

Two new species of *Spiloxene* (Hypoxidaceae) from the northwestern Cape, South Africa

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ABSTRACT

Newly described are two new species of *Spiloxene* Salisb.: *S. nana* Snijman from the Bokkeveld Escarpment, Northern Cape Province, is a shade-loving plant with narrow, pale green leaves and small, white or rarely cream-coloured flowers; *S. pusilla* Snijman from the Matsikamma, Gifberg and Pakhuis Mountains, Western Cape Province, resembles *S. nana* in habit but the yellow- or white-tepalled flowers which are tetramerous or hexamerous have darkly coloured stamens and style and an ovary with a short, solid, narrow prolongation at the apex. Inhabiting rock overhangs formed by quartzitic sandstone sheets, both species are close allies of *S. scullyi* (Baker) Garside from Namaqualand.

With about 30 species, *Spiloxene* Salisb. is the largest genus of the family Hypoxidaceae in the Greater Cape Floristic Region, which corresponds geographically with the winter and all-year rainfall region of southern Africa. The genus, as presently circumscribed, was first separated from *Hypoxis* L. by Williams (1901) who reinstated the name *Ianthe* Salisb. that was originally applied to just three species (Salisbury 1866). Despite its early history, the genus has nevertheless remained one of the most poorly studied groups of Cape geophytes. The last comprehensive revision of the genus was that of Nel (1914) who, having taken into account that the letters I and J are interchangeable in the transliteration of the Greek letter 'iota', re-introduced the spelling *Janthe*, which was first used by Pax (1887) for a section of *Hypoxis*. Fourcade (1932) then changed the name to *Spiloxene* following the discovery that *Ianthe* Salisb. (Salisbury 1866) is a later homonym of *Janthe* Griseb. (Grisebach 1844), which has become a synonym of *Celsia* L. in the family Scrophulariaceae.

In two recent regional treatments, the accounts of *Spiloxene* included an undescribed species, which was referred to as 'sp.1' (Snijman 2000a; Manning *et al.* 2002). In the short period following the preparation of these publications, however, new material has been collected that clarifies what was proposed as the new species. It has become apparent that what was previously regarded as one species actually comprises two species of shade-loving plants that are separated from one another geographically. The new species are described and illustrated here as *Spiloxene nana* from the Bokkeveld Escarpment near Nieuwoudtville, Northern Cape, and *S. pusilla* from the Matsikamma–Gifberg massif near Vanrhynsdorp and the Pakhuis Mountains in the northern Cederberg, Western Cape.

***Spiloxene nana* Snijman, sp. nov.**, quoad habitum et floribus parvis ad *S. pusillae* Snijman, sed ab ea differt filamentis e basi libris, antheras et stigmatibus luteolis (haud rubiginosis). Ab *S. scullyi* (Baker) Garside foliis 1.5–5.0 mm (nec 3–14) mm latis, floribus 2 (nec 2–5),

albis raro cremeis (non luteis), ovario triloculari (non uniloculari) et placentatio axilis (non parietali) facile distinguitur. Figura 1.

TYPE.—Northern Cape, 3119 (Calvinia): Oorlogskloof Nature Reserve, 773 m, (–AC), 11-10-200 *W.A.J. Pretorius* 589 (NBG, holo.; K, MO, PRE).

