

## New records and new species of Asclepiadaceae from Namibia

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**Keywords:** Asclepiadaceae, Namibia, new records, new species, taxonomy

### ABSTRACT

Eleven species of Asclepiadaceae not previously recorded from Namibia are discussed. Of these, *Brachystelma codonanthum* Bruyns, *B. recurvatum* Bruyns and *Schizoglossum saccatum* Bruyns are new species. The new combinations *Brachystelma gymnopodum* (Schltr.) Bruyns (for *Ceropegia pygmaea* Schinz) and *B. schultzei* (Schltr.) Bruyns [for *Tenaris schultzei* (Schltr.) E. Phillips] are proposed and the delimitation of *Brachystelma* R. Br. against *Ceropegia* L. and *Tenaris* E. Mey. is discussed. Notes are also included on little-known species, and the species of *Gomphocarpus* R. Br. in Namibia are enumerated.

### UITTREKSEL

Elf spesies van die Asclepiadaceae wat nog nie voorheen in Namibia aangeteken is nie, word bespreek. Hiervan is *Brachystelma codonanthum* Bruyns, *B. recurvatum* Bruyns en *Schizoglossum saccatum* Bruyns nuwe spesies. Die nuwe kombinasies *Brachystelma gymnopodum* (Schltr.) Bruyns (vir *Ceropegia pygmaea* Schinz) en *B. schultzei* (Schltr.) Bruyns [vir *Tenaris schultzei* (Schltr.) E. Phillips] word voorgestel en die omgrensing van *Brachystelma* R. Br. teenoor *Ceropegia* L. en *Tenaris* E. Mey. word bespreek. Notas oor min bekende spesies word ook ingesluit en die spesies van *Gomphocarpus* R. Br. in Namibia word opgenoem.

### INTRODUCTION

Several collecting trips to Namibia since 1987 have brought to light species of Asclepiadaceae not previously recorded from Namibia. Searches through the material preserved in the National Herbarium, Windhoek (WIND) have also revealed a few already recorded but not dealt with in Huber (1967).

The recently published list of Namibian plants (Kolberg *et al.* 1992) has various errors in the account of the Asclepiadaceae. Some of these are rectified here. Keys are provided to the taxa where possible. The very confused state of the taxonomy of the complex of genera around *Asclepias* does not allow for an exact statement as to the generic placing of all the species. This problem is being addressed by Nicholas (pers. comm. 1994) and once this has been sorted out it should be possible to construct keys to these genera. The genera are arranged alphabetically except for those in the *Schizoglossum* complex which are all discussed together.

### 1. ASCLEPIAS L.

Apart from the larger, shrubby species of *Asclepias*, which are here placed under *Gomphocarpus*, no others are listed by Huber (1967). However, at least two collections of small, herbaceous species are known from Namibia. Their identification poses somewhat of a problem as generally species of the narrow-leaved, herbaceous type in *Asclepias*, as with *Pachycarpus* E. Mey., are known from the eastern side of southern Africa only (Nicholas

1982: 450). Since the genus *Asclepias* is now intended to be restricted to the American species (see discussion under *Gomphocarpus*), these will all be moved to other genera in due course.

#### Key to the herbaceous species of *Asclepias* for Namibia

- 1a Leaves at least 3 mm broad at middle, plant branching profusely from base with spreading stems . . . . . *A. randii*
- 1b Leaves not more than 1.5 mm broad at middle, plant usually single-stemmed, erect . . . . . *A. aurea*

#### 1.1 *Asclepias aurea* (Schltr.) Schltr.

*A. aurea* is widespread along the eastern side of southern Africa and also occurs in Zimbabwe (Brown 1902–1904). According to Nicholas (1982: 452), it does not occur in the Cape Province but I have seen plants undoubtedly belonging to this species south of Kuruman in the northern Cape (Bruyns 5836, BOL).

There is a small specimen in WIND which is probably also referable to *A. aurea*. However, whereas material from Kuruman fits the description of *A. aurea* exactly, in this Namibian collection there are some differences. It is slightly more hairy than *A. aurea* (where the leaves are glabrous except sometimes for a few hairs on the midrib beneath) and the peduncles are also much shorter. A brief description of this material follows.

Plant 100–250 mm tall, stems just over 1 mm thick, erect, with fine hairs in a single line, internodes 15–20 mm long. *Leaves* up to 70.0 × 1.1 mm, scantily hairy on both sides, ± sessile. *Peduncle* up to 20 mm long, finely hairy in a single line, bearing 4 flowers. *Pedicel* 10–12 mm long, very scantily hairy. *Corolla* about 8 mm diam., lobes with few hairs on dorsal surface. *Corona* lobes about

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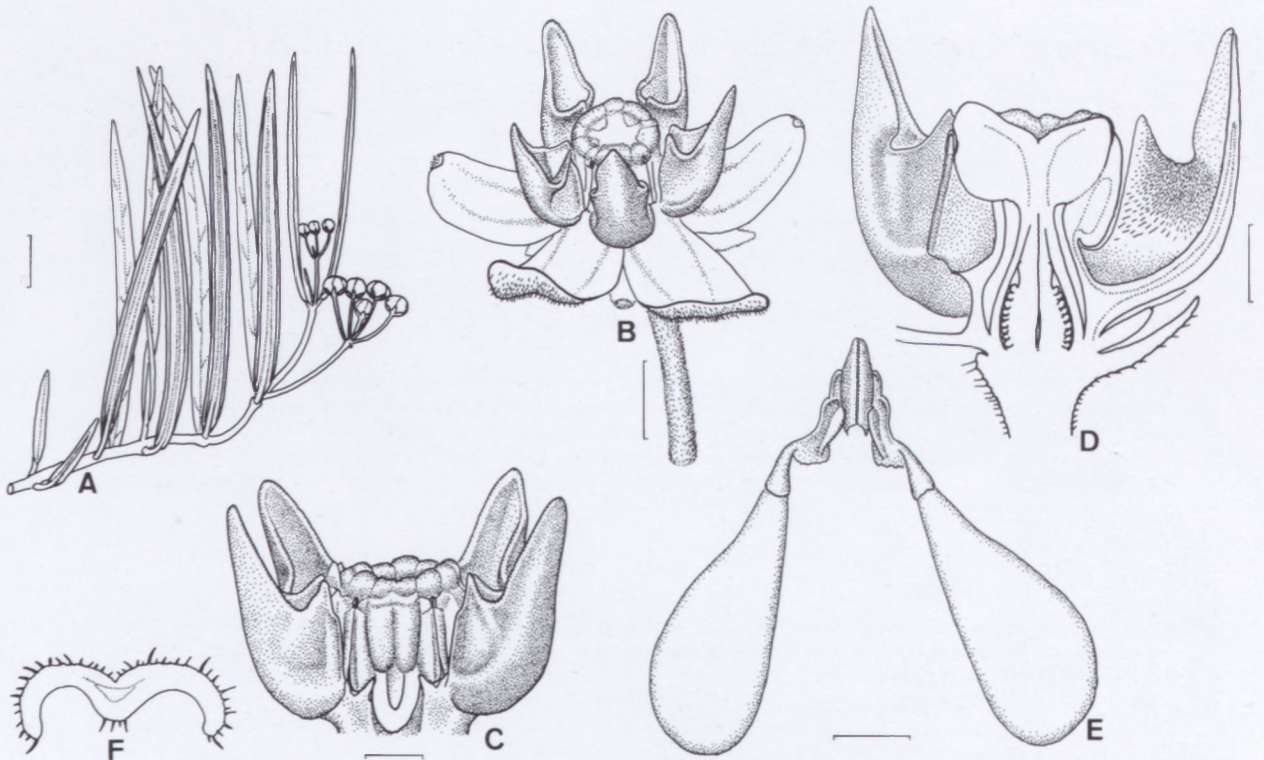


FIGURE 1.—*Asclepias randii*, Bruyns 5487. A, portion of plant; B, flower; C, gynostegium with one corona lobe removed; D, half flower, papillae on inner face of corona lobes clearly visible; E, pollinarium; F, cross-section of leaf, taken near middle. Scale bars: A, 10 mm; B, 2 mm; C, F, 1 mm; D, 1 mm; E, 0.25 mm.

2.5 mm long, with many papillae inside hood. Otherwise as in *A. aurea*.

#### Specimen examined

NAMIBIA.—2217 (Windhoek): near Windhoek, (–CA), Seydel 4109, coll. Jan. 1965 (WIND).

#### 1.2 *Asclepias randii* S. Moore. Figure 1.

Small herbs belonging probably to this species were observed among short grasses on a gentle slope in the Otavi Mountains. According to Brown (1902–1904: 351), *A. randii* is known only from central Zimbabwe. However, the species is very similar to *A. modesta* N.E. Br. (Nicholas pers. comm. 1994) which is known to be widespread in south tropical Africa with known localities in Tanzania, Zambia, Malawi and Angola (Brown 1902–1904). The two seem to be separated mainly by the rather long, erect apices of the corona lobes in *A. randii*, which project somewhat above the gynostegium.

*A. modesta* was made a synonym of *Trachycalymma pulchellum* (Decne.) Bullock (1953: 351), a genus which Bullock defined mainly by the papillae or 'papilliform hairs' on the inner face of the hood formed by the corona. These papillae are present in both the material illustrated here of *A. randii* (Figure 1D) and *A. aurea* but neither appears to have been referred to *Trachycalymma* Bullock.

#### Specimen examined

NAMIBIA.—1917 (Tsumeb): Otavi Mountains, (–DB), Bruyns 5487 (BOL; K, alcohol only).

## 2. BRACHYSTELMA Sims

Two new species of *Brachystelma* are described. The generic boundaries of *Brachystelma* against *Ceropegia* and *Tenaris* E. Mey. are discussed and this results in two new combinations in *Brachystelma*. A key to these genera and *Macropetalum* Burch. is given and also one to all the species of *Brachystelma* in Namibia.

2.1 *Brachystelma recurvatum* Bruyns sp. nov., a ceteris speciebus lobis corollae pedicellisque longissimis angustissimis differt. Typus: Namibia, 1917 (Tsumeb): Otavi Mountains, (–DB), 5-2-1993, Bruyns 5486 (BOL, holo.; WIND, K, iso.). Figures 2, 3.

Plant with flattened subglobose tuber up to 80 mm diam., with 1–several erect simple to branched stems reaching 60–300 mm tall. Stems 1–2 mm thick, pubescent,



FIGURE 2.—*Brachystelma recurvatum*, Bruyns 5486, showing very slender pedicels and recurved petals.



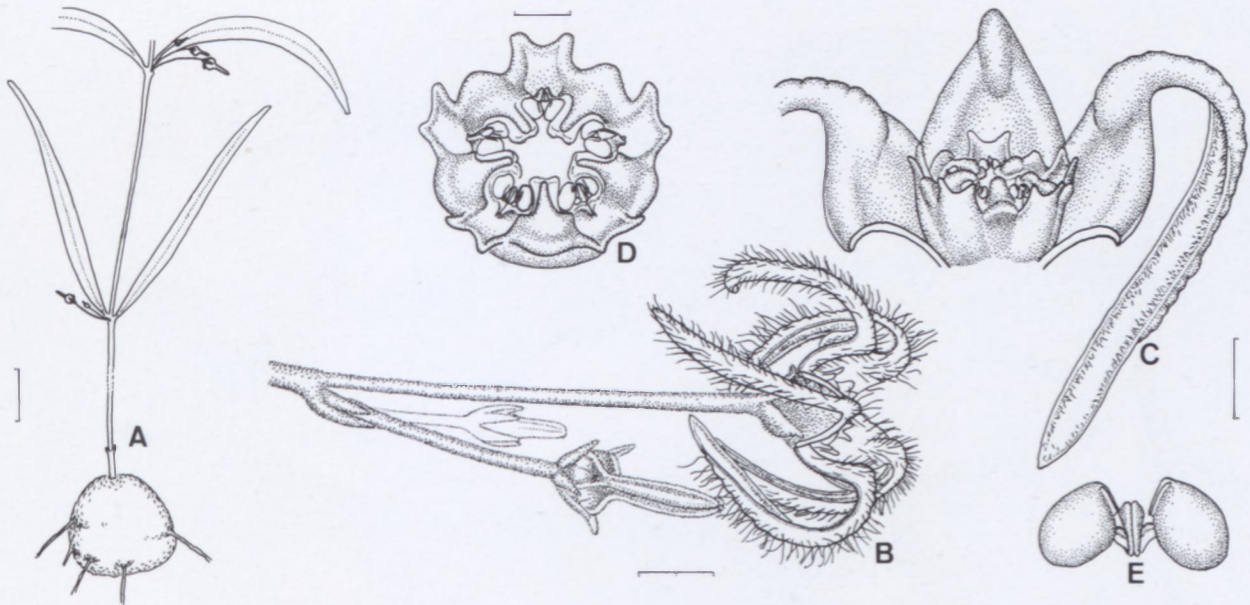


FIGURE 3.—*Brachystelma recurvatum*, Bruyns 5486. A, plant, much reduced in length (up to 300 mm tall); B, flower and bud; C, dissected flower; D, gynostegium; E, pollinarium. Scale bars: A, 10 mm; B, 2 mm; C, 1 mm; D, 0.5 mm; E, 0.25 mm (at B).

green to purplish. Leaves 30–90 × 3–13 mm, narrowly lanceolate, margins recurved, pubescent on both surfaces, green, petiole 1.0–1.5 mm long. Inflorescence extra-axillary, bearing 1–4 successively developing flowers, pubescent; peduncle 0–2 × 0.5 mm; pedicels 10–16 × 0.25 mm, purplish. Corolla 7–8 mm diam., outside green finely pubescent, inside with fine crinkled white hairs, with very shallow tube ( $\pm 0.5$  mm deep) enclosing base of gynostegium; lobes within greenish black blotched with very pale yellow (nearly colourless), with  $\pm$  deltoid basal portion about 1.5 mm broad at base then abruptly narrowing into recurved tail  $\pm 6 \times 0.5$  mm (seen in bud as long beak), margins recurved. Gynostegium  $\pm 1.5$  mm diam., glabrous; outer corona lobes truncate-bifid, pale yellow with large greenish black patch on inner surface; inner lobes with dorsal projection confluent with outer lobes and narrow limb incumbent on anthers nearly equalling them, with droplets of colourless fluid secreted on backs, practically colourless (pale yellow).

