NOTES ON SOME PLANTS FROM SOUTHERN AFRICA CHIEFLY FROM NATAL: VII*

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ABSTRACT. This part is concerned wholly with Amaryllidaceae-Hypoxideae. *Rhodohypoxis* is revised, with the recognition of six species; *R. baurii*, the most widespread, has three varieties; *R. incompta* is a new species allied to *R. rubella* and like it has an underground ovary. Natural hybrids between species and varieties of *Rhodohypoxis* are not infrequent and more rarely hybrids with *Hypoxis parvula* are found; an account is given of some of the mixed populations. *Saniella* is a new genus allied to *Rhodohypoxis*; it has an open crocus-like flower, white with yellow throat, and a subterranean ovary; it is known from Lesotho, near Sani, and from the mountains of the E Cape, Barkly East Div.; *S. verna* is the only species. The genera of Hypoxideae are briefly discussed: eight are tentatively accepted and a key is provided.

233–244. Rhodohypoxis Nel in Bot. Jahrb. 51:239, 257, 300 (1914); Phillips, Gen. S. Afr. Fl. Pl. 165 (1926), ed. 2, 206 (1951); Pax & Hoffm. in Engl. & Prantl, Natürl. Pflanzenfam. 2 Aufl. 15a:426 (1930); Lemée, Dict. 5:807 (1934); Grey, Hardy Bulbs 2:98 (1938); Roy. Hort. Soc. Dict. Gard. 4:1786 (1951); Geerinck in Bull. Jard. Bot. Nat. Belg. 39:82 (1969); Hilliard & Burtt in Notes R.B.G. Edinb. 32:309 (1973) et 34:73 (1975); Dyer, Genera S. African Fl. Pl. 2:956 (1976); Killick in Veld & Flora 62:16–17 (1976).

Syn.: [*Hypoxis* auctt. p.p.; Baker in Fl. Cap. 6:179 (1896); Hutchinson, Fam. Fl. Pl. 2:166 (1934), ed. 2, 2:678 (1959); Melchior in Engler, Syllabus, 12 Aufl. 2:531 (1964)—non Linn. sens. strict.]

Type species: *R. baurii* (Baker) Nel

GENERIC DESCRIPTION: Herbs with short swollen vertical subterranean mucilaginous axis, with fleshy contractile roots as well as other thin ones; subterranean pseudostem up to 5 cm long (according to depth in soil) composed of colourless, membranous, tubular, sheathing leaf-bases; lateral stolons (if present) break through the outer leaf-sheaths. *Indumentum* on leaves, pedicels, ovary and backs of outer tepals of tufted hairs with branches (sometimes only two) of unequal length; hairs sometimes few or wanting. *Leaves* all basal, spreading on soil surface or erect, elliptic to filiform. *Peduncles* solitary in leaf-axils, simple or once-branched, more or less dorso-ventrally compressed at base, very short and included in leaf-sheath or up to 10 cm long; bracts, if peduncle branched, linear. *Flowers* white, pink or red. *Perigone tube* shorter than the segments, cupular. *Perigone segments* 6, three inner slightly narrower than the outer and clawed at the base with distinct inflexed knees closing the mouth of the tube, inner and outer segments spreading in upper part. *Stamens* 6, arising from the perigone tube at two levels, upper three opposite the outer segments, lower 3 opposite the inner and slightly smaller than the upper; filaments very short, attached to anther low down on the back and continued upwards as thick swelling; anther

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* Continued from *Notes R.B.G. Edinb.* 35:177 (1977).

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thecae with acute, usually free tips, dehiscing introrsely. *Ovary* trilocular, with or without a beak; ovules axile. *Style* very short. *Stigma* of three fleshy papillose flanges. *Capsule* circumscissile if borne on erect peduncle; 3 valves curving back after fall of perigone when peduncle deflexed; thin-walled and rupturing irregularly when remaining underground or at soil surface. *Seeds* ellipsoid or spherical; testa black, mamillate or echinulate; micropyle prominent; part of funicle persistent, black; endosperm white, soft; embryo small.

Rhodohypoxis is a small genus of some 6 species, but it is of wide potential interest. A number of putative hybrids are known (nos 239–244 below), and some artificial ones have been made. These suggest that there are few genetic barriers between the species. Thus the differences between the aerial circumscissile capsule of *R. baurii* or *R. milloides* and the subterranean indehiscent fruit of *R. rubella* or *R. incompta* may be open to direct genetical study, or at least indirect study via such species as *R. thodiana*. The rapid ripening of the seed and the small size of the plants make this a feasible undertaking. Similarly the relationship between *Rhodohypoxis* and *Hypoxis* could be studied through the hybridization of *R. baurii* or *R. milloides* with *H. parvula*, which sometimes takes place naturally (nos 245–248 below).

Phytogeographically *Rhodohypoxis* is an important component of a group of "Drakensberg" genera whose better understanding will help us to assess the botanical significance of the uplift of the Natal monocline which gave rise to this splendid escarpment range (see p. 52).

Finally, the genus is of considerable horticultural potential and the investigating geneticist may well find himself with some attractive garden plants on his hands, especially amongst the intergeneric hybrids.

The following revision attempts to lay down a taxonomic basis for such further studies and to summarise what is known about the genus at present. This last season's work (Nov.–Dec. 1976) produced much new information, including the first collections of the hybrids *Hypoxis parvula* x *Rhodohypoxis baurii* var. *platypetala* and *H. parvula* x *R. milloides*. There is a clear need for more field work.

Populations of *Rhodohypoxis* are variable, and isolated hybrid plants, hybrid populations and introgressed populations all occur. Vegetative propagation means that a variant may occur not as a single plant but as a sizable patch—this can be particularly striking where flower colour is concerned. Thus isolated plants may often be difficult to determine. It is important to ensure that the general characters of a population are used in working the key and it is important to know if other species of *Rhodohypoxis* were present in the neighbourhood.

Most of the specimens seen have been enumerated. The lists of localities are not intended as a guide to places where the species may be found, but rather as an indication of places where work has already been done, and as an incentive to the interested botanist to hunt elsewhere.

THE CHARACTERS AND DIVERSITY OF RHODOHYPOXIS. The genus was established in 1914 by G. Nel (then a student under Engler and Gilg in Berlin, subsequently Professor of Botany at Stellenbosch): he distinguished it from

Hypoxis by its pink or white flowers, by the presence of a short perigone tube, and by the subsessile included anthers borne at two levels in the tube; he described the anthers as having a dorsal gland. Apart from the interpretation of this gland (see below) these characters are perfectly sound. Nel, working from herbarium material alone, could not see the most conspicuous feature of his new genus; this is the sharply inbent knee on the claw of the inner perigone segments which virtually closes the mouth of the flower and gives it a characteristically blind look.

Nel recognised two species of *Rhodohypoxis*, *R. baurii* (with two varieties) and *R. rubella* (with one variety), but noted that the latter had an ovary with a distinct beak, like that of *Curculigo* or *Empodium* (*Forbesia* Nel), and might have to be segregated as another genus. Milne-Redhead, when writing on *R. baurii* (*Bot. Mag.* t. 9412. 1935), reiterated this point and actually restricted the genus to *R. baurii*, though he did not place *R. rubella* elsewhere. *R. rubella* was then known only from two herbarium specimens: had Milne-Redhead seen the living plant with the characteristic floral form of *Rhodohypoxis*, he would have had no doubt that it belongs to the same genus as *R. baurii*. Furthermore *R. thodiana*, with a short beak on the aerial ovary, serves to link *R. rubella* and *R. baurii*.

The presence or absence of an ovary beak is correlated with differences in fruit biology. In *R. baurii* and *R. milloides* there is no beak, the flowers are held erect on their pedicels and the capsules ripen in this position. They have a circumscissile dehiscence, the withered perigone and top of the ovary fall off neatly as a cap, and the seeds are dispersed from the lower half as from a censer when wind or a passing animal move the pedicel. In *R. rubella* and *R. incompta* it is the long beak of the ovary, not the pedicel, that lifts the perigone above ground, the ovary being protected within the leaf sheath underground or at the soil surface. The fruit then ripens with only enough elongation of the pedicel to bring it clear of the leaf-sheath. Here the dispersal mechanism found in *R. baurii* could not function. Instead we find a thin-walled fruit that simply disintegrates to release the seeds, a pattern similar to that of *Apodolirion buchananii* Bak. (see *Notes R.B.G. Edinb.* 32:304–307) and *Saniella* (see below No. 246), both of which also have underground ovaries.

A third, somewhat intermediate, fruit type is found in *R. deflexa*. In this species there is no ovary beak and the short pedicel is held erect at flowering time: it then bends down towards the soil as the fruit ripens. The capsule is circumscissile at the top as in *R. baurii* and *R. milloides*, but the fruit-wall is somewhat thinner than in those species and splits downward into 3 valves that curl back to release the seeds. This is clearly an essential adjunct to the primary circumscissile dehiscence when the ejection of the seeds by a censer-mechanism is lost.

A capsule like that of *R. deflexa*, is found in *Hypoxis asiatica* Lour., and in some American members of the genus, such as *H. decumbens* L., but among the numerous African species the erect circumscissile capsule seems to be the rule. The deflexed capsule is also characteristic of the tiny Cape genus *Pauridia* Harv.

The seed-coat of *Rhodohypoxis* is always black and brittle, but two kinds of surface are found. In *R. baurii*, *R. milloides* and *R. deflexa* the surface is merely mamillate: in *R. rubella* and *R. thodiana* and *R. incompta* it is echinulate. The three species with echinulate seeds are the same three that have an ovary beak. Another correlation is that in the mamillate seeds the micropyle is very close to the funicle (0·3 mm or less apart), and the seeds are slightly angled by pressure; in the echinulate seeds there is about 0·5 mm between micropyle and funicle.

The characters of the stamens also need particular attention (fig. 4, p. 73). Nel described the swelling on the back of the anther as a gland, but we see no sign of a secretory function: it is simply a swelling of the connective just above the attachment of the filament. Furthermore the filament is attached low down but clearly at the back of the anther, which is thus low-dorsifixed, not basifixed as Nel classifies it in his key; and certainly not basifixed in the same way that the anthers of *Hypoxis* are basifixed. Anther dehiscence in *Rhodohypoxis* is clearly introrse, as one would expect where the stamens arise from the perigone tube and are included within it: in *Hypoxis* the anthers are latrorse. Staminal characters in relation to generic concepts are discussed more fully below.

Turning to vegetative characters, we describe the rootstock as a swollen vertical axis: there is a continuous growing point at the apex and each year's leaves are produced in a series continuous with those of the previous year: there is no elongation of internodes, and annual periods of growth and rest are not associated with replacement of the storage organ. Although smaller, and less woody, the morphological structure is similar to that illustrated by Arber (*Monocotyledons*: 20, 1925) for *Hypoxis setosa* L.; however, a few species of *Hypoxis* have true corms.

Vegetative propagation is effected by underground stolons, which bear reduced colourless leaves. It seems that the axis of the stolon is relatively short-lived and decays soon after the apical part sends up aerial leaves and becomes established as a separate plant. Details of this process have not been studied. Production of stolons is especially vigorous in *R. milloides*: it has not been observed in *R. rubella* and *R. incompta*.

The leaves range from broad and flat in *R. baurii* var. *platypetala* to filiform-triangular in *R. incompta* and *R. rubella*. Anatomical study has been restricted to transverse sections, seeking simple characters of taxonomic value. Usually the cells of the upper epidermis are larger than those of the lower, and the ones lying above the midrib (in the V of the leaf) are deeper than the rest; these are the bulliform cells that are rather widespread in monocotyledonous leaves (cf. Metcalfe, *Anat. Monocot.* 5, Cyper.: 22). In *R. baurii*, *R. milloides* and *R. thodiana* (fig. 1 B, D, E) the upper epidermis abuts on to the chlorenchyma; in *R. deflexa*, however, there may be a few large colourless parenchymatous cells underlying the epidermis above the midrib (fig. 1C). This feature seems to be inconstant in *R. deflexa*, but it is a regular feature and more strongly developed in *R. incompta* and *R. rubella*: in these the area of chlorenchyma is V-shaped, but the V is entirely filled by rounded colourless parenchyma, so that the whole leaf is triangular in section (fig. 1A).

The vascular tissue and its associated fibres are not usually very strongly developed, but the lateral veins in *R. thodiana* have a strong capping of very thick-walled sclerenchyma: this is responsible for the lateral veins being so prominent, providing a good specific character (fig. 1E).

The leaf tip of *R. baurii* is grooved over the midrib right to the end (fig.

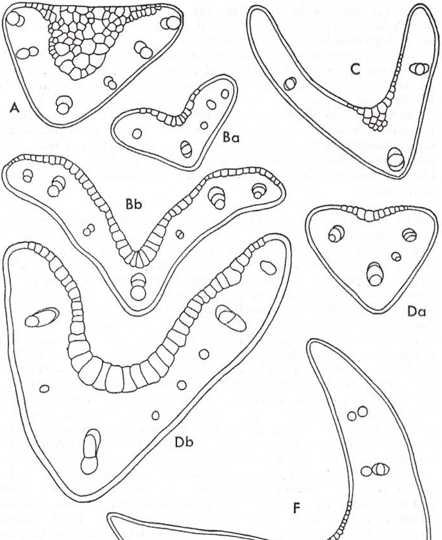

FIG. 1. Diagrammatic transverse sections of leaves of *Rhodophypoxis* and *Saniella*. A, *R. rubella*; B, *R. baurii*, a, near tip, b, median; C, *R. deflexa*; D, *R. milloides*, a, near tip, b, median; E, *R. thodiana*; F, *Saniella verna*. All ×36.

