

TAXONOMIC TREATMENT

New taxa, synonyms and insufficiently known species

Recently published species

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Species put into synonymy in the present study

H. arnottii Baker = ***H. rigidula*** Baker var. ***pilosissima***

H. cordata Nel = ***H. rigidula*** Baker var. ***rigidula***

H. distachya Nel = ***H. colchicifolia*** Baker

H. dinteri Nel = ***H. argentea*** Harv. ex Baker var. ***sericea*** Baker

H. ecklonii Baker = ***H. floccosa*** Baker

H. gilgiana Nel = ***H. colchicifolia*** Baker

H. iridifolia Baker = ***H. obtusa*** Burch. ex Ker Gawl.

H. junodii Baker = ***H. gerrardii*** Baker

H. lata Nel = ***H. angustifolia*** Lam. var. ***angustifolia***

H. limicola B.L. Burtt = ***H. parvula*** Baker var. ***parvula***

H. neliana Schinz = ***H. kraussiana*** Buchinger

H. obtusa Burch. ex Ker Gawl. var. *chrysotricha* Nel = ***H. obtusa*** Burch. ex Ker Gawl.

H. pretoriensis (manuscript name) = ***H. interjecta*** Nel

H. rigidula Baker var. *hemerocallidea* Fisch., C.A. Mey. & Avé-Lall. = ***H. rigidula*** Baker var. ***rigidula***

H. rooperi T. Moore var. *forbesii* Baker = ***H. hemerocallidea*** Fisch., C.A. Mey. & Avé-Lall.

H. villosa L.f. var. *obliqua* Jacq. = ***H. obliqua*** Jacq.

H. woodii Baker = ***H. angustifolia*** Lam. var. ***buchananii***

H. zuluensis S.E. Wood quoad specim. *Gerstner 4936*, nom. illeg. = ***H. longifolia*** Baker ex Hook.f.

H. zululandensis S.E. Wood non. nud. = ***H. longifolia*** Baker ex Hook.f.

Species insufficiently known

H. beyrichii Nel

H. exaltata Nel

H. jacquinii Baker

H. longipes Baker

H. mollis Baker

H. nigricans Conrath ex Baker

H. setosa Baker

H. sagittata Nel

H. uniflorata Markötter

Hypoxis L., Systema Naturae: 986 (1759); Baker: 98 (1878b); Salisbury: 712 (1883); Pax: 121 (1889); Baker in Thiselton-Dyer: 174 (1896); Baker: 377 (1898); Nel: 259 (1914); Hepper: 172 (1968); Geerinck: 72 (1969) & : 4 (1971); Nordal *et al.*: 15 (1985); Nordal & Iversen: 46 (1986); Nordal & Iversen: 34 (1987); Champluvier: 81 (1987); Nordal in Kubitzki: 292 (1998); Nordal & Zimudzi: 1 (2001); Wiland: 305 (2001); Wiland-Syzmańska & Nordal (2006). Type: *H. hirsuta* (L.) Colville (syn.: *H. erecta* L.)

Herbs, small to robust, 50–700 mm high, near-glabrous to densely hairy, growing solitary or in tufts; underground stem a perennial rhizome, vertical, sometimes producing short horizontal stolons ending in rhizome-like structures, each bearing a shoot. *Rhizome* globose, oblong or turbinate, older basal portion slowly withering away over time, crowned by leaves and a tunic formed by the remains of old leaf bases, tunic either a ring of fibrous bristles (brush-like) or a papery sheath in delicate species, white, yellow to deep orange inside; roots few to many, short, thick, contractile. *Leaves* winter (spring in SW Cape species) deciduous, 5–20, outer few reduced to cataphylls, spreading outwards from base, generally in three ranks or bases clasping to form a funnel- or column-like false stem (pseudostem), base lighter in colour approaching white, hyaline in delicate species, occasionally purple or red; coriaceous or membranous, sickle-shape (falcate) or erect, linear, lanceolate or filiform, folded together along the length (conduplicate) towards the base, rarely subterete; V-shaped or flat in cross section, gradually or rapidly tapering to a narrow point (acuminate); veins of even or uneven thickness, flush with or raised on upper surface; pilose, floccose, tomentose, sericeous or ciliate, hairs appearing more dense in young leaves, bifurcate (2 arms), stellate (3–8 arms), rarely simple (one-arm) or a combination, filiform or needle-shaped, ascending in a V- or U-shape, or appressed, white, yellow or brown. *Inflorescence* 1–8 per plant, axillary, produced with emergence of leaves, only at start of, or sequentially in growing season, racemose or corymbose, rarely spicate, near-glabrous or sparsely to densely hairy; indumentum white, yellow, or red-brown; scapes overtopping, as tall as or slightly shorter than leaves, flattened in cross section (ancipitous), rarely terete, covered in hairs apically. *Bract* one per flower, unless flower aborted then two, subulate, setaceous, hairy abaxially.

Flowers 2–17, rarely solitary, short-lived, bisexual, actinomorphic, star-like, yellow, rarely white; pedicels shorter or longer than flowers, sometimes reduced, green, sometimes red, slightly longer in fruit. *Tepals* 3+3, rarely 4 in two whorls of 2, free, persistent; outer tepals, elliptic, green-yellow (or green-white) and hairy abaxially; inner tepals elliptic or ovate-elliptic, yellow (or white), green and sparsely hairy along midrib abaxially, midribs occasionally red. *Stamens* 3+3, rarely 4 in two whorls, exerted, filaments inserted at base of tepals, subulate or filiform, outer whorl slightly longer (by \pm 0.5 mm) than the inner whorl; anthers sagittate, thecae 2, versatile, opening by longitudinal slits, latrorse; pollen grains yellow, ellipsoid, monosulcate. *Ovary* inferior, turbinate or subglobose, 3-locular; style subulate or filiform, sometimes reduced or absent; stigma 3-lobed, spherical or pyramidal, with 3 concave faces, ovules numerous, biseriate in each locule, placentation axile. *Fruit* a capsule, turbinate or oblong, opening by a circular split around the middle (circumscissile dehiscence), in a few species followed by splitting into 3-segments (longitudinal dehiscence). *Seeds* few to many, globose to ovoid, black rarely brown, glossy or dull; testa smooth or papillate. *Chromosome number*: $2n = 14$.

Species \pm 85, in the warmer parts of all continents, except Europe, mostly in sub-Saharan Africa, 28 in the Flora of southern Africa region (South Africa, Namibia, Botswana, Swaziland and Lesotho), with 70% endemic to the region and three taxa having white flowers, deviating from the usual yellow for the genus. The range of seven taxa, *H. angustifolia* var. *angustifolia*, *H. argentea* var. *argentea*, *H. filiformis*, *H. galpinii*, *H. hemerocallidea*, *H. longifolia*, *H. obtusa*, *H. parvifolia*, *H. rigidula* var. *rigidula*, extends from southern Africa to tropical Africa. *H. angustifolia* is the most widespread species in Africa with a distribution also in West Africa. With the start of the growing season (September), plants of *Hypoxis* develop new shoots, usually stimulated by fire and are more noticeable when the grass is short. Plants show variation in leaf length over growing season; specimens collected later in the season, January to May have elongated leaves in comparison to those collected early, in October to December. *Hypoxis* has potential use in medicine. Rhizomes of the larger species are a rich source of hypoxoside (Drewes *et al.* 1984; Bayley & Van Staden 1990) which in its active form, rooperol has been shown to inhibit the growth of cancer cells (Drewes & Khan 2004). Such species are also used in traditional and alternative medicines in South Africa where their popularity is driving unsustainable harvesting of rhizomes in the wild. Exploitation of target and related species of the genus has expedited the need for correct species identification and more data on the morphology, ecology and distribution of species.

KEY TO SPECIES

Note— Plant height excludes inflorescence length, and leaf width is measured midway between base and apex. Vein and hair characters are described from a stereomicroscope at 10–40 x magnifications. To avoid ambiguity, descriptive terms are used with botanical equivalents in brackets.

In species with a robust habit and many flowers per inflorescence, the first few inflorescences in young plants may bear only 2 flowers, the flowers being opposite and this causes difficulty on classifying it as racemose or corymbose. For such specimens, a combination of habit, leaf dimensions, leaf hair distribution, length of pedicel and, type and length of tepal should be applied.

- 1a Plants medium to large in size, more than 150 mm tall (if shorter, then leaves lanceolate and more than 12 mm wide); flowers firm, yellow, large, tepals of lowermost flowers 12–20 mm long:
- 2a Plants taller than wide; leaves tightly clasping at base to form a false stem:
- 3a False stem widening into the shape of a funnel; leaves erect, converging apically (connivent), lanceolate, 25–110 mm wide:
- 4a Leaves broadly lanceolate, 3–6 times longer than wide; veins of uniform thickness, raised on upper surface (ribbed); leaf blade glabrous or with a few hairs scattered near the base and on margins; inflorescence near-glabrous with few scattered hairs; specimens drying straw-coloured or light brown 1. *H. colchicifolia*
- 4b Leaves narrowly lanceolate, 8–20 times longer than wide; veins of uneven thickness, 2(–4) near each margin raised on upper surface; leaf blade sparsely hairy, margins and midrib fringed with hairs (ciliate); inflorescence densely hairy; specimens drying red-brown or dark brown 2. *H. galpinii*
- 3b False stem upright in the form of a column; leaves spreading or recurving apically, linear or filiform, 3–20 mm wide:
- 5a Leaves firm but not rigid, erect, spirally twisting towards apex, with an even distribution of long, weak hairs (pilose) on both surfaces, margin and midrib on lower surface; hairs bifurcate; flowers 2 (occasionally 4–6) 4. *H. acuminata*
- 5b Leaves rigid, erect or recurving above the middle, ± straight towards apex, near-glabrous or sparsely to densely hairy on one or both surfaces, margins and midrib on lower surface fringed with hairs (ciliate); hairs bifurcate or stellate; flowers 4–11 (2 or 3 in first few inflorescences):
- 6a Leaves ribbed near margins only; veins of uneven thickness with 3–5 near each margin raised on upper surface; leaf blade sparsely to densely hairy 3. *H. rigidula*
- 6b Leaves strongly ribbed; veins of uniform thickness, raised on upper surface; leaf blade near-glabrous, margins and midrib on lower surface outlined in white by a thickened band of squat hairs
- 7a Leaves filiform, 3–4 mm wide, subterete, rarely flat; veins 4–6 5. *H. longifolia*
- 7b Leaves strap-like, 10–15 mm wide, V-shaped or flat; veins 10–16. 6. *H. ludwigii*
- 2b Plants as wide as tall; leaves spreading upwards and outwards from base (false stem absent):
- 8a Plants in flower small, 50–120 mm tall; leaves few (usually less than 7), overlapping in helical

arrangement to give a rosette-like appearance, flat, broadly ovate; inflorescences produced at start of growing season; flowers 2 (occasionally 3–5):

9a Leaves glabrous, margin rarely with a few scattered hairs; inflorescence with 2 flowers
..... 10. *H. interjecta*

9b Leaves hairy (pilose or scabrous), inflorescence with 2–5 flowers:

10a Leaves covered with long, weak hairs (pilose) mostly along margins and midrib
..... 11. *H. costata*

10b Leaves covered with short stiff hairs (scabrous) throughout 12. *H. multiceps*

8b Plants in flower large, 150–300 mm tall; leaves many (usually more than 7), arranged one above the other in three ranks, folded together along the length (conduplicate), sickle-shape (falcate); inflorescences produced sequentially throughout growing season; flowers 4–12 (2 in first few inflorescences):

11a Leaves near-glabrous or with even distribution of bifurcate hairs; pedicels firm, erect, lowermost 5–25 mm long:

12a Leaves firm but not rigid, remaining straight with age, non waxy; veins flush with upper surface, with an even distribution of long, weak hairs (pilose); hairs bifurcate
..... 7. *H. hemerocallidea*

12b Leaves rigid, spirally twisting towards apex with age, waxy (glaucous); veins raised on upper surface (ribbed), near-glabrous, margin and midrib outlined in white by a thickened band of squat hairs (ciliate); hairs stellate (3–6 arms) 8. *H. obtusa*

11b Leaves with white-velvety hair layer on lower surface or with an even distribution of stellate hairs in tufts; pedicels soft, flexible, lowermost 20–35 mm long:

13a Leaves dark green, glabrous on upper surface, lower surface with a distinct white-velvety layer formed by dense appressed interwoven hairs (tomentose); restricted to area between Uniondale (Western Cape) and Grahamstown (Eastern Cape) 9. *H. stellipilis*

13b Leaves dull green, sparsely or densely covered with an even distribution of white or brown, ascending hairs in tufts (floccose); widespread along the coasts of Western Cape (from Mossel Bay) and Eastern Cape and reaching KwaZulu-Natal 13. *H. sobolifera*

1b Plants small in size, less than 150 mm high (if taller then leaves linear, less than 12 mm wide); flowers delicate, yellow or white, small, tepals of lowermost flowers 4–10 mm long:

14a Leaves membranous in texture, drying papery (if leaves are thicker then inflorescence with one flower only), sparsely covered with long, weak hairs (pilose):

15a Leaves linear-triangular (subulate), arranged loosely in three ranks, V-shaped in cross section (fresh material):

16a Flowers white, stigma spherical 25. *H. nivea*

16b Flowers yellow; stigma pyramidal (rarely approaching spherical) 26. *H. angustifolia*

15b Leaves lanceolate, radiating irregularly from rhizome, flat in cross section:

17a Leaves 80–150 x 8–25 mm, upper surface of leaf with pustules appearing as dots; inflorescence usually with 2 or 3 flowers, (if single-flowered, then other scapes on plant

- with 2 or 3 flowers); flowers white 27. *H. membranacea*
- 17b Leaves 15–70(–90) x 5–10 mm, upper surface without pustules; inflorescence usually with a single flower, rarely 2; flowers yellow or white 28. *H. parvula*
- 14b Leaves thick (not membranous) in texture, sparsely or densely covered with hairs of different types:
- 18a Leaves lanceolate, 7–25 mm wide:
- 19a Leaves 7–10 mm wide, usually erect, with an even distribution of bifurcate hairs 17. *H. gerrardii*
- 19b Leaves 10–25 mm wide, obliquely twisting or recurving, near-glabrous or sparsely to densely covered with stellate hairs:
- 20a Leaves near-glabrous, margins sparsely to densely hairy; hairs short, stiff, appressed:
- 21a Leaves erect, obliquely twisting towards apex; margins fringed with squat hairs (ciliate); persistent; pedicels firm, lowermost 5–20 mm long when flowers open 15. *H. obliqua*
- 21b Leaves falcate, ± straight towards apex; margins with sparse hairs; falling off (caducous); pedicels flexible, lowermost 25–50 mm long when flowers open 16. *H. zeyheri*
- 20b Leaves covered with hairs throughout, dense on margins; hairs long, weak, appressed or ascending (villose or floccose):
- 22a Leaves 75–150 mm long, margins undulate; hairs silky white, as strands stacked one above the other in two rows opposite each other and parallel along the length of the leaf, not clearly separated, appressed (villose) 14. *H. villosa*
- 22b Leaves 100–300 mm long, margins straight, hairs white or brown (not silky), in tufts, separated, ascending (floccose) 13. *H. sobolifera*
- 18b Leaves linear (if linear-lanceolate, then plants up to 60 mm tall), 2–10 mm wide:
- 23a Leaves strongly ribbed, with veins close to each other, uniformly thickened and raised on upper surface; scapes wiry, subterete (round in cross-section):
- 24a Leaves sparse to densely hairy; hairs bifurcate, stellate (4–6 arms) on margins, squat, patent, U-shaped and curling into rings; filaments subulate 22. *H. kraussiana*
- 24b Leaves sparsely hairy; hairs bifurcate, long, weak (thread-like), ascending, V-shaped and straight; filaments filiform:
- 25a Flowers 6-merous, very rarely 4-merous; scape erect in fruit, widespread in southern Africa from Eastern Cape to Limpopo 23. *H. filiformis*
- 25b Flowers 4-merous; scape decumbent in fruit, restricted to the Drakensberg range in KwaZulu-Natal 24. *H. tetramera*
- 23b Leaves not ribbed, with veins of uneven thickness, one to two near each margin thickened and raised on upper surface; scapes weak, ancipitous (flattened in cross section):
- 26a Plants 70–120 mm tall; scapes as tall as or shorter than leaves; flowers 2–5(–7):
- 27a Plants dark-green; leaves rigid, 4–10 mm wide; hairs bifurcate, ascending in V- or

- U-shape, white or brown; inflorescence furry, brown 17. *H. gerrardii*
- 27b Plants silvery; leaves firm but not rigid, 2–5 mm wide; hairs bifurcate or stellate, appressed as strands parallel to length of leaf (sericeous), silky-white; inflorescence silky-white 18. *H. argentea*
- 26b Plants 30–60 mm tall; scapes overtopping leaves; flowers 1 or 2:
- 28a Leaves 4–8 mm wide, covered in bifurcate, stiffly U-shaped hairs; inflorescences firm, pedicels 5–15 mm long; found in the interior of southern Africa (Swaziland, Mpumalanga, Limpopo and Free State 19. *H. parvifolia*
- 28b Leaves 2–4 mm wide; covered in bifurcate hairs, lying parallel to length of leaf or with stellate hairs in tufts; inflorescences lax, pedicels 12–25 mm long, found along the coasts of Western Cape and Eastern Cape:
- 29a Leaf hairs mostly bifurcate, appearing in a V shape, ascending, white 20. *H. flanaganii*
- 29b Leaf hairs stellate, in tufts, ascending (floccose), red-brown (rufous) 21. *H. floccosa*

Key to varieties of *Hypoxis rigidula*

- 1a Plants glaucous green, usually drying dark brown; leaf blade hairs sparse, confined mostly to channels between veins, bifurcate or stellate, long, weak and ascending or needle-shaped and appressed var. *rigidula*
- 1b Plants grey-white, retaining colour on drying; leaf blade hairs dense giving leaves a furry texture (floccose), evenly spread throughout; stellate, tufted, long, weak and ascending var. *pilosissima*

Key to varieties of *Hypoxis sobolifera*

- 1a Hairs sparsely scattered throughout leaf, in distinct tufts, drying white or light brown var. *sobolifera*
- 1b Hairs dense, giving leaves a soft furry texture, tufts obscured, drying red-brown (rufous) var. *pannosa*

Key to varieties of *Hypoxis angustifolia*

- 1a Plants solitary, usually less than 120 mm tall; leaves 3–4 mm wide; 2 veins near each margin raised on upper surface var. *angustifolia*
- 1b Plants in tufts, usually more than 120 mm tall; leaves 8–18 mm wide; 4 veins near each margin prominent on upper surface var. *buchananii*

Key to varieties of *Hypoxis parvula*

- 1a Flowers yellow var. *parvula*
- 1b Flowers white var. *albiflora*

Key to varieties of *Hypoxis argentea*

- 1a Hairs mostly stellate, dense in channels between veins, forming a silky-white layer on lower surface var. *argentea*
- 1b Hairs mostly bifurcate, scattered in channels between veins, with an even distribution on both surfaces var. *sericea*

1. ***Hypoxis colchicifolia*** Baker, Journal of Botany: 3 (1889); Baker in Thiselton-Dyer: 186 (1896); Burtt: 201 (1986); Singh: 362 (2007). Type: South Africa, Cape, without precise locality, hort. *Bull s.n.* Nov. 1884 (K, holo!).

