

# The South African Species of *Dipcadi*

by

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In the *Flora Capensis* 6: 445 (1897) Baker enumerated 14 species for South Africa. Since then over 50 more "new" species have been described for southern Africa, including a large number from South West Africa. As some are known to be poisonous and others are eaten by Bushmen and wild animals, it is essential to bring order into the classification of this genus. It has been necessary to reduce to synonymy a large number of names. Many of the unnecessary "new" species were based on variable characters and others resulted because some species flower hysternthously in spring and later synanthously. It seems also that several hybrids were given specific rank.

Baker divided the species into two sections; those with the perianth segments of equal length were classified in the §*Tricharis* and those with caudate appendages to the outer segments in the §*Uropetalum*. When the appendages are well developed sectional classification is easy but in some specimens the appendages are very short. Bentham & Hooker, *Gen. Pl.* III, 2: 809 (1883) pointed out that the length of the appendages varied even in flowers on one raceme and Baker, when describing the Madagascar species, *D. heterocuspe*, also mentions that short and long appendages occurred on one raceme. As the appendages are formed at an early stage in the bud, even the short ones may be seen to protrude as three short apical teeth. Apparently the species with appendages to the outer perianth-segments are restricted to Africa and Madagscar. Those from Europe and India do not have them. However, the sections are not used here.

An example of a variable species is *D. viride* (L.) Moench, the first species to be described for South Africa, a widespread almost weed-like species extending into tropical Africa. It appears to be extremely adaptable and shows great variation in size, also in the length of the outer appendages which can vary from 2 mm to 3 cm. Flowers from near the base of the raceme usually have shorter appendages than those from the apex.

Examples of species flowering hysternthously are *D. ciliare* (Zeyh. ex Harv.) Bak. and *D. marlothii* Engl. from the drier areas. Later in the season they may flower synanthously and intermittently. The early spring forms were usually wrongly identified as *D. brevifolium* from the Cape.

Of interest too is the dimorphism of *D. gracillimum* from the borders of the Kalahari and the Transvaal Highveld. In early spring, after a dry winter, the reserves stored in the bulb produce a few-flowered raceme and a few thin leaves which, if water is insufficient, wither from the tip downwards. The capsules are small. The same plant looks very different after good rains. The numerous succulent leaves are then flabby and bend over or lie flat on the ground. Several many-flowered inflorescences may be produced in which the flowers are bigger and the transformation of the capsule is especially striking. It may be at least six times the size of the capsule of the depauperate form. Around Kimberley the older farmers call it "Oupa Groot Toon" alluding to its size. Large and small capsules were also observed in *D. brevifolium* Fourc. and in *D. longifolium* Bak. Hooker, *Fl. Brit. India* 6: 346 (1892), describes the capsule of *D. serotinum* as "very variable, 1/3-2/3 inch in diam."

A study of *D. bakerianum* Bol. and *D. glaucum* Bak. and several related "species" indicates that they hybridize in nature.

The first species described from the Cape was classified as *Hyacinthus viridis* by Linnaeus. It does not grow on the Cape Peninsula as one might expect but is found further east. Thunberg later collected the solitary species of the Peninsula and named it *Hyacinthus brevifolius*. Subsequently these two species were transferred several times to different genera before Baker in 1871 placed them both in *Dipcadi* but not under the presently accepted names. The genus *Dipcadi* was described by Medicus in 1790 for a species from the Mediterranean region, *Hyacinthus serotinus* Linnaeus. Botanists working on the Cape flora overlooked this northern genus and placed the Cape species variously in *Hyacinthus*, *Lachenalia*, *Zuccagnia*, *Polemanna*, *Uropetalum* and *Tricharis*. With the exception of *Hyacinthus* and *Lachenalia*, these genera have become synonyms of *Dipcadi*.

#### ECONOMIC IMPORTANCE

*D. glaucum* Bak., "Dronk ui"; the Bushman's "igwashe". This species has been known to be poisonous to cattle and sheep since 1867, often with fatal results, but the active principle has not been isolated. Steyn in "The Toxicology of Plants in South Africa" 1934, found that it was less poisonous in the flowering stage than at a later stage. It is widespread in the north-western parts of the Cape Province, South West Africa and the Transvaal and rare in the Federation where it occurs as a form with shorter pedicels. (The Central Research Station at Mazabuka reported on a specimen that it was not toxic to stock.)

*D. crispum* Bak. Marloth recorded on a specimen collected at Kalkfontein in Namaqualand by Meyer (Marloth 6430) that it was "very poisonous"; called "gifbol" in the Beaufort West district.

*D. platyphyllum* Bak. ("Horinkies"). Some farmers in the Kimberley district claim that it is poisonous.

*D. marlothii* Engl. (syn. *D. polyphyllum* Bak.) and *D. viride* (L.) Moench (syn. *D. umbonatum* Bak.), are Sotho remedies for gonorrhoea and pimples according to Watt & van Brandwyk in "The Medicinal and Poisonous Plants in South Africa" (1932).

*D. dinteri* Bak. It is recorded by Dinter on the herbarium specimen that the Hottentots eat the bulbs.

*D. gracillimum* Bak. On a specimen from Prieska, Bryant (J 188) wrote the following: "Very common, bulbs said to be edible but have an insipid taste".

*D. longifolium* (Lindl.) Bak. and *D. marlothii* Engl. The bulbs are eaten by Bushmen according to Story and Schoenfelder, either fresh or roasted in ash.

In India the bulbs of this genus are non-poisonous and are eaten in times of scarcity.

*Dipcadi Medicus* in Acta Palat. 6: Phys. 431, ex eod. Ust. Ann. ii: 13 (1790); Baker in Journ. Linn. Soc. 11: 401 (1871); Benth. & Hook. f., Gen. Plant. iii: 809 (1883); Bak. in Fl. Cap. 6: 445 (1897); Fl. Trop. Afr. 7: 516 (1898); Phillips, Gen. S.A. Fl. Pl. ed 2: 190 (1951).

*Zuccagnia* Thunb., Nov. Gen. Plant. 9: 127 (1798), in error "Zuccangia"; in Roem. Archiv. ii: 2 (1799); Fl. Cap. ed. Schult. 328 (1823).

*Uropetalon* Burch. ex Ker in Bot. Reg. t. 156 (1816). The name was spelt *Uropetalum* by subsequent authors.

*Polemannia* Berg. ex Schtdl. in *Linnaea* 1: 250 (1826), not of Ecklon whose name is rejected, cf. *Taxon* 9: 74 (1960).

*Tricharis* Salisb., *Gen. Pl. Fragm.* 24 (1866).

The name *Dipcadi* is said by Adamson & Salter in *Fl. Cap. Pen.* (1950) to be an oriental name for the grape hyacinth.

Roots many, thin. *Bulb* small, ovoid, with thin outer tunics, sometimes produced into a neck; occasionally forming runners or bulbils. *Leaves* one, several or many per flowering shoot, their number more or less constant for each species; lamina narrow to wide, flat or folded, straight or spirally twisted, glabrous or hairy dorsally; margin smooth, rarely undulate, ciliate or papillate, occasionally prominent, base free or clasping, apex acute or acuminate; often the innermost leaf much smaller and narrower, hysteranthous and/or synanthous. *Inflorescence* a simple, central raceme, often secund, with a few to many flowers; scape terete, glabrous or slightly ribbed and papillate, rachis drooping in bud, becoming erect during anthesis; bracts small, caducous or persistent; pedicels very short to long, usually erect in bud, recurved during anthesis, becoming erect again and lengthening slightly in fruit. *Flowers* green or brown, sometimes with some yellow, red, brown or white near the tips on the inner surface and along the margin of the perianth lobes; appendages occasionally reddish; emitting scent at night and therefore probably pollinated by moths. *Perianth* deciduous, at first closing over the ovary when fading; segments forming a tube, fused at the base or rarely 2/3 of the way, connivent above; the 3 outer segments spreading outwards from near the middle or erect with only the tips recurved, apex cucullate with a group of papillae on the inside; tips sometimes extended into a short to long, caudate, terete appendage; 3 inner segments similar to the outer (but never with caudate appendages), often connivent to form a tube inside the outer segments with only the tips curved outwards. *Stamens* 6, included, uniform, filaments flat, flimsy, fused to the tube below, appressed to the connivent segments above it; anthers with the apex just reaching the mouth of the tube, introrse, bilocular, attached dorsally near their base; locules long and narrow, often slightly diverging and obtuse or sagittate at the base, the connective produced into a short, apical appendage in one species (*D. glaucum*). *Gynoecium* with a turbinate, sessile or stipitate ovary, rarely with 3 apical knobs; with about 20 biseriate ovules per loculus, style short or as long as the ovary, papillate, hollow (often mucilaginous inside), shorter than the stamens; stigma of 3 lingulate, papillate lobes\* or rarely capitate and sub-persistent (*D. marlothii*, *D. papillatum*). *Capsule* trigonous in cross-section or rounded or oblong with the side-walls in this case at first adnate near the centre, splitting later (i.e. *D. marlothii*); in one species (*D. bakerianum*) with an apical knob on each valve; shortly stipitate in some species (*D. longifolium* and some Indian species). *Seeds* flat, round, black, shiny, papillose.

*Type Species:* *D. serotinum* (L.) Medic.

#### Chromosome numbers

*D. serotinum* (L.) Medic,  $2n = 8$ , according to Levan (1943).

*D. viride* (L.) Moench,  $2n = 12$ , according to de Wet [*Cytologia*, 22: 145-149 (1957)].

*D. glaucum* Bak.,  $2n = 18$  according to de Wet, l.c. and La Cour (*Darlington & Janaki Ammal*, 1945).

**DISTRIBUTION.**—Mediterranean region, Africa, Madagascar Socotra and India. About 100 specific epithets have been used but only about 30 may eventually be upheld. From southern Africa 13 species are recognised here.

\* In dried specimens the lobes are stuck together. Much pollen from the anthers falls on the stigmas. Self pollination may take place but we do not know if the flowers are protogynous or not.

From collectors' records it is apparent that these relatively unattractive plants have been collected in South Africa mainly by botanists who have concentrated on an area, as for instance Fauresmith, Kimberley and Pretoria. The species are probably more widely spread than our present records show them to be. The large number of species and the extensive pure stands recorded from around Kimberley are noteworthy. Here 11 of the 13 species have been recorded. Most of these species extend to the western side of the Kalahari sandveld in South West Africa and further northwards to Southern Rhodesia and north-eastwards to the Transvaal. *D. gracillimum*, *D. ciliare* and *D. marlothii* also penetrate further east and south. Absent from the Kimberley area are *D. brevifolium* Bak., a winter rainfall species extending to the Namib in South West Africa, and *D. longifolium* Bak., a subtropical, hygrophytic species.