1Ba): in *R. milloides* the groove runs out and the tip of the leaf is a solid triangle in section (fig. 1Da). In cases of doubt this is one of the best features for distinguishing between these two species.

None of the species has the chlorenchyma well differentiated into palisade and spongy mesophyll. The cells tend to be rather uniform and closely packed. Scattered through the chlorenchyma are cells containing bundles of raphides (often appearing as round empty cells in prepared sections).

The hairs of *Rhodohypoxis* are similar in general pattern to those found in *Hypoxis*. If the plant is conspicuously hairy, the hairs are tufted with several rays of unequal length, usually with one ray obviously the longest. If the plant is subglabrous (as in *R. milloides* or *R. deflexa*) the hairs are often only bifurcate with one long arm and a shorter one pointing in the opposite direction.

SPECIES PROBLEMS AND HYBRIDIZATION. Taxonomically *Rhodohypoxis* is a fascinating genus in which species problems are, as yet, by no means settled. The main one concerns the limits of *R. baurii*. We present it here as a widespread species whose diversity is acknowledged by dividing it into three distinct components, to which we assign a non-committal varietal rank. Three varietal names permit us to describe and discuss our observations. These varieties show slight but definite ecological distinctions. Where var. *baurii* and var. *platypetala* occur contiguously (the former always in the wetter habitats) hybrids occur, but do not lead to a merging of the parent populations: the hybrids are restricted to intermediate habitats. In these localities too, var. *baurii* can be distinguished by its narrow suberect leaves, those of var. *platypetala* being broader and more spreading. The populations look like closely related, but distinct, species. However, in parts of its range where var. *baurii* is absent, var. *platypetala* may have narrower more erect leaves. It looks very much as though there is selection against hybrids in the localities where both varieties occur, and that this has resulted in the accentuation of the morphological differences. The possibility of regarding var. *platypetala* as an independent species is reduced by the occurrence of the third variety, var. *confecta*. This combines the flower colour of var. *baurii* and var. *platypetala* within its range of variation, and occupies a habitat which, though distinctive, is to some extent intermediate. The taxonomic structure of *R. baurii* clearly needs a more critical study: we hope an adequate basis for the start of such work is given here, but the picture may well need to be amended subsequently.

R. milloides is variable in size and leaf-width but these features seem to be linked to habitat-differences: variation is more or less continuous and the recognition of varieties here would not be justified.

The other species, as known at present, show little morphological variation. All species are variable in flower colour, but not indiscriminately; colour may be helpful in recognition, particularly the vivid red of *R. milloides*.

As to the interrelations of the species, *R. baurii*, diverse in form but always with the circumscissile capsule and hairy leaves typical of *Hypoxis*, proclaims itself as the centrepiece of the genus; a position confirmed by its wide geographical range. *R. milloides* is slightly more specialized in its restriction to the vicinity of running water, but it also has the erect circumscissile capsule and is very closely allied. Of the high altitude species, *R. thodiana*, with broad hairy leaves, shows close affinity to *R. baurii*; while *R. deflexa* having more glabrous leaves and a liking for marshy places is, perhaps, nearer to *R. milloides*.

R. incompta and *R. rubella* are very closely allied to one another. *R. incompta* is larger and tends to flower earlier, but morphological differences are slight. However, there is an ecological distinction. *R. incompta* grows at the edge of grass or sedge tussocks, sometimes on rock sheets, sometimes on seepage slopes: *R. rubella* grows in wet gravel or silt patches. The habitats may be contiguous and the two species may be within a few inches of one another: but the preferences remain well-marked. *R. incompta* and *R. rubella* are distinguished from the other species by the long ovary beak and the packing of colourless parenchyma below the upper epidermis. In the character of the ovary only *R. thodiana* shows an approach to these species, having an aerial ovary that is shortly beaked. *R. deflexa*, on the other hand, is the species that comes closest in leaf-structure as it sometimes shows a few colourless subepidermal cells above the midrib.

The importance of the adaptation of the different species and varieties to distinct microhabitats has already been stressed. These habitats often occur close together, and it is where they meet that the putative hybrids are found. We record enough instances of these putative hybrids to make it certain that hybridization does take place. This may be within species, between species, or with a species of the neighbouring genus *Hypoxis*, *H. parvula*. It is by no means clear whether this hybridization plays any role of evolutionary importance. It does, nevertheless, considerably complicate the taxonomy and the identification of plants in the field. Hybrids are not rare. It therefore seems useful to describe the total *Rhodohypoxis* populations of one or two localities before proceeding to the detailed taxonomic treatment. When working with *Streptocarpus*, a genus of Gesneriaceae, we often found it desirable to prepare tables of co-existence so that we could be alert to possible sources of unusual variation in a species (Hilliard & Burtt, *Streptocarpus: An African Plant Study*: 76–77, 1971). Similarly in *Rhodohypoxis* knowledge of the total range of forms present in an area may be vital to an understanding of the forms encountered there.

NOTES ON SPECIAL LOCALITIES

1. MT INSIZWA, MT AYLIFF DISTR., TRANSKEI. Visited 17 xi 1973; *Hilliard & Burtt* 7311–7318.

Rhodohypoxis on Mt Insizwa presented the most complicated situation we have yet encountered. The lower slopes of the hill have been afforested and there is natural forest in the gulleys and where the ground is too steep and rocky for plantations. Above the forest one climbs out on to a steep rocky hillside (c. 900–1500 m) with scattered *Protea* bushes. On grassy patches on these dryish slopes there is plenty of white *R. baurii* var. *platypetala*. Then, in a hollow just below the summit of the hill (at about 1500 m) there is a small marsh fed by a clear spring at the foot of the upper slopes and draining out through a brisk little stream. Here, at the edge of the marsh the white *R. baurii* var. *platypetala* (No. 7313) gave way to *R. baurii* var. *baurii* (No. 7318) with its characteristically deep red flowers and narrower leaves. Between the red and the white populations and scattered elsewhere, were pink (No. 7314) and pale pink-flowered (No. 7315) plants that had every appearance of being hybrids between these two varieties of *R. baurii*. Both varieties of *R. baurii* were in full flower. In still wetter ground near the middle of the marsh we found *R. milloides* (No. 7312), easily distinguishable from *R. baurii* var. *baurii* by its brighter crimson flowers and erect vivid green nearly glabrous leaves. There were plenty of plants of *R. milloides* but they were only just starting to flower. Above the marsh at the edge of wet rock sheets *R. baurii* var. *baurii* (No. 7318) was plentiful, while away from the drainage of the rock-sheets the drier slopes were populated by *R. baurii* var. *platypetala* (No. 7316). Here again intermediate pinks (No. 7317) were found in the ecotone between the wetter and drier habitats.

We did not implicate *R. milloides* in any of the hybrids at this site, but that may have been due merely to lack of investigation. Crosses between *R. milloides* and *R. baurii* var. *baurii* would be very difficult to spot, and pinks arising from *R. milloides* x *R. baurii* var. *platypetala* might look very like the crosses between the two varieties of *R. baurii*.

2. MT TABANKULU, TABANKULU DISTR., TRANSKEI. Visited 18 xi 1973; Nos 7334–5, 7352–5.

The lower slopes of the mountain are broken by cliffs at about 1350 m. On the drier slopes below the cliffs and on drier parts of the cliffs themselves the white-flowered *R. baurii* var. *platypetala* was plentiful: in wet crevices and sedge tufts on steep slopes and cliff faces *R. baurii* var. *baurii* (No. 7354), distinguished by its red flowers and longer narrower leaves, formed conspicuous masses. In places of intermediate wetness there were pink-flowered plants with the broader more spreading leaves of *R. baurii* var. *platypetala*. We suspected that these were hybrids.

Near the summit beacon (at a little above 1500 m) *R. baurii* var. *platypetala* grew amongst flat rock outcrops: a particularly fine large white-flowered form (No. 7334). Nearby on the margins of a marshy stream was *R. baurii* var. *baurii* (No. 7335): red-flowered and with narrower leaves. One or two of the plants here were pink-flowered, perhaps a colour variant, or perhaps contaminated by the nearly white var. *platypetala*.

There was no true marsh near the summit of Tabankulu, and no *R. milloides* was found.

3. ZUURBERG, NATAL (ALFRED DISTR.)—TRANSKEI BORDER. Visited 30 xi 1973; Nos 7546–9.

Near the summit beacon above Weza forest, that is just below 1500 m, *R. baurii* var. *baurii* (No. 7549) was plentiful at the edges of wet rock sheets: it had the characteristic deep red flowers, fading a little as they went over, and relatively long narrow hairy leaves. In the grass a few yards away, a slightly drier habitat, was *R. baurii* var. *platypetala* (No. 7548). As on Tabankulu this was a particularly large-flowered form, decidedly larger than the neighbouring *R. baurii* var. *baurii* and, as usual when the two grow together, distinguished from it by its broader more grey-green leaves as well as by flower colour.

Here var. *platypetala* was white-flowered, tinged green and pink on the outside and occasionally in the centre, which is usual. Growing at the edge of the white var. *platypetala* were some pink-flowered plants: these had the leaves of var. *platypetala* but their colour may well have originated from var. *baurii* nearby. It should be noted that despite the small spatial separation of var. *baurii* and var. *platypetala* the division between the two was remarkably sharp. A little lower down the slope a spring arose and here in the marshy ground at its source was typical *R. milloides*.

4. MAWAHQUA MT, "SUNSET" FARM, POLELA DISTR., NATAL. Visited 10 xi 1973; Nos 7213, 7213/1, 7214.

On south-facing slopes at about 1680 m *R. baurii* var. *platypetala* (No. 7213) was common on dryish outcrops and scattered in burnt grassland. In flushes and by streams the vivid magenta flowers and bright green leaves of *R. milloides* were strikingly different. Intermediates were particularly well-developed at the intergrading of the habitats; their flowers were varying shades of pink, the paler ones having broader more hairy leaves (approaching those of var. *platypetala*), the darker ones had narrower more glabrous leaves (approaching those of *R. milloides*). *R. baurii* var. *baurii* was not present on this site.

The situation at Mawahqua is repeated rather closely at other localities where *R. baurii* var. *platypetala* and *R. milloides* grow together: for instance at Byrne, Richmond distr.; on the S-facing slopes of Nhluzane, Lions River distr.; on Fort Nottingham commonage, Lions River distr.; on the farm 'Game Pass', Kamberg, Estcourt distr.

HISTORY OF COLLECTION AND CULTIVATION. The earliest herbarium specimen of *Rhodohypoxis* known to us is that collected by Krauss in 1839–40: it is represented at the British Museum and at Kew as *Krauss* 24, but this number does not appear in Krauss's published lists. Nearly all his Natal plants may be found labelled "Port Natal", but he travelled far inland. From what we know of his routes (see Spohr, O., ed., Ferdinand Krauss, *Travel Journal Cape to Zululand*. Cape Town. 1973) and the distribution of the species, it seems likely that the specimen came from the present-day Lions River District: in 1878 it became one of the syntypes of *Hypoxis milloides* Baker.

Just previously, however, Baker (1876) had described *Hypoxis baurii*, and this represents the first appearance in botanical literature of what we now know as *Rhodohypoxis*. Specimens had been collected by Rev. Leopold Richard Baur on Mt Baziya, in the modern Transkei, and sent by him to Professor MacOwan, who forwarded them to Kew. At the same time MacOwan sent living material to the German nurseryman Max Leichtlin, and Baker (in *Gard. Chron. n.s.* 8:584, 10 xi 1877) reports that these flowered in 1877. It seems, however, that Leichtlin's plants were lost before the species became widely cultivated. A further introduction was made by Mrs S. Garnett Botfield and received an Award of Merit from the Royal Horticultural Society at the Chelsea Show in 1927: both a white and a pink form were exhibited. It is this introduction that has formed the nucleus of the stocks now widespread in cultivation (see *J. Roy. Hort. Soc.* 60:255, 1935), although other introductions were made shortly afterwards.

There is now a wide range of named cultivars of *R. baurii*, raised by Mrs Garnett Botfield's daughter, Mrs McConnel, offered in the horticultural trade in Britain: 'Great Scot', with deep red flowers, seems to be very close to typical *R. baurii* while the various white and pink forms ('Harlequin', 'Stella', 'Picta', etc.) could be matched by selections from wild populations of var. *platypetala* and var. *confecta*.

GEOGRAPHICAL DISTRIBUTION. Although one species ranges as far as the northern Transvaal and also out into the Midlands of Natal, *Rhodohypoxis* is clearly a genus centred in the Natal Drakensberg and the Lesotho plateau. This is the fourth such genus that we have revised, the others being:—

Craterocapsa (Campanulaceae): 4 spp: N to Inyanga. (*Notes R.B.G. Edinb.* 32:314, 1972).

Macowania (Compositae): 11 spp: N to E Transvaal and then a jump to Ethiopia and Yemen. (*l.c.* 34:260, 1976).

Glumicalyx (Scrophulariaceae): 6 spp: between the Witteberg in E Cape and Platberg near Harrismith, O.F.S. (*l.c.* 35:155, 1977).

Although small in number of species (6), *Rhodohypoxis*, like these three genera, shows a well-developed range of morphological diversity. None of these 4 genera can be dismissed as a mere congeries of very closely allied species that could really be included in a large neighbouring genus. *Macowania* has no obvious parent group; while to include *Craterocapsa* in *Wahlenbergia*, *Glumicalyx* in *Zaluzianskya*, or *Rhodohypoxis* in *Hypoxis* would be entirely misleading. In each case the structural range of the smaller genus rivals that of its larger neighbour.