H. latifolia Hook.: t.4817 (1854) nom. illegit.; Baker: 115 (1878b); Baker in Thiselton-Dyer: 185 (1896)—non *H. latifolia* Wight (1853). Type: South Africa, KwaZulu-Natal, *Adlam s.n.* June 1857 (K, holo!).

H. oligotricha Baker: 3 (1889); Baker in Thiselton-Dyer: 187 (1896); Nel: 321 (1914). Type: South Africa, KwaZulu-Natal, Clairmont, *Wood 1170* (K, holo!, BM!, NH!).

H. distachya Nel: 322 (1914). Type: South Africa, KwaZulu-Natal, Pinetown, *Thode s.n.* August 1893 (B, holo!).

H. gilgiana Nel: 322 (1914). Type: South Africa, without precise locality, *Ecklon? 4529* (B, holo!).

Tall, robust herb, 250–500 mm high, growing singly, near-glabrous. *Rhizome* globose or oblong, 40–70 mm in diameter or 1.5 times longer than wide, with many contractile roots, crowned by leaves and a dense mass of fibrous bristles from remains of old leaves, light yellow to orange inside, with faint incense-like smell. *False stem* cylindrical, thick, 50–75 x 15–30 mm. *Leaves* few, 4–8, clasping at base to form a false stem, opening into funnel above, converging apically (connivent), broadly lanceolate, (100–)200–600 x 30–85(–110) mm, erect, flat, coriaceous; veins \pm 18–40, evenly spaced, almost all thickened and raised on upper surface (ribbed), approaching white at base, sometimes purple or red, usually glabrous; hairs if present, scattered on margins, veins and channels in between veins, bifurcate, needle-shaped, appressed. *Inflorescence* 1–4 per plant, appearing with leaves and produced sequentially, racemose, with few scant white hairs; scapes shorter than leaves, 150–300 mm x 2–3 mm, flattened in cross section (ancipitous). *Bract* subulate, basal two stronger, 16–30 x 1.5–2 mm. *Flowers* (5–)8–17, basal two opposite, 1 to 3 upper tiers with 3 flowers each; pedicels varying slightly in length from base to apex of raceme, 7–15 mm long when flowers open. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 13–19 x 3–5 mm, pale green with short stiff hairs abaxially; inner tepals ovate-elliptic, 11–15 x 4–5 mm, yellow, green and sparsely hairy along midrib abaxially.

Stamens 3+3, with filaments subulate, 3–4 mm long; anthers 4–6 mm long, sagittate, apex entire or slightly split. *Ovary* 4–6 mm long, style \pm 1 mm long, stigma 2–5 mm long, pyramidal with 3 concave faces. *Capsule* turbinate or subglobose, 6–8 mm x 4–7 mm, opening by a circular slit. *Seeds* ovoid, 1.5–2 x 1–1.8 mm, black, glossy or dull; testa papillate. *Flowering time*: September–February. Figure 12.6.

Diagnostic characters and relationships: *H. colchicifolia* is the taxon with the most robust habit among the southern African species. It is easily distinguished by its large, broadly lanceolate leaves that clasp at the base to form a thick false stem (pseudostem) which widens upwards in the shape of a funnel. Further, the leaves are glabrous and ribbed on the upper surface. The species is likely to be confused with *H. galpinii* in having lanceolate leaves and racemose inflorescences, but it lacks hairy leaf margins and densely hairy inflorescences, which is characteristic of *H. galpinii*.

Two specimens, *Burt-Davy 13457* (in PRE) and *Reid 53* (in PRE), both collected in Northern KwaZulu-Natal deviate from the typical glabrous leaves in the species. These specimens have bifurcate hairs on leaves similar to those in *H. galpinii* and *H. rigidula* var. *rigidula*. Although rare, this state is recognised as the extreme limit for hairiness in the species, seeing that in habit, leaf shape and ribbing, the specimens closely match *H. colchicifolia*.

Distribution and ecology: *H. colchicifolia* is a South African endemic with a coastal and inland distribution. It occurs in the Eastern Cape, KwaZulu-Natal and Free State, from Mkambati in the south and is concentrated towards the uplands in KwaZulu-Natal (Figure 12.34F). The species forms strong stands in protected grasslands. *H. colchicifolia* grows sympatrically with *H. obtusa* and *H. rigidula* and like these species, prefers full sun and well-drained soil. It is recorded at altitudes from 30 to 2100 m above sea level. Although large populations of plants are encountered in the field, the species is not frequently collected for herbarium records. There is a record of a specimen (*Moss 13679* in J) collected outside the range for the species. It was noted as collected in Milner Park, Johannesburg, Gauteng in November 1926. In December of the same year, Moss collected *H. galpinii* at the same locality (*Moss 14026* in J). Heideman (1979) was unsuccessful in finding the plant on the Witwatersrand. As suggested by Burt (1986), there may have been a mistake in the labelling of the specimen. This outlier record has not been included in mapping of the distribution of the species in this study.

Conservation status: Lower risk-Near Threatened (LRnt).

Etymology: the name *colchicifolia* describes the species as having leaves like those of the European genus, *Colchicum*.

Common names: broad-leaved hypoxis, igudu, ilabatheka, ingcobo, inkomfe (Zulu).

Uses: *H. colchicifolia* is used in traditional medicine to treat various ailments including bad dreams, barrenness, impotence and hysterical fits (Watt & Breyer-Brandwijk 1962). In her inventory of Zulu medicinal plants, Hutchings (1996) discussed the several uses of the species in Zulu healing practices, and as such the species is in great demand. It is, for example, available at the Warwick Avenue Muthi Market in Durban, KwaZulu-Natal as ilabatheka (Zulu), together with the more popular medicinal species, *H. hemerocallidea*, which is sold as inkomfe (Zulu).

Notes: Wight (1851) published an illustration of a new species that he called *Hypoxis latifolia*, unfortunately without a description. In 1854, the name was used by Hooker for a South African plant and with a proper description. Wight's plant turned out to be *Curculigo finlaysoniana* Wall. from India and this makes *H. latifolia* Hook. a later homonym. *H. colchicifolia* was described by Baker in 1889 and since there are no difficulties with the species, its name is in use as suggested by Burt (1986). *H. oligotricha* was recognised by Baker (1889) as being different to *H. colchicifolia* in having longer leaves, more flowers, shorter pedicels and a less hairy inflorescence. This study, however, confirms that the claimed differences fall within the range of *H. colchicifolia*.

Vouchers: Abbott 6383 (NH); Burt-Davy 13457 (PRE); Herbst s.n. NBG18441 (NBG); Nicholson 797 (PRE); Singh 802 (NH).

2. ***Hypoxis galpinii* Baker**, in Thiselton-Dyer, Flora Capensis: 188 (1896) as 'galpini'; Nel: 320 (1914); Compton: 130 (1976); Zimudzi: 16 (1996); Nordal & Zimudzi: 11 (2001). Type: South Africa, Mpumalanga, Barberton, Saddleback Range, Umlomati Valley, *Galpin*, 1098 (K, holo!; PRE!; NBG!).

H. stricta Nel: 320 (1914). Type: South Africa, Pondoland, *Buchanan* 338 (B, holo!).

Tall, robust herb, 250–400 mm high, growing singly, occasionally in tufts of 2 to 10 plants. *Rhizome* globose or oblong, 20–60 mm in diameter or $\pm 1\frac{1}{2}$ times longer than wide, with many contractile roots, crowned by leaves and a dense mass of fibrous bristles from remains of old leaves, sometimes proliferating by means of short stolons, light yellow to orange inside. *False stem* cylindrical, 50–120

x 12–20 mm. *Leaves* few, 4–7, clasping at base to form a false stem, opening into funnel, converging apically (connivent) lanceolate to narrowly-lanceolate, 150–470 x 13–40 mm, erect, flat, coriaceous; veins 20–40, flush with surface, 2–4 near each margin thickened and raised on upper surface, approaching white at base; hairs sparse, mainly on lower surface, along margins and midrib, predominantly stellate (5–8 arms) with bifurcate hairs intermingled, bifurcate hairs 1–1.5 mm long, stellate hairs with 1 or 2 arms more strongly developed, shorter arms needle-shaped, ± 0.3 mm long, longer arms 3–3.5 mm long, appressed, white or brown. *Inflorescence* 2–7 per plant, appearing with leaves and produced sequentially, racemose, covered in white hairs; scape as tall as leaves or taller than leaves, 120–280 mm x 2–3 mm, flattened in cross section (ancipitous). *Bract* subulate, basal two stronger, 12–25 x 1–3 mm. *Flowers* (5–)8–11 per inflorescence, basal two opposite, 1 to 3 upper tiers with 3 flowers each; pedicels varying slightly in length from base to apex of raceme, 2–12 mm long when flowers open. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 10–16 x 3–5 mm, green and hairy abaxially; inner tepals ovate-elliptic, 10–16 x 5–7 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–3 mm long; anthers 4–5 mm long, sagittate, apex entire or slightly split. *Ovary* 3–4 mm long; style 2–3 mm long; stigma pyramidal with 3 concave faces, 2–3 mm long. *Capsule* turbinate, 6–10 mm x 4–6 mm, opening by a circular slit. *Seeds* ovoid, 1.2–1.8 x 1–1.6 mm, black, glossy; testa papillate. *Flowering time*: September–December. Figure 12.11.

Diagnostic characters and relationships: *H. galpinii* is recognised by its long, lanceolate leaves that clasp at the base to form a false stem, widening above into the shape of a funnel and its near-glabrous leaves, similar to the arrangement in *H. colchicifolia*. It differs from *H. colchicifolia* in having veins flush with the leaf surface, with only two to four near each margin thickened and raised on the upper surface, and densely hairy inflorescences. In *H. colchicifolia*, the upper surface of the leaf is ribbed due to almost all veins being thickened and raised, and the inflorescences are sparsely hairy.

H. galpinii could also be confused with plants of *H. rigidula* var. *rigidula* when leaves of the latter species are still developing or are wider, approaching linear-lanceolate. In *H. galpinii*, leaves are broader and folded into a thick (more than 13 mm wide), short false stem while in *H. rigidula*, leaves are strap-like and wrap in a narrow (usually about 10 mm wide), slender false stem.

Distribution and ecology: *H. galpinii* occurs in the eastern region of southern Africa with an inland distribution. It occurs in the Eastern Cape, KwaZulu-Natal, Mpumalanga, Lesotho and Swaziland (Figure 12.34K). The species extends into tropical Africa, occurring in Zimbabwe and Tanzania.

H. galpinii grows in open rocky grasslands, in full sun and at altitudes of 900 to 2300 m above sea level. It is found growing sympatrically with many species, including *H. argentea*, *H. costata*,

H. multiceps, *H. gerrardii* and *H. obtusa*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named after Ernest Galpin [1858–1941], a banker, who started out as an amateur botanist and developed in taxonomy through leisure learning and encouragement from influential persons like George Elliot, William Tyson and N.E. Brown (Gunn & Codd 1981).

Uses: no known uses recorded in literature. As the species is similar to *H. colchicifolia* and the latter is frequently used in Zulu traditional medicine, it is very likely that *H. galpinii* is also collected in the wild as ilabetheka (Zulu). It could become a target species for use in herbal remedies should populations of the more popular species, *H. hemerocallidea* and *H. colchicifolia* start to decline.

Vouchers: *Compton 30881* (NBG, NH, PRE); *Gibbs-Russel 3482* (GRA); *Gilliland s.n. J26911*(J, PRE); *Ngwenya 1504* (NH); *Thode 2544* (NH).

3. ***Hypoxis rigidula* Baker**, *Journal of the Linnean Society, Botany* 17: 116 (1878b) & in Thiselton-Dyer: 186 (1896); Nel: 331 (1914); Eyles: 328 (1916) pro parte quoad saltem specm. *Eyles 455*; Norlindh & Weimarck: 166 (1937); Compton: 130 (1976); Zimudzi: 16 (1996) pro parte; Retief & Herman: 69 (1997); Nordal & Zimudzi: 12 (2001); Singh: 364 (2007). Type: South Africa, Free State, *Cooper 883* (K, lecto!).

Tall slender herb, mostly 600–700 mm high, growing singly, occasionally in tufts forming clumps. *Rhizome* oblong-globose, 40–90 x 30–50 mm or 1.25–2 times longer than wide, with many contractile roots, crowned by leaves and a mass of fibrous bristles from remains of old leaves, sometimes proliferating by means of short stolons, light yellow to orange inside. *False stem* cylindrical, slender, (65–)400–700 x (6–)8–13 mm. *Leaves* few to many, 4–12, clasping at base to form false stem, usually recurving apically, rigid, whip- or strap-like, linear, 320–800 x (4–)7–20 mm, tapering gradually from base to apex; veins flush with surface, two to five near each margin thickened and raised on upper surface; hairs sparse to dense, mainly along margins and midrib (ciliate) or forming a furry covering, bifurcate or stellate (3–8 arms, tufted), one arm more strongly developed, ascending or appressed, shorter arms needle-shaped, white. *Inflorescence* 2–5 per plant, appearing with leaves and produced sequentially, racemose or spicate, covered in white hairs; scapes as tall as or shorter than leaves, 150–300 mm x 2–3 mm, flattened in cross section (ancipitous). *Bract* subulate, 7–20 x 1–2 mm. *Flowers* 3–9 (2 in the first produced inflorescences of the new season's growth); pedicels subsessile or short,

8–16 x 1–1.5 mm when flowers open. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 10–20 x 3–4 mm, green and hairy abaxially; inner tepals ovate-elliptic, 8–16 x 4–6 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 1.5–2 mm long; anthers 4–7.5 mm long, sagittate, apex entire. *Ovary* 4–5 mm long, style 1–1.5 mm long; stigma pyramidal with 3 concave faces, 2.5–3.5 mm long. *Capsule* turbinate or ellipsoidal, 5–8 x 3–5 mm, opening by a circular slit. *Seeds* globose to ovoid, 1.3–2 x 1.2–1.8 mm, black, glossy; testa papillate. *Flowering time*: September–March.

3a. var. **rigidula**

H. cordata Nel: 331 (1914). Type: South Africa, Limpopo, Bergwiesen, Shiluvane, *Junod 1445* (Z!).

H. elliptica Nel: 332 (1914). Syntypes: South Africa, Eastern Cape Province, Alexandra, *Rudatis 688* (K!); South Africa, KwaZulu-Natal, Pietermaritzburg, *Schlechter 3303* (B!); South Africa, KwaZulu-Natal, between Pietermaritzburg and Greytown, *Wilms 2317* (K!); South Africa, KwaZulu-Natal, Fields Hill near Pinetown, *Wood 734* (B!).

H. longifolia Baker: 176 (1904). Type: South Africa, Limpopo, Berglehnen um Shiluvane, *Junod 1445* (Z!).

H. oblonga Nel: 332 (1914). Type: South Africa, KwaZulu-Natal, Weenen District, *Wood 4372* (K!, B!, NH!).

H. volkmanniae Dinter: 257 (1931). Type: Namibia, Hereroland, *Dinter 5601* (PRE!).

H. rigidula var. *hemerocallidea* (Fisch. & C.A. Meyer) Heideman: 892 (1983), nom. nud. Type: South Africa, Kalahari Region, Basutoland *Cooper 3242* (K!).

Diagnostic characters and relationships: *H. rigidula* is a distinct species, plants being the tallest in the genus, with a rigid, elongated column-like false stem and strap-like leaves, recurving above the middle. *H. rigidula* var. *rigidula* is variable in leaf length, width and hairiness. The newly formed leaves are erect and densely hairy in comparison to mature leaves. Its closest allied species is *H. acuminata*. In the growing season, newly formed leaves of *H. rigidula* var. *rigidula* closely resemble those of *H. acuminata* and are likely to be confused with this species. However, the softer appearance of leaves and ascending long, bifurcate leaf hairs and usually two-flowered inflorescences in *H. acuminata* separates it from *H. rigidula*. In *H. rigidula* var. *rigidula*, leaves are rigid, erect and needle-shaped when young and inflorescences mostly more than four-flowered. Specimens of *H. rigidula* var. *rigidula* with broader leaves approach the range of *H. galpinii* but differ in their

elongate, narrow false stem and leaves recurving above the middle, while those in *H. galpinii* form a thick false stem and converge apically. Figure 12.27.

Distribution and ecology: *H. rigidula* var. *rigidula* is found in Namibia, South Africa, Swaziland and Lesotho. It is widespread in South Africa, occurring in all provinces except the Western Cape and Northern Cape (Figure 12.34AA). It is concentrated in the eastern region of the country with a coastal and inland distribution. The species also extends into tropical Africa, occurring in Zimbabwe, Mozambique, Kenya and Tanzania. *H. rigidula* is frequent in open grasslands and easily spotted because of its tall, lanky habit and ‘strap-like’ leaves. The species grows in open, well-drained areas, rocky slopes and on the edges of shrubland, wetlands and stream banks. The typical variety is more abundant forming pure populations although it grows sympatrically with many other taxa including *H. colchicifolia*, *H. galpinii*, *H. hemerocallidea*, *H. obtusa*, *H. multiceps*, *H. acuminata* and *H. rigidula* var. *pilosissima*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named from the Latin *rigidulus* (somewhat rigid) referring to its stiff leaves.