Deciduous, entirely glabrous, softly herbaceous, cormous plant, 95–350 mm high. *Corms* growing horizontally or geotropically; new corms somewhat globose, 4–10 mm diam., loosely covered by brown tunics; old corms persisting for a few seasons as withered, flattened discs; innermost tunics papery, outermost softly fibrous; fibres fine, reticulate and free from corm base; roots dimorphic, arising from near base of new corm, slender and spreading, contractile and geotropic. *Shoot* arising laterally, surrounded at base by a membranous cataphyll up to 45 mm long. *Foliage leaves* synanthous, 2–6, 3-ranked in a basal tuft, sheathing from \pm 10–30 mm at base; blades suberect to slightly arched, narrowly lanceolate, V-shaped in *t/s*, 35–350 \times 1.5–5.0 mm, the innermost narrowest, pale green, soft and thin-textured, keeled abaxially almost to apex; margins entire. *Inflorescences* 2 or more, erect, a 2-flowered umbel-like raceme; scape 30–150 \times 0.5–2.0 mm, laterally compressed, pale green with membranous lateral edges; bracts 2, opposite, partially sheathing pedicels proximally, lanceolate, 10–40 \times 3–4 mm, foliaceous, shallowly keeled, inconspicuously nerved, pale green, with translucent margins. *Flowers* stellate, usually opening sequentially, unscented; pedicels suberect at anthesis thereafter spreading horizontally, triangular in *t/s*, 35–80 \times 1 mm, slender, pale green; tepals 6, reflexed when fully open, narrowly lanceolate, 2.5–7.0 (–12.0) mm long, white or rarely cream-coloured, occasionally flushed pink, backed with pale green in outer whorl, outer tepals 1.5–2.5 mm wide and mucronate, inner tepals 1–2 mm wide and minutely mucronate. *Stamens* 6, slightly spreading, unequal, outer whorl slightly shorter than inner; filaments inserted at base of tepals and joined to sinus between anther lobes, filiform, 0.5–1.5 mm long, yellow; anthers latrorse, oblong, 1.5–2.0 mm long before opening, yellow, apical and basal lobes slightly spreading and \pm 0.05 mm long; pollen yellow. *Ovary* inferior, narrowly tubular to ellipsoidal, 2.5–8.0 (–11.0) \times 0.7–2.0 mm, 3-locular with axile placentation, narrowed distally

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FIGURE 1.—*Spiloxene nana*: A, B, Pretorius 589; C–F, Rourke 2218. A, whole plant, including t/s leaf; B, corm; C, flower; D, stamens, style column and stigmatic branches; E, capsule; F, seed. Scale bars: A, 5 mm; B, 2 mm; C, 2.5 mm; D, 1 mm; E, 3 mm; F, 0.2 mm. Artist: John Manning.

into an inconspicuous, solid, ± 0.5 mm prolongation that sometimes extends up to 1 mm after anthesis; ovules 15–20 per locule; style column cylindrical, 0.3–0.5 mm long, white; stigmatic branches 3, erect but eventually spreading, 1.2–3.0 mm long, tapering upwards from broad base, with edges of abaxial surface slightly folded together, densely papillate on margins and edges of adaxial surface, white. *Capsule* narrowly ellipsoidal, 2.5–11.0 \times 1.0–2.0 mm, thin-walled, shedding withered ovary beak and perigone; dehiscence loculicidal, irregularly longitudinal; placental ridges remaining contiguous axially; septa disintegrating. *Seeds* depressed-ellipsoidal, 0.53 \times 0.43 mm; funicle stout, attached in chalazal hemisphere; micropyle prominent; testa brittle, lustrous black with wicker basket-like ornamentation, consisting of ± 15 longitudinal rows of closely set, transversally widened cells; outer periclinal walls each with a central, conical, raised papilla. Figure 1.

Phenology: *Spiloxene nana* is spring flowering, mostly from the middle of September to late October. The leaves are green during the winter and spring but die back during the onset of the dry conditions which extend through summer and autumn.

Distribution and habitat: the species is known only from the Bokkeveld Escarpment near Nieuwoudtville, Northern Cape (Figure 2), where it was first collected by Mrs L. Bolus in 1930. Surrounded by sheer quartzitic sandstone cliffs belonging to the Nardouw Formation, the Escarpment is deeply dissected by the Oorlogskloof River which flows through a 100 m deep gorge. *Spiloxene nana* is found on the Escarpment's southwest-facing slopes which are relatively moist and cool, unlike the hotter and drier slopes that face northeast. Several populations, sometimes comprising as many as 500 plants in each, have been recorded in and around the Oorlogskloof Nature Reserve. Individuals are usually massed together in shallow soil under damp, shaded rock ledges at 730–770 m. Although locally dominant in small patches, other tiny, shade-loving plants may co-occur, especially the softly herbaceous, annual species, *Crassula strigosa*.