When the flora of the Drakensberg Centre is well enough known to be assessed as a whole, these small but significantly diversified genera may be found to give a valuable measure of the generative capacity of the area. The final phase of uplift of the Drakensberg is assigned to the Pliocene (Lester King, *The Natal Monocline*, 61, 1972); the range thus provides an area where the evolution of montane species, such as *R. deflexa*, *R. incompta*, *R. rubella* and *R. thodiana*, is of particular interest.

Glumicalyx and *Rhodohypoxis* have added status because they do not stand alone. *Strobilopsis* Hilliard & Burtt is a monotypic genus allied to *Glumicalyx*, and in this paper we describe another monotypic genus, *Saniella*, allied to *Rhodohypoxis*.

KEY TO SPECIES OF RHODOHYPOXIS

Note: Natural hybrids occur (see nos 239–245 below)

1a. Ovary not beaked 2
1b. Ovary joined to the perigone by a distinct beak 4
2a. Flowers very small, outer perigone segments 3·5–6·5 mm long; fruiting pedicels deflexed . . . . . . 235. *R. deflexa*
2b. Flowers larger, outer perigone segments at least 10 mm long; fruiting pedicels erect 3
3a. Leaves dull green, midrib impressed above and its groove clearly visible up to the leaf tip, hairy right to tip; flowers red to white . . . . 233. *R. baurii*

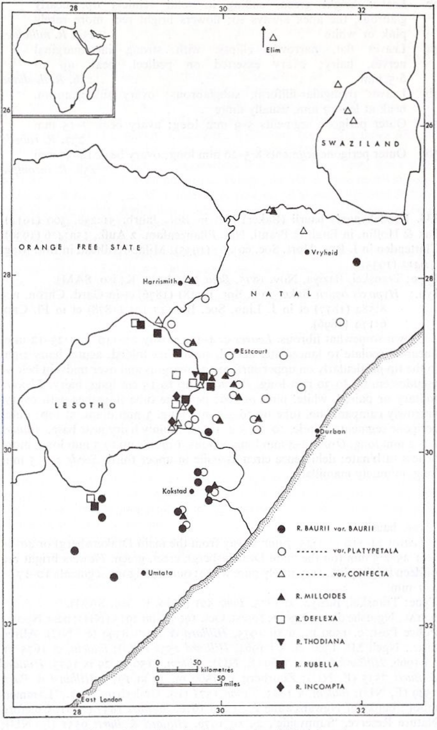

FIG. 2. Map of distribution of species of *Rhodohypoxis*.

3b. Leaves bright green, ending in solid veinless tip, nearly glabrous, the apex always so; flowers bright red, more rarely pink or white . . . . 234. *R. milloides*

4a. Leaves flat, narrowly elliptic with strong intramarginal nerves, hairy; ovary exserted on pedicel, beak up to 6·5 mm . . . . 236. *R. thodiana*

4b. Leaves triangular-filiform, subglabrous; ovary subterranean, beak at least 7 mm, usually more 5

5a. Outer perigone segments 5–9 mm long; ovary beak 7–15 mm 237. *R. rubella*

5b. Outer perigone segments 8·5–20 mm long; ovary beak 14–37 mm 238. *R. incompta*

233. Rhodohypoxis baurii (Baker) Nel in Bot. Jahrb. 51:258, 300 (1914); Pax & Hoffm. in Engl. & Prantl, Nat. Pflanzenfam. 2 Aufl., 15a:426 (1930); Chittenden in J. Roy. Hort. Soc. 60:467 (1935); Milne-Redhead in Bot. Mag. t. 9412 (1935).

Type: Transkei, Baziya, Nov. 1875, *Baur* 501 (holo. K; iso. SAM).

Syn.: *Hypoxis baurii* Baker in J. Bot. 14:181 (1876) et in Gard. Chron. n.s. 8:584 (1877) et in J. Linn. Soc. Bot. 17:105 (1878) et in Fl. Cap. 6:179 (1896).

Crown somewhat fibrous. *Leaves* c. 4–10, mostly 25–110 × 1·25–12 mm, linear-lanceolate to lanceolate, keeled, somewhat folded, acute, hairy right to the tip particularly on upper surface and margins and over midvein below; pseudostem up to 30 mm long. *Peduncles* up to 15 cm long, hairy. *Flowers* solitary or paired, white, pink or red; perigone tube (together with ovary) narrowly campanulate, tube up to 2.5 mm long, 3 mm diam. at top; outer perigone segments elliptic, 10–20 × 4–10 mm, thinly hairy near base. *Anthers* 1·5–2 mm long. *Ovary* 2–4 mm long, villous. *Capsule* up to 5 mm long, more or less turbinate; dehiscence circumscissile in upper third. *Seeds* c. 1·5 mm long, minutely mamillate.

var. **baurii**

Leaves 24–110 × 1·25–7 mm (away from the main Drakensberg) or 40–95 × 1·25–2·5 mm (on the main Drakensberg), erect, green. *Flowers* bright red or deep bright pink, very rarely pure white; outer perigone segments 10–17 × 4–7 mm.

Type: Transkei, Baziya, xi 1875, *Baur* 501 (holo. K; iso. SAM).

NATAL. Ngotshe distr., Ngome forest, Oct. 1905, *Sim* 2915 (NH); near Ngome Police Post, c. 1500 m, 6 xii 1975, *Hilliard & Burtt* 8399 (E, NU). Alfred distr., Ngeli Mt, 1300 m, 5 i 1964, *Hilliard* 2532 (NU); *ibidem*, c. 1675 m, 1 i 1966, *Hilliard & Burtt* 3469 (E, NU); *ibidem*, 1150 m, 29 ix 1973, *Hilliard & Burtt* 7535 (E, NU); Zuurberg, c. 1500 m, 30 xi 1973, *Hilliard & Burtt* 7549 (E, NU); *ibidem*, x 1883, *Tyson* 1571 (E). Underberg distr., 'Lammermoor', banks of Ngwangwane R., 13 xi 1976, *Stewart* 1837 (NU); Coleford Nature Reserve, 'Sunnyside', 25 xii 1976, *Hilliard & Burtt* 9551 (E, NU); Bamboo Mt, Dec. 1973, *Grice* s.n. (NU).

CAPE. Mt Currie distr., Mt Currie, 1650 m, x 1883, *Tyson* 481 (BM, K, NBG, PRE); farm "Hebron" NE of Kokstad, c. 1750 m, 20 xi 1973, *Hilliard & Burtt* 7375 (E, NU); Kokstad, 2 ii 1959, *Tyrwhitt Drake* s.n. (NBG 459/58); Inungi Farm, 30 miles N of Palmiet, 24 i 1957, *Taylor* 5536 (NBG). Maclear distr., Tsitsa footpath, c. 2100 m, 5 iii 1904, *Galpin* 6862 (K, NH, PRE, SAM); Maclear to Elands Heights near 'Chamisso', 28° 11′ E, 30° 52′ S, 14 xii 1976, *Stewart* 1910 (NU); Naude's Nek pass, Maclear side c. 2250–2400 m, 28° 08′ E, 30° 45′ S, 15 xii 1976, *Stewart* 1915 (NU); *ibidem*, c. 2400 m, 19 xi 1945, *Acocks* 12183 (PRE); *ibidem*, 2500 m, 18 xii 1971, *Jacot Guillarmod* 7209 (E). Barkly East distr., Saalboom Nek, 13·4 miles SSE of Clifford P.O., c. 2200 m, 15 i 1959, *Acocks* 20192 (PRE).

TRANSKEI. Umzimkulu distr., Sneezewood Plantation, 12 x 1969, *Strey* 9177 (K, NH, NU, PRE). Tabankulu distr., Tabankulu Mt, c. 1300 m, 18 xi 1973, *Hilliard & Burtt* 7354 (E, NU); *ibidem*, c. 1500 m, 18 xi 1973, *Hilliard & Burtt* 7335 (E, NU). Mt Ayliff distr., Mt Insizwa, 17 xi 1973, *Hilliard & Burtt* 7314, 7318 (E, NU). Mt Fletcher distr., 3 miles SW Katkop P.O., c. 1400 m, 18 i 1962, *Acocks* 21903 (PRE).

LESOTHO. Qacha's Nek distr., Sehlabathebe region, Lekhala la Lethiba Pass, at 2400–2900 m, 13 ii 1971, *Williamson* 943 (K); near Ramatseliso's Gate, 1800–2100 m, ii, *Williamson* 1017 (K); Sehlabathebe Nature Reserve, 29° 52′ S, 29° 07′ E, 16 xii 1971, *Jacot-Guillarmod* 7207 (E).

var. **platypetala** (Baker) Nel in Bot. Jahrb. 51:300 (1914).

Syn.: *Hypoxis platypetala* Bak. in Journ. Linn. Soc. 17:105 (1878).
H. baurii Bak. var. *platypetala* (Bak.) Bak. in Thiselton-Dyer, Fl. Cap. 6:179 (1896).
Rhodohypoxis baurii forma *platypetala* (Bak.) Milne-Redhead in Bot. Mag. t. 9412 (1935).
R. platypetala (Bak.) C. H. Grey, Hardy Bulbs 2:98 (1938); cf. Hilliard & Burtt in Notes R.B.G. Edinb. 34:74 (1975).

Leaves 25–100 × (1·5–)3–12 mm, spreading (away from the main Drakensberg) or erect (along the foothills of the Drakensberg), grey-green. *Flowers* white or very rarely pale pink, green or pinkish on the backs; outer perigone segments 10–20 × 4–10 mm.

Lectotype: Natal, Dargle Farm, *Mrs Fannin* (TCD).

NATAL. Klip River distr., Van Reenen, 1500–1800 m, 5 xii 1895, *Wood* 5839 (E). Bergville distr., Cathedral Peak Forestry Reserve, Ndedema river valley, 25 x 1973, *Hilliard & Burtt* 6916 (E, NU). Estcourt distr., Hlatikulu, 22 xii 1901, *Johnson* 752 (E); Giant's Castle Game Reserve, c. 1700 m, 26 ix 1957, *Edwards* 2169 (NU); *ibidem*, c. 2100 m, 7 xii 1975, *Stewart* 1763 (E, NU), *ibidem*, 2250 m, 16 i 1973, *Wright* s.n. (E, NU); *ibidem*, c. 1800 m, 11 xii 1973, *Wright* 1605 (E, NU); "Game Pass" and Highmoor Forestry Reserve, 28 x 1973, *Hilliard & Burtt* 6963, 6968 (E, NU). Nkandla distr., Nkandla, 5 xii 1936, *Gerstner* 2621 (NH). Lion's River distr., Kamberg, c. 2100 m, 22 x 1973, *Wright* 1562 (E, NU); Dargle Farm, c. 1500 m, 29 x 1973, *Hilliard & Burtt* 6981 (E, NU); Impendhle distr., "Tillietudlem", c. 1700 m, xii 1948, *Huntley* 448 (NU); Impendhle, 1800 m, 28 x 1924, *Levett* 53 (NH). Umvoti distr., Greytown, x-xi 1931, *Wylie* s.n. (K, NH). New Hanover distr., Noodsberg, Kingscliffe, c. 900 m, xi 1963, *Hilliard* 2065 (E, NU). Pietermaritzburg distr., Zwartkop, 1200–1500 m, 19 xi 1906, *Wylie* comm. *Wood* 10103 (E, NH, NU); *ibidem*, 1200 m, 26 x 1944, *Hillary* 61 (NU). Richmond distr., Hela-Hela, 2 xi 1969, *Strey* 9214 (NH); escarpment above Byrne valley, c. 1500 m, 13 xi 1975, *Hilliard* 5585 (NU); *ibidem*, 2 xii 1973, *Stewart* 1694, 1695 (NU). Polela distr., Mawahqua Mt, Sunset Farm, 7 xi 1971, *Rennie* 73 (NU); *ibidem*, 10 xi 1973, *Hilliard & Burtt* 7213 (E, NU); Polela, mountain top, xii, *Mrs Clark* 29 (BM). Underberg distr., Drakensberg Garden Forest Reserve (Garden Castle Nature Reserve), 3 xi 1973, *Hilliard & Burtt* 7022 (E, NU); Bushman's Nek, c. 1500 m, 21 xi 1973, *Hilliard & Burtt* 7399 (E, NU); 2 km from Himeville on Nottingham Road road, 1 x 1974, *Stirton* 1144 (E, NU); Sani Pass, xi 1964, *Gillies* 30 (E, NU); Bamboo Mt, ix and xii 1973, *Grice* s.n. (NU). Alfred distr., Zuurberg, c. 1500 m, 30 xi 1973, *Hilliard & Burtt* 7548 (E, NU); *ibidem*, 1200 m, x 1883, *Tyson* 1212 (BM, K); *ibidem*, 1650 m, x 1883, Tyson 1572 (NBG); *ibidem*, 1580 m, 1 ii 1898, *Schlechter* 6580 (Z); *ibidem*, May 1904, *Groom* in *Wood* 1976 (K). Without locality ("Port Natal") received 1870, *McKen* (K); 1500 m, received 1864, *Sutherland* (K).

CAPE. Mt Currie distr., farm "Hebron", NE of Kokstad, c. 1500 m, 20 ix 1973, *Hilliard & Burtt* 7364, 7365, 7374 (E, NU); near Kokstad, *Groom* sub *Wood* 1753 (K, NH).

