Ceropegia, Brachystelma and Tenaris
in South West Africa

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Introduction:
During a brief stay in SWA in 1979, I became interested in knowing which species
of these three genera occur in the territory. A bit of searching indicated that the only
modern source of such information was Huber’s account in the Prodromus einer
Flora von Südwestafrika, other older sources being the nomenclaturally confusing
and rare „Neue und wenig bekannte Pflanzen . . .“ by Dinter and Brown’s account
in the very incomplete Flora of Tropical Africa. The Prodromus was not entirely
satisfactory as no descriptions are given in this work (by virtue of its being a
“Prodromus”), the keys are a little cumbersome and it is not illustrated at all.

It was thus apparent that there was a real need for some relatively simple article for
the specific purpose of the easy identification of members of these genera. It is
hoped that this account will at least partially satisfy this requirement.

In preparation for this, a number of species occurring in the territory were collected
in 1979. Further species were gathered in March and April of 1981 which added sub-
stantially to those that I had already seen. Unfortunately I was not able to locate
two of those recorded from SWA in the field. These are Brachystelma schinzii
N.E.Br. and B. blepharanthera Huber. B. schinzii could not be reached because of
military operations in the area: it occurs in the vicinity of Ondangua, where the
presence of land-mines makes any collecting distinctly hazardous. B. blepharanthera
is still only known from Dinter’s original collections of around the turn of the centu-
ry, made near Windhoek.

As the sketches have all been prepared from living, field-collected specimens it was
decided to exclude those not personally seen in the field. In two cases, C. pygmaea
and C. pachystelma, plants have not been seen in SWA in flower and the drawings
have been prepared from material collected in South Africa. However, these speci-
mens agree well in most details with material seen in the Windhoek Herbarium and
it is thus reasonable to take these drawings as being representative of the species in
SWA.
The three genera with which this work is concerned fall into the tribe Ceropogieae of the family Asclepiadaceae. This family consists of some 2000 species in about 200 genera and is distributed over most of the old world and much of the new world as well but with a vast majority of species occurring in tropical to temperate regions with very few in the colder parts. It is distinguished from its nearest congeners at family level, the Periplocaceae and Apocynaceae, by the manner in which the pollen grains are united in large numbers into 10 (or occasionally 20) waxy, fairly rigid masses. This is a rare phenomenon in the plant kingdom as a whole and has its nearest parallel in the Orchidaceae.

Brown divided the Asclepiadaceae into 6 tribes of which one has now become the separate family Periplocaceae. According to his system — and this, with few modifications, is the same as that adopted by Dyer (1975) — the two tribes Ceropogieae and Stapelieae are separated from all the others by having their pollinia transparent along the inner margin or at the apex. Brown differentiated between these two very closely related tribes on vegetative grounds: In the Ceropogieae the stems are herbaceous or fleshy and often twining with well-developed leaves and, if leafless, then without definite angles; in the Stapelieae the stems are fleshy with numerous angles each divided into tubercles or teeth tipped with either a small, rudimentary leaf or a spine.

In southern Africa the Ceropogieae consists of nine genera. It is further subdivided into two groups by whether or not the corona consists of one or two series of lobes and it is to the latter group that the genera discussed here belong.

Figure 1: A key to the towns indicated in the distribution maps. Also given here are the major drainage systems around the territory and some of the “regions” into which it may be divided.
White and Sloane (1937) have coined the term Ceropogiads for this tribe as a whole. On the few occasions that it is used here it is intended to encompass the three genera *Ceropogia, Brachystelma* and *Tenaris* rather than the whole tribe as they seem (on a superficial examination at least) to be considerably different from the other members of the tribe and to lie far closer to the *Stapeliaceae* than to the others.

**KEY TO THE GENERA** (valid for SWA only)

1. Corolla tube more than twice as long as broad at widest, usually inflated at base .......................................................... *Ceropogia*
   — Corolla tube less than twice as long as broad at widest, without basal inflation .......................................................... 2.

2. Corolla lobes more than 5x as long as broad at base .................... *Tenaris*
   — Corolla lobes less than 5x as long as broad at base ............... *Brachystelma*

**CEROPGIA L.**

*Ceropogia* consists of some 160 species found throughout Africa, the near East and the far East to China. It is predominantly a genus of relatively insignificant, climbing or twining plants which show a high degree of diversity and adaptability in both habitat and growth forms. A considerable number are succulents with a tuber or thickened roots and the succulence may be found in the stems or leaves or in both of these parts. Species become less succulent as the rainfall received increases and the least succulent of them — slender, herbaceous climbers — are to be found in and on the fringes of the forests of West Africa and the far East. Progressing into drier areas one finds that Ceropogias become smaller, flesher in the stems and their leaves decrease in size. This trend reaches an extreme in species like *C. stapeliformis* (from South Africa), *C. variegata* (north-east Africa) and *C. carlandii* (Madagascar). In fact these species just mentioned, along with a few others, show a remarkable similarity to some members of the *Stapeliaceae* — especially to those Carallumas in which a long, attenuated flowering stem is produced. Some Ceropogias (as in *C. campanulata*, for example) have entirely diverged from the twining habit and are small, erect geophytes, often occurring in places with shallow soils which are seasonally moist and subject to periodic drought from which they protect themselves by retreating into an underground tuber.

In general flowers of Ceropogias are in direct contrast to their insignificant vegetative parts. Their remarkable shape — mostly very long and slender with the corolla tube inflated near the base and the corolla lobes contorted into some or other peculiar cage-like structure over the mouth of the tube — makes them some of the oddest in the vegetable kingdom. Many are visibly quite highly coloured but in many others their often brilliant colouration is restricted to deep within the corolla tube which has to be dissected to see this.
As in many of the more succulent genera of the Asclepiadaceae, a great number of species of Ceropogia is to be found in southern Africa. SWA lies on the outskirts of the region where the highest concentration of Ceropogias is to be found and this suggests that the genus originated in wetter parts on the eastern side of the continent and the more resilient species have migrated westwards into drier areas like SWA. This is substantiated by the paucity of endemic species (Cdinteri being the only known one) and the distribution in the broader African context of those occurring in SWA. This may also have some bearing on the lack of taxonomically difficult groups in this region which is in contrast to the position in other parts of southern Africa, where Ceropogia is a fairly complex genus taxonomically.

Since at least half of the country falls into the tropics considerable evidence of the influence of the central African flora might be expected. However, except for the north-eastern corner (north and east of Grootfontein), the annual rainfall is mostly below 400 mm (see fig 2). This together with the fact that a considerable portion of the central part of the country is covered with a deep layer of Kalahari sand has caused much of the vegetation to bear a distinct relationship to that of Botswana and parts of the Transvaal rather than to that of central Africa. This is reflected quite conspicuously in the species of Ceropogia (and Brachystelma) and all those occurring south of Grootfontein (except for C. stenoloba, which is an outlier from the north and C. dinteri, which is apparently endemic) occur in Botswana and the Transvaal as well. North of Grootfontein the picture is somewhat different. Here the rainfall steadily increases as one progresses towards and then along the Caprivi Strip towards the Zambezi River (where it reaches 800 mm annually) and the vegetation takes on a more tropical aspect. Giess (1971) classifies it as “Tree Savannah and Woodland”, typified by such well-known trees as Pterocarpus angolensis (kiaat), Bampa plurijuga (Rhodesian teak), Ricinodendron raunentii (manketti), Lonchocarpus capassa (rain tree) and many others, with palms in certain areas.

In structure although not necessarily in species composition this woodland is similar to that of much of south tropical Africa. This is again reflected in the species of Ceropogia occurring there. Of those found in this area, C. nilotica and C. stenantha are species with a pan-African distribution; C. paricyma, C. lugardiae and C. purpurascens are known from Kenya southwards and C. bonafouxii and C. meyeri from Angola and Zambia. Of these only C. nilotica and C. lugardiae venture further south in SWA and clearly have a wider rainfall tolerance than the others.

The highest concentration of species is found in the central and northern Kalahari (“Camelthorn Savannah”, vegetation type no. 12 and “Tree Savannah and Woodland”, no. 11 of Giess, 1971) and the Caprivi, where the annual rainfall is above 500 mm and the soil is deep and relatively free of rocks near the surface. A few advance west into the “Mountain Savannah and Karstveld” (no. 6), “Thornbush Savannah” (no. 7) and the “Mopane Savannah” (no. 5) of the Kaokoveld where they are not as common, occurring on rocky habitats, usually restricted to the denser bush. Very little is known about their distribution in the “Highland Savannah” (no. 8) of the Khomas Hochland and surrounding areas and there is only a single record of a Ceropogia from south of Windhoek — this being Dinter's collection of C.dinteri from Re-
Figure 2: Mean Annual Rainfall Belts in SWA

Rainfall is probably the single most important physical feature affecting the distribution of plants in SWA. As a result of the cool Benguela current moving along the coast from the south, the atmosphere over the coastal belt is relatively stable and little rainfall arises from this quarter; though precipitation in the form of mists occurs in significant amounts, it only influences a narrow region. Thus moist, rain-bearing air has to come from the eastern side of the continent. In so doing it deposits most of its moisture over the escarpment in the east and the interior of the continent and little is left by the time it reaches SWA. In addition there are no large mountain chains in SWA which will force a westward-moving air mass to deposit its moisture. Although there is an escarpment in SWA, it fails to provide any such barrier and has little influence on the rainfall received in the interior of the territory.

Important points to note about the rainfall:

(1) It is extremely unreliable and severe droughts are frequent, floods being somewhat less frequent.

(2) It falls between November and March (with a maximum in February and March) and rarely at any other time. Showers are often interspersed with up to several weeks without rain and this can render them ineffective in stimulating growth of the vegetation.

(3) although much of the country receives over 400 mm of rain annually, the deep Kalahari sands found towards the Okavango system in the east and north-east drain much of this moisture away causing a lack of any permanent rivers and the relatively rapid drying out of the surface soils.

Figure 2: (After Grove, 1967).
hoboth. Species have not been found to inhabit the coastal desert region of the Namib nor do they appear to occur in the Pro-Namib region. None is known either from the succulent rich flora of the south-western part of SWA and this ties in with the lack of species in northern Namaqualand, to which the flora of this region is related.

As has already been mentioned, *Ceropegia* exhibits a wide variety of vegetative forms. In SWA the rootstock may be in the form of a round tuber with thick or thin roots emanating from it or there may be very thick (fusiform) roots without a tuber. The stems may be thick, succulent and rubbery or may be entirely non-succulent, and the same possibilities arise in the case of the leaves.