*Brachystelma recurvatum* is unlike any other species known in Namibia, with exceptionally slender pedicels and corolla lobes. The corolla lobes are strongly recurved behind the corolla with the narrow tail then sometimes bent back and partly obscuring the gynostegium, hence the epithet *recurvatum*. The corona structure is typical of the genus with short, truncate-bifid outer corona lobes and very small inner lobes. Plants were found among short grasses on a gentle slope between dolomite outcrops growing in reddish loam. This is the '*Tenaris spec. indet.*' mentioned and illustrated rather poorly in Bruyns (1984) from a specimen collected west of Outjo (no material preserved). Since there seems to be some vagueness about the distinctions between *Tenaris* and *Brachystelma*, this is discussed separately under 2.4 and 2.5.

**2.2 *Brachystelma codonanthum* Bruyns sp. nov.,** a *B. dinteri* Schltr. cognatum sed flore campanulato coronaque exteriori cupulata, a *B. cupulato* R.A. Dyer lobis

corollae deltoideis et corona exteriori quinqueloba discedit. Typus: Namibia, 1918 (Grootfontein): northeast of Grootfontein, (–BB), Bruyns 5518 (BOL). Figure 4.

Plant arising from a depressed-globose tuber up to 20 × 30 mm. Stem usually solitary, simple,  $\pm$  erect, 20–150 ×  $\pm 1.5$  mm. Leaves 11–22 × 9–15 mm, elliptic, tapering into petiole 1–2 mm long. Flowers in small sessile groups extra-axillary at nodes, opening successively. Pedicel spreading, 2–3 × 0.5 mm. Sepals lanceolate, acute, 2 × 0.5 mm. Corolla 5 × 9–10 mm, outside pale green to brown, inside glabrous obscurely transversely rugose green to brown with greenish tips, campanulate; tube  $\pm 2.5 \times 4.0$  mm (across mouth), broadly conical; lobes 3–4 × 3 mm, deltoid, spreading. Gynostegium 1.5 × nearly 3.0 mm, dark brown, glabrous, cupular; outer corona lobes rising above rim of cup, bifid, narrowing towards apex; inner lobes cushion-like, arising lower down in cup and adpressed to backs of anthers near their base, very short and usually leaving most of anthers uncovered.

#### Specimens examined

NAMIBIA.—1819 (Karakuwisa): (–CC), Bruyns 5990 (BOL). 1918 (Grootfontein): (–BB), Bruyns 5518 (BOL).

With its solitary, erect stem and elliptical leaves, this species resembles *B. dinteri* vegetatively and, when collected, was assumed to be that species. On flowering, it turned out to have a completely different, campanulate flower with somewhat cupular corona. In *B. dinteri* the outer corona lobes arise between the broad dorsal parts of the inner lobes which determine the pentagonal shape of the corona. In *B. codonanthum* the inner corona lobes arise on the inside of the cupular outer corona as in *B. cupulatum*. From *B. cupulatum* it is distinguished by differently-shaped corolla lobes with rugose surface (oblong in *B. cupulatum*, deltoid in *B. codonanthum*) and the outer corona cup which is deeply 5-lobed in *B. codonanthum* and notched around the apex in *B. cupulatum*. *B. codonan-*



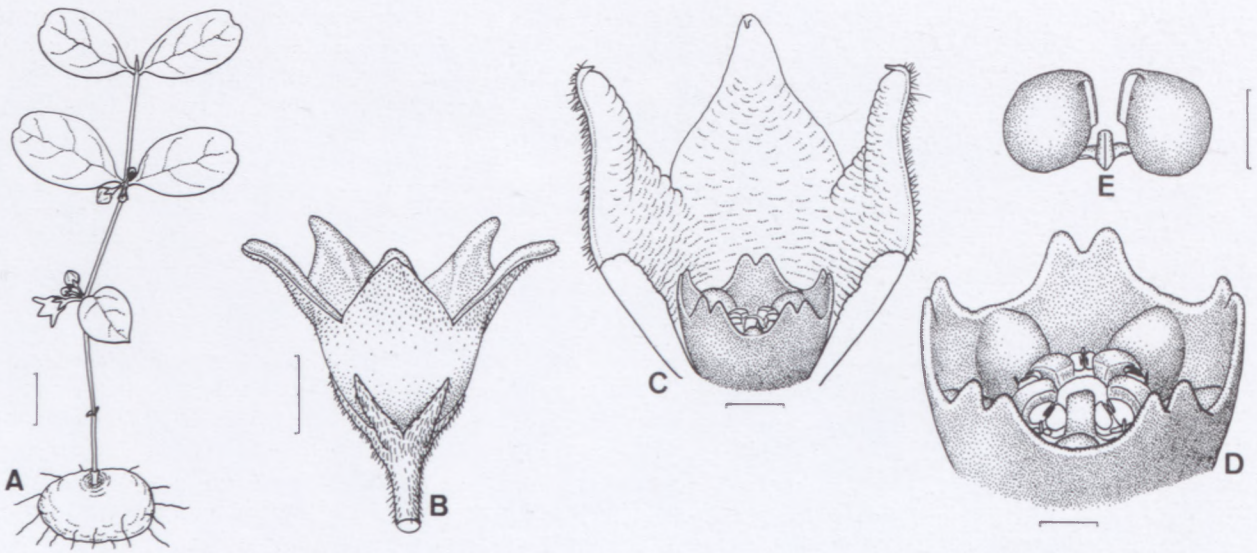


FIGURE 4.—*Brachystelma codonanthum*, Bruyns 5518. A, portion of plant; B, flower; C, dissected flower; D, gynostegium; E, pollinarium. Scale bars: A, 10 mm; B, 2 mm; C, 1 mm; D, 0.5 mm; E, 0.25 mm.

*thum* was found in two places northeast of Grootfontein growing in deep white sand in open forest.

### 2.3 *Brachystelma blepharantha* (Schltr.) H.E. Huber

This small species of *Brachystelma* was not dealt with in Bruyns (1984) but, alongside that account, Müller (1984) recorded its 'rediscovery' in 1983 after 70 years since Dinter's original collections in 1909 and 1910. Actually it had been collected long before this in 1968 by C. Grabow near Gobabis, but this and another collection by Woortman from north of Okahandja remained unidentified at WIND until recently.

More intensive collecting over southern Namibia has revealed that this species is widely distributed in the southern half of the country from Gobabis and Okahandja southwards to Helmeringhausen. In the southern parts it is the only known species of *Brachystelma* (Figure 5).

Unlike other species, *B. blepharantha* grows in arid places on pebbly or stony ground usually in the open or among short bushes (sometimes even among *Rhigozum trichotomum*). From Gobabis to Windhoek and southwards to Nauchas it was mainly seen in spots with a scanty cover of small bushes with the ground densely strewn with quartz and other small pebbles. Several times it was observed growing with *Lithops pseudotruncatella*. Around Helmeringhausen it was usually found on stony, north-facing mountain slopes.

The tuber of *B. blepharantha* is usually cylindrical to irregularly top-shaped (Figure 6A) or very occasionally flattened discoid. The largest seen was  $\pm 80 \times 50$  mm and several up to 80 mm long and only 20–30 mm thick were found. This shape is unique in *Brachystelma*. It is often tightly wedged among stones and can be difficult to extract. In the northern part of the distribution, plants seen were rarely more than 50 mm tall above the soil with the branches spreading horizontally up to about 100 mm. Further south, the plant may be erect with stems up to 300

mm tall. The cylindrical stems are almost always finely mottled with purple and the small leaves are usually crinkled (as in the largest plant in Figure 6A).

Generally in this species the sepals are green to brownish, the corolla tube is white (sometimes lightly suffused with pink), the lobes are green (sometimes with purplish margin), the inner corona lobes are green whereas the rest of the gynostegium is white. In the northern part of the range the corolla lobes vary from 2–4 mm long,

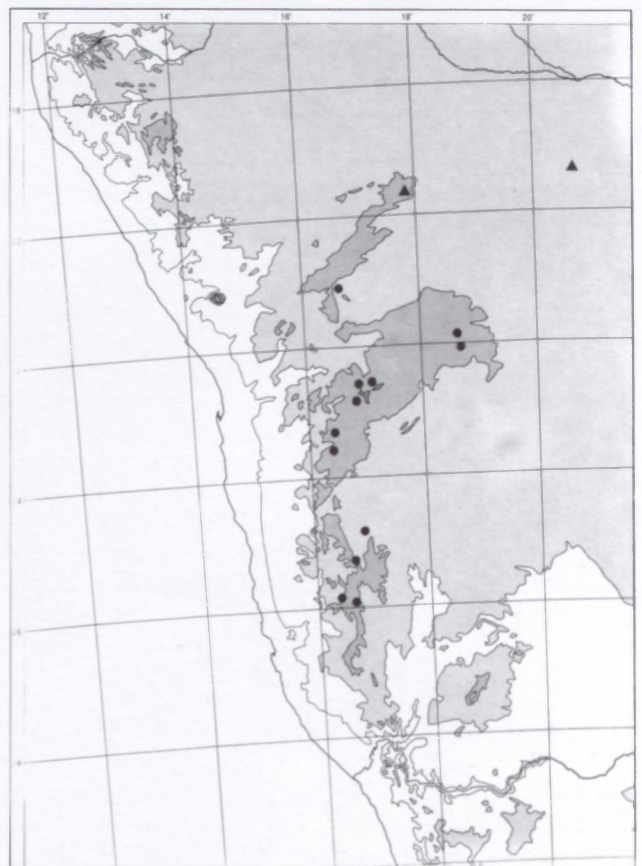


FIGURE 5.—Distribution of *Brachystelma blepharantha*, ●; and *Pachycarpus schweinfurthii*, ▲, in Namibia.



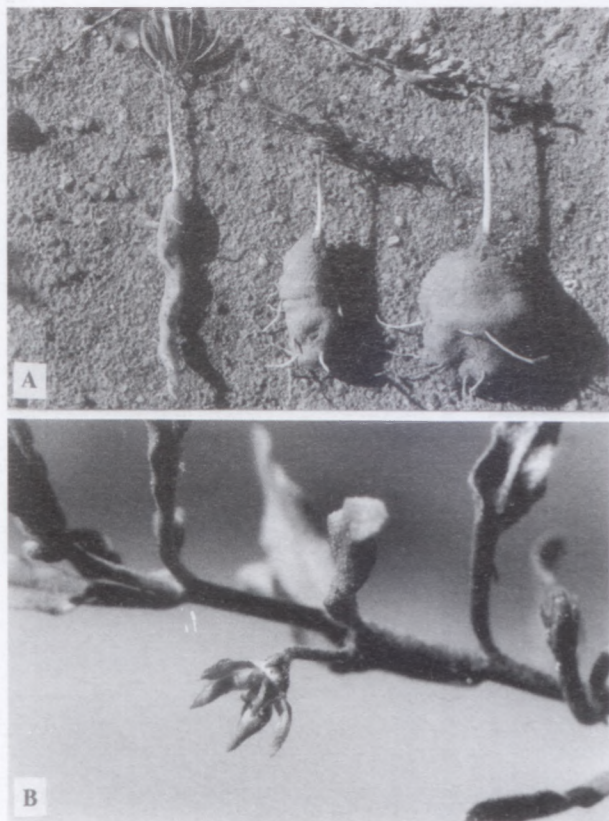


FIGURE 6.—A, B, *Brachystelma blepharathera*, Bruyns 5818: A, three plants excavated to show peculiar elongated tubers, usually crinkled leaves clearly visible in plant with largest tuber; B, plant with

the flowers are nodding (Figure 6B) and the club-shaped inner corona lobes are widely divergent to almost horizontally spreading. Towards the base the inner surface of the corolla lobe is usually covered with papillae each topped by a fine hair. Around Maltahöhe plants were collected with flowers held erect and with the base of the corolla lobes entirely smooth within. Near Helmeringhausen the flower was nodding once more (Figure 7K), the corolla lobes were much longer (5 mm) and narrower, the papillae with hairs were again present but the corona lobes, though still club-shaped, were much less thickened towards their tips and were connivent rather than widely diverging (Figure 7L).

#### Specimens examined

NAMIBIA.—2116 (Okahandja): (–BA), Woortman 221 (WIND). 2118 (Steinhausen): (–DC), Grabow 19 (WIND). 2216 (Otjimbingwe): (–DB), Van Vuuren s.n. (WIND); (–DD), Bruyns 5626 (K). 2217 (Windhoek): (–CA), Van Vuuren s.n. (WIND). 2218 (Gobabis): (–BA), Bruyns 5818 (WIND). 2316 (Nauchas): (–AD), Pehlemann 1334 (WIND); (–CB), Bruyns 5639 (BOL). 2416 (Maltahöhe): (–DD), Bruyns 5658 (BOL). 2516 (Helmeringhausen): (–BC), Bruyns 5681 (BOL); (–CD), Bruyns 5703 (BOL); (–DC), Bruyns 5734 (BOL).