Common names: Kaffertulp, silver-leaved star-flower, moli-teane (Sesotho); inkomfe (Zulu).

Uses: the rigid leaves of the species are suitable for rope making and are used with *H. obtusa* in rural areas in the midlands of KwaZulu-Natal to make twine for cross threading thatch roofing of huts.

Vouchers: *Compton 32393* (NBG, PRE); *Dold 1365* (GRA); *Dieterlen 223* (NBG, PRE); *Dinter 5601* (PRE, SAM); *Singh 460, 463* (NH).

3b. var. ***pilosissima*** *Baker*, *Journal of the Linnean Society, Botany*: 117 (1878b); *Baker*: 186 (1896); *Nel*: 331 (1914); *Singh 364* (2007): Type: South Africa, Gauteng, Magalies Berg [Magliesberg], *Burke 156* (K, lecto!).

H. arnottii *Baker*: 552 (1877); *Baker*: 112 (1878b); *Baker in Thiselton-Dyer*: 132 (1896). Type: South Africa, Eastern Cape, Colesberg, *Arnott s.n.* (not yet traced, seemingly not at K), June 1870, Hort. Kew.

Diagnosis: *H. rigidula* var. *pilosissima* is distinct in its slender, tall, soft, grey-white appearance and is not likely to be confused with any other species in the genus. It is distinguished from the typical variety by density and type of leaf hairs. Hairs in the typical variety are sparse, scattered mainly on

the lower surface in channels between veins, bifurcate, long and ascending or stellate, short and appressed. In *H. rigidula* var. *pilosissima*, hairs are dense on both surfaces, stellate, long and ascending giving leaves a soft, furry, grey-white appearance. Figure 12.26.

Distribution and ecology: *H. rigidula* var. *pilosissima* has a similar distribution to that of var. *rigidula*, being present in South Africa, Lesotho and Swaziland. It occurs in all provinces in South Africa, except the Western Cape, Northern Cape and Free State (Figure 12.34Z). The variety does not occur in tropical Africa. *H. rigidula* var. *pilosissima* is often found growing in the vicinity of *H. rigidula* var. *rigidula*, but its occurrence is less frequent in comparison to the typical variety. The difference in density of hairs on leaves between the two varieties is often not obvious to field collectors and both varieties are sometimes presented in the same gathering.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: Named from the Latin *pilosus* meaning hairy in reference to the felt-like hairs in this taxon.

Common names: Kaffertulp, silver-leaved star-flower, moli-teane (Sesotho); inkomfe (Zulu)

Vouchers: *Abbott 6121* (NH, PRU, Umtamvuna); *Compton 28102* (NH, NBG); *Singh 326* (NH); *Thode 2534* (PRE); *Van Wyk 1749* (PRE).

4. ***Hypoxis acuminata*** Baker, *Journal of Botany*: 3 (1889); Baker in Thiselton-Dyer: 186 (1896); Compton: 129 (1976). Type: South Africa, KwaZulu-Natal, Inanda, *Wood 1347* (NH, holo!; K!).

Tall, slender, sparsely hairy herb, ± 200 mm high, growing singly or in tufts of 3–40 shoots forming large clumps. *Rhizome* subglobose or oblong, 15–25 mm in diameter, with many contractile roots arising above middle; crowned by leaves and a dense mass of fibrous bristles from remains of old leaves, sometimes proliferating by short stolons, white to pale yellow inside. *False stem* cylindrical, slender, 30–100 x 5–10 mm. *Leaves* few, 4–8, erect or semi-erect, spirally twisting, linear, 130–380 x 4–7 mm, V-shaped in cross section; veins 6–12, flush with surface, two to four near each margin thickened and raised on the upper surface; hairs predominantly bifurcate with few stellate intermingled, mainly on lower surface and along veins and margins, V- or U-shaped. *Inflorescence* 1–4 per plant, appearing with leaves and produced sequentially, racemose, covered sparsely in white, long hairs; scape shorter than leaves, 200–300 mm x 1.5–2 mm, flattened in cross section

(ancipitous). *Flowers* 2(–5), basal two opposite, upper tier with 1–3 flowers; pedicels 4–12 mm long when flowers open. *Bract* subulate, 10–20 x 1–2 mm. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 11–20 x 3–7 mm, green and hairy abaxially; inner tepals ovate-elliptic, 9–15 x 2–5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments linear, 1–1.5 mm long; anthers 2–6 mm long, sagittate, apex split. *Ovary* 3–4 mm long; style 1–2 mm long; stigma pyramidal with 3 concave faces, 2–3 mm long. *Capsule* turbinate, 5–8 x 4–6 mm, opening by a circular slit. *Seeds* globose to ovoid, 1.8–2.1 x 1.6–1.8 mm, black, glossy; testa papillate. *Flowering time*: September–December. Figure 12.1.

Diagnostic characters and relationships: *H. acuminata* is recognised by its grass-green, slender habit, few leaves arising from a narrow short false stem and acuminate apices. Its racemes are mostly two-flowered. The species is most closely related to *H. rigidula* var. *rigidula*, but differs in having shorter, firm but not rigid leaves, fewer flowers per raceme and sparsely hairy inflorescences. Further, its even distribution of bifurcate, weak, long V- or U-shaped, ascending hairs on leaves can be separated from the predominantly stellate, short, needle-shaped, appressed hairs in *H. rigidula* var. *rigidula*.

Distribution and ecology: *H. acuminata* occurs in South Africa, Lesotho and Swaziland and displays a coastal and inland distribution. It occurs in all provinces of South Africa, except the Western Cape, Northern Cape and North West (Figure 12.34A). It is possibly more abundant in the Eastern Cape, Free State and Lesotho, but these areas lack herbarium records. The species grows in open grasslands in damp areas, sometimes associated with forest margins, stream banks and roadside depressions, in full sun or partial shade. It is concentrated away from the coast, at higher altitudes of 500 to 2000 m above sea level. *H. acuminata* grows sympatrically with *H. argentea*, *H. filiformis*, *H. galpinii* and *H. rigidula*. The typical form of *H. acuminata* is a slender plant with a false stem, but a form lacking a false stem and with shorter leaves was recorded. The latter form is less common and associated with dry ground, usually just after a burn and before the spring rains. Except for the false stem, both forms are similar in leaf shape, hairs and inflorescences, and display the characteristic oblique twisting of leaves.

Conservation status: Lower Risk Least Concern (LRlc).

Etymology: named from the Latin *acuminatus* meaning tapering to a narrow point, referring to the shape of the leaf apices.

Common names: Moli-motsanyane, thotolinyenyane (Sesotho).

Vouchers: Compton 27182 (NBG); Dieterlen 290 (PRE); Dold 678 (GRA); Moss 13888 (J); Singh 655 (NH).

5. ***Hypoxis longifolia*** Baker ex Hook.f., Curtis Botanical Magazine 26: t. 6035 (1873), non Baker (1904); Baker: 115 (1878b); Baker in Thiselton-Dyer: 185 (1896); Singh: 363 (2007). Type: South Africa, Free State, Vet River, *Burke s.n.* (K, lecto!).

H. longifolia var. *thunbergii* Baker: 116 (1878b). Type: South Africa, Cape, *Thunberg s.n.* (UPS, image no. 8269!) as *H. villosa* var. δ .

H. zululandensis S.E. Wood (MS), MSc. Dissertation, unpublished, pg. 65. Type: South Africa, KwaZulu-Natal, Ubombo, Manzenzwenya, *Moll 4740* (NBG, holo!).

Tall, slender, glabrous herb, 200–350 mm high, growing singly. *Rhizome* turbate, 40–52 x 35–50 mm, with many contractile roots arising above middle, crowned by leaves and a dense mass of fibrous bristles from remains of old leaves, yellow inside. *False stem* slender, 40–70 x 6–10 mm. *Leaves* few, 4–6(–8), erect or semi-erect, clasping at base to form a narrow false stem, filiform, 150–500 x 2–4 mm, subterete rarely flat, ribbed; veins 4–6, close to each other, uniformly thickened and raised on upper surface, straw-colour, blade near-glabrous or with few hairs, margins and midrib on lower surface outlined in white by a thickened band of squat hairs; hairs stellate (4–5 arms) with one to two arms three times longer than the rest, short arms \pm 0.3 mm, long arms \pm 1 mm, appressed, white. *Inflorescence* 2–4 per plant, appearing with leaves and produced sequentially, racemose, covered in white, patent hairs; scapes as tall as or shorter than leaves, 150–400 x 1–2 mm, flattened in cross section (anapitous). *Flowers* 4–5(–7); pedicels 11–30 x 0.5–1.0 mm when flowers open. *Bract* subulate, 5–19 x 1–2 mm. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 12–14 x 4–5 mm, green and hairy abaxially; inner tepals ovate-elliptic, 10–12 x 5–6 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments linear, 2–3 mm long; anthers 4–5 mm long, sagittate, apex split. *Ovary* 4–5 mm long; style cylindrical, \pm 3 mm long; stigma pyramidal with 3 concave faces, 1–3 mm long. *Capsule* turbate, 4–7 x 3–5 mm, opening by a circular slit. *Seeds* ovoid, 1.8–2 x 1.4–1.5 mm, black, glossy; testa papillate. *Flowering time:* August–May, mostly in November–January. Figure 12.16.

Diagnostic characters and relationships: *H. longifolia* is a slender herb with a narrow, short false stem and characteristic linear, subterete leaves with few veins close to each other, thickened and

raised on the upper surface making the leaves appear ribbed. The blade is usually glabrous while the margins and midrib on lower surface are ciliate, being lined with squat white stellate hairs.

H. longifolia closely resembles *H. kraussiana* in leaf width, venation and hair characters. However, the longer leaves, more than 120 mm long, and inflorescences with usually more than two flowers in *H. longifolia* separates it from *H. kraussiana*. In *H. kraussiana*, leaves are shorter and inflorescences consistently two-flowered. The slender, subterete, ribbed leaves of *H. longifolia* are also similar to those in *H. filiformis*. However, the rhizome in *H. longifolia* is also much larger with a strong crown of bristles in comparison to *H. filiformis*, and leaves in the latter species are sparsely covered with long, weak mostly bifurcate hairs (pilose).

Distribution and ecology: *H. longifolia* occurs in South Africa, Lesotho and Swaziland. It is found in all provinces of South Africa, except the Northern Cape and has a coastal and inland distribution. It extends along the coast from Knysna (Western Cape) to Ubombo in KwaZulu-Natal and westwards across Free State and Lesotho and into North West (Figure 12.34P). The species also extends into tropical Africa, occurring in southern Mozambique. A specimen, *Govender 79* (NH), collected west of Zitundo in Mozambique during a SABONET southern Mozambique Expedition 2001, was found to closely match the type specimen. It has not been previously recorded in Mozambique. Plants of *H. longifolia* occur in grasslands, in well-drained or moist soil and full sun. The species grows at altitudes of 10 to 700 m above sea level. It appears not to be frequently collected, possibly being missed among tall grass due to the very slender habit.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: derived from the Latin *longi* and *folia* describing the long, narrow leaves of the species.

Vouchers: *Gerstner 4936* (PRE); *Hugo 2088* (PRE); *MacOwan 2123* (NBG); *Moll 4740* (NBG, NH); *Ngwenya 1738* (NH).

6. ***Hypoxis ludwigii*** Baker in Journal of Botany 14: 181 (1876), 116 (1878b), in Thiselton-Dyer: 185 (1896). Type: South Africa, Eastern Cape, Baziya, *Baur 301*, cult. in Baron Ludwig's garden in Cape Town (K, image!; B!).

Tall, slender herb, 250–350 mm high, sparsely hairy, usually growing in tufts forming large stands. *Rhizome* oblong, 25–40 x 15–20 mm, with contractile roots, crowned by leaves and a mass of dense bristles from remains of old leaf bases, yellow or orange inside. *False stem* cylindrical, slender, 40–50

x 20-30 mm. *Leaves* 8–10, clasping at base to form false stem, coriaceous, erect, linear, 300–450 x (8–)10–20 mm; veins 16–40, almost all thickened and raised on upper surface (ribbed), sparsely hairy; hairs scattered on blade, bifurcate, V-shaped, ascending, dense on margin and midrib below forming a white band (ciliate), stellate (3–6 arms); arms of unequal length, needle-shaped, 1–2 mm long. *Inflorescence* 1–4 per plant, produced sequentially in the growing season, racemose, covered in white, ascending hairs; scapes as tall as or shorter than leaves, 150–200 x 2–3 mm, ancipitous. *Flowers* 2–5, lower two opposite each other, upper tier with 2–3 flowers; pedicels 16–25 x 1–2 mm when flowers open. *Bract* linear-subulate, 5–12 mm long, hairy below. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 10–12 x 3–3.5 mm, green and densely hairy abaxially; inner tepals ovate-elliptic, 8–10 x 3–4 mm, with a green band and hairy along midrib abaxially. *Stamens* with filaments subulate, 2–3 mm long; anthers 2.5–3 mm long, sagittate, apex entire. *Ovary* 4–5 mm long; style 1–2 mm long; stigma pyramidal with 3 concave faces, 1–3 mm long. *Capsule* turbinate, 4–7 mm x 3–4 mm, opening by a circular slit. *Seeds* ovoid, 1.5–2 x 1–1.5 mm, black, glossy; testa smooth. *Flowering time*: August–February. Figure 12.17.

Diagnostic characters and relationships: *H. ludwigii* is a slender herb with a narrow false stem and linear leaves with many veins close to each other, thickened and almost all raised on the upper surface making the leaves appear ribbed. The blade is glabrous or lightly covered with bifurcate long hairs, while the margins and midrib on lower surface are ciliate, being lined with squat white stellate hairs. *H. ludwigii* is closely related to *H. longifolia* having strongly ribbed ciliate leaves. ~~and corymbose inflorescences~~. It is separated from *H. longifolia*, in its leaves being wider and inflorescences usually with more than two flowers. In *H. longifolia* leaves are subterete and inflorescences usually two-flowered. *H. ludwigii* may be confused with *H. rigidula* var. *rigidula* in its rigid, hairy leaves but differs in its shorter false stems, shorter and broader ribbed leaves, and ~~corymbose~~ fewer (usually 2–4) flowers per inflorescence. In *H. rigidula* var. *rigidula*, false stems are long and narrow, leaves strap-like, ribbed near each margin and inflorescences with usually more than five flowers ~~racemose~~. Further, specimens of *H. ludwigii* dry light green while those of *H. rigidula* var. *rigidula* dry dark brown.

Distribution and ecology: *H. ludwigii* occurs in South Africa and possibly Lesotho, and is known from a single specimen in Namibia. In South Africa, it is found in the Eastern Cape, KwaZulu-Natal and Free State, and is associated with the Drakensberg Mountains. It extends from Stutterheim in the south to Warden in the north and is concentrated in the Drakensberg mountain range close to the KwaZulu-Natal-Lesotho border (Figure 12.34Q). *H. ludwigii* grows in grasslands, in well-drained or moist soil and full sun. The species grows at high altitudes of 1300 to 2400 m above sea level.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: Named in honour of Baron Carl Ludwig (1784–1847), who established a noteworthy botanic garden known as the Ludwig-burg Garden in the Cape around 1830.

Vouchers: Hilliard & Burt 187692 (NU); Hilliard & Burt 18751 (NU); Singh 522, (NH); Singh & Baijnath 314 (NH).

7. **Hypoxis hemerocallidea** Fisch., C.A. Mey. & Avé-Lall., Index Seminum quae Hortus Botanicus Imperialis Petropolitanus 8: 64 (1842); Baker: 119 (1878b); Baker in Thiselton-Dyer: 188 (1896); Nel 51: 316 (1914); Compton: 130 (1976); Burt: 202 (1986); Singh: 362 (2007). Type: South Africa, Cape of Good Hope, cult. in Hort. Bot. Petrop. (LE, image!).

H. elata Hook.f. (non Schultes & Schultes): t. 5690 (1868). Type: From specimen grown in Reigate, 1862.

H. obconica Nel: 330 (1914). Syntypes: South Africa, KwaZulu-Natal, Pinetown, South Africa, KwaZulu-Natal, Verulam, Schlechter 2898 (B!, BR, GRA!, PRE!, ZT!); Thode July 1893 (B!); South Africa, KwaZulu-Natal, Inanda, Wood 184 (K, image!).

H. patula Nel: 333 (1914); Retief & Herman: 69 (1997). Type: South Africa, Mpumalanga, Barberton, Saddleback Range, Galpin 1100 (K, holo., image!; PRE, isolecto!).

H. rooperi T. Moore: 65 cum icone (1852); Lemaire: t. 303 (1853); Baker: 118 (1878b) excl. specim. Forbes (1822); Baker in Thiselton-Dyer: 188 (1896); Wood: 132 (1907); Nel: 337 (1914); Phillips t.172 (1925); Burt: 202 (1986). Type: cult. by Rev. T. Rooper of Wick Hill, Brighton in October 1850, from a plant collected by Captain E. Rooper in the Eastern Cape at the Buffalo River mouth in July 1837 (K, image!). Syntype: South Africa, Eastern Cape, Albany Division, near Bushmans River, Drège 8529 (K!).

H. rooperi var. *forbesii* Baker: 118 (1878b); Baker in Thiselton-Dyer: 189 (1996). Type: Mozambique, Delagoa Bay, Forbes s.n.K1999/1186 (1822) (K, holo., image!).