1. Capsule knobbed; ovary with 3 distinct apical bulges; leaves many, rosulate, lanceolate, long-tapered in upper half; outer and inner segments equal..... 2. *bakerianum*  
Capsule not knobbed; ovary oblong to obovoid, sometimes obscurely umbonate but then segments unequal..... 2
2. Style short, stigma capitate, sub-persistent..... 3  
Style and stigmatic lobes (erect and closed in dried flowers) forming a pencil-shaped organ about as long as the ovary..... 4
3. Leaves 4-6, linear-lanceolate, acuminate, glaucous, glabrous, margin yellow, prominent, papillate; scape often minutely ribbed and papillate..... 3. *papillatum*  
Leaves many, grass-like, the outer with short white, straggling hairs on the margin and dorsally at the base (these sometimes absent later in the season); scape smooth..... 5. *marlothii*
4. Anthers with a short apical appendage; large plants with many rosulate, glaucous leaves up to 7 cm wide; pedicels 2-7 cm long..... 9. *glaucum*  
Anthers without an apical appendage; plants usually smaller and with narrower leaves; pedicels short..... 5
5. Leaf 1 (occasionally 2 when the bulb produces 2 flowering racemes simultaneously), synanthous, clasping the scape for about half its length below the surface, with the lamina flat on the ground at right angles to the scape..... 6  
Leaves more than 1, or, if hysteroanthous and at a certain stage perhaps showing a small immature leaf or bract, then not as above..... 7
6. Lamina folded, linear, margin smooth; caudate appendages of outer segments long 12. *vaginatum*  
Lamina flat, lanceolate, margin crisped-ciliate; caudate appendages of outer segments short 13. *platyphyllum*
7. Ovary and capsule shortly stipitate; segments fused only near the base, spreading, obtuse, not caudate; subtropical, glabrous, usually hygrophytic plants..... 6. *longifolium*  
Ovary and capsule sessile (if occasionally shortly stipitate in *D. ciliare* then leaves ciliate) 8
8. Outer perianth segments with short to long caudate appendages;\* leaves straight or spirally twisted..... 9  
Outer perianth segments not caudate, more or less equal in length to inner; leaves with a lax spiral twist in upper half when young..... 11
9. Leaves crisped-undulate, setaceous to glabrescent; flowers campanulate, orange to brown 7. *crispum*  
Leaves glabrous, smooth; flowers tubular, green, occasionally with red, brown or orange margins..... 10
10. Leaves strap-shaped, coriaceous, apex obtuse, apiculate, margin prominent, often red 11. *rigidifolium*  
Leaves linear to lanceolate, soft, long tapered towards the apex, margin not prominent 10. *viride*
11. Leaves 2-3, filiform to linear, glabrous; flowers 12-18 mm; south-western Cape, Namib 1. *brevifolium*  
Leaves many (sometimes few in early spring)..... 12
12. Flowers about 1 cm long; leaves (at least after rains) many, not rosulate, filiform, equalling more or less inflorescences in length, glabrous, margin entire..... 4. *gracillimum*  
Flowers 2-2.8 cm long; leaves many, rosulate, linear, flat, long-attenuated to the apex (usually hysteroanthous in spring, later synanthous), shorter than the inflorescence, margin crisped and ciliate..... 2. *ciliare*

1. *D. brevifolium* (Thunb.) Fourc., Bot. Surv. Mem. S.A. 20: 99 (1941).

*Hyacinthus brevifolius* Thunb., Prodr. 63 (1794). Type: Cape, "Carro et Cannaland, Oct.-Nov." Thunberg (UPS, holo., PRE, photo).

\* In cases where the outer appendages are short the buds will show them as 3 short apical teeth.

*D. hyacinthoides* (Spreng.) Bak. in J. Linn. Soc. 11: 398 (1871); Fl. Cap. 6: 446 (1897). *D. spirale* Bak. in Engl. Bot. Jahrb. 15: 7 (1892); Fl. Cap. 6: 447 (1897). Type: Cape, Calvinia, Hantam Mountains, Meyer (B, holo., PRE, photo). As "*D. hyacinthiflora* (Berg. ex Schltld.) Hutch.", A Botanist in S.A. 200 (1946); Adams & Salter, Fl. Cape Penin. 197 (1950).

*Polemammia hyacinthiflora* Berg. ex Schltld. in Linnaea 1: 250 (1826). Type: Cape, Camps Bay, Bergius (B, holo., probably destroyed).

*Uropetalum hyacinthoides* (Berg. ex Schltld.) Spreng., Syst. 4, 2: 135 (1827); Cur. Post. 16: 135 (1827); Roem. & Schult., Syst. Veg. 7: 618 (1829); Kunth, Enum. 4: 378 (1843).

*Scilla brevifolia* (Thunb.) Roem. & Schult., Syst. Veg. 7: 574 (1829).

*Periboea? brevifolia* (Thunb.) Kunth, Enum. 4: 294 (1843).

Plants 20–40 cm tall, glabrous. *Bulb* 15–30 mm in diam. with firm grey outer tunics sometimes produced into a short neck. *Leaves* hysteranthous or synanthous, 2–4, filiform to linear or terete and deeply channelled, 6–50 cm long, 1–5 mm wide, glabrous, sinuous, apex long attenuated, often dying back, frequently forming lax spirals when young, base free, rarely vaginate. *Raceme* variable in length, 10–40 cm long, secund, 8–20-flowered; scape terete, firm; bracts deltoid, acuminate, persistent; pedicels about 2 mm long during anthesis, up to 10 mm in fruit. *Flowers* 12–20 mm long, in shades varying from brown to green, greenish-yellow to cream, the darker colours being found on the outside and the lighter inside; perianth-segments fused in lower half, outer narrower and slightly longer than inner, recurved from the middle; inner forming a connivent tube with only the tips spreading. *Ovary* with about 13 ovules in each cell; style about as long as the ovary with a 3-lobed stigma. *Capsule* rounded in outline, trigonous, 15 mm long, 18 mm broad; seeds 8 mm in diam.

DISTRIBUTION.—South-western Cape, eastwards as far as the Middelburg and George districts; South West Africa, Namib; rocky habitats.

CAPE.—Peninsula: Cape Town, Signal Hill, Marloth 1592; Lions Head, Schlechter 1284 (BOL). Worcester: Hex River Mts., Buffelshoek Twins, summit, Esterhuysen 8499 (BOL). Caledon: Appelskraal, Rivier Sonder Einde Mts., Stokoe (SAM 62219, NBG). Uniondale: Georgida, Esterhuysen 6370. George: Kleinswart River, Gillett 1190 (BOL). Middelburg: Bangor farm, on lower koppies, common, Bolus (BOL 14044). Sutherland: Roggeveld, Farm Fransplaas, Marloth 9833. Ceres: near Karroopoort, Barker (BOL 26944). Clanwilliam: Cedarberge, shale land below Tafelberg, Esterhuysen (BOL 18138); near Citrusdal, Stokoe (SAM 63660, NBG). Vanrhynsdorp: Klaver, Lewis 1457, 2964, Compton 17430 (NBG). Namaqualand: near Steinkopf, Acocks 19535. Richtersveld, Arrisdrift, on stony flats, Marloth 12303, 12646.

SOUTH WEST AFRICA.—Luderitz: stony, granite flats 15 miles west of Aus, Giess & van Vuuren 847; Halenberg, Dinter 6610.

The combination *D. hyacinthiflora* (Berg.), which Hutchinson made in his book, A Botanist in Southern Africa, must be considered invalid as he did not mention the basionym (*Polemammia hyacinthiflora* Berg. ex Schltld.). Sprengel arbitrarily changed the epithet to *hyacinthoides*.

This is the only species from the Cape Peninsula. The specimens cited under this species in the Flora Capensis from the Transvaal, Natal and eastern Cape do not belong here. They are hysteranthous forms of *D. ciliare* or *D. marlothii*.

It flowers from September–November; "faintly scented" (Foley).

2. *D. ciliare* (Zeyher ex Harv.) Bak. in Journ. Linn. Soc. 11: 398 (1871); Fl. Cap. 6: 447 (1897). Benth & Hook., Gen. Plant. III, 2: 809 (1883).

*Uropetalum ciliare* Zeyher ex Harv., Thes. Cap. II: 45, t. 170 (1863). Type: Cape, Uitenhage, fields near Zwartkops River, *Ecklon & Zeyher* 48 (K, lecto, TCD, NBG, iso., PRE, photo); Cradock, *Cooper* 493 (K).

*Dipcadi setosum* var *readii* Bak. in Journ. Linn. Soc. 11: 398 (1871). Type: Cape, Fort Beaufort dist., Fuller's Farm, *Reade* 94, pro parte, excluding left hand specimen. (TCD, holo., PRE, photo.). *D. readii* Bak. in Fl. Cap. 6: 447 (1897). *D. megalanthum* Zahlbr. in Ann. Hofmus. Wien 15: 21 (1902), ex descr. Type: Cape, Albany Dist., Grahamstown, *Penther* 511 (W, holo., destroyed). *D. adelae* Beauv. in Bull. Soc. Bot. Geneva, ser. II, 5: 326 (1914). Type: Cape, Matatiele district, near Mafubé, *Adele Berthoud* (G, holo., PRE, photo.).

Small plants up to about 40 cm high. *Bulb* ovoid to globose, about 2 cm in diam. with thin, dark, outer tunics produced into a short neck. *Leaves* about 6 per shoot, hysteroanthous at first, later synanthous; outer leaves usually twisted spirally, narrowed in upper half to a long, acuminate apex, broadest below and there laxly vinate, 5–18 cm long, up to 8 mm broad below, margin usually undulate, often prominent, yellow, ciliate with long scattered hairs, lamina dorsally at the base sparsely to densely covered with bristles on the prominent nerves; inner leaves 1–2, linear to filiform, glabrescent. *Raceme* 20–30 cm high, secund, laxly 4–10 flowered; scape erect, glabrous, faintly ridged; bracts ovate, acuminate, membranous, about 7-nerved, persistent; pedicels short, up to 1 cm in fruit. *Flowers* green, brownish- or yellowish-green, 16–28 mm long; perianth-segments fused 1/3 of the way, with a broad 5-nerved central band, about equal, spreading somewhat near the apex (often with one segment bent outwards below), outer slightly narrower than inner. *Stamens* with the anthers obtuse or apiculate at the apex and diverging at the base. *Ovary* with about 20 biseriolate ovules per cell; style ultimately reaching to the base of the anthers, the 3 stigmatic lobes triangular, papillate. *Capsule* varying in size, 9–18 mm high, quadrate to oblong in outline, trigonous, often very shortly stipitate; seeds 6 mm in diam.