TRANSKEI. Tabankulu distr., Tabankulu Mt, c. 1500 m, 18 xi 1973, *Hilliard & Burtt* 7352, 7334 (E, NU). Mt Ayliff distr., Mt Insizwa, 17 xi 1973, *Hilliard & Burtt* 7311, 7313, 7316, (E, NU).

var. **confecta** Hilliard & Burtt, **var. nova** alticola, a var. *platypetala* floribus variicoloratis saepe primo albis erubescentibus et deinde rubris praecipue distincta.

Syn.: *R. baurii* auct. non (Bak.) Nel sens. strict.; Letty, Wild Fl. Transvaal, 69 tab. 35 fig. 1 (1962); Compton, Fl. Swaziland 131 (1976).

Leaves 25–75 × 1·5–5 mm, erect, bright green. *Flowers* white, pink or deep red, sometimes opening white and ageing through pink to red; outer perigone segments 10–16 × 4–9 mm.

Type: Lesotho, Sani Top, 2865 m, 31 xii 1973, *Hilliard* 5414 (holo. E; iso. NU).

ORANGE FREE STATE. Witzieshoek, Sentinel Gate, 2280 m, 17 xi 1954, *Edwards* 339 (NU, PRE); Bester's Vlei, 1980 m, *Flanagan* 1830 (PRE); *ibidem*, 2050 m, xii 1893, *Flanagan* 1835 (SAM).

NATAL. Bergville distr., Royal Natal National Park, near Sentinel path, c. 2150 m, 28 xii 1975, *Hilliard & Burtt* 8685 (E, NU). Impendhle distr., Hlatimba Pass, c. 2800 m, 3 xii 1972, *Wright* 1316 (E, NU). Underberg distr., Bushman's Nek, Thamathu Pass, 2280–2375 m, 23 xi 1973, *Hilliard & Burtt* 7462 (E, NU); *ibidem*, 4 ii 1976, *Hilliard & Burtt* 8929 (E, NU); *ibidem*, Ngwangwane river valley beyond foot of Bushman's Nek pass, 22 xi 1973, *Hilliard & Burtt* 7432 (E, NU); Sani Pass, 2100 m, 6 i 1977, *Hilliard & Burtt* 9615 (E, NU).

LESOTHO. Sani Top, 2865 m, 18 ii 1973, *Hilliard* 5332 (E, NU). Sehlabathebe Nature Reserve, 16 xii 1971, *Jacot Guillarmod* 7208 (E).

The following material from more northerly districts is tentatively referred here (see discussion below):—

TRANSVAAL. Zoutpansberg distr., Elim [23° 10′ S, 30° 3′ E], xii 1930, *Obermeyer* (TM 29250—PRE). Barberton distr., near Angle Station. xi 1961, *Codd*, cult. Pretoria comm. Meeuse (PRE). Wakkerstroom distr., farm 'Oshoek', 1950 m, 22 x 1961, *Devenish* 705 (K, PRE); *ibidem*, 1900–2000 m, 25 x 1975, *Devenish* 1561 (E, NU); farm 'Rusfontein', 7 xi 1976, *Hilliard & Burtt* 9189 (E, NU).

SWAZILAND. Forbes Reef, 17 xii 1955, *Prosser* 1958 (PRE). Mbabane distr., Abner's Farm, c. 1525 m, 21 x 1956, *Compton* 26108 (NBG, PRE); Ukutula, 21 xi 1955, *Compton* (NBG 847/54); *ibidem*, c. 1050 m, 16 x 1955, *Compton* 25192 (NBG); *ibidem*, 4 viii 1954, *Compton* 24488 (NBG); hill NE of Mbabane, 1500 m, 19 x 1958, *Ben Dlamini* s.n. (NBG); mountains above Mbabane, 1050 m, 13 xi 1966, *Bayliss* 3731 (NBG).

ORANGE FREE STATE. Harrismith distr., mountain slopes, Nov. 1904, *Sankey* 309 (K); Platberg, Gibson Dam, 30 xii 1975, *Hilliard & Burtt* 8693 (E, NU); near Swinburne, farm 'Airlie', 1800 m, 27 xi 1973, *Jacobsz* 545 (E, K, PRE).

NATAL. Utrecht distr., farm 'Nauwhoek', c. 2100 m, 6 xi 1976, *Hilliard & Burtt* 9169, 9170 (E, NU); Wonderhoogte, 2130 m, i 1952, *Parkhouse* s.n. (NH); Tweekloof—Altemooi, xii 1926—i 1927, *Thode* A 1190 (PRE). Paulpietersburg distr., summit Dumbe Mt, 10 xi 1929, *Galpin* 9665 (PRE).

R. baurii is a species where the most obviously variable character, flower-colour, does in part follow a taxonomic pattern, linked to both geographical and ecological distribution. The three varieties that it is found convenient to recognise here may be contrasted thus:—

var. *baurii*: flowers predominantly deep red; habitat moist (damp partly shaded cliff faces or rock flushes).

var. *platypetala*: flowers predominantly white, occasionally pale pink; habitat dry (often shallow stony soils over rock sheets).

var. *confecta*: flowers pink or white, some reds usually present, some flowers opening white changing to pink then red with age; habitat moist (damp grass slopes often among outcropping rocks, or, on the summit plateau, in short damp turf among rock sheets).

The localities from which *R. baurii* var. *baurii* is known fall into two groups: those that stand away from the main Drakensberg, ranging from 1140–1740 m in altitude; and those on the face of the main Berg at heights of 2070–2640 m.

The known localities are still, 100 years after the plant was discovered on Mt Baziya (31° 30′ S), quite few in number. The first group includes in the Transkei, in addition to Baziya, Mt Insizwa, Mt Tabankulu, and a station near Katkop (on the Maclear-Mt Fletcher road); in Griqualand East Mt Currie and the farm "Hebron" near Kokstad; in Natal Mt Ngeli, and the nearby Zuurberg, and two stations near Coleford, and Bamboo Mt in Underberg district, then a leap of over 300 km to Ngome in N Natal. In the Transkei and Griqualand East there must be many more localities as yet unknown.

The westernmost locality on the face of the Drakensberg is Saalboom Nek at c. 27° 30′ E, and var. *baurii* is then found north-eastwards at Naude's Nek and the nearby Tsitsa footpath in East Griqualand, Ramatseliso's Gate and Sehlabathebe in Lesotho. Somewhere thereabouts var. *baurii* seems to end and var. *confecta* replaces it at these altitudes.

R. baurii var. *platypetala* is the most widespread form of the species. In the Transkei we know it from Mt Insizwa and Mt Tabankulu; in Griqualand East from Mt Currie and the farm "Hebron" near Kokstad; in Natal from Bushman's Nek all along the foothills of the Drakensberg to the Royal Natal National Park, and off the main Berg from the Zuurberg (on the Transkei border), Mt Mawahqua, Byrne, Swartkop above Pietermaritzburg, and Dargle, with outliers near Greytown, the Noodsberg, and Nkandla in Zululand. *R. baurii* var. *platypetala* is always on drier ground than var. *baurii* where they occur together.

R. baurii var. *confecta* is a high altitude plant from about Sehlabathebe in the south right along the escarpment of the main Drakensberg to Witzieshoek, and we also provisionally include here the material from scattered localities along the low Drakensberg to Wakkerstroom district on the Natal-Transvaal border, from Swaziland and the southern Transvaal around Barberton and the single record from the northern Transvaal at Elim. The situation in the northern part of its range requires much more study. Its recurrence in the northern Transvaal is reminiscent of that of *Streptocarpus polyanthus* subsp. *dracomontanus* Hilliard which jumps to the Zoutpansberg from an otherwise most northerly locality in Utrecht district of N Natal.

In many places var. *confecta* occurs in sheets of mixed white, pink and red flowers, giving an effect so like that of scattered confetti that we inevitably dubbed it with that name in the early days of this study; a name so apt that a latinized version is adopted for the formal epithet. The medley of colours is only due in part to a mixture of white, pink and red-flowered plants. An important component consists of plants on which the flowers open white, then change to pink and finally to red. The presence of these plants is the most characteristic feature of populations of this variety. *R. baurii* var. *platypetala* is predominantly white, but a few pink-flowered plants may be found in most extensive populations. However, plants showing change of colour with the age of flower have not been seen.

We have not ourselves seen var. *confecta* further north than Wakkerstroom district. There, however, the characteristic change of flower colour was observed and there too, as further south on the main Drakensberg, var. *confecta* is usually found in damper situations than var. *platypetala* would be expected to favour. In the main area of var. *confecta*, for instance at Sani Top or Witzieshoek, the drier habitats where var. *platypetala* might be expected are virtually absent. However on the low Drakensberg (for example Bezuidenhout Pass, Van Reenen Pass, De Beers Pass) there seem to be many spots where var. *platypetala* might be expected but is not found.

We include the records from Swaziland, Barberton and the Zoutpansberg district under var. *confecta* with some hesitation. The areas are too scattered for us to have been able to attempt field work.

Another critical area where field work is much needed is that between Naude's Nek (Barkly East div.) and Sehlabathebe in Lesotho. It is somewhere in this area that the relationship between var. *baurii* and var. *confecta* must be unravelled. In this account both varieties are recorded from the Sehlabathebe Nature Reserve: var. *baurii*, "damp places and small marshy stream-banks; flowers pink and deep rosy pink to magenta" (*Guillarmod* 7207): var. *confecta*, "marshy slopes above deep pools; flowers white, pink, pale pink or magenta" (*Guillarmod* 7208). We originally entertained the possibility that var. *confecta* had arisen by hybridization between the montane form of var. *baurii* and var. *platypetala*: but the truth is that we do not yet know enough even to justify speculation.

234. Rhodohypoxis milloides (Baker) Hilliard & Burtt in Notes R.B.G. Edinb. 34:74 (1975).

Syn.: *Hypoxis milloides* Baker in J. Linn. Soc. Bot. 17:105 (1878) et in Thiselton-Dyer, Fl. Cap. 6:179 (1896).
Rhodohypoxis baurii (Baker) Nel var. *milloides* (Baker) Nel in Bot. Jahrb. 51:300 (1914).
R. palustris Killick in Bothalia 7:480 (1961). Type: Natal, Cathedral Peak Research Station, *Killick* 1602 (NH, PRE, K).

Underground axis up to 2 × 1·5 cm, fibrous at the crown, producing numerous lateral stolons. *Leaves* c. 4–10, mostly 25–170 × 2–9 mm, linear-lanceolate to lanceolate, keeled, folded, acuminate, tip deltoid in section, stiffly erect, light bright green, very sparsely hairy mainly near margins and over keel, tip always glabrous; pseudostem 1–5 cm long. *Peduncles* up to 6, c. 2·5–15 cm long, hairy. *Flowers* solitary or paired; perigone tube (together with ovary) narrowly campanulate, tube up to 2 mm long, 3 mm diam. at top; outer perigone segments elliptic, 10–20 × 4–10 mm, thinly hairy near base, all medium to dark but bright crimson or cerise, rarely pink or pure white. *Anthers* 2–2·5 mm long. *Ovary* 2–4 mm long, villous. *Capsule* up to 5 mm long, more or less turbinate in outline; dehiscence circumscissile in upper third. *Seeds* c. 1·5 mm long, minutely mamillate.

Lectotype: Natal, Dargle, *Mrs Fannin* (TCD).

ORANGE FREE STATE. Harrismith distr., Platberg, Keiber Pass, 16 i 1932, *van Wyk* 83 (PRE); *ibidem*, above Gibson Dam, 30 xii 1975, *Hilliard & Burtt* 8708 (E, NU).

NATAL. Utrecht distr., farm 'Nauwhoek', c. 2100 m, 6 xi 1976, *Hilliard & Burtt* 9166, 9171 (E, NU). Klip River distr., Klip R Mts, 1050–1350 m, x 1858, *Sutherland* s.n. (K). Estcourt distr., Giant's Castle, 2440 m, xi 1914, *Symons* 156 (PRE, SAM); *ibidem*, 30 xi 1965, *Trauseld* 488 (NU, PRE); *ibidem*, 7 xii 1975, *Stewart* 1766, 1744 (E, NU); Highmoor Forest Reserve, c. 2075 m, 10 xii 1973, *Wright* 1603 (E, NU); *ibidem*, 12 xii 1973, *Wright* 1606 (E, NU); *ibidem*, 1950 m, 13 i 1966, *Killick & Vahrmeijer* 3568 (K, PRE); *ibidem*, 26 xii 1968, *Hilliard & Burtt* 5702 (E, NH, NU); *ibidem*, divide between Mooi and Loteni Rivers, 28 x 1973, *Hilliard & Burtt* 6966 (E, NU); Kamberg Nature Reserve, 1860 m, 13 xi 1974, *Wright* 1865 (E, NU); *ibidem*, Stillerust Vlei, 16 xi 1972, *Wright* 1287 (E, NU); Lion's River distr., Liddesdale, 12 xii 1883, *Wood* 4261 (K, NH); Nottingham Road, 14 xi 1945, *Sparks* s.n. (NH); 16 miles Nottingham Road on Underberg road, 11 xii 1961, *Edwards* 2676 (K, NU, PRE); ¼ mile from Nottingham Road—Underberg main road on turnoff to Kamberg, 27 xi 1972, *Wright* 1589 (E, NU); farm Dargavel, 27 xi 1973, *Wright* 1590 (E NU); Nottingham Road to Underberg road, Soutar's Hill, 29 x 1973, *Hilliard & Burtt* 6975 (E, NU); Fort Nottingham Commonage, c. 1700 m, 6 x 1975, *Wright* 2213 (NU); *ibidem*, 26 x 1976, *Hilliard & Burtt* 9065 (E, NU);

Nhluzane, S slopes, 1800 m, 28 x 1976, *Hilliard & Burtt* 9092, 9096; Richmond distr., escarpment above Byrne Valley, c. 1500 m, 13 xi 1975, *Hilliard* 5584 (E, NU); *ibidem*, 3 xi 1976, *Hilliard & Burtt* 9126 (E). Impendhle distr., farm 'Tillietudlem', xii 1948, *Huntley* 460 (E, NU, PRE); farm Umgeni Vlei, c. 1800 m, 4 xii 1973, *Wright* 1597, 1598, 1599 (E, NU). Alfred distr., Zuurberg, c. 1500 m, 30 xi 1973, *Hilliard & Burtt* 7546 (E, NU). Polela distr., Mawahqua Mt, Sunset Farm, 10 xi 1973, *Hilliard & Burtt* 7213A (E, NU); *ibidem*, 14 xii 1972, *Rennie* 236 (NU). Underberg distr., S of Cobham Forest Station, x 1976, *Hilliard & Burtt* 9406 (red), 9407 (pink) (E, NU).

