

are a unique feature in the genus *Plectranthus*, possibly assisting flying insects in effective pollination. The corolla tube of *P. ecklonii* is 12–18 mm long and slightly expanding to the throat, whereas the corolla tube of *P. ambiguus* is 20–25 mm long.

Plectranthus mzimvubuensis is a scrambling shrub with pendent branches. It is endemic to south-facing Ecce Group shale cliff faces (Karoo Supergroup) along the Mzimvubu River, upstream from Port St Johns in Eastern Cape (Figure 4). *P. mzimvubuensis* was first collected during a rubber-boat expedition to study the cremnophilous flora of the Mzimvubu River Valley in the autumn of 2002. The Mzimvubu River, after which this species is named, is the largest river in the Transkei portion of Eastern Cape. The Xhosa name *Mzimvubu* means 'the home of the hippopotamus' (*Hippopotamus amphibius*), but these animals were wiped out in the area more than a century ago. The new species was encountered below Ludonga Village, about 40 km from the river mouth, at an altitude of ± 600 m. The vegetation consists of savanna and the rainfall occurs mainly from spring to autumn, 800–1 000 mm per annum. The climate is subtropical, with hot summers, dry, sunny, frost-free winters and cool evenings. The population of *P. mzimvubuensis* was encountered on a south-facing cliff in light shade, together with other succulent plants such as *Adromischus cristatus*, *Bulbine natalensis*, *Crassula cordata*, *C. cultrata*, *C. multicava* subsp. *floribunda*, *C. orbicularis*, *Cyanotis speciosus*, *Delosperma tradescantioides* and *Peperomia blanda*. Trees and shrubs in the area include *Bauhinia bowkeri*, *Celtis africana*, *Ficus burkei* and *Euphorbia tirucalli*. Cuttings taken from *P. mzimvubuensis* rooted rapidly and are grown at Kirstenbosch National Botanical Garden.

Although only a small population of the new species was found, no threats seem to exist on or near the cliff face and the species is expected to be more common in similar habitats elsewhere in the river valley. Its present conservation status is classified as Rare, but not threatened.

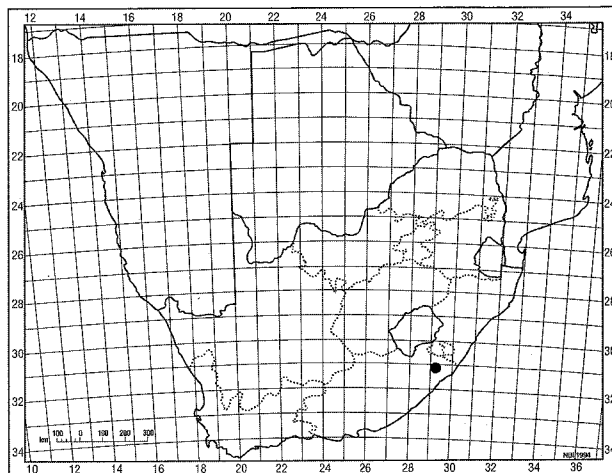


FIGURE 4.—Known distribution of *Plectranthus mzimvubuensis*.

ACKNOWLEDGEMENTS

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REFERENCE

CODD, L.E. 1985. Lamiaceae. In O.A. Leistner, *Flora of southern Africa* 28,4: 137–172.

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PTERIDOPHYTA

DRYOPTERIS GORGONEA (PTEROPSIDA: DRYOPTERIDACEAE), A NEW SPECIES FROM THE CAPE VERDE ISLANDS

INTRODUCTION

The Cape Verde is a group of 10 major islands and several smaller islands situated in the Atlantic Ocean (15–17°N, 23–25°W), ± 620 km west of the coast of Mauritania. Nine of the islands, which are of volcanic origin, are inhabited. The Barvalento or Windward Islands consist of Santo Antão, São Vicente, Santa Luzia, Ilheu Branco, Ilheu Raso, São Nicolau, Sal and Boa Vista, whereas the Sotavento or Leeward group consists of Maio, Santiago, Fogo and Brava. Santiago, the main island, is mountainous and like most islands it is arid. Fogo has the highest peak within the island group with Mt Fogo reach-

ing 2 840 m. Santo Antão, the most northern island has the highest rainfall. The climate is oceanic with daily highs ranging between 20–29°C from August to October.