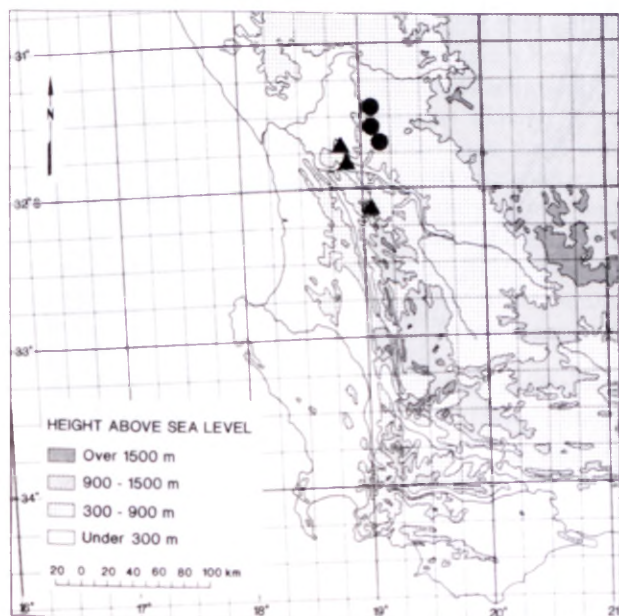


FIGURE 2.—Known distribution of *Spiloxene nana*, ●, in the Northern Cape Province; and *S. pusilla*, ▲, in the Western Cape Province.

Diagnostic features: as the epithet suggests, *Spiloxene nana* is characterized by slender leaves, 1.5–5.0 mm wide, and relatively small flowers ranging from 5–12(–20) mm across. In addition, the flowers are inconspicuously coloured—white or rarely cream-coloured with a pink flush, but always with pale green on the backs of the outer tepals—and the tepals usually reflex downwards when fully mature. Although the leaves are fairly long (up to ± 350 mm) they are characteristically soft and pale green with a delicate appearance.

Its affinities seem to lie primarily with *Spiloxene pusilla*, which closely resembles *S. nana* in habit. Furthermore, the somewhat membranous leaves and the thin-textured, pale green foliaceous bracts suggest that *S. nana* and *S. pusilla* are allied to *S. scullyi* (Baker) Garside, a species found in the granite hills of Namaqualand and which belongs to Nel's Aquaticae group (Nel 1914). Although Nel described the corms of the five species in this group as lacking persistent fibres and the disc-like remnants of old corms, those of *S. scullyi* may sometimes be softly fibrous towards the apex and may retain a few old discoid corms laterally. Both these features are shown, for example, in *Pearson 6585* (BOL) and *Scully s.n.* (Herbarium Normale Austro-Africanum 1381 in SAM). *S. scullyi* differs from *S. nana* and *S. pusilla*, however, in generally being more robust. It has broader leaves, 3–9(–14) mm wide, and considerably larger flowers, 14–28(–38) mm across, which are plain yellow above. Most importantly, the ovary in *S. scullyi* is unilocular with parietal placentation. Like most other *Spiloxene* species, the ovary in *S. nana* or *S. pusilla* is trilocular with axile placentation.

The similarities and differences between *Spiloxene nana* and *S. pusilla* are fully discussed below under *S. pusilla*.