LESOTHO. Sehlabathebe, 2400 m, 15 ii 1971, *Williamson* 968, cult. K 088–71–00974.

CAPE. East Griqualand, Mt Currie distr., farm 'Hebron', NE of Kokstad, c. 1600 m, 20 xi 1973, *Hilliard & Burtt* 7363 (E, NU).

TRANSKEI. Mt Ayliff distr., Mt Insizwa, 17 xi 1973, *Hilliard & Burtt* 7312 (E, NU).

When publishing this combination, we designated Mrs Fannin's specimen labelled "Dargle" as the lectotype. The precise locality is not known, and at that time the farm 'The Dargle' was much more extensive than now. Mrs Fannin's specimen represents the large broad-leaved form that is characteristic of big marshes with flowing water, and this form has probably decreased in frequency very much as a result of land-drainage and ploughing. The position is well shown at Soutar's Hill (16 miles from Nottingham Road on the way to Underberg), the nearest locality to Dargle at which we have seen the large-leaved form. It grows there in a strip of marsh persisting between the farm fence and the road: the main marsh, which was evidently several acres in extent, has been drained and was growing a crop of potatoes. We have also seen this large form in the great marsh on 'Stillerust', Kamberg, in an equally fine one on the farm 'Hebron' near Kokstad, and in a marsh near Cobham Forest Station, Underberg district.

When *R. milloides* grows in spring flushes on hillsides (as on Mawahqua Mt, or on 'Game Pass', Kamberg), it is usually a smaller plant with distinctly narrower leaves. However, a series of specimens collected by F. B. Wright, on the farm 'Umgeni Vlei' in Lion's River district, shows that all intergradations between the two forms can occur within a short distance; furthermore the plants in small mountain marshes (e.g. on Mt Insizwa, the Zuurberg, Platberg) are somewhat intermediate in size between those of the large marshes and those of the flushes.

R. milloides may usually be recognised in the field by its very vivid flowers and bright green erect leaves, which are only slightly hairy. The larger forms are much taller plants than those of *R. baurii*. Doubtful herbarium specimens can be distinguished because in *R. milloides* the groove over the midrib does not continue right to the tip of the leaf, whereas it does so in *R. baurii*.

Plants with white or pink flowers may occur as sports in normal red-flowered populations, and, as *R. milloides* spreads vigorously by means of its stolons, they sometimes appear as patches. The one anomalous population we have seen was at the northernmost locality of the species, in Utrecht district of northern Natal. Here the normal vivid red colour was entirely absent: all the plants were deep to pale pink—the paler tones, at least, being probably due to introgression from surrounding *R. baurii* var. *confecta*. A search must be made for other populations of *R. milloides* in this area, to see if the absence of the normal vivid red colour is a regional or merely local phenomenon.

The highest record for *R. milloides* at present is from 2407 m in the Giant's Castle area: it comes down to 1500 m at Byrne, near Richmond, and on the Zuurberg. It is certainly a plant that likes to be near moving water, but it does not stand constant flooding and when found actually in water this is a sure sign that the water is not permanent. As known at present *R. milloides* ranges from Mt Insizwa in the Mt Ayliff district of the Transkei to Platberg near Harrismith, in the Orange Free State, and the farm "Nauwhoek" in Utrecht distr., on the Natal-Transvaal border.

235. Rhodohypoxis deflexa Hilliard & Burtt in Notes R.B.G. Edinb. 34:73 (1975).

Underground axis ovoid, c. 4–8 mm diam. *Leaves* c. 5–10; blade spreading, up to 6·5 × 0·5 cm, linear-lanceolate, tip gradually attenuate, strongly keeled and slightly folded, both surfaces glabrous or with a few tufts of delicate spreading hairs mainly on the margins; pseudostem up to c. 1·5 cm long. *Peduncles* up to 6, c. 1·5–2 cm long, distinctly jointed, deflexing at the joint in fruit, glabrous or very sparsely hairy. *Flowers* solitary or occasionally paired; perigone tube (together with the ovary) campanulate, tube c. 1·5 mm long, c. 2 mm diam. at the top; outer segments oblong-lanceolate, 3·5–6·5 × 1·75–2 mm, bright reddish-pink or paler pink, sometimes white, glabrous or with a few tufts of long delicate spreading hairs. *Anthers* 0·75–1·25 mm long. *Ovary* 2 mm long, campanulate, glabrous or hairy. *Capsule* elliptic in outline, c. 5 × 3·5 mm; wall leathery; dehiscence circumscissile. *Seeds* c. 1·5 mm long; testa shining, minutely mamillate.

Type: Cape, Barkly East distr., Rhodes to Naude's Nek, c. 2600 m, 22 ii 1971, *Hilliard & Burtt* 6705 (E, K, NU, PRE).

LESOTHO. Summit of Langalibalele pass, c. 2800 m, 20 xi 1973, *Wright* 1585 (E, NU); Sani, near the river, 2800 m, 17 ii 1973, leg. *M. Grice* (*Hilliard* 5320, NU); Sani, 2800 m, 18 ii 1973, *Hilliard* 5358 (E, K, NU); Sani, main vlei towards Hodgson's Peak, 2800 m, 30 xii 1973, *Hilliard* 5386 (E, NU); Sani, marsh supplying water to Border Post, 2800 m, 1 i 1974, *Hilliard* 5430 (E, NU); Black Mts, 3170–3230 m, 13 i 1976, *Hilliard & Burtt* 8786 (E, NU). Malhai area, 3200 m, 30 xii 1969, *M. M. Cole* 13 (PRE); Makhapung Valley, 3050 m, 19 i 1955, *Jacot Guillarmod* 2243 (PRE); Pela Tseou river, 3100 m, 4 ii 1954, *Jacot Guillarmod* 2058 (PRE); between Matsuba and Khube rivers, 2500 m, 13 i 1955, *Coetzee* 540 (BLFU, PRE); Butha Buthe, valley no. 1, 2895 m, 2 ii 1954, *Coetzee* 396 (NBG); Oxbow Agric. camp, 2700–3000 m, 18 xii 1969, *Williamson* 386B (K, with *R. rubella*).

We first saw this plant growing in marshy turf beside a stream on the heights at Naude's Nek, then again on the plateau above Sani Pass, also in marshy turf, and in such quantity that it formed an almost pure sward. The leaves arch out and are held nearly horizontally just above ground level; the peduncles are erect at anthesis, but as the capsules begin to form, they gradually bend so that the ripe capsules lie on the marshy ground.

Both Jacot Guillarmod and Coetzee record that the plants are nibbled by sheep and goats, and this was evident at Sani too. Dr Jacot Guillarmod also records (*J.G.* 2234) that the flowers were red or pink, and again (*J.G.* 2058) flowers white, pale pink or deep pink, while Dr Coetzee (*Coetzee* 540) noted that the flowers were white with a tiny yellow spot in the throat, tube yellowish green. The yellow spot in the throat would be the tips of the three upper anthers. The colony we saw at Naude's Nek had all bright reddish-pink flowers, while in the big marsh in the valley leading to Hodgson's Peaks, beyond the Sani border post in Lesotho, bright reddish-pink predominated, but there were some paler pinks, and patches of snow-white intermingled with pink. Plants flower from late December to February.

R. deflexa seems to be confined to the high Lesotho plateau and the neighbouring heights at Naude's Nek in Barkly East district of the Cape. The diminutive size of the plant, including its flowers, immediately recalls *R. rubella*, with which it is sympatric, though they occupy different habitats (*R. deflexa* in marshy turf, *R. rubella* in damp silt patches) and *R. rubella* is fruiting when *R. deflexa* is flowering. *R. rubella* is set sharply apart from *R. deflexa* by its subterranean ovary with a long beak that acts as a pedicel, raising the perianth into the air. In *R. deflexa*, ovary and perianth are contiguous, as they are in *R. baurii* and *R. milloides*.

236. Rhodohypoxis thodiana (Nel) Hilliard & Burtt in Notes R.B.G. Edinb. 34:75 (1975).

Syn.: *R. rubella* (Bak.) Nel var. *thodiana* Nel in Bot. Jahrb. 51:300 (1914).

Underground axis ovoid, c. 6 mm diam., somewhat fibrous at the crown. *Leaves* 3–6, blade more or less erect or spreading, up to c. 35 × 7 mm, lanceolate, strongly keeled and slightly folded with a conspicuous intramarginal vein, apex acute, both surfaces pilose with tufts of long delicate spreading hairs or lower surface almost glabrous. *Peduncles* 1–3, up to c. 3 cm long, protruding up to c. 1·5 cm from the leaf sheaths, only the exposed part pilose with tufted hairs. *Flowers* solitary; perigone tube campanulate, 3·5–5 mm long, c. 2 mm diam. at the top; outer segments lanceolate, 8–13 × 3–5 mm, backs, perigone tube, ovary and ovary beak pilose with long delicate tufted spreading hairs, perigone segments delicate pink. *Stamens*: anthers c. 1·5 mm long. *Ovary* 2–3 mm long, elliptic or subrotund in outline, surmounted by a beak 2–6·5 mm long; slightly dorso-ventrally compressed. *Ripe capsule* not seen, but obviously thin-walled. perhaps rupturing irregularly. *Seeds* 1 mm long when unripe, testa minutely echinate.

Type: (Natal-Lesotho border) Bushman's River Pass, 3200 m, *Thode* 87 (B); *Thode* s.n. (STE 8379, prob. iso).

LESOTHO-NATAL border, summit of Bushman's River Pass, 2895 m, herb, prostrate and minute, colour salmon, common in shade of rocks, 23 i 1940, *West* 1741 (NH); summit Langalibalele Pass, c. 2865 m, 20 xi 1973, *Wright* 1584 (E, NU); *ibidem*, c. 2680 m, 20 xi 1973, *Wright* 1582 (E, NU); *ibidem*, c. 2800 m, *Wright* 1583 (NU); exit from Giant's Castle Pass, c. 3050 m, 11 xii 1973, *Wright* 1609 (E, NU); Giant's Castle Pass, c. 400 m below the summit, c. 2650, *Wright* 1607 (E, NU); c. ¾ mile S of summit of Giant's Castle Pass, c. 2865 m, 3 xii 1972, *Wright* 1315 (E, NU).

R. thodiana is easily recognized by its flat hairy leaves, having a strong intramarginal nerve, and by the aerial ovary having a well-developed beak.

R. rubella and *R. incompta* are the only other species with a beaked ovary, but in both the ovary is subterranean and the leaves are bluntly triangular in section, glabrous or nearly so, with only the midvein visible. At present *R. thodiana* is known only on or near the passes leading from the Giant's Castle area to the Lesotho plateau.

Nel saw only a single specimen of *R. thodiana* when he described it as a variety of *R. rubella* (then known only from two collections). The plant remained virtually unknown, as the only subsequent gathering was *West* 1741, made in January 1940. We asked Mr F. B. Wright to see if he could find it again, which he did early in December 1972 and also the following year. Mr Wright supplied these notes:—

> "From the summit of Giant's Castle Pass the ground starts to slope downwards towards the precipices above the Loteni river. It is covered very largely with a closely cropped turf, and dotted about in this turf are small bare gravelly areas, of varying degrees of moisture. The soil that supports the turf is black and rich in humus. The gravelly areas have a good deal of mud derived from this black soil. On 11 xii 1973 the slope was covered with millions of closely packed specimens of *R. rubella* var. *thodiana*, the perfume from which could be distinctly smelt. These were growing mostly in the turf, but also on the less damp bare areas.
>
> "*R. rubella* was confined mostly to the damper bare areas, but the two varieties (species) mingled at the edges of their areas. In general the flowers of typical *R. rubella* var. *thodiana* are distinctly larger than those of *R. rubella* but the smaller specimens of the former and the larger specimens of the latter are hard to distinguish without closer examination. The two varieties are so closely intermixed and apparently in the same stage of flowering that every opportunity for cross breeding exists if it depends only on contiguity.
>
> "The number of specimens of *R. rubella* var. *thodiana* greatly outnumbered the number of specimens of *R. rubella*."

In fact, *Mr Wright* collected specimens in both localities which we interpret as *R. rubella* x *thodiana* (see below no. 244); there is also a specimen from Giant's Castle Pass which we take to be *R. baurii* var. *confecta* x *thodiana* (see no. 241).