The island group has a depauperate flora as a result of its arid climate. To date, 35 pteridophyte species have been recorded for the Cape Verde Islands (Lobin *et al.* 1998). *Dryopteris* collections from the islands have been ascribed to various taxa, of which a summary is provided by Lobin *et al.* (1998). Fraser-Jenkins (1982) was the first to show that two *Dryopteris* species occur on the islands, ascribing them to *D. oligodonta* (Desv.) Pic.Serm. and *D. pentheri* (Krasser) C.Chr.

During the review of the African *Dryopteris* species currently undertaken by me, I had the opportunity to study most of the relevant types. I therefore can confirm that *D. oligodonta* is indeed one of the species occurring in the Cape Verde Islands. The other species, however, ascribed to *D. pentheri* by Fraser-Jenkins (1982), and embraced by Lobin *et al.* (1998) is not that species, but represents a distinct entity. Furthermore, several collections belonging to this taxon have erroneously been ascribed to *D. oligodonta* by Lobin *et al.* (1998).

The earliest available name for this taxon appears to be *Dryopteris elongata* (Aiton) Sim var. *simplex* A. Chev. However, in describing the variety, three collections were cited of which *Chevalier 45476* is taken as the type, as he states 'Covão, 900 m alt. avec le type 45476,' whereas the other two collections are considered as paratypes (Chevalier 1935). In spite of Chevalier clearly having designated his number 45476 as the holotype, it was lectotyped by Lobin *et al.* (1998) with the same collection. This collection, however, is *D. oligodonta* whereas *Chevalier 45113* and *45499* are not. *Dryopteris elongata* var. *simplex* therefore becomes a synonym of *D. oligodonta*. Since no name exists for *Chevalier 45113* and *Chevalier 45499*, it is here described as *D. gorgonea*, an epithet derived from the Gorgades, an old geographical name for the island group.

***Dryopteris gorgonea* J.P.Roux, sp. nov., a *D. oligodonta* stomatibus bene majoribus glandibus laminae differt.**

TYPE.—Cape Verde Islands, Fogo, Espia, Mosteiros, 1-08-1934, A. *Chevalier 45113* (P!, holo.; COI!, K!, iso.).

Plants terrestrial. *Rhizome* up to 50 mm long, up to 5 mm in diameter, suberect to erect, closely set with roots, crowded stipe bases and scales. *Fronde* up to 1 020 mm long, suberect to arching; *stipe* up to 640 mm long, up to 9 mm in diameter, proximally castaneous, adaxially flattened and densely set with glands and pluricellular dendroid hairs and scales; larger stipe scales up to 23 mm long, up to 3 mm wide, concolorous or bicolorous, if bicolorous then centrally castaneous to ferruginous with a narrow staminate margin, firmly herbaceous, broadly attached, linear-attenuate, margin variously set with long, reflexed, pluricellular, mostly uniseriate hairs and capitate glands; capitate glands also occur on the scale surface; apex flagelliform; stipe higher up stramineous, shallowly sulcate and sparsely scaled, larger scales up to 5 mm long, up to 4 mm wide, fugaceous, concolorous, ferruginous to stramineous, chartaceous, broadly attached, lanceolate to broadly ovate, variously set with few short or long marginal outgrowths and glands, surface variously set with capitate glands, apex flagelliform. *Lamina* herbaceous, ovate to broadly ovate, up to 650 mm long, up to 31 mm wide, anadromous, catadromous towards apex, up to 2-pinnate-pinnatifid, with up to 13 petiolated pinna pairs; rachis adaxially shallowly sulcate, narrowly winged towards apex, variously set with clavate glands and scales; scales up to 5 mm long, up to 4 mm wide, fugaceous, stramineous to ferruginous, chartaceous, broadly attached, margins variously set with a few short and/or long outgrowths and glands, surface variously set with capitate glands; apex flagelliform. *Pinnae* near opposite to alternate, slightly overlapping or