Other specimens examined

NORTHERN CAPE.—3119 (Calvinia): stream feeding waterfall ± 10 miles out of Nieuwoudtville, (–AC), *L. Bolus* (BOL19597); Oorlogskloof trail near Nieuwoudtville, (–AC), *Esterhuysen s.n.* (NBG); 9 km SW of Nieuwoudtville on Groot Tuin 653, near hiking trail, (–AC), *Helme 3075* (NBG); Oorlogskloof Nature Reserve, (–AC), *W.A.J. Pretorius 279* (NBG), near Eland se Kliphuis, *Rourke 2218* (NBG, PRE), *Snijman 1865a* (NBG, PRE), Annex Uitkomst 797, ± 425 m NE of Dolfontein camp, on a steep SSW-facing slope under a damp, shaded rock ledge, *R.C. Turner 1374* (NBG, PRE); Lokenburg, under overhanging rocks, (–CA), *Acocks 19725* (NBG, PRE); Uitkomst Farm, SW of Nieuwoudtville, (–CA), *W.F. Barker 10730* (NBG); Farm Driefontein, 18 km S of Nieuwoudtville, (–CA), *Goldblatt & Manning 19725* (NBG, PRE).

Spiloxene pusilla *Snijman*, sp. nov., habitu et textura *S. nanae* *Snijman* similis, praecipue differt filamentis ad stylum connatis, ovario breviter rostrato, antherae connectivo et stylo rubiginoso. Figura 3.

TYPE.—Western Cape, 3118 (Vanrhynsdorp): Driekoppen Peak, Gifberg Mtns, on floor of low overhangs, (–DB), 6-9-1964, *Esterhuysen 30747* (NBG, holo.; B, BOL, K, MO, PRE, Z).

Delicate, deciduous, entirely glabrous, cormous herb, 70–190(–300) mm high. *Corms* growing horizontally or geotropically, new corms somewhat globose, 4–7 mm diam., loosely covered by dark brown tunics, withering after fruiting and persisting for a few seasons as flat-



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FIGURE 3.—*Spiloxene pusilla*, Snijman 1623. A, whole plant; B, corm; C, tip of leaf; D, flower; E, tip of ovary; F, stamens, style column and stigmatic branches; G, capsule; H, seed. Scale bars: A, 5 mm; B, 2 mm; C, D, G, 1 mm; E, F, 0.5 mm; H, 0.2 mm. Artist: Claire Linder Smith.

tened discs; innermost tunics papery, outermost softly fibrous; fibres reticulate and free from corm base; roots dimorphic, arising from base of new corm, slender and spreading, contractile and geotropic. *Shoot* arising laterally, surrounded at base by a membranous cataphyll up to 10 mm long. *Foliage leaves* synanthous, 2–6, 3-ranked in a basal tuft, sheathing for up to 10 mm at base; blades suberect to slightly arched, narrowly lanceolate, V-shaped in *t/s*, 45–160(–300) × 1.0–2.5 mm, pale green, soft and thin-textured, keeled abaxially almost to apex; margins entire. *Inflorescences* 2 or more, erect, a 2(rarely 3)-flowered umbel-like raceme; scape 20–100 × 0.5–1.5 mm, laterally compressed, sharp-edged, pale green; bracts 2(3), opposite, partially sheathing pedicels proximally, lanceolate, 15–25 × 1–3 mm, foliaceous, shallowly keeled, inconspicuously nerved, pale green, with translucent margins. *Flowers* stellate, usually opening sequentially; pedicels suberect at anthesis and thereafter, terete, 20–50(–80) mm long, slender, pale green; tepals 4 or 6, rarely 5, reflexed when fully open, narrowly lanceolate, 3–4 mm long, yellow or white, backed with pale green mostly in outer whorl, outer tepals 1.5 mm wide and mucronate, inner tepals 1.0–1.2 mm wide and minutely mucronate. *Stamens* as many as tepals, suberect proximally to slightly spreading distally, unequal, outer whorl slightly shorter than inner; filaments joined to sinus between anther lobes, filiform, 1.4–2.2 mm long, yellow, maroon-tipped, outer whorl adnate to style base for up to ± 0.5 mm, inner whorl adnate to style for up to ± 1 mm; anthers latrorse, oblong, 1.0–1.4 mm long before opening, apical and basal lobes ± 0.17 mm long and slightly spreading; thecae and pollen yellow; connective dark red. *Ovary* inferior, narrowly ellipsoidal, 2.3–3.0 × 0.8–1.2 mm, 2- or 3-locular with axile placentation, narrowed distally into a solid, 0.5–1.0 mm prolongation that lengthens up to 1.5 mm after anthesis; ovules 15–20 per locule; style column cylindrical, 1.5 mm long, yellow; stigmatic branches 2 or 3, erect, 0.9–1.5 mm long, slightly broader than style column, with edges of abaxial surface slightly folded together, densely papillate on margins and edges of adaxial surface, dark red. *Capsule* narrowly ellipsoidal, 2.5–5.0 × 1.0–1.5 mm, thin-walled, partially topped with withered, persistent ovary beak and perigone; dehiscence irregularly apical and longitudinal; placental ridges remaining contiguous axially; septa disintegrating. *Seeds* ovate, ± 0.5 × 0.4 mm; raphe continuous with a short, straight, persistent funicle attached in chalazal hemisphere; micropyle slightly raised; testa brittle, shiny black, of transversally widened cells, ornamented with ± 12 widely spaced, longitudinal ribs; outer periclinal walls each with a central, blunt, raised papilla; papillae closely aligned giving ribbed appearance. Figure 3.