In June 1972, Mr W. Marais kindly drew our attention to a plant that he has in cultivation at Kew; the stock is of unknown provenance, and was first given to Sir Frederick Stern by Mrs Garnett Botfield. It was then passing as *R. milloides*. The Kew plant is slightly more robust than the material described above (which agrees well with the type specimen), having the perigone tube 6 mm long and ovary 4 mm, but beak only 1 mm. Variation in flower size is commonplace in *Rhodohypoxis* and the Kew plant agrees in other respects with *R. thodiana*.

237. Rhodohypoxis rubella (Bak.) Nel in Bot. Jahrb. 51:300 (1914).

Syn.: *Hypoxis rubella* Bak. in Fl. Cap. 6:531 (1897).

Forbesia galpinii L. Bolus in J. Bot. 67:137 (1929). Type: Orange Free State, Mont aux Sources, xii 1928, *Galpin* NBG 2068/28 (BOL; PRE under *Galpin* 10366).

Underground axis spherical or ovoid, c. 7 mm diam. *Leaves* 3–7, blade 1–4·5 cm long, c. 1–1·5 mm diam., erect or spreading, filiform, apex acute, deeply channelled on inner face, rounded or angled on back, with sparse, very delicate long tufted spreading hairs, or glabrous, pseudostem 1–4·5 cm long. *Peduncles* 1–3, up to c. 3 cm long, completely hidden by the leaf sheaths, glabrous. *Flowers* solitary, perigone tube campanulate, c. 2–3 × 1·5–2·5 mm, outer segments c. 5–9 × 2–3 mm oblong-lanceolate, with an apical tuft of long delicate hairs, usually bright pink, rarely pale pink or white. *Anthers* c. 1–1·25 mm long. *Ovary* c. 2–3 × 1·5–2 mm, elliptic in outline, flattened on the inner face, convex on the outer, thin-walled, subterranean, hidden by the leaf sheaths, beak c. 7–15 mm long (depending on depth of silt), 1 mm diam., both ovary and beak glabrous or with a few tufts of delicate hairs. *Capsule* c. 3–5 × 3–4 mm with a thin white papery wall that ruptures irregularly to release the seeds. *Seeds* c. 1·25 mm long, testa minutely echinate.

Type: Basutoland (Lesotho), near the summit of Mont aux Sources, 2895 m, submerged in water, i 1894, *Flanagan* 2024 (K, BOL, PRE, SAM: NH but very poor).

NATAL. Estcourt distr., Giant's Castle Game Reserve, upper Injasuti, c. 3050 m, 16 xii 1964, *Trauseld* 300 (NU, PRE); *ibidem*, Bushman's River Pass, c. 2750 m, xii 1891, moist sandy places on summit, 1–2 in. high, flowers reddish, *Thode* s.n. STE 8377; *ibidem*, Giant's Ridge, c. 1980 m, Cave Sandstone pavement bog, in mud, 7 xii 1975, *Stewart* 1773 (E, NU). Lesotho-Natal border, Mont aux Sources, near hut, flowers light to dark pink, frequent in short grassland and frost erosion areas, 2 xii 1951, 2980 m, *Schelpe* 3042 (BM, NH); *ibidem*, Nov. 1930, *Schweickerdt* 30642 (PRE).

LESOTHO. Butha Buthe distr., Oxbow Agricultural Camp, 2740–3050 m, 18 xii 1969, *Williamson* 386A (K); valley no. 1, 3 ii 1954, *Coetzee* 385 (NBG); Mpojoa stream, c. 3000 m, 31 i 1954, *Coetzee* 395 (NBG). Mokhotlong distr., summit plateau c. ¼ mile north of summit Hlatimba Pass (from Impendhle distr.), c. 2900 m, 3 xii 1972, *Wright* 1318 (NU); c. 2 miles south of Giant's Castle Pass, summit plateau of Drakensberg, source of Mokhotlong river, c. 2900 m, 17 i 1973, *Wright* 1401 (NU); between Indumeni Dome and Castle Buttress, 2950 m, 5 xii 1952, *Killick* 1846 (PRE); Pela Tsoeu River, *Jacot Guillarmod* 2041 (PRE); Little Bokong River, 28° 8′ E, 29° 14′ S, 2590 m, *Jacot Guillarmod* 113 (PRE); Sani Top, 2860, 6 xi 1973, *Hilliard & Burtt* 7096 (E, NU); *ibidem*, 30 xii 1973, *Hilliard* 5402, 5404 (E, NU); 17 ii 1973, all fruiting, *Hilliard* 5321 (E, K, NU); *ibidem*, 14 i 1976, fruiting only, *Hilliard & Burtt* 8802 (E, NU); Black Mts, 3170–3230 m, 13 i 1976, *Hilliard & Burtt* 8787 (E, NU).

CAPE. Barkly East—Maclear distr. boundary, Naude's Nek, 2500 m, 27 xi 1971, *Hilliard* 5194 (E, NU); *ibidem*, 19 xi 1945, *Acocks* 12184 (PRE).

R. rubella is found growing in myriads in the shallow seasonal pools on the summit plateau of the high Drakensberg from Naude's Nek just south of the SE tip of Lesotho to Mont aux Sources and the Oxbow area of Lesotho, where Lesotho, Natal and the Orange Free State meet. It has only once been recorded over Cave Sandstone, at only 2000 m above sea level. At flowering, in November and December, the plants may be standing in shallow water or growing in damp silt or fine sandy gravel that will be inundated after rain showers. At fruiting, in late January and February, the standing water has often dried up. Only tufts of green wiry leaves are visible on the bare earth; capsules are all subterranean, buried in the surface layers of silt. At flowering, the ovaries are hidden in the leaf sheaths; the ripe capsules are free of the sheaths, partly through splitting of the delicate membranes, but partly too it would seem by elongation of the pedicels to bring the capsules just clear of the sheathing bases. The delicate capsule wall soon ruptures.

Typically *R. rubella* has its peak flowering period in the latter part of December. In different years our observations at Sani Top (c. 2850 m) may be summarized: 6 November, only the first few flowers showing; 30 December, in full flower; 14 January, all in fruit at Sani Top, but some in flower on the Black Mts at 300 m higher altitude.

238. Rhodohypoxis incompta Hilliard & Burtt, **species nova** a *R. rubella* ovarii rostro longiore, perigonii limbo majore, anthesi praecociore differt.

Tuber c. 10–12 × 8–10 mm. *Folia* 3–8, usque ad 7 cm longa, triangulari-filiformia, pilis marginalibus et in pagina inferiore costae exceptis glabra, basi vaginantia et pseudocaulem 8–35 mm formantia. *Pedunculi* axillares, 1–5, in vaginis omnino occulti. *Flores* solitarii. *Perigonium* tubo 2·5–4 mm longo glabro vel parce piloso; segmenta exteriora 8·5–20 (plerumque c. 15) mm longa, elliptica, apice acuta et glabra. *Antherae* superiores 1·5 mm longae, inferiores 1·75 mm. *Stylus* brevissimus, cum stigmate tricostato 1 mm longus. *Ovarium* 4 × 2 mm, glabrum, rostro 14–37 mm longo praeditum, triloculare; ovula in loculo 10–15. *Capsula* 4·5–7 × 3·5–4·5 mm. *Semina* in capsula plerumque c. 18 sed usque ad 50, 1·5 mm longa, nigra, minute echinata.

Type: Natal, Underberg distr., Cobham Forest Reserve, Upper Polela Valley, c. 2300 m, 21 xi 1976, *Hilliard & Burtt* 9303 (holo. E; iso. NU).

LESOTHO. Sani Top, c. 2900 m, 6 xi 1973, *Hilliard & Burtt* 7097; *ibidem*, 30 xii 1973, mostly fruiting, *Hilliard* 5401 (E, NU); *ibidem*, *Hilliard* 5403 (E, NU) mixed with *R. rubella*; *ibidem*, 16 i 1976, *Hilliard & Burtt* 8825 (E, NU). Sehlabathebe, 2425 m, 29 ix 1976, *Hoener & Beverley* 725 (E, NU).

R. incompta was first found in 1973 at the head of the Sani Pass and was in full flower in early November. At that date *R. rubella*, which grows in thousands in silt patches on slopes nearby, was only just pushing through the soil, only one or two stray flowers being seen. The habitat of *R. incompta* is different from that of *R. rubella*: it grows in the edges of grass or sedge tussocks bordering the silt patches or rock sheets. The flowers of *R. incompta* were much larger and less neatly formed than those of *R. rubella*, but the relationship is clearly a very close one. At first we were undecided whether to treat *R. incompta* as a distinct species or just as a large and early-flowering variety of *R. rubella*. However in November 1976 we found it again in the Upper Polela Valley. In a straight line this new station is only some 6 miles from Sani, but here the plant was growing alone: there was no *R. rubella* in the neighbourhood, and indeed there was no habitat suitable for it. *R. incompta* was growing in the edges of grass tussocks on wet sandstone rock sheets, thus confirming its ecological distinction from *R. rubella*. More recently still we have seen a few late flowers of *R. incompta* on wet rocky basalt slopes at Sani, further up the valley towards Hodgson's Peaks. There seems little doubt that it deserves specific rank. At Sani the presence of *R. rubella* makes hybridization possible, and a recent collection from Sehlabathebe seems to include one or two plants of *R. rubella*; we have therefore taken the specimen of the isolated population in the Polela Valley as the type of the name.

239–244. HYBRIDS WITHIN RHODOHYPOXIS

239. R. baurii var. **baurii** x var. **platypetala**
TRANSKEI. Mt Ayliff distr., Mt Insizwa, 17 xi 1973, *Hilliard & Burtt* 7315, 7317 (E, NU). Tabankulu distr., Mt Tabankulu, 18 xi 1973, *Hilliard & Burtt* 7353, 7355 (E, NU).
CAPE. Mt Currie distr., farm 'Hebron', NE of Kokstad, c. 1740 m, 20 xi 1973, *Hilliard & Burtt* 7373 (E, NU).
NATAL. Alfred distr., Zuurberg, c. 1500 m, 30 xi 1973, *Hilliard & Burtt* 7547 (E, NU).

The putative hybrids were always pink-flowered and occupied the intermediate zone between the wetter habitat of *R. baurii* var. *baurii* and the drier one of var. *platypetala*. The narrowness of the hybrid zone, especially marked on the Zuurberg, suggests that either the range of both cross-pollination and seed dispersal is very short or that the hybrid plants are very restricted in their ecological tolerance.

240. R. baurii var. **confecta** x **R. deflexa**
LESOTHO. Sani Top, east of pass, c. 2850 m, 14 i 1976, *Hilliard & Burtt* 8805 (E, NU).

These specimens were collected from wet marshy turf where they were surrounded by myriads of *R. deflexa*. Larger than *R. deflexa* in flower (outer perigone segments 7–10 mm), they were nonetheless slightly smaller than *R. baurii* var. *confecta* which was growing on drier rocky ground nearby: these plants also had leaves intermediate in hairiness between the putative parents, and clear pink flowers.

241. R. baurii var. **confecta** x **R. milloides**
NATAL. Utrecht distr., farm 'Nauwhoek', 2100 m, 6 xi 1976, *Hilliard & Burtt* 9171 (E, NU).

R. milloides was growing in a broad wet flush area with flat rocks: it had the characteristic bright green erect leaves, but the flowers were pale to deep pink, not the more usual magenta. Nearby on drier ground was *R. baurii* var. *confecta* with its medley of white and pink flowers and more hairy much duller green leaves than those of *R. milloides*. In wet ground between these two populations were numerous plants with leaves erect, but more hairy than in *R. milliodes*, though less so than in *R. baurii*, and with pale pink flowers: one such plant was noted as having the young flowers white and the old ones deep pink, thus showing the colour change characteristic of *R. baurii* var. *confecta*.

242. R. baurii var. **confecta** x **R. thodiana**
LESOTHO. Summit Langalibalele Pass, c. 2820 m, 20 xi 1973, *Wright* 1588 (E).
NATAL. Estcourt distr., Giant's Castle Pass, c. 2610 m, 11 xii 1973, *Wright* 1607/A (NU).

Two plants sorted out from a collection of *R. thodiana* lack the ovary beak of that species, but have the strongly marked intramarginal nerve. They probably represent this hybrid but confirmation is obviously needed.

243. R. baurii var. **platypetala** x **R. milloides**
NATAL. Estcourt distr., Giant's Castle Game Reserve, c. 2100 m, 11 xii 1973, *Wright* 1604 (E, NU); *ibidem*, 7 xii 1975, *Stewart* 1767, 1775 (E, NU); Highmoor, main road to large dam, 2010 m, 12 xii 1973, *Wright* 1615 (E, NU); 'Game Pass' and Highmoor F.R., divide between Mooi and Loteni R, 28 x 1973, *Hilliard & Burtt* 6964, 6965, 6967, 6969 (E, NU); Kamberg area, summit of Little Berg, 2100 m, 11 xi 1972, *Wright* 1290 (E, NU). Lions River district, Fort Nottingham Commonage, 13 x 1976, *Wright* A2, B1, 2, 3, C1, 2 (NU); *ibidem*, 26 x 1976, *Hilliard & Burtt* 9066 (E, NU); Nhluzane, S slopes, 28 x 1976, *Hilliard & Burtt* 9094, 9097 (E, NU). Richmond distr., escarpment above Byrne, c. 1500 m, 13 xi 1975, *Hilliard* 5586 (E, NU), 5588 (NU); *ibidem*, 16 xi 1975, *Schofield* s.n. (NU). Polela distr., Mawahqua Mt, 'Sunset', 1800–2100 m, 6 xi 1971, *Rennie* 70 (NU); *ibidem*, 10 xi 1973, *Hilliard & Burtt* 7241 (E, NU).