not, up to 1-pinnate-pinnatifid, basal pair mostly longest, not conspicuously basiscopically developed, ovate, lanceolate, or oblong-acute distally, up to 193 mm long, up to 85 mm wide, with up to 6 petiolated pinna pairs; petiole up to 8 mm long; pinna-rachis shallowly sulcate adaxially, narrowly winged for most of the length, closely set with clavate glands, sparsely scaled; scales lanceolate to broadly ovate, up to 3.5 mm long, up to 1 mm wide, ferruginous to stramineous, chartaceous, sessile, often somewhat bullate, variously set with short or long, mostly uniseriate hairs and capitate glands, few capitate glands also occur on scale surface, apex terminates in a short or long uniseriate series of oblong cells. *Pinnules* near opposite to alternate, slightly overlapping or not, pinnatifid, ovate to oblong-obtuse, up to 48 mm long, up to 24 mm wide, adaxially glandular along and between veins, also with scattered isocytic hairs along costa, abaxially closely set with clavate glands (50–)68.48(–98) μm long and isocytic hairs along veins; hairs often glandular near base; costa adaxially shallowly sulcate, glandular, abaxially variously scaled; scales up to 3 mm long, up to 1 mm wide, ferruginous to stramineous, chartaceous, sessile to short-stalked, often somewhat bullate, similar to those on pinna-rachis; petiolule up to 2 mm long; segments oblong-obtuse, up to 13 mm long, up to 6 mm wide, lobed; lobes dentate, teeth cuneate. *Venation* anadromous, catadromous towards apex, pinnately branched, branches end in teeth near margin. *Stomata* mostly of polocytic type, (42–)53.31(–64) μm long. *Sori* circular, medial on predominantly anadromous vein branches, 2-seriate on segments, discrete or touching at maturity, up to 1.2 mm diam.; *indusium* brown, firmly herbaceous, up to 0.5 mm diam., flabellate, entire to repand, glandular along margin and on surface. *Sporangium*: stalk simple, glandular, or haired; capsule with (10–)13(–16) indurated annulus cells, epistomium 4(or 5)-celled, hypostomium 4(or 5)-celled; *spores* brown, ellipsoidal, monolete, perispore folded to form narrow reticulate ridges, (38–)42.44(–46) \times (24–)27.86(–32) μm . Figure 5A–I.

Diagnostic features and relationships

Dryopteris gorgonea differs from *D. pentheri*, to which it was formerly ascribed, in the scales often bearing capitate glands on the surface and the presence of clavate glands (50–)68.48(–98) μm long along the frond axes and on the lamina surfaces. In *D. pentheri* the glands are oblong, (60–)137.02(–260) μm long, and restricted to the frond axes and veins. Also the 2-celled hairs diagnostic of *D. pentheri*, have not been recorded for *D. gorgonea*. *Dryopteris gorgonea* is closely related to *D. oligodonta*, but differs in the longer clavate glands [(36–)51.31(–60) vs. (50–)68.48(–98) μm] and larger stomata [(30–)37.54(–48) vs. (42–)53.31(–64) μm]. The larger stomata suggest it being tetraploid, rather than diploid, as is *D. oligodonta* (Fraser-Jenkins 1982).

Distribution and ecology

Dryopteris gorgonea appears to be endemic to the Cape Verde Islands having been recorded from Santo Antão, São Vicente and the summit of Monte Gordo on São Nicolau. Unfortunately, no ecological information has been record-