Phenology: flowering extends throughout spring from early September to mid-October. The leaves remain green for slightly longer until the onset of the summer dry period, when they are shed. New leaves emerge each year with the onset of winter rain which often starts to fall in autumn. Most species of *Spiloxene* depend on sunshine to open their flowers (lasting from ± 11:00 to ± 16:00), but those of *S. pusilla* are able to open in the shade and to remain open throughout the day.

Distribution and habitat: *Spiloxene pusilla* is restricted to the northwestern Cape Fold Mountains (Figure

2), where populations are found on the relatively moist, cool summit of the Gifberg and Matzikamma massif, near Vanrhynsdorp, and on the Pakhuis Mountains east of Clanwilliam, at 460–760 m. These mountains have large areas of exposed, flat, quartzitic sandstone sheets that are often waterlogged in winter and are extremely dry in summer. The plants shelter under south-facing, overhanging rocks in shallow, sandy soil, where they escape the severe conditions of the exposed rock sheets. *S. pusilla* is often the sole inhabitant of these cool, shady, shelf-like habitats, where it forms dense mats having the appearance of soft, pale green turf.

Diagnostic features: one of the most unusual features of this species, and perhaps the most important reason why it has remained unnamed for so long, despite several collections having been made since its discovery by E.P. Phillips in 1911, is the fusion of the inner filaments to the style. Handwritten notes by the late Ms M.F. Thompson (Mrs Rand), author of several papers on Cape Hypoxidaceae (Thompson 1969, 1976a, b, 1978, 1979), suggest that she regarded the fusion of the filaments to the style to be sufficiently significant to delay formally describing the species until its relationships were more clearly understood. Fortunately, the availability of many more collections of the newly described and apparently closely related *S. nana* has made this description possible.

Morphologically *Spiloxene pusilla* bears a striking resemblance to *S. nana*. Both are shade-loving plants with delicate, narrow, pale green, extremely soft-textured leaves and small flowers, often only 10 mm in diameter. In addition, both species inhabit rock overhangs where the plants form dense, turf-like patches.

The particular features that separate *Spiloxene pusilla* from *S. nana* are those of the flower. The inner filaments are shortly fused to the style (versus free from the style); the anther connectives and stigmatic branches are dark red (as opposed to yellow); and the ovary is constricted into a short (0.5–1.0 mm) but distinct solid, neck-like prolongation at anthesis (compared with an indistinct prolongation of up to ± 0.5 mm that sometimes lengthens slightly after anthesis).