Robust sparsely hairy herb, 100–600 mm high, growing singly. *Rhizome* globose, turbinate or oblong, 25–100 x 25–60 mm, with many contractile roots arising above middle; crowned by leaves and a dense mass of fibrous bristles from remains of old leaves; yellow to orange inside. *Leaves* many, (6–)8–12, noticeably arranged one above the other in three ranks with roughly 120° between the ranks, lanceolate, seldom linear-lanceolate, (10–)200–500(–900) x 18–25(–45) mm, sickle-shaped (falcate), recurving, folded together along the length (conduplicate) towards the base, V- or inverted

W-shaped in cross section; veins flush with surface, two near each margin thickened and raised on upper surface; with an even distribution of hairs, mainly on lower surface and in young leaves, less hairy with age; hairs on blade bifurcate, V- or U-shaped, on margins scattered, stellate (3–6 arms) with 1 or 2 arms more strongly developed, ascending, white. *Inflorescence* 3–8 per plant, produced sequentially throughout the growing season with leaves, racemose, covered in long, ascending, white hairs; scapes as tall as or shorter than leaves, 150–350 x 15–50 mm, flattened in cross section (ancipitous). *Flowers* (2–)4–12 in tiers, basal tier with 2 flowers, opposite, upper tiers with 2 or 3 flowers; pedicels 10–30 x 1.5–4.0 mm when flowers open. *Bract* subulate, ½ to 1½ the length of pedicel, 5–38 x 3–4 mm. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 12–20 x 4–7 mm, green and hairy abaxially; inner tepals ovate-elliptic, 10–18 x 7–8 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–4 mm long; anthers 4–7 mm long, sagittate, apex entire or split. *Ovary* 3–4 mm; style 1–2.5 mm long; stigma pyramidal with 3 concave faces, 2–5 mm long. *Capsule* ellipsoidal or turbinate, 7–10 x 5–7 mm, opening by a circular slit. *Seeds* ovoid, 1.5–2 x 1–1.8 mm, black, glossy; testa smooth. *Flowering time*: August–May, mostly September–March. Figure 12.13.

Diagnostic characters and relationships: In southern Africa, *H. hemerocallidea* is the best known species in the genus. Plants of the species are diagnostic in their appearance and easy to identify, particularly in the field. The leaves are arranged one above the other in three ranks with roughly 120° between the ranks. Leaves are sickle-shape (falcate), recurving with an even distribution of soft, ascending hairs. The species is most similar to *H. obtusa* in the size of rhizomes, habit and inflorescence. However, the soft, pilose leaves of *H. hemerocallidea* are distinct from the rigid, ribbed near-glabrous leaves with ciliate margins in *H. obtusa*. *H. hemerocallidea* is one of the most variable species in the genus with regards to plant height, leaf dimensions, hairiness, number of flowers depending on the age of plants and part of season. The new season's leaves are always densely hairy and as the leaves mature, hair density is reduced by the enlargement of the leaf surface area. In young plants, less than three years that develop from seed, leaves are short and narrow approaching linear, densely hairy and have fewer flowers in comparison to older plants. The smaller form has been confused as representing a new entity. Also, at the start of the growing season, like in *H. rigidula*, the first few inflorescences in *H. hemerocallidea* bear two flowers, opposite each other; deviating from the usually many-flowered racemes in the species.

Distribution and ecology: *H. hemerocallidea* is found in Botswana, South Africa, Swaziland and Lesotho. It occurs in all provinces in South Africa, except the Western Cape and Northern Cape. It is concentrated in the eastern region of the country with a coastal and inland distribution (Figure

12.34M). Its distribution extends into tropical Africa, where it occurs in Zimbabwe and Mozambique but is scarce in these countries in comparison to southern Africa. Possibly, also in Kenya and Uganda (see notes). In southern Africa, plants of *H. hemerocallidea* occupy a wide range of habitats. Plants form extensive pure stands in open grasslands. To a lesser degree, they extend into sandy dune slopes and damp areas around streams. The species is adaptable enough to grow in semi-shade conditions for example in thicket and forest margins. It also occurs in disturbed areas like road verges and pine plantations. *H. hemerocallidea* occurs from just above sea level at 5 m to high altitudes up to 1800 m.

Conservation status: Lower risk-Near Threatened (LRnt) due to its exploitation for the medicinal trade especially in the Eastern Cape Province and KwaZulu-Natal.

Etymology: *hemerocallidea* is used in reference to the species resembling the leaves of *Hemerocallis*, the day lily.

Common names: African potato (coined recently by the media following its popularization in South Africa as a potential immune booster for patients with immune-related diseases like cancer and HIV/AIDS, star-flower, gifbol, sterblom, kaffertulp (Afrikaans), moli-kharatsa (Sesotho), inkomfe (Zulu).

Uses: *H. hemerocallidea* is the species most used by humans among the hypoxids in southern Africa. Rhizomes of the species were used for centuries to treat various ailments including headaches and mental disorders by the Zulu (Hutchings, 1996). White farmers in South Africa used the rhizomes as a herbal remedy to treat prostate cancer (Van Staden 1981). The species has potential in Western medicine as it contains the diglucoside, hypoxoside, which in its active form rooperol is known to inhibit cancer cells (Drewes & Khan 2004). Plants of the species are still being harvested from the wild for the medicinal plant (muthi) trade and this is of concern to conservationists, as populations diminish in the wild, especially in the Eastern Cape Province (Dold & Cocks 2002) and KwaZulu-Natal. *H. hemerocallidea* is an excellent species for the garden and when massed in a bed, its large bright yellow flowers provide a resplendent display.

Notes: *Hypoxis hemerocallidea* is not considered to occur in the Flora of Tropical East Africa region and is possibly considered within the concept of *H. urceolata* or *H. obtusa* (Nordal *et al.* 1995; Wiland-Szymańska & Nordal 2006). Specimens *Verdcourt & Fraser Darling 2281, Glover, Gwynne & Samuel 809, Hansen 756, Horeau 73, Iveas 871, Kerfoot 2640, Sheldrick 11559* and *Verdcourt 3828C*, collected in Kenya, *Gillett & Kariuki 18825* and *Lye & Rwaburindore 4517* and *Harker 445*

from Uganda, all in EA (and on loan to NH, except *Verdcourt 3828C* and *Harker 445*) are identified as *H. hemerocallidea* in the present study. Considering the number of collections, there appears to be a marked decline in the occurrence of *H. hemerocallidea* in tropical Africa.

Baker (1878b) separated *H. rooperi* T. Moore from *H. hemerocallidea* on its corymbose-like inflorescence. Based on the smallness in stature of the plant, Baker (1878b) proposed the variety *forbesii* citing *Forbes s.n.* (in K) collected in Mozambique. Burt (1986) clarified the concept of *H. hemerocallidea* and reduced *H. rooperi* as a synonym of *H. hemerocallidea*. Burt (1986) also discusses the problems around Heideman's (1983) concept of *H. rigidula* and *H. hemerocallidea*. Heideman (1979, 1983) considered two varieties in *H. rooperi* namely var. *rooperi* and var. *forbesii*. She recognised var. *forbesii* as a smaller plant and included with these, plants with new leaves in the growing season e.g. *Leisgang 46* (NU). During fieldwork in South Africa, plants of *H. hemerocallidea* were found to have a varying degree of leaf dimensions, number of flowers and dimensions of pedicels. It is extremely difficult to define limits for leaf dimensions in order to create varieties within *H. hemerocallidea*. As in other robust species, younger plants of *H. hemerocallidea* appear different from the older plants in a population and if collected independently, can be mistaken for a new entity. Therefore, the approach in this study has been to extend the limits of variability to accommodate the small and large facies of a species over its growing season. Variety *H. rooperi* var. *forbesii* is considered within the limits of *H. hemerocallidea*.

Vouchers: *Barker 4367* (NBG); *Cloete & Bosa 3219* (NH); *Galpin 1190* (PRE); *Nicholas & Perks 1502* (PRE); *Singh 649* (NH).

8. ***Hypoxis obtusa*** Ker Gawl., Botanical Register 2: t. 159 (1816); Baker: 114 (1878b) & in Thiselton-Dyer: 184 (1896); Burt: 205 (1986); Nordal & Zimudzi: 13 (2001); Singh: 363 (2007). Type: Bot. Reg. t. 159, icono!.

H. iridifolia Baker: 117 (1878b); Burt: 204 (1986); Retief & Herman: 69 (1997); Nordal & Zimudzi: 13 (2001). Type: "Tropical South Africa", *Baines s.n.* October 1872, (K, holo!).

H. nitida I. Verd. 27: t. 1058 (1949). Type: South Africa, Gauteng, Pretoria, *Robertson 2* (holo., PRE!).

H. obtusa var. *chrysotricha* Nel: 334 (1914). Type: South Africa, KwaZulu-Natal, Newmarket, *Krook 405* (W)-type lost in World War II.

Robust herb, 200–450 mm high, growing singly. *Rhizome* subglobose, oblong or turbinate, 4–12 x 4–8 mm, with many contractile roots arising above middle, crowned by leaves and a dense mass of fibrous bristles from remains of old leaves, yellow or orange inside. *Leaves* many, (6–)8–15, coriaceous, erect or recurving, arranged one above the other in three ranks with about 120⁰ between the ranks, folded together along the length (conduplicate) at least at base, spirally twisting upwards with age, lanceolate, sometimes linear-lanceolate, 100–700 x 6–30 mm, gradually tapering to a narrow acute apex; veins 30–70, close to each other, uniformly thickened and raised on upper surface (ribbed), bases sometimes red or purple, near-glabrous or hairy towards base, margin and midrib outlined in white by a thickened band of squat hairs (ciliate); hairs stellate (3–6 arms) with 1 or 2 arms more strongly developed, needle-shaped, appressed. *Inflorescence* 2–5 per plant, produced sequentially throughout growing season with leaves, racemose, covered in short bristle-like, patent, white hairs; scapes as tall as or shorter than leaves, 250–350 x 25–70 mm, flattened in cross section (ancipitous). *Flowers* (2–)5–12 in tiers, basal tier with 2 flowers, opposite, upper tiers with 2 or 3 flowers, two to four opening at a time; pedicels unequal in length, lowermost longer, 5–20 x 1–2 mm when flowers open. *Bract* subulate, 7–35 mm x 3–4 mm. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, (10–)12–20 x 4–8 mm, green and hairy abaxially; inner tepals ovate-elliptic, 10–18 x 6–10 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–5 mm long; anthers 5–8 mm long, sagittate, apex entire. *Ovary* 3–4 mm; style 1–2.5 mm long; stigma pyramidal with 3 concave faces, 2–4 mm long. *Capsule* turbinate, 6–7 x 5–7 mm, opening by a circular slit. *Seeds* ovoid, 1.5–2 x 1–1.5 mm, black, glossy; testa smooth. *Flowering time*: August–February. Figure 12.22.

Diagnostic characters and relationships: *H. obtusa* is easy to identify from its leaf characters. Its leaves are stiff and ribbed due to the many veins close to each other, thickened and raised on upper surface. The leaf blade is glabrous except at bases. Leaf hairs form a conspicuous white band along margins and midrib on lower surface. The species is also floriferous, with 5–11 flowers per raceme. *H. obtusa* is most similar to *H. hemerocallidea* in its habit and inflorescences, but leaves in the latter species are moderately firm (not rigid and ribbed) and have an even distribution of long, weak hairs. *H. obtusa* is also related to *H. longifolia* and *H. obliqua* in its ciliate leaf margins and midrib on lower surface but can be separated from these species on habit, leaf width, inflorescence type and tepal size. *H. longifolia* has linear leaves wrapped in false stem at the base and four to five flowers in a corymbose inflorescence while *H. obtusa* lacks a false stem, its leaves are lanceolate and usually more than five flowers held in a racemose inflorescence. *H. obliqua* is a short plant, less than 150 mm high and tepals up to 12 mm long in comparison to *H. obtusa* which is usually more than 200 mm high and tepals are more than 12 mm long.

Distribution and ecology: *H. obtusa* occurs in Namibia, Botswana, South Africa, Lesotho and Swaziland. In South Africa it occurs in all provinces except the Western Cape. The species is common in South Africa with a more inland distribution. It is known from a few localities in Botswana and Namibia and is the only species that extends marginally into the Northern Cape at the North West border (Figure 12.34V). *H. obtusa* also extends into tropical Africa and occurs in Zimbabwe, Uganda, Kenya and Tanzania. The species prefers open grasslands, especially sandy areas and full sun. It grows at altitudes of 300 to 2100 m above sea level. In southern Africa, *H. obtusa* forms pure stands or grows sympatrically with *H. rigidula* and *H. colchicifolia*. Although hybridization among these species is suspected, it is not obvious from field observations as suspected hybrids tend to strongly resemble one parent and can be placed into the range for one species. It is therefore not possible to provide a conclusive remark on occurrence of hybridisation between these species in the absence of extensive field observations and breeding studies that include apomixis and hybridization.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: Named from the Latin *obtusus*, referring to the blunt tips of the tepals.

Common names: Mr Burchell's hypoxis, Moli-boea (Sesotho); inkomfe (Zulu).

Uses: *H. obtusa* has a few varied uses in southern Africa. Hypoxoside, the di-glucoside targeted mainly from *H. hemerocallidea* and *H. colchicifolia* for its anti-tumor activity for treating cancer patients, was first isolated from *H. obtusa* (Marini-Bettolo *et al.* 1982). *H. obtusa*, like the two former species would therefore also be a good source of hypoxoside. Together with *H. rigidula* var. *rigidula*, *H. obtusa* is used to make twine for cross threading thatch roofing of huts in the midlands of KwaZulu-Natal. The species is also reported to be used in the making of floor polish for huts in rural KwaZulu-Natal (Singh 1999). Like *H. hemerocallidea*, *H. obtusa* offers a brilliant display of large yellow flowers in gardens in the spring and summer months.

Vouchers: *Bester 1333* (NH, PRU); *Dinter 617* (NBG); *Cross PRE38186* (PRE); *Jenkins TM7124* (PRE); *Singh & Wiland 689* (NH).

9. ***Hypoxis stellipilis*** Ker Gawl., Botanical Register t. 663 (1822); Fisch. & C.A. Meyer (1845); Baker: 118 (1878b). Type: t. 663 (1822) icono. Epitype selected here: South Africa, Eastern Cape, Uitenhage, Zwartkops River, *Zeyher 4140* (K!, NBG!).

H. lanata Eckl. in herb. ex Baker: 118 (1878b). Exsic.

Medium-sized, soft herb, 100–200 mm high, growing singly. *Rhizome* oblong, slightly longer than wide, 40–60 x 30–50 mm, with many contractile roots arising above middle, crowned by leaves and a mass of bristles from remains of old leaves, yellow inside. *Leaves* many, 10–18, arranged one above the other in three ranks, lanceolate, 150–300(–400) x 12–25 mm, sickle-shaped (falcate), recurving, folded together along the length (conduplicate) at least at base, upper surface dark green and glabrous, lower surface white tomentose; veins 8–14, slender, flush with surface, one to two near each margin thickened and raised on upper surface, obscured on lower surface by hairy layer; hairs stellate (6–14 arms), star-shaped; arms needle-shaped, short, one or two more strongly developed, 1–3 mm long, appressed, in different heights over each other, interwoven to form thick, silvery-white layer. *Inflorescence* 2–4 per plant, produced sequentially in growing season, corymbose, covered in dense, long, soft hairs (furry); scapes as tall as or shorter than leaves, 75–130(–200) mm long, flattened in cross section (ancipitous). *Flowers* 3 or 4(–7); pedicels unequal in length bringing flowers to same height; two lowermost 10–20 mm long; upper 2–5 mm long. *Bract* subulate-linear, 10–25 mm long, hairy below. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, (12–)15–19 x 4–5 mm, green and hairy abaxially; inner tepals ovate-elliptic 14–18 x 5–6 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments linear, 2–3 mm long; anthers 3–5 mm long, sagittate, apex split. *Ovary* 6 mm long; style \pm 4 mm long; stigma pyramidal with 3 concave faces, \pm 4 mm long. *Capsule* turbinate, 6–8 x 4–5 mm, opening by a circular slit. *Seeds* ovoid, 1–2 x 0.8–1.0 mm, black, glossy; testa papillate. *Flowering time*: August–April. Figure 12.30.

Diagnostic characters and relationships: *H. stellipilis* is the most distinct species in the genus. The entire lower surface of leaves is silvery-white and tomentose due to the stellate, appressed, interwoven, thick hairs. The upper surface of leaves is near-glabrous and dark green. The type and distribution of hairs makes the species unique. *H. stellipilis* is most closely allied with *H. hemerocallidea* and *H. obtusa* in leaves arranged one above the other in three ranks and large flowers, more than 20 mm in diameter. It differs from these species in its unique hair type and distribution, and corymbose inflorescences. In *H. hemerocallidea* hairs are bifurcate and evenly distributed throughout leaves while in *H. obtusa* leaves are near-glabrous and ciliate on margins, being lined with stellate hairs.

Distribution and ecology: *H. stellipilis* is a South African endemic with a very narrow distribution range. It occurs from Uniondale (Western Cape) in the south, along the coast to Port Elizabeth (Eastern Cape) in the north, making it the only *Hypoxis* species near-endemic to the Cape Floristic Region (Figure 12.34AD). The species is known mainly from the Albany Thicket Biome, where it grows in grassy patches on drier hill slopes, in full sun or partial shade. *H. stellipilis* prefers lower altitudes of 160 to 560 m above sea level. Plants of this species are very scarce in its distribution range, never forming strong populations.

Conservation status: Lower risk-Near Threatened (LRnt) due to few and small size of populations.

Etymology: named from the Latin *stellipilis* (star-shaped), referring to the mass of stellate hairs forming a silvery-white layer on lower surface of leaves.

Common names: Starry-furred hypoxis.

Vouchers: *Acocks 16117* (PRE); *Drege 9018* (PRE); *Ecklon & Zeyher 1063* (BOL, GRA, NBG); *Phillips & Van Rensberg 2113* (J); *Singh 621* (NH).

10. ***Hypoxis interjecta*** *Nel*, Engler Botanische Jahrbücher 51: 321 (1914). Type: South Africa, Mpumalanga, near Lydenburg *Wilms 1454* (B, holo!).

H. pretoriensis *Goossens* (MS). Type: South Africa, Gauteng, near Pretoria, Muckleneuk, *Goossens 91* (K, holo., image!).