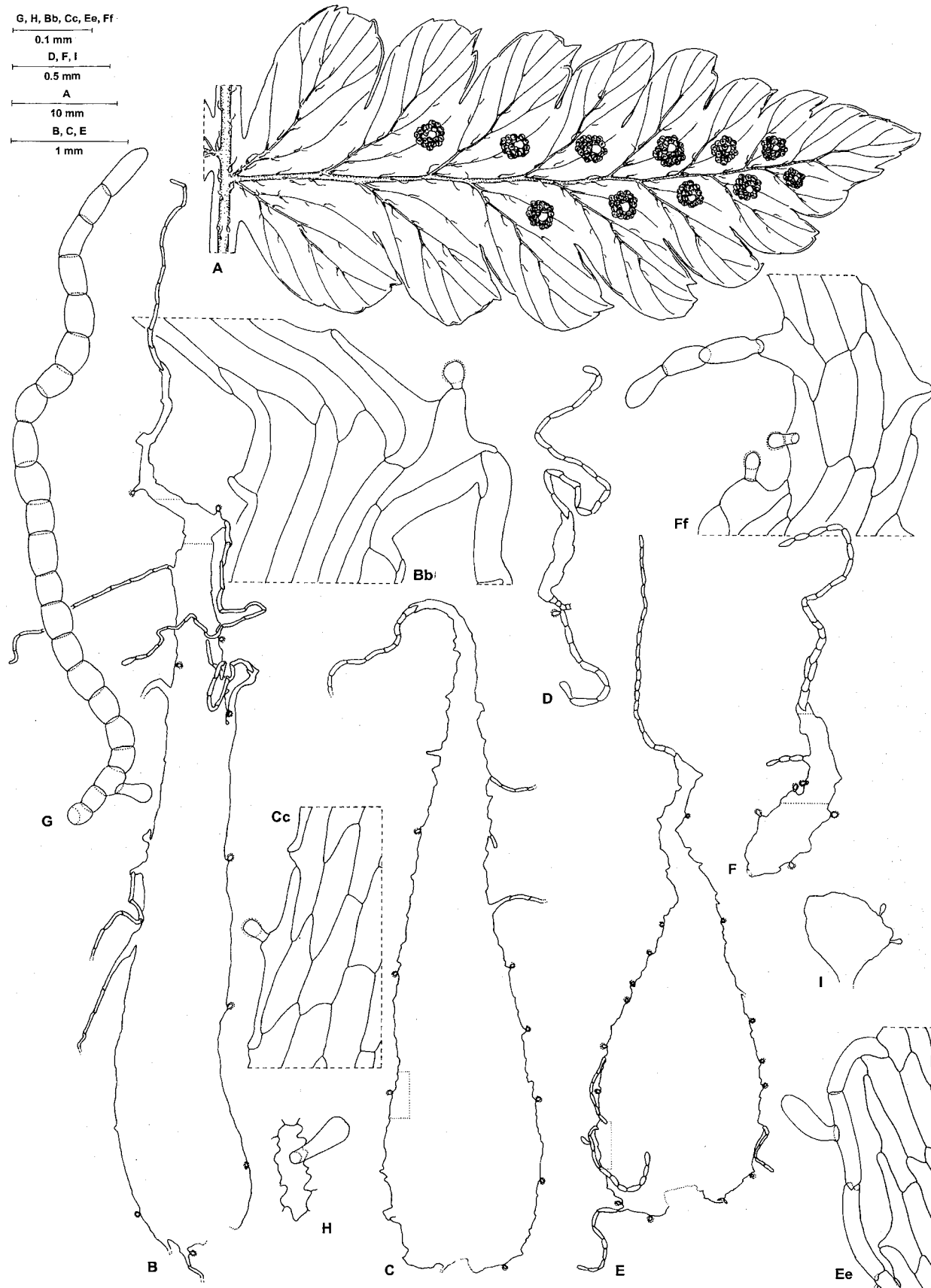


FIGURE 5.—A-I: *Dryopteris gorgonea*. A, abaxial view of fertile pinnule; B, stipe scale; Bb, section of B showing cellular structure; C, D, rachis scales; Cc, section of C showing cellular structure; E, secondary rachis scale; Ee, section of E showing cellular structure; F, scale from abaxial surface of costa; Ff, section of F showing cellular structure; G, hair from abaxial surface of lamina; H, clavate gland from abaxial surface of lamina; I, indusium. Scale bars: A, 10 mm; B, C, E, 1 mm; D, F, I, 0.5 mm; Bb, Cc, Ee, Ff, G, H, 0.1 mm. Drawn from *Chevalier 45113 (P)* by J.P. Roux.

ed. No recent collections of the species appear to have been made from any of the islands and it has been suggested to be extinct (Lobin & Ormonde 1996; Lobin *et al.* 1998). Since the species closely resembles *D. oligodonta*, a careful search for it on the islands should continue.