Elsewhere in the family a solid prolongation of the ovary, most often referred to as the ovary beak, is found in *Empodium* Salisb., *Curculigo* Gaertn., *Molinieria* Colla, *Rhodohypoxis* Nel and *Saniella* Hilliard & B.L. Burt (Hilliard & Burt 1978), and although infrequent in *Spiloxene*, it is well developed in *S. alba* (Garside 1950). Moreover, the darkly coloured stamens and style, in otherwise yellow or white flowers, are only known in *Spiloxene*, particularly in the southwestern Cape species, *S. canaliculata* Garside, *S. capensis* (L.) Garside and *S. serrata* (Thunb.) Garside, which belong to a guild of beetle pollinated plants (Steiner 1998). Undoubtedly the flowers of *S. pusilla* are too small to support monkey beetles, but their dark filaments and stigmas may attract specific, albeit tiny, pollinators—an aspect which is yet to be studied. Records show that this dark coloration is constant throughout the distribution range but that populations on the Matsikamma Mountain and Gifberg consistently have yellow tepals, whereas those in the northern Cederberg have white or cream-coloured tepals.

Although Figure 3 shows a plant with tetramerous flowers, this is not constant in the populations, and hexamerous flowers also frequently occur, occasionally even on the same plant. Only very rarely has a pentamerous flower been noted. This variation in the number of floral parts is not unique and is also known in species of *Hypoxis* and *Empodium*.

Lastly, the only other member of Hypoxidaceae that has parts of the androecium fused to the style is *Pauridia* Harv., a small Western Cape genus of two species. *Pauridia*, however, is characterized by tepals that are joined below to form a cup-shaped or tubular perigone; an inner whorl of fertile stamens which is inserted in the perigone throat; and an outer whorl of staminodes that is fused to the style. Moreover, the stigmatic branches are slender and distinctly shorter than the style column. This is in contrast to *Spiloxene pusilla*, in which all six stamens are fertile, the flowers are stellate, and the stigmatic branches are distinctly broader and longer than the style column. These features, together with the cormous habit, are common to all the currently known species of *Spiloxene*, which suggests that this northwestern Cape species is best placed within *Spiloxene*.

Despite clear evidence from leaf anatomy and *rbcL* sequence data that *Spiloxene* and *Pauridia* are closely related (Thompson 1976a; Hilliard & Burt 1978; Nordal 1998; Rudall *et al.* 1998; Burt 2000; Judd 2000), both genera have been consistently retained in local floras (Garside 1950; Snijsman 2000a, b). Should future studies reveal, however, that *Spiloxene* and *Pauridia* comprise one monophyletic genus, it nevertheless seems likely, given the different relative positions of the structures involved, that the fusion of filaments to style in *S. pusilla* is not homologous with the fusion of staminodes to style in *P. minuta* (L.f.) Durand & Schinz and *P. longituba* M.F.Thomps.

Other specimens examined

WESTERN CAPE.—3118 (Vanrhynsdorp): Matsikamma Mtn, Op de berg 314, Dreyers Kloof, (–DB), *Helme 1358* (NBG); Matsikamma, Farm Sewefontein, (–DB), *Snijsman 1623* (NBG, PRE), *Snijsman 1860* (NBG); Gifberg, (–DD), *Compton 20847* (NBG), *Esterhuysen 22062* (BOL, NBG, PRE), *E.P. Phillips 7569* (SAM); summit of Gifberg Pass, near De Kom, (–DD), *Snijsman 1864* (NBG). 3219 (Wuppertal): Pakhuis, N Cederberg, (–AA), *Esterhuysen 21722* (BOL, NBG), *Esterhuysen 21910* (BOL, NBG, PRE); N Cederberg, Diagonal Kloof N of Ribbokberg, (–AA), *H.C. Taylor 11869* (NBG).