#### *Brachystelma gymnopodum*, a new name for *Ceropegia pygmaea* Schinz

The genera *Brachystelma* and *Ceropegia* have similar distributions around the perimeter of the Indian Ocean from southern Africa to Australia. The only recent regional treatments of both genera have covered southern Africa (Dyer 1980) and Australasia (Forster 1988; Bruyns & For-

ster 1989). None of these accounts deals with the problem of the boundaries between the two genera which is not as insignificant as this neglect may imply. Dyer (1980) followed Brown (1907–1909) in separating the two genera as follows:

- 1a Corolla tubular with the tube usually 2 to several times as long as its diameter at middle . . . . . *Ceropegia*  
 1b Corolla opening nearly flat or tube campanulate, when tubular then less than twice as long as its diameter at middle . . . . . *Brachystelma*

Many genera within the Stapelieae exhibit variation in the corolla from nearly rotate through campanulate to tubular (cf. *Stapelia leendertziae* N.E. Br., *Tridentea chonanthera* (Lavranos & Hall) L.C. Leach, *Echidnopsis mijerteina* Lavranos as extreme examples within their respective genera) and it is therefore not surprising to find this variation in *Brachystelma*. However, the tubular-flowered species of *Brachystelma* (such as *B. oianthum* Schltr.) may begin to resemble *Ceropegia* as it is defined above. Similarly some species may have been placed in *Ceropegia* because of this single character while their closest relatives are in *Brachystelma*.

The generic position of *Ceropegia pygmaea* is of concern here. It is clear from Brown (1902–1904), Huber (1957) and Dyer (1980) that *C. pygmaea* occupies an isolated position in *Ceropegia*, where its very long corolla tube places it according to the above definition.

In general the gynostegium of *Ceropegia* has a shallowly cupular outer corona with the usually bifid lobes only slightly overtopping the bases of the inner lobes. The dorsiventrally flattened inner lobes are incumbent on the backs of the anthers and then rise up, connivent, in a column above the centre of the style head. Whereas exactly this inner corona structure is found randomly in several genera, but is useful there only to separate species [cf. *Lavrania cactiformis* (Hook.) Bruyns and *L. picta* (N.E. Br.) Bruyns, (1993)], it is remarkably reliable in separating *Ceropegia* from its allies. As far as I am aware there are only three species out of about 160 where this is not found: *C. pygmaea* (southern Africa), *C. loranthiflora* K. Schum. (Ethiopia: own unpublished drawings of material at K) and *C. dorjei* C.E.C. Fisch. [Bhutan: illustrated in Huber (1957) but gynostegium possibly based on a juvenile flower].

The gynostegium in *Brachystelma* on the other hand, has an extremely variable outer corona: from slender bifid lobes to a tube containing the whole gynostegium. The inner corona lobes are invariably small and often only just touch the backs of the anthers near their base. In a few cases they exceed them, rising up connivent in a column above the style head as in *Ceropegia*: *B. blepharathera*, *B. dyeri* K. Balkwill, *B. gracile* E.A. Bruce, *B. pachypodium* R.A. Dyer and *B. schizoglossoides* (Schltr.) N.E. Br. are the only examples known to me. In all these the corolla tube is shorter than it is broad and so these species separate out (according to Dyer 1980) clearly as *Brachystelma*, where their closest relatives are as well.



In *Ceropegia pygmaea* the outer corona forms a deep cup hiding the rest of the gynostegium (Figure 8G, H). The inner corona lobes are short, touching the backs of the anthers and do not exceed them (Figure 8K). As can be seen, the corolla is very variable in length, ranging from twice its maximum breadth with the mouth up-turned (Figure 8B) to about five times its maximum breadth (Figures 8C; 9) with the mouth turned down towards the soil and usually touching it or even becoming slightly buried among leaf litter and loose sand [exactly as observed in *Echidnopsis ballyi* (Marn.-Lap.) P.R.O. Bally, (Bruyns 1988)].

In *C. pygmaea* the leaves vary from broadly ovate to linear. Narrow-leaved forms are difficult to distinguish when sterile from *Brachystelma stenophyllum* (Schltr.) R.A. Dyer and, in fact, vegetatively these two are very similar: both are small plants arising from a

flattened-globose tuber with short stems branched just above ground level, producing a cluster of leaves usually close to the ground with flowers developing on short, horizontal peduncles near the base of the stems. Their gynostegia are almost identical. A similar corona structure is also found in *B. cupulatum* and *B. brevipedicellatum* Turrill. These four species possibly form a group with corolla increasing in tubularity from the nearly rotate state in *B. brevipedicellatum* via *B. stenophyllum* (illustrated in Bruyns 1984) to the deep tube of *C. pygmaea*. Whereas *C. pygmaea* occupies an isolated position in *Ceropegia*, its close affinities to *B. stenophyllum* suggest that it would be much better accommodated in *Brachystelma* and it is therefore transferred to that genus. However, it cannot be called *Brachystelma pygmaeum* because of the earlier and validly published *Brachystelma pygmaeum* (Schltr.) N.E. Br. Therefore a new combination is required:

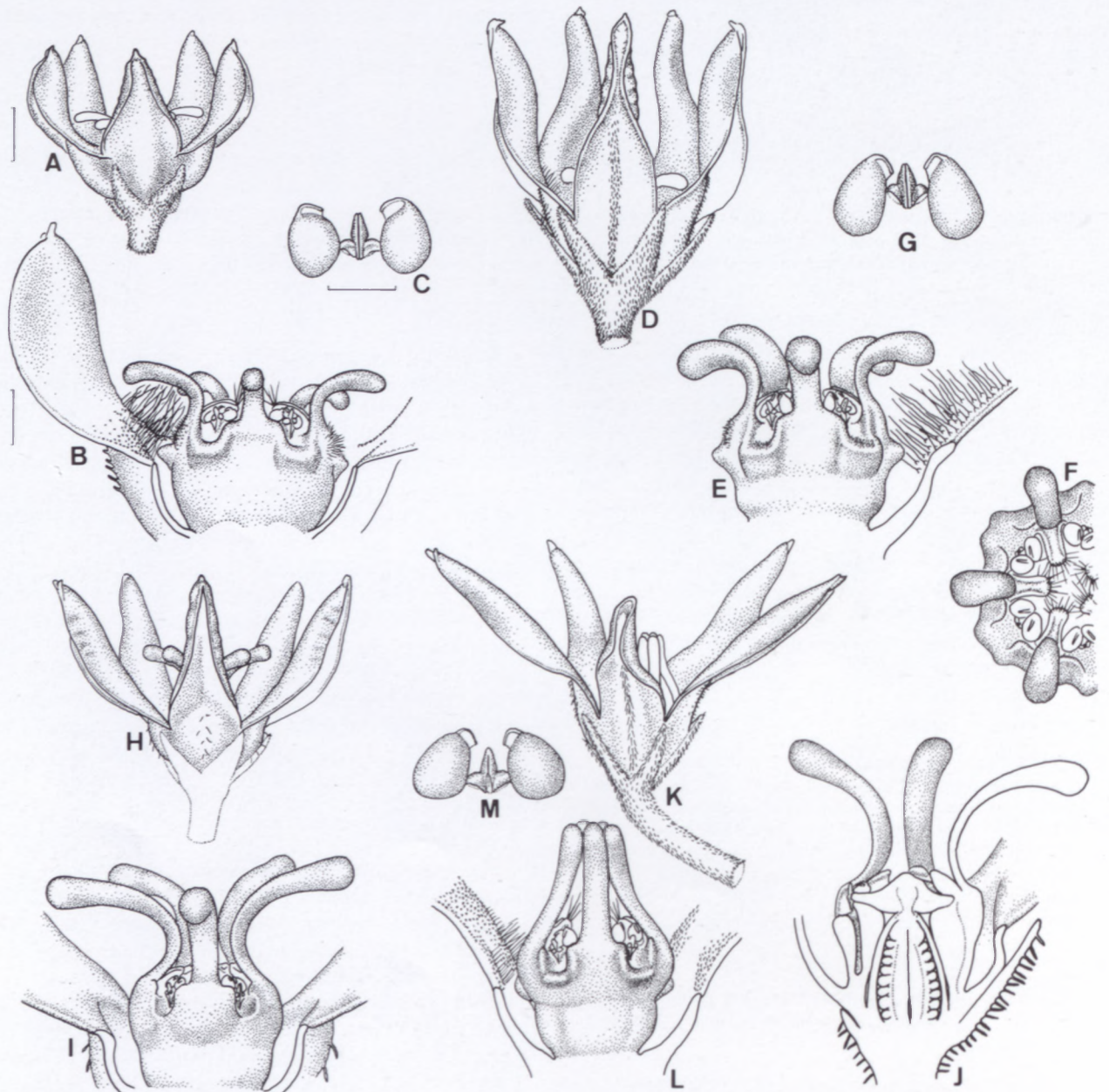


FIGURE 7.—*Brachystelma blepharantha*. A, D, H, K, flowers; B, E, I, L, dissected flower showing gynostegium from side; F, face view of gynostegium; J, half flower; C, G, M, pollinaria. Scale bars: A, D, H, K, 1 mm (at A); B, E, F, I, J, L, 0.5 mm (at B); C, G, M, 0.25 mm (at C). A–C, Bruyns 5626; D–G, Bruyns 5639; H–J, Bruyns 5658; K–M, Bruyns 5703.



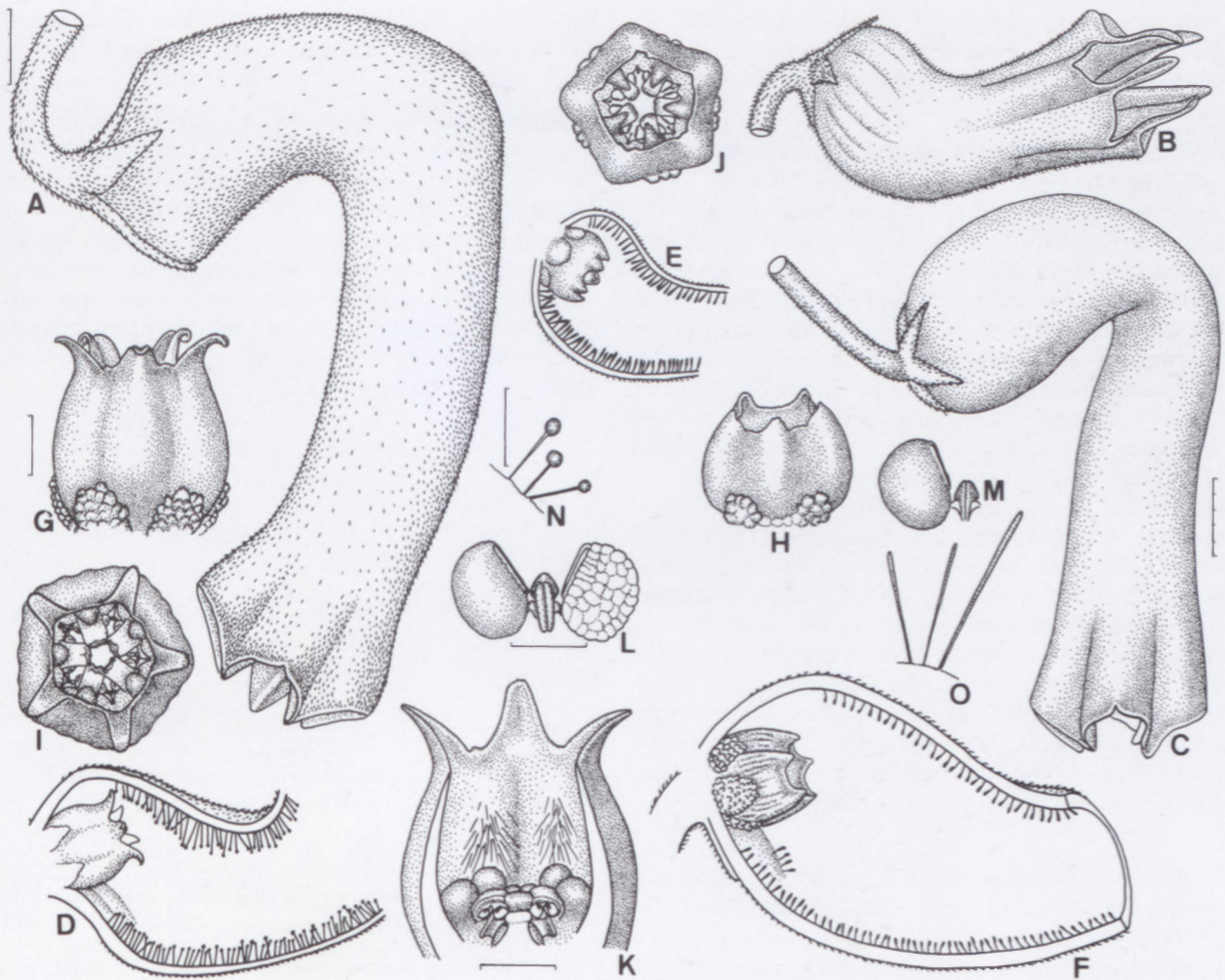


FIGURE 8.—*Brachystelma gymnopodum* (*Ceropegia pygmaea*). A–C, flowers; D–F, corolla dissected; G, H, side view of corona; I, J, face view of gynostegium; K, dissected gynostegium; L, M, pollinaria; N, O, hairs in corolla tube. Scale bars: A, B, D, E, F, 3 mm (at A); C, 5 mm; G, H, I, J, 1 mm (at G); K, 1 mm; L, M, 0.25 mm (at L); N, O, 0.5 mm (at N). Drawn from: A, D, G, I, K, L, N, Bruyns 2078, Gravelotte, eastern

2.4 *Brachystelma gymnopodum* (Schltr.) Bruyns, comb. nov. *Ceropegia gymnopoda* Schltr. in Bulletin de l'Herbier Boissier 4: 450 (1896). Type: Namibia, Rautanen 82 (Z).