Other material examined

CAPE VERDE ISLANDS.—São Nicolau: in summo monte Gurdo, 1851, *C. Bolle s.n.* (COI, K); Monte Gordo, 24-02-1864, *R.T. Lowe s.n.* (K); *Forbes s.n.* (K). Santo Antão: Covão, 09-1934, *A. Chevalier 45499* (P); Covão, 23, 24-09-1934, *A. Chevalier 45532* (COI, K, P). Sine loc.: Cape Verdes, *Cardosa 169* (K); Cap du Vert, *Forbes s.n.* (K).

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REFERENCES

- CHEVALIER, A. 1935. Les Iles du Cap Vert, géographie, biogéographie, agriculture. Flore de l'Archipel. *Revue de Botanique Appliquée et d'Agriculture Tropicale* 15(170-171): 1-336.
- FRASER-JENKINS, C.F. 1982. *Dryopteris* in Spain, Portugal and Macaronesia. *Boletim da Sociedade Broteriana*, sér. 2, 55: 175-336.
- LOBIN, W., FISCHER, E. & ORMONDE, J. 1998. The ferns and fern-allies (Pteridophyta) of the Cape Verde Islands, West Africa. *Nova Hedwigia, Beihefte* 115: 1-115.
- LOBIN, W. & ORMUNDE, J. 1996. Lista vermelha para os Pteridófitos (Pteridophyta). In T. Leyens & W. Lobin, Primeira lista vermelha do Cabo Verde. *Courier Forschungsinstitut Senckenberg* 193: 37-42.

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CRASSULACEAE

ADROMISCHUS SCHULDtianus SUBSP. BRANDBERGENSIS, A NEW SUBSPECIES AND A CHECKLIST OF THE SUCCULENT FLORA OF THE BRANDBERG, NAMIBIA

INTRODUCTION

Adromischus schuldianus (Poelln.) Poelln. subsp. *brandbergensis* B.Nord. & Van Jaarsv., a new subspecies endemic to the Brandberg, northwestern Namibia, is described. Since its discovery by H.J. Wiss below Aigub Peak (Nordenstam 1974), by the second author on Königstein and Orabeskop, and later by P.V. Bruyns (Craven & Craven 2000), this taxon, due to its distinct leaf characters and isolated distribution, demanded some form of taxonomic recognition. The new subspecies is at once distinguished from *A. schuldianus* (Poelln.) Poelln. subsp. *schuldianus* by its subfusiform-ellipsoid and semiterete leaves without a clear margin; they are usually shallowly concave above, becoming channelled during the dry season. Both *A. schuldianus* subsp. *schuldianus* and subsp. *juttiae* have dorsiventrally flattened, oblanceolate (rarely obovate) leaves.

Adromischus schuldianus* (Poelln.) Poelln.** subsp. ***brandbergensis B.Nord. & Van Jaarsv., subsp. nov., differt a *A. schuldiano* (Poelln.) Poelln. subsp. *schuldianus* foliis subfusiformibus-ellipsoideis plusminusve semiteretibus 20-90 mm longis 10-15 mm crassis supra applanatis vel leviter concavis sine margine distincto apice acutis-obtusis saepe recurvatis.

TYPE.—Namibia, 2114 (Uis): Orabeskop, 2 300 m, Brandberg Mountain, (-AA), 06-04-1964, *Nordenstam 3677* (ex hort. Bot. Garden, Lund, specimen in WIND, holo.!; M!, S!, iso.).

Dwarf mat-forming, branched succulent up to 70 mm high, filling crevices in granite rock fissures. *Roots* fibrous. *Branches* short and succulent, in cultivation up to 70 × 10 mm. *Leaves* alternate, spreading, subfusiform-ellipsoid to ± semiterete, 20-70 × 10-15 mm, without a

distinct margin, flattened to shallowly concave above, tapering to base and acute-obtuse and often somewhat recurved at tip, dark green and marbled with white or dull red areas. *Inflorescence* a ± one-sided raceme with 2-15 almost patent flowers; peduncle 150-500 mm long (in cultivation), 1.2-1.5 mm thick, simple or branching above middle, terete, glabrous, greenish brown or reddish; bracts 1.5 mm long, acute, succulent; bracteoles 2, basal, subulate, ± 1 mm long, acute; pedicels 5-17 mm long, somewhat thickened towards apex. *Calyx*: lobes narrowly triangular, 1.8-2.0 × 0.6-1.0 mm, acute. *Corolla* 12-15 mm long, pinkish white or wax-coloured; tube cylindrical, 2.5-3.0 mm wide; lobes patent, deltoid, acute, with somewhat wavy margins; throat bright purple inside. *Styles* subulate-filiform, 5-8 mm long, white at apex, pale green at base. *Squamae* oblong, bifid, 1 × 0.8 mm, white. *Stamens*: filaments white or pinkish, five longer ones adnate for 5 mm, ± 12 mm long, five shorter ones adnate for 3 mm, ± 10 mm long; anthers oblong, 0.4 mm long. Figure 6.

