Monsonia speciosa*: 1. Habit, $\times \frac{2}{3}$; 2, 9. compound leaves, $\times \frac{2}{3}$; 3-8, 10. simple leaves, $\times \frac{2}{3}$; 11. tailed mericarp, $\times \frac{2}{3}$. (1, 2: J. Bos 653 (WAG); 3, 4: Barker 5763 (NBG); 5: Wilman 837 (BOL); 6, 7: G. Lewis 1294 (SAM); 8: Collection Burmann 3966/80 (G); 9: E. Oliver 4711 (STE); 10: Schlechter 10609 (Z); 11: Ebersohn 378 (NBG).

main veins more densely pubescent with erect hairs, often also granulose, beneath as above but never glabrous and furthermore with the veins often velutinous, these hairs often gland-based, often also with stalked and/or sessile glands; main veins impressed above, prominent beneath. The simple blade shallowly to deeply palmately lobed with 5 or 7 lobes; lobes entire or shallowly to deeply pinnately lobed, serrate, dentate or crenate at the margin, obtuse or rarely acute at the apex, cordate or truncate at the base. The compound blade palmate with 5 or 7 leaflets; leaflets ovate, obscurely to deeply pinnately or bipinnately lobed, pinnatisect or bipinnatisect; the pinnae linear-elliptic to very narrowly elliptic, entire at the margin.

Inflorescences axillary, rarely terminal, 1-flowered, 80–440 mm long. Peduncles and pedicels stiff, erect, with the same indumentum as the stem which is, however, often less dense, often with more stalked glands than the stems; peduncles 1–3(5) × as long as the pedicels, 35–305 mm long; pedicels 15–125 mm long, geniculate under the fruit; involucre bracts 6, subulate or narrowly ovate, sometimes mucronate, often purplish or reddish, ciliate, glabrous or with a few scattered short or long hairs, sometimes also with stalked glands.

Sepals green, purplish or reddish, narrowly obovate, connate at the base for 1–2 mm, each sepal with a pouch of 1–2 mm deep and 2 mm in diam. at the connate base, limb 2–5 × as long as wide, 15–30 × 3–10 mm; outside glabrous, with a few scattered long erect hairs, velutinous, or with a double indumentum the first of which is obscure to densely pubescent with appressed or curved hairs, while the second is composed of few to many long erect hairs, these long hairs often gland-based, often with few to numerous stalked glands; inside glabrous, mostly pubescent towards the base and in the pouch, sometimes also with stalked glands, with 3 or 5 parallel main veins, not ciliate at the margin; mucro glabrous or obscurely hairy, terete and acicular, reddish or purplish, 0.5–3 mm long, with a small tuft of whitish hairs at the base of the mucro.

Petals obovate, obtriangular or angular-obovate, rarely broadly obovate or broadly obtriangular, 1–2 × as long as wide, 25–65 × 20–40 mm, 1.5–2.5 × as long as the sepals, (1)2–3 × as long as the stamens, white, white flushed with pink, pink, red, mauve, or purple, with the veins darker than the rest of the petal, glabrous or with scattered stalked glands, base ciliate, inside pubescent and outside obscurely puberulent, with 5 or 7 main veins, 5-toothed at the apex; the teeth sharp to blunt, with the central tooth mostly larger than the others.

Stamens monadelphous, arranged in a cylindrical column around the pistil; groups connate at the base for 1–2.5 mm; filaments of each group basally connate for 5–11 mm; filaments in the central stamens 11–21 mm and in the lateral 9–19 mm long, purplish to reddish, inside glabrous, outside pubescent at the base or all over and also channelled; an ovate often rimmed gland-cavity of approximately 1 mm diam. is situated on the outer side of the base of each group, directly below the channel and above or halfway into the sepal-pouch; anthers oblong, 4–6 × 1–1.5 mm, purplish-black, laterotrorse.

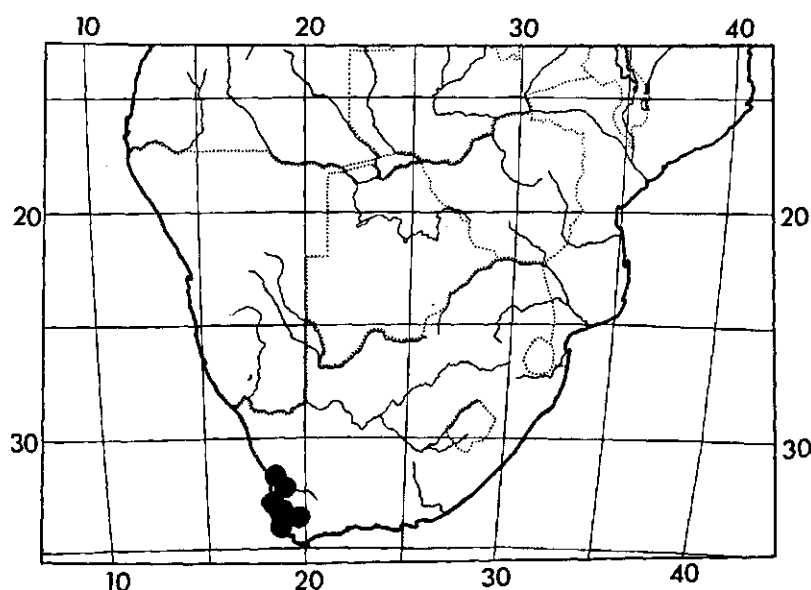
Pistil 12–20 mm long; ovary obconical, 4–6 × 2–3.5 mm, hirsute-pubescent to hirsute, apex rimmed and with numerous stalked glands; beak longitudinally

grooved, 3–10 mm long, with numerous stalked glands at the base, obscurely or densely puberulent to shortly hirsute towards the apex; stigmas purplish-black, linear to clavate, 4–6 × 1 mm, outside clavellate, serrate or dentate at the margin, acute or obtuse at the apex.

Fruit 70–100 mm long, mericarps 10–16 × 3–4 mm and beak 60–80 mm long; mericarps dark brown, narrowly obconical, hirsute or setaceous with copper-coloured hairs, with reddish spots at some of the hair bases, conspicuously rimmed and ridged at the apex; the rim forming a cup-shaped cavity with a central ridge; the rim and ridge perpendicular to the tail; the tail obscure and short hirsute outside, hispid inside where the tail detaches from the beak-axis; these hairs stiff, whitish, straw- or copper-coloured and long at the tail's base, forming a crest.

Seed obconical, 6–7 × 2–3 mm, glabrous.

Distribution: South Africa in the south-west Cape Province.



MAP 22. *Monsonia speciosa*.

Ecology: Common to abundant on sandy, moist soils under conditions of wet winters and dry, hot summers. Alt. 0–150 m.

Main flowering and fruiting period during spring and early summer, August to November.

Vernacular names: *Slangblom*, *Sambreeltjie*, *Butterfly flower*.

Note: A study of the material reveals all possible transitional forms in the leaves and their indumentum from the simple, shallowly lobed leaf of *M. lobata*,

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

through the simple, deeply lobed leaf of *M. pilosa* to the compound leaf of *M. speciosa*. As for the stems, inflorescences, flowers and fruits the material is, however, remarkably uniform. Therefore *M. lobata* and *M. pilosa* are reduced to synonyms of *M. speciosa*.

Representative specimens:

South Africa: Cape Province: 32S18E – Bergvallei, Paleisheuvel (fl. Sep.) *J. Acocks* 2917 (S); near Ysterfontein (fl. Sep.) *T. Salter* 1348 (BM, K); Clanwilliam (fl.) *P. Mader*, anno 1904 (GRA); Olifants River Valley, 16 km N. of Citrusdal (fl. Sep.) *J. Lewis* 1294 (SAM); between Greef's Pass and Graafwater (fl. Sep.) *C. Leipoldt* 3217 (BOL); Clanwilliam-Piketberg (fl. Sep.) *Godman* 772 (BM); between Citrusdal and Piketberg (fl. Sep.) *A. Wilman* 837 (BOL, PRE); Piketberg-Porterville on Tulbach Road (fl. Sep.) *A. Wilman* 712 (BOL, PRE); Piketberg (fl. fr. Sep.) *D. Weintroub* 19479 (J); Piketberg, Het Huis (fl. Sep.) *Stephens & Glover* 8639 (BM, BOL, K); Piketberg, De Hoek (fl. Sep.) *Lewis* 2876 (SAM); Piketberg (fl. Sep.) *L. Bolus* BOL-31452 (BOL); Piketberg-Goedverwacht (fl.) *H. Bolus* 8417 (BOL, PRE); Piketberg, *Thunberg herb.* 15785 (UPS, holotype of *M. filia*). 32S19E – Citrusdal (fl. Sep.) *W. Barker* 3602 (NBG). 33S18E – Riebeeckkasteel (fl. Oct.) *Drège*, 8 Oct. 1828 (P, S, W); Hopefield (fl. Sep.) *H. Bolus* 12623 (BOL); Malmesbury (fl. Oct.) *R. Schlechter* 1651 (BM, G, GRA, PRE, W, Z); Darling (fl. Oct.) *N. Pillans* 10721 (G); between Darling and Ysterfontein (fl. Sep.) *Lütjeharms* 6410 (BLFU); Darling Flora Reserve (fl. Oct.) *G. Lewis* 5055 (NBG); Ysterfontein (fl. Sep.) *R. Compton* 17377 (NBG); Malmesbury, Slangkop (fl. Sep.) *W. Barker* 8153 (NBG, STE); Malmesbury (fl. fr. Sep.) *F. Bachmann* 47 (Z); near Paarl (fl. Sep.) *T. Salter* 1235 (BM, K); Paarl, Hercules Pillar (fl. Sep.) *W. Barker* 1646 (NBG); Paarl (fl. Sep.) *Drège* 13a.b. (BM, K, P); Wemmershoek (fl. Aug.) *R. Bayliss* 3549 (GRA); Kirstenbosch Gardens (fl.) *I. Verdoorn* PRE-41201 (PRE); Langverwacht above Kuils River (fl. Oct.) *E. Oliver* 4711 (STE); Hopefield, Waterboerskraal (fl. Oct.) *L. Hugo* STE-30868 (STE); Porterville (fl. Sep.) *W. Barker* 5821 (NBG); Belleville (fl. Nov.) *F. Rogers* 18428 (BM, Z); Bellville, Farm Joostenberg (fl. fr. Oct.) *W. Barker* 9608 (NBG); Cape Flats (fl. July) *E. Phillips*, 19 July 1908 (G); Klappmutz (fl. Sep.) *W. Barker* 1145 (NBG); Klappmutz, Paarl & Groenekloof (fl.) *Ecklon* 444 (K, M, P, S, W); Klappmutz (fl. Sep.) *A. Schenk* 588 (Z); Stellenbosch (fl. fr.) *H. Bolus* 2734 (BOL); Stellenbosch (fl. fr. Oct.) *R. Marloth* 130 (BM, G, P, W, Z); Stellenbosch Flats (fl. fr. Oct.) *J. Bos* 653 (K, M, STE, WAG); Stellenbosch Golf Course next to Duthie Reserve (fl. Sep.) *J. van der Walt* 446 (STE-U); Stellenbosch Flats (fl. Oct.) *H. Venier* 7471 (BLFU); Stellenbosch, Blaauwklip (fl. Oct.) *M. Gillett* 115 & 116 (STE); Stellenbosch, Koelenhof (fl.) *I. Hauf*, anno 1925 (Z); Faure (fl. Oct.) *W. Barker* 4199 (NBG). 33S19E – Saron (fl. Oct.) *Schlechter* 10609 (BM, BR, E, G, GRA, K, P, PRE, S, W, Z); Tulbach (fl. Sep.) *W. Barker* 9227 (NBG); Tulbach (fl. Sep.) *T. Kassner* 1284 (E, P); Bergrivier at Tulbach (fl. Jan.) *Ecklon & Zeyher* 442 (FI, G, K, L, P); Tulbach (fl. Sep.) *Ecklon* 222 (M); Wellington (fl.) *M. Cummings* 69 (GH, US); Wellington (fl. Aug.) *A. Grant* 2386 (PRE); Wellington (fl. Sep.) *M. Knobel* 23758 (PRE); Wellington (fl. fr. Sep.) *C. Moss* 3015 (BM, J, K); Wellington, *J. Thode* 7852 (STE). 34S18E – Hottentotsholland (fl. Oct.) *Ecklon*, Oct. 1828 (P); Hottentotsholland (fl. Sep.) *Alexander*, 22 Sep. 1846 (K); Sir Lowry's Pass (fl. Oct.) *R. Schlechter* 5363 (BM, G, GRA, K, W, Z); Sir Lowry's Pass (fl. Sep.) *J. van der Walt* 454 (STE-U); foot of Sir Lowry's Pass (fl. Sep.) *Werdermann & Oberdieck* 325 (B); Sir Lowry's Pass (fl. fr. Oct.) *MacOwan* 1765 (= 2785) (BM, G, GH, GRA, K, P, PRE, UPS, W, Z); mountain at Gordons Bay (fl. Sep.) *A. Wessels* 5 (STE); flats between Gordons Bay and Strand (fl. fr. Nov.) *W. Ebersohn* 378 (NBG); Gordons Bay (fl.) *H. Bolus* BOL-31454 (BOL); Steenbras Water Works (fl. Sep.) *M. Brunt* 24911 (BOL); Somerset West (fl. Sep.) *R. Dümmer* 353 (E). The Cape (fl.) *herb. Linnaeus* 936.1 (LINN), 936.2 (LINN), 936.3 (LINN, holotype of *M. speciosa*), 936.4 (LINN), 936.5 (LINN). The Cape, cultured in Berlin from seeds collected at the Cape (fl.) *Willdenow* 12600 (B-WILLD, holotype of *M. pilosa* (microfiche reproduction seen); isotype: BR), 12599 & 12601 (B-WILLD (microfiche reproduction), BR); origin unknown, *Willdenow*, anno 1845 (G). Swartland, Bergrivier, Vierentwintig riviere (fl. fr.) *Thunberg*, anno 1773 (S, holotype of *M. lobata*); *Thunberg herb.* 15786 (UPS, isotype of *M. lobata*). The Cape (fl.) *Drège* a (G, holotype of *M. dregeana*); *Drège b* (G, paratype of *M. dregeana*). The Cape (fl.) *Brehm*, anno 1820 (M). The Cape (fl.) *Burmman collection* 3966/80 (G). The Cape (fl.) *de Jussieu herb.* 12135 (P). Swartland, Groenekloof, *Ecklon* 443 (S), 531 (M). The Cape, *Ecklon & Zeyher*, anno 1845 (FI). *Lamarck Herb.* (P). The Cape

(fl.) *Lehmann 1173* (GH, P). The Cape (fl. fr.) *Fr. Masson* (BM). The Cape, 100 km from the Cape (fr.) *Fr. Masson, anno 1795* (G). The Cape, *Oldenburg 912* (BM). Brakfontein (fl. Sep.) *A. Penther 2145* (W). Pikenierskloof (fl. Aug.) *A. Penther 2147* (W). The Cape (fl.) *A. Rehmann 1133* (Z). The Cape (fl.) *Zeyher 400* (G, P, PRE). The Cape (fl.) *Thunberg herb. 15787* (UPS). The Cape (fl.) *Thunberg* (S).

23. *Monsonia transvaalensis* KNUTH

Fig. 23, Map 23.

In Engler, *Pflanzenr.* 4.129: 299 (1912); Burt Davy, *Fl. pl. & ferns* 1: 192 (1926).

Type: South Africa: Lydenburg District: Hell's Gate, F. WILMS 96 (holotype not seen, destroyed in B; lectotype: G; isotypes: G, E, BM, K).

Erect or decumbent, suffrutescent, few-stemmed, 10–30 cm high.

Stems herbaceous to woody, up to 25 cm long, 1–2 mm in diam., pubescent with curved hairs, rarely also with scattered long erect hairs, with stalked and sessile glands.

Leaves: Lower alternate, upper opposite, those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum as the stem, 0.2–0.5 × as long as the blade, 5–20 mm long, sometimes geniculate at the apex, not flattened at the base; stipules subulate or acicular, 4–14 mm long, reddish, with the same indumentum and glands as the stem or with only rather long hairs; blade simple, narrowly elliptic to elliptic at the base of the stems, elsewhere on the plant narrowly ovate to very narrowly ovate, 2–9 × as long as wide, 15–70 × 5–15 mm, obtuse or acute, mucronate at the apex, truncate to cuneate at the base, at the basal $\frac{1}{4}$ – $\frac{1}{2}$ entire or rarely obscurely serrate, at the terminal part serrate at the margin, granulose on both sides, with sessile glands, sparsely to moderately pubescent or velutinous, the hairs on the veins beneath more conspicuous and more numerous, and mostly with stalked glands; main veins subpinnate, 3 branching from the base, impressed above, prominent beneath.

Inflorescences axillary or terminal, 1–3-flowered, 60–120 mm long. Peduncles and pedicels slender, with the same indumentum as the stem and, furthermore, with the stalked glands conspicuous; peduncles 0.5–2(5) × as long as the pedicels, 15–55 mm long; pedicels 9–50 mm long and geniculate under the fruit; involucre bracts usually 3 per flower, conspicuous, sepal-like, 5–15 mm long.

Sepals green to blackish, free, narrowly ovate to ovate, or narrowly obovate to obovate, 2–3.5 × as long as wide, 10–15 × 4–5 mm, outside pubescent or obscurely pubescent, with curved hairs, and with numerous long stalked glands, inside glabrous, with 3 parallel main veins; mucro terete, 1–4 mm long, reddish to purplish, with the same indumentum as the sepal and furthermore, also with a few scattered long erect hairs, with a small tuft of downy hairs or rarely with a pocket of yellowish resinous granules at the base.