*Ceropegia pygmaea* Schinz (1888). Type: Namibia, Schinz 147 (Z). Figures 8, 9.

***Tenaris* E. Mey. in Namibia? A new combination in *Brachystelma* for *Tenaris schultzei* (Schltr.) E. Phillips**

Brown (1902–1904) listed three species of *Tenaris* from tropical Africa (two from Somalia and one from Tanzania) and commented that 'there is little beyond habit to distinguish this genus from *Brachystelma*'. In the key he used the 'terminal raceme or lax panicle' of flowers to distinguish these species from *Brachystelma*. Brown (1907–1909) listed four species of *Tenaris* for South Africa. In this account he used characters of the flower 'corolla tube very short; lobes free, not reflexed' etc. to distinguish *Tenaris* from *Brachystelma* but it is not clear how this could succeed in separating these genera, for there are many species of *Brachystelma* to which this would apply equally well. It appears that *T. chlorantha* Schltr., where there is no 'terminal raceme or lax panicle',

may be the reason for Brown's abandoning his earlier distinctions for *Tenaris*.

The seven species listed in Brown (1902–1909) appear to share the following characteristics:

Flowering stems slender, erect, unbranched, glabrous; leaves linear 1–2 mm broad or filiform, blade narrower than midrib on flowering stems, glabrous; peduncle and



FIGURE 9.—*Brachystelma gymnopodum*, Bruyns 5512. Plant with broad leaves and very long corolla touching ground at anthesis.



pedicel glabrous; exterior of corolla glabrous; follicles glabrous. Some of these characters are found in species of *Brachystelma* but no *Brachystelma* has all of them.

Another species, *Tenaris schultzei* (Schltr.) E. Phillips was added in 1941. Here, although the plant often has only a single stem and linear leaves 1–2 mm broad, the stem may branch above and the flowers are not borne on long, slender, unbranched stems. The entire plant is pilose. Schlechter (1914) intended describing this species as a *Brachystelma* but decided, after a more thorough examination of the gynostegium, that the long, connivent inner corona lobes were more similar to those in *Ceropegia* than *Brachystelma*. However, the corolla was entirely different from *Ceropegia* and hence he placed it in a separate genus *Kinopetalum* Schltr. Phillips' (1941) placing of this species in *Tenaris* was not justified by any discussion and, indeed, if it is to be accepted, then it is unclear how *Tenaris* should be defined. Dyer (1975), partly following Brown (1907–1909), characterised *Tenaris* by 'Corolla tube almost obsolete, with linear, linear-spathulate or sometimes filiform lobes, slender erect herbs with tubers'. However, 'corolla tube almost obsolete' and 'slender erect herbs with tubers' would fit many species of *Brachystelma* and *T. schultzei* [as illustrated in Bruyns (1984)] would not fit comfortably into 'slender erect herbs'. Also 'linear' or 'filiform lobes' would fit some species of *Brachystelma* as well (e.g. *B. recurvatum*, *B. gracile*).

Schlechter was in favour of segregating many species from *Brachystelma* but most of his segregate genera were abandoned by Brown (1902–1904). Bullock (1953) seems to have intended reviving some of these segregates and started moving species to *Dichaelia*, but this was abandoned by Dyer (1980). If one is to make the treatment of this group consistent with that being applied in the Asclepiadeae, and elsewhere in the Stapelieae, then one will have to examine Bullock's statement (1953: 358) that *Brachystelma* is unsatisfactorily 'heterogeneous' in some detail. In my opinion Bullock's statement is not true except perhaps in respect of the inclusion within the genus of those species with fusiform roots. These species differ in their vegetative parts and florally quite substantially from the remainder of the genus. Also, *Dichaelia*, as Bullock envisaged it, is unsatisfactory and it would

be unwise to resurrect the genera *Siphonostelma* Schltr. and *Kinopetalum* which seem to be superfluous.

Nevertheless there appears to be a case for maintaining *Tenaris* as distinct from *Brachystelma* provided it is confined to the seven species of Brown (1902–1904; 1907–1909). *Brachystelma christianeae* Peckover (1992) also belongs to this genus. Furthermore, it needs to be considered carefully whether *Tenaris* should be united with the monotypic *Macropetalum* which also shares most of the above-mentioned characters. There seems to be no justification for placing *T. schultzei* in *Tenaris* and it should be moved to *Brachystelma*. This change is effected below.

## 2.5 *Brachystelma schultzei* (Schltr.) Bruyns comb. nov.

*Kinopetalum schultzei* Schltr. in Botanische Jahrbücher 51: 150 (1914). *Tenaris schultzei* (Schltr.) E. Phillips (1941). Lectotype: Namibia, Okakuja, Dinter 2528 (SAM).

To summarise the information above, one may separate the four genera *Brachystelma*, *Ceropegia*, *Macropetalum* and *Tenaris* as follows:

- 1a Corolla rotate to campanulate, tube broader than long, if longer, then inner corona lobes not exceeding anthers:
  - 2a Flowering stems slender, unbranched glabrous; leaves linear or filiform, 1–2 mm broad, glabrous; exterior of corolla glabrous:
    - 3a Pedicel glabrous, anthers horizontal, pollinia inserted at level of top of style head ..... *Tenaris*
    - 3b Pedicel pilose, anthers erect, pollinia inserted about half-way up style head ..... *Macropetalum*
  - 2b Flowers amongst leaves on short often spreading, branched stems; stems pubescent; leaves pilose, usually with distinct blade narrowing into petiole and to apex; exterior of corolla pilose [at least one of these must apply, many species will not satisfy all of them] ..... *Brachystelma*
- 1b Corolla with tube longer than max. breadth; inner corona lobes exceeding anthers, connivent into column above style head ..... *Ceropegia*

The key to *Brachystelma* in Namibia in Bruyns (1984) is incomplete, dealing only with the five species discussed there. There are now 11 species recognised from Namibia and it is necessary to construct a key to them. This key is somewhat complicated, using characters of the corona as well as more obvious ones.

## Key to *Brachystelma* spp. in Namibia

- 1a Outer corona lobes united above anthers into an entire to 5-lobed cup with inner lobes cushion-like fused to inside of cup  $\pm$  half-way up:
  - 2a Corolla tube more than twice as long as lobes ..... *B. gymnopodium*
  - 2b Corolla tube shorter than lobes:
    - 3a Corolla lobes ovate-lanceolate becoming linear above, fused at apices ..... *B. stenophyllum*
    - 3b Corolla lobes deltoid to oblong, not becoming linear above, free at apices:
      - 4a Corolla lobes oblong 4.5–6.0 mm long, cup formed by outer corona with 5 small notches in margin ..... *B. cupulatum*
      - 4b Corolla lobes deltoid 3–4 mm long, outer corona cup deeply 5-lobed with each lobe bifid and narrowing towards apex ..... *B. codonanthemum*
- 1b Outer and inner corona lobes not as above:
  - 5a Inner corona lobes much longer than anthers, rising up and connivent above style head or widely separating:
    - 6a Corolla lobes lanceolate-oblong to narrowly deltoid, 2–4  $\times$  as long as broad at base, inner corona lobes clavate ..... *B. blepharathera*
    - 6b Corolla lobes  $\pm$  filiform, about 10  $\times$  as long as broad at base, inner corona lobes uniformly wide to tips ..... *B. schultzei*
  - 5b Inner corona lobes shorter than anthers, not rising up above style head:
    - 7a Pedicel 10–35 mm long:
      - 8a Corolla rotate, lobes not recurved, with clavate cilia along margins ..... *B. schinzii*
      - 8b Corolla with recurved lobes without cilia along margins:
        - 9a Corolla glabrous within, lobes 2–3  $\times$  1 mm ..... *B. arnotii*
        - 9b Corolla pubescent within, lobes  $\pm$  7.5  $\times$  1.5 mm ..... *B. recurvatum*
    - 7b Pedicel 1–5 mm long:
      - 10a Corolla faintly rugose within, lobes  $\pm$  deltoid (1.0–1.5  $\times$  as long as broad at base) ..... *B. dinteri*
      - 10b Corolla smooth within, lobes linear to filiform (at least 4  $\times$  as long as broad at base) ..... *B. circinatum*



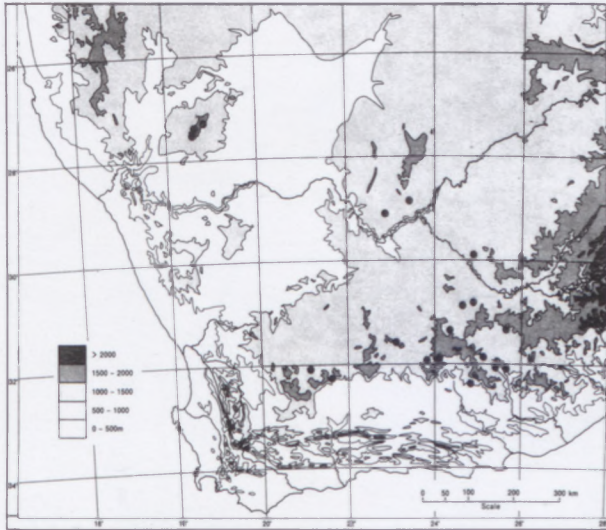


FIGURE 10.—Distribution of *Ceropegia filiformis*.

### 3. CEROPEGIA L.

#### 3.1 *Ceropegia filiformis* (Burch.) Schltr.

The collections cited below are the first known from Namibia and extend the known distribution of this species about 450 km to the west. There are no known localities from the intervening territory between these Namibian gatherings and that of William Burchell, who originally discovered it in 1812 between Kloof and Witwater, southwest of Griquastad in the northern Cape. The distribution map (Figure 10) has been compiled from material seen in BOL, NBG, from PRECIS records, collections (2922 BB, 2824 CD) cited by Wilman (1946) and two collections in cultivation in Cape Town. From the map the extremely wide and scattered range is clear with the records from Namibia providing a remarkable case of vicariance. Most of the other known localities lie on the Great Karoo in the Cape from Richmond eastwards to Colesburg and south to Pearston and Somerset East with further unusual records in the southwest between Sutherland and Frasersburg. There is a single collection from the Orange Free State near Lückhoff. This distribution is unique in the genus (Bruyns 1985).

In January 1989, after good rains had fallen, several colonies of plants were found on the eastern side of the Great Karas Mountains. Plants were scrambling in the open among stones or climbing on *Rhigozum trichotomum* bushes on flat areas on the summit of mountains. On the western side (seen February 1993) they are also quite plentiful at higher levels and usually found climbing on *Rhigozum trichotomum*.

Specimens of *Ceropegia filiformis* are extremely inconspicuous. The plant usually consists of an unbranched, thin (about 1 mm thick) cylindrical stem (up to 0.8 m but usually 150–300 mm long) arising from a dense cluster of thick, spreading, whitish, fusiform roots. The leaves are narrow, linear-lanceolate. On the other hand the flowers, which are 50–60 mm long, are quite striking. Most of the exterior is greyish mottled with purple. The contrast on the lobes of white on the medial keel against the dull

purple remainder and striking, narrow, replicate, purple-black margin makes them easily visible. A peculiar feature of this deeply coloured margin, which has particularly large epidermal cells, is the secretion along its length of regularly spaced droplets of a clear liquid. The function of this liquid remains unknown. The inside of the basal inflation of the corolla is white with longitudinal green stripes on which rows of scattered green papillae are located. These stripes continue up into the constricted part of the tube without the papillae. There are no hairs at all inside the corolla tube (Figure 11).

The outer corona has unusual, thickened, brownish or purple-red apices. The rest of the corona is white to yellow-white, flecked with purple-red spots, quite densely on the inner corona lobes, sparsely on the outer lobes. The raised style-head projecting above the anthers (Figure 11L) is most unusual. This is known in a few *Brachystelma* species but not in any other *Ceropegia*.

*C. filiformis* is unusual among the species with fusiform roots, slender non-succulent stems and leaves in that the stems are cylindrical and not angled. Its affinities among the other southern African species remain unclear.

#### *Specimens examined*

NAMIBIA.—2718 (Grünau): Great Karas Mountains, (–BC), ± 1 650 m, *Bruyns* 5767 (WIND); (–BD), 1 600–1 700 m, *Bruyns* 3523 (BOL, WIND); (–DA), ± 1 600 m, *Bruyns* 5806 (WIND).

NORTHERN CAPE.—3123 (Victoria West): (–DD), *Tyson* 410 (BOL); (–CA), *Bruyns* 4230 (no specimen). 3124 (Hanover): (–AD), *Bruyns* 3275 (BOL); (–CC), *Meve* 347 (BOL). 3221 (Merweville): (–AA), *Bruyns* 4840 (BOL); (–BC), *Bruyns* 5969 (BOL).

EASTERN CAPE.—3125 (Steynsburg): (–CC), *Bruyns* 5060 (no specimen). 3224 (Graaff-Reinet): (–BD), *Bruyns* 1960 (NBG). 3225 (Somerset East): (–AB), *Bruyns* 1767 (NBG); (–BA), *J.R. James* (BOL).

#### 3.2 *Ceropegia dinteri* Schltr.

Dinter first collected this species around Rehoboth, where it has not been seen again. Several gatherings have been made from west of Outjo to Grootfontein (Bruyns 1984). The four collections listed below extend the known distribution over 400 km to the north and make it possible that this rare and inconspicuous species occurs in Angola.