Stout, tough, glabrous herb, 100–120 mm high, glabrous, growing singly. *Rhizome* oblong to subglobose, 20–60 mm x 15–30 mm, with few contractile roots arising above middle; crowned by leaves and a dense mass of fibrous bristles from remains of old leaves; yellow or orange inside. *Leaves* few, 4–7, erect or semi-erect, bases overlapping in a rosette, lanceolate to broadly oblong-lanceolate, 40–60 x 8–20 mm, elongating to 250–400 mm in post-flowering, forming false petioles when shaded by dense grass, flat, tapering rapidly to subacute apices; veins 12–18, close to each other, flush with surface, two near each margin slightly thickened and raised on upper surface, glabrous; hairs if present then on margins and midrib of younger leaves, caducous in mature leaves, stellate (3 or 4 arms), white or yellow. *Inflorescence* 2–4 per plant, appearing before or with emergence of leaves, corymbose noticeable when flowers more than 2, densely covered with coarse, short, white or yellow hairs (hispid); scapes as tall as to twice as tall as leaves, 50–80 mm long, flattened in cross section (ancipitous). *Flowers* usually 2, opposite, seldom 4 in 2 tiers of 2 flowers

each; pedicels short, 6–15 x 1.5 mm, densely covered in short, yellow hairs. *Bract* subulate, 5–6 mm long, densely covered in short hairs. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 14–15 x 6–8 mm, green and densely hairy abaxially; inner tepals ovate-elliptic, 13–14 x 8–10 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 3–4 mm long; anthers 4–5 mm long, sagittate, apex entire; *Ovary* 2–3 mm long. style 0.5–2 mm long, stigma pyramidal with 3 concave faces, 1.5–2 mm long. *Capsule* turbinate, 5–6 x 4–5 mm opening by a circular slit. *Seeds* few, 3–5, ovoid, large, 2–3 x 1–1.8 mm, black, glossy; testa smooth. *Flowering time*: August–October. Figure 12.14.

Diagnostic characters and relationships: *H. interjecta* can be identified by its short leaves, less than 100 mm long when flowers open, completely glabrous when mature, and usually two-flowered, strong inflorescences. The species is closely related to *H. multiceps* and *H. costata* in having few, short, broadly oblong leaves overlapping in a rosette-like arrangement and stout inflorescences, produced at the start of the growing season and reaching fruiting by the time leaves develop fully. *H. interjecta* differs from *H. multiceps* and *H. costata* in having glabrous leaves. In *H. multiceps*, leaves are scabrous while in *H. costata*, veins, margins and midrib on lower surface are ciliated with long soft hairs, noticeable to the naked eye. Glabrous leaves in *H. interjecta* are similar to those in *H. colchicifolia* but cannot be confused with *H. colchicifolia* as the latter is a robust plant with large, ribbed leaves and racemose inflorescences. A few specimens of *H. interjecta* (*Behr 607* in NBG, *West 387* in PRE), *Thode 161* (in PRU) were found to have stellate hairs sparsely distributed on margins and midrib on the lower surface of young leaves and may be confused with *H. obliqua*. However, in *H. interjecta*, hairs are scattered, ascending, falling off with age while in *H. obliqua*, margins and midrib on the lower surface are ciliate, with stellate, appressed hairs that persist.

Distribution and ecology: *H. interjecta* is a South African endemic with an inland distribution. It occurs in KwaZulu-Natal, Mpumalanga and Gauteng; most collections being from around Pretoria, (Gauteng) [Figure 12.34N]. The species occurs on hill and mountain slopes, in full sun and at high altitudes, between 1400 and 1800 m above sea level. As the species does not continue to produce inflorescences sequentially into the growing season, they are possibly overlooked in the field, and this may explain the scant number of herbarium specimens. Like *H. multiceps* and *H. costata*, *H. interjecta* shows pronounced environmentally induced variation (phenotypic plasticity) in post-flowering. Leaves are two to four times longer, appearing different from the start of the growing season. Elongation of leaves is possibly due to ecological change from full sun to partial shade created by tall grass. Although not recorded for the species from the few number of specimens

collected, bases of leaves possibly narrow to form petioles as in the allied species, *H. multiceps* and *H. costata*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named from the Latin *interjectus* (placed in between, intermediate between) presumably in reference to it being intermediate between the tall near-glabrous *H. colchicifolia* and the stout scabrous species like *H. multiceps* with very hairy inflorescences.

Vouchers: Behr 607 (NBG); Codd 2215 (PRE); Reddy, Reddy & Reddy 520 (J, NH); Singh 613 (NH); Venter & Vorster 5 (PRE).

11. ***Hypoxis costata*** Baker, Journal of the Linnean Society, Botany 17: 119 (1878b); Baker in Thiselton-Dyer: 188 (1896); Burt: 202 (1986); Retief & Herman: 69 (1997). Type: South Africa, Free State, Nelson's Kop, Cooper 879 (K, holo!).

Stout, tough, sparsely hairy herb, 100–150 mm high when in flower, growing singly or in tufts. *Rhizome* oblong to subglobose, 10–40 mm in diameter or 1.5 times longer than wide, with many contractile roots arising above middle, crowned by leaves and a mass of fibrous bristles formed from remains of old leaves; yellow or orange inside. *Leaves* few, 4–6(–8), bases overlapping in a rosette, erect or semi-erect, oblong-lanceolate, 100–200 x 30–50 mm, elongating in post flowering, flat, tapering rapidly to a subacute apex, stiff, strongly ribbed; veins 30–50, close to each other, uniformly thickened (one or two veins near each margin more strongly thickened) and raised on upper surface (ribbed), ciliate; hairs mainly along veins, margins and midrib on lower surface, bifurcate with a few stellate intermingled, long, weak, white or yellow; arms varying in length, shorter arms 1–1.5 mm long, longer arms 2.3–2.7 mm long. *Inflorescence* 1–5 per plant, corymbose, more noticeable when flowers more than 2, covered in long, soft (villous), white or yellow stellate hairs; scapes overtopping emerging leaves, 80–200 mm x 2–3 mm, flattened in cross section (ancipitous). *Flowers* mostly 2, occasionally 3–5 in 2 tiers, upper tier with 2 or 3 flowers; pedicels 4–12 mm long, villous. *Bract* subulate, 13–20 mm long, hairy below. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, pale green and hairy abaxially, 12–17 x 3–4 mm; inner tepals ovate-elliptic, 11–16 x 4–5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2.5–3 mm long; anthers 4–6 mm long, sagittate, apex entire. *Ovary* 4–5 mm, style 0.5–2 mm long; stigma subsessile, pyramidal with 3 concave faces, 2–4 mm long. *Capsule* turbinate or subglobose, 5–6 mm

in diameter, opening by a circular slit. *Seeds* large, ovoid, 2–3 x 1.5–1.8 mm, black, glossy; testa smooth. *Flowering time*: September–December. Figure 12.7.

Diagnostic characters and relationships: *H. costata* is recognised by its stiff, broadly oblong-lanceolate leaves, ribbed and ciliate along margins and midrib on lower surface. The species resembles *H. multiceps* in its habit and leaf characters at the start of the growing season, but *H. costata* differs in having strongly ribbed leaves with ciliate margins and midrib on lower surface. *H. multiceps* has a scabrous texture from the dense short hairs. The size and shape of leaves in the species are variable; one extreme of the range includes plants with broad stout oblong-lanceolate leaves, while the other extreme includes plants with long, narrow leaves. The form with long, narrow leaves is associated with tall grass that creates a shaded environment later in the season. As in most members of *Hypoxis*, density of leaf hairs was found to be variable in the species; blades being densely hairy when young and on maturing, blades appear near-glabrous or sparsely hairy.

Distribution and ecology: *H. costata* occurs in South Africa, Swaziland and Lesotho. In South Africa, it occurs in Eastern Cape, KwaZulu-Natal, Free State, Gauteng, Mpumalanga and Limpopo, with an inland distribution (Figure 12.34G). The species grows on grassy hill tops and mountain slopes, in patches where the grass is scant, in well-drained sandy or loam soil. *H. costata* occurs at high altitudes of 1300 to 2500 m above sea level. It prefers full sun and when shaded by tall grasses, plants show environmentally induced variation (phenotypic plasticity) as noted in *H. interjecta* and *H. multiceps*. Leaves are two to three times larger in the post-flowering period which coincides with the grass becoming taller. Further, in plants overshadowed by grass, as leaves age they narrow at base to form false petioles. Elongation and widening of leaves, and petiole formation are possibly due to ecological change from full sun to partial shade created by tall grass.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named from the Latin *costatus* meaning ribbed, in reference to the strongly veined leaves in the species.

Common names: Kharatsa (Sesotho).

Vouchers: Abbott 5453 (NH); Flanagan 1836 (PRE); Gibbs Russell 3456 (GRA); Onderstall 1287 (PRE); Singh 300, 309 (NH).

12. ***Hypoxis multiceps*** *Buchinger ex Krauss*, *Flora* 28: 311 (1845); Baker: 118 (1878b); Baker in Thiselton-Dyer: 187 (1896); Nel: 319 (1914); Compton: 130 (1976). Type: South Africa, KwaZulu-Natal, Pietermaritzburg, *Krauss 248* (K, holo!, BM!).

Stout, tough, scabrous herb, 100–200 mm high, growing singly or in tufts forming large clumps. *Rhizome* oblong to subglobose, 30–50 mm x 15–35 mm, with few contractile roots arising above middle, crowned by leaves and a mass of fibrous bristles from remains of old leaves, occasionally proliferating by means of short stolons giving rise to new rhizomes, yellow or orange inside. *Leaves* few, 4–6(–8), bases overlapping in a rosette, erect or semi-erect, oblong-lanceolate, (30–)80–120 x 12–45(–60) mm, elongating to 250–300 mm in post-flowering, sometimes forming false petioles of 40–200 mm length, flat, tapering rapidly to subacute apex, twisting obliquely with age; veins 25–40, slender, of uniform thickness, flush with surface, two to four near each margin slightly raised, scabrous; hairs stellate (4 or 5 arms), yellow or brown; arms needle-shaped, short, of equal length, 0.5–1 mm long, patent (hirsute). *Inflorescence* 2–6 per plant, appearing before or with emergence of leaves, corymbose, more noticeable when flowers more than 2, densely covered with coarse, short, yellow hairs (hispid); scapes usually overtopping emerging leaves, (20–)40–60(–120) x 1–2.5 mm, flattened in cross section (ancipitous), covered in long, stiff, ascending hairs apically. *Flowers* 2, opposite, occasionally 3–5 in 2 tiers; pedicels short, 4–15 x 1 mm, with long, stiff, ascending hairs. *Bract* subulate, 4–10 mm long, densely hairy below. *Tepals* 3+3, yellow adaxially; outer tepals broadly elliptic, 11–15 x 5–7 mm, pale green and densely hairy below; inner tepals ovate-elliptic, 10–14 x 6–8 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2.5–3 mm long; anthers 4–6 mm long, sagittate, apex entire. *Ovary* 3–4 mm, style 0.5–1 mm long, stigma subsessile, pyramidal with 3 concave faces, 2–3 mm long. *Capsule* turbinate, 5–8 x 4–6 mm, opening by a circular slit. *Seeds* few, 3–5, large, ovoid, 2–2.5 x 1.5–1.8 mm, black, glossy; testa smooth. *Flowering time*: August–November. Figure 12.19.

Diagnostic characters and relationships: *H. multiceps* is distinct in having broadly oblong-lanceolate, scabrous leaves. The species is closely related to *H. costata* in its habit and leaves but in *H. costata* leaves are strongly ribbed and ciliate (not scabrous). *H. multiceps* and *H. interjecta* are initially hysteranthous and the inflorescences of these species can be confused with each other in the absence of leaves. In *H. multiceps*, inflorescences are distinctly scabrous, but the species are best separated on leaf characters, being glabrous in *H. interjecta*.

Distribution and ecology: *H. multiceps* is widespread in South Africa, Swaziland and Lesotho. In South Africa, the species occurs in Eastern Cape, KwaZulu-Natal, Free State, Gauteng, Mpumalanga

and Limpopo (Figure 12.34S). Like *H. costata*, it has an inland distribution, growing on grassy hills and mountain slopes, in sandy, well-drained soil. The species occurs from close to sea level to high altitudes, between 20 and 2100 m. In slightly moist depressions, *H. multiceps* proliferates by short stolons giving rise to daughter rhizomes and forming large tufts. The species prefers full sun and when shaded by tall grasses, plants show environmentally induced variation (phenotypic plasticity) as in *H. interjecta* and *H. multiceps*. Leaves appear longer and broader and tend to narrow at the base to form pseudopetioles, suggesting modifications due to ecological change from full sun to partial shade created by tall grass.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: derived from the Latin *multi* (many) and from the Greek *cephalus* (headed) in reference to many shoots from a single crown either in allusion to the habit of the plant or to the stellate hairs on the leaves.

Common names: Winter star-flower, moli-kharatsa, moli-motsane, morethetho (Sesotho), inkomfe (Zulu).

Uses: In Lesotho, a mixture of *H. multiceps* and *Ipomoea oblongata* is prepared and smeared on pegs that are placed around a kraal for protection against lightning (Watt & Breyer-Brandwijk 1962).

Vouchers: Bester 1594 (NH); Flanagan 1173 (NBG); Galpin 1603 (PRE); Singh 642 (NH); Thode 2539 (NH).

13. ***Hypoxis sobolifera* Jacq.** *Collectaneorum supplementum*: 53 (1796), with illustrations in *Icones plantarum rariorum*: t. 372 (1788); Ker Gawler: t. 711 (1804); Schultes & Schultes: 764 (1830); Fischer & Meyer: 51 (1846); Nel: 309 (1914). Type: t. 372, icono! Epitype: *Thunberg*, cultivated in Hort. Kew.

Soft hairy herb, 100–200(–250) mm high, growing singly or in tufts forming large clumps. *Rhizome* subglobose or turbinate, 40–60(–100) × 20–50 mm, with few stout contractile roots, crowned by leaves and a mass of fibrous bristles from remains of old leaves, proliferating by means of short stolons, giving rise to new rhizomes, white or light yellow inside. *Leaves* usually many, (4–)8–12, arranged one above the other in three ranks, lanceolate-linear, 100–300 × 10–25 mm, sickle-shaped (falcate), folded together along the length (conduplicate), twisting towards apex; veins ± 20, slender, flush with surface, two to four near each margin thickened, raised on upper surface; sparse to densely

hairy mainly on lower surface; hairs bifurcate or stellate (6–10 arms); arms radiating, ascending, usually in distinct tufts (floccose), except when very dense then appearing appressed in dried pressed specimens, of varying lengths, short arms 0.5–0.6 mm, medium arms 1.0–1.5 mm and long arms 1.7–2.5 mm long, white, turning light to red-brown (rufous) in young leaves on drying, grey-white in old leaves on drying, falling off in leaves of previous season, resulting in blade becoming glabrous with age. *Inflorescence* 2–6 per plant, appearing with leaves and produced sequentially, corymbose, more noticeable when more than 2-flowered, densely hairy in upper part; hairs white, turning red-brown on drying; scapes as tall as or shorter than leaves, 80–300 × 1–2 mm, flattened in cross section (ancipitous). *Bract* subulate, 10–25 mm long, hairy below. *Flowers* 2–7, basal two opposite, 1 or 2 upper tiers with 2 or 3 flowers each; pedicels unequal in length, 20–70 × 1.0–1.5 mm, hairy, lowermost 2–6 times longer than uppermost, bringing flowers to about the same height. *Tepals* 3+3, yellow adaxially; outer tepals elliptic, 8–15 × 3.0–6.5 mm, pale green and densely hairy abaxially; inner tepals ovate-elliptic, 8–14 × 3.5–7.5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 3–4 mm long; anthers 2–5 mm long, sagittate, apex clearly split. *Ovary* 2–4 mm long; style 1.5–2.5 mm long; stigma 2–3 mm long, pyramidal with 3 concave faces. *Capsule* oblong or turbinate, 6–12 × 4–5 mm, opening by a circular slit then splitting longitudinally into 3 lobes. *Seeds* ovoid or subglobose, 1.3–1.5 × 1.0–1.2 mm, black, glossy; testa papillate with brown micropapillae. *Flowering time*: August–March.

13a. var. **sobolifera**

H. canescens Fisch.: 50 (1845). Type: *Thunberg*, without further details.

H. krebsii Fisch.: 72 (1846). Type: South Africa, Cape of Good Hope, *Krebs*, cultivated.

H. villosa L.f. var. *canescens* (Fisch.) Baker: 114 (1878b); Baker in Thiselton-Dyer: 184 (1896). Syntypes: *Thunberg*, without further details; South Africa, Eastern Cape, *Burchell 3380-2, 3542* (K!); South Africa, Eastern Cape, Somerset East, *MacOwan 1899* (NBG!).

H. villosa L.f. var. *sobolifera* (Jacq.) Baker: 114 (1878b). Type: *Thunberg*, cultivated in Hort. Kew.

H. sobolifera Jacq. var. *accedens* Nel: 310 (1914). Syntypes: South Africa, Cape, Lions Creek, *Schlechter 12215* (B!); South Africa, Eastern Cape, Kentani District, without closer locality, *Pegler 108* (K!, BOL!, PRE!); *Burchell 6401* (K, image!).

Diagnostic characters and relationships: *H. sobolifera* is recognised by its grey-white leaves arranged in three-ranks, corymbose inflorescences and tufted ascending hairs, usually light brown in colour. It is most closely related to *H. villosa* which also has leaves in three ranks and corymbose inflorescences, but differs from *H. villosa* in the distribution and type of hairs. In *H. villosa*, hairs are dense on the lower surface, forming a thin, white layer and unlike *H. sobolifera*, they are appressed, with arms arranged in rows parallel to the length of leaf. The tufted, stellate hairs of *H. sobolifera* are similar to those in *H. floccosa*, but the latter species is distinctly smaller, less than 100 mm tall and has tiny flowers in comparison to *H. sobolifera*. Figure 12.29.