Petals obtriangular, 1–2 × as long as wide, 15–30 × 10–25 mm, 1.3–2.5 × as long as the sepals, 1.5–3 × as long as the stamens, pink or mauve, with 5 or mostly 7 purplish main veins, outside glabrous or with scattered, shortly stalked



FIG. 23. *Monsonia transvaalensis*: 1. Habit, $\times \frac{3}{4}$; 2. floral diagram. (1, 2: Werdermann & Oberdieck 2155 (B, BR)).

JW

glands, inside pilose, puberulent and auriculate at the base, ciliate in the basal half at the margin, obscurely sinuate to crenate at the apex.

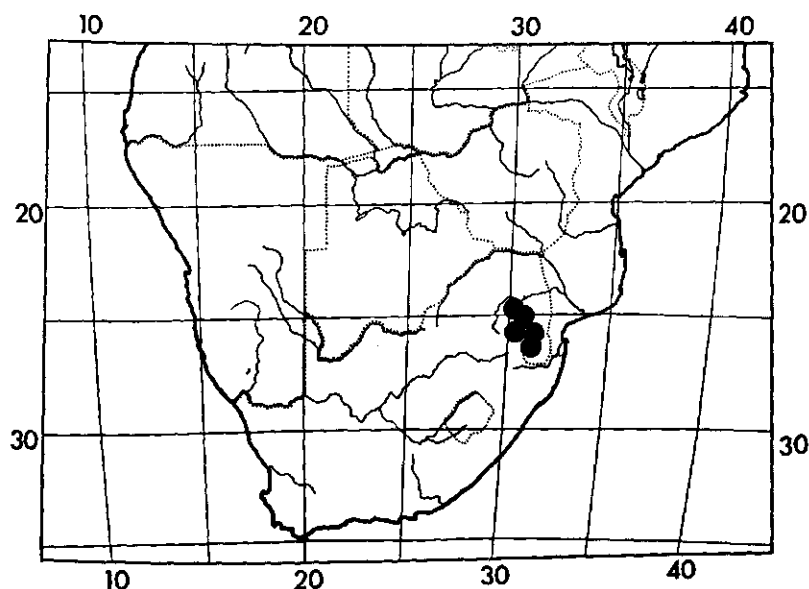
Stamens (rarely some imperfect), monadelphous; groups basally connate for 1–2 mm; filaments of each group basally connate for 2–3 mm; filaments in the central stamens 8–9 mm and in the lateral 6–7 mm long, terete and apically recurved, hairy outside, glabrous inside; an ovate rimmed gland-cavity is situated on the outer side of the base of each group; anthers oblong, those of the long filaments sometimes slightly larger, 2.5–3.5 × 1–1.2 mm, rarely sterile and then 1.4 × 0.5 mm, normally shaped or deformed, subintrorse.

Pistil 10–15 mm long; ovary obovoid, 2–3 × 2 mm, hyalino-pubescent or -hirto-pubescent; beak longitudinally grooved, 4–8 mm long, pubescent, mostly with numerous stalked glands; style when present 0.5–1 mm long, obscurely hairy; stigmas linear to clavate, 3–4 × 0.4–0.6 mm, outer side obscurely hairy, margin subentire to crenate, apex obtuse or acute.

Fruit 45 mm long; mericarps 11 × 2 mm and beak 35 mm long; mericarps hirsute, obliquely rimmed and ridged at the apex; beak hirsute outside, hispid inside where the tail detaches from the beak-axis; these stiff hairs copper-coloured and long at the tail's base, forming a crest.

Seed narrowly obovoid, 4 mm long, glabrous.

Distribution: South Africa in eastern Transvaal and Swaziland.



MAP 23. *Monsonia transvaalensis*.

Ecology: Mountain grassland with relative moist and moderate climate. Alt. 1900–2300 m.

Flowering and fruiting in summer from approximately December to March.

Meded. Landbouwhogeschool Wageningen 79-9 (1979)

Note: The specimens, COMPTON 26674 and 28718, collected in the Mbabane District of Swaziland are atypical and probably hybrids of *M. transvaalensis* and *M. attenuata*. The vegetative parts of both collections agree with that of *M. transvaalensis*, but the flowers have petals that are like those of *M. attenuata*, viz. with dark reticulate venation and dentate apices.

Representative specimens:

South Africa: Transvaal: 24S30E—Lydenburg Distr., Hell's Gate (fl. fr. Feb.) *F. Wilms* 96 (G, lectotype; isotypes: BM, E, G, K); Lydenburg (fl. Dec.) *W. Atherstone*, Dec. 1873—Jan. 1874 (K); Long Tom Pass between Sabie and Lydenburg (fl. Feb.) *Werdermann & Oberdieck* 2155 (A, B, BR, K, PRE, WAG); 20 km E. of Lydenburg on road to Sabie (fl. fr. Feb.) *L. Codd* 5174 (K); 20 km E. of Lydenburg (fl. Jan.) *E. Prosser* 1808 (J, K, PRE); Pilgrimsrust, plateau of Pilgrims Hill (fl. Feb.) *E. Galpin* 14446 (K, PRE, US); Pilgrimsrust, Van der Merwe bush (fl. Jan.) *Burt Day* 1405 (PRE); Mount Anderson (fl. Dec.) *Smuts & Gillett* 2474 (PRE), Mt. Anderson peak (fl. Mar.) *E. Galpin* 13772 (K, PRE); Mt Anderson, near summit (fl. Mar.) *A. Meeuse* 10054 (K, M). 25S30E—Mauchsberg, Sabie (fl. Dec.) *Smuts & Gillett* 2332 (PRE), 2294 (PRE). 25S31E—Barberton, 15 km W. of Havelock Mine at Angle Station (fl. fr. Mar.) *L. Codd* 6424 (PRE); Barberton (fl.) *Rogers* 20209 (K); Barberton, Saddleback Mountain (fl. Mar.) *G. Thornecroft*, Mar. 1913 (BM); Barberton (fl. Aug.) *G. Thornecroft* 18281 (PRE).

Swaziland: 25S31E—Piggs Peak (fl. fr. Mar.) *R. Compton* 28718 (K, NBG, PRE). Mbabane Distr., Ngwenya Mountains (fl. Feb.) *R. Compton* 26674 (NBG).

24. *Monsonia trilobata* KERS

Fig. 24, Map 24.

Bot. Notiser 121: 48 (1968).

Type: South West Africa: Keetmanshoop District: 11 km north of Narubis, THERON 1960 (B, holotype; isotypes: PRE, K).

Prostrate or semiprostrate, many-stemmed, strongly aromatic, probably annual, up to about 7 cm high.

Stems herbaceous to semi-woody, up to 25 cm long, 1–3 mm in diam., puberulent with appressed hairs, with stalked and sessile glands.

Leaves crowded on the stunted primary stem, opposite on the lateral branches, those of a pair unequal, the smaller leaves with lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, 0.5–1.5 × as long as the blade, 7–35 mm long, not swollen or widened at the base; stipules triangular to subulate, 2–5 mm long, with the same indumentum and glands as the stem or only obscurely hairy, ciliate; blade simple, broadly ovate or broadly elliptic, 1–1.5 × as long as wide, 10–25 × 8–20 mm, obtuse, or rarely acute at the apex, cuneate, truncate, or rarely cordate at the base, with the basal part entire and the terminal $\frac{2}{3}$ – $\frac{3}{4}$ serrate or dentate at the margin, above obscurely to more densely puberulent with the hairs appressed or curved, with stalked and sessile glands, beneath as above but with the veins always densely puberulent, mostly granulose and also glandular punctate; main veins palmate or subpalmate, 5 or 7 branching from the base, impressed above, prominent beneath.

Inflorescences axillary, 3–6-flowered, 20–30 mm long. Peduncles and pedicels slender, with the same indumentum as the stem; peduncles 0.5–1 × as long as



FIG. 24. *Monsonia trilobata*: 1. Habit, $\times 1\frac{1}{3}$; 2. petal, $\times 4$; 3. tailed mericarp, $\times 4$; 4. mericarp, $\times 6$. (1, 2, 4: *B. de Winter 3548* (WIND); 3: *Wilman 355* (BOL)).

the pedicels, 4–8 mm long; pedicels 6–10 mm long, geniculate under the fruit; involucre bracts 1–3 per flower, 2–5 mm long, stipule-like.