Plants were found on dolomite and granite hillsides growing between rocks or in stony bare patches under trees. Tubers were observed from 25–60 mm in diameter. The stem (1.0–1.5 mm thick) is frail and spindly but reaches a height of over 500 mm with leaves up to 100 mm long. If the plant is growing in the open among short grasses, the stem is short—the stem in Figure 12 was about 150 mm long. Flowers are exceptionally variable with no two the same in size, shape or colouring. The differences between flowers illustrated in Dyer (1983: t. 17) and the present Figures 12 & 13C give some idea of this variability.

#### *Specimens examined*

NAMIBIA.—1713 (Swartbooisdrif): (–AC), 1 200–1 500 m, *Bruyns* 4092 (BOL); (–DA), 1 170 m, *Bruyns* 4095. 1813 (Opuwo): (–DD), *Bruyns* 5548 (BOL); south of Kaoko Otavi, 18-02-1993, *Bruyns* 5557 (K).



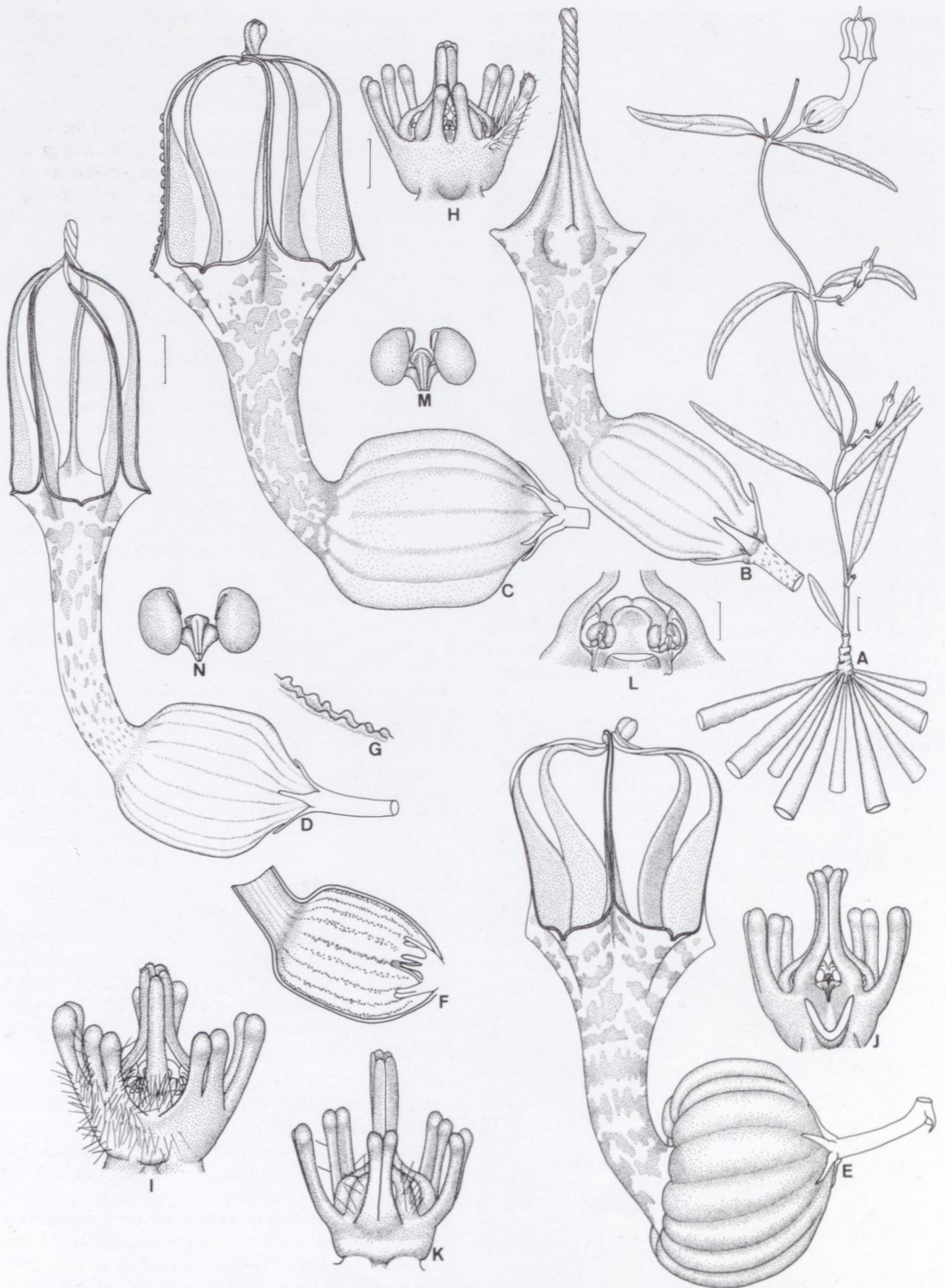


FIGURE 11.—*Ceropegia filiformis*. A, plant; B, bud; C–E, flower; F, l.s. of inflated base of flower: longitudinal ridges of papillae; G, papillae from within basal inflation of flower. H–L, gynostegium: J, one corona lobe removed; L, top, outer corona and one inner corona lobe removed, anthers and  $\pm$  elongated style-head. M, N, pollinaria. Scale bars: A, 10 mm; B–F, 3 mm (at C); G–K, 1 mm (at H); L, 0.5 mm; M, N, 0.25 mm (at H). A, B, C, I, L, *Bruyns* 3275; D, K, N, *Bruyns* 3523; E, J, M, *Bruyns* 1960; F, G, H, *Meve* 347.





FIGURE 12.—*Ceropegia dinteri*, Bruyns 5557. Flower: corolla tube 41 mm long.

4. GOMPHOCARPUS R. Br.

According to Bullock (1952: 406) and Nicholas & Goyder (1992), the genus *Asclepias* should be confined to species from the New World since the type species, *A. syriaca* L., is an American species. Most of the larger, shrubby species from Africa placed in *Asclepias* by Brown should be referred to *Gomphocarpus* R. Br. The majority of the names have already been transferred to *Gomphocarpus* and it is only necessary now to decide which species occur in Namibia.

In Kolberg *et al.* (1992), *Asclepias buchenaviana* and *A. fruticosa* appear under *Asclepias* whereas *Gomphocarpus tomentosus* is listed under *Gomphocarpus*. If Bullock's system is to be used then clearly this is inconsistent and all three should appear under *Gomphocarpus* as in Bullock (1952). Three other species are also known from Namibia and are listed neither in Huber (1967) nor Kolberg *et al.* (1992).

A key is provided for all the species now known for Namibia and, since the synonymy of some is rather complicated, this is listed and discussed briefly.

Key to *Gomphocarpus* in Namibia

- 1a Leaves not more than 2 mm broad, follicles 4–6 mm broad when mature . . . . . *G. filiformis*
- 1b Leaves broader than 4 mm, follicles usually much more than 15 mm broad when mature:

- 2a Plant glabrous in all parts, leaves at least 25 mm broad with rounded lobes clasping stem at base . . . . . *G. glaucophyllus*
- 2b Plant pubescent or puberulous at least on young shoots and leaves, leaves less than 20 mm broad at max., subsessile to shortly petiolate without stem-clasping basal lobes:
- 3a Leaves oblong-lanceolate to elliptic, usually rounded at base, coriaceous and somewhat rigid . . . . . *G. cancellatus*
- 3b Leaves linear or linear-lanceolate, acute, tapering gradually into petiole, thin:
- 4a Follicle without bristles on exterior, produced into apical beak at least 25 mm long . . . . . *G. rostratus*
- 4b Follicle covered with soft bristles, beak not more than 15 mm long:
- 5a Young parts of stem, leaves and inflorescences densely white-tomentose (plant grey-green) . . . . . *G. tomentosus*
- 5b Young parts of stem, leaves and inflorescence not densely white-tomentose (plant yellow-green) . . . . . *G. fruticosus*

4.1 *Gomphocarpus cancellatus* (Burm. f.) Bruyns, comb. nov. *Asclepias cancellata* Burm. f., Flora Indica: cui accedit series zoophytorum indicorum nec non prodromus florae capensis: 7 (betw. 1 March and 6 Apr. 1768).

*A. rotundifolia* Miller (1768).

*A. arborescens* L.: 216 (1771). *Gomphocarpus arborescens* (L.) W.T. Aiton: 79 (1811).

*A. pubescens* L.: 215 (1771).

Brown (1907–1909) was incorrect in using the name *A. rotundifolia* Miller as this was published on 16 April 1768, slightly after *A. cancellata*. Several other names exist for this plant, of which only *Asclepias arborescens* L. has been transferred to *Gomphocarpus*.

*G. cancellatus* is common in the southwestern Cape and even occurs in places as a roadside weed. In Namaqualand and the Richtersveld it is rare and there appears to be only a single record of its occurrence in Namibia, some distance north of Rosh Pinah but well within the winter rainfall zone.

Specimen examined

NAMIBIA.—2716 (Witpütz): (–DA), Bruyns 3927 (BOL).

4.2 *Gomphocarpus filiformis* (E. Mey.) Dietr., Synopsis plantarum 2: 900 (1839–1852). *Lagarinthus filiformis* E. Mey.: 203 (1836–1838). *Asclepias filiformis* (E. Mey.) O. Kunze: 268 (1886) non Jacq. (1760).

*Asclepias buchenaviana* Schinz: 261 (1888). *A. filiformis* var. *buchenaviana* (Schinz) N.E. Br.: 336 (1902–1904).

The name *Asclepias buchenaviana* has become familiar. The species was first described as *Lagarinthus filiformis* by Meyer in 1837 but this name cannot be used in *Asclepias* because of *Asclepias filiformis* Jacq. (1760), a species from the Caribbean. However, there is no reason for it not to be used in *Gomphocarpus*.

4.3 *Gomphocarpus fruticosus* (L.) W.T. Aiton, Hortus kewensis (1810–1813).

*Asclepias fruticosa* L.: 216 (1753).



4.4 *Gomphocarpus glaucophyllus* Schltr. 19 (1894).*Asclepias glaucophylla* (Schltr.) Schltr.: 455 (1896).

Rare, only found in the northeastern portion of Namibia.

*Specimen examined*NAMIBIA.—1718 (Nkurenkuru): (–CD), *De Winter 3881* (WIND).4.5 *Gomphocarpus rostratus* (N.E. Br.) Bullock in Kew Bulletin: 410 (1952).*Asclepias rostrata* N.E. Br.: 331 (1902–1904).

A widespread species in tropical Africa known from Kenya, Tanzania (Bullock l.c.), Angola and Botswana (Brown l.c.) and from two collections in Namibia.

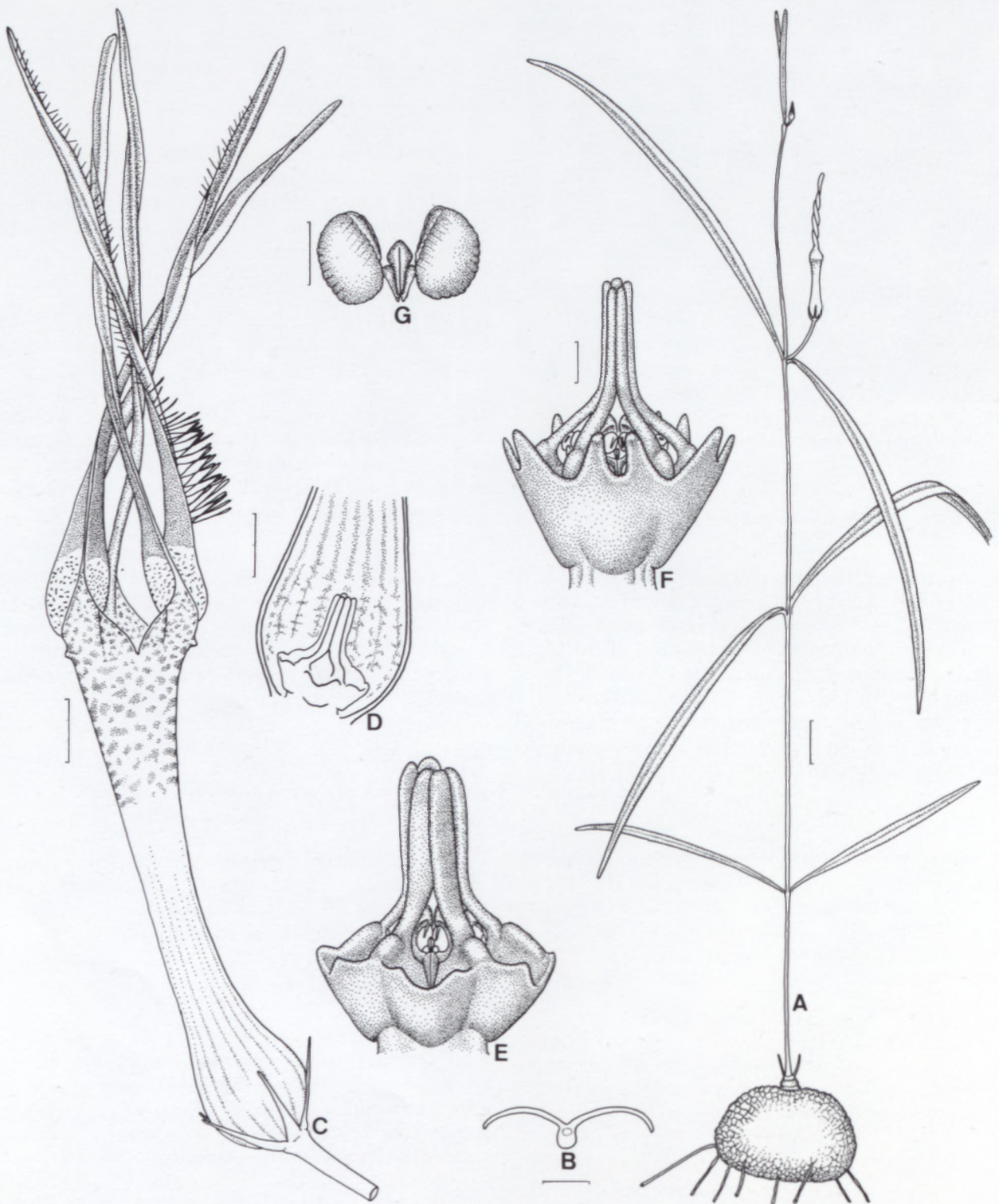


FIGURE 13.—*Ceropegia dinteri*. A, plant; B, cross-section of leaf taken more or less in middle; C, flower; D, base of corolla dissected; E, F, gynostegium; G, pollinarium. Scale bars: A, 10 mm; B, 1 mm; C, 3 mm; D, 2 mm; E, F, 0.5 mm; G, 0.25 mm. F drawn from Bruyns 2062, Outjo, remainder from Bruyns 4095.