Different species have different combinations of these and, in a region like SWA, where the total number of species is not large, one can quite often identify a specimen without seeing the flowers, though it is obviously preferable to see flowering material for an accurate and final identification. The different vegetative combinations give rise to natural groups and are used here to key out the species.

In this account each species is presented with line drawings of most aspects of the plant and notes which include a brief description. For more detailed descriptions the reader is referred to Dyer (1980). The specimens on which the illustrations are based are cited and if they are represented by a herbarium specimen, its location is mentioned. At the time of writing many are only represented by an alcohol specimen and this is lodged at the Karoo Botanic Garden at Worcester (cited as: KG alc. coll.).
KEY TO CEROPEGIA IN SWA

1. Plant with tuber.................................. 2.
   — with thick, fleshy roots, no tuber .............. 11.

2. Leaves succulent, midrib not standing out on lower surface .......... 3.
   — Leaves non-succulent, midrib prominently standing out on lower surface ........................................ 4.

3. Corolla lobes free at tips, corolla exterior glabrous ... C. multiflora
   ssp. tentaculata

   — Corolla lobes joined at tips, corolla exterior pilose .... C. pachystelma
4. Plant a climber ............................................. 5.

- Plant not a climber ..................................... 9.

5. Flowers arising on peduncle longer than 1 cm, tuber with smooth, soft epidermis .......................................................... C. purpurascens

- Flowers with only very short pedicel, tuber hard with rough epidermis ................................................................. 6.

6. Tuber covered with elliptic protuberances, flowers less than 1.5cm long ................................................................. C. stenotoba
   (flower nat. size)

- Tuber without protuberances, flowers more than 1.5cm long ............................................................... 7.

7. Flower up to 2cm long, sepals nearly glabrous, less than 0.5cm long .............................................. C. paricyma

- Flower 3-4cm long, sepals nearly 1cm long, with conspicuous hairs ................................................................. 8.

8. Inflated base of corolla tube uniformly wide to over 1/2 length of tube, exterior of corolla with fine hairs .................................................. C. bonafouxii

- Inflated base of corolla tube narrowing uniformly nearly right from base, exterior of corolla glabrous ................................................................. C. meyeri
9. Stems erect, unbranched, corolla lobes longer than 1 cm ....

10. Flowers produced in dense clusters near end of stems, 1/2 corolla length occupied by corolla lobes ............... C. mafekingensis

11. Stems with ridges originating at base of each leaf giving stem slight angular shape ................. 12.

12. Leaves lanceolate, margins entire, flowers uniformly pale cream in colour ....................... C. stenantha

13. Leaves circular to ovate-lanceolate, margins finely toothed, flowers with dark spots on light background .......... 11
13. Flowers with doubly inflated base to corolla tube ........................................ C. nilotica

--- Corolla tube without double inflation in base ......................................... C. crassifolia

14. Stems 1-2 mm in diameter at position of first leaves ........................................ C. racemosa ssp. setifera

--- Stems 4-5 mm in diameter at position of first leaves ........................................ C. lugardae

1. *Ceropegia lugardiae*
   Collected from fence of the police canteen in Run- du, April 1981 (Bruyns 2315, WIND)

2. *Ceropegia stenantha*
   Plant collected inside town of Katima Mulilo, March 1981 (Bruyns 2288, WIND)

3. *Ceropegia crassifolia*
   From near Witvlei, March 1981 (Grabow 12, WIND)

4. *Ceropegia pygmaea*
   Plants from eastern Transvaal, flowering in cult. Windhoek, November 1979.

5. *Ceropegia majekingensis*
   Plant photographed in situ near Witvlei, 2nd December 1979 (Bruyns 1954, WIND)

6. *Brachystelma cupulatum*
   Collected near Witvlei, December 1979 (Bruyns 1953)

7. *Brachystelma dinteri*
   From near Witvlei, 1st December 1979 (Bruyns 1986, PRE)

8. *Tentris schultzei*
   Plant collected near Witvlei, 1st December 1979 (Bruyns 1951, WIND)
9. Ceropgia dinteri
   Flowers placed on a stone, one open but other still in bud, east of Outjo, 15th December 1979 (Bruyns 2062)

10. Ceropgia nilotica
    From about 7 km south of Katima Mulilo, March 1981 (Bruyns 2332, WIND)

11. Ceropgia nilotica
    Form with long corolla lobes, Okavango River, March 1981 (Bruyns 2280, WIND)

12. Ceropgia racemosa subsp. setifera (Photo M.B. Bayer)
   About 30 miles north of Omaruru, flowering in cultivation, Worcester (Bruyns 2353, Kg etc. coll)

13. Ceropgia multiflora subsp. tentaculata
    Plant flowering in cultivation near Witvlei, March 1981 (Grabow 14, WIND)

14. Ceropgia meyeri
    Flower collected on Mpalela Island, Zambesi River, March 1981 (Bruyns 2303, WIND)

15. Ceropgia stenoloba
    Plant collected south of Otavi, December 1979 (Bruyns 2063)

† Brachystelma cincinnatum
   Near Witvlei, plant photographed in situ, December 1979 (Bruyns 1952)

‡ Brachystelma arnottii
   Plant collected near Witvlei, December 1979 (Bruyns 2063)
Ceropegia lugardiae
From near Witvlei, March 1984. Note hairs on exterior of corolla (Grabow in Bruyns 2276, WIND)

Ceropegia nilotica
Small-flowered plant from south of Otavi, April 1981 (Bruyns 1981)
Ceropegia pachystelma
Plant from north of Pretoria (Bruyns 1995, PRE)

Brachystelma dinteri
Plants collected a few miles south of Otavi, December 1979 (Bruyns 1980, PRE)
Figure 3: *Ceropgia lugardiae*

A. Plant, much reduced in length.
B. Various seed pods showing some variation in shape.
C. Bud.
D. Side view of dissected corolla tube. Note hairs on staminal column.
E. Face view of staminal column.
F. Side view of staminal column.

Drawn from: A, near Witsle, *Grabow* in *Bruiyns* 2276 (WIND); B and seed in A, Rundu, in the town, *Bruiyns* 2315 (WIND); C-F, Kumkauas, Otavi, *Bruiyns* 1943 (KG alc. coll.)
**Ceropegia Lugardiae**


**Distribution & Habitat:**

From as far south as Gobabis, this species extends northwards to Otavi and into Ovamboland as well as eastwards towards Tsumkwe. It is very common in Rundu and occurs sporadically from here right to the eastern corner of the Caprivi. A species of wide distribution in Africa, it occurs from Kenya and Tanzania southwards through most countries as far as Zimbabwe.

Plants are found mostly in thick bush, where the soils are deep, in low-lying areas but occasionally also in rocky ground. They climb extensively in the sheltering trees and bushes. These are most commonly *Dichrostachys cinerea* but plants were also observed in many species of *Acacia* including *A. schweinfurthii* on Mpalela Island in the Caprivi as well as in *Terminalia* bush around Rundu.

**Affinities:**

Although most authors have followed Huber in allying this species with *C. distincta* N.E.Br., this should really only be applied once the rootstock of this species is known, which is not at present the case (Field, 1981). *C. lugardiae* has a rootstock consisting of a cluster of fleshy roots, as does *C. verruculosa* (Dyer) Field and it is therefore to this species to which *C. lugardiae* is closest vegetatively. How reliable the 'fleshy versus fibrous roots' character is, has yet to be seen but there is no evidence

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Figure 4: Distribution of *Ceropegia lugardiae*
to suggest it to be any less reliable than that of 'tuber versus no tuber'. This would mean, if applied, that *C.lugardiae* has no particularly close affinity to *C.haygarthii* Schltr. as many authors seem to believe.

It was placed as a subspecies of *C.distincta* by Huber (1957) but re-instated to specific rank by Dyer (1980).

**Distinctive Features:**
The fairly thick, grey, slightly pustulate stem — particularly noticeable in the newer tissue — with non-succulent, ovate leaves different in colour to the stem. The flower is not similar to that of any other in the area.

**Description:**
**Plant:** climbing extensively to height of 10 metres but more usually 1-3 m, arising from a cluster of thick, fleshy roots.

**Stem:** 0.5cm in diameter, greyish-blue with slightly pustulate surface, only youngest portion dying off in winter, rest perennial.

**Leaves:** only very slightly fleshy — essentially non-succulent — ovate to ovate-elliptic.

**Flowers:** produced in small groups on a peduncle, usually opening successively. Exterior pale greenish, often covered with fine hairs, interior purple-spotted, pubescent in lower portions, with sulphur yellow mouth to tube, lobes often with purplish apex.

**Remarks:**
A common and easily grown plant, *C.lugardiae* should be more often cultivated as it is one of the most striking and vigorous species in the genus in SWA. In the town of Rundu, where this species abounds, it was observed climbing in trees to a height of 10 m where it forms large masses of stems covered with leaves and flowers. Large clusters of stems were also seen hanging on the fence of a tennis court where it seemed particularly contented. In the field it is generally smaller (1-3 m long) but usually quite easy to see on account of the colour and shape of the leaves. However, if these are absent, the stem is extremely inconspicuous.

Plants do not die back to ground level, as is the case with *C.nilotica* and its allies in the field, but in the winter the leaves drop off and only the thinnest part of the stem withers and falls off leaving most of the plant intact.
CEROPEGIA NILOTICA


**Distribution & Habitat:**

From Otavi this species is found northwards and eastwards into the Caprivi. It is a species of pan-African distribution and occurs in Ghana, Sudan, Congo and most other tropical African countries. It is also found in the northern Transvaal and Natal.

Typically it is a plant of moist areas with thick bush and deep soils, where it is an extensive, although generally inconspicuous climber. Although it occurs among many different trees it is most commonly found in Dichrostachys stands. It will also be found with many Acacias — in particular A.nigrescens and A.tortilis — as well as Terminalia prunioides and various Combretums.

**Affinities:**

*C.nilotica* is related to *C.crassifolia* and *C.stenantha* on account of the similar stem structures that they have. In all three the stems are distinctly articulated at the nodes (breaking there readily on dying), the leaves are similar in colour to the stems (as opposed to the case in *C.lugardiae*) and at the base of each leaf two ridges arise which run down the stem to the next leaves, giving the stem a slightly angled appearance. Other species also possibly involved here are *C.identica K.Schum.* and *Carenaria Dyer* as well as *C.gemmifera K. Schum.* from West Africa. It was previously known in SWA under the formidable name of *C.boussingaultifolia* Dinter.

**Distinctive Features:**

Florally it is easily distinguished from its two congeners in SWA by the fact that the others lack the double inflation to the base of the corolla tube found in *C.nilotica*. Vegetatively it is more slender than *C.crassifolia* and has rather differently shaped leaves to *C.stenantha*.