DISTRIBUTION.—Eastern Cape, Orange Free State, Transvaal. On grassy slopes, apparently widespread but never common.

CAPE.—Oudtshoorn: near Oudtshoorn, *Bolus* (BOL 12398, PRE). Steytlerville: Steytlerville, *Barker* 5064 (NBG). Graaff-Reinet: near Graaff-Reinet, *Barker* 7098 (NBG). Cradock: Mortimer, *Kensit* (BOL 9241). Queenstown: plains near Queenstown, *Galpin* 2203. Middelburg: Bangor Farm, *Bolus* (BOL 14108). Murraysburg: near Murraysburg, *Tyson* 85 (GRA). Somerset East: *MacOwan* (BOL). Port Elizabeth: 12 miles N.E. of Port Elizabeth, *Barker* 6916 (NBG). Alexandria: Kaba, limestone slope, *Johnson* 250. Albany: Grahamstown, *Daly & Sole* 340 (GRA, BOL). King William's Town: Kei Road, Gleniffer, *Ranger* 33. East London: Fort Jackson near East London, *Galpin* 3123 (GRA, PRE); East London, *Comins* 1361. Stutterheim: Kubusie River valley at St. John's, rocky grass-slope, rare, *Acocks* 9426. Kentani: near Kei Mouth, *Flanagan* 1152. Mount Currie: Clydesdale, *Tyson* 2124 (GRA, NBG). Aliwal North: Ruitfontein, *Thode* A1872.

NATAL.—Lions River: Culvers near Rosetta, *Rogers* 28149 (GRA). Pietermaritzburg: Pietermaritzburg Race Course, *Barker* 4438 (NBG).

ORANGE FREE STATE.—Fauresmith: on Reserve, foot of hill, *Smith* 5570, *Henrici* 4407, 4198. Kroonstad: *Pont* 648, 638.

TRANSVAAL.—Bloemhof: "Kaffraria", *Burt Davy* (PRE 12774), in leaf but sterile, March. Pretoria: Hammanskraal, *Mauve* 4028, in flower, leafless, July; in leaf but sterile, December 1959.

Harvey adopted Zeyher's manuscript name, *Uropetalum ciliare* under which the specimens *Ecklon & Harvey* 48 were distributed. There is a type specimen at Dublin and one at Kew. Since Harvey's hand-writing is on the Kew sheet and since he quotes

the *Cooper* specimen mounted next to it, I agree with Kew that it should be made the lectotype. The material of the isotype at NBG is excellent. Bentham and Hooker state that Harvey's figure (t. 170) is not accurate in that the filaments are drawn free from the tube, and the anthers appear basifixed. The filaments are fused to the tube below, where the perianth-segments are also fused. Higher up where the segments become free (although still connivent), the weak filaments are also free but are pressed to the segments. They can be pulled away without disturbing the tissues of the segments. The anthers are dorsifixed near the base; the locules often diverge or are separated below the insertion. The figure was drawn from dried material.

The locality of *D. readii* Bak. is cited in the Flora Capensis as Fuller's Farm, Natal, but Miss M. D. Gunn, Librarian, points out that the farm was situated near Fort Beaufort in the eastern Cape and is at present part of a forest reserve. The type specimens have either lost their outer leaves or were hysteranthous. When Zahlbruckner described *D. megalanthum* he admitted that it might prove to be a variety of *D. readii* Bak. In the eastern Cape the species flowers from November to January, at first hysteranthously, later synanthously.

On the highveld it was seldom collected for its flowers so early in the season; it is difficult to spot because of its small size and moreover its drab colour merges into the background of dry earth. Here it apparently flowers only once hysteranthously. However, in cultivation, bulbs collected from the same area (*Mauve* 4028 from Hammanskraal near Pretoria) produced 2 leaves with the inflorescence, probably as a result of receiving more water.

The flowers of the highveld specimens are shorter than those from the eastern Cape and the dorsal pubescence on the ribs of the leaf was absent.

When leafless the species can be distinguished from *D. marlothii* by its glabrous prophylls and its long style and lingulate stigmas. In *D. marlothii* the prophylls are shortly scabrid, the style is very short and the stigma capitate.

3. *D. papillatum* Oberm., sp. nov., affine *D. ciliari*, sed foliis glabris, scapo papillato, floribus minoribus, stylo brevi, stigmatate capitato differt.

*Planta* minor a 40 cm alta. *Bulbus* ovoideus ca 2 cm latus. *Folia* circ. 4 rosulata primo lax spiralia glabra glauca. *Racemus* 4-7 florus scapus costatus basi papillis. *Segmenta* perianthii aequalia. *Stylus* brevis, stigmatate capitato.

Small plants up to 40 cm high. *Bulb* avoid, ca 2 cm broad with thin brown outer skins, produced into a neck, often producing several shoots simultaneously. *Leaves* about 4 per flowering shoot, often hysteranthous in spring, forming an erect rosette with the lamina in lax spirals, becoming straight with age, somewhat coriaceous, glaucous, glabrous, except for the yellow, minutely ciliate margin, and occasionally dorsally minutely papillate on the ribs, which are situated very close together. *Racemes* up to 40 cm, secund, 4-7 flowered, overtopping the leaves; scape terete, ridged, with the ribs minutely papillate, occasionally papillae absent; bracts minute, subulate, deciduous; pedicels 3-5 mm in fruit. *Flowers* green, 1 cm long, segments fused about 1/3 of the way, constricted above ovary, equal, outer recurved from near the apex. *Stamens* with the filaments fused to the perianth-tube below and pressed to the segments above it, anthers basifixed, slightly sagittate at the base. *Ovary* oblong, obtusely triangular, ending in a short, stout style; stigma forming a 3-lobed, papillate, apical disc. *Capsule* round, trigonous, 7 mm long; seeds 3 mm in diam.

**DISTRIBUTION.**—Transvaal, Orange Free State, northern Cape, Southern Rhodesia, usually in sand. Common where found.

**TRANSVAAL.**—Pretoria: N.E. of Hammanskraal on road to Rust de Winter, *Codd*, 3488 (PRE, holo.); Rust de Winter Research Station, on loose reddish sandy soil.

*C. A. Smith* (PRE 28284); Eerste Fabrieke, *Young* 1950; Pretoria, Hatfield, *Obermeyer* 68. Soutpansberg: Messina, *Pole Evans* (13121); Bandolierkop, *Riley*. Pietersburg: Pietersburg commonage, *Hafström & Acocks* 214.

ORANGE FREE STATE.—Fauresmith, Groenvlei, *Kies* 382.

CAPE.—Gordonia: 14 miles west of Kuruman—Gordonia boundary, Kuruman River, compact white sand, *Leistner* 2222 (KMG). Barkly West: Pniel near Barkly Bridge, *Wilman* (KMG 4061). Kimberley: Kimberley Golf Course, red sand, *Brueckner* 513 (KMG).

SOUTHERN RHODESIA.—Bulalima-Mangwe, Plumtree, *McLeod* 11, pro parte (PRE).

Flowering in the summer months. The flowers smell sweetly like honeysuckle, in the evening.

4. *D. gracillimum* *Bak.* in *Fl. Cap.* 6: 446 (1897). Type: Cape, Colesberg, *Shaw* (K, holo.! PRE photo.).

*D. polyphyllum* *Bak.* in *Bull. Herb. Boiss. ser. 2: 4: 1001* (1904); not of *Fl. Cap.* 6: 446 (1897). Type: Transvaal, Germiston, Modderfontein, *Conrath* 673 (K, holo., GZU, sheet 041987, iso.! PRE, photo.). *D. involutum* *Suess.* in *Mitt. Bot. Staatssamml. München* 2: 53 (1950). Type: South West Africa, Karibib, sandy grasslands, *Dinter* 6829 (M, holo., B, BOL, PRE, iso.!).

*Ornithogalum dipcadioides* *Bak.* in *Bull. Herb. Boiss. ser. 2: 4: 999* (1904). Type: South West Africa, near Karibib, *Rautanen* 445 (Z, holo.!, PRE, photo.).

Plants glabrous, 5–30 cm high. *Bulbs* ovoid, about 3 cm in diam., attenuated into a short neck; outer tunics greyish-brown, leathery, inner membranous, transparent; producing 1–5 flowering shoots simultaneously. *Leaves* 4–12 per shoot; at first hysteranthous, later synanthous, flaccid after rains, lamina filiform or narrowly linear and canaliculate, up to 30 cm long (usually about 18 cm long), base dilated, membranous, upper part of leaf often spirally twisted when young. *Raceme* simple, secund, as long as, or, in spring usually longer than the leaves; scape terete, slender, often arcuate near the base; bracts varying in size, lanceolate, acuminate, persistent or caducous; pedicels up to 8 mm in fruit. *Flowers* 3–12 on a raceme, green sometimes with a reddish tinge, small, up to 14 mm long, segments fused 1/3 of the way, outer slightly narrower, recurved when fully opened, inner erect with only the tips recurved; stamens typical; ovary cylindrical with about 20 biseriate ovules in each loculus, style hollow, stigma 3-lobed, rounded, papillate. *Capsule* globose, varying in size, 8–18 mm in diam. trigonous, walls thin, leathery; seed 2–3 mm in diam. to twice as large in larger capsules.

DISTRIBUTION.—Northern Cape, Orange Free State, Natal, Swaziland, Transvaal, Southern Rhodesia, South West Africa, in grassveld, often in sand.

CAPE.—Barkly West, *Bennie* 595 (GRA). Herbert: Valschfontein, *Esterhuysen* (BOL). Kimberley: Ronaldsvlei, *Pocock* (BOL 26949); Soutpan, open alluvial sandveld above river in pure stands, *Brueckner* 1008, 1010 (KMG, BOL). Hay: Gordonia boundary, rare, low quartz and limestone ridges, *Acocks* 2036; Rietkloof, yellowish sand, locally common, *Esterhuysen* (KMG 5402); Ongeluk, frequent on hard red sand, *Wilman* (KMG 5387). Namaqualand: sand between hills 4 miles S. of the Orange River near its mouth, *Pillans* 5613 (BOL). Prieska: *Bryant* J188 (SRGH). Angelierspans, adjoining Jagbult, Karroid Broken Veld, *Acocks* 12675.