Adromischus schuldianus subsp. *brandbergensis* appears to be endemic to the Brandberg Mountain in northwestern Namibia (Figure 7). It occurs in rock crevices of steep southern and eastern slopes and cliffs of the mountain from ± 1 500 m to ± 2 300 m. It is not common anywhere but occurs scattered in protected fissures and crevices in small to dense groups due to vegetative proliferation. Associated plants in the same habitat include *Aloe dichotoma*, *A. hereroensis*, *A. littoralis*, *Cyphostemma currorii* and *Kalanchoe lanceolata*, also *Diospyros acocksii*, *Euphorbia mairitanica*, *Ficus ilicina*, *Obetia carruthersiana*, *Salvia garipensis* and *Tetradenia riparia*.

In his 1985 revision of the genus *Adromischus*, Toelken recognized 27 taxa. A very handy popular version of the same account was published by Pilbeam *et al.* in 1998,

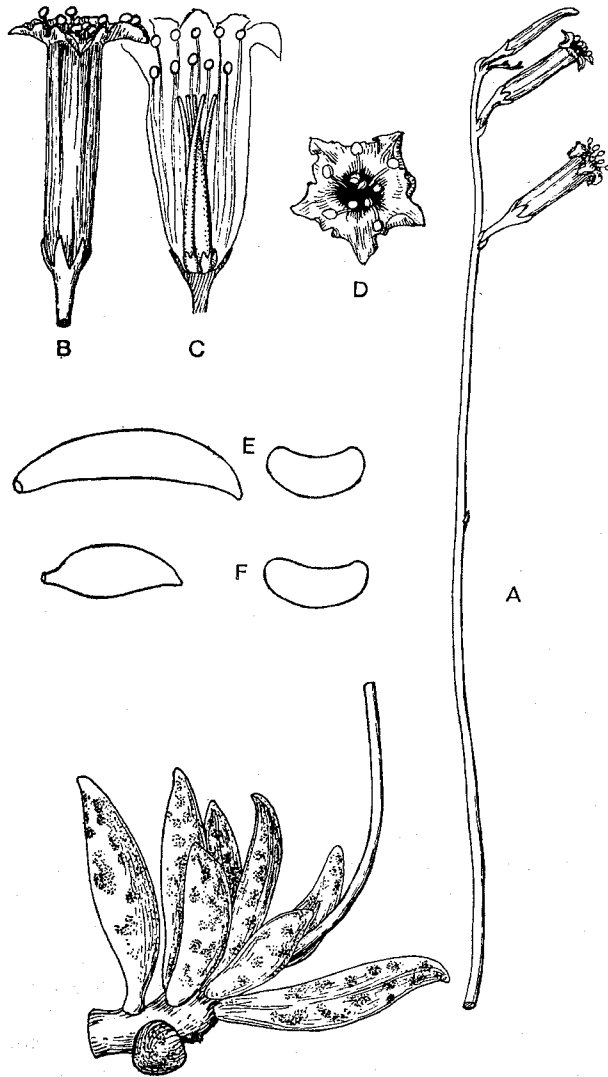


FIGURE 6.—*A. schuldianus* subsp. *brandbergensis* B.Nord. & Van Jaarsv. Illustration based on a cultivated plant that flowered in the Botanical Garden, Lund, Sweden: A, flowering branch, $\times 1$; B, flower, $\times 2.5$; C, corolla, opened to show styles and stamens, $\times 2.5$; D, corolla, dorsal view, $\times 2.5$; E, F, leaf outlines in side view and transect, $\times 1$. Reprinted, with permission, from Nordenstam. Drawn by Bertil Nordenstam.