*Specimens examined*

NAMIBIA.—1719 (Rundu): (–DC), *De Winter & Marais 5037* (WIND). 1724 (Katima Mulilo): (–DD), *Killick & Leistner 3153* (WIND).

4.6 *Gomphocarpus tomentosus* Burch., *Travels 1: 453* (1822). *Asclepias burchellii* Schltr.: 336 (1895).

Bullock (1952: 406) regarded this taxon as a synonym of *G. fruticosus* but, as Huber (1967) pointed out, two distinct species appear to be involved.

5. PACHYCARPUS *E. Mey.*

Smith (1988) revised the southern African species of *Pachycarpus*, recognising 24 species for the region. All of them seem to occur only on the eastern side of southern Africa and neither there nor in Huber (1967) are any species mentioned for Namibia. Nevertheless, as early as 1955, B. de Winter gathered a plant clearly identifiable as a *Pachycarpus* in northern Namibia. Recent collections by B. Strohbach and myself have again brought to light the same taxon.

5.1 *Pachycarpus schweinfurthii* (*N.E. Br.*) *Bullock*

According to Bullock (1953), *P. schweinfurthii* is very widely distributed in tropical Africa from Nigeria and Sudan southwards to Angola and Zimbabwe. In Namibia it

only occurs in the moister northeastern region (Figure 5) and its occurrence in Botswana is also likely.

I have attempted to insert *P. schweinfurthii* into Smith's (1988) key to the southern African species of *Pachycarpus* (see below) by adding an extra couplet, and a description is also provided. Unfortunately the drawings in Smith's paper are not clear and it is hard to see what the characters used in the key really refer to, especially as there is no explanation of the terminology adopted for the different floral parts. In the specimen here the guide rails (anther wings of Smith) are a little over 3 mm long. The distance from the edge of the rail to the centre of the flower increases as one goes from the corpusculum towards the base of the flower (clearly seen in Figure 14D) and I assume that this is what Smith means by 'outer margin concave'. I have changed this to 'with concave margin' as there is no 'inner' margin which the use of 'outer' implies.

It may be of use to observe here that the 'corona lobes' referred to above and throughout Smith (1988) are the 'staminal corona' lobes of Kunze (1982) corresponding to the 'inner corona lobes' of the Stapelieae. It seems to be assumed generally that in the species in the *Asclepias–Gomphocarpus–Pachycarpus–Schizoglossum* complex the corona only consists of these five lobes of staminal origin. However, in most species I have looked at, there are five more lobes which are of interstaminal origin (Kunze 1982). Unlike in the Stapelieae (where these 'outer corona lobes' are generally well developed), here they are minute and mostly hidden behind and below the large mouth at

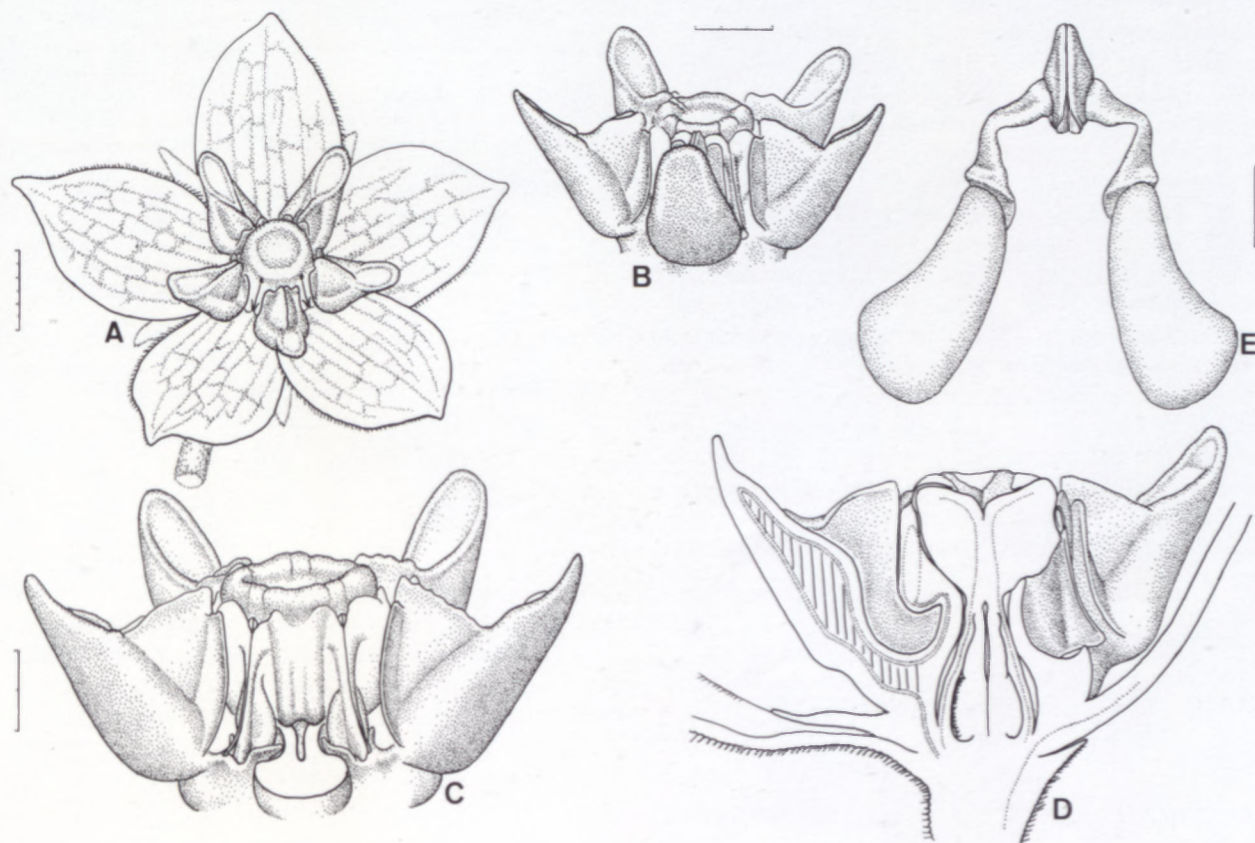


FIGURE 14.—*Pachycarpus schweinfurthii*, *Brayns 5484*. A, flower; B, gynostegium; C, gynostegium with one corona lobe removed; D, half flower; E, pollinarium. Scale bars: A, 6 mm; B, 3 mm; C, D, 2 mm (at C); E, 0.5 mm.





FIGURE 15.—*Pachycarpus schweinfurthii*, Bruyns 5484, in habitat.

the base of the guide rail so they have probably been missed. They are clearly visible in Figure 14C, each lobe divided into two narrow, widely diverging teeth encircling the base of the guide rail.

#### Part of key taken from Smith (1988)

- 19a Guide rail (anther wings) 1.3–2.4 mm long with  $\pm$  straight margin . . . . . *P. natalensis*  
 19b Guide rail 3.0–7.2 mm long with concave margin:  
 20a Flower rotate-campanulate, corolla lobes spreading but curved inwards in upper half . . . . . *P. schweinfurthii*  
 20b Corolla lobes reflexed:  
 20ba Keel of corona lobe taller than broad . . . . . *P. reflectens*  
 20bb Keel of corona lobe not taller than broad . . . . . *P. appendiculatus*

Plant to 450 mm tall, consisting of 1–several ascending stems, all parts stiffly pubescent except where indicated otherwise (Figure 15). *Stems* 3–5 mm thick. *Leaf* 30–70  $\times$  20–50 mm, ovate to ovate-lanceolate, apex rounded, base truncate to cordate, green with many prominent parallel veins, petiole 4–10 mm long. *Peduncle* 20–55 mm long,  $\pm$  2 mm thick, bearing 4–10  $\pm$  simultaneously opening flowers, bracts narrowly lanceolate, 6–14 mm long, pedicels 15–18 mm  $\times$  1.0–1.5 mm thick. *Sepals* 10–12  $\times$  2–3 mm (at base), widening very slightly above base then lanceolate, pubescent below, glabrous above. *Corolla* 30–35 mm diam., rotate-campanulate; lobes 15  $\times$  9 mm, ovate, finely pubescent outside and on one margin, glabrous within, white suffused with reddish outside, inside white with conspicuous greyish red veining. *Gynostegium* 14–15 mm across; *outer corona lobes* minute, bifid and spreading adpressed to base of guide rails; *inner corona lobes* ascending,  $\pm$  7 mm long, exceeding height of style-head, with keel 2 mm tall, just equalling style-head, keel and part below it white, part above keel pinkish red.

#### Specimens examined

NAMIBIA.—1917 (Tsumeb), Otavi Mountains, (–DB), Bruyns 5484 (BOL, K). 1920 (Tsumkwe): (–BC), Strohbach 1268 (WIND).

### 6. SCHIZOGLOSSUM E. Mey. *sensu lato* in Namibia

During recent expeditions to the northern parts of Namibia several plants belonging to the former genus *Schi-*

*zoglossum* have been collected. These have proved very difficult to identify to species level and information on these collections is presented here in the hope that they may add to the knowledge of the group. This group was worked on extensively by Kupicha (1984) who, following Bullock (1952), resurrected the genus *Aspidoglossum* E. Mey. and created a new genus *Miraglossum* Kupicha as well as concurring with Bullock's resurrection of *Stenostelma* Schltr. and *Glossostelma* Schltr. However, she provided no keys to all these genera and various lengthy diagnoses have to be perused to sift out the salient details for identifications.

In Kolberg *et al.* (1992) various species were left erroneously in *Schizoglossum* with Kupicha cited as the authority for this. In fact she placed *S. baumii* Schltr. ex N.E. Br. under *Aspidoglossum masaicum* (N.E. Br.) Kupicha (not *S. bidens* subsp. *atrorubens* (Schltr.) Kupicha) and *S. penteri* Schltr. tentatively under *Aspidoglossum erubescens* (Schltr.) Bullock so that *Schizoglossum sensu stricto* is not known in Namibia. Nevertheless, I have included it in the key which follows. The differentia that Kupicha (1984) gives for *Stenostelma* seem to me to have so much overlap with the other genera that I have reverted to the shape of the style-head to separate this genus from the others as Schlechter (1894) originally did: this works for *S. capense* but may cause problems with the other species tentatively assigned to this genus by Kupicha.

#### Key to genera of the *Schizoglossum* complex in Namibia

- 1a Style-head conical, anther appendages much exceeding style-head connivent in centre and hiding it entirely, caudicles conspicuously angled, broadly attached to corpusculum . . . . . *Stenostelma*  
 1b Style-head flat with slight depression in centre, anther appendages adherent to sides of apex and not covering it, caudicles not conspicuously angled with narrow attachment to corpusculum:  
 2a Inflorescences pedunculate, pollinia medially attached to caudicle with germinating mouth on outer side . . . . . *Schizoglossum*  
 2b Inflorescences sessile, pollinia subapically attached usually without germinating mouth, if this is present then located at point of attachment of pollinium to caudicle:  
 3a Corona lobes fleshy, pollinia without germinating mouth . . . . . *Miraglossum*  
 3b Corona lobes thin, pollinia often with germinating mouth . . . . . *Aspidoglossum*

#### 6.1 *Aspidoglossum carinatum* (Schltr.) Kupicha

The taxon illustrated in Figure 16 keys out in Huber (1967) as *Schizoglossum penteri*. In Kupicha (1984) one arrives at *Aspidoglossum carinatum* (Schltr.) Kupicha rather than *A. erubescens* which is where she tentatively placed *S. penteri* in synonymy. The pollinium lacks the conspicuous germinating zone supposedly typical of *A. erubescens* and so we are unlikely to be dealing with that species.

According to Kupicha (1984: 640), *A. carinatum* occurs in the eastern Cape Province and Natal. The present, rather exceptional extension of its distribution into north-



ern Namibia stretches credibility somewhat. In addition, the corona does not correspond very exactly with that of *A. carinatum*: the ventral appendage of the corona is slender and much exceeds the apical process (not broadly triangular). However, there appears to be nowhere else to place this collection and since the taxonomy of this whole group remains such a mess, I would prefer to avoid describing new taxa which might further confound the situation.

It should be observed that the stem here is uniformly finely pubescent all round and the leaves are pubescent on the ventral surface and glabrous on the dorsal except for the pubescent midrib (Figure 16F). Unless damaged, the plant always consists of a simple, slender, erect stem up to 300 mm tall with narrow leaves and many small clusters of nearly sessile flowers. There is a small, neat, carrot-like tuber just beneath the surface of the soil (one excavated was  $\pm 60$  mm long and 10 mm broad at apex).

#### Specimen examined

NAMIBIA.—1917 (Tsumeb): Otavi Mountains, (–DB), *Bruyns* 5488 (BOL).