ORANGE FREE STATE.—Parys: Parys, *Rogers* 740 (GRA, BOL, PRE). Fauresmith: Reserve, *Verdoorn* 2305.



TRANSVAAL.—Warmbad: *Leendertz* 1520 (GRA, PRE). Lydenburg: MacMac Falls, *Prosser* 2048. Piet Retief: 11 miles S. of Amsterdam, *Codd* 4720. Ermelo: Mavriestad, *Pott* 5252. Germiston: Modderfontein, *Gilliland* (J 26773). Witbank: *Gilfillan* (Hb. Galpin 7265).

SWAZILAND.—Mbabane: Ukutulu, *Compton* 25228.

BECHUANALAND.—Molotoana Siding, woodland on sandy flats, *Codd* 8946.

SOUTH WEST AFRICA.—Omaruru: Omaruru, *Schmidt* 8; Namib, Brandberg, south side, *Merxmüller* 1678 (M).

SOUTHERN RHODESIA.—Umtali: Sabie Drift, *Wild* 4661 (SRGH, M).

This species was described from a depauperate specimen flowering in spring and using its stored resources in the effort. It remains small, few flowered and with the leaves soon withering from the tips downwards during the usually dry early summer months. In late summer after good rains, however, the plant shows a very different form. The now numerous leaves become bright green and succulent but so weak that they bend over or even lie prostrate on the sand. The subsequent scapes are of about the same length as the leaves. The capsules of these plants are 2 to 3 times the size of those from the early depauperate specimens. In fact the older farmers call these plants "Oupa Groot Toon" an allusion to the large capsules. It flowers from September to March. "Flowers expand from about 6 p.m.—6 a.m. and then begin to close again". *H. Bolus*.

5. *D. marlothii* *Engl.* in *Engl. Bot. Jahrb.* 10: 3 (1889); *Fl. Cap.* 6: 446 (1897). Type: Cape, Bechuanaland, Kuruman, *Marloth* 1041 (B. holo., PRE, iso.). *D. bakerianum* *Schinz* in *Verh. Bot. Ver. Brand.* 31: 217 (1890), non *Bolus*. *D. durandianum* *Schinz* in *Dur. & Schinz, Consp. Fl. Afr.* V: 374 (1895), nom. nov. for *D. bakerianum* *Schinz*. Type: South West Africa, Ovamboland, near Olukonda, *Schinz* 410! (Z, syn., PRE, photo., GRA, iso.); *Rautanen* 103 (Z, syn., PRE, photo.). *D. polyphyllum* *Bak.* in *Fl. Cap.* 6: 446 (1897). Type: Natal, Groenberg, *Wood* 1166 (K, holo., NH, iso., PRE, photo.). *D. oligotrichum* *Bak.* in *Bull. Herb. Boiss. Ser.* 2, 4: 1000 (1904); *Fl. Pl. Afr.* 24, t. 934 (1944). Type: Transvaal, Germiston, Modderfontein, *Conrath* 676 (K, holo., GZU, iso., PRE, photo.). *D. ernesti-ruschii* *Dinter* in *Fedde, Rep.* 19: 185 (1924). Type: South West Africa, Lichtenstein, Auas Mts., *Rusch* sub *Dinter* 4346 (B, holo.).

Plants 50–100 cm high. *Bulb* globose produced into a neck and with a brown leathery skin. *Leaves* hysteranthous at first, synanthous later in the season, many, often in lax spirals when young, linear to filiform, 10–45 cm long, 1–4 mm wide, upper half attenuate into a long filiform point, dilated into a white membranous base, sparsely to densely bristly on the margins and ribs dorsally in lower half, often with patches of short white curly retrorse pubescence; inner leaves longer, filiform and glabrescent. *Raceme* longer than the leaves, subsecund, 10–20 flowered; scape terete; bracts lanceolate, aristate, early caducous; pedicels up to 1 cm in fruit, arcuate at the base. *Flowers* about 18 mm long (shorter early in the season) segments subequal, fused in lower third, outer segments spreading slightly in upper half, inner connivent, forming a tube with the apex slightly recurved. *Filaments* with a few transverse wrinkles and a small curve where they become free from the tube, appressed to the inner segments above it; anthers 6 mm, hastate at the base. *Ovary* narrow ovoid, narrowed into a semi-persistent short style; stigma capitate, situated below the anthers, 3-grooved. *Capsule* oblong to globose, about 15 mm long, with dorsal ridges and the sidewalls splitting near the axis; seeds typical, 2 mm in diam.

DISTRIBUTION.—Northern Cape, Orange Free State, Basutoland, Natal, Swaziland, Transvaal, Bechuanaland, South West Africa, Southern Rhodesia; usually solitary plants in savanna-grassveld, often on sand but also on firmer soils. Fairly common.

CAPE.—Barkly West: Hardeveld, *Acocks* 2124. Kuruman: *Ferrar* (KMG 6681). Vryburg: Duffield, *Brueckner* 1157. Postmasburg, 26 m. E.S.E. of Postmasburg, *Leistner* 1649. Taungs: Andalusia, *Cartwright* (KMG 7010). Mafeking: Moshesh near Mosita, *Brueckner* 537 (KMG); Hay: Groenwater, *Acocks* 8569. Mount Currie: Mount Currie, *Goossens* 300.

ORANGE FREE STATE.—Heilbron: Heilbron, *Goossens* 578. Bethlehem: Bethlehem, *Rogers* (TRV 2954). Bloemfontein: Bestersput, *Acocks* 8499. Boshoff: Smitskraal, *Burt Davy* (PRE 12887). Kroonstad: near Vals River, *Pont* 317.

BASUTOLAND.—Leribe, *Dieterlen* 237; Maletsunyane Falls, *Jacot-Guillarmod* 1767.

NATAL.—Dundee: 7 miles E. of Dundee, *Codd* 5607. Estcourt: Tabamhlope Research Station, *West* 587. Paulpietersburg: *Galpin* 9294.

SWAZILAND.—Goedgegun, *Nel*.

TRANSVAAL.—Wolmaransstad: Boskuil, *Sutton* 191. Christiana: "Kaffraria", *Burt Davy* (PRE 12826). Pretoria: Pretoria, *Smith* 1161; Witfontein 53, *Hardy* 426. Bronkhorstpruit: Rooikop, *Smuts & Gillett* 2518. Nelspruit: Kruger National Park, Skukuza, *van der Schijff* 1801. Barberton: Upper Moodies, *Galpin* 583. Pietersburg: Blouberg, Mohlakeng Plateau, *Codd & Dyer* 5194. Waterberg: 9 miles N.E. of Thabazimbi, *Codd* 4800. Ermelo: Nooitgedacht 10, *Potter* 1761. Witbank: Sondagsfontein, *Thode A* 2860. Belfast: Donkerhoek, between Belfast and Lydenburg, *Codd* 8032. Johannesburg: Jeppetown Ridge, *Gilfillan* 91a. Heidelberg: *Schlechter* 3518.

BECHUANALAND.—Gaberones, *van Son* (TRV 28670).

SOUTH WEST AFRICA.—Windhoek: Bingenheim, *Gauchape, Volk* 1119. Gobabis: farm Nico, *Merxmüller* 1167 (M, PRE). Grootfontein: *Rehm* (M); 30 miles N. of Gautscha Pan, *Story* 6430, 6449; Karakovisa, *Schoenfelder* 16. Otjiwarongo: Okahandja, *Bradfield* 312.

SOUTHERN RHODESIA.—Matobo: farm Besna Kobila, *Miller* 2080 (SRGH); Bulawayo, *Brain* (SRGH). Salisbury: Enterprise, *Wild* 3899 (SRGH). Inyanga: Mare River, *Wild* 1581 (SRGH). Nyamandhlovu: Pasture Research Station, *Plowes* 1758 (SRGH). Bulalima Mangwe: Plumtree, *McLeod* 10.

The synonym, *D. polyphyllum* Bak. from Natal, was described as glabrous. It is possible that the outer leaves were destroyed leaving only the inner new leaves which are usually glabrous. The isotype collection (NH) is leafless.

This species can be recognized by its long flowers, characteristic pubescence, short style and swollen stigma. It flowers from September to April. At times a somewhat pungent smell is emitted at night.

6. *D. longifolium* (Lindl.) Bak. in Journ. Linn. Soc. 11: 397 (1871). Fl. Trop. A. 7: 519 (1898).

*Uropetalum longifolium* Lindl. in Bot. Reg. t. 974 (1826); Kunth, Enum. 4: 378 (1843). Type: Portuguese East Africa, Mozambique, Mafamale Island, 10° 25' S., 39° 45'–43'; E.\* growing in fine loose sand, *Forbes* (t. 974, icono, CGE, para., PRE, photo.). *Dipcadi venenatum* Schinz in Bull. Herb. Boiss. 4, App. 3: 42 (1896); Fl. Trop. Afr. 7: 518 (1898). Type: South West Africa, Ovamboland, near Olukonda, *Rautanen* 126 (Z, holo., PRE, photo.). *D. zambesiicum* Bak. in Fl. Trop. Afr. 7: 517 (1898).

\* This is the position given by Exell and Hayes in *Kirkia* 1, 136. The Director, C.I.C.A., Lourenço Marques, suggested that it could be Mafamede Island (uninhabited) opposite Antonio Enes, more to the South.

Type: Portuguese East Africa, Zambesi Delta, between Mambucha and Vicenti, *Scott* (K, holo.). *D. firmifolium* Bak. in Fl. Trop. Afr. 7: 519 (1898). Type: Bechuanaland, Ngamiland, Kwebe, *Lugard* 57 (K, holo., GRA, iso., PRE, photo.). *D. anthericoides* Engl. & Gilg in Warb., Kunene-Sambesi Exped. 193 (1903). Type: Angola, Bondo, on the Kubango and Kuito, on clay near reeds, *Baum* 499 (B, holo.†, M, iso., PRE, photo.).

Glabrous plants up to 60 cm high. *Bulb* ovoid, 1–3 cm in diam., outer tunics dark, leathery; occasionally producing suckers or bulbils. *Leaves* 4–7, linear to linear-lanceolate, up to 40 cm long and 9 mm broad, tapering towards the apex and base, not vaginate, firm to coriaceous, closely ribbed. *Raceme* simple, overtopping the leaves, scape terete, tapered at the base, often arcuate just above it; bracts small lanceolate, subulate, caducous; pedicels lengthening in fruit to about 15 mm. *Flowers* 4–12, subsessile to shortly stalked, subsecund, ultimately laxly arranged on rhachis, green, brownish, yellowish or whitish-green; outer and inner segments fused 1/3 of the way, equal, linear, about 13 mm long, with about 5 central nerves, cucullate, the outer recurved from below the middle, the inner broader than the outer, slightly spreading. *Stamens* with anthers about 5 mm long, obtuse at the base. *Ovary* contracted into a stipe at the base, with about 14 biseriate ovules per cell; style about as long as the ovary, hollow, papillate ending in a 3-lobed stigma reaching halfway the anther cells. *Capsule* on a pedicel 1–2 cm long, sub-quadrate, broader than long, either small (9 by 12 mm) or large (15 by 20), trigonous, base stipitate; seed 5 mm in diam.