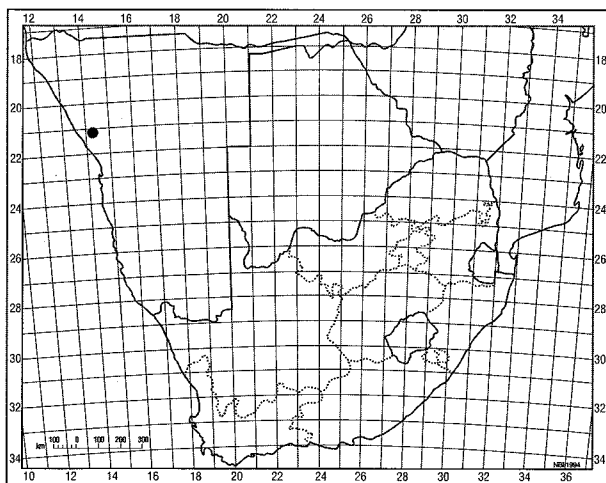


FIGURE 7.—Known distribution of *Adromischus schuldianus* subsp. *brandbergensis*.

reflecting the horticultural value of the group. *Adromischus schuldianus* subsp. *brandbergensis* belongs to section *Boreali* (Toelken 1978) which includes a few other taxa confined to the northern parts of South Africa and Namibia, for example, *A. schuldianus* subsp. *schuldianus*, *A. trigynus* and *A. umbraticola*. From these the new subspecies is at once distinguished by its subfusiform or almost terete leaves distinctly concave on the upper side. It is found the furthest north of any *Adromischus* species.

Of all the members of section *Boreali*, *A. trigynus* has the most southern distribution. It is confined to dolerite outcrops, growing in shallow soil at altitudes above 1 000 m in the Nama-Karoo Biome in an area that receives predominantly summer and autumn rain. *A. trigynus* ranges from southern Namibia and Pofadder in the west to Aliwal North and the southern Free State in the east.

Adromischus umbraticola occurs on south-facing cliffs and in the shallow soil of sandstone and quartzite outcrops on the Highveld of Gauteng, mountains of the North-West and further north to the Blouberg and Chuniespoort (Limpopo). It is common on rocky ridges of the Witwatersrand and in the Magaliesberg range. The vegetation of its habitat consists mainly of dry, short savanna. It has very brittle leaves, and plants often colonize shallow pockets of soil where there is little competition from mesophytic taxa.

Toelken (1985) recognizes two subspecies of *A. schuldianus*, namely subsp. *schuldianus* and subsp. *juttae*, characterized by their oblanceolate to obovate leaves but mainly differentiated by their stem and branch length, 40–80 mm tall, and little branched in subsp. *juttae* as opposed to branches 10–30 mm long in subsp. *schuldianus*, which occurs in arid savanna in central Namibia, from the Erongo and Auas Mountains in the north to near Aus Village and the Karas Mountains in the south. It grows on rock outcrops, usually with a southern aspect. The second subspecies, *A. schuldianus* subsp. *juttae* is confined to the Karasberg in southern Namibia and is differentiated by its longer branches; the plants occur in the Nama-Karoo. Bruyns (1990) noticed variability in the leaf shape of *A. schuldianus* subsp. *schuldianus* on the Brandberg. He found flat- and fusiform-leaved plants occurring together. However, in spite of some local variation, the majority of specimens encountered on the Brandberg are represented by the subterete-leaved plants here described as a distinct subspecies.

The Brandberg is an isolated granite inselberg of $\pm 21 \times 25$ km and Königstein (2 573 m) represents the highest peak in Namibia. It is surrounded by Namib Desert with typical species such as *Welwitschia mirabilis*, annual herbs and grasses, and foothills with woody species including *Acacia montis-usti*, *Adenolobus garipensis*, *Commiphora saxicola*, *C. virgata*, *C. wildii* and *Moringa ovalifolia*. The rainfall on the lower slopes is low (less than 100 mm per annum) and typical of the Namib.

A total of 480 species was recorded from the mountain by Craven & Craven (2000). The vegetation of the Brandberg is slowly transformed with altitude (increase in rainfall, decrease in temperature). At 2 000 m and above it is reminiscent of renosterveld, not unlike the