6.2 *Schizoglossum saccatum* *Bruyns*, sp. nov., a ceteris speciebus pilis longis densis in lobis corollae et lobis coronae crassioribus processa apicale horizontale breve discedit. Typus: Namibia, 1813 (Opuwo), south of

Kaoko Otavi, (–DD), 1 400 m, *Bruyns* 5558 (BOL, holo.; K, WIND, iso.).

Plant much branched at ground level from an underground rootstock, with milky latex. *Stems* 70–200  $\times$  1.5–2.0 mm, ascending, hairy all round, internodes 7–25 mm long. *Leaves* 20–70  $\times$  2.5–4.0 mm, narrowly linear, sessile, ventral surface pilose, dorsal glabrous except on midrib, margins recurved, acute at apex and at base. *Flowers* in fascicles mostly of 4 arising alongside all except the basal nodes; *peduncle* 7–20  $\times$   $\pm$  1 mm, pilose along one side only, with several filiform bracts up to 3 mm long at apex; *pedicel* 7–9 mm long, about 0.5 mm thick, pilose. *Sepals* dorsally pilose, ventral surface glabrous, 4–5  $\times$  1-mm (at base), lanceolate, usually recurved towards apex, green. *Corolla* divided right to base; *lobes* 6.0  $\times$  2.5 mm (at base), ovate-lanceolate, ascending-spreading with recurved margins and apex, dorsal surface glabrous, ventral surface convex and densely white-pilose especially towards apex with hairs up to 1.5 mm long, green with faint longitudinal purplish stripes. *Gynostegium* 2.0  $\times$  5.5 mm, glabrous, white except for purplish pink dorsal apex; *outer corona lobes* minute, truncate-emarginate, beneath guide rails; *inner lobes* massive, inflated,  $\pm$  ovoid when viewed from above with small apical process projecting horizontally onto anther appendage and broad rounded dorsal process. Fruit and seed not seen. Figure 17.

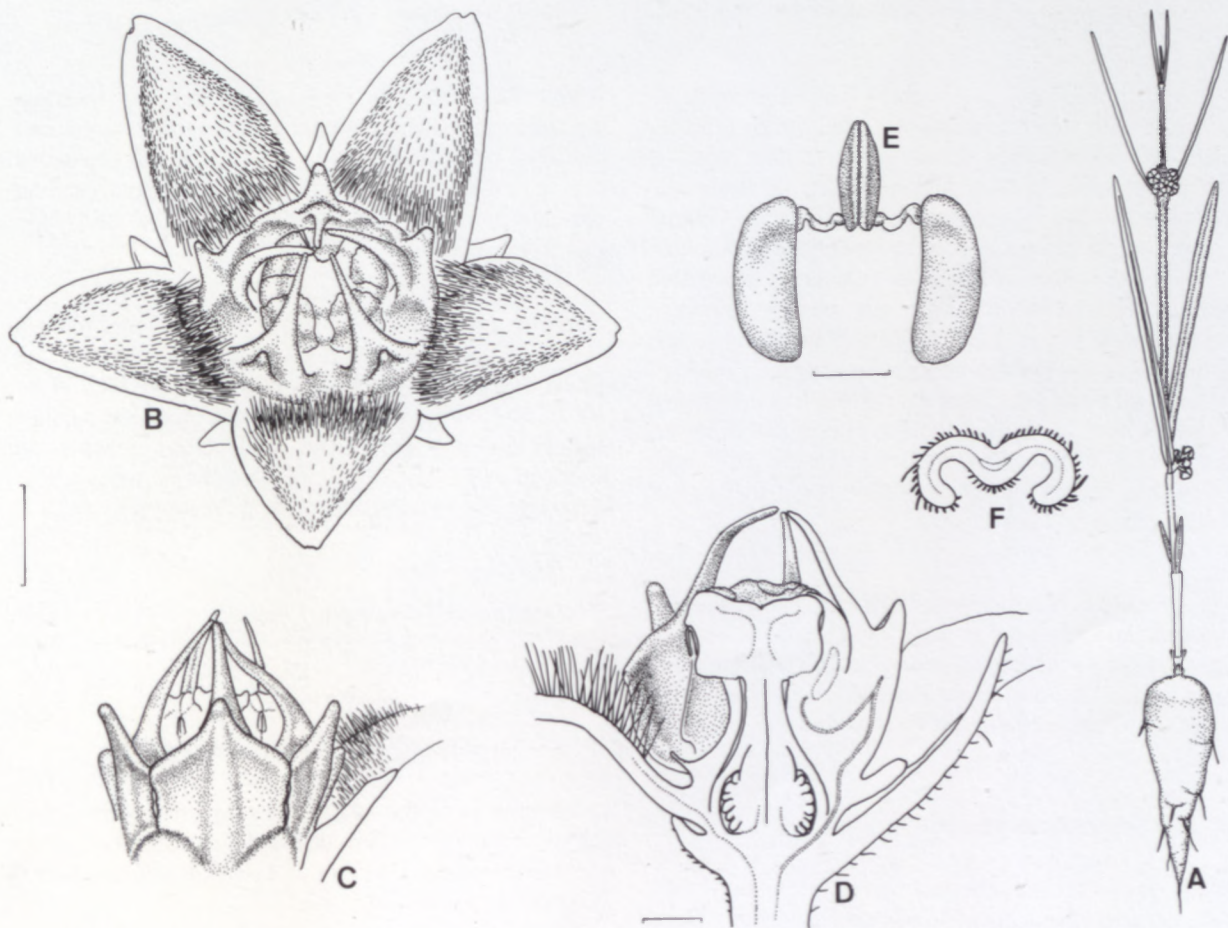


FIGURE 16.—*Aspidoglossum carinatum*, *Bruyns* 5488. A, plant, much reduced in length (up to 450 mm tall); B, flower; C, gynostegium; D, half flower; E, pollinarium; F, cross-section of leaf taken near middle showing distribution of thickened hairs. Scale bars: A, 10 mm; B, C, F, 1 mm (at B); D, 0.5 mm; E, 0.25 mm.



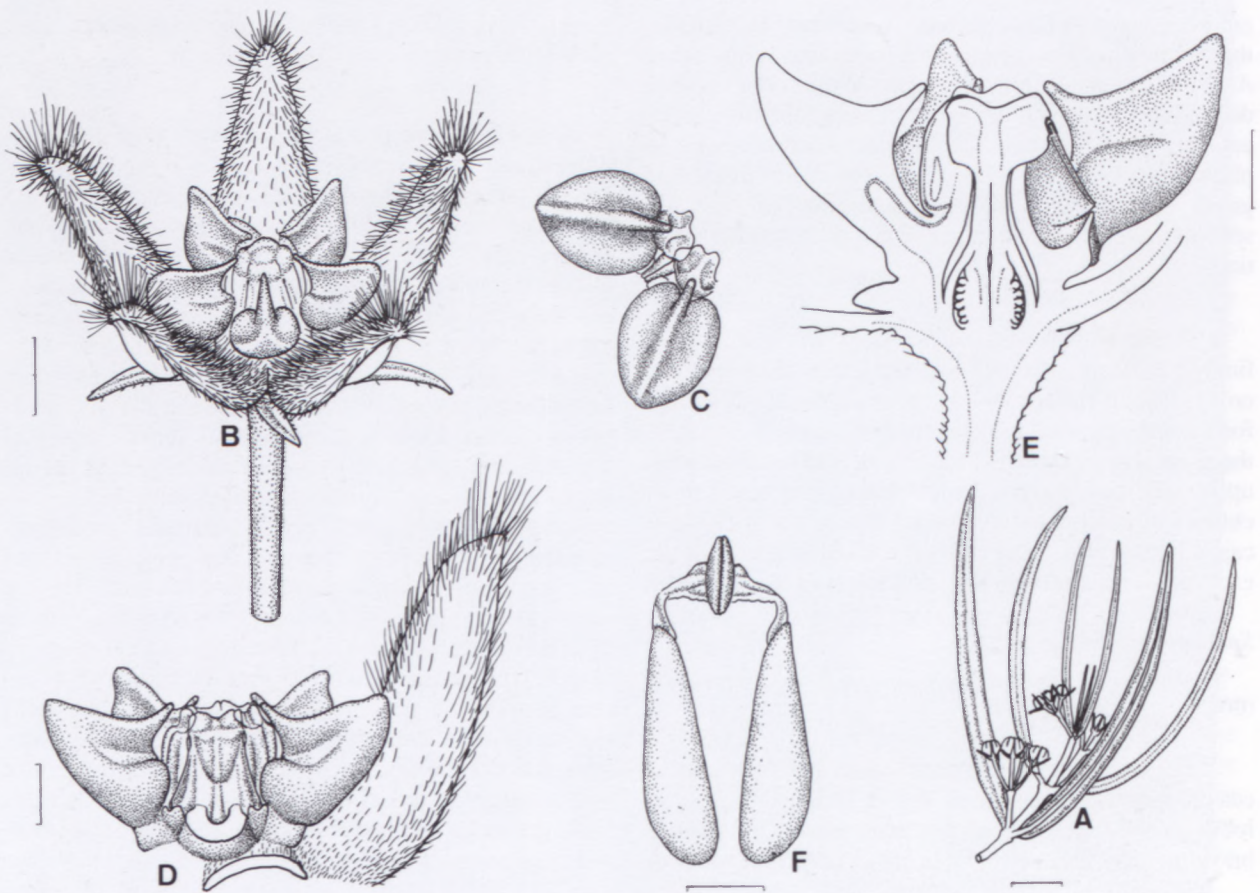


FIGURE 17.—*Schizoglossum saccatum*, Bruyns 5558. A, portion of plant; B, flower; C, face view of part of corona; D, gynostegium with one corona lobe removed; E, half flower; F, pollinarium. Scale bars: A, 10 mm; B, 2 mm; C, D, 1 mm (at D); E, 1 mm; F, 0.25 mm.

This species is only provisionally placed under *Schizoglossum* with which it shares the pedunculate inflorescence but, if Kupicha's (1984) sense of the genus is applied, little else. In *Miraglossum*, where the fleshy corona lobes and lack of germinating mouth on the pollinia suggest it might belong, it would be a very odd bedfellow with the other species of this small, compactly distributed genus: as Kupicha (in litt.) points out, most of them have whorled leaves in the flowering part of the stem, sessile inflorescences and pollinia attached to the caudicle somewhat on their inner side rather than apically as in this new species. It also seems that the fleshiness of the corona lobes exceeds anything known in *Miraglossum*. D. Goyder at Kew has tried to match it with existing material or existing genera without success.

Plants were common among limestone chunks in a flat *Sesamothamnus*-dominated area, growing with a small spiny *Euphorbia* and many other succulents. They are generally small and inconspicuous and, once the grass begins to grow, are probably difficult to find.

### 6.3 *Stenostelma capense* Schltr.

This species seems to be widespread but relatively uncommon in northern Namibia. Schlechter (1894) based *Stenostelma* on the conical shape of the style-head. From the half flowers shown here (compare Figure 18H with Figure 1D) it can be seen that the style-head is indeed differently shaped to that typical amongst the genera *As-*

*clepias*, *Gomphocarpus*, *Pachycarpus* and *Schizoglossum*. The anther appendages are also much more conspicuous. Instead of being addressed to the edge of the pentagonal style-head they here only touch the edge, rise up and are connivent in the centre, in so doing hiding the entire style-head from view.

In the material illustrated here the stems are pilose in a longitudinal band on one side (the side changing after each node) and are not pilose all round as given by Huber (1967). On the other hand the corolla lobes are papillate all over the inner surface and not glabrous as Schlechter described them. The very tiny outer corona lobes consist of a single, erect tooth beneath the guide rail (Figure 18G).

### Specimens examined

NAMIBIA.—1918 (Grootfontein): Gobis Water, (–AC), Bruyns 5499 (BOL). 1920 (Tsumkwe): 15 km southeast of Tsumkwe, (–DA), Bruyns 5834 (BOL).

### 7. *Stigmatorhynchus hereroensis* Schltr.

The genera of the Marsdenieae are so poorly known that every attempt should be made to obtain and publish information on them so that an eventual re-assessment of the tribe is possible.