DISTRIBUTION.—Mozambique, the Federation, Angola, northern South West Africa, Bechuanaland.\* A hygrophyte. Sometimes appearing as a weed in cultivated lands and lawns where it propagates itself by runners.

MOZAMBIQUE.—Lourenço Marques, Sul do Save, near the sea, *Pedro* 3860 (LM.) Mozambique: Mocuba, Namagoa often in damp ground, *Faulkner* 259.

SOUTHERN RHODESIA.—Darwin: Umvukwes, Umsengedzi R. on sandy river bank, *Wild* 3969 (SRGH). Melsetter: Nyshama farm, *Crook* 458 (weed in cultivated lands, SRGH). Salisbury: Prince Edward Dam, in a vlei, *Wild* 3693 (SRGH). Bikita: Devuli Bridge 7 miles W. of Birchenough Bridge, *Obermeyer* 2494. Bulalima Mangwe: Embakwe, *Feiertag* (SRGH 45420).

NORTHERN RHODESIA.—Livingstone: Livingstone-Victoria Falls road, *Young* 1087. Mongu: between Mongu & Lealui, grassy flood plain, *Drummond & Cookson* 6266 (SRGH, PRE).

SOUTH WEST AFRICA.—Caprivi Strip: Katima Mulilo area, about 5 miles from Katima on road to Linyanti, occasional on sandy moist flats, *Killick & Leistner* 3091. Okavango Native Territory: 5 miles E. of Masari Exp. Farm on road to Nyangana, in low lying areas, black, sandy clay, *de Winter & Wiss* 4113. Grootfontein: Namutoni, *Breyer* in TRV 20686; Gautscha Pan, *Naegelsbach* 70 (M); Simkue, *Storj* 6204. Okahandja: Quickborn, along riverbank, *Bradfield* 142.

BECHUANALAND.—Ngamiland, Kwebe, *Lugard* 57 (K, GRA).

The cultivated plant which was figured and described must be regarded as the holotype but apparently it was not preserved. Specimens of the original Forbes collection are to be found at Cambridge and since Lindley's handwriting is on it, Mr. John Lewis suggests it should be made the paratype. Accordingly the sheet at the British Museum would be a paratype collection.

The plate shows a plant with much wider and flabby leaves, probably the result of hothouse conditions. But Lindley mentions in his description that the outer leaves

\* Baker mentions *Barter* 3441 from Nupe, Niger Territory in Flor. Trop. Afr. 7: 519 (1898). Not seen by me.

were linear. Baker in his description of it in the Flora of Tropical Africa 7: 519, stated that the capsule is sessile but this was incorrect for the specimens I have examined; the pedicel is very short during the flowering stage but lengthens after fertilization and is up to 2 cm long in fruit.

Schinz called his species *D. venenatum* because of a note by Rautanen which said that it was poisonous, for goats after eating it, started swelling and died. The colour of the flower was said to be white-yellow by Rautanen. Either the note does not belong to this specimen (the colour of the flower seems to indicate another plant) or the swelling was caused by something else. As far as we know, the bulbs are edible. It was experimentally fed to cattle in large quantities at the Central Research Station at Mazabuka, Northern Rhodesia in December 1931, but was found to be non-toxic (cf. note on sheet CBS 533 at PRE). It flowers during the summer months from November to April.

7. *D. crispum* Bak. in Journ. Linn. Soc. 11: 399 (1871); Fl. Cap. 6: 449 (1897). Type: Hopetown, near the Orange River between Puffadder Halt and Bare station, Burchell 2682 (K, holo!, PRE, photo).  
*D. setosum* Bak. in Journ. Linn. Soc. 11: 398 (1871). Fl. Cap. 6: 447 (1897). Type: Cape, Namaqualand, Modderfontein, Whitehead (TCD, holo!, PRE, photo.).  
*D. volutum* Bak. in Fl. Cap. 7: 448 (1897). Type: Cape, Namaqualand, Scully 214 (K, holo!, PRE, iso., photo.).  
*D. undulatifolium* Schinz in Viert. Nat. Ges. Zurich, 57: 534 (1912). Type: South West Africa, Ovamboland, Ondonga, Kestila 4 (Z, holo!, PRE, photo.).  
*D. tortile* Dyer in Fl. Pl. Afr. t. 956 (1944). Type: Cape, Vanrhynsdorp, Rood (PRE 27198, holo!).  
*D. crispociliatum* Suesseng. in Mitt. Bot. Staatssamm. München, 2: 51 (1950). Type: South West Africa, Karibib, sandy flats with *Aristida obtusa*, Dinter 6830 (M, holo!, PRE, iso.).  
*Uropetalum crispum* Burch. ex Gawl. in Bot. Reg. sub t. 156 (1816), nom. nud.

Plants up to 30 cm high, variable, usually hairy. *Bulb* ovoid with yellowish scales forming a neck (as it is usually situated some distance below the surface). *Leaves* about 4, usually in a rosette, variable, linear to linear-lanceolate, 6–20 cm long, 4–16 mm broad, glaucous, soft (under moist conditions), straight or spirally twisted; margin straight or much crisped, usually sparsely to densely ciliate with white, long flat, hairs; ventral surface glabrous, closely ribbed when dry, dorsal glabrous or bristly with a few to many long and short hairs on the ribs especially near the base. *Raceme* up to 30 cm long, laxly 6–14 flowered; scape terete, smooth or ridged with papillae on the ridges to densely and shortly pubescent (when the papillae lengthen into hairs); bracts small, lanceolate, acuminate, membranous, about 5 nerved, persistent, margin entire or ciliate; pedicels short, 2–5 mm, glabrous or densely and patently setose. *Flowers* brown to orange, 15–20 mm long; segments fused at the base into a bulbous tube for about one half of their length, outer slightly longer with a short caudate tip, narrower than inner, all cucullate (the inner segments not surrounded by outer). *Stamens* with the filaments fused to the tube, the free apical part short. *Ovary* turbinate, style smooth or papillate above, about as long as the ovary, with three stigmatic lobes which form a shaggy ridge at the apex, just reaching the base of the anthers. *Capsule* large (i.e. *Comins* 1183) globose, brown, 2 cm in diam. leathery or smaller in others; seeds (*Comins* 1183) 9 mm in diam. or smaller.

DISTRIBUTION.—Western Cape, South West Africa; in stony areas or on sandy flats. Rare.

CAPE.—Namaqualand: Richtersveld, Kalkfontein, Meyer (sub. Marloth 6430); Steinkopf, Meyer (sub. Marloth 6449); Eenriet, Herre 13 (BOL). Calvinia: near Hantams River, 30 miles N.W. of Calvinia, Lewis 2746 (NBG); 26 miles from Calvinia on Loeriesfontein road, Western mountain karoo, *Comins* 1183. Clanwilliam: Welbedacht,

*Lewis* 2554 (NBG). Vanrhynsdorp: Vredendal, *Smith* 4670 (NBG); Knersvlakte 11 miles N. of South River Bridge, *Salter* 5473 (BOL). Herbert: Douglas, *Marloth* 9473; near Hopetown, *Muskett* 30 (BOL). Britstown: *Pole Evans*.

SOUTH WEST AFRICA.—Bethlehem: Sandverhaar, *Pearson* 4439 (BOL); Halenberg, *Dinter* 6613 (B!). Keetmanshoop: Great Karasberg, Narüda Süd, *Pearson* 8297 (BOL). Gobabis: farm Nico, flooded limestone pan, *Merxmüller* 1156 (M). Rehoboth: Ababis, *Strey* 2623. Karibib: sandy *Aristida obtusa* flats, *Dinter* 6830. Ovamboland, Odonga, *Kestila* 4 (Z).

In the Flora Capensis Baker noted the variability of the leaf, probably caused by local climatic conditions. When cultivated it is long, straight and glabrous; under dry conditions it is small, spirally twisted and the margin is densely ciliate and undulate. Some specimens fall between these two extremes. *D. tortile* Dyer is a fairly good match of the type of *D. crispum* (the wild collection) but is more hairy. *D. setosum* is a good match of *D. volutum*; these have elongated leaves and few hairs. *D. crispiliatum* Suess. has very small and hairy leaves; it is near *D. undulatifolium*.

It flowers during the summer months in the summer rainfall area and during the winter months in the winter rainfall area. "Sweet smelling, strongly scented" (Marloth). According to Marloth it is poisonous.

8. *D. bakerianum* Bol. in Journ. Linn. Soc. 18: 394 (1881); Fl. Cap. 6: 450 (1897). Type: Cape, Murraysburg, *Bolus* 2059 (BOL, holo., PRE, photo.). *D. brevipes* Bak. in Kew Bull. 1901: 136 (1901). Type: Bechuanaland, Kwebe Hills, *Mrs. Lugard* s.n. (K, holo.). *D. rautanenii* Bak. in Bull. Herb. Boiss. ser. 2, 4: 1000 (1904). Type: South West Africa, Ovamboland, Omakunde, *Rautanen* 437 (Z, holo., PRE, photo.). *D. gonocarpum* Suesseng. in Mitt. Bot. Staatssamml. München, 2: 52 (1950). Type: South West Africa, Grootfontein, Rietfontein, Gesundbrunnen, *Rehm*, 22 Nov. 1939 (M, holo., PRE, photo.).

Plants glabrous, 25–40 cm high. *Bulb* ovoid, about 2.5 cm in diam. outer tunics thin. *Leaves* rosulate, usually 4 per flowering shoot, ovate-lanceolate, 15–30 cm long, vaginate and up to 3 cm broad below, upper half tapering into a long slender tip, dark green, shiny, soft; innermost leaf much narrower. *Raceme* 10–15-flowered, the flowers at first close together, not secund, ultimately lax, overtopping the leaves; scape terete, somewhat swollen; bracts small, lanceolate, acuminate, membranous, thin, persistent, shrivelling in a concertina-like way, or spirally from the tip downwards; pedicels very short, up to 3 mm in fruit. *Flowers* about 18 mm long, green to yellow-green, segments equal, fused for about 2/3 of the way (inner not surrounded by outer). *Filaments* fused to the tube, free and flattened at the tip, anthers protruding from the mouth of the tube, versatile with the locules diverging below. *Ovary* truncate with an apical swelling on each outer corner; style longer than the ovary, stigma 3-lobed, papillate. *Capsule* oblong, about 15 by 12 mm, knobbed; seeds oblong, 7 mm.