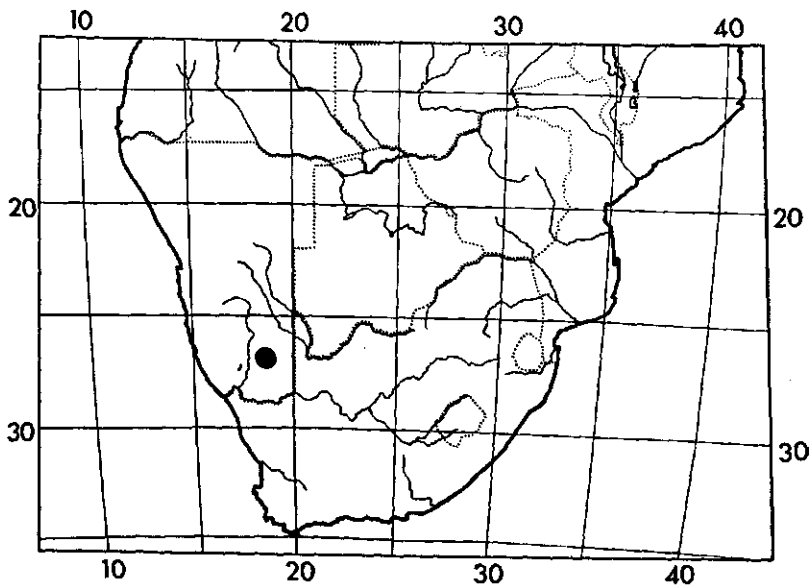
Sepals green, connate at the base for 0.5 mm, obovate, 1.5–2 × as long as wide, 4.5–5 × 3 mm, outside pubescent with the hairs curved and often gland-based, with stalked and sessile glands, with 3 or 5 parallel prominent main veins, inside glabrous, with a longitudinal cavity on the midrib towards the apex, ciliate at the margin; base with a shallow hairy pouch of 0.5 mm deep and 1 mm in diam.; mucro 1 mm long, narrowly triangular, connate to the midrib for half the length of the sepal to form a keel, laterally compressed, hairy.

Petals obtriangular, 1.5–2 × as long as wide, 10–11 × 6–7 mm, 2 × as long as the sepals, 1–2 × as long as the stamens, pink, glabrous, ciliate and pubescent inside at the base, 3-lobed at the apex.

Stamens monadelphous, groups connate at the base for 1 mm; filaments of each group connate at the base for 1.5 mm and also channelled on the outer side; filaments in the central stamens 5–6 mm and in the lateral 4–5 mm long, terete at the apex, glabrous inside and hairy outside in the channel; an ovate rimmed gland-cavity is situated on the outer side of the base of each group directly above the sepal-pouch; anthers oblong, equal or subequal, 1.5–1.8 × 0.5–0.8 mm, subintrorse.

Pistil 3.5–4 mm long; ovary broadly obovoid, 1–1.2 × 1 mm, pubescent, beaked, obscurely rimmed and with numerous stalked glands at the apex; beak longitudinally grooved, 1.5–2 mm long, puberulent; stigmas clavate, yellow, 1.5 × 0.3 mm, outside obscurely hairy, apex obtuse to acute.

Fruit 35 mm long; mericarps 5.5 × 1.6–1.7 mm and beak 30 mm long; mericarps brown to pale brown, subovoid, shortly hirsute, the apex ridged and



MAP 24. *Monsonia trilobata*.

with a double rim; the rims and ridge perpendicular to the tail; the tail slender, dark brown, outside obscurely puberulent, hirsute and glabrous inside where the tail detaches from the beak-axis; these stiff hairs long, forming a crest at the tail's base, glabrous towards the apex.

Seed obovoid, 3×1.5 mm, glabrous.

Distribution: South West Africa in the Keetmanshoop District.

Ecology: This species has a very limited distribution but it is locally frequent on sandy soil. Alt. 800–900 m.

Flowering and fruiting in April and May.

Representative specimens:

South West Africa: 26S18E – Keetmanshoop Distr., 11 km N. of Narubis (fl. fr. Apr.) G. Theron 1960 (B, holotype; isotypes: K, PRE); 40 km ESE. of Keetmanshoop on road to Narubis (fl. fr. May) de Winter 3548 (K, M, WIND). 27S18E – 26 km S. of Narubis (fl. fr. Apr.) A. Wilman 355 (BOL, PRE, SAM).

25. *Monsonia umbellata* HARVEY

Fig. 25, Map 25.

In Harvey & Sonder, Fl. Cap. 1: 255 (1860); Knuth in Engler, Pflanzenr. 4.129: 307 (1912); Exell & Mendonça, Consp. Fl. Ang. 1: 259 (1951); Merxmüller & Schreiber, Prodr. Fl. S.W.A. 64: 5 (1966); Kers, Bot. Notiser 124: 208 (1971); Schreiber, Mitt. bot. St Samml., Münch. 12: 386 (1976).

Types: South Africa: Cape Province: Bitterfontein, ZEYHER 184 (K, holotype; isotypes: BM, G, K, S, SAM, W, Z). Bitterfontein, BURKE (K, paratype).

Heterotypic synonym: *M. rehmi* Suesseng. & Karl, Mitt. bot. St Samml., Münch. 2: 47 (1950). Type: South West Africa: Namib, STREY (S. Rehm-dedit.) 29/12/1948 (M, holotype).

Prostrate or decumbent, aromatic, few- to many-stemmed, suffrutescent, 4–40 cm high and up to 60 cm in diam.

Stems herbaceous to woody, up to about 55 cm long, 1–4 mm in diam., pubescent with curved hairs or mostly with a double indumentum the first of which is as above and the second is composed of few to numerous long white erect hairs, with stalked and sessile glands.

Leaves alternate and crowded on the stunted primary stem, opposite or sub-opposite on the lateral branches, those of a pair unequal, with the bigger about twice as big as the smaller, the smaller leaves with short lateral branches and/or inflorescences in the axil; petiole with the same indumentum and glands as the stem, $0.5-2 \times$ as long as the blade, 10–50 mm long, sometimes geniculate at the apex, often swollen at the base; stipules triangular to subulate, 3–5 mm long, papery, obscurely hairy or glabrous, ciliate, brown; blade simple, broadly ovate, $1-1.5 \times$ as long as wide, $10-50 \times 10-45$ mm, acute or rarely obtuse at the apex, cordate or rarely truncate at the base, dentate, ciliate and sometimes undulate or pleated at the margin; above glabrous to puberulent, glandular-punctate, and



FIG. 25. *Monsonia umbellata*: 1. Habit, $\times \frac{1}{2}$; 2. petal, $\times 3$; 3. sepals of different form and texture, $\times 3$; 4. tailed mericarp, $\times 1\frac{1}{2}$; 5. mericarp, $\times 3$. (1, 2: Nordenstam 3741 (S); 3, 4, 5: Ortendahl 97 (S)).

with stalked and sessile glands; beneath granulose, puberulent, glandular-punctate and with stalked and sessile glands between the veins, mostly with the indumentum of the stem on the veins, otherwise puberulent; main veins palmate to subpalmate, 5 or 7 branching from the base, impressed above, prominent beneath.

Inflorescences axillary, 2–14-flowered, 40–135 mm long. Peduncles and pedicels with the same indumentum and glands as the stem; peduncles 5–15 × as long as the pedicels, 25–115 mm long, stiff; pedicels 5–10 mm long, slender, geniculate under the fruit; involucre bracts 1–3 per flower, stipule-like.

Flowers strongly aromatic.

Sepals green, connate at the base for 1 mm, ovate or obovate, 1.5–2 × as long as wide, 6–7 × 3–4 mm, outside puberulent, with stalked and sessile glands, inside glabrous except at the puberulent base, with 3 parallel main veins, ciliate at the margin; mucro narrowly triangular at the base, terete and cylindrical towards the apex, puberulent, with a few long straight hairs at the apex, 2–3 mm long; the base spurred; the spur 0.6 mm deep and 0.4 mm in diam., connate with the pedicel-apex and the base of the stamens, inside of the spur finely puberulent and glanduliferous, aperture rimmed and directly opposite the filament-channel.

Petals obtriangular, not recurved, tapering into a long claw at the base, emarginate at the apex, white or creamy-white, 2.5–5 × long as wide, 7–11 × 2.5–4.5 mm, 1.2–1.7 × as long as the sepals, 1.2–1.8 × as long as the stamens, the limb glabrous; the claw puberulent on both sides with the hairs on the inner side directing towards the apex, channelled on the outer side.

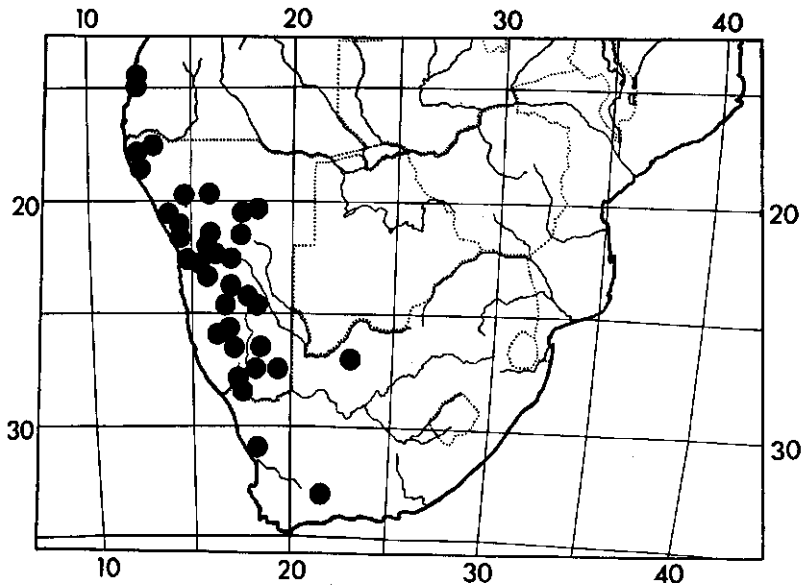
Stamens monadelphous, arranged in a cylindrical column around the pistil; groups connate at the base for 0.2–0.3 mm; filaments of each group basally connate for 2–3 mm; filaments in the central stamens 5–7 mm and in the lateral 4–6 mm long, inside glabrous, outside puberulent and channelled, the channel at its base rimmed, this rim confluent with the spur-opening; anthers all equal, orbicular, broadly elliptic, or elliptic, 0.8–1 × 0.5–1 mm, subintrorse.