**Description:**

**Plant:** climbing extensively up to 3 m, arising from a cluster of thick, fleshy roots, glabrous.

**Stem:** usually 3-5 mm thick, green, slightly 4-angled in cross-section caused by 2 ridges arising at base of each leaf and running longitudinally down to next pair of leaves, dying back to rootstock in winter.

**Leaves:** ovate to ovate-lanceolate, margin finely toothed, same colour as stem.

**Flowers:** arising in small groups on a peduncle, opening successively, base of the flower whitish, corolla lobes very dark purple sometimes with patches of green on inner face.
Figure 5: Ceropegia nilotica
A-B. Plant (drawn from long-flowered form).
C. Bud.
D. Dissection of lower part of corolla tube showing ridge in tube wall.
E. Face view of staminal column.
F. Side view of staminal column (one pollinium in guide rails and thecas empty).

Drawn from: A-B, Bagani Military base, Okavango River, Bruyns 2280 (WIND); C-F, Kumkauas, Otavi, Bruyns 1981 (KG alc. coll.)
Remarks:

Plants of this species are common and very widely distributed in the wetter parts of the territory but seem to be confined mostly to the thickest bushes. They are often very extensive, climbing up to 3 m above ground level but equally often are small, possibly due to being grazed off by animals. As with *C. crassifolia* they die back to ground level in winter.

The flower is rather attractive, being a dark purple-black with some green in the mouth of the tube. It is very variable in size (from 2.5-5 cm long) and some of the larger forms are quite spectacular. Florally there appear to be two easily recognisable forms. The one has a broad, rounded top to the corolla with the lobes about as broad at the base as long; the other has corolla lobes at least twice as long as broad. Huber (1967, page 27) discusses the correlation between the length of the corolla lobes and the height of the raised ridge occurring on the inside of the tube at the position of its lowest constriction — those with the long, linear lobes tending to have a more significant ridge. As can be seen, however, in figure 5 this is by no means absent from the forms with the short corolla lobes.

Plants with long corolla lobes occur from Bushmanland through to Rundu and then further eastwards to the Okavango River. The form with short, broad lobes is best known from south-west of this, in particular around Otavi and Grootfontein, but is also to be found in the easternmost part of the territory along the Zambesi River from Katima Mulilo to the confluence with the Chobe. Thus the distribution of these two is closely interlinked though I have not seen them growing together at any locality.

Figure 6: Distribution of Cerapegia nitotica
Figure 7: *Ceropegia stenantha*

A. Plant, showing rootstock, flowering stem and some of the variation found in the leaves.
B-C. Side view of corolla.
D. Corolla lobe removed to show keel near base. This is caused by a thickening of the lobe and is not simply a fold.
E. Corolla with tube dissected to show distribution of hairs in interior.
F. Base of corolla tube showing staminal column.
G-H Side views of staminal column.

Drawn from: A, B, Bukalo, about 20 km south-east of Katima Mulilo, Bruyns 2290 (KG alc. coll.); rest from 2 km east of Rundu along the Okavango River, Bruyns 2310a (KG alc. coll.). These two localities are a little over 500 km apart and are at the eastern and western extremities of the distribution of this species in SWA.
CEROPEGIA STENANTHA

Distribution & Habitat:
Exclusively a tropical, wet-land species, this one begins its distribution in the vicinity of Rundu from where it occurs sporadically over much of the Kavango region and the eastern Caprivi as far as Mpalela Island in the Zambesi. It is widely distributed in Africa, occurring from the Sudan through the Congo and Uganda into Zimbabwe. Many plants were seen in thick Dichrostachys-Acacia stands. However, the largest number of specimens was seen along the shores of Lake Liambesi in the eastern Caprivi where they grew in grass around the base of mopane trees.

Affinities:
see C.nilotica.

Distinctive Features:
Distinguished readily from its two relatives by the entire margins, relatively thin fabric and shape of the leaves. The small, creamy-yellow flowers with narrow corolla lobes are also unmistakable and the lack of a peduncle is a further distinguishing feature.

Description:
Plant: up to 3 m in length, climbing or scrambling on ground, arising from a cluster of thick, fleshy roots.

Figure 8: Distribution of Ceropegia stenantha
Stem: 2-4 mm diameter, slightly 4-angled in cross-section, green, dying back to root-stock in winter.

Leaves: lanceolate, 3-8 cm long, tapering abruptly at apex, midrib prominent but side-veins practically invisible, only very slightly fleshy.

Flowers: in small groups near apex of stem, arising without peduncle, corolla pale yellow to creamy, without any markings.

Remarks:

Some extremely prolific populations of this *Ceropegia* were seen in the eastern Caprivi. Plants were rarely solitary, mostly forming groups of 20 to 30 but each such group would be only a few feet in diameter. Of these plants only one or two would be climbing the tree under which they grew, the rest would be entangled among the grasses or on the exposed ground. Individual plants, however, did not seem to become lengthy and few specimens longer than 1 m were observed.

The habit of *C.stenantha* of frequently forming sprawling masses on the ground is rather different from that of its two congeners in the region (i.e. *C.nilotica* and *C.crassifolia*), which always climb upwards into a tree or bush. This sprawling habit is similar to that recorded for *Carenaria* (Dyer, 1980) and also to that of *C.gemmifera* (Newton, pers. comm.) from West Africa. However, it was not observed to root at the nodes at all as happens in both of these other species. As with *C. nilotica* and *C.crassifolia*, the stem of *C. stenantha* breaks up at the nodes quite soon after the plant is removed from the soil but in none of these species do these pieces of stem appear to have the ability to regenerate — something so far only known for *C.gemmifera*.

The small, pale flowers, produced in clusters close to the stems are some of the most attractive that I have seen, despite their size. The entire flower is a pale yellow colour and it is in fact quite unusual for a *Ceropegia* flower to be monochromatic, as these are.
CEROPEGIA CRASSIFOLIA

Distribution & Habitat:
In SWA only known from the Gobabis-Summerdown region and between Tsumeb and Grootfontein. Otherwise it is widely distributed in southern Africa with a variety (var. copleyae Huber) recorded from Kenya.

Plants usually occur in or alongside a bush or tree in otherwise fairly open areas with deep soils.

Affinities:
Related to C.nilotica and C.stenantha — see discussion under the former.

Distinctive Features:
Distinguished easily from C.nilotica by the more spherical “cage” formed by the corolla lobes as well as the differently shaped tube. Vegetatively it is far more robust with usually highly succulent, almost circular leaves and a thicker stem than that of either of the other two.

Description:
Plant: up to 2 m, scrambling or climbing, sometimes short & erect, arising from a cluster of thick, fleshy roots.

Stem: 3-5 mm diameter, slightly 4-angled in cross-section, green to speckled with purple, dying back to rootstock in winter.

Leaves: very variable in shape as proceed towards end of stem, broadly ovate to almost circular, up to 6 cm in length, fleshy, with finely toothed margin, same colour as stem.

Flowers: arising in clusters near end of stems, opening successively from short, stout peduncle, with purple patches and reticulations on whitish to pale-green background.

Remarks:
This species is somewhat rare in SWA and despite visiting a farm in the Gobabis area twice I have only seen about 5 plants of it there. Another isolated specimen was collected about 30 km east of Tsumeb. C.crassifolia is well equipped in this area to cope with dry conditions with its very thick roots and fleshy stems and leaves. Plants seem to be somewhat smaller than those in the Transvaal — climbing usually to about a metre in the surrounding bush but this is certainly variable depending on the amount of rain received. However, despite its smaller stature, the flowers are no less striking than they are in the Republic and it remains a most handsome plant.
Figure 9: *Ceropegia crassifolia*

A. Plant showing separately the many different leaf-shapes. Note variation in the shape of the seedpods.
B. Bud.
C. Side view of lower part of corolla tube dissected.
D. Side view of staminal column.

Figure 10: Distribution of *Ceropegia crassifolia*
Figure 11: *Ceropegia racemosa* subsp. *setifera*

A. Plant, much reduced in length.

B. Leaves, showing variation in shape — all possess the fine marginal cilia indicated in the middle one.

C. Side view of corolla.

D. Upper part of corolla showing arrangement of hairs — a dense cluster near the top of each lobe and longer hairs ranging down the centre of each lobe.

E. Side view of staminal column.

G. Short hairs on exterior of corolla (the slightly longer ones come from the exterior of the corolla lobes).

Drawn from: A-B, Hagestolz, Otavi, *Bruyns* 2330; C-G, Otjua, Omaruru, *Bruyns* 2353 (KG alc. coll.).
**CEROPEGIA RACEMOSA subsp. SETIFERA**
(Schlr.) Huber in Mems Soc. Brot. 12: 96 (1958).

**Distribution & Habitat:**

Despite its relative frequency of occurrence in the Republic, this subspecies is only scantily recorded from SWA. It is known from the Otavi, Outjo and Tsumeb districts and also from Omaruru. Outside SWA it is known from Angola, Zimbabwe, Swaziland and the Transvaal and Natal in South Africa. Subsp. *racemosa* is of much wider distribution, occurring from Nigeria to Ethiopia and as far south as Angola and Zimbabwe.

In comparison to the relatively cool, sheltered habitats that this subspecies prefers in South Africa, habitats in SWA are usually limestone, dolomite or granite outcrops. These are somewhat drier than the surrounding, flatter areas. Trees covering such places are usually *Dichrostachys cinerea* and *Acacia erubescens* with the occasional *A. reficiens* and *A. mellifera* while a habitat near Omaruru consisted almost exclusively of *A. erubescens* and a species of *Combretum*.

**Affinities:**

In southern Africa the congener of subsp. *setifera* seems to be *C. carnosa* E.Mey. which also has non-succulent above-ground parts and thick, fusiform roots. Comparison of specimens with some of *C. carnosa* have revealed more or less no differences between them in the flowers although the leaves are generally far smaller in *C. carnosa* than in the other. There appears to be a relationship on vegetative grounds

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![Figure 12: Distribution of Ceropegia racemosa subsp. setifera](image-url)
with *C. volubilis* N.E.Br. from east Africa but more information on the rootstock of this species is required.

The SWA plants were known as subsp. *secamonoides* (S. Moore) Huber to Huber and appear under this name in the Prodromus. He separated this subspecies from the others (of which there are three) by the presence of hairs on the exterior of the corolla (see Huber, 1957).