DISTRIBUTION.—Cape (Karoo, northern Cape), Bechuanaland, South West Africa, sandy areas.

CAPE.—Graaff-Reinet: near Graaff-Reinet, *Bolus* (GRA). Prieska: Prieska commonage, on soft sand, fairly common, *Bryant* J 187. Kimberley: Koedoesrand, Panheuwel, *Jacobs*.

BECHUANALAND.—*Pole Evans & Erens* 1226. Ghanzi, *de Winter* 7409.

SOUTH WEST AFRICA.—Keetmanshoop: Great Karasberg, Narüda Süd, *Pearson* 8319, 7979, 7980 (BOL). Mariental: Swartrand, 40 miles W., *Basson* 164. Windhoek: Auas Mts., farm Krumhoek, *Merxmüller* 795 (M); Neudam College, *van Vuuren* 1006; 26 miles S. of Windhoek on road to Rehoboth, *Gies & van Vuuren* 954. Omaruru: Otjihorongo, on the Ugab, S.W. Anigab, *Merxmüller* 1626 (M, PRE). Grootfontein:

Klein Namutoni, *Breyer* in TRV 20685; Tsumeb, *Naegelsbach* 44 (M). Gobabis: farm Uitsig, *Merxmüller* 1109 (M).

This species is easily distinguished by its knobbed capsule and wide dark green leaves. It flowers from November to February.

9. *D. glaucum* (*Ker-Gawler*) *Bak.* in Journ. Linn. Soc. 11: 401 (1871); Fl. Cap. 6: 450 (1897); Steyn, The Toxicology of Plants in South Africa, 503 (1934).

*Uropetalon glaucum* Burch. ex Ker-Gawler in Bot. Reg. 6: 156 (1816). Type: Cape Griqualand West between Asbestos Mts. and Wittewater, *Burchell* 2066 (K, holo.).

*Dipcadi longibracteatum* Schinz in Verh. Bot. Ver. Prov. Brand. 31: 218 (1890). Type: South West Africa, Ovamboland, between Uukuambi and Ondonga, *Schinz* (Z, holo., PRE, photo.). *D. magnum* *Bak.* in Fl. Trop. Afr. 7: 522 (1898), e descr. Type: Bechuanaland, Ngamiland, Kwebe, *Lugard* 88 (K, holo.). *D. gracilipes* Krause in Engl. Bot. Jahrb. 48: 357 (1912). Type: South West Africa, Bethanien, Sandverhaar, *Schaefer* 376 (B, holo., PRE, photo.).

*Urginea lorata* *Bak.* in Bull. Herb. Boiss. ser. 2, 3: 664 (1903). Type: South West Africa, Ovamboland, Ondonga, *Rautanen* (Z, holo., PRE, photo.).

Plants up to 120 cm tall. *Bulb* ovoid, flattened at the base, 3–6 cm in diam. *Leaves* 6–9 in a rosette, glaucous, shiny, sub-fleshy, narrow lanceolate, up to 35 cm long, 10 mm broad, attenuated and clasping at the base, apex acute or acuminate, closely but faintly ribbed, innermost leaves narrower than outer. *Raceme* with flowers arranged in a spiral (not secund), congested at first, lax afterwards with up to 40 flowers; scape terete, lengthening during anthesis; bracts linear, membranous, whitish, persistent, shrivelling at an early age; pedicels variable in length, at first short, thin and ascending, becoming patent and sturdy and up to 8 cm in length with the apex curved upwards in fruit. *Flowers* up to 2.5 cm long (excluding appendages of outer segments), fleshy, green with a brownish margin, segments fused about halfway, outer with caudate appendages varying in length from 4–8 mm, inner lingulate with a yellowish to orange margin along the slightly recurved tips. *Stamens* with the connective produced into a short papillate appendage above the locules which are rounded at the base. *Ovary* oblong, style about as long as the ovary with the stigmatic apex indistinctly 6-lobed. *Capsule* globose, 2 cm in diam. skin membranous; seeds 8 mm in diam.

DISTRIBUTION.—Northern Cape, Bechuanaland, northern South West Africa, Southern and Northern Rhodesia, Transvaal, Orange Free State.

CAPE.—Richmond: collector unknown. Prieska: *Bryant* J 347 (SRGH). Barkly West: Victoria Farm, *Marloth* 960. Kuruman: between Hopetown and Kuruman, *Strekdale* (BOL. 2030). Kimberley: 30 miles W. of Kimberley on Douglas road, *Lewis* 3610 (NBG). Gordonia: slopes of Saalskop between Groblershoop and Upington, *Hardy*.

ORANGE FREE STATE.—Fauersmith: Luckoff, *Henrici*; Fauersmith, *Smith* 5331. Harrismith: Harrismith, in damp places in catchment area, *Phillips* 3501.

TRANSSVAAL.—Soutpansberg: Zoutpan, *Galpin* 13785; *Obermeyer*, *Schweickerdt* & *Verdoorn* 291; 259. Pietersburg: Brakrivierlei, *Bremekamp* & *Schweickerdt* 54. Sibasa: Kruger National Park, Baiandbai, *Lang* in TRV 32151. Lydenburg: Sekukuni, Farm Middelin, *Barnard* 444; 207.

BECHUANALAND.—Mochudi, *Harbor* in TRV 17026; near Derdepoort, *Codd* 8865.

SOUTH WEST AFRICA.—Rehoboth: Gravenstein, sandstone slope, *Volk* 11563 (M). Windhoek: on road to Okahandja 6 miles N., *Merxmüller* 1003. Otjiwarongo: Okosongomingo, *Volk* 462 (M). Grootfontein: Tsumeb, *Naegelsbach* 71 (M).

Okavango Native Territory, Runtu near Okavango River, *de Winter* 4045. Kaokoveld: Etoshapan, farm Onguna, *Walter* 511 (M).

SOUTHERN RHODESIA.—Nyamandlovu: near Umfusa Bridge on Victoria Falls Road, *West* 2558 (SRGH). Victoria Falls, *Rogers* 13059 (BOL). Melsetter: Hotsprings near Odzi River, *Chase* 4323 (SRGH); Birchenough Bridge, Sabi River, *Obermeyer* 2495.

NORTHERN RHODESIA.—Mazabuka, Central Research Station 539.

*D. magnum* Bak. from Ngamiland agrees with *D. glaucum*. The few specimens seen from the Federation belong to a shade-loving form with shorter pedicels (about 2.5 cm in length) and somewhat smaller in stature. The Central Research Station, Mazabuka, Northern Rhodesia, found it to be non-toxic to stock (cf. note on sheet CRS 539, PRE).

*D. glaucum* seems to hybridize with *D. bakerianum* cf. p. 135. It flowers from November to May.

10. *D. viride* (L.) Moench, Meth. Suppl. 267 (1791); Bak. in Journ. Linn. Soc. 11: 401 (1871); Fl. Cap. 7: 449 (1897); Fl. Trop. Afr. 8: 523 (1898). *Hyacinthus viridis* L., Sp. Pl. ed. 2, 454 (1762). Jacquin, Ic. Rar. t. 66 (1798). Red., Lil. t. 203 (1808). Type: Cape, collector unknown (LINN, holo., PRE, photo.). *Dipcadi filamentosum* Medic. in Ust. Ann. 2, 13 (1791). *D. umbonatum* (Bak.) Bak. in Journ. Linn. Soc. 11: 400 (1871); Fl. Cap. 6: 448 (1897). *D. comosum* Welw. ex Bak. in Trans. Linn. Soc. ser. 2, Bot. 1: 247, t. 34, fig. 1-3 (1878); Engl., Hochgebirgsfl. Trop. Afr. 167 (1892); Bak. in Fl. Trop. Afr. 7: 521 (1898). Type: Angola, near Lopollo, on sandy hills in the subtemperate region, *Welwitsch* 3732 (BM, holo.). *D. lateritium* Welw. ex Bak. in Trans. Linn. Soc. ser. 2, Bot. 1: 247 (1878); Fl. Trop. Afr. 7: 521 (1898). Syntypes: Angola, Huilla, *Welwitsch* 3716 (BM, holo., B, iso.), PRE, photo.) 3717. *D. elatum* Bak. in Fl. Cap. 6: 449 (1897). Type: Cape, Mount Currie, Clydesdale, *Tyson* 2107 (K, holo., NBG, BOL, iso.). *D. lividescens* Engl. & Gilg in Warb., Kunene-Sambesi Exp. 194 (1903), ex descr. Type: Angola, left Kubango bank near Kuimaroa, *Baum* 459 (B, holo.?). *D. palustre* Bak. in Bull. Herb. Boiss. ser. 2, 4: 1000 (1904). Type: Transvaal, Germiston district, Modderfontein, *Conrath* 675 (K, holo., GZU, iso.), PRE, photo.). *D. conrathii* Bak. in Bull. Herb. Boiss. ser. 2, 4: 1000 (1904). Type: Transvaal, Germiston district, Modderfontein, *Conrath* 677 (K, holo., GZU, iso.), PRE, photo.). *D. longicauda* Engl. & Krause in Engl. Bot. Jahrb. 45: 150 (1910). Type: South West Africa, Okahandja, hard sandy ground, *Dinter* 425 (B, holo.), PRE, photo.). *D. helenae* Beauv. in Bull. Soc. Bot. Genève, ser. 2, 5: 326 (1914). Type: Cape, Matatiele, Mafubé, *Helene Jacottet* (G, holo.), PRE, photo.). *D. stenophyllum* Dinter in Fedde Rep. 19: 185 (1924). Type: South West Africa, Windhoek, Auas Mts., Lichtenstein, *Dinter* 4371 (M, holo.), PRE, photo.). *D. cinnabarinum* Suesseng. in Mitt. Bot. Staatssamm. München, 2: 50 (1950). Type: South West Africa, Grootfontein, Waldorf-Süd, *Rehm* 6789 (M, holo.), PRE, photo.). *D. sulcatum* Suesseng. in Bot. Staatssamm. München 2: 53 (1950). Type: South West Africa, Grootfontein district, Rietfontein on exposed limestone, *Rehm* (M, holo.), PRE, photo.). *D. geniculatum* Dinter & Suesseng. in Mitt. Bot. Staatssamm. 1: 51 (1950). Type: South West Africa, Karibib, *Dinter* 6789 (M, holo.), PRE, iso.). *Lachenalia viridis* (L.) Thunb., Prod. 64 (1794). Ait., Hort. Kew. 1: 462 (1789); ed. 2, ii, 285 (1811). Willd., Sp. Plant. 2: 174 (1799). *Zuccagnia viridis* (L.) Thunb., Nov. Gen. Plant. 9: 127 (1798); in Roem. Archiv. 2: 2 (1799); Fl. Cap. ed. Schult. 328 (1823). *Phormium viride* (L.) Thunb., Nov. Gen. Plant. 9: 127 (1798), in syn. nom. nud.