Pistil 6–8 mm long; ovary obovoid, 1.5–2 × 1.5–2 mm, silky-pubescent; beak longitudinally grooved, 3–4 mm long, lanulose or puberulent, with stalked glands; stigmas linear, yellow, 1.6–2 × 0.3–0.4 mm, obtuse or acute at the apex, outside glabrous or obscurely verrucose; entire at the margin.

Fruit 50–85 mm long, mericarps 5–6 × 1.8–2 mm and beak 40–80 mm long; mericarps narrowly obconical, brown, often with dark brown spots around the hair-bases, shortly hirsute with the hairs white or copper-coloured; ridged and rimmed at the apex; the rim prominent and perpendicular to the tail; tail helically twisted in the basal part, shortly hirsute outside, crested at the base with long stiff hairs and plumose towards the apex with long silky hairs on the inner side where the tail detaches from the beak-axis.

Seed obovoid, 3–4 × 1.3–2 mm, glabrous.

Distribution: South western Africa in Angola, South West Africa and the Cape Province of South Africa.



MAP 25. *Monsonia umbellata*.

Ecology: In various places that range from semi-desert savannah to desert habitats of gravelly, rocky or sandy plains, riverbeds or brackish depressions. Alt. 0 to 1400 m.

Main flowering and fruiting period in the late summer and autumn, January to May.

Vernacular names: *Rhabas*, *Babus*, *Wilderabassam*, *Veldkos*.

Uses: From the fragrant leaves a tea with menthol aroma is brewed. The seed is collected by the local people as food. According to TROMP PRE-16651 'ants collect seed and put it away (under ground). During wet weather they carry it above ground again when natives collect it'. Said to be a very nourishing food.

Representative specimens:

Angola: 14S12E – Moçamedes Distr., along road Moçamedes-San Nicolau, near road to Chape (fl. Apr.) *L. Kers* 3613 (S). 15S12E – Moçamedes Distr., 8 km W. of P. Exp. Caracul (fl. fr. Apr.) *L. Kers* 3274 (S); Moçamedes, rio Caraca, Carva Chao (fl. fr. June) *Carisso & Sousa* 243 (BR, BM).

South Africa: Cape Province: 27S23E – Kuruman (fl. fr. Feb.) *R. Marloth* 1302 (GH, GRA, PRE). 28S17E – *H. Pearson* 4111 (BM, K). 31S18E – Bitterfontein (fl. fr. May) *Zeyher* 184 (K, holotype of *M. umbellata*; isotypes: BM, G, K, S, SAM, W, Z); Bitterfontein (fl.) *Burke* (K, paratype of *M. umbellata*). 33S21E – Prins Albert Distr., 26 km SE. of Prince Albert Road Station (fl. fr. Apr.) *J. Acocks* 24551 (K).

South Africa: Cape Province: 27S23E – Kuruman (fl. fr. Feb.) *R. Marloth* 1302 (GH, GRA, (M, WIND). 18S12E – Kaokoveld, Anabib (fl. Aug.) *R. Story* 5743 (K, PRE); 32 km S. of Orupembe (fl. fr. June) *Giess & Leippert* 7432 (M, WIND). 18S13E – Kaokoveld, 3.5 km N. of Ohopoho (fl. fr. Mar.) *de Winter & Leistner* 5261 (B, M). 19S14E – Outjo Distr., Petrified Forest Nat. Res., 50 km WSW. of Fransfontein (fl. fr. Mar.) *L. Kers* 2664 (S). 19S15E – Outjo Distr., 50 km NW. of Outjo along road to Welwitschia (fl. fr. Feb.) *L. Kers* 2082 (S). 19S16E – Outjo, Farm

Trocadero (fl. Jan.) *S. Regins* 55e (WIND). 20S14E – Fransfontein (fl. fr. May) *Liebenberg* 4963 (B, PRE, WIND); Road Torra Bay-Welwitschia (fl. Apr.) *Ihlenfeldt & de Winter* 3244 (M, PRE, WIND). 20S17E – Otjiwarongo, West part of Brandberge (fl. fr.) *H. Merxmüller* 1630 (M, PRE, WIND). 21S13E – Outjo Distr., 21 km SE. of Torra Bay (fl. fr. Apr.) *B. Nordenstam* 3741 (M, S). 21S14E – Messumberge (fl. Mar.) *W. Giess* 9700 (WIND); Brandberg, 8 km S. of Tsisabschlucht (fl. fr. June) *W. Giess* 3585b (M, WIND); Brandberg, Numasschlucht (fl. fr. June) *W. Giess* 3585 (M, WIND); Uis Mine main road to Brandberg West Mine (fr. Mar.) *L. Kers* 122 (S); Omaruru Distr., Omaruru River bed at road Cape Cross-Swakopmund (fl. fr. Mar.) *L. Kers* 2583 (S); Okombahe Res. Road, Henties Bay – Uis Mine (fl. fr. Mar.) *L. Kers* 2584 (S); 11 km N. of Uis on road Sorris-Sorris (fl. fr. Apr.) *B. Nordenstam* 3686 (M, S); road Henties Bay-Uis Mine (fl. fr. Mar.) *H. & H. Wanntrop* 279 (S). 21S16E – 11 km from Omaruru on Ubombo Road (fl. fr. Mar.) *D. Hardy* 2029 (PRE, WIND); Omaruru Distr., Farm Kamombonde West (fl. Apr.) *L. Kers* 3078 (S). 21S17E – Okahandja (fl. fr. Mar.) *Dinter* 4576 (B); Okahandja (fl. fr.) *Dinter* 227 (B, BM, BR, E, FI, G, K, P, SAM, Z). 22S15E – Swakopmund Distr., Kuiseb River, Hope Mine (fl. May) *L. Kers* 1588 (S); Usakos (fr. Aug.) *J. Boss* TM34516 (PRE); 40 km from Usakos, Farm Sukses (fl. fr. Mar.) *H. & H. Wanntrop* 227 (S); Usakos (fl. fr.) *Tromp* PRE-16651 (PRE); Gross Spitzkopf (fl. fr. May) *M. Jensen* 222 (PRE); Spitzkopf (fl. Jan.) *J. Boss* TM36415 (PRE); Swakopmund Distr., Ida Mine (fl. fr. Feb.) *L. Kers* 18 (S, WIND); Namib Desert Park, Tinkas Flats (fl. fr. Mar.) *W. Giess* 9617 (M, WIND); Namib Desert, Aukas Siding (fl. fr. May) *R. Bradfield* 570 (PRE); Welwitschia Flats, between Khan & Swakop Rivers (fl. fr. Apr.) *J. Abbott* NU54120 (NU). 22S16E – Karibib, Farm Anschluss (fl. fr. Mar.) *Giess, Volk & Bleissner* 5699 (M, PRE, WIND); Karibib Distr., Farm Sandemap (fl. fr. Jan.) *L. Kers* 1931 (S); Karibib (fl. fr. Mar.) *Kinges* 3194 (M), 3199 (M, PRE); Karibib, Okomitundu (fl. fr. June) *R. Seydel* 2947 (G, GB, K, L, M, WAG); Karibib, Farm Otjosondou (fl. fr. Feb.) *R. Seydel* 3353 (A, B, K, WAG); Karibib, Farm Nudis, *H. & E. Walter* 1198 (M). 22S17E – Windhoek Distr. (fl. fr. Mar.) *De Winter & Hardy* 7916 (K, M, PRE, WIND); Windhoek Distr., Otjisewa (fl. Apr.) *H. Kinges* 4692 (M). 23S14E – Namib, Kuiseb (fl. Dec.) *Strey* (S. Rehm-dedit.), 29 Dec. 1948 (M, holotype of *M. rehmi*). 23S15E – Kuisseb Bridge (fl. May) *S. & G. Lüdtkke* 642 (WIND); 17 km W. of Kuisseb River Canyon (fl. Apr.) *B. Nordenstam* 2396 (M, S). 23S17E – Rehoboth (fl. Feb.) *O. Volk* 11431 (M); Rehoboth Distr. Farm Djab (fl. fr.) *H. & E. Walter* 4449 (M); Rehoboth/Nauchas, Farm Namibgrens (fl. fr. Mar.) *H. & E. Walter* 1802 (M, WIND); Rehoboth, Bleissterauz (fl. fr. Oct.) *O. Volk* 927 (M); Rehoboth, Gravenstein (fl. fr. May) *Leippert* 4656 (M). 24S16E – Oberhof, 50 km E. of Maltahöhe (fl. fr. Feb.) *E. MacDonald* 353 (BM); Maltahöhe, Duwisib (fl.) *O. Volk* 6788 (M). 24S17E – Mariental, Hardap Dam (fl. fr. Apr.) *H. Schlieben* 10278 (PRE); Gideon Distr., 29 km SE. of Kalkrand (fl. fr. Feb.) *L. Kers* 2119 (S); Gibeon, Farm Dabib (fl. fr. May) *Giess, Volk & Bleissner* 6812 (M, WIND); Gibeon, Haribes (fl. fr. Apr.) *O. Volk* 12177 (M). 24S18E – 32 km E. of Mariental (fl. fr. Apr.) *E. Esterhuysen* 379 (BR); Mariental, near Gochas (fl. Apr.) *H. Schlieben* 10428 (PRE); 32 km E. of Mariental, between Witvlei and Hofmeyer (fl. fr. Apr.) *A. Wilman* 379 (BOL, GB, SAM). 25S16E – Bethanië Distr., 13 km N. of Helmeringhausen on road to Maltahöhe (fl. fr. Apr.) *B. Nordenstam* 2290 (M, S). 26S16E – Lüderitz Distr., 50 km N. of Aus (fl. fr. Apr.) *B. Nordenstam* 2269 (M, S). 26S17E – Bethanië Distr., 22 km W. of Konkiep (fl. fr. Apr.) *B. Nordenstam* 2197 (M, S). 26S18E – Keetmanshoop (fl. fr. Apr.) *I. Örtendahl* 162 (UPS); Keetmanshoop (fr.) *P. Range* 1318 (PRE). 27S17E – 5 km from Ai-Ais (fr. June) *Nordenstam & Lundgren* 148 (S). 27S18E – Klein Karas (fl. fr. Apr.) *I. Örtendahl* 97 (S, UPS); Tsawisis (fl. fr. Feb.) *H. Pearson* 4111 (SAM). 27S19E – Karasburg, Numdis (fl. fr. Jan.) *W. Auret* 5624 (K). Great Namaqualand (fl. fr. Apr.) *H. Schinz* 260 (Z). Great Namaqualand (fl. fr.) *Fleck* 919 (Z). Great Namaqualand, Sendelingsgrab (fl. fr. Apr.) *Fleck* 221a (Z). Great Namaqualand (fl. Oct.) *Dinter* 999 (Z). Bullsporter Flats (fl. fr. Dec.) *Dinter* 8319 (B, G, K, M, PRE, Z). Great Namaqualand, Fish River (fl. Apr.) *Fleck* 224a (Z). Kaokoveld, between Korikas Flag and Anigab (fr. Mar.) *W. Belek* 54 (Z). Hereroland, Salem (fr. July) *C. Dinter* 128 (Z).