*S. hereroensis* is common and fairly widespread in the northern portion of Namibia usually growing in areas with much surface limestone. The distribution (Figure 19,



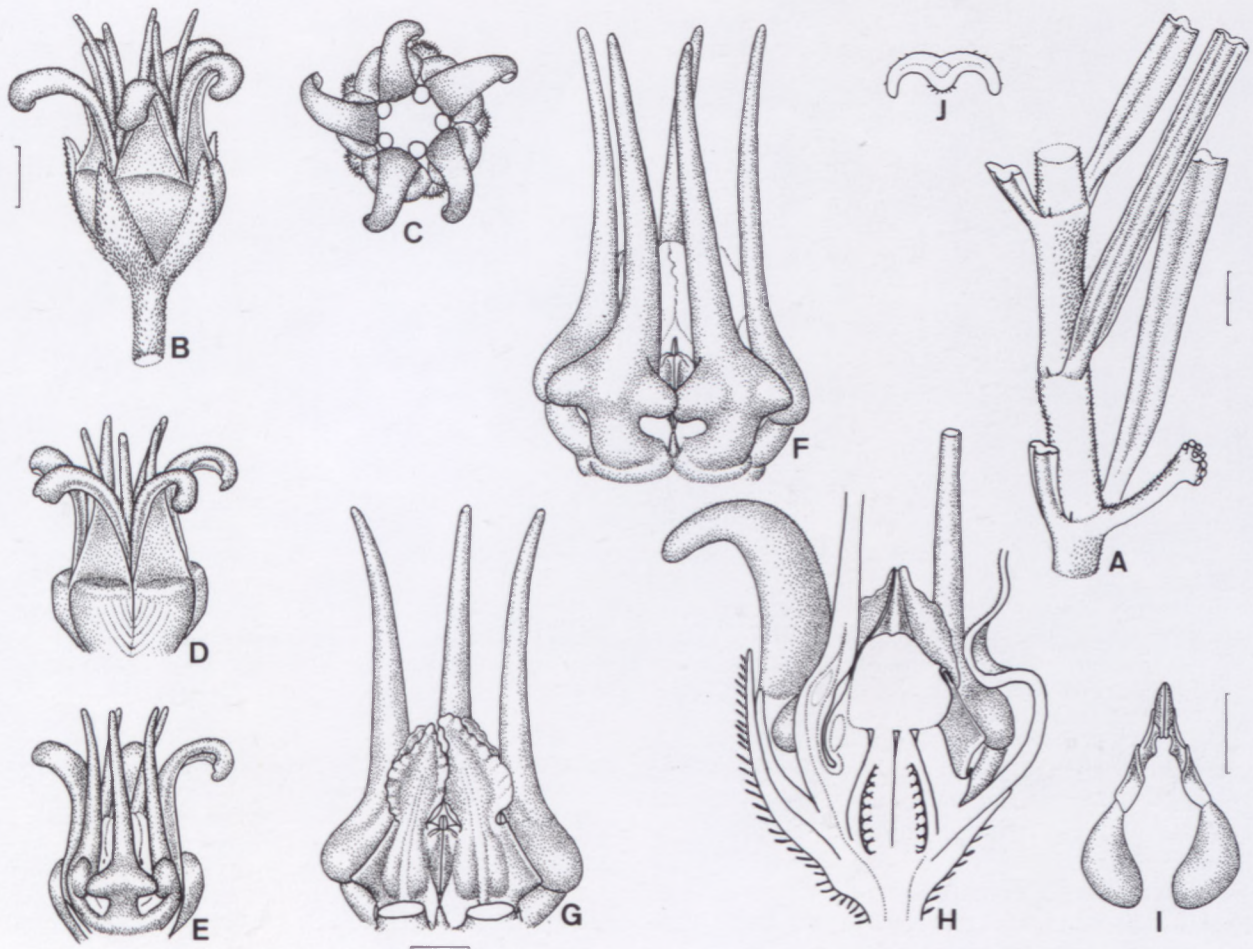


FIGURE 18.—*Stenostelma capense*, Bruyns 5834. A, part of plant: stem virtually glabrous in patch below insertion of each petiole, peduncle only hairy on upper side. Flowers produced in dense, simultaneously opening clusters on several such peduncles towards apex of stem; B, C, flower; D, flower with sepals removed; E, flower with two corolla lobes excised; F, gynostegium; G, gynostegium with two corona lobes removed; H, half flower (small oval area demarked inside cut corona lobe is hollow); I, pollinarium; J, cross-section of leaf, taken near middle. Scale bars: A, 2 mm; B–E, J, 1 mm (at B); F–H, 0.5 mm (at G); I, 0.25 mm.

drawn up from material in WIND and BOL) seems to be bounded to the north and east by regions covered with deep Kalahari sand but it remains possible that it extends into Angola and Botswana. Plants often grow in the open but may also be found growing inside other bushes. They are usually heavily grazed.

*S. hereroensis* is a shrub-forming species. Plants usually form a rigid, round bushlet up to about 300 mm tall but, if sheltered, may reach 1 m in height, although they never show any tendency to climb. The grey, woody stems contain a milky latex.

Plants bear small white flowers in nearly sessile, simultaneously opening clusters along the stems. Within each flower is a dense beard of whitish hairs, beginning on the lobes, extending into the tube and blocking the throat of the tube. Peculiar to this species (to the genus?) is the very long, cylindrical style-head which protrudes slightly from the tube, and the pair of ovules in each carpel. One of these ovules seems to abort as each pod contains only a single, quite large seed. The pods may be paired or solitary and when paired are divergent from one another at about 120°. The pollinia are very small and attached by long, slender caudicles to the small corpusculum (Figure 20).

Schlechter (1914) placed three species in *Stigmatrhynchus*, of which the other two, *S. umbelliferus* (K. Schum.) Schltr. and *S. stelostigma* (K. Schum.) Schltr. (from Tanzania and Somalia respectively) are unknown

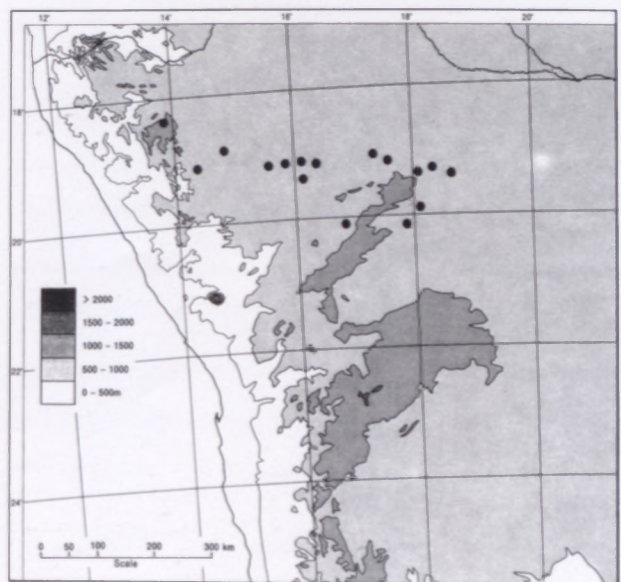


FIGURE 19.—Distribution of *Stigmatrhynchus hereroensis* in Namibia (from records in WIND, BOL).



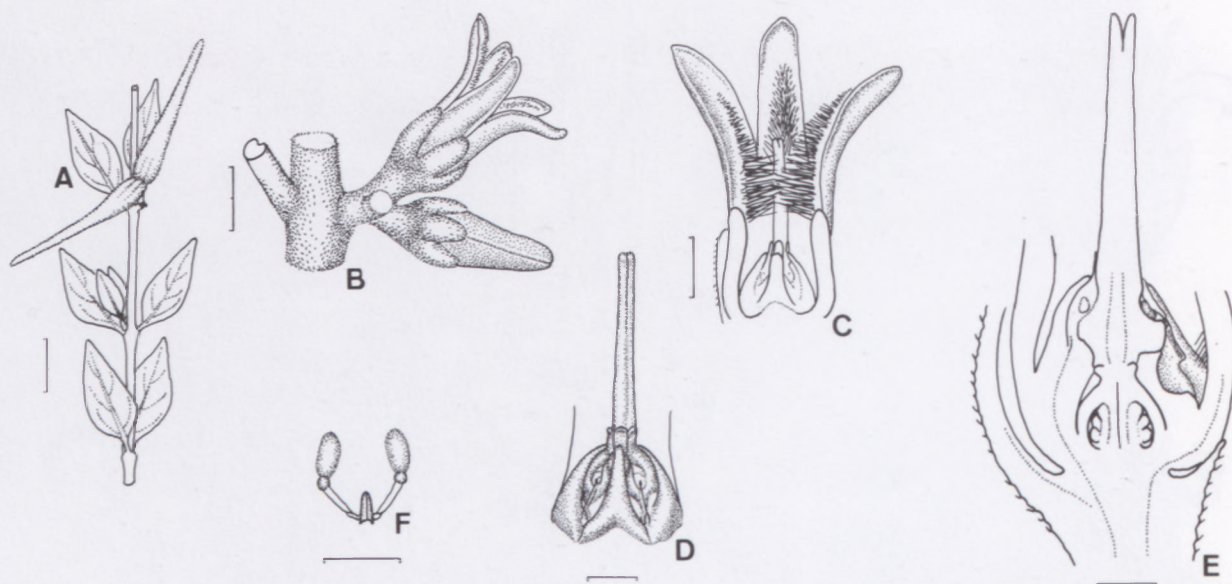


FIGURE 20.—*Stigmatorhynchus hereroensis*, Bruyns 5833. A, portion of plant with paired follicles; B, flower; C, dissected flower; D, gynostegium; E, half flower, each carpel has two ovules; F, pollinarium with caudicles stretched out. Scale bars: A, 10 mm; B, 2 mm; C, 1 mm; D, 0.5 mm; E, 0.5 mm; F, 0.25 mm.

to me. Bullock (1954) transferred *S. stelostigma* back to *Marsdenia* R. Br. so that, at present, *Stigmatorhynchus* contains only two species. It should be noted that Schlechter's illustration (1914) is not very accurate: the pollinaria are very different to what he has shown and the style head maintains a roughly equal diameter right to the apex, where it may sometimes be bifid.

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#### REFERENCES

- AITON, W.T. 1810–1813. *Hortus kewensis*, edn 2. London.
- BROWN, N.E. 1902–1904. Asclepiadaceae. *Flora of tropical Africa* 4, 1: 231–503.
- BROWN, N.E. 1907–1909. Asclepiadaceae. *Flora capensis* 4, 1: 518–1036.
- BRUYNS, P.V. 1984. *Ceropegia*, *Brachystelma* and *Tenaris* in South West Africa. *Dinteria* 17: 3–80.
- BRUYNS, P.V. 1985. Notes on *Ceropegias* of the Cape Province. *Bradleya* 3: 1–47.
- BRUYNS, P.V. 1988. A revision of the genus *Echidnopsis* Hook. f. *Bradleya* 6: 1–48.
- BRUYNS, P.V. 1993. A revision of *Hoodia* and *Lavrania*. *Botanische Jahrbücher* 115: 145–270.
- BRUYNS, P.V. & FORSTER, P.I. 1989. *Ceropegia cumingiana* Decne. *Austrobaileya* 3: 7–11.
- BULLOCK, A.A. 1952. Notes on African Asclepiadaceae I. *Kew Bulletin* 1952: 405–426.
- BULLOCK, A.A. 1953. Notes on African Asclepiadaceae III. *Kew Bulletin* 1953: 329–362.
- BURMAN, N.L. 1768. *Flora indica: cui accedit series zoophytorum indicorum nec non prodrum flora capensis*: 7. Amsterdam, Leiden.
- DIETRICH, D.N.F. 1839–1852. *Synopsis plantarum*. Voigt, Weimar.
- DYER, R.A. 1975. *The genera of southern African flowering plants* 1. Government Printer, Pretoria.
- DYER, R.A. 1980. Asclepiadaceae. *Flora of southern Africa* 27, 4. Government Printer, Pretoria.
- DYER, R.A. 1983. *Ceropegia*, *Brachystelma* and *Riocreuxia* in southern Africa. Balkema, Rotterdam.
- FORSTER, P.I. 1988. Studies in the Australasian Asclepiadaceae. I. *Brachystelma* Sims in Australia. *Nuytsia* 6: 285–294.
- HUBER, H.E. 1957. Revision der Gattung *Ceropegia*. *Memorias da Sociedade Broteriana* 12.
- HUBER, H.E. 1967. Asclepiadaceae. *Prodrum einer Flora von Südwestafrika* 114.
- JACQUIN, N.J. 1760. *Enumeratio systematica plantarum*. Haak, Leiden.
- KOLBERG, H., GIESS, W., MÜLLER, M.A.N. & STROHBACH, B. 1992. List of Namibian plant species. *Dinteria* 22.
- KUNZE, H. 1982. Morphogenese und Synorganisation des Bestäubungsapparates einiger Asclepiadaceen. *Beiträge zur Biologie der Pflanzen* 56: 133–170.
- KUNZE, O. 1886. *Jahrbuch des Königlichen Botanischen Gartens Berlin* 4: 268.
- KUPICHA, F.K.A. 1984. Studies on African Asclepiadaceae. *Kew Bulletin* 38: 599–672.
- LINNAEUS, C. 1753. *Species plantarum*. Stockholm.
- LINNAEUS, C. 1771. *Mantissa plantarum*. Stockholm.
- MEYER, E.H.F. 1836–1838. *Commentarium de plantis Africae australis*: 203. Leipzig.
- MILLER, P. 1768. *The gardener's dictionary*. London.
- MÜLLER, M.A.N. 1984. *Brachystelma blepharantnera* Huber—rediscovered after 70 years. *Dinteria* 17: 81.
- NICHOLAS, A. 1982. *Taxonomic studies in Asclepias with particular reference to the narrow-leaved species in southern Africa*. M. Sc. Thesis, University of Natal, Pietermaritzburg.
- NICHOLAS, A. & GOYDER, D. 1992. *Aspidonepsis*, a new southern African genus. *Bothalia* 22: 23–35.
- PECKOVER, R. 1992. A new species of *Brachystelma* from Natal. *Aloe* 29: 56, 57.
- PHILLIPS, E. P. 1941. Newly described species and new combinations. *Bothalia* 4: 41.
- SCHINZ, H. 1888. *Verhandlungen des Botanischen Vereins Brandenburg* 30.
- SCHLECHTER, R. 1894. Beiträge zur Kenntnis südafrikanischer Asclepiadaceen. *Botanische Jahrbücher* 18 Beiblatt 45: 19.
- SCHLECHTER, R. 1895. Asclepiadaceae elliotianae. *Journal of Botany* 33: 333–339.
- SCHLECHTER, R. 1896. Asclepiadaceae. In H. Schinz, Beiträge zur Kenntnis der Afrikanischen Flora 4. *Bulletin de l'Herbier Boissier* 4: 450.
- SCHLECHTER, R. 1914. Asclepiadaceae africanae. *Botanische Jahrbücher* 51: 129–155.
- SMITH, D.M.N. 1988. A revision of the genus *Pachycarpus* in southern Africa. *South African Journal of Botany* 54: 399–439.
- WILMAN, M. 1946. *Preliminary checklist of the flowering plants and ferns of Griqualand West*. Deighton Bell, Cambridge.