*Uropetalum viride* (L.) Gawl. in Bot. Reg. sub t. 156 (1816); Roem. & Schult., Syst. Veg. 7: 620 (1829); Kunth, Enum. 4: 379 (1843). *U. umbonatum* Bak. in Saund. Ref. Bot. t. 17 (1868). Type: Natal, *Hutton* (K, holo.).

Glabrous plants 15–120 cm high. *Bulb* firm (when dormant) or loose and scaly (during growth period), occasionally bulbiferous or with runners. *Leaves* 1–4 per shoot (occasionally hysteranthous) variable in size, linear to linear-lanceolate, 6–60 cm long, 3–20 mm broad, usually clasping at the base, attenuated in upper half to an acuminate point, shiny, flaccid, somewhat succulent in well developed specimens, indistinctly veined. *Raceme* central, as long as or longer than the leaves, 15–120 cm long, few to many flowered; flowers close together at first, lax and subsecund when mature; sometimes the uppermost sterile, the perianth then remaining small but the filiform, often red appendages of the outer segments developing fully; together with the filiform bracts they give the raceme of the tall forms its characteristic plumose appearance (*D. comosum* form); scape terete, smooth, shiny, sometimes arcuate at the base; bracts lanceolate, acute or acuminate, apex often long acuminate to filiform, 4–30 mm long, early deciduous or absent; pedicels 8–18 mm in fruit. *Flowers* with unequal perianth-segments about 12 mm long (excluding appendages) fused 1/3 of the way; outer green with a cream or orange or reddish or brown tinge, usually recurved from the middle, linear-lanceolate, with a short to long, filiform appendage, 2–30 mm long; inner forming a connivent tube, lanceolate, acute, with the tips curved outwards. *Stamens* typical. *Ovary* turbinate, sometimes slightly umbonate near the apex of the valves; about 25 ovules per cell, style about as long as the ovary, sparsely papillate, stigma shortly 3-lobed, papillate. *Capsule* oblong in outline, 14 mm long, 9 mm broad, trigonous; seeds 5 mm.

DISTRIBUTION.—Found all over southern Africa, except for the south western Cape districts.

CAPE.—Ladismith: Huis River Pass, *Lewis* 753 (NBG). Calitzdorp: top of Rooiberg Pass, rocky false Fynbos, locally frequent, *Acocks* 20364. Victoria West: *Compton* 21656 (NBG). Port Elizabeth: *West* (BOL 26953). Kentani: valleys, *Pegler* 1381 (GRA, BOL). Warrenton: *Adams* (KMG 1122). Mafeking: Moshesh near Mosita, among rocks on dam wall, common, eaten, *Brueckner* 636, 536 (KMG). Kimberley: Rooipoort, 33 miles W. of Kimberley, near homestead, reddish sandy loam on lime, occasional, *Leistner* 1205 (KMG).

NATAL.—Utrecht: 6 miles S.E. of P.O. Groenvlei, *Codd & Dyer* 6274. Umvoti: Greytown, town commonage, railway bank, *Galpin* 14753. Mooi River: Mooi River, *Wood* 5623 (NBG).

ORANGE FREE STATE.—Bethulie: Orange River, *Flanagan* 1643 (NBG). Bloemfontein: near Rhenoster Spruit, *Potts* (UCOFS 2869). Fauresmith: *Verdoorn* sub *Henrici* 2322.

TRANSVAAL.—Belfast: *Leendertz* in TRV 9169. Pretoria: 4 miles N.E. of Hammanskraal, moist sandy soil beside stream, *Codd* 4781. Waterberg: 18 miles W. of Villa Nora, sandveld, *Codd* 6587. Carolina: *Bolus* 12399 (BOL).

SWAZILAND.—Mbabane: Dense mountain grassveld 11 miles N.W. of Mbabane, *Codd* 4756; 4757. Forbes Reef Road, swamp, *Compton* 27159.

MOZAMBIQUE.—Lebombo Marsh, *Junod* 398. Inhaca Island, *Moss* (J 27417).

SOUTHERN RHODESIA.—Umtali: S.E. portion of Rangehill, *Chase* 5419 (SRGH).

NORTHERN RHODESIA.—Mankoya: 50 miles E. of Mankoya on road to Kafue Hoek, *Drummond & Cookson* 6720 (SRGH, PRE). Mazabuka, Central Research Station, *Vet. Officer* (CRS 522).



SOUTH WEST AFRICA.—Grootfontein: near Grootfontein, *Schoenfelder* 133. Windhoek: Auas Mts. at Auas Pass, *Merxmüller* 796 (M).

The species appears variable and adaptable. We get the depauperate forms *D. lateritium*, *D. cinnabarinum*, *D. stenophyllum*, etc.; the optimal form, *D. comosum*, possibly a polyploid; the Kalahari form with its deep seated bulb and arcuate scape, *D. geniculatum*, etc. The type in the Linnaean Herbarium consists of part of a raceme, lax and few-flowered with long-tailed outer perianth-segments. The old specimens found in the Munich herbarium and that pictured by Jacquin are similar to it. It thus shows the typical form (cultivated in Europe) to be medium sized. In the optimal forms the plants produce racemes every few months during the summer; they are up to 4 ft tall and often have a comose appearance because of the sterile, long-tailed upper flowers and long filiform bracts. All gradations are found from this tall form to the small depauperate form which is only about 10 inches high and few flowered, the flowers often with short "tails" and the plants flowering only once in spring and then becoming dormant; the latter have comparatively large bulbs in relation to the scanty parts above ground.

These forms are not confined to geographical areas and the plants are found on different kinds of soil, on sand near the sea, heavy clay, on sour grassveld, etc. The red colour sometimes present in the flowers (i.e. *D. lateritium*, *D. cinnabarinum*) may be due to a chemical in the soil.

The "tails" lengthen to 3 cm in some cases or remain small (2 mm) in others. They vary in length even on the same raceme. Hallier, with Arber concurring [cf *Monocotyledons* by Arber, p. 114 (1925)] put forward the theory that the petal represents the leaf-sheath and the tip the vestigial petiole. This theory appears to fit the segments of *Dipcadi* very well, for the segment is concave but the appendage terete. Within limits the vestigial petiole may vary in length.

The plants flower either once in early spring or intermittently during the summer months. Sometimes a faint scent is emitted at night.

11. *D. rigidifolium* *Bak.* in Journ. Linn. Soc. 11: 399 (1871); Fl. Cap. 6: 448 (1897). Type: Transvaal, Pretoria dist., Apies River, *Burke* (K, holo., PRE, photo.). *D. rhodesiacum* *Weim.* in Bot. Notiser 1937: 439, fig. 6. Type: Southern Rhodesia, Makoni near Maidstone, *Norlindh & Weimarck* 4078 (LD, holo.).

Plants 20–50 cm high (60–80 cm fide *Weimarck*). *Bulbs* globose, 2–5 cm in diam. outer tunics thin, light coloured. *Leaves* 2–3 per flowering shoot (often 2–3 shoots per bulb), linear-lanceolate, up to 30 cm long and 25 mm broad, glabrous, coriaceous, glaucous, closely ribbed, margin prominent, yellow, apex acute, apiculate, base clasping. *Raceme* up to 50 cm long, secund, lax, 8–20 flowered; scape arcuate at the base; bracts narrow-ovate, acuminate, persistent, occasionally the lower sterile; pedicels short, up to 1 cm in fruit. *Flowers* about 15 mm long (excluding appendages) green; segments fused about half way, outer spreading, or recurved in upper half with the caudate appendages 5–14 mm long; inner segments obtuse, cucullate. *Stamens* with the anthers acute or minutely mucronate. *Ovary* oblong, gradually narrowed into the style; style about as long as the ovary, stigmas 3, lingulate. *Capsule* broadly oblong, 18 mm, trigonous; no ripe seed seen.

DISTRIBUTION.—Transvaal, northern Cape, Southern Rhodesia; rare.

TRANSVAAL.—Pretoria: 1 mile N. of Hammanskraal, *Codd* 5620, 5621, *Mauve* 4048; Rooikop, *Smuts* 382. Waterberg: Nylstroom, *van Dam* (TRV20949). Rustenburg: Zwarttruggens, *Sutton* 792. Bronkhorstspuit: *Marais* 6. Witbank: Witbank, *Rogers* 24300.

CAPE.—Hay: pale sandveld to the W. of Padkloof, *Acocks* 2206. Mafeking: *Graham Green* (GRA).

SOUTHERN RHODESIA.—Salisbury, *Eyles* 1884 (SRGH; NBG); Ruwa River, *Wild* 2261 (SRGH).

It flowers during the summer months, November to April.

12. *D. vaginatum* *Bak.* in *Fl. Trop. Afr.* 6: 523 (1898). Type: Bechuanaland, Ngamiland, Kwebe, *Lugard* 47 (K, holo.).

*D. baumii* *Engl. & Gilg* in *Warb., Kun. Sam. Exp.* 194 (1903), ex descr. Type: Angola, left bank of the Kubango below Kabindere, *Baum* 349 (B, holo.?).

Plants 10–40 cm high. *Bulb* ovoid, about 2.5 cm in diam. *Leaf* 1, clasping the scape at the base, forming a long, flexuose, subterranean sheath, lamina spreading above, folded, linear, 12–20 cm long, 3–10 mm broad, smooth, glabrous. *Raceme* laxly 3–10-flowered, secund; scape terete, ribbed, shortly and minutely pubescent with patent papillae or bristles; bracts small, membranous, persistent; pedicels up to 2 cm in fruit (fide Baker), with a pubescence similar to that of the scape. *Flowers* green, about 12 mm long (excluding appendages); segments fused 1/3 of the way; outer spreading with filiform appendages 8–20 mm long; inner lanceolate with a cucullate apex. *Anthers* 5 mm long, filaments fused to the tube except for the tips. *Ovary* turbinate, style somewhat shorter than the ovary, ending in 3 rounded papillate stigmatic lobes. *Capsule* not seen; seed not seen.