NOMINA NUDA

- M. arabica* Steudel, Nomen. Bot. 158 (1841). Probably after W. SCHIMPER 1005 which belongs to *M. senegalensis* Guill. & Perr.
M. biflora var. *angustifolia* Burt Davy, Fl. Pl. and Ferns Tvl. 1: 193 (1926) = *M. angustifolia* E. Mey. ex A. Rich.
M. densiflora Täckh. & Boulos in Täckholm, Stud. Fl. Egypt, ed. 2, 299 (1974) = *M. nivea* (Dcne.) Webb.
M. heliotropioides var. *hassibii* Täckh. & Boulos in Täckholm, Stud. Fl. Egypt, ed. 2, 300 (1974) = *M. heliotropioides* (Cav.) Boiss.
M. nivea var. *intermedia* Täckh. & Boulos in Täckholm, Stud. Fl. Egypt, ed. 2, 300 (1974) = *M. nivea* (Dcne.) Webb.
M. nivea var. *villosa* Täckh. & Boulos in Täckholm, Stud. Fl. Egypt, ed. 2, 300 (1974) = *M. nivea* (Dcne.) Webb.

SPECIES EXCLUDED

- M. maskatensis* Bornm., Mitt. Thüring. Bot. Ver. 51: 347 (1944). The type specimen of *M. maskatensis* does not belong to the *Geraniaceae*. The floral parts of this specimen, however, is so poor that a positive identification is impossible.
M. tenuifolia Willd., Spec. Pl. 3 (1): 717 (1800). WILLDENOW 12598, the specimen on which this species is based, consists of a single flower of *M. speciosa* accompanied by a twig with leaves of a *Grielum* species.

ACKNOWLEDGEMENTS

The present author sincerely wishes to thank and acknowledge the following persons and instances:

Dr. A. J. M. LEEUWENBERG for his invaluable, professional and critical guidance in the investigation of *Monsonia* and in the compilation of the present monograph.

Prof. dr. H. C. D. DE WIT and the authority of the 'Landbouwhogeschool' of Wageningen for permission to work in the Laboratory of Plant Taxonomy and Plant Geography.

The Ministry of Education and Sciences of the Netherlands and the Central Research Committee of the University of the Orange Free State, South Africa, for financial grants that made possible the visit to the Netherlands.

The Council of the University of the Orange Free State for sabbatical leave granted to study in the Netherlands.

The Specialist Group of the Laboratory for Plant Taxonomy and Plant

Geography and the Ministry of Education and Sciences of the Netherlands for their allocations of funds to cover the costs of the drawings of the present monograph. The author is indebted to dr. J. J. F. E. DE WILDE in particular for his negotiations in this matter.

The artists, Miss JULIET WILLIAMSON and Miss YÜEN FANG TAN, for their professionally executed drawings. These drawings constitute an integral component to the completeness of the monograph.

Mr. G. BOELEMA for his assistance in administrative matters concerning the investigation and for his lithographic correcting and trimming of the monograph.

The laboratory photographer, Mr. J. W. MUGGE, for the excellent photos and colour slides produced in connection with the present investigation.

The herbarium staff of Wageningen for their administrative assistance.

The curators of the herbaria cited in the introduction for the loan of their material. The present author visited a number of these herbaria in person and is deeply indebted to the staff of these institutions for their friendly assistance.

The different libraries for photocopies of, and assistance in the location of relevant literature, in particular the libraries of the Botanical Research Institute (Pretoria, South Africa), the Laboratory of Plant Taxonomy and Plant Geography (Wageningen), the Leiden herbarium (Netherlands), the Kew herbarium (London), the Paris herbarium, and the Uppsala University (Sweden).

BIBLIOGRAPHY

Literature cited or consulted:

- ADAMSON, R. S. & T. M. SALTER, 1950. *Flora of the Cape Peninsula*: 520–521.
AITON, W. T., 1812. *Hortus Kewensis* ed. 2, 4: 192–193.
ANDREWS, F. W., 1950. *The flowering plants of the Anglo-egyptian Sudan* 1: 131.
BATTANDIER, J. A. & L. TRABUT, 1888. *Flore de L'Algérie* 1: 118.
BATTEN, A. & H. BOKELMAN, 1966. *Wild flowers of the eastern Cape Province*: 88.
BENTHAM, G. & J. D. HOOKER, 1862. *Genera plantarum* 1: 271–272.
BEWS, J. W., 1921. *Flora of Natal and Zululand*: 115.
BOISSIER, P. E., 1849. *Diagnosis plantarum sér. 2*, 2 (8): 120.
BOISSIER, P. E., 1867. *Flora Orientalis* 1: 897–898.
BORNMÜLLER, J. F. N., 1944. Über eine neue *Monsonia* der Flora Süd-Arabiens. *Mitt. thür. bot. Ges.* 51: 347.
BOYCE, S. G., 1954. The salt spray community. *Ecol. Mon.* 24: 29–67.
BREMELMANN, C. E. B. & A. A. OBERMEYER, 1935. *Sertum Kalahariense, a list of plants collected.* *Ann. Transv. Mus.* 16: 420.
BURMAN, N. L., 1768. *Flora Indica: prodromus flora Capensis*: 23.
CANDOLLE, A. L. P. P. DE, 1824. *Prodromus*: 638, 648.
CAVANILLES, A. J., 1787. *Diss.* 4: 193, 220–221, Tab. 113.
CHIOVENDA, E., 1919. Le piante raccolte dai prof. G. Dainelli, E. O. Marinelli in Eritrea nel 1905–06. *Journ. Bot. Ital.* 26: 151–152.
CHIOVENDA, E., 1929. *Flora Somala* 1: 121–122.