In my experience of the southern African forms of *C. racemosa* this seems to be a reasonable arrangement and the apparent isolation of the SWA (and probably the Angolan specimens as well) may lend some credence to this. The name subsp. *secamonoides* has been dropped entirely by Dyer (1980). It is probably necessary to examine *C. racemosa* more thoroughly in the field in south tropical Africa to come to a final conclusion and Dyer’s arrangement is adopted here.

**Distinctive Features:**

The non-succulent leaves and slender stems with thick, fleshy roots make this an easily recognisable taxon in SWA.

**Description:**

**Plant:** a climber reaching height of 3 m but usually 1-2 m tall, arising from a cluster of thick, fleshy roots.

**Stem:** 1½ mm thick for most of length, somewhat thicker just under soil surface, brownish-green, dying back to thicker, underground portion in winter.

**Leaves:** ovate-lanceolate to sub-cordate (in SWA) with acute apex, 2-3 cm broad and 2-6 cm long, non-succulent.

**Flowers:** arising in small numbers from well-developed peduncle, dark purplish-red, covered on exterior with short hairs, with numerous longer hairs inside corolla tube: a dense patch of them near apex of corolla lobes and a few longer ones distributed down centre of lobe.

**Remarks:**

Subsp. *setifera* bears a strong resemblance to *Pentarrhinum insipidum* in its vegetative parts and this may well be the reason behind its being so little recorded in SWA. An additional factor may be that it often grows in very thorny scrub which may deflect a (sensible?) collector away from where it occurs. When they are found, however, one is often struck by how extensive and vigorous the plants are and it is quite common to see them climbing to a height of 2 m or more into a tree.

It is notable that the leaves, with their acute apex, have an entirely different shape to those of the South African form of this subspecies where they are elliptic with a broadly rounded apex. Flowers of the SWA form also differ in some features: the exterior of the corolla is covered with short hairs and the lobes have a dense patch of hairs near their apex on the inner face.

This deviation from the South African forms may be related to the difference in habitat noted above together with the fact that the SWA populations have probably become genetically isolated from the others.
CEROPEGIA PYGMAEA


Distribution & Habitat:
Recorded from widely scattered localities in SWA, this species is also known from Angola, Zimbabwe, Botswana and the Transvaal.
It generally occurs among grasses in rather open savannah.

Affinities:
It appears that this species is closest related to Brachystelma stenophyllum and it certainly bears no relation to any other species of Ceropegia.

Distinctive Features:
The narrow leaves on a short, usually considerably branched stem make it easy to recognise amongst Ceropegias. However, it is not possible to separate it from B. stenophyllum until flowers are seen.

Description:
Plant: 3-10 cm tall, arising from a top-shaped to laterally flattened tuber.
Stem: simple or branching just above soil surface, dying back to tuber in winter.
Leaves: very variable in shape; mostly linear or lanceolate but can be ovate-spathulate, 2.5-10 cm long, non-succulent, finely hirsute.
Flowers: produced singly or in groups of up to three, usually near base of branches early in seasonal development of plant, exterior greenish, interior dark purple-brown.

Remarks:
The small, non-succulent-leaved, non-climbing species present something of a problem from the classification point of view. There are two groups of them; those with erect, single stems with often very large, typically "Ceropegia-like" flowers — a group represented throughout Africa and by C. dinteri in SWA, and those with short, usually branched stems producing a cluster of leaves at or just above ground level, with flowers very different from the usual Ceropegia format. Two such species, C. pygmaea and C. mafekingensis, are found in SWA. In the case of C. pygmaea the flowers are extremely unusual in shape. Although very short corolla lobes are found in several species of Ceropegia, flowers in the genus are generally upright (at least initially) with a relatively long, slender corolla tube with an inflated base and an often inflated neck so that the cylindrical, uniformly wide or nearly cup-shaped, dependent corolla of this species is very peculiar. It is very much reminiscent of the structure found in Brachystelma oianthum Schltr. The corona of C. pygmaea, consisting of a cupular outer corona with tiny lobes on the lip and cylindrical, blunt-ended inner corona lobes protruding from the walls of this cup, is also unlike that usually found in Ceropegia where the outer corona lobes are generally deeply divided into
Figure 13: Ceropogia pygmaea
A. Plant.
B. Side view of corolla.
C. Piece of wall of corolla tube showing hairs on exterior (same scale as B).
D. Face view of staminal column.
E. Side view of staminal column.
F. Side view of staminal column with outer corona tube cut away to show inner lobes.

Drawn from: A-F, Gravelotte, eastern Transvaal, Bruyns 2078 (KG alc. coll.).
two teeth and the inner lobes are slender and rise up in the centre of the column to some height above the stigmatic surface.

Again this type of structure is to be seen frequently in *Brachystelma*, *c.f. B.stenophyllum* and *B.cupulatum*.

The flowers of *C.pygmaea* vary greatly in length and both long-flowered and short-flowered forms are found in SWA. Huber (1957) divides the species into two varieties based on this variation but they do not seem to be worth upholding in view of their both being found in the area under consideration, a fact not known to Huber at that time.

Dinter (1914) illustrates this species with a specimen with notably rounder leaves than is usual. That this is not a typical specimen is indicated by the material in the Windhoek Herbarium where the leaves were generally linear.

Figure 14: Distribution of *Ceropegia pygmaea*
Figure 15: *Ceropegia mafekingensis*
A. Plant. Note thick roots.
B. Side view of corolla.
C. Side view of dissected corolla.
D. Side view of staminal column.

**CEROPEGIA MAFEKINGENSIS**  

**Distribution & Habitat:**
This species is known to be widespread but scarce, from Grootfontein in the north to Windhoek and the Gobabis region. In South Africa it is known from the Mafeking-Zeerust districts and the vicinity of Pretoria. It occurs in open patches in short grass among trees, often in Terminalia savannah and usually in fairly firm and deep soil.

**Affinities:**
*C.mafekingensis* provides a link between *Ceropegia* and *Brachystelma* in that the flowers have a tube rather too short for *Ceropegia* and too long for *Brachystelma*. The vegetative parts are similar to those of the latter genus i.e. non-succulent and forming a cluster of leaves near the soil surface. Dyer (1977) suggests that this species may be related to *C.pygmaea*.

This species has had various names — in particular *B.mafekingensis* N.E.Br. and *C.patriciae* Rauh & Buchloh. It is not included in Huber (1967), either under *Ceropegia* or *Brachystelma*.

**Distinctive Features:**
Corolla tube conspicuously shorter than the lobes which are dark purple-brown in colour. No other species produces such dense clusters of flowers. It also has the shortest flowers in *Ceropegia* in SWA.

![Figure 16: Distribution of Ceropegia mafekingensis](image)
**Description:**

**Plant:** up to 6 cm tall, arising from a flattened tuber.

**Stem:** branching usually just above soil surface, dying back to tuber in winter, up to 4 mm thick.

**Leaves:** oblong-lanceolate, up to 7 mm broad and 3 cm long, non-succulent, finely hirsute.

**Flowers:** arising before development of leaves, produced in clusters of 2-20 per leaf axil, not arising from a peduncle; corolla exterior whitish, interior deep purple, lobes free at tips with margins strongly reflexed, entire corolla less than 1.5 cm long.

**Remarks:**

This remarkable and strange plant has only been collected a few times. The dense clusters of dark flowers opening simultaneously make it easily recognised. In fact the flowers are so densely clustered close to the soil that from a distance the plant resembles a pile of dung — the resemblance is reinforced by their appalling smell.

The leaves, which start to appear after most of the flowers have fallen off, are entirely non-succulent and resemble those of *C.pygmaea* quite closely.
**CEROPEGIA DINTERI**


**Distribution & Habitat:**
An isolated record exists from Rehoboth made by Dinter. Otherwise it is known from Outjo in the west to Grootfontein in the east. It is apparently endemic to SWA.

Plants occur in a wide variety of situations on soils with limestone or dolomite bedrock. Sometimes they are found in very exposed places on rock slabs under bushes, sometimes in deep soils in flats under trees but the largest observed concentration was found growing among ferns (of the genera *Cheilanthes* and *Actiniopteris*) and very scattered grasses under trees on dolomite hills.

**Affinities:**
Vegetatively it is very similar to *C.insignis* Dyer and *C.turricula* Bruce from the Transvaal and to *Cantennifera* Schltr. from Natal which are all related to *C.campanulata* G. Don from West Africa.

**Distinctive Features:**
Very narrow, flat, non-succulent leaves with prominent midrib on ventral surface (underneath) on a slender, non-climbing stem with the flowers borne near the apex of the stem. The flowers are longer in relation to their width than those of any other species in SWA.

**Description:**
- **Plant:** 0.1-0.3 m tall, arising from a hard, flattened tuber very variable in size.
- **Stem:** solitary, erect, with few narrow, linear leaves distributed up it, dying back to tuber in winter.
- **Leaves:** pale-green, 12-20 cm long and less than 5 mm broad, non-succulent, margins folded back and midrib very clearly visible on lower surface.
- **Flowers:** produced near apex of stem, solitary, without peduncle, less than 5 mm broad at maximum, 3-8 cm long, corolla exterior greenish-white, interior greenish in base to yellow and white on inner face of corolla lobes.

**Remarks:**
This species has remained obscure more or less since its discovery and when one sees it this is not surprising. The plants are extremely frail and although they are sometimes up to ½ m tall, the leaves are so fine that the whole plant resembles a piece of grass. The presence of flowers does not, as in the case of *C. turricula*, make it any more conspicuous as they are also very slender and insignificantly coloured. Tubers are variable in size and those of specimens growing in the shelter of trees are usually small — less than 2 cm in diameter — while larger tubers (up to 6 cm in diameter) occur on specimens growing in exposed spots. Dinter records very big tubers (up to 12 cm diameter) on plants that he collected around Rehoboth.
Figure 17: *Ceropegia dinteri*

A. Plant. A medium-sized specimen is depicted here with a small tuber.
B. Bud.
C. Corolla in side view.
D. Staminal column in side view.

Drawn from: A-D, 10 km west of Outjo, *Bruyns* 1949 (KG alc. coll.). This is the same illustration as that used in Bruyns (1980) as no new material could be obtained in 1981 owing to the severe drought in this area. The specimens in cultivation at Worcester unfortunately died without flowering again.
Figure 18: Distribution of *Ceropegia dinteri*
Figure 19: *Ceropegia multiflora* subsp. *tentaculata*

A. Plant, much reduced in length.
B. Leaves, showing variation in shape.
C. Flowering stem.
D-E. Buds — note variation in size.
F. Corolla, side view.
G. Corolla tube dissected to show staminal column and distribution of hairs and papillae.
H. Papilla from inflated base of corolla tube (scale as for I).
I-J. Side view of staminal column.