Wherever *R. baurii* var. *platypetala* and *R. milloides* occur close together we have found evidence of hybridization. *R. milloides* is always in the wetter habitat and the putative hybrids are usually represented by pink-flowered plants growing in the intermediate zone between the two parents. In one locality on 'Game Pass', quite deeply coloured plants were found growing in and around rocks in the habitat of *R. baurii* var. *platypetala* and here it seemed likely that there was some introgression from *R. milloides* into *R. baurii*. No situations have been seen in which the plants in the wetter areas were anything but pure *R. milloides*.

It will be noted that all the material quoted above is recent. Allocation of old material, collected without knowledge of the botanical situation, is difficult and can be misleading. For instance, sheets of *Wood* 4182 (moist ground, Weenen County, 8 xii 1890) in different herbaria cover *R. milloides* and the hybrid. The same probably applies to *Wood* 4260 (Liddesdale, 12 xii 1889); and a hybrid situation is strongly suggested by *Evans* 274 (NH), from Maxwell, near Ixopo; the collector noted "flowers vary from white to deep pink; rocky places and nearby swamp".

244. R. rubella x **R. thodiana**
LESOTHO. Summit of Langalibalele Pass, c. 2820 m, 20 xi 1973, *Wright* 1586, 1587 (E); exit from Giant's Castle Pass, c. 3000 m, 11 x 1973, *Wright* 1608 (E, NU), 1608A (NU), the A specimen more clearly hybrid, 1608 introgressed.

Mr Wright's notes with reference to the Giant's Castle Pass populations have been quoted under *R. thodiana* (no. 236 above), and it will be remembered that he recorded *R. thodiana* as being much more plentiful in this locality than *R. rubella*. We have sorted out from his collections the plants recorded above as *Wright* 1608/A which certainly seem to be hybrids between *R. rubella* and *R. thodiana*. They are much less hairy plants than *R. thodiana* but do have hairs on the ovary (absent in *R. rubella*) and the leaves are intermediate in width (c. 1 mm in *rubella*, c. 2·5 mm in the putative hybrid, 4–5 mm in *thodiana*) and show the intramarginal nerves of *R. thodiana*: pedicels are shorter than in *R. thodiana*, longer than in *R. rubella*.

Apart from these hybrid plants, however, it is found that all the plants collected as *R. rubella* (*Wright* 1608, E, NU) in this locality [and indeed at the station on Langalibalele Pass as well (*Wright* 1587, E)] have flatter more hairy leaves than usual. It seems possible that the whole of the *R. rubella* population has been introgressed from the more numerous one of *R. thodiana*. A similar situation is reported under the hybrid *Hypoxis parvula* x *Rhodohypoxis baurii* (no. 245).

245–248. HYBRIDS BETWEEN HYPOXIS PARVULA AND RHODOHYPOXIS

Miss S. Wood (unpublished M.Sc. thesis, University of Natal, 1976) has shown that *Hypoxis parvula* Baker is distinct from *H. membranacea* Baker, to which Baker himself reduced it as a synonym (in Dyer, *Fl. Cap.* 6:182. 1896). *H. membranacea* has 1–3 flowers on each peduncle (flowers always solitary in *H. parvula*), 2 bracts (1 or 0 in *H. parvula*), and larger leaves; it is found at lower altitudes than *H. parvula*, and probably does not overlap with *Rhodohypoxis*. These two species differ from all the rest of *Hypoxis* by their elongate styles and short subcapitate stigmas.

H. parvula occurs in two forms, one with white the other with yellow flowers. Though they may occur in the same area, they do not appear to intermingle. For instance, Mr F. B. Wright has looked at the situation on the south-facing slopes of Kamberg Mt: he reports that the white form is found at about 1860 m, very common, and continues up to 1980 m; a metre higher was a yellow-flowered plant and from there on a few plants with yellow flowers were found to just below the summit, but none with white flowers. These observations agree with out own general impressions: the yellow-flowered plant is always found at the higher altitudes. The situation needs further study before a decision can be taken on what taxonomic rank these variants merit.

The immediate point of interest is that *Rhodohypoxis* hybridizes in the wild with *H. parvula*, and apparently with both white and yellow forms. Interbreeding with other species of *Hypoxis* is unknown. The style and stigma, which distinguishes *H. parvula* and *H. membrancea* from all other species of *Hypoxis*, are not, however, characters in which they approach *Rhodohypoxis*. In leaf form there is some similarity between *H. parvula* and the broader-leaved forms of *R. baurii* var. *platypetala*, but the leaves of *H. parvula* are much thinner, a difference consistent with its preferred habitats of damp grassy banks or crannies under boulders.

Hypoxis and *Rhodohypoxis* differ markedly in the structure of the anther: *Hypoxis* has latrorse dehiscence and the anthers are similar back and front, *Rhodohypoxis* has introrse dehiscence and the anthers are rounded on the back with thick swollen connective. Intermediates between these two states are not easily measured, but the intergradation is easily observed and is illustrated in fig. 3. Hybridization is betrayed by at least a slight swelling of the connective on the back of the anther.

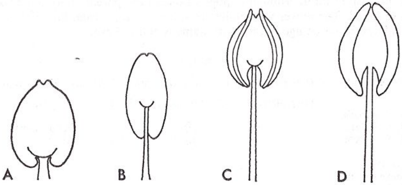

FIG. 3. Inner stamens (from outside) of *Rhodohypoxis baurii* (A), *Hypoxis parvula* (D) and two of the natural hybrids between them, B being closer to *R. baurii* and C to *H. parvula*. All ×12.

245. Hypoxis parvula (white form) x **Rhodohypoxis baurii** var. **baurii**
CAPE. Mt Currie distr., farm 'Hebron', NE of Kokstad, 1500 m, *Hilliard & Burtt* 7376 (E, NU).

The hybrids are most easily recognised when they are pink-flowered plants that have lost the inflexion of the inner tepals and have exserted stamens. Plants from this colony on the farm 'Hebron', near Kokstad, have been cultivated in the Royal Botanic Garden, Edinburgh, and have provided material for detailed study. A number of plants were lifted in the wild, and also a sample of the *Hypoxis parvula* populations. Even white-flowered hybrids retained the *R. baurii* characters of red filaments, and hybrid origin may always be detected in the form of stamens (fig. 3). The characters most easily measured as an assessment of hybridity are perigone-tube, filament, and style. When we came to compare the plants collected at 'Hebron' as true *H. parvula* (*H & B* 7377) with plants from areas where *Rhodohypoxis* was absent, or where there were no signs of hybridization, we found that all the plants from 'Hebron' had relatively short filaments and styles, suggesting that, apart from the obvious hybrids, the whole *H. parvula* population had been introgressed by *H. baurii*. Comparative measurements are shown in Table 1, p. 70.

246. Hypoxis parvula (yellow form) x **Rhodohypoxis baurii** var. **confecta**
NATAL. Underberg distr., Thamathu Pass, c. 2460 m, *Hilliard & Burtt* (photo E).

This possible hybrid consisted of a single plant only and further research in this area is obviously needed. The populations of *H. parvula* and *R. baurii* var. *confecta* were close together but did not actually intermingle.

247. Hypoxis parvula (white form) x **Rhodohypoxis baurii** var. **platypetala**
NATAL. Lions River distr., Nhluzane, 1920 m, in short grass among rocks just below summit, 28 x 1976, *Hilliard & Burtt* 9110 (E).

In extensive and intermingling populations of the parents only one hybrid was detected. The flower was similar in shape to *H. parvula*, but showed its *Rhodohypoxis* parentage in the short stamens and red eye.

TABLE I

Measurements of *Hypoxis parvula*, *Rhodohypoxis baurii* and their hybrids (in mm)

	Long filaments	Short filaments	Style	Notes
Hypoxis parvula				
H. & B. 8912	5	3·5	5	yellow tepals
H. & B. 5589	5	3·5	4·5	white tepals
H. parvula (introgressed)				
H. & B. 7377	4	2·5	3	white tepals with red filaments
	3·5	2·5	2·5	
H. parvula x *Rhodohypoxis baurii*				
H. & B. 7376	3·5	2	2	
	1·5	0·75	1·75	white tepals with pink margin
	1·5	0·75	0·5	deep pink tepals, shortly ascending before spreading
	1	0·75	1	white flushed pink tepals, scarcely united
Rhodohypoxis baurii	1	0·5	0·5	red tepals

248. Hypoxis parvula (white form) x **Rhodohypoxis milloides**
NATAL. Lions River distr., Fort Nottingham Commonage, c. 1650 m, 26 x 1976, *Hilliard & Burtt* 9059 (E).

The hybrids had bright pink flowers easily recognised by the open throat with the yellow anthers visible in the centre. In this locality *H. parvula* was most frequently flushed pink on the outside of the tepals, rather than the more usual green; however, there was no indication that this was due to introgression from *R. milloides*.

249. Saniella Hilliard & Burtt, **genus novum** *Rhodohypoxidi* Nel affine sed differt perigonii segmentis subaequalibus interioribus basi nec unguiculatis nec inflexis, filamentis longis, antheris e tubo perigonii exsertis latrorsim dehiscentibus, connectivo haud dorso incrassato. Ab *Empodio* Salisb. ovario triloculari (haud uniloculari), seminibus nudis (haud strophiolatis), caudice hypogaeo (nec cormo), floribus albis (nec luteis) facile distinguitur. *A Spiloxene* Salisb. caudice hypogaeo (nec cormo), perigonii tubo, antherae connectivo dorso percurrente, ovario longe rostrato recedit.

Saniella verna Hilliard & Burtt, **species nova** adhuc unica.

Herba acaulis e caudice verticali carnoso ad c. 1 cm longo et 5 mm diam. radicibus carnosis contractilibus praedito, pseudocauli subterraneo e vaginis membranaceis foliorum composito 2–3 cm longo. *Folia* (3–)4–6, supra vaginam linearia, 40–80 × 2–4 mm, arcuato-patentia, profunde sulcato-carinata, glabra, canaliculis muco incolorato plenis percursa (fig. 1F, p. 47). *Flos* unicus, axillaris, brevissime pedicellatus; perigonium in rostro ovarii 20–47 mm longo elevatum; tubus 2–4 mm longus; segmenta magnitudine variabilia, c. 8 × 2·5—14 × 4 mm, subaequalia, elliptica, alba. *Stamina* 6, prope basin tubi orientia; exteriora filamentis 3–4 mm antheris 2·5–3 mm, interiora filamentis 2·5–3·5 mm antheris 3–4 mm; antherae latrorsim dehiscentes, filamentis basifixis dorso ad apicem percurrentibus. *Ovarium* triloculare, oblongum, c. 3 mm longum, altera facie plana altera convexa; rostrum 20–47 mm longum; stylus 3–6·5 mm; stigma (2–)3-fidum, interne papillosum. *Fructus* subterraneus, tenuis, irregulariter ruptus. *Semina* nigra, mamillata, ellipsoidea, 1·5 mm longa, micropylo et funiculo conspicuis.

Dwarf herb with vertical underground fleshy rootstock. *Leaves* all radical, (3–)4–6, membranous and sheathing at base; lamina linear, 40–80 × 2–4 mm, deeply channelled above, glabrous, rather fleshy. *Flowers* solitary, axillary, very shortly pedicellate. *Perigone* raised on the 20–47 mm long ovary beak; tube 2–4 mm long; segments c. 25 × 8 to 14 × 4 mm, subequal, elliptic. *Stamens* 6 arising near base of tube; outer with filaments 3–4 mm, anthers 2·5–3 mm; inner with filaments 2·5–3·5 mm, anthers 3–4 mm; anthers dehiscing laterally, filaments attached dorsally near base and running up back of anther to tip. *Ovary* trilocular, c. 3 mm long; beak 21–47 mm long; style 3–6·5 mm; stigma (2–)3-fid, papillose on inner face. *Fruit* subterranean, thin-walled, breaking irregularly. *Seeds* black, mamillate, ellipsoid, 1·5 mm long, with conspicuous micropyle and funicle.

Type: Lesotho. Black Mountains, between Sani and Mokhotlong, c. 3050 m, 5 xi 1973, *Hilliard & Burtt* 7076 (holo E; iso NU). Also seen at 2850 m at Sani Top.

CAPE. Barkly East div., Naude's Nek, 2580 m, 27 xi 1971, *Hilliard* 5201 (E, NU).

LESOTHO. Qacha's Nek distr., c. 29° 46′ S, 29° 13′ E, marsh near head of Mashai Pass, c. 2700 m, 7 xi 1977, *F. B. Wright* sub *Hilliard & Burtt* 10493 (E, NU).

The first collection from Naude's Nek, Barkly East division, consisted of two plants only: no more could be found despite careful search, and the specimen was put down as '*Empodium?*' In the early spring of 1973 the same plant was found in Lesotho on the Black Mountains and at Sani Top. It was growing in profusion, starring the short wet turf sloping down to stream banks and looking like a white crocus. Both at Naude's Nek and in Lesotho *Haplocarpha nervosa* (Thunb.) Beauv. was an associate.

The flowers of *Saniella* have white perigone segments which are pale yellow at the base, blending into the pale yellow tube; they are somewhat yellowish-green up the midline on the outside; filaments, style and stigma are pale yellow, anthers deeper yellow.