- CUFODONTIS, G. in E. CHIOVENDA, A. FIORI, D. LANZA & G. CUFODONTIS, 1939. Reale Aca. D'Italia: Missione Biologica nel Paese dei Borana 17: 90-91.
- CUFODONTIS, G., 1956. Enumeratio plantarum Aethiopiae Spermatophyta. Bull. Jard. bot. Etat Brux. Suppl. 26: 345-440.
- CURTIS, W., 1792. Botanical magazine 3: tab. 73.
- CURTIS, W., 1797. Botanical magazine 11: tab. 385.
- DAVY, J. BURTT, 1926. Flowering plants and ferns 1: 192-193.
- DECAISNE, J., 1835. Florula Sinaica. Ann. sc. nat. sér. 2, 3: 285.
- DINTER, K. in F. FEDDE, 1918. Reprim nov. Spec. Regni veg. Suppl. 3: 32.
- DINTER, K. in F. FEDDE, 1920. Reprim nov. Spec. Regni veg. 16: 344.
- DINTER, K. in F. FEDDE, 1924. Pflanzenarten aus Deutsch-Südwestafrika. Reprim nov. Spec. Regni veg. 19: 237.
- DINTER, K. in H. SCHINZ, 1931. Geraniaceae. Vjschr. naturf. Ges. Zürich 76: 144.
- DRÈGE, J. F., 1843. Zwei Pflanzengeographische Documente, Suppl. to Flora 26 (1843): 1-230, map.
- DUMONT DU COURSET, G. L. M., 1811. Le Botaniste Cultivateur ed. 2, 5: 49-50.
- DYER, R. A., 1957-58. The flowering plants of Africa 32: plate 1278.
- ECKLON, C. F. & C. ZEYHER, 1836. Enumeratio plantarum Africae Australis Extratropicale 1: 57-58.
- EDGEWORTH, M. P., 1862. Florula Mallica. Journ. Linn. Soc. (Bot.) 6: 200.
- EDGEWORTH, M. P. & J. D. HOOKER in J. D. HOOKER, 1874. Flora of British India 1 (2): 427-428.
- ENDLICHER, S., 1840. Genera plantarum: 1167.
- ENGLER, A., 1892. Über die Hochgebirgsflora des tropischen Afrika: 275.
- ENGLER, A., 1915. Die Pflanzenwelt Afrikas 3 (1): 705.
- EXELL, A. W. & F. A. MENDONÇA, 1951. Conspectus florum Angolensis 1: 258-259.
- EYELS, F., 1916. A record of plants collected in Southern Rhodesia arranged on Engler's system. Trans. R. Soc. S. Afr. 5: 386.
- FARIA, M. T. & J. DE A. MACEDO, 1974. Notas sobre a flora de Mocambique. Agron. Mozamb. 8: 93-96.
- FOCKE, W. O. & H. SCHINZ in H. SCHINZ, 1888. Beiträge zur Kenntnis der Flora von Deutsch-Südwest-Afrika. Verh. bot. Ver. Prov. Brandenb. 29: 61.
- GUILLARMOD, A. J., 1971. Flora of Lesotho: 198.
- GUILLEMIN, J. A. & S. PERROTTET, 1831. Flora Senegambiae 4: 131-132.
- HARVEY, W. H. in HARVEY, W. H. & O. W. SONDER, 1860. Flora Capensis 1: 254-256.
- HARVEY, W. H. in HARVEY, W. H. & O. W. SONDER, 1862. Flora Capensis 2: 591-592.
- HEINZ-SMITH, S., 1962. Wild flowers of the Nairobi Royal National Park: 20-21.
- HILLARY, O. M., 1947. The plant ecology of the coast dunes at Tongaat Beach, Natal. M.Sc.-thesis. University of South Africa.
- JEX-BLAKE, M., 1948. Some wild flowers of Kenya: 22-23.
- KEAY, R. W. J., 1954. Flora of West Tropical Africa 1 (1): 156-157.
- KERS, L. E., 1968. Contributions towards a revision of Monsonia (Geraniaceae). Bot. Notiser 121: 44-50.
- KERS, L. E., 1971. Monsonia parvifolia Schinz (Geraniaceae), a species with concealed spurs. Bot. Notiser 124: 208-212.
- KLOTZSCH, J. F., 1835-36. Bemerkungen zu den Geraniaceen und deren Verwandtschaften. Linnæa 10: 428-429.
- KNUTH, R. in A. ENGLER, 1907. Geraniaceae africanæ. Bot. Jb. 40: 62-67.
- KNUTH, R. in A. ENGLER, 1912. Geraniaceae. Pflanzenreich 4.129: 43, 290-311.
- KNUTH, R. in F. FEDDE, 1918. Geraniaceae novae. Reprim nov. Spec. Regni veg. 15: 137-138.
- KNUTH, R. in F. FEDDE, 1930. Geraniaceae novae. Reprim nov. Spec. Regni veg. 28: 89-90.
- KNUTH, R. in F. FEDDE, 1936. Geraniaceae novae. Reprim nov. Spec. Regni veg. 40: 220.
- KOKWARO, J. O., 1971. The family 'Geraniaceae' in north-east Tropical Africa. Webbia 25: 650-658.
- KOKWARO, J. O., 1971. Flora of Tropical east Africa, Geraniaceae: 10-14.
- LAWRENCE, G. H. M., 1951. Taxonomy of vascular plants: 737-775.
- LEISTNER, O. A. & J. W. MORRIS, 1976. South African place names. Ann. Cape Prov. Mus. 12: 1-565.

- LETTY, C., 1962. Wild flowers of the Transvaal: 176, plate 87.
- L'HÉRITIER DE BRUTELLE, C.-L., 1788. Geraniologia: tab. 41.
- LINNAEUS, C., 1767. Systema naturae ed. 12, 2: 508.
- LINNAEUS, C., 1767. Mantissa plantarum: 14, 105.
- LINNAEUS, C., 1784. Systema vegetabilium ed. 14: 696–697.
- LINNAEUS, C. in J. F. GMELIN, 1796. Systema vegetabilium 2: 1152.
- LINNAEUS FIL., C., 1781. Supplementum plantarum: 306, 341–342.
- MARLOTH, R., 1925. The flora of South Africa 1: 85, plate 30.
- MERXMÜLLER, H. & A. SCHREIBER, 1965. Drei verkannte Monsonien der Südnamib. Mitt. bot. StSamml., Münch. 5: 551–562.
- MERXMÜLLER, H. & A. SCHREIBER, 1966. Prodrömus einer Flora von Südwestafrika 64: 1–5.
- MOFFET, R. O., 1978. A monographic study of Sarcocaulon (Geraniaceae). M. Sc. thesis, Univ. Stellenbosh, Rep. of South Africa.
- MONTIN, L., 1780. Monsonia lobata, en ny Ört, beskrifven och afritad. Gothob. Samk. Handl., Wet. Afd. 1: 1–4.
- MÜLLER, T. & L. F. BOWDEN, 1963. Geraniaceae. Flora Zambesiaca 2: 136–140.
- MUNRO, W. in R. WIGHT & G. A. WALKER-ARNOTT, 1846. Icones plantarum Indiae orientalis 3 (4): 5, tab. 1074.
- OLIVER, D., 1868. Flora of Tropical Africa 1: 289–290.
- PHILLIPS, E. P., 1951. Genera of South African flowering plants: 428–429.
- PRESL, K. B., 1844. Bot. Bemerk. Prag: 26.
- RANGE, P. in F. FEDDE, 1934. Die Flora des Namalandes VI. Reprium nov. Spec. Regni veg. 36: 244.
- RECHINGER, K. H., P. AELLEN & E. ESFANDIARI, 1948. Anz. Österr. Akad. Wiss. Math.-Nat. 87: 300–301.
- RICE, E. C. & R. H. COMPTON, 1951. Wild flowers of the Cape of Good Hope: Plate 16.
- RICHARD, A., 1847. Tentamen Florae Abyssinicae 1: 115.
- RILEY, H. P., 1963. Families of flowering plants of southern Africa: 183.
- ROSS, J. H., 1972. Flora of Natal: 210.
- SALISBURY, R. A., 1796. Prodrömus: 311.
- SAUNDERS, W. W., 1869. Refugium botanicum 1: tab. 4.
- SCHINZ, H., 1888. Beiträge zur Kenntnis der Flora von Deutsch-Südwestafrika. Verh. bot. Ver. Prov. Brandenb. 29: 60–61.
- SCHINZ, H., 1890. Beiträge zur Kenntnis der Flora von Deutsch-Südwestafrika. Verh. bot. Ver. Prov. Brandenb. 31: 182–183.
- SCHINZ, H. 1895. Beiträge zur Kenntnis der Afrikanischen Flora. Bull. herb. Boiss. 3: 399–400.
- SCHINZ, H., 1903. Beiträge zur Kenntnis der Afrikanischen Flora. Bull. herb. Boiss. sér. 2, 3: 821–822.
- SCHINZ, H., 1904. Monsonia attenuata Harv. var. lanceolata Schinz. Vjschr. naturf. Ges. Zürich 49: 194–195.
- SCHONLAND, S., 1919. Verhandeling over de Phanerogamiese flora van de afdeling Uitenhage en Port Elizabeth. Bot. surv. S.A. mem. 1: 67.
- SCHREIBER, A., 1976. Nachtrag zur Gattung Monsonia L. in Südwestafrika. Mitt. bot. StSamml., Münch. 12: 377–390.
- SMITH, C. A., 1966. Common names of South African flowering plants. Bot. surv. S.A. mem. 35: 574.
- STANDLEY, P. C., 1917. Monsonia pumila Standley. Smithsonian Misc. Coll. 68 (5): 8–9.
- STEUDEL, E., 1841. Nomenclator botanicus ed. 2, 2: 158.
- STOCKS, M. S. in R. WIGHT, 1846. Notes on Indian Botany. Calcutta Journ. nat. hist. 7: 18–20.
- SUESSENGUTH, K., 1950. Geraniaceae. Mitt. bot. StSamml., Münch. 1: 16.
- SUESSENGUTH, K. & KARL, 1950. Geraniaceae. Mitt. bot. StSamml. Münch. 2: 47–48.
- SWEET, R., 1821. Geraniaceae 1: 77.
- SWEET, R., 1824. Geraniaceae 2: 199.
- SWEET, R., 1825. Geraniaceae 3: 273.
- SYSTEMATICS ASSOCIATION COMMITTEE FOR DESCRIPTIVE BIOLOGICAL TERMINOLOGY, 1962. Terminology of simple symmetrical plane shapes. Taxon 11: 145–156 & 245–247.
- SZYSZYLOWICZ, I., 1888. Pol. Disc.: 6–7.