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REFERENCES

- BURTT, B.L. 2000. *Saniella* and its relation to other South African genera of Hypoxidaceae. *Edinburgh Journal of Botany* 57: 63–70.
- FOURCADE, H.G. 1932. Contributions to the flora of the Knysna and neighbouring divisions. *Transactions of the Royal Society of South Africa* 21: 75, 76.
- GARSDIE, S. 1950. *Spiloxene*. In R.S. Adamson & T.M. Salter, *Flora of the Cape Peninsula*: 214–217. Juta, Cape Town.
- GRISEBACH, A.H.R. 1844. *Spicilegium florae rumelicæ et bithymicæ* I. Vieweg, Braunschweig.
- HILLIARD, O.M. & BURTT, B.L. 1978. Notes on some plants from southern Africa chiefly from Natal: VII. *Notes from the Royal Botanic Garden Edinburgh* 36: 43–76.
- JUDD, W.S. 2000. The Hypoxidaceae in the southeastern United States. *Harvard Papers in Botany* 5: 79–98.
- MANNING, J., GOLDBLATT, P. & SNIJSMAN, D. 2002. *The color encyclopedia of Cape bulbs*. Timber Press, Oregon and Cambridge.
- NEL, G. 1914. Die afrikanischen Arten der Amaryllidaceae–Hypoxidaceae. *Botanische Jahrbücher* 51: 287–340.
- NORDAL, I. 1998. Hypoxidaceae. In K. Kubitzki, *The families and genera of vascular plants III: flowering plants—Monocotyledons Liliaceae (except Orchidaceae)*: 286–294. Springer, Berlin.
- PAX, F. 1887. Amaryllidaceae (Hypoxidoideae–Hypoxidaceae). In A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien*, Teil 2, Abteilung 5: 121, 122. Engelmann, Leipzig.
- RUDALL, P.J., CHASE, M.W., CUTLER, D.F., RUSBY, J. & DE BRUIJN, A.Y. 1998. Anatomical and molecular systematics of Asteliaceae and Hypoxidaceae. *Botanical Journal of the Linnean Society* 127: 1–42.
- SALISBURY, R.A. 1866. *The genera of plants: a fragment containing part of Liriogamæ*. Van Voorst, London.
- SNIJSMAN, D.A. 2000a. Hypoxidaceae. In P. Goldblatt & J.C. Manning, *Cape Plants. A conspectus of the Cape flora of South Africa*. *Strelitzia* 9: 108–110. National Botanical Institute, Pretoria & Missouri Botanical Garden, St. Louis.
- SNIJSMAN, D.A. 2000b. Hypoxidaceae. In O.A. Leistner, *Seed plants of southern Africa: families and genera*. *Strelitzia* 10: 621–623. National Botanical Institute, Pretoria.
- STEINER, K.E. 1998. Beetle pollination of peacock moraeas (Iridaceae) in South Africa. *Plant Systematics and Evolution* 209: 47–65.
- THOMPSON, M.F. 1969. *Spiloxene capensis* and *S. canaliculata*. *The Flowering Plants of Africa* 39: t. 1557A & B.
- THOMPSON, M.F. 1976a. Studies in the Hypoxidaceae. I. Vegetative morphology and anatomy. *Bothalia* 12: 111–117.
- THOMPSON, M.F. 1976b. *Empodium namaquensis*. *The Flowering Plants of Africa* 44: t. 1727.
- THOMPSON, M.F. 1978. Studies in the Hypoxidaceae. II. Floral morphology and anatomy. *Bothalia* 12: 429–435.
- THOMPSON, M.F. 1979. Studies in the Hypoxidaceae. III. The genus *Pauridia*. *Bothalia* 12: 621–625.
- WILLIAMS, F.N. 1901. On *Ianthe*, a genus of Hypoxidaceae. *Journal of Botany* 39: 289–294.