Distribution and ecology: *H. sobolifera* is a South African endemic with a coastal and inland distribution. *H. sobolifera* var. *sobolifera* occurs in the Western Cape, Eastern Cape and KwaZulu-Natal from Stellenbosch in the south to Zululand in the north. It has a mainly coastal distribution but a few populations are noted from the foothills of the Drakensberg in KwaZulu-Natal (Figure 12.34AC). *H. sobolifera* var. *sobolifera* shows pronounced environmentally induced variation (phenotypic plasticity). Leaves of plants growing in the shade of trees or among tall grass are two to three times longer and broader than those growing in open grassland. The leaves of the larger plants are more sparsely hairy than those of smaller plants, implying that hair density is reduced by enlargement of leaf surface which may be due to ecological change from full sun to partial shade. In the Eastern Cape, var. *sobolifera* occurs among short, dense coastal scrub. Along the beach in West Bank, East London, the variety forms mats in between rocks where it is sheltered from the salt spray.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: derived from the Latin *sobolifera* which means with an underground creeping stem in reference to dividing rhizomes.

Common names: Creeping hypoxis.

Vouchers: *Chering s.n.* PRE38062 (PRE); *Hall 206* (NBG); *MacOwan 1899* (GRA, NBG); *Singh 578, 622* (NH); *Starke 100/27* (BOL).

13b. **var. *pannosa*** (*Baker*) *Nel*, *Botanische Jahrbücher* 51: 309 (1914). Type: South Africa, Cape, without precise locality, from the Royal Horticultural Society, cultivated at Kew and flowered in 1874. Specimen prepared in 1875 (K!).

H. pannosa Baker: 130 (1874). Type: South Africa, Cape, without precise locality, from the Royal Horticultural Society, cultivated at Kew and flowered in 1874. Specimen prepared in 1875 (K!).

H. villosa L.f. var. *pannosa* (Baker) Baker: 114 (1878b); Baker in Thiselton-Dyer: 184 (1896). Type: South Africa, Cape, without precise locality, from the Royal Horticultural Society, cultivated at Kew and flowered in 1874. Specimen prepared in 1875 (K!).

Diagnostic characters: Variety *pannosa* differs from var. *sobolifera* in having felt-like leaves and predominantly red-brown hairs. Figure 12.28.

Distribution and ecology: *H. sobolifera* var. *pannosa* occurs in the Eastern Cape and possibly KwaZulu-Natal. It extends along the Eastern Cape coast, from Humansdorp in the south to Kentani in the North (Figure 12.34AB). Only a single collection, *Wood 3434* (in K, NH), collected in 1886 is known from the slopes of the Drakensberg Mountains in KwaZulu-Natal, without precise locality and is therefore not reflected on the map. To date, no other specimens of the variety have been collected so far inland.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: derived from Latin *pannosus* meaning felt-like in reference to the hair covering on leaves.

Vouchers: *Cloete & Calvo-Ugarteburu 3889* (NH); *MacOwan 1899* (NBG); *Theron 1692* (PRE); *Scharf 1074* (PRE); *Singh 828* (NH).

14. ***Hypoxis villosa*** L.f., Supplementum Plantarum: 198 (1781); Thunberg: 60 (1794), Schultes & Schultes: 765 (1830); Baker: 113 (1878b); Baker: 113 (1978) Baker in Thiselton-Dyer: 184 (1896); Baker in Thiselton-Dyer: 379 (1898). Type: South Africa, Cape, without closer locality, *Thunberg* (UPS image no. 8267, 8268!).

H. microsperma Ave-Lall. in Fischer & C.A. Meyer: 50 (1845). Type: South Africa, Cape of Good Hope, without further information.

H. scabra Lodd. t. 970 (1824). Type: South Africa, Cape of Good Hope, *Bowie*, cultivated from specimens received in 1823.

H. tomentosa Lam.: 182 (1789). Cap de Bonne-Esperance, without further details.

H. villosa L.f. var. *fimbriata* Nel: 310 (1914). Type: Eastern Cape, Riversdale, *Schlechter 1788* (BOL!, Z!).

H. villosa L.f. var. *scabra* (Lodd.) Baker: 114 (1878b); Baker: 184 (1896). Type: South Africa, Mossel Bay, *Burchell 6307* (K).

Small, soft, silky-white herb, 60–150 mm high, growing singly. *Rhizome* oblong to globose, 30–55 x 20–40 mm, with a few contractile roots, arising above middle, crowned by leaves and a mass of bristles from remains of old leaves, white inside. *Leaves* few, 4–7, tightly arranged one above the other in three ranks, moderately firm in texture, lanceolate, sometimes linear-lanceolate, 150–175(–200) x (6–)10–20 mm, sickle-shape (falcate), recurving, folded together along the length (conduplicate) towards base, obliquely twisting towards apex; veins 18–20, flush with the surface, one to two near each margin slightly thickened and raised on upper surface, sparse to densely on margins; hairs forming thin layer on lower surface, soft, silky-white, stellate (4–6 arms); arms unequal in length, shorter arms 0.7–1 mm long, longer arms 2–2.5 mm long, usually stacked one above the other in two rows opposite each other and parallel along the length of the leaf, appressed, occasionally ascending, then shaggy. *Inflorescence* 3–6 per plant, appearing with leaves and produced sequentially, corymbose, covered in long, soft brown (on drying) hairs in upper part; scapes slender, 70–120 x 1.5–2 mm, flattened in cross section (ancipitous). *Flowers* 2–6(–10), basal two opposite, 1 or 2 upper tiers with 2 or 3 flowers each; *pedicels* unequal in length bringing flowers to about the same height, 12–25 x 0.75–1 mm. *Bract* subulate, 6–20 mm long, hairy below. *Tepals* 3+3, yellow adaxially; outer tepals elliptic, 8–10(–13) x 3–4 mm, pale green and densely hairy abaxially; inner tepals ovate-elliptic, 8–12(–14) x 4–5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–3.5 mm long; anthers 2.5–4 mm long, sagittate, apex split. *Ovary* 2–3 mm long; style 1.5–3 mm long; stigma pyramidal with 3 concave faces, 1.5–2 mm long. *Capsule* turbinate, 5–8 x 3–4 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid, 1.2–1.5 x 1–1.2 mm, black, dull; testa papillate. *Flowering time*: October–April. Figure 12.32.

Diagnostic characters and relationships: *H. villosa* is recognised by its leaves arranged in three ranks, corymbose inflorescences and hairs forming a silky-white layer on lower surface of leaves. The species is most similar to *H. sobolifera* in its leaf arrangement and inflorescences. It differs from *H. sobolifera* in hairs with arms in rows lying parallel to the length of the leaf, appressed and remaining white on drying. In *H. sobolifera*, hairs are in distinct tufts, ascending, drying light- or red-brown. *H. villosa* can also be confused with *H. argentea* which has similar leaf hairs but the species can be separated on their leaf shape and width; being linear and less than 6 mm wide in *H. argentea*, and lanceolate and more than 6 mm wide in *H. villosa*.

Distribution and ecology: *H. villosa* is a South African endemic, restricted to the Western Cape and Eastern Cape from Swellendam in the south to Mkambati in the north (Figure 12.34AF). It has a coastal distribution and occurs at low altitudes of 5–250 m above sea level. The species grows in open grasslands in the east and fynbos in the west, in well-drained soil and full sun. It is known from very few specimens.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named from the Latin *villosus* meaning shaggy with long, soft ascending hairs probably referring to those covering inflorescences in the species.

Common names: Golden winter star, sterretjie; inkbol (rhizomes were used by colonists as a source of ink, hence the vernacular name).

Uses: Watt & Breyer-Brandwijk (1962) recorded that the rhizomes of *H. villosa* were used by the Sotho as a charm against thunder.

Notes: *H. villosa* has been confused with *H. sobolifera* (Baker 1878b) and *H. obtusa* (Zimudzi 1996; Nordal 1997).

Vouchers: Muir 1326 (PRE); Thode A2766 (NH); Ecklon & Zeyher 270 (NBG); Zeyher 4138 (BOL, K).

15. **Hypoxis obliqua** Jacq., *Collectaneorum Supplementum*: 54 (1796), with illustrations in *Icones Plantarum Rariorum* Ic. t. 371 (1786–1793); Schultes & Schultes: 766 (1830); Nel: 309 (1914). Type: t. 317, icono! Epitype: South Africa, Somerset East, *MacOwan 1594a* (K!, NBG!).

H. villosa var. *obliqua* (Jacq.) Baker: 114 (1878b). Type: South Africa, Somerset East, *MacOwan 1594a* (K!).

Stout, tough, near-glabrous herb, 50–120 mm high, growing singly. *Rhizome* small, oblong, 40–50 x 25–40 mm, with a few stout contractile roots, crowned by leaves and a dense mass of bristles from remains of old leaves. *Leaves* few, 5–8, lanceolate, 80–150 x (6–)10–25 mm, erect, twisting obliquely towards apex; veins 9–10, slender, flush with surface, one to two near each margin thickened and raised on upper surface, near-glabrous, margins and midrib on lower surface fringed with hairs (ciliate) forming white band; hairs stellate (4–8 arms), white; arms needle-shaped, appressed, one to two more strongly developed, short arms 0.5–1.2 mm long, longer arms 3–3.5 mm long, breaking off

with age. *Inflorescence* 3–6 per plant, appearing with emergence of leaves, overtopping leaves, racemose, more noticeable when flowers more than 2, covered with coarse, rigid (hispid) white hairs in upper part; scape stiff, 80–150 x 1–2 mm, flattened in cross section (ancipitous). *Flowers* 2–7, close to each other; pedicels short, stiff, 8–18(–35) x 0.7–1 mm, covered with coarse hairs (hispid). *Bract* subulate, 4–10 mm long, hairy below. *Tepals* yellow adaxially; outer tepals elliptic, 9–10(–12) x 2–3 mm, pale green and densely hairy abaxially; inner tepals ovate-elliptic, 8–10 x 2–4 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 1–2 mm long; anthers \pm 3 mm long, sagittate, apex slightly split. *Ovary* 6–7 mm; style 1–2 mm long, stigma pyramidal with 3 concave faces, 3 mm long. *Capsule* oblong or turbinate, 7–10 x 4–6 mm, opening by a circular slit. *Seeds* ovoid to subglobose, 1.5–1.8 x 1.1–1.5 mm, black, dull; testa papillate. *Flowering time*: September–December. Figure 12.21.

Diagnostic characters and relationships: *H. obliqua* is a distinct species, recognised by its stiff leaves, twisting towards apex, ciliate margins and coarsely hairy inflorescences. The species is most similar to *H. interjecta* in having broadly lanceolate glabrous leaves and coarsely hairy inflorescences but differs from *H. interjecta* in its leaf margins and midrib on lower surface outlined in white by dense short hairs, racemose inflorescences and small flowers (tepals less than 12 mm). In *H. interjecta*, leaves are completely glabrous, inflorescences corymbose and flowers large with tepals more than 12 mm long.

Distribution and ecology: *H. obliqua* occurs in South Africa and Lesotho. In South Africa, it occurs in the Eastern Cape and KwaZulu-Natal with a coastal to inland distribution. It extends from Port Elizabeth in the south to Zululand in the north (Figure 12.34U). *H. obliqua* grows in open rocky grasslands, in well-drained soil and full sun. The species is found from altitudes of 500 to 1800 m above sea level.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: Named from the Latin *obliquus* referring to oblique twist of leaves towards the apex.

Common names: Oblique-leaved hypoxis, ixalanxa (Xhosa).

Uses: Water boiled in hollowed out rhizomes of *H. obliqua* was used to dress septic wounds (Wright 1963). *H. obliqua* is an excellent species to propagate, as it produces up to seven small flowers which

provide a bright display, and like most members of *Hypoxis*, it is hardy, requiring little care in the summer rainfall region of southern Africa.

Vouchers: *Bester 1343* (PRU); *Goossens 190, 193* (PRE); *Hilliard & Burt 19051* (NU); *MacOwan 1594a* (NBG); *Singh 512* (NH).

16. ***Hypoxis zeyheri*** Baker, *Journal of the Linnean Society, Botany* 17: 112 (1878b); Baker: 181 (1896). Type: South Africa, Cape Colony, *Ecklon & Zeyher 7* (TCD, holo, image!, P!).

Small, glabrous herb, 50–100 mm high, growing singly. *Rhizome* small, oblong, 20–40 x 10–20 mm, with a few stout contractile roots, crowned by leaves and a mass of fibrous bristles from remains of old leaves. *Leaves* few, 5–8, stacked loosely one above the other in three ranks, erect or recurving, lanceolate or linear-lanceolate, 80–120 x 5–25 mm, sickle-shaped (falcate), folded together along the length (conduplicate) towards the base, tapering to a narrow point (acuminate); veins 10–20, slender, flush with surface, one to three near each margin thickened and raised on upper surface, near-glabrous; hairs indistinct, ± evenly spaced along margins and midrib on lower surface, predominantly stellate (4 or 5 arms) with few bifurcate, white or lightly brown, one or more arms more strongly developed, shorter arms 0.5–0.8 mm long, longer arm 1–1.5 mm long, loosely ascending, caducous. *Inflorescence* 2–7 per plant, appearing with leaves and produced sequentially in growing season, corymbose, covered with sparse long, soft, white (brown on drying) hairs; scape slender, 80–120 x 0.5–1.0 mm, flattened in cross section (ancipitous), hairy in upper part. *Flowers* 2–5, lower tier with 2 flowers, opposite, upper tier with 1–3 flowers; pedicels slender, 15–50 x 0.5–0.75 mm. *Bract* subulate, 7–15 mm long, hairy below. *Tepals* yellow adaxially; outer tepals elliptic, 6–10 x 3–4 mm, pale green and sparsely hairy adaxially; inner tepals ovate-elliptic, 5–10 x 4–5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 1.2–2 mm long; anthers 1.8–2.5 mm long, sagittate, apex entire or split. *Ovary* 3–4 mm long; style 0.5–0.6 mm long; stigma pyramidal with 3 concave faces, 1.6–2 mm long. *Capsule* turbinate-oblong, 4–8 x 3–4 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid, 1.1–1.5 x 0.6–0.8 mm black, glossy or dull; testa papillate. *Flowering time*: October–April. Figure 12.33.

Diagnostic characters and relationships: *H. zeyheri* is distinct in having glabrous, lanceolate, leaves and corymbose inflorescences with slender, flexible pedicels. The species is most closely related to *H. angustifolia* var. *buchananii* in its leaves and inflorescences but differs in distribution and type of leaf hairs. In *H. angustifolia* var. *buchananii*, leaves are sparsely hairy throughout (pilose) and hairs mostly bifurcate while in *H. zeyheri*, hairs are restricted to leaf margins and midrib on lower surface,

and are stellate, breaking off with age. *H. zeyheri* may also be confused with *H. obliqua* in having smooth, glabrous leaf blades. However, in *H. obliqua*, leaf margins and midrib on lower surface are fringed with short hairs and inflorescences are racemose with short, stiff pedicels which is distinctive in the species in comparison to the corymbose inflorescences with long, flexible pedicels in *H. zeyheri*.

Distribution and ecology: *H. zeyheri* is a South African endemic, occurring in the Eastern Cape, from Grahamstown in the south to Maclear in the north (Figure 12.34AG). It has a coastal and inland distribution. The species grows in well-drained or marshy soil and at altitudes of 15 to 1400 m. It appears to be rare.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named in honour of Carl Zeyher (1799–1858), botanical collector who travelled widely collecting specimens in South Africa.

Common names: Small yellow star, sterretjies.

Vouchers: *Ecklon 4134* (BOL); *Gibbs Russell 3420* (PRE); *MacOwan 1898* (NBG); *Germishuizen 1185* (PRE); *Singh 526* (NH).

17. ***Hypoxis gerrardii*** Baker, *Journal of the Linnean Society, Botany* 17: 110 (1878b); Baker: 181 (1896); Nel: 306 (1914); Burt: 188 (1988). Type: South Africa, KwaZulu-Natal, Zululand, *Gerrard & McKen 1827* (NH, holo!, BM!, K!, P!).

H. junodii Baker: 859 (1901) as *junoidi*. Type: South Africa, Pinetown, *Junod 157* (Z!).

Slender, hairy, dark green herb, 80–200 mm high, growing singly. *Rhizome* deep seated, small, oblong, 10–25 x 8–15 mm, with a few contractile roots, crowned by leaves and a mass of fine bristles, white inside. *Leaves* few, 6–7(–10), loosely arranged in three ranks, sometimes clasping in short, slender false stem when leaves elongate, linear (40–)80–150(–300) x 3–8(–11) mm, rigid in texture, flat or subterete; veins 6–8, one or two near each margin strongly thickened and raised on upper surface, straw-coloured, sparse or densely covered in long, weak hairs, compact on margins; hairs bifurcate, white or brown; arms needle-shaped of unequal length, shorter arms 0.5–0.6 mm long, longer arm 0.8–1 mm long, ascending in the shape of V or U, appressed on margins, lying parallel

along the length of the leaf in the direction of apices, occasionally ascending, then appearing shaggy. *Inflorescence* 2–5 per plant, appearing with leaves and produced sequentially throughout growing season, corymbose, densely covered in long, weak, needle-shaped, white or brown hairs in upper part, often furry brown; scape slender, 8–20 x 1–1.5 mm, flattened in cross section (ancipitous). *Flowers* 2–5(–7); pedicels slender, (12–)20–30 mm long, hairy. *Bract* subulate, 4–12 mm long, hairy below. *Tepals* yellow adaxially; outer tepals narrowly elliptic, 7–9 x 3–4 mm, pale green and densely hairy adaxially; inner tepal elliptic, 7–8 x 2.5–3.5 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 1–2 mm long; anthers \pm 3 mm long, sagittate, apex split. *Ovary* 4 mm long; style 1–2 mm long, stigma pyramidal with 3 concave faces, 3 mm long. *Capsule* turbinate, 3–8 x 2–4 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid to globose, 1 x 0.8–1 mm, black, dull, testa papillate with brown micropapillae. *Flowering time*: September–March. Figure 12.12.