- TÄCKHOLM, V., 1974. Students flora of Egypt, ed. 2: 299–300.
 THUNBERG, C. T., 1800. Prodrömus plantarum Capensium 2: 112.
 THUNBERG, C. T., 1823. Flora Capensis 2: 509–511.
 TRAUSELD, W. R., 1969. Wild flowers of the Natal Drakensberg: 108–109.
 VICARY, N., 1847. Some notes on the botany of Sinde. Journ. As. Soc. Beng. 16 (2): 1161.
 WATT, J. M. & M. G. BREYER-BRANDWIJK, 1962. Medicinal and poisonous plants of southern and eastern Africa: 451–452.
 WEBB, P. B., 1854. Fragmenta florulae Aethiopico-Aegyptiacae 2: 59.
 WIGHT, R. in R. WIGHT & G. A. WALKER-ARNOTT, 1846. Icones plantarum Indiae orientalis 3 (4): 5.
 WILLDENOW, C. L., 1800. Species plantarum 3 (1): 638, 717–719.
 WILLDENOW, C. L., 1809. Enumeratio plantarum horti Berolinensis: 717–718.
 WILMAN, M., 1946. Preliminary check list of the flowering plants and ferns of Griqualand West (southern Africa): 40.
 WRIGHT, W. G., 1963. Wild flowers of southern Africa: Natal: 63–64.

Present address of the author:

Department of Botany
 University of the Orange Free State
 Bloemfontein
 Rep. of South Africa

INDEX OF NAMES

The main entries of the correct taxon-names are indicated by **bold** printed page numbers. All figures are indicated by an asterisk attached to their page numbers.

Synonyms, nomina nuda, and excluded names are in *italics*, with the new synonyms listed as syn. nov.

	page
Erodium	4
<i>chumbalense</i> Munro	98
<i>heliotropioides</i> (Cav.) Willd.	58
<i>niveum</i> Dcne.	85
Geranium	4
<i>emarginatum</i> L.f.	39
<i>heliotropioides</i> Cav.	58
Monsonia L.	5
<i>alexandraensis</i> Knuth, syn. nov.	54, 57
<i>angustifolia</i> E. Mey. ex A. Rich.	3, 4, 8, 10 , 11*, 13, 26, 30, 122
<i>arabica</i> Steudel	122
<i>asiatica</i> Vicary	58, 62
<i>attenuata</i> Harv.	3, 4, 6, 18 , 19*, 21, 57, 114

<i>Monsonia attenuata</i> var. <i>lanceolata</i> Schinz	53
Section <i>Barbatae</i>	4, 5
<i>belfastensis</i> Knuth, syn. nov.	18, 22
<i>betschuanica</i> Knuth, syn. nov.	28, 30
<i>biflora</i> DC.	26, 30, 31
<i>biflora</i> var. <i>angustifolia</i> Burt Davy	30, 122
<i>biflora</i> var. <i>pygmaea</i> Chiov., syn. nov.	10, 14
Section <i>Biflorae</i>	4
<i>brevirostrata</i> Knuth	3, 4, 7, 23, 24*, 25
<i>burkeana</i> Planch. ex Harv.	3, 4, 8, 26, 27*, 29
<i>chumbalensis</i> (Munro) Wight	98, 105
<i>commixta</i> Rech. fil., Aellen & Esfandiari, syn. nov.	85, 89
<i>densiflora</i> Täckh. & Boulos	122
<i>depressa</i> Dinter ex Schinz	32, 35
<i>deserticola</i> Dinter ex Knuth	3, 4, 5, 8, 32, 33*, 34
<i>dregeana</i> Presl	106, 110
<i>drudeana</i> Schinz	3, 4, 9, 35, 37*, 38
<i>emarginata</i> (L.f.) l'Hérit.	3, 4, 8, 39, 40*, 42, 47, 50, 57
<i>filia</i> L.f.	106
<i>galpinii</i> Schlechter ex Knuth	3, 4, 7, 44, 45*, 46
Section <i>Genistiformis</i>	4
<i>glandulosissima</i> Schinz	28, 32
<i>glauca</i> Knuth	3, 4, 8, 47, 49*, 51
<i>grandifolia</i> Knuth	3, 4, 7, 8, 22, 43, 53, 55*, 56, 81
<i>heliotropioides</i> (Cav.) Boiss.	3, 4, 5, 7, 57, 59*, 61, 62, 122
<i>heliotropioides</i> var. <i>hassibii</i> Täckh. & Boulos	122
<i>hispida</i> Boiss.	58, 60
<i>igneae</i> Schinz	3, 4, 8, 62, 63*, 65, 75
<i>ignorata</i> Merxm. & Schreiber	3, 4, 9, 38, 66, 67*, 68
<i>incisa</i> Dum.-Cours.	106
<i>keniensis</i> Knuth & Mildbraed, syn. nov.	72, 77
<i>lanceolata</i> (Schinz) Knuth, syn. nov.	53, 57
<i>lancifolia</i> (Szysz.) Burt Davy	47, 52
<i>lanuginosa</i> Knuth	3, 4, 6, 7, 69, 70*, 72
<i>lawiana</i> Stocks in Wight	100, 105
<i>lawiana</i> Stokes	101
<i>lobata</i> Mont., syn. nov.	106, 109, 110
<i>longipes</i> Knuth	3, 4, 5, 6, 7, 8, 72, 74*, 76
<i>longipes</i> var. <i>boranensis</i> Cuf., syn. nov.	72, 75, 76
<i>luederitziana</i> Focke & Schinz	3, 4, 8, 77, 78*, 80, 93
<i>mallica</i> Edgew.	58, 62
<i>malvaeflora</i> Schinz	28, 32
<i>malvaefolia</i> Schinz	28
<i>maskatensis</i> Bornm. (excluded)	122
Section <i>Monsonia</i>	4

<i>Monsonia namaensis</i> Dinter	77, 80, 81
<i>natalensis</i> Knuth	3, 4, 7, 57, 81 , 82*, 84
<i>nivea</i> (Dcne.) Webb	3, 4, 5, 7, 84 , 86*, 88, 89, 122
<i>nivea</i> var. <i>intermedia</i> Täckh. & Boulos	122
<i>nivea</i> var. <i>villosa</i> Täckh. & Boulos	122
Section <i>Odontopetalum</i>	4
Section <i>Olopetalum</i>	4
<i>orientali-africana</i> Knuth, syn. nov.	72, 75
<i>ovata</i> Cav., syn. nov.	39, 43
<i>ovata</i> var. <i>biflora</i> Harv., syn. nov.	39, 42, 43
<i>ovata</i> subsp. <i>glauca</i> (Knuth) Bowden & T. Müll., syn. nov.	47, 50
<i>ovata</i> var. <i>lancifolia</i> Szysz.	47, 52
Section <i>Ovatae</i>	4
<i>parvifolia</i> Schinz	3, 4, 8, 90 , 91*, 93
<i>pilosa</i> Willd., syn. nov.	106, 110
Section <i>Plumosae</i>	4
<i>praemorsa</i> E. Mey. ex Knuth	3, 4, 8, 94 , 95*, 97
<i>pumila</i> Standley, syn. nov.	72
<i>rehmii</i> Suesseng. & Karl	117, 121
Section <i>Rotundae</i>	4
<i>rudatisii</i> Knuth, syn. nov.	54, 57
Section <i>Sarcocaulon</i>	4
<i>senecioides</i> Knuth, syn. nov.	94, 97, 98
<i>senegalensis</i> Guill. & Perr.	3, 4, 8, 58, 98 , 99*, 102, 105, 122
<i>senegalensis</i> var. <i>hirsutissima</i> Harv.	90, 94
<i>speciosa</i> L.	3, 4, 5, 6, 105 , 107*, 109, 122
<i>stricta</i> Knuth, syn. nov.	47, 51, 52
<i>tenuifolia</i> Willd. (excluded)	122
<i>transvaalensis</i> Knuth	3, 4, 7, 22, 111 , 112*, 113
<i>trilobata</i> Kers	3, 4, 8, 114 , 115*, 116
<i>umbellata</i> Harv.	3, 4, 8, 117 , 118*, 120
Section <i>Umbellatae</i>	4
<i>uniflora</i> Chiov., syn. nov.	62, 65
Pelargonium	4
Sarcocaulon	4