Drawn from: A, near Witvlei, *Grabow* 14 (WIND); B-D, F-I, 12 km east of Outjo, *Brwyns* 2038 (KG alc. coll.); E, J, Outjo townlands, *Brwyns* 1982 (KG alc. coll.)
**CEROPEGIA MULTIFLORA** *subsp. TENTACULATA*  

**Distribution & Habitat:**

It is found in the northern parts of SWA from the Kaokoveld to Tsumkwe in Bushmanland and comes as far south as Gobabis in the east and Okahandja in the west. It also occurs in the eastern Caprivi on the shores of Lake Liambesi and is further known from Angola, Zimbabwe and Botswana.

Often found in *Acacia mellifera* *subsp. detinens* Brenan thickets, it also occurs among other species of *Acacia, Dichrostachys cinerea, Sesamothamnus guerichii* Bruce and various other xerophytic shrubs in dry, exposed, often rocky situations. In the eastern Caprivi it occurs in "mopane veld".

**Affinities:**

Apart from its relationship to *subsp. multiflora*, it is also related to the little-known *C.floribunda* N.E.Br. from Botswana and also to *C.conrathii* Schltr.

**Distinctive Features:**

Distinguished from the other succulent-leaved, tuberous climber (*C.pachystelma*) by the flowers with free, spreading corolla lobes which resemble the tentacles of an octopus and the glabrous exterior of the corolla. Also, although the flowers are produced in clusters, each flower arises directly from the leaf axil without there being a common peduncle.

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**Figure 20:** Distribution of *Ceropegia multiflora* *subsp. tentaculata*
Description:

**Plant:** usually climbing to about 1 m but ranging from 0.4 m to 3 m in length, arising from a tuber with fairly thin, smooth, soft epidermis.

**Stem:** about 2 mm in diameter with brownish patches on a pale green background, dying back to tuber in winter.

**Leaves:** lanceolate to ovate, very variable even on a single specimen depending often on the amount of shade received, conspicuously fleshy, often with undulated margins, glaucous green.

**Flowers:** produced in small groups arising in the leaf axils, without a peduncle, opening successively, corolla exterior pale yellow-green, glabrous, interior whitish covered with fine hairs and papillae lower down in tube.

Remarks:

In contrast to subsp. *multiflora* the flowers in this subspecies are relatively large and, as the lobes do not wither away, their colour is quite obvious — being a more intense yellow-white than in the other. The flowers are variable in size and the corolla lobes in length as can be deduced from the sketches. In fact the same applies to the leaves. Much of this variation can be ascribed to local environmental factors and this serves to illustrate how widely and visibly such factors can influence features of a plant.

Being fairly common, this plant will be found in a variety of situations and climbing on just about anything available. Near Outjo a specimen was even found climbing on the fence right next to the national road but mostly they are found in thorny shrubs among often thornier trees.
CEROPEGIA PARICYMA
N.E. Br. in Kew Bull. 1898: 309 (1898).

Distribution & Habitat
This species is at present known in SWA only from an island in the Zambesi River near the confluence with the Chobe R. According to Huber it also occurs in Tanzania, Mozambique, Zambia and Zimbabwe so that it seems to be a widely distributed tropical species.

Plants were seen growing in a very shady forest on a slight rise in the middle of the island. The trees under which it was growing were unfortunately not identified. Plants were climbing onto some of the lower branches of these or onto young saplings and all seen were climbing to a height of less than a metre although generally were quite a bit longer than this.

Affinities:
Huber places this species along with a number of others, some possessing tubers and others not so that, as suggested by Field (1982), his grouping is unsatisfactory here. Field (op. cit.) allies his C.swaziorum with C.paricyma and this species certainly bears no close relationship to any other found in SWA. The rather woody tubers, the fine, fibrous roots arising from the stem a little above the tuber and the thickened lower part of the stem are all to be found in C.meyeri as well but florally these two are very different.

Distinctive Features:
Distinguished easily from C.meyeri by the lack of the coarse hairs that this species has covering the stems, leaves and pedicels. The leaves are also rather different in shape.

Description:
Plant: up to 2 m in length, climbing in lower branches of small trees in forest undergrowth, arising from a small, hard tuber with bark-like exterior.
Stem: 2 - 3 mm in diameter, brownish-green, dying back to tuber in winter.
Leaves: elongated-ovate to tri-lobed or cordate, non-succulent, finely pilose to glabrous.
Flowers: arising in groups of up to three on very short (sometimes absent) peduncle, lobes very dark green (nearly black) on inside and rest of flower cream to purplish within, lobes pilose on inner surface, corolla tube entirely free of hairs.

Remarks:
This species is particularly little-known, which has probably been caused by its relative insignificance. The leaves, particularly when nearly trifoliate, are similar to those of the Cucurbitaceae and some members of the Convolvulaceae which does not assist in locating the plants. This shape of leaf is most unusual for a Ceropegia and
Figure 21: *Ceropegia paricyma*

A-C. Plant. Note variation in leaf-shape (lower leaves are generally as in A). Much reduced in length.

D. Side view of corolla.

E. Dissection of corolla.

F. Side view of staminal column. Note hairs (indicated on only one outer corona lobe).

Drawn from: A-F, Mpalette Island, Zambesi River, Bruyns 2302 (NBG).
the flowers are also odd. They are fairly small but with a very straight tube — most species have the tube bent just above the basal inflation — and dark, almost black, corolla lobes. As can be seen from the illustration, the corona is also a strikingly different structure from the general pattern.

Figure 22: Distribution of Ceropegia paricyma
Figure 23: Ceropogia purpurascens
A. Plant, much reduced in length, showing tubers in series and seed.
B. Leaves. Most are finely pilose as shown in the one.
C-D. Side views of corollas.
E. Corolla tube dissected to show staminal column.
F-G. Side views of staminal column. Note that inner corona lobes become reduced in length on one side due to bend in corolla tube (this is also visible in E).

Drawn from: C, G, Katima Mulilo, inside the town, Bruyns 2258 (KG alc. coll.); rest from Bagani Military Base, Okavango River, Bruyns 2281 (NBG).
**CEROPEGIA PURPURASCENS**


**Distribution & Habitat:**

This species is found in the Caprivi Strip and was collected at three localities in this area in 1981; on the banks of the Okavango River, in and around the town of Katima Mulilo and on Mpalela Island in the Zambesi River. It has also been collected near the Kwando River in the same region (Killick & Leistner 3267, PRE). Huber records this species from Tanzania and the Congo southwards to Botswana and Zambia. The var. *thysanotos* (Werdm.) Huber is recorded from Tanzania.

Plants were generally observed to prefer very dense bush and forests in wetish areas (consequently protected by fierce squadrons of mosquitoes). These thickets were either riverine vegetation consisting of a wide variety of trees or, further away from the river banks, were *Acacia nigrescens* — *Dichrostachys* or *Aerubescens* — *Dichrostachys* bush. Two plants were observed in more open areas climbing in small *Terminalia* trees — one of these near Katima Mulilo in a so-called “manketti forest” (*Ricinodendron rautanenii*) — but these were evidently exceptional habitats.

**Affinities:**

Huber places this species in his section *Ceropegiella* together with the well-known *Cafricana* R.Br. and *Cwoodii* Schltr. in the series *Africanae*. Although this species, with its entirely non-succulent leaves and stems, appears not to belong here at a first
glance, this arrangement seems to be correct when an overall assessment of vegetative and floral characters is made and *C.purpurascens* probably represents an adaptation of this group to rather wetter, tropical habitats than the other members inhabit.

The plants from Botswana were originally described as *C.kw:bensis* N.E.Br. but both Huber and Dyer have discarded this name.

Huber recognises two varieties which he separates by the shape of the inner corona lobes.

**Distinctive Features:**

Distinguished from other climbing species with tuber and non-succulent leaves by the relatively few hairs on the leaves, the well-developed peduncle and also the smooth, soft-skinned texture of the tuber — most of the others have a tough exterior which is somewhat “bark-like”.

**Description:**

**Plant:** climbing, 1-3 m in height, arising from a laterally flattened tuber 2-6 cm in diameter, up to 3 tubers often joined in a vertical sequence beneath the soil surface, tubers with soft, easily damaged epidermis.

**Stem:** 2-3 mm in diameter, green to brownish, glabrous to slightly pilose, dying back to tuber in winter.

**Leaves:** elliptic to cordate-acuminate, 1.5 - 2.5 cm broad, 2 - 4 cm long, non-succulent, green to speckled with purple (if growing in bright sunlight), sometimes sparsely pilose.

**Flowers:** produced in small groups on a slender, dependent peduncle up to 2 cm long, greenish outside, purple within, sparingly pilose over most of interior and on lobes but glabrous outside.

**Remarks:**

*C.purpurascens* is fairly common in riverine bush in the Caprivi, particularly along the Okavango River, where it is found easiest by following hippopotamus paths through the thickets. The leaves are mostly eaten off towards the end of the summer, however, and this makes many of the plants difficult to spot.

Of all the SWA species, it seems to produce tubers most freely and many plants have two or three of these, some of which may be quite large. Others appear to be produced at random along the stems when these touch the ground. This is a feature of many members of the *Cafricana* alliance from South Africa. The flowers are also of a similar size and shape to those of *Cafricana* and this species also has a similar deeply cupular outer corona and broadly falcate inner corona lobes to *C.purpurascens*.

A peculiar feature of the corona in this species is to be seen in the inner corona lobes (see fig. 23) which are somewhat shortened on the lower side to fit into the very abrupt bend in the corolla tube without pressing against the side of the corolla.
It must be noted that Dyer (1980) gives the rootstock as consisting of a cluster of fleshy roots. There is, in general, a fair amount of confusion surrounding the nature of the rootstock of many species of Ceropogia caused largely by the fact that many herbarium specimens lack this part of the plant. In the case of this species, however, a number of specimens at Kew (very kindly shown to me by Mr D.V. Field) possessed tubers and Huber also gives it as having a tuber. Specimens collected in the field also indicate Dyer to be incorrect.

There is an interesting reproduction of a painting of this species by Mrs E.J. Lugard (Lugard, 1941) made in the Kwebe Hills of the Lake Ngami district which gives one some idea of what the Botswana forms look like. In fact her drawing is of the type of C. kwebensis. The leaves clearly have a slightly different shape to the SWA specimens and the corolla is sometimes even more abruptly bent above the basal inflation. Unfortunately her representation of the corona is not sufficiently clear to allow of comparison.
Figure 25: *Ceropegia pachystelma*

A. Plant, much reduced in length.
B. Leaves.
C. Bud.
D. Corolla in side view.
E. Dissection of corolla tube.
F. Side view of staminal column.