A median transverse section of the leaf of *Saniella* is V-shaped in outline. The upper epidermal cells are small and uniform in size right across the leaf (there are no enlarged bulliform cells over the midrib as in *Rhodohypoxis*). There is a well-developed mucilage canal above the midrib and above each of the lateral veins. The palisade tissue is loosely packed and the lower mesophyll is very spongy; these layers both contain chlorophyll but the loose middle mesophyll (between the veins) is colourless; towards the margins the cells become more closely packed and resemble the uniform mesophyll of *Rhodohypoxis*; as in that genus scattered cells containing bundles of raphides have been observed. The generic importance of some of these features is further discussed below.

THE GENERA OF HYPOXIDEAE

The revision of *Rhodohypoxis* and the description of *Saniella* follow previous notes on the allied genus *Empodium* (*Notes R.B.G. Edinb.* 32:308, 1973). In dealing with these three items we have necessarily had to look at generic concepts in the group as a whole—that is Hypoxideae with the exception of the Australasian *Campynema* and *Campynemanthe*, which are sometimes placed here but do not seem to be closely related to the other genera.

We have examined representative members of all the genera recognised by Nel (*Bot. Jahrb.* 51:239, 1914) and in essentials we concur in his taxonomic conclusions if not in all his statements. It should be noted that since 1914 there have been changes in generic nomenclature: the genus called *Ianthe* Salisb. by Nel is *Spiloxene* Salisb., while *Forbesia* [Eckl. ex] Nel is *Empodium* Salisb. We use the latter names in each case, even in reference to Nel's work. Nel did not deal with the small Cape endemic genus *Pauridia* Harv., which differs from the rest of Hypoxideae in having only three fertile stamens. Pax (in Engl. & Prantl, *Naturl. Pflanzenfam.* 2, 5:96. 1887; 2 Aufl. 15a:390, 1930) referred *Pauridia* to Haemodoraceae, and he was followed by Phillips (*Gen. S Afr. Fl. Pl.* 158. 1926; ed. 2, 197, 1951). Harvey had, however, given good reasons for placing it in Hypoxideae and almost all other authors (Lindley, Bentham, Baker, Hutchinson for example) have agreed with him; confirmation has come from Brackett (in *Contr. Gray Herb.* 69:155–163, 1923), de Vos (in *J. S. Afr. Bot.* 15:13-22, 1949), and Geerinck (*Bull. Jard. Bot. Nat. Belg.* 39:47–82, 1969).

No one will quarrel with Geerinck's view (*Bull. Jard. Bot. Nat. Belg.* 39:74, 1969) that the terminology applied to the attachment of anther to filament by Nel and others is often muddled and misleading; this does not alter the fact that in *Hypoxis* and related genera there are important differences in the structure of the stamens, and Nel was quite right to try to use these in his classification. The genera can, however, be classified into two groups more easily than by use of the ill-defined terms 'dorsifixed' and 'basifixed'. In *Empodium*, *Molineria*, *Rhodohypoxis* and *Saniella* the filament joins the anther low down on the outer face. The anthers are different on the inner and outer faces: this may be obvious, as in *Molinieria* and *Rhodohypoxis*, or the difference may be slight as in *Empodium* and *Saniella*. In the latter case a transverse section of the anther shows that the vascular strand is not strictly central and there is a decided groove between the thecae on the inner face which is lacking on the outer (fig. 4A). In *Curculigo*, *Hypoxis*, *Pauridia* and *Spiloxene* the anthers look the same on inner and outer faces: the filament

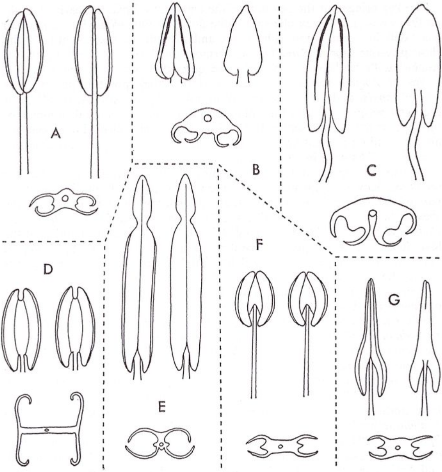

FIG. 4. Stamens of Hypoxideae, view from inside on left, from outside on right, and median transverse section. A, *Saniella verna*; B, *Rhodohypoxis milloides*; C, *Molineria capitulata*; D, *Pauridia minuta*; E, *Empodium monophyllum*, the apical appendages are filled with mucilage and sometimes show a lateral line of dehiscence; F, *Hypoxis parvula*; G, *Curculigo orchioides*. A, B, D, F, G, stamens ×8, t.s. anthers ×16; C, E, stamens ×6, t.s. anthers ×12.

joins the anther medianly in the sinus between its basal lobes. Thus in the first group a cross-section of the anther is asymmetrical, in the second group it is symmetrical. This grouping differs from Nel's in interchanging the positions of *Spiloxene* and *Rhodohypoxis*.

The stamens certainly provide important taxonomic features, but they are not to be considered decisive in matters of affinity. *Rhodohypoxis* is most closely related to *Hypoxis* despite the differences in the stamens; and *Empodium* is not close to *Molineria* although the anthers of both are asymmetric in cross section. The genera do not differ in staminal characters alone. For each genus there are good supporting features to justify its recognition and these are incorporated in the key that follows. The staminal differences are not necessarily the easiest to use and we have made them the primary means of discrimination only where other characters are less reliable

The key brings out the position of the new genus *Saniella* clearly enough. At first we took it for an aberrant white-flowered *Empodium*, but *Empodium* has a definite corm, a unilocular ovary and strophiolate seeds, and lacks the short perigone tube of *Saniella*. Furthermore the deeply channelled glabrous somewhat fleshy leaves of *Saniella* are quite different from the grass-like leaves of *Empodium*. Perigone tube and rootstock point rather towards *Rhodohypoxis*, and the ovary beak more especially towards *R. rubella*; but the open perigone mouth, long filaments, different anthers and presence of mucilage canals in the leaves (as well as other anatomical differences, see above) require too great an extension of the characters to permit the accommodation of *Saniella* in *Rhodohypoxis*.

No overall survey of the leaf-anatomy of *Hypoxideae* is available for reference. However, mucilage canals are apparently not found in the upper part of the leaf in *Hypoxis* sens. strict., though they may be present in the sheath (Scharf in *Bot. Centralbl.* 52:181, 1892; Pirotta in *Ann. Inst. Bot. Roma* 5:83, 1892–4). Mucilage canals lying above the vascular bundles of the leaf-blade have been reported (Schulze in *Engl. Bot. Jahrb.* 17:343, 1893) in *Pauridia* and in *Hypoxis glabella* R.Br. and *H. minuta* (L.) L.f., two species now to be referred to *Spiloxene*.

Recently M. F. Thompson has reported on seven species of *Spiloxene*, two of *Pauridia* and one of *Empodium* (see *Bothalia* 12:111–117, 1976). Mucilage canals were found in the lamina of all, except two species of *Spiloxene*. *Empodium* stands alone in having the mucilage canals scattered in the mesophyll. In *Spiloxene* and *Pauridia*, as in *Saniella*, they are placed above the vascular bundles. Thus leaf anatomy certainly suggests that *Saniella* is closely related to *Spiloxene* and *Pauridia*. Points of difference are marked, however. *Pauridia* and *Spiloxene* both have true tunicate corms and both have anthers that are symmetrical in cross-section. *Pauridia* agrees with *Saniella* in having a perigone tube, but differs in having only three stamens. *Spiloxene* lacks a perigone tube and the long ovary beak. Neither genus could easily be stretched to include *Saniella*. It is also noteworthy that *Pauridia* and *Spiloxene* are both members of the Cape flora which enjoys a winter rainfall. *Saniella*, like *Rhodohypoxis*, belongs to the summer rainfall area.

Before Nel's study, *Molineria* was separated from *Curculigo*, either at generic or sectional level, because it lacked an ovary beak. Nel relied rather on the structure of the stamens, recognizing that in *Molineria* the ovary beak might be present or absent. Use of the anther character (which we would express briefly as: anther asymmetric in cross-section in *Molineria*, symmetric in *Curculigo*) permits the association in *Molineria* of two coarse-growing Indo-Malayan plants that are superficially very similar, the beakless *M. capitulata* (Lour.) Herb. and the beaked *M. latifolia* (Dryand.) Kurz. On the other hand the anther-character excludes from *Molineria* the plant variously known as *M. finlaysoniana* Bak., *Curculigo finlaysoniana* (Bak.) Hook. f., *C. leptostachya* (Wight) Alston or *Molineria leptostchya* (Wight) Abeywickrama (the nomenclature unfortunately still needs revision). This species is best placed at present in *Curculigo*: it has the anther and seed of that genus, but is anomalous in having a beakless ovary and an aerial branched inflorescence, the upper flowers of which are functionally male. It was probably not examined by Nel, for he described *Curculigo* as always having an ovary beak. There are two endemic species in the Seychelles, *Curculigo seychellensis* Bak. and *Molineria rhizophylla* (Bak.) Bak.; the former with an ovary beak, the latter without one. However they have similar elongate apiculate anthers that are symmetrical in cross section. They are however much more robust than the anthers of *Curculigo* and the generic position of these plants needs reconsideration when more ample material is available.

There is no doubt that there is an innate tendency for an ovary beak to develop under certain circumstances; it is also clear that it has arisen independently in different genera and does not form a reliable taxonomic character at generic level.

Equally the form of fruit shows parallel development. It seems that when species dwell in rather damp habitats free dispersal of the seeds may be lost; the peduncle or pedicel tends to bend downwards after flowering and the fruit is thin-walled, moulded to the seeds within and showing rather irregular dehiscence. This situation is found in *Hypoxis decumbens* L. and some allied American species, in the Asiatic *H. aurea* Lam., in *Spiloxene aquatica* (L.f.) Fourcade, in *Pauridia minuta* (L.f.) Dur. & Schinz, in *Rhodohypoxis deflexa* and no doubt elsewhere.

The rootstock is also important. Presumably the vertical stock, which is virtually a slow-growing underground trunk, is the primitive type. It is found in *Hypoxis* and *Curculigo*; in *Rhodohypoxis* and *Saniella* there is an abbreviated vertical stock which is more fleshy and less fibrous than those of *Curculigo* and *Hypoxis* and lacks the characteristic yellow pigment common in these genera. Underground stolons may arise from the lower leaf axils. A few specimens of *Hypoxis* seem to have a true corm; these are chiefly American species, and a corm is characteristic of *Empodium*, *Pauridia* and most species of *Spiloxene*, where a considerable variety of corm-tunic is displayed (see Nel in *Bot. Jahrb.* 51:252, fig. 1, 1914; Thompson in *Bothalia* 12:111, fig. 1, 1976).

The black and brittle seed coat is one of the most characteristic features of Hypoxideae. Commonly (always?) the development of this black seed-coat covers the uppermost part of the funicle, which remains attached to the seed. The testa varies from almost smooth (*Curculigo scorzonerifolia*, *C. pilosa*) to echinate (*Hypoxis hirsuta*—see Brackett in *Contr. Gray Herb.* 69:126, fig. 2, 1923; other seed types are also figured here). In *Molineria* the seed has an irregular ridging superposed on the testa pattern. There is little doubt that seeds provide both specific and generic characters, but no survey of the whole group has yet been made, and adequate material is not available for all species.

TENTATIVE KEY TO GENERA OF HYPOXIDEAE

1a. Perigone segments united at base into a tube* 2
1b. Perigone segments free to base* 4

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* A solid prolongation of the ovary, the ovary beak, is found in some species of most genera: this is not a perigone tube.

2a. Stamens 3; rootstock a corm surrounded by hard leaf-base fibres *Pauridia* Harv.

2b. Stamens 6; rootstock a vertical axis 3

3a. Anthers included in tube, introrse; filaments very short, the inner and outer series arising on the tube at different levels; inner perigone segments clawed, inflexed above base and closing mouth of perigone; style short, equalling stigma . *Rhodohypoxis* Nel

3b. Anthers exserted from tube, latrorse; filaments arising at base of tube, 2·5–4 mm long; perigone segments all similar, spreading from base; style about twice as long as stigma . . . . . *Saniella* Hilliard & Burtt

4a. Ovary unilocular 5

4b. Ovary trilocular 6

5a. Seeds strophiolate; ovary usually beaked . *Empodium* Salisb.

5b. Seeds not strophiolate; ovary not beaked . *Spiloxene* Salisb.

6a. Anthers rounded on back, with a groove between the thecae on inner face (i.e. anther asymmetric in cross-section); filament attached low down on back of anther; flowers in bracteate capitate raceme, or more rarely raceme elongate, dense-flowered; leaves petiolate; fruit fleshy. . . . . . *Molineria* Colla

6b. Anthers similar on both surfaces (i.e. symmetric in cross-section); filament attached medianly in sinus of anther thecae (the basal auricles may curve to inside of filament) 7

7a. Plants, or at least outside of flower, hairy; leaves strongly veined; rootstock usually a thickened vertical axis, rarely a corm; anther thecae usually divergent at base 8

7b. Plants glabrous; leaves somewhat fleshy, not strongly veined; rootstock a corm, in a few marsh plants almost absent and replaced by thick lateral roots; anther thecae not usually divergent at base . . . . *Spiloxene* Salisb.

8a. Seeds mamillate or echinate; ovary not beaked; flowers all hermaphrodite . . . . *Hypoxis* L.

8b. Seeds striate or nearly smooth; ovary usually beaked and flowers solitary in axils, if beak absent flowers numerous and the upper ones functionally male . . . . . *Curculigo* Gaertn.

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