Diagnostic characters and relationships: *H. gerrardii* is recognised by its slender habit, narrow, rigid leaves with an even distribution of bifurcate hairs and corymbose, brown usually furry inflorescences. The species is most closely related to *H. argentea* in habit, leaves and inflorescences and is often confused with *H. argentea* var. *sericea* in having bifurcate hairs. However, in *H. gerrardii*, hairs are short, stiff, needle-shaped, ascending to form a V or U. *H. argentea* var. *sericea* differs in having long, weak hairs, with arms mostly appressed, lying opposite each other, more noticeable on the margins and midrib below. Like in most *Hypoxis* species, variation in leaf dimensions was noted in *H. gerrardii*. Tall, slender habit and linear leaves are typical in the species, but in some populations (*Singh & Baijnath 271* in NH; *Wood 74* in J, NU), shorter plants, with linear-lanceolate leaves were recorded and the variation may relate to start of the growing season. These plants display hair and inflorescence characters typical of the species.

Distribution and ecology: *H. gerrardii* occurs in South Africa, Lesotho and Swaziland. In South Africa, it has been recorded in the Eastern Cape and KwaZulu-Natal, with a concentration in the midlands and uplands of KwaZulu-Natal (Figure 12.34L). The species grows in open grasslands, usually on rocky slopes, in full sun and at altitudes of 500 to 2300 m. It grows sympatrically with *H. argentea*, *H. costata*, *H. filiformis* and *H. galpinii* and *H. multiceps*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named in honour of William Gerrard (?–ca.1866), naturalist and traveller, collected along the coast and inland in KwaZulu-Natal.

Common names: Small yellow star, inkomfe (Zulu).

Uses: The Zulu prepares a decoction from the rhizomes to treat stomach aches like gripe and dysentery (Hulme 1954).

Notes: Nel (1914) reduced *H. junodii* under *H. dregei* Baker. *H. dregei* is synonymous with *H. argentea* var. *sericea*. This study confirms the observation by Burt (1988) that *H. junodii* is conspecific with *H. gerrardii*.

Vouchers: Bayliss 2547 (NBG); Wood 74 (NH); Gordon-Gray 107 (NU); Rudatis 1748 (PRE); Singh & Baijnath 419 (NH).

18. ***Hypoxis argentea*** Harv. ex Baker, Journal of the Linnean Society, Botany 17: 110 (1878b); Baker in Thiselton-Dyer: 181 (1896); Nel: 305 (1914). South Africa, Eastern Cape, Grahamstown, MacOwan 50 (K, lecto., selected here, SAM, GRA, isolecto!).

Slender, silvery-white herb, 70–100 mm high, growing singly. *Rhizome* small, deep seated, oblong, two to three times as long as wide, 20–30 mm x 10–15 mm, with few contractile roots, crowned by leaves and a sparse to dense mass of fine bristles, white inside, *Leaves* few 4–7(–10), clasping at base to form a slender false stem wrapped in a membranous brown tunic, arranged loosely in three ranks, linear, (–35)50–200 x 3–6 mm, slightly broader and folded together along the length (conduplicate) towards base, erect or recurving; veins 8–10, flush with surface, one to two near each margin strongly thickened and raised on upper surface, straw-coloured, drying grey-white, sparse to densely hairy, mainly on lower surface and margins; hairs bifurcate or stellate (3–6 arms), long, soft, weak, silky, closely pressed (sericeous), white or yellow-brown; arms \pm 1.5 mm long, appressed, usually stacked one above the other in two rows opposite each other and parallel along the length of the leaf, appressed, occasionally ascending, then appearing shaggy. *Inflorescence* 1–6 per plant, produced sequentially throughout growing season, corymbose, covered with soft, long, white hairs in upper part; scape slender, 30–200 x 1 mm, flattened in cross section (ancipitous). *Flowers* 1–5; pedicels slender, 10–30(–40) x 0.5 mm when flowers open. *Bract* subulate, 0.5–1.2 mm long, hairy below.

Tepals 3+3, yellow adaxially; outer tepals narrowly elliptic, 6–10 x 2–3 mm, green and hairy abaxially; inner tepals ovate-elliptic, 5–9 x 2.5–3 mm, yellow, green and sparsely hairy along midrib abaxially, sometimes midrib red striped. *Stamens* 3+3, with filaments subulate, 1–2 mm long; anthers 2–3 mm long, saggitate, apex split. *Ovary* 3–4 mm, long style 1–1.5 mm long; stigma pyramidal with 3 concave faces, 0.5–2.5 mm long. *Capsule* turbinate, 3–5 x 2.5–3 mm, opening by circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid, 1–1.2 x 0.8–1 mm, black, glossy, testa papillate. *Flowering time*: August–March.

18a. var. **argentea**

Diagnostic characters and relationships: *H. argentea* can be recognised by its slender habit, narrow, silvery-white leaves and corymbose inflorescences. The species is similar to *H. gerrardii* in a number of characters but is separated on leaf hairs. See discussion under *H. gerrardii* on how to separate the species. *H. argentea* may also be confused with *H. filiformis* in their slender, subterete leaves but in *H. argentea*, hairs are long, weak and appressed lying parallel to leaf length, and inflorescences are corymbose with usually more than three flowers. In *H. filiformis*, leaf hairs are scattered along margins, ascending and inflorescences are racemose and mostly two-flowered. As in *H. sobolifera* and *H. rigidula*, two varieties are recognised in *H. argentea*, based on hair density. Variety *sericea* differs from the typical variety in being less hairy, especially on leaf margins and the lower surface while in var. *argentea*, hairs are compact on margins and lower surface. Figure 12.4.

Distribution and ecology: *H. argentea* var. *argentea* occurs in South Africa, Lesotho and Swaziland. It is found in the Western Cape, Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga and Gauteng, with a coastal and inland distribution (Figure 12.34D). The species grows in open grasslands on well-drained hill slopes and full sun. It occurs at altitudes of 20 to 1000 m above sea level and is common across its range, growing sympatrically with most species of *Hypoxis*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: named from the Latin *argenteus* meaning silvery, referring to the silvery shine caused by the soft shiny hairs on the leaves.

Common names: Small yellow star-flower, star of Bethlehem, leihlo-khomo le leholo, lesikitlane (Sesotho), ixalanxa (Xhosa), inongwe (Xhosa, Zulu), isinana (Zulu), kaffertulp (Afrikaans).

Uses: Noted as having a few uses among African people (Watt & Breyer-Brandwijk 1962). Rhizomes used by Xhosa as famine food and to make an oil to anoint chafes on horses. The Sotho prepare an ointment from the rhizome to treat cracks on teats of cows. It is also used in African medicine in Democratic Republic of Congo.

Vouchers: Bayliss 2135 (NBG); Brynard 297 (PRE); Cloete 691 (KEI, NH); Germishuizen 1460 (PRE); Singh 490, 650 (NH).

18b. var. **sericea** (*Baker*) *Baker* in Thiselton-Dyer, *Flora Capensis* 6: 182 (1896); Retief & Herman: 69 (1997); Singh: 361 (2007). Type: South Africa, Eastern Uitenhage, *Zeyher 950* (K, lecto., image!, BM!).

H. sericea Baker: 111 (1878b). Type: South Africa, Uitenhage, *Zeyher 950* (K! BM!, BOL!, NBG!).

H. sericea Baker var. *dregei* Baker: 112 (1878b), in part based on Drège 8525; Singh: 361 (2007). Type: South Africa, Eastern Cape, Stockenstrom, *Drège 8525* (K, lecto!; BM, isolecto!).

H. sericea Baker var. *flaccida* Baker: 112 (1878b). Type: South Africa, Albany, South Africa, Free State, 'Seven Fountains', *Burke s.n.* (K!).

H. dinteri Nel: 302 (1914). Type: Namibia, Otavital, *Dinter 634* (B, holo!, NBG!).

Diagnostic characters and relationships: *H. argentea* var. *sericea* differs from var. *argentea* in having hairs scattered in channels between veins on leaves, unlike in var. *argentea* where the leaf hairs are closely pressed forming a layer on the lower surface. *H. argentea* var. *sericea* may also be confused with *H. gerrardii*, both having sparsely hairy leaves but in *H. gerrardii*, hairs are short, stiff, needle-shaped and ascending in a V- or U-shape while in *H. argentea* var. *sericea*, hairs are long, weak and appressed, more noticeable on the margins and midrib below. *H. argentea* also lacks the brown, furry inflorescences common in *H. gerrardii*. Figure 12.5.

Distribution and ecology: *H. argentea* var. *sericea* occurs in South Africa, Lesotho, Swaziland and is known from a single specimen in Namibia. It is found in all provinces of South Africa, except the Northern Cape (Figure 12.34E). It is likely that it extends into tropical Africa, in Tanzania (see notes for details). Like *H. argentea* var. *argentea*, the taxon grows in open grasslands, in well-drained soil and full sun, at altitudes 40 to 1000 m above sea level. It is often found growing with *H. argentea* var. *argentea* and a number of other species of *Hypoxis*.

Conservation status: Lower risk-Least Concern (LRlc).

Etymology: Named from the Latin *sericeus* meaning silky with long, straight closely pressed glossy hairs in reference to the leaves in the taxon.

A study of specimens from EA indicates that specimens *Guebson 947* collected in Nachingwea and *Robertson 374A* from the Nguru Mountains, both in Tanzania, are similar to *H. argentea* var. *sericea*. Wiland-Szymańska (2001), recorded for the first time that *H. dinteri* also occurs in the Democratic Republic of Congo and Zambia. Unfortunately, the specimens cited by Wiland-Szymańska from BR and MO were not examined and it was therefore not possible to confirm if these may be classified as *H. argentea* var. *sericea*.

Vouchers: *Tyson 1095* (GRA, NBG); *Acocks 12960* (NH); *Acocks 17902* (PRE); *Reid 130* (PRE); *Singh 570, 648* (NH).

19. ***Hypoxis parvifolia*** *Baker*, in *Thiselton-Dyer, Flora Capensis* 6: 183 (1896); *Nel: 307* (1914), as “*parviflora*”; *Compton: 131* (1976); *Retief & Herman: 70* (1997). Type: South Africa, Mpumalanga, Barbeton, Saddleback Range, *Galpin 1059* (K, holol!; BOL!, NBG!, NH!).

Small soft, hairy herb, 50–60 mm high, growing singly. *Rhizome* small, oblong, 10–30 x 5–15 mm, with a few stout contractile roots, crowned by leaves and a few fine bristles from remains of old leaves. *Leaves* few, 4–8, bases wrapped in membranous, brown tunic, linear, sometimes linear-lanceolate, 40–100 x 5–6 mm, folded together along the length (conduplicate) towards the base, tapering to a narrow apex, yellow on drying; veins 4–6, flush with surface, one to two near each margin thickened and raised on upper surface, sparsely to densely hairy on both surfaces; hairs predominately bifurcate, stellate (4 or 5 arms) on margins, U-shaped, almost at 90° to surface (patent), needle-shaped, white; arms short, 0.3–0.5 mm long, one or two more strongly developed, ±0.7 mm long. *Inflorescence* 1(2) per plant, appearing before or with leaves, corymbose, covered in white or yellow long hairs; scape taller than leaves, 60–130 x 0.75–1.2 mm, flattened in cross section (ancipitous). *Flowers* 1 or 2(3); pedicels short, 5–15 x 1–1.5 mm. *Bract* subulate, 4–10 mm long, hairy below. *Tepals* 3+3, yellow adaxially, outer tepals narrowly elliptic, 8–10 x 3–5 mm, pale green and densely hairy abaxially; inner tepals ovate-elliptic, 9–10(–13) x 5–7 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–3 mm long; anthers 3–4 mm long, sagittate, apex entire or slightly split. *Ovary* 2–3 mm long; style 1.5–2 mm long; stigma pyramidal with 3 concave faces, 0.5 mm long. *Capsule* turbinate, 3–5 x 2–3 mm, opening by a

circular slit. *Seeds* globose, 1–1.5 mm in diameter, black, glossy; testa papillate. *Flowering time*: August–December (occasionally in March–May). Figure 12.23.

Diagnostic characters and relationships: *H. parvifolia* is distinct in having few, dwarf leaves with striking patent U-shaped hairs and usually single weak inflorescence with mostly two flowers. *H. parvifolia* is closely related to *H. kraussiana* in its hairs but is separated from *H. kraussiana* by its dwarf, flat leaves with indistinct veins. In *H. kraussiana*, leaves are tall, subterete and strongly ribbed. The species may also be confused with smaller plants of *H. costata* in its linear-lanceolate leaves, bifurcate hairs and two flowered inflorescences. It differs in lacking the strongly ribbed leaf characteristic of *H. costata*.

Distribution and ecology: *H. parvifolia* occurs in South Africa and Swaziland. In South Africa, the species occurs in Limpopo, Mpumalanga and Free State (Figure 12.34W). It extends into tropical Africa, where it occurs in Zimbabwe and Malawi. *H. parvifolia* associated with high mountain areas at altitudes of 1300 to 2500 m above sea level. The species grows in open grasslands, on slopes and rock crevices, in full sun and well-drained soil or muddy ground. The species may be more plentiful in southern Africa, but like *H. flanaganii* and *H. floccosa* is possibly overlooked in the field due to its small size.

Conservation status: Lower risk–Least Concern (LRlc).

Etymology: Named from the Latin *parvitas* (smallness) and *folia* (leaf) indicating a species with small leaves.

Vouchers: *Compton 26991* (NBG, PRE); *Compton 32165* (PRE); *Jacobs 2982* (PRE); *Kerfoot K8360* (J); *Moss 15426* (J).

20. ***Hypoxis flanaganii*** *Baker*, in *Thiselton-Dyer in Flora Capensis* 6: 179 (1896); *Nel*: 301 (1914).
Type: South Africa, Eastern Cape, Komga, *Flanagan 314* (K, holo!, NBG!, PRE!).

Diminutive, sparsely hairy herb, 30–50 mm high, growing singly. *Rhizome* oblong to subglobose, 10–20 x 7–10 mm, with a few contractile roots; crowned by leaves, devoid of bristles, white inside. *Leaves* few, 4–7, bases wrapped in membranous, brown tunic, linear, 40–70 x 2–3 mm, erect or semi-erect, V-shaped, sometimes red at base; veins 8–10, flush with surface, one near each margin slightly thickened and raised on upper surface, sparsely hairy on both surface, mainly on margins and midrib

on lower surface; hairs bifurcate intermingled with few stellate (3–8 arms) on margins, white or light brown, ascending; arms 0.5–1 mm long, one or two more strongly developed, up to 1.8 mm long. *Inflorescence* 1(–3) per plant, corymbose, hairy in upper part; scapes as tall as leaves, 10–25 mm long, subterete. *Flowers* 1 or 2; pedicels slender, 15–25 mm long. *Bracts* 2, even when flowers solitary indicating reduction in a flower, subulate, 4–8 mm long. *Tepals* 3+3, small, inner and outer narrowly elliptic, about equal in size, 4–6 x 1.5–2 mm, yellow adaxially; outer tepals pale green and hairy adaxially; inner tepals yellow, green and sparsely hairy along midrib abaxially, sometimes midrib red striped. *Stamens* 3+3, with filaments subulate, 1–2 mm long; anthers 1.2–1.5 mm long, sagittate, apex split. *Ovary* ± 2 mm long; style ± 2 mm long, stigma pyramidal with 3 concave faces, ± 1.4 mm long. *Capsule* oblong or subglobose, 2–3 x 2 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid to globose, 1–1.2 x 0.8–1 mm, black, glossy; testa papillate. *Flowering time*: September–December. Figure 12.9.

Diagnostic characters and relationships: *H. flanaganii* is the smallest member in *Hypoxis*. It has few short, very narrow sparsely hairy leaves and inflorescences usually solitary with one or two tiny flowers. In habit, *H. flanaganii* is close to *H. floccosa*, but differs in its leaves being less hairy with hairs bifurcate and white. In *H. floccosa* leaves and inflorescences are densely hairy with the hairs stellate and red-brown.

Distribution and ecology: *H. flanaganii* is endemic to South Africa, being restricted to the Western Cape, Eastern Cape and KwaZulu-Natal. It occurs along the coast from Bredasdorp in the Western Cape and just reaches KwaZulu-Natal, where it is known only from a single specimen, collected in the Umtamvuna Nature Reserve (*Nicholson 1693*, PRE) [Figure 12.34I]. Populations of *H. flanaganii* are found in rocky outcrops in fynbos, thicket and grasslands where the vegetation is sparse or low-growing. By growing among rocks, the tiny plants are offered protection from wind. The species grows at altitudes of 15–500 m. Plants are abundant at sites where they have been collected. However, there are very few collections of the species and it is therefore difficult to assess its full range of distribution and variation. Like *H. floccosa*, due to its small stature and tiny flowers, the species is easily overlooked during fieldwork.

Conservation status: Data Deficient (DD). Probably more abundant than reflected by in collections.

Etymology: named in honour of Henry Flanagan (1861–1919) who actively collected plants from Komga and Kei River Mouth in the Eastern Cape Province.

Vouchers: *Fourcade* 895 (BOL, PRE); *Nicholson* 1693 (PRE); *Schlechter* 7731 (GRA, NH); *Schönberg* 2795 (GRA, PRE); *Singh* 807 (NH).

21. ***Hypoxis floccosa*** Baker, Kew Bulletin: 357 (1894); Baker in Thiselton-Dyer: 181 (1896); Nel: 303 (1914); Singh: 362 (2007). Type: South Africa, Western Cape, Swellendam, *Bolus* 7469 (BOL, holo!; K!).

H. ecklonii Baker: 859 (1901) [as eckloni]; Nel: 307 (1914). Type: South Africa, Western Cape, Zwarteberg, *Ecklon & Zeyher* 4136 (K, image! B!, Z!).