CEROPEGIA PACHYSTELMA


Distribution & Habitat:
In SWA this species is only known from the Steinhausen area somewhat north-west of Gobabis. This probably represents the western end of the distribution as it is fairly well-known from Botswana, the Transvaal and as far east as Natal and Mozambique.

Plants usually occur in rather well-wooded areas. The trees providing shelter vary from Grewia and Terminalia intermingled with Acacia to Acacia-Dichrostachys stands and the plants climb extensively in these trees. This is usually in deep soil with no evidence of rockiness.

Affinities:
Although resembling C.multiflora in many respects, this species seems to be closer to the Cafricana-C.woodii complex of tuberous, succulent-leaved species from the eastern part of South Africa.

It was known under various other names previously in SWA, probably the best-known of which is Cacacietorum Schltr. ex Dinter.

Distinctive Features:
Various differences between this species and C. multiflora are discussed under the latter. A further point of interest is that the tubers are markedly different — those
Ceropegia meyeri
Decne. in DC. Prodr. 8: 645 (1844)

and

Ceropegia bonafouxi

Distribution & Habitat:

C. bonafouxi is known from Angola and Zambia with a single record in the Kavango district (De Winter & Marais 4633). C. meyeri occurs in Zimbabwe as far as Wankie and also Livingstone in Zambia and is now recorded from Mpalela Island in the Caprivi Strip (Bruyns 2303). It is also known from Mozambique and as far south in South Africa as the Eastern Cape.

De Winter & Marais record their collection of C. bonafouxi as growing in “sandy flats with scattered bush.” In my own collection of C. meyeri in the Zambesi River, plants were growing in Terminalia stuhlmannii and Dichrostachys trees in rocky ground on the island. Plants were rather scattered but not rare.

Affinities:

These two species are so closely related that I have placed them together in this account. C. bonafouxi differs from C. meyeri in the shape of the “cage” formed by the corolla lobes, in the shape of the corolla tube (see key to species) and in the presence of a few hairs on the exterior of the corolla. Dyer (1980) states that C. meyeri has a “more eastern” distribution. However, both are recorded from Zambia and now that C. meyeri is known to occur in the Caprivi Strip this argument has little validity. It is probable that both represent one widely distributed species which occurs over much of southern tropical and subtropical Africa.

A variety, C. bonafouxi var. linearifolia Stopp (Stopp, 1971) has been described from the Huila district in southern Angola but no plants like this have yet been collected in SWA.

These two species, as with most of the others with tubers and non-succulent leaves, show no close affinity to any other in southern Africa.

However, both of them are florally similar to Cabyssinica Decne. a species occurring from Angola and Zimbabwe northwards to Ethiopia. The fact that C. meyeri is a vigorous climber and C. abyssinica rarely climbs is not of much relevance as C. bonafouxi var. linearifolia does not climb at all (Stopp, 1971).

Distinctive Features:

The comparatively long hairs on the stems of these two separate them clearly from all other tuberous species in SWA. The bottle-shaped, relatively long flowers are also easily recognised.
Figure 27: *Ceropegia meyeri* (*C. bonafouxii* not illustrated).

A. Plant, greatly reduced in length.
B. Larger leaves.
C-D. Side view of corolla from two different plants: that in C collected in the field and D produced in cultivation at Worcester.
E. Close-up of cage formed by corolla lobes showing fine hairs distributed around base of lobes. These occur in two bands along the sides of each lobe as is seen best in the two rear-most lobes.
F. Staminal column inside corolla tube.
G-H. Two views of staminal column: G from flower C and H from D.

Description:

Plant: climbing to 3 m in small trees, arising from a small, hard tuber with a rough, bark-like exterior, above-ground parts conspicuously pilose.

Stem: 2 mm in diameter, pubescent with rather shaggy hairs, dying back to tuber in winter.

Leaves: in SWA usually elongated cordate-ovate, not with toothed margin as in southern forms, conspicuously pubescent, non-succulent.

Flowers: arising in successively developing clusters of up to 10 from short, thick peduncle among upper leaves on stem, corolla bottle-shaped, whitish on interior & exterior of tube, dark purple to greenish on lobes.

Remarks:

Although *C. meyeri* is a widespread species it is very little known and *C. bonafouxi* is not better known. This is probably on account of their resemblance to climbing species of *Convolvulaceae* and even *Cucurbitaceae* and the relatively sparse production of the leaves. Nevertheless, once recognised they are quite obvious and their robust nature — climbing to 3 m and with some large leaves — and spectacular flowers make them some of the most interesting Ceropegias. Another interesting habit of the plants is their solitariness — although about 10 plants were found on the island there was never more than a single specimen in any given bush.

Figure 28: Distribution of Ceropogia bonafouxi and *C. meyeri.*
Figure 29: Ceropegia stenoloba

A-B. Plant slightly reduced in length (in a year of better rainfall plants are much longer).
C. Bud.
D-E. Side views of corolla.
F. Dissection of corolla.
G. Face view of staminal column.
H. Side view of staminal column.

Drawn from: C, G, Kumkauas, Otavi, Bruyns 2063 (KG alc. coll.); rest from Tsumkwe, Bruyns 2325 (NBG).

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CEROPEGIA STENOLOBA


Distribution & Habitat:

This species appears to occur in SWA only in a small belt from Otavi in the west through to Tsumkwe in the east and as far north as Tsumeb. This series of populations seems to be discrete from the other known distribution of the species which is from Ethiopia as far south as Kenya.

In general specimens are found in thicker bush. Near Otavi they were seen in Combretum-Acacia mellifera-Dichrostachys thickets and near Tsumkwe in dense Acacia erubescens-Terminalia prunioides stands.

Affinities:

Perhaps related to C. meyeri, C.paricyma and C. purpurascens on account of the similar non-succulent leaves, climbing habit and the presence of a tuber. However, it differs from these species considerably in the flower and also in the structure of the tuber. There seems to be no possibly closer ally.

Distinctive features:

Short flower not more than 1.5 cm long and the smallish tuber with roots arising in a ring on the underside make it easily recognisable.

Figure 30: Distribution of Ceropegia stenoloba.
Description:

Plant: 0.5-2 m tall, climbing in surrounding vegetation, arising from a small, hard, often pinkish tuber bearing numerous elliptic protuberances on surface, above-ground parts finely pilose.

Stem: 1-2 mm diameter, covered with fine hairs, dying back to tuber in winter.

Leaves: ovate to sub-cordate, with acute apex, 2-7 cm long, half as broad as long, non-succulent.

Flowers: with very short peduncles, arising in groups of 1-3, opening successively, flesh-coloured with longitudinal purplish markings both inside and outside, entire corolla 1-1.5 cm long.

Remarks:

This most distinctive plant is one of the least attractive and at the same time one of the least conspicuous. It grows in thick bush and is very easily confused with the common Pentarrhinum insipidum which it resembles vegetatively. However, Pinsipidum never has a tuber (only underground runners) and the flowers are quite different.

The combination of non-succulent leaves, a climbing habit and a tuber is uncommon in the genus as a whole and the oddity of this plant is further compounded by the curious hardness of the tuber, with the roots arising in a well-organised ring on its underside and nowhere else — in other tuberous species the roots arise at random on the surface of the tuber. Another peculiarity of the tuber is the presence of numerous rounded protuberances on the surface. These are presumably the old root scars which move away from the position where the roots develop as the tuber expands with age, in this manner spreading out over its entire surface.

The flower of C.stenoloba is remarkably small and, as the illustrations show, it is usually bent over to one side from the middle upwards. This is possibly a device to hinder pollinators from escaping from the rather short corolla tube too easily. The staminal column is also quite unusual and shows no similarity to that of any other southern African species.
*Ceropegia ampliata* E. Mey.

Süssenguth and Merxmüller (Mitteil. Bot. Staatss. München 5: 154 (1952)) make an official announcement of the occurrence of this species in SWA, citing in evidence of their statement a collection of Dinter reputedly made near Ariams, east of Gobabis. Huber (1957) cites a photograph by Dinter of a plant from this place for the occurrence of this species in SWA. By the time he had compiled his account of *Ceropegia* for the Prodromus, however, he had changed his mind on this and there he considers it "unlikely to occur in this region".

The photograph referred to by Huber (1957) is in the possession of Mr W. Giess of Windhoek who very kindly copied it for me. On the rear is the remark "Ceropegia triebneri Dtr." in Dinter's handwriting. From this it can be concluded that it came from Triebner, formerly a collector and nurseryman of Windhoek. It is likely that he obtained this plant on a trip to the Cape or else from his friend Long who lived in Port Elizabeth and there is the further possibility that someone else in SWA may have given it to him.

*Campliata* is by no means obvious when without flowers but becomes so easy to see when these are present that it is reasonable to assume that it would have been re-located in SWA if it did occur there naturally. It is also, in this regard, worth noting that it is only known from the eastern portion of southern Africa and not from either Zimbabwe (Drummond, 1977) or Botswana (Huber, 1957). It is therefore assumed not to be indigenous to SWA.
**BRACHYSTELMA** R. Br.

*Brachystelma* is also a genus of wide distribution and it is found over much the same area as *Ceropegia*, with the apparent exclusion of Madagascar and the inclusion of more parts of Australasia. In southern Africa, where it reaches the highest concentration of known species, it is found high up in mountains, on mountain slopes and hillsides and in the vast, flat tracts of land making up much of the interior of the region. However, *Brachystelma* shows a lower tolerance of semi-desert conditions than *Ceropegia* and is only found on the eastern edges of the Karoo and is also not found in the drier parts of the Kalahari desert. Within SWA the distribution of species is similar to that of *Ceropegia* at least as far as vegetation regions are concerned, except that there are none known from the Kavango-Caprivi region. Whether they indeed do not occur there or whether this is just due to lack of collecting is a matter of speculation at present. It is also notable that, in SWA, species are very rarely encountered in mountainous areas or even on hills, in contrast to the position with some *Ceropegias*.

In *Ceropegia* a wide variety of growth forms exists. This is not the case in *Brachystelma* (or in *Tenaris*) where the vegetative parts are relatively uniform. In SWA all species possess a variously shaped, underground tuber which may be inverted top-shaped or flattened on both the upper and lower surfaces (it is important to note that a small number of species of *Brachystelma* do have fusiform roots instead of a tuber but none of these is known to occur in SWA). Above the ground the plants are small and herbaceous, generally forming a cluster of deciduous stems bearing well-developed leaves which may be extremely variable in shape, even on one plant.