DISTRIBUTION.—Northern Cape, South West Africa, Bechuanaland, apparently rare.

BECHUANALAND.—Ngamiland, Kwebe, *Lugard* 47 (K, holo.).

CAPE.—Kimberley, 4 miles S. of Kimberley, red loamy sand at foot of dolerite koppie, rare, *Leistner* 1202 (KMG).

SOUTH WEST AFRICA.—Okahandja: Quickborn, *Bradfield* 311, 99c.

A specimen, *Quarré* 4343 from Elizabethville, Belgian Congo, seems to be near this species but it has a glabrous scape. *D. thollonianum* *Hua* is probably related to this species but bigger.

It flowers in November–December.

13. *D. platyphyllum* *Bak.* in *Fl. Trop. Afr.* 7: 518 (1898). Type: Bechuanaland, Ngamiland, Kwebe, *Lugard* 44 (K, holo.).

*D. ciliatum* *Engl. & Krause*, in *Engl. Bot. Jahrb.* 45: 147 (1910). Type: South West Africa: Brackwater, amongst small stones, *Dinter* s.n. (B, holo., PRE, photo.).

Plants 7–20 cm high. *Bulb* round, about 2–5 cm in diam. covered with leathery, thin, light brown tunics. *Leaf* 1 (occasionally 2 if a second shoot is produced), clasping the scape at the base, forming a long, flexuose, subterranean sheath; lamina lying flat on the ground, ovate-lanceolate to linear-lanceolate, 5–15 cm long, 1–3 cm broad, upper surface glabrous except for the crisped, ciliate margin, lower surface with short bristles on the ribs, base obtuse, clasping, apex acute. *Raceme* up to 20 cm high, secund, 4–20 flowered, the flowers close together; scape terete, densely pubescent with short, patent bristles or papillae; bracts small, ovate, acuminate, membranous; pedicels up to 1 cm in length, with the same pubescence as the scape. *Flowers* green to brownish-green, to yellowish-green, about 14 mm long (excluding appendages), segments fused nearly half way, outer with a very short caudate appendage about 3 mm long; inner linguulate, cucullate. *Anthers* 4 mm, filaments fused to the tube except for the tips, pollen ellipsoid, large. *Ovary* turbinate with about 20 biseriate ovules, style somewhat

shorter than the ovary, ending in 3 papillate, short, stigmatic branches. *Capsules* rounded in outline, trigonous, circ. 15 mm in diam., thin-walled; seeds 5 mm in diam.

DISTRIBUTION.—Northern Cape, Bechuanaland, South West Africa, Transvaal and the Federation.

CAPE.—Kuruman: Batlharos, *Silk* 266 (KMG). Gordonia: 25 miles S.E. of Moenieput, compact calcareous clay in a depression between red sand dunes, *Leistner* 1916 (KMG).

BECHUANALAND.—Ngamiland, Kwebe, *Lugard* 44 (K, holo.).

SOUTH WEST AFRICA.—Rehoboth: between Gamis and Bulls-mouth Pass on shale plains about the headstreams of the Great Fish River, *Pearson* 8943 (BOL). Windhoek: sandy flats 26 miles S. of Windhoek on Rehoboth road, *Giess & van Vuuren* 952. Omaruru: Namib, Brandberg, Oritsaub, vlei-like sandflats, *Merxmüller* 1686 (M). Karibib: sandy flats, Karibib, *Dinter* 6788 (M). Gobabis: Sandfontein, *Wilman* (BOL 15232). Grootfontein: Rietfontein on loamy soil, *Volk* 2572 (M), *Rehm* (M, fruiting). Okavango: farm Eckenberg, Okumuamakamp, *Walter* 222 (M).

TRANSVAAL.—Soutpansberg: Messina, *Moss & Rogers* 206 (BOL).

SOUTHERN RHODESIA.—Victoria Falls, *Rogers* 5424 (BOL); in shade of mopani, *Wild* 3133 (SRGH). Urungwe, Sanyati-Chiroti Junction, in *Brachystegia boehmii* woodland, *Wild* 4240 (SRGH).

NORTHERN RHODESIA.—Mapanza, Choma, open mopani bush, *Robinson* 2510 (M, SRGH).

NYASALAND.—Zomba, *Jackson* 2092 (SRGH).

The species is closely related to *D. vaginatum* which has been found growing next to it on several occasions. Whether *D. vaginatum* is perhaps a mutant is an open question.

*D. platyphyllum*, called "horinkies" by farmers around Kimberley, may become very common in overgrazed areas, according to Mr. O. A. Leistner.

It flowers November-January.

#### Uncertain Species

*D. dinteri* Bak. in Bull. Herb. Boiss. ser. 2, 1: 788 (1901). Type: South West Africa, Great Namaqualand, Awichab, *Dinter* 1: 1038 (Z, holo., PRE, photo.). The material is too poor for a definite conclusion. It may be a synonym of *D. crispum* Bak. The long white hairs are absent, however. Baker describes the plant as 2-leaved but there are about 4 on the type specimen.

*Suspected Hybrids of D. glaucum* Bak. X *D. bakerianum* Bol.

*D. clarkeanum* Schinz in Verh. Bot. Ver. Brand. 31: 218 (1890). Type: South West Africa, Luderitz Bay, Angra Pequena, near the coast, *Schinz* (Z, holo., PRE, photo.). *D. juttae* Engl. & Krause in Bot. Jahrb. 45: 150 (1910). Type: South West Africa, Okahandja, riverine forest, *Dinter* 376 (B, holo., PRE, photo.).

*D. bakerianum* is a very characteristic species that can be easily recognized by its knobbed ovary and capsule, the rosette of long tapered leaves, the swollen scape, persistent bracts, short pedicels, equal perianth-segments, etc. *D. glaucum* has a set of different but also characteristic features, for example, its large size, wide, glaucous leaves, long pedicels, longer outer perianth-segments and appendaged anthers. A number of specimens showed intermediate forms combining characters of each and I therefore suspect them to be hybrids between these two species. Some of these were described as new species, i.e. *D. clarkeanum* Schinz and *D. juttae* Engl. & Krause;

others were placed in either one or the other species. Dominant characters appear to be the development of caudate appendages on the outer perianth-segments and the connective being produced above the locules.

The knobs were absent from ovary and capsule; this seems to be a recessive character. The size of the plants, leaf-shape and length of pedicel were intermediate between those of *D. glaucum* and *D. bakerianum*.

#### EXCLUDED SPECIES

*D. ausense* Dinter in Fedde, Rep. 19: 186 (1924). Type: South West Africa, Luderitz' Aus, on quartzite flats, about 2 Km. N. of the railwayline, rare, *Dinter* 4344. Cult. at Lichtenstein, Jan. 1923. (B, holo.?).

*D. avasimontanum* Dinter in Fedde, Rep. 19: 186 (1924). Type: South West Africa, Windhoek, Auas Mts., farm Lichtenstein, *Dinter* 4345 (B, holo.?).

The type specimens of both the above mentioned are sterile. They were placed by Soelch in his thesis on the Liliiflorae of South West Africa, 1961 (München), under **ALBUCA NAMAQUENSIS** *Bak.* In Fedde, Rep. Beih. 53: 74 (1928), Dinter himself already transferred them to *Albuca*.

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<i>geniculatum</i> <i>Dinter &amp; Suesseng.</i>	131, 133	<i>Lachenalia viridis</i> ( <i>L.</i> ) <i>Thunb.</i>	131
<i>glaucum</i> ( <i>Ker-Gawl.</i> ) <i>Bak.</i>	118, 119, 120, 130, 131, 135, 136	<i>Ornithogalum dipcadioides</i> <i>Bak.</i>	124
<i>gonocarpum</i> <i>Suesseng.</i>	129	<i>Periboea? brevifolia</i> ( <i>Thunb.</i> ) <i>Kunth</i>	121
<i>gracilipes</i> <i>Krause</i>	130	<i>Phormium viride</i> ( <i>L.</i> ) <i>Thunb.</i>	131
<i>gracillimum</i> <i>Bak.</i>	117, 118, 120, 124	<i>Polemannia</i> <i>Berg. ex Schltnl</i>	119
<i>helenae</i> <i>Beauv.</i>	131	<i>hyacinthiflora</i> <i>Berg. ex Schltnl</i>	121
<i>heterocuspe</i> <i>Bak.</i>	117	<i>Polemannia</i> <i>Eckl.</i>	118, 119
<i>hyacinthiflora</i> ( <i>Berg. ex Schltnl</i> ) <i>Hutch.</i>	121	<i>Scilla brevifolia</i> ( <i>Thunb.</i> ) <i>Roem &amp; Schult.</i>	121
<i>hyacinthoides</i> ( <i>Spreng.</i> ) <i>Bak.</i>	121	<i>Urginea lorata</i> <i>Bak.</i>	130
<i>involutum</i> <i>Suesseng.</i>	124	<i>Uropetalon</i> <i>Burch. ex Ker</i>	118
<i>juttae</i> <i>Engl. &amp; Krause</i>	135	<i>Uropetalum</i> <i>Burch. ex Ker</i>	122
<i>lateritium</i> <i>Welw. ex Bak.</i>	131, 133	<i>ciliare</i> <i>Eckl. &amp; Zeyh.</i>	122
<i>lividescens</i> <i>Engl. &amp; Gilg</i>	131	<i>crispum</i> <i>Burch.</i>	128
<i>longibracteatum</i> <i>Schinz</i>	130	<i>glaucum</i> <i>Burch. ex Ker-Gawler</i>	130
<i>longicauda</i> <i>Engl. &amp; Krause</i>	131	<i>hyacinthoides</i> <i>Spreng.</i>	121
<i>longifolium</i> ( <i>Lindl.</i> ) <i>Bak.</i>	117, 118, 119, 120, 126	<i>longifolium</i> <i>Lindl.</i>	126
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<i>marlothii</i> <i>Engl.</i>	117, 118, 119, 120, 121, 123, 125	<i>viride</i> ( <i>L.</i> ) <i>Gawl.</i>	132
<i>megalanthum</i> <i>Zahlbr.</i>	122, 123	<i>Tricharis</i> <i>Salisb.</i>	119
<i>oligotrichum</i> <i>Bak.</i>	125	<i>Zuccagnia</i> ( <i>Thunb.</i> )	118
<i>palustre</i> <i>Bak.</i>	131	<i>viridis</i> ( <i>L.</i> ) <i>Thunb.</i>	131
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