These leaves are always non-succulent and usually finely hirsute and, except for those of some of the large-leaved species (e.g. *B. barberiae* Hook. f.), are rather inconspicuous. The flowers are only present for a short while and as a result the plants usually have to be detected in the field by their leaves. As these resemble those of seedlings of many other plants, they are fairly difficult to find and consequently the species are little known. This is amply demonstrated by the paucity of records which has resulted in our generally scanty knowledge of their distribution.

It is sometimes possible to confuse the above-ground parts of *Brachystelma* with those of *Fockea angustifolia* and species of *Raphionacme* (and those of *Tenaris* with some species of *Schizoglossum*) with which they usually occur. However, this problem can be resolved without seeing flowers. In *Fockea, Raphionacme & Schizoglossum* the sap is very obviously milky in colour while in *Brachystelma* and *Tenaris* it is clear and this is easily tested by breaking off a leaf of the plant. I have never observed this test to fail but an alternative check is to be found in the rootstock — that of *Brachystelma* and *Tenaris* always having a rounded base while in *Fockea, Raphionacme* and *Schizoglossum* the tuber is elongated and the base is attenuated into a root.

Florally, *Brachystelmas* are generally distinguished from *Ceropegias* by the lack of a long corolla tube. The flowers are often fairly flat and star-like and closely resemble those of many Stapeliads — in fact the first *Brachystelma* known to science (*B.cauda-
tum) was described as a *Stapelia*. As in the Stapeliads, the colour of the flowers is usually dark and attractively mottled and often accompanied by a foetid odour.

The presentation of these species is somewhat different from that used for *Ceropegia*. Since there is a large degree of vegetative uniformity the descriptions in the text have been omitted as it is felt that adequate information of this kind can be obtained from the sketches and other notes.

**KEY TO BRACHYSTELMA IN SWA**

1. Corolla lobes united at tips or scarcely diverging if free .................. 2.
   — Corolla lobes fully spread out to reflexed, not joined at tips ........... 3.
2. Corolla tube more or less as long as lobes, lobes less than 4x
   as long as broad at base .................................. *B. stenophyllum*
   — Corolla tube almost lacking, lobes more than 4x
   as long as broad at base .................................. *B. circinatum*
3. Pedicel more than 1 cm long, corolla lobes reflexed, corolla
   uniformly blackish ..................................... *B. arnotii*
   — Pedicel less than 1 cm long, corolla lobes not reflexed, corolla
     yellow or green, often blotched with brown .......................... 4.
4. Outer corona united into a cup about as deep as broad, corolla
   lobes at least 2x as long as broad .............................. *B. cupulatum*
   — Outer corona united into shallow cup over 3x as broad as deep,
     corolla lobes as long as broad .............................. *B. dinteri*
BRACHYSTELMA ARNOTII

Bak. in Refug. Bot.: t g (1869).

Distribution & Habitat:

Occurring from the Okahandja district eastwards into the Gobabis area, it is also known from the Waterberg in SWA. Outside SWA it is recorded from Botswana and the Transvaal but the records are few and sparse.

Mostly this species will be found among grass tufts or in small bushes among the larger trees in firm soil.

Affinities:

*B. arnotii* is related to *B. huttonii* N.E.Br. from the Grahamstown area as well as to the recently described *B. minimum* Dyer also from the eastern Cape. All of these are species with small flowers borne on a long, slender pedicel with the corolla lobes somewhat reflexed.

It was previously known in SWA as *B. grossartii* Dinter.

Distinctive Features:

No other species in SWA has the flowers borne on long, slender pedicels. Apart from this, another distinctive feature is the manner in which the corolla lobes are reflexed — this is only occasionally and to a much lesser extent found in *B. dinteri*.

Figure 31: Distribution of *Brachystelma arnotii*. 

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Remarks:
With its diminutive, blackish flowers on very long pedicels, this species looks rather quaint. The corolla lobes are quite strongly reflexed and the outer corona is extremely simple — just consisting of 5 linear or bifid lobes.

Figure 32: Brachystelma arnotii
A. Plant — a medium-sized specimen.
B. Face view of corolla.
C. Side view of corolla showing long pedicels
D. Face view of staminal column.
E. Dissected view of corolla showing staminal column in side view.

Drawn from: A-E, near Wittlei, Bruyns 1964 (KG alc. coll.).
**BRACHYSTELMA CUPULATUM**


**Distribution & Habitat:**
In SWA this species is known from the Steinhausen-Summerdown region to Tsumkwe in Bushmanland and there is an isolated record from Rehoboth. It is also found north of Pretoria in the Transvaal and on the Lowveld of the Transvaal around Phalaborwa.

**Affinities:**
Huber (1967) confused this species with *B. blepharanthera* Huber. It does not seem to be particularly close to this species but is very similar to *B. brevipedicellatum* Turrill.

**Distinctive Features:**
*B. cupulatum* is easily recognised by the yellow-green flowers with folded corolla lobes and an obvious cup in the centre formed by the outer corona. In all the other species with spreading corolla lobes the outer corona lobes are free nearly to their base.

**Remarks:**
Only described quite recently, it is quite common in the Steinhausen district. Some of the leaves are odd in that they show slight indentation of the margins — something almost never seen in *Brachystelma* — and they have an unusually grey-colour which makes them confusible with the seedlings of the “vaalbos” (*Grewia* spp. and others) very common in the area.

![Figure 33: Distribution of *Brachystelma cupulatum.*](image-url)
Figure 34: *Brachystelma cupulatum*

A. Plant — a fairly large specimen (all leaves are as indicated).
B. Face view of corolla.
C. Dissected corolla with staminal column in side view.
D. Face view of staminal column.
E. Side view of staminal column with outer corona tube cut away to show inner corona.

Drawn from: A-E, near Witvlei,Bruyns 1953 (KG alc. coll.).
BRACHYSTELMA DINTERI

Distribution & Habitat:
This species occurs east of a line approximately through Okahandja and Outjo, but is not known to come south of Okahandja.

Very variable in habitat preference, it is found in *Acacia-Dichrostachys* thickets around Steinhausen, inside grass tufts or small bushes in the Otavi district and inside small shrubs among scattered *Acacia mellifera* trees around Outjo. In the lattermost place it was found in an unexpectedly dry, stony patch which contained *Aloe dinteri* as well as a wealth of Stapeliads which included *Caralluma peschii*, *C. lugardii*, *Huernia oculata* and *Stapelia bergeriana*.

Affinities:
None.

Distinctive Features:
The deltoid corolla lobes (i.e. as long as broad) and extremely flattened column, hardly projecting above the corolla surface despite the lack of any significant corolla tube make it easily recognised. Also distinctive are the erect, simple stems with broad, almost elliptic leaves.
Remarks:
This is certainly the most widespread species in SWA and is the only one known to advance as far west as Outjo. It is frequently so inconspicuous that it is easily overlooked and the rounded leaves look much like those of many other small herbs. *B. dinteri* generally has a single, unbranched stem which is extremely variable in length — around Outjo and Otavi it is up to 15 cm tall while east of this, towards Tsumkwe it grows up to 60 cm tall and forms quite a large, robust plant. The flowers, produced in clusters of up to 5 in each leaf axil are neither very attractive nor very large and are mostly a dull greenish, obscured by blackish dots, but these may be absent and the flower is then plain green.

Figure 36: *Brachystelma dinteri*
A. Plant.
B. Face view of corolla.
C. Side view of corolla.
D. Face view of staminal column.
E. Side view of staminal column.

**BRACHYSTELMA CIRCINATUM**


**Distribution & Habitat:**
Recorded from near Grootfontein and east of Steinhausen, it has a very wide distribution in South Africa as well — from the Transvaal and northern Cape to the mountains near Port Elizabeth. Plants are usually found in the open among tufts of grass between the trees.

**Affinities:**
It is related to *B.pygmaeum* N.E.Br. from the Transvaal and to various other S. African species.
It was previously known in SWA as *Dichaelia forcipata* Schltr. — *Dichaelia* being distinguished from *Brachystelma* by the corolla lobes remaining joined at their tips — but this name was discarded by Dyer (1971) in favour of *B. circinatum*.

**Distinctive Features:**
With its little cage-like flowers with no apparent corolla tube and long, narrow lobes it cannot be confused with any other species in SWA. The leaves are also smaller than in the others — 0.5 cm broad, 1-1.5 cm long — and usually at least partially folded.

**Remarks:**
Specimens from SWA show little deviation from the plants common around Pretoria except that the flowers are slightly smaller and narrower.

![Figure 37: Distribution of Brachystelma circinatum.](image-url)
Figure 38: *Brachystelma circinatum*

A. Plant — a small specimen with small tuber.
B. Side view of corolla.
C. Corolla dissected to give side view of staminal column.

Drawn from: A-C, near Witvlei, Bruyns 1952 (KG alc. coll.).
BRACHYSTELMA STENOXYLLUM
(Schltr.) Dyer in Bothalia 10: 376 (1971).

Distribution & Habitat:
This species is found east of Windhoek in the region of Steinhausen and from here as far north as Grootfontein. It is also known from the Transvaal.
Most plants seen were found to grow close to or underneath bushes where some shelter is obtained. A few were also seen in grass clumps in open places.

Affinities:
Huber (1957 and 1967) suggests that it is related to Ceropetia pygmaea and this seems very possible. Certainly it is not clearly allied to any other species of Brachystelma.
Previously it was known as Siphonostelma stenoxyllum Schltr.

Distinctive Features:
The long, bell-shaped corolla tube is quite different from that of any other species. However, it can also be recognised by the long, linear leaves. The only other species with the corolla lobes mostly joined at the tips is Brancinatum which has the lobes at least 4 times as long as broad at the base — in this species the ratio is about 2:1.

Remarks:
This inconspicuous plant with its narrow leaves and rather small, green flowers is not particularly attractive. Frequently it is quite amazingly tiny — the plant standing only 3 cm tall with a small number of leaves and not many flowers — so that it is not always too easy to find. However, larger specimens do occur and they are not as difficult to see as some of the other Brachystelmas.

Figure 39: Distribution of Brachystelma stenoxyllum.
Figure 40: *Brachystelma stenophyllum*

A. Plant — a medium-sized specimen.
B. Seed pod (same scale as A).
C. Bud.
D-E. Side view of corolla.
F. Corolla dissected and shown in side view.
G. Face view of staminal column.
H. Side view of staminal column with part of outer corona tube removed.

Drawn from: A,B,E near Witvlei, Brews 1965 (KG alc. coll.), rest from same area, Grabow in Städtische Sukkulentensammlung Zürich 803370 (ZSS).
This genus, vegetatively and florally very close to *Brachystelma*, consists of about 7 species and is known only from southern Africa. Plants are extremely inconspicuous on account of the excessively narrow leaves and spindly habit and, even more so than *Ceropogia dinteri*, resemble the grass amongst which they grow. The single SWA species, *T. schultzei*, has been collected only about four times throughout SWA and seems to be very rare.

Figure 41: *Tenaris schultzei*

A. Plant with buds and flowers.
B. Face view of corolla.
C. Face view of staminal column.
D. Side view of staminal column.
E. Papillae and clavate hairs on face of corolla around base of lobes and mouth of tube. (scale of papillae as for C; for hairs scale of C = 2 mm).

TENARIS SCHULTZEI
(Schltr.) Phillips in Bothalia 4: 41 (1941).

Distribution & Habitat:
Known from around Gobabis on the edge of the Kalahari, it was also collected by Dinter near Rehoboth. It is apparently endemic to SWA. Plants appear to prefer relatively open places among scattered grass clumps in soil which is fairly loose. This observation is from a single locality and consequently may not be too reliable.

Affinities:
T.schultzei is quite different from other species which have much shorter, sometimes spathulate corolla lobes. Also the entire plant is finely pilose and the others are glabrous. Formerly it was known as Kinepetalum schultzei Schltr.

Remarks:
With the leaves about 3 mm broad and 25 mm long and a vague, greyish-green, this plant is very inconspicuous and difficult to see. The flowers are quite amazing as they are almost 5 cm in diameter but, with the corolla lobes about 1.5 mm broad for most of their length and 20-25 mm long, have very little surface area and are consequently as inconspicuous as the rest of the plant. Being so long and narrow, they are very frail and flutter around in whatever wind there may be.

Two plants were observed and in both cases the tuber was slightly longer than broad and conical, with the narrowest portion at the apex.

Figure 42: Distribution of Tenaris schultzei
Figure 43: *Ténaris* spec. indet.?

A. Plant, slightly reduced in length and showing very distinctive bud shape.
B. Face view of corolla.
C. Piece of corolla lobe showing hairs.
D. Face view of staminal column.
E. Side view of staminal column.

Drawn from: A-E, 10 km west of Outjo, *Bruijns* 2098 (KG alc. coll.).

**Footnote:**

Another species which probably belongs to this genus was collected near Outjo in 1979. This turned out to be undescribed but unfortunately no more specimens could be located in 1981 owing to the severe drought being experienced in the area. A sketch of the plant has been prepared from the scanty material that I have preserved in spirit but this seems too small a specimen to justify describing a new species and so this awaits the efforts of another collector.
DATA FOR DISTRIBUTION MAPS

In the foregoing account each species is accompanied by a map giving the approximate known distribution. This has been compiled from gatherings represented in the herbarium at Windhoek (WIND), from a few specimens represented at Pretoria (PRE) and also from specimens preserved in the Karoo Botanic Garden Alcohol Collection (KG alc. coll.) and has been supplemented further by personal observations in the areas concerned. A list of the relevant specimens is provided below and they are housed in WIND unless otherwise stated.

Brachystelma arnotii
2116: Omatako (-BA), Woortman 221. 2117: Otjosondu (-BD), collector unknown. 2118: Witvlei (-BD), Grabow 19.

B.circinatum
1917: Kombat (-DA), Braine in Giess 1054. 2118: Witvlei (-DC), Bruyns 1952.

B.cupulatum
2118: Otjombindi (-AB), Blaauw s.n., Witvlei (-DC), Grabow in Muller 1259, Bruyns 1953.

B.dinteri

B.stenophyllum

Ceropegia crassifolia
1917: Tsumeb (-BD), Bruyns 2329 (KG alc. coll.); 1917: Kombat (-DA), Giess 10233. 2118: Sturmveld (-DB), Tölken 175; Witvlei (-DC), Grabow 12.

C.dinteri
1918: Grootfontein (-CA), Dinter 2529, photo. 2016: Outjo (-AA), Bruyns 1949. See also Dinter (1914) for further localities.

C.lugardiae
1715: Ondangua (-DD), De Winter & Giess 6847. 1719: Rundu (-DD), Bruyns 2315; E of Rundu (-DD), Bruyns 2312 (KG alc. coll.). 1723: near Singalumwe (-DB), Killick & Leistner 3266. 1724: Katima Mulilo (-CB), Bruyns 2286 (KG alc. coll.). 1725: Mpalela Island (-CC), Bruyns 2300 (KG alc. coll.). 1917: Otavi (-CA), Giess 12456; Osib (-CD), Giess 10231. 1920: Tsumkwe (-DA), Giess et al 11014.
C.mafekingensis
1917: Kombat (-DA), Giess 9056. 1918: Grootfontein (-DA), Dinter 2701. 2118: Witvlei (-DC), Bruyns 1954. 2217: Windhoek (-CB), Dinter s.n.
C.meyeri
1725: Mpailela Island (-CC), Bruyns 2303.
C.multiflora
1724: Muyako (-CD), Bruyns 2334. 1813: S of Ohopoho (-BD), Herero Abner 79. 1916: Etosha (-BD), Tinley 1319. 1915: Otjitambé (-CC), Schlettwein s.n.
1917: Tsumeb (-AB), v. Koenen 68; Otavifontein (-CB), Giess 8624. 1920: E of Tsumkwe (-DA), Giess et al 11034. 2016: Omatjènne (-AD), Giess 13682. 2116: Omatako (-BA), Woortman 76. 2118: Witvlei (-DC), Grabow 14. Brabant (-AB), Bruyns 2272.
C.nilotica
1713: Ombazu-Quelle (-DC), Merxmüller & Giess 30590. 1714: Ombalantu (-DB), Giess & De Winter 7078; Oshandi (-DD), Rodin 9117; 1715: Ondangua (-DD), Giess & De Winter 6874. 1723: Singalumwe (-DD), Killick & Leistner 3268. 1724: W of Katima Mulilo (-CA), -Killick & Leistner 3279. 1817: Tsumeb (-CA), Garny s.n. 1821: Bagani (-BA), Bruyns 2280. 1916: Franken (-CD), Schlettwein s.n. 1917: Auros (-BA), Giess 12577; 1917: Otavi (-CA), Giess 14973; Kombat (-DA), Giess 8566. 1920: Tsumkwe (-DA), Giess et al 11192. 2116: Omatako (-BA), Woortman 115.
C.pachystelma
2118: Sturmveld (-DB), Giess 7667; Lybian (-DC), Grabow 1.
C.paricyma
1725: Mpailela Island (-CC), Bruyns 2302 (KG alc. coll.).
C.purpurascens
1821: Bagani (-BA), Bruyns 2281 (KG alc. coll.).
C.pygmaea
1715: Ondangua (-DD), De Winter & Giess 6846. 1920: Tsumkwe (-DA), Giess et al 11080. 2118: Sturmveld (-DB), Tölkens 194.
C.racemosa
1915: Otjitambé (-CC), Giess 15014. 1917: Grootfontein (-AB), Giess 11234; Otavi (-CA), Giess 12471. 2116: Omaruru (-AA), Bruyns 2353 (KG alc. coll.); Omatako (-BA), Woortman 75.
C.stenantha
1724: Katima Mulilo (-CB), Bruyns 2288; Bukalo (-DA), Bruyns 2290 (KG alc. coll.). 1821: Popa Falls (-BA), Bruyns 2309 (KG alc. coll.).


**C. stenoloba**

1917: Otavi (-CA), Giess 12458; Kombat (-DA), Giess 10232. 1920: E of Tsumkwe (-DA), Giess et al 11186. 2016: Groottfontein (-BB), Giess et al 6371.

**Tenaris schultzii**

2118: Witvlei (-DC), Bruyns 1951. See also Dinter (1914) for further localities.

**ACKNOWLEDGEMENTS:**

The fieldwork for this article was done in two parts. The first of these was during my military service, when I was stationed at Windhoek in November and December 1979. Travelling could only be done over the weekends and this was by hitch-hiking. A second trip was made to SWA during March and April of 1981 from Cape Town when I was in the employ of the Karoo Botanic Garden at Worcester. Again travelling was done entirely by hitch-hiking. Thus I have to thank, firstly, all those who so kindly picked me up at so many places, without whose help I would certainly not have been able to cover nearly as much of the territory as I did.

I am also very grateful to Mr. M.A.N. Müller, curator of the Windhoek Herbarium for allowing me to look at specimens whenever necessary and for the use of the excellent records of Ceropegia in the herbarium for compiling distribution maps.

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**REFERENCES**


Dinter, K. 1914. *Neue und wenig bekannte Pflanzen Deutsch SWAs*. Im Selbstverlag, Okahandja.


**INDEX**

Species in bold type are those to which a section is devoted, those in ordinary type are mentioned in the text and those in italics are synonyms of other species according to Dyer (1980) or more recent work.

**Brachystelma arnotii** Bak.

B. barberiae Harv. ex Hook. f.

B. blepharanthera Huber

B. brevipedicellatum Turrill

B. caudatum N.E.Br.

B. **circinatum** E.Mey.

B. **cupulatum** Dyer

B. **dinteri** Schltr.

B. **grossartii** Dinter

B. **huttonii** N.E.Br.

B. minimum Dyer

B. oianthum Schltr.

B. schinzii N.E.Br.

B. **stenophyllum** Dyer

*Ceropogia acaciiorum* Schltr. ex Dinter

C. africana R.Br.

C. ampliata E.Mey.

C. antennifera Schltr.

C. arearia Dyer

C. **bonafouxii** K.Schum.

C. **boussingaultifolia** Dinter

C. campanulata G.Don

C. carnosa E.Mey.

C. conrathii Schltr.

C. **crassifolia** Schltr.

C. denticulata K.Schum.

C. **dinteri** Schltr.

C. distincta N.E.Br.

C. floribunda N.E.Br.

C. gemmifera K.Schum.

C. haygarthii Schltr.

C. insignis Dyer

C. kwebensis N.E.Br.

C. **lugardiae** N.E.Br.

C. mafekingensis Dyer

C. meyeri Deene.

C. **multiflora** Bak.

C. nilotica Kotschy

C. **pachystelma** Schltr.

C. **paricyma** N.E.Br.

C. **patriciae** Rauh & Buchloh

C. **purpurascens** K. Schum.

C. **pygmaea** Schinz

C. **racemosa** N.E.Br.

C. **stenantha** K.Schum.

C. **stenoloba** Hochst. ex Chiov.

C. **swaziorum** Field

C. turricula Bruce

C. volubilis N.E.Br.

C. woodii Schltr.

*Dickaelia forcipata* Schltr.

*Tenaris schultzii* Phillips