Diminutive, densely hairy herb, 50–70 mm high, growing singly. *Rhizome* oblong to subglobose, 20–25 x 10–15 mm in diameter, with a few contractile roots, crowned by leaves, devoid of bristles, white inside. *Leaves* few, 6–7, bases wrapped in membranous, brown tunic, linear, 50–100 x 2–4 mm, erect or semi-erect, subterete or flat; veins 8–10, slender, flush with surface, one near each margin slightly thickened and raised on upper surface, margins and lower surface covered densely in long, soft hairs (floccose); hairs stellate (4–8 arms) intermingled with few bifurcate, white turning red-brown on drying; arms of unequal length, short 0.5–1.2 mm long, one or two more strongly developed, 2–3 mm long. *Inflorescence* 2(–4) per plant, corymbose; scapes as tall as or shorter than leaves, 40–80 mm long. *Flowers* 2, sometimes 1; pedicels long, slender, 15–25 mm long. *Bract* subulate, 4–10 mm long, hairy below. *Tepals* 3+3, small, inner and outer narrowly elliptic, about equal in size, 6–7 x 2.5–3.0 mm yellow adaxially; outer tepals pale green and densely hairy abaxially, inner tepals yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 1.5–2.0 mm long; anthers 1.5–2 mm long, sagittate, apex split. *Ovary* 2–3 mm long; style 0.5–0.6 mm long, stigma pyramidal with 3 concave faces, 1.5–2 mm long. *Capsule* turbinate or subglobose, 2–4 x 1.5–2 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid to globose, 1–1.2 x ±1 mm, black, glossy; testa papillate. *Flowering time*: November–May. Figure 12.10.

Diagnostic characters and relationships: *H. floccosa* is recognised by its small stature, leaves covered in dense, soft, red-brown hairs, and weak scapes with slender pedicels bearing one or two tiny flowers. Leaf hairs in *H. floccosa* are predominantly stellate. In leaf and inflorescences characters, *H. floccosa* is closely related to *H. flanaganii*, but is separated from *H. flanaganii* by its stellate hairs, radiating loosely from the centre in a tuft and turning red-brown on drying, giving plants a dirty brown furry appearance. In *H. flanaganii*, hairs are predominantly bifurcate. The tufted red-brown hairs in *H. floccosa* is similar to those in *H. sobolifera* but the leaves in *H. floccosa* are

small and linear while *H. sobolifera* has large, lanceolate leaves.

Distribution and ecology: *H. floccosa* is a South African endemic, restricted to the Western Cape and Eastern Cape from Swellendam to Stutterheim (Figure 12.34J). It grows in open areas in fynbos and grassland, in well-drained soil, full sun and at altitudes of 50 to 600 m above sea level. Known from very few collections, none from recent years.

Conservation status: Data Deficient (DD). Probably more abundant than reflected by collections.

Etymology: named from the Latin *floccosus* (with tufts of soft hairs) relating to the appearance of woolly hairs on leaves.

Common names: sterretjie (Afrikaans).

Vouchers: Bolus 7469 (BOL); Ecklon & Zeyher 4136 (BOL); Lewis 3009 (NBG); Sim 665 (NU); Gillet 885 (PRE).

22. ***Hypoxis kraussiana*** *Buchinger ex Baker*, *Journal of the Linnean Society, Botany* 17: 109 (1878b); Baker in Thiselton-Dyer: 180 (1896); Wood: 132 (1907); Nel: 306 (1914). Type: South Africa, KwaZulu-Natal, hills near Pietermaritzburg, *Krauss 104* (BM holo!, BOL!, PRE!).

Hypoxis neliana Schinz: 136 (1926). Type: South Africa, KwaZulu-Natal, mountains near Estcourt, *Schlechter 3348* (BOL!, K!, GRA!, PRE!).

Slender, erect hairy herb, 70–100 mm high, growing singly. *Rhizome* small, oblong, 10–20 x 7–15 mm, crowned by leaves and a dense mass of bristles from remains of old leaves, white inside. *Leaves* few, 4–6, linear, 50–250 x 2–4 mm, subterete; veins 8–12, close to each other, uniformly thickened and raised on upper surface (ribbed) sparse to densely hairy; hairs with an even distribution on blade, dense on margins and midrib on lower surface, bifurcate or stellate (4–6 arms), U-shaped, curling into rings, sharply pointed (needle-shaped), ascending, yellow; arms 0.3–0.6 mm long, one or two more strongly developed, 1.2–2.5 mm long, breaking off with age. *Inflorescence* 1 or 2 per plant; racemose, covered with short, yellow hairs in upper part; scape wiry, 60–150 x 1 mm. *Bract* subulate, 4–10 mm long, hairy below. *Flowers* 2(3), pedicels short, 5–10 mm long. *Tepals* 3+3, yellow adaxially; outer tepals, elliptic, 8–9 x 2–3 mm, pale green and densely hairy adaxially; inner tepals ovate-elliptic, 7–8 x 3–4 mm, yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–3 mm long; anthers 3–5 mm long, sagittate, apex slightly split. *Ovary* 3–4 mm long; style

0.5–1 mm long; stigma pyramidal with 3 concave faces; 1.2–2.5 mm long. *Capsule* turbinate, 3 x 2.5 mm, opening by a circular slit. *Seeds* ovoid \pm 1.2 x 0.7 mm; black, glossy; testa papillate. *Flowering time*: October–December. Figure 12.15.

Diagnostic characters and relationships: *H. kraussiana* is recognised by its narrow, strongly ribbed, leaves and short, yellow, U-shaped hairs curling into rings. It is closely related to *H. filiformis* in its slender leaves and wiry two-flowered scapes, but differs in having squat stellate hairs on margins and midrib on lower surface. In *H. filiformis*, leaves are lightly covered in long, weak hairs throughout (pilose) and hairs are white. Further, in *H. kraussiana* inflorescences are densely hairy appearing yellow from the colour of hairs, while in *H. filiformis*, inflorescences are sparsely hairy.

Distribution and ecology: *H. kraussiana* is a South African endemic, with a coast to inland distribution. It occurs in KwaZulu-Natal, Free State, Mpumalanga, Gauteng and Limpopo (Figure 12.34O). The species grows in open rocky grasslands, on mountain slopes in well-drained soil and full sun. Like *H. parvifolia*, it grows at high altitudes of 1200 to 2000 m above sea level.

Conservation status: Lower risk-Least Concern (LRlc). *Wood 130* (in NU) recorded a large population along the Himeville Road. Such populations are threatened by rapidly expanding development and agriculture in the province.

Etymology: named in honour of Christian Krauss (1799–1858), scientist, traveller and collector who collected from the Western Cape, through the Eastern Cape into KwaZulu-Natal.

Vouchers: *Allsopp 911* (NH, NU); *Ngwenya 1607* (NH); *Robertson 12* (NU); *Saltmarshe 984* (NBG); *Singh 636* (NH).

23. ***Hypoxis filiformis*** Baker, *Journal of the Linnean Society, Botany* 17: 109 (1878b); Baker in *Thiselton-Dyer*: 180 (1896); *Nel*: 305 (1914); *Compton*: 130 (1976); *Zimudzi*: 15 (1996); *Nordal & Zimudzi*: 10–11. Type: South Africa, Eastern Cape Province, Queenstown, *Cooper 462* (K, holo!, B!, BM!)

H. caespitosa Baker: 858 (1901). Type: South Africa, Gauteng, Pretoria, *Fehr s.n.* (Z!).

H. dregei (Baker) *Nel*: 306 (1914); *Burt*: 188 (1988). Type: South Africa, Eastern Cape, Kaffraria, *Cooper 1811* (K, lecto!).

Slender, wiry, lightly hairy herb, 50–150 mm high, growing singly. *Rhizome* oblong or globose, 10–20 mm in diameter or 1½ times longer than wide, crowned by leaves and a mass of strong bristles from remains of old leaves, white inside. *Leaves* few, 4–7, bases wrapped in membranous, brown tunic, erect, rigid, subterete, 80–200 (300) x 2–3 mm, wiry, U-shaped in cross section; veins 4–11, close to each other, uniformly thickened and raised on upper surface (ribbed), sparsely covered in long, weak hairs (pilose); hairs mainly along margins and midrib on lower surface, predominantly bifurcate with a few stellate (3 arms) intermingled, white; arms filiform, unequal in length, shorter arms 0.8–1 mm; longer arms 1.5–2 mm, ascending, occasionally appressed on margins. *Inflorescence* 1–5 per plant, produced with leaves and sequentially in the growing season, racemose, covered with long, weak white hairs; scapes shorter than or as tall as leaves, wiry, 40–300 x 1 mm, stiff, with thickened venation as in leaves, subterete. *Flowers* 2(–4), one above the other, pedicels short, 5–15 x 1 mm when flowers open. *Bract* subulate, 4–10 mm long, hairy below. *Tepals* 3+3, occasionally 2+2, outer and inner elliptic, about the same size, 4.5–9 x 1.8–4 mm, yellow adaxially, outer tepals green and pilose adaxially, inner tepals yellow, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments filiform; 2–2.5 mm long; anthers 1.8–2.3 mm long, sagittate, apex split. *Ovary* 2.0–2.5 mm long; style 0.5–1.5 mm long; stigma pyramidal with 3 concave faces, 0.5–1.8 mm long. *Capsule* turbinate or globose, 4–5 x 2–3 mm, opening by a circular slit, splitting longitudinally into three lobes. *Seeds* ovoid or globose, 1.5 x 1.2–1.4 mm, black, dull or shiny, testa papillate. *Flowering time*: mostly from September to February, less frequently from March to May. Figure 12.8.

Diagnostic characters and relationships: *H. filiformis* is recognised by its erect, subterete, strongly ribbed leaves and wiry inflorescences, mostly two-flowered and on very short pedicels. *H. filiformis* is most closely related to *H. kraussiana* in its habit and leaves. It differs from *H. kraussiana* in having long, weak, filiform hairs while in *H. kraussiana*, hairs are squat, stiff and needle-shape, curling into rings. *H. filiformis* is also similar to *H. longifolia* in habit and two-flowered inflorescences. It differs from *H. longifolia* in that it is a much smaller plant, with pilose leaves and tiny flowers (tepals less than 10 mm long). In *H. longifolia*, leaves are near-glabrous, margins fringed with squat, stellate hairs and flowers large (tepals more than 10 mm long).

Distribution and ecology: *H. filiformis* occurs in South Africa, Lesotho and Swaziland. In South Africa, it is found in all provinces, except the Western and Northern Cape, with a coastal and inland distribution (Figure 12.34H). The species extends into tropical Africa, occurring in Zambia, Zimbabwe, Malawi, Mozambique, Angola, Democratic Republic of Congo, Burundi, Uganda and Tanzania. In southern Africa, *H. filiformis* grows in open grasslands, on drier hill slopes but are more plentiful in damp areas. Hilliard & Burtt (1988) recorded collections of *H. filiformis* from the almost

bare floor of a partially dried up pond. The species occurs across a wide altitude range from sea level to 2500 m, and grows sympatrically with most grassland species of *Hypoxis*.

Conservation status: Lower Risk Least Concern (LRlc).

Etymology: named from the Latin *filiformis* (thread-like), describing the leaves.

Common names: Grass star-flower, moli-letsana (Sesotho), izinongwe (Zulu).

Vouchers: *Compton 26129* (NBG, NH); *Devenish 769* (PRE); *Flanagan 1811* (NBG); *Mauve 4506* (PRE *Singh 443 823* (NH)).

24. ***Hypoxis tetramera*** *Hilliard & Burt*, Notes from the Royal Botanic Garden Edinburgh 41: 299 (1983). Type: KwaZulu-Natal, Underberg District, *Hilliard & Burt 13524* (E, holo; NU, iso!).

Short, wiry, sparsely hairy herb, 50–120 mm high, growing singly, flowers minute. *Rhizome* tiny, oblong-globose, 6–8 x 4–7 mm, with very few contractile roots, crowned by leaves and few fine bristles from remains of old leaves, white inside. *Leaves* few, 4–8, bases wrapped in membranous, brown tunic, linear, 60–150 x 1–1.2 mm, subterete, sparsely covered; veins 10–12, flush with surface or thickened and raised on upper surface, sparsely hairy; hairs bifurcate and stellate (3 or 4 arms), filiform, 3–4 mm long, ascending, white. *Inflorescence* 1 or 2 per plant, covered with long, weak, white hairs; scapes shorter than leaves, 25–60 x 0.5 mm, subterete, sometimes decumbent in fruiting. *Flowers* 1(2), racemose; pedicels 4–6 mm long when flowers open. *Bract* subulate, 0.6–10 mm long, hairy below. *Tepals* 2+2, rarely 3+3, minute, outer and inner elliptic, about equal in size, 4.5–5 x 1.5–2 mm, yellow adaxially; outer tepals green and pilose abaxially; inner tepals yellow, green and sparsely hairy along midrib abaxially green and sparsely hairy along midrib abaxially. *Stamens* 2+2, rarely 3+3, with filaments filiform, 1.5–2 mm long; anthers 1 mm long, sagittate, apex minutely split. *Ovary* 2 mm long; style 1 mm long; stigma pyramidal with 3 concave faces, 1 mm long. *Capsule* globose or oblong, 4–6 x 2 mm. *Seeds* ovoid or globose, 0.5–1.0 x 0.5–0.1 mm, black, testa papillate, *Flowering time:* November to January. Figure 12.31.

Diagnostic characters and relationships: *H. tetramera* is recognised by its subterete, lightly hairy leaves and wiry inflorescences. Flowers in this species are diagnostic in that they are solitary, minute and have only four tepals and stamens, instead of the usual six parts found in the genus. On the label of specimen *Hoener 1623* (in PRE), it is noted that the ‘number of perianth parts were variable 4, 5 or

6 and number of stamens were variable 4, 5 or 6'. Most other sheets indicate four tepals. The species is most closely related to *H. filiformis* in its habit and subterete leaves. It differs from *H. filiformis* in the usually solitary flowers with four tepals. In *H. filiformis*, inflorescences bear 2 or 3 flowers with six tepals, seldom four.

Distribution and ecology: *H. tetramera* is a South African endemic and occurs in KwaZulu-Natal and Lesotho (Figure 12.34AE). It occurs on the Drakensberg Mountains and is associated with mud pans that become submerged during periods of high water. The species occurs in grasslands, mainly on the margin of mud pans, in full sun. *H. tetramera* is known from high altitudes 2000 to 2500 m.

Notes: *Abbott 1660* (PRU, Umtamvuna Nature Reserve) has fine, thread-like leaves and could be considered as the end of the range for width of leaves in *H. tetramera*. It could also represent *H. sagittata*, a species excluded from this study.

Conservation status: Lower Risk Least Concern (LRlc).

Etymology: named from the Latin *tetra* (four) and Greek *merus* (parts or their number) in reference to most flowers having four instead of six tepals, the latter being the prevailing state in *Hypoxis*.

Vouchers: *Devenish 1336* (PRE); *Guillarmod, Getliffe & Mzamane 274* (GRA); *Hilliard & Burt 16798* (NU); *Killick 3868* (PRE); *Manning, Hilliard & Burt 16011* (PRE).

25. **H. nivea** *Y. Singh*, *Flowering Plants of Africa* 60: 28 (2007) TYPE.—South Africa, KwaZulu-Natal, Kranzkloof Nature Reserve, *Singh 874* (NH, holo; K, PRE, PRU).

Slender, delicate herb, 70–120 mm high, lightly hairy, growing singly. *Rhizome* small, oblong, 8–10 mm in diameter or 1.5 times longer than wide, with few contractile roots; crowned with leaves and few fine bristles from remains of old leaves; white inside. *Leaves* few, 4–7, bases wrapped in membranous, white or brown tunic, linear, 70–150 × 4–12(–18) mm when flattened, pale green, paler approaching white at base, forming an inverted W from above, semi-erect, flaccid, thin and semitransparent against the light, apex browning in older leaves; veins 7–14, two near each margin slightly thickened and raised on upper surface, sparsely hairy; hairs a mixture of simple and bifurcate hairs, mostly along margins and midrib, filiform, soft, white. *Inflorescence* 1–5 per plant, corymbose, covered with soft, white hairs; scapes as tall as or shorter than leaves, 50–80 × 1 mm. *Flowers* 2–4; pedicels slender, 15–30 mm long. *Bract* subulate, 4–15 mm long. *Tepals* 3+3, white; outer tepals

narrowly elliptic, $3-6 \times 1.5-2.5$ mm, green and hairy abaxially; inner tepals elliptic, $3.0-6.5 \times 1.25-2.00$ mm, white, green and sparsely hairy along midrib abaxially. *Stamens* 3+3, with filaments filiform, 1.5–3 mm long, white; anthers 1.0–2.5 mm long, yellow. *Ovary* subglobose, ± 1 mm in diameter; style filiform, 2–4 mm long; stigma minute, spherical, 0.4–0.5 mm in diameter, minutely lobed, white. *Capsule* turbinate, $2.0-2.5 \times 2.5-3.0$ mm, opening by a circular slit, splitting longitudinally into 3 lobes. Seeds ovoid or globose, ± 1 mm in diameter, black, papillate. *Flowering time* (September) October–November. Figure 12.20.

Diagnostic characters and relationships: *H. nivea* is easy to recognise by its membranous leaves and by its small, white flowers. It is most closely related to *H. angustifolia*, from which it differs in its smaller flowers, white flowers, thin-textured tepals, filiform filaments and style, and oblong to spherical stigmas. In these characters, *H. nivea* is similar to *H. membranacea* and *H. parvula* var. *albiflora*. In *H. angustifolia*, the flowers are yellow, tepals thicker, style subulate approaching filiform and stigma pyramidal approaching spherical. *H. nivea* differs from *H. membranacea* in its narrow, linear, smooth leaves. In *H. membranacea*, the leaves are lanceolate and the upper surface bears translucent pustules that appear as dots to the naked eye. *H. nivea* can be separated from *H. parvula* var. *albiflora* by its long, slender leaves lightly covered in hairs and by the scapes equal to or slightly shorter than leaves, with two or three flowers per inflorescences. *H. parvula* is distinguished by its short leaves, more dense leaves and flowers that are held singly on slender scapes, overtopping the leaves.

Distribution and ecology: *H. nivea* is endemic to South Africa and occurs in the Eastern Cape and KwaZulu-Natal. It extends from Kentani in the south to just north of Durban and displays a coastal distribution (Figure 12.34T). Populations of *H. nivea* are found in shade in forest, growing on rocky edges and ledges in shallow, well-drained soil. Leaves of plants in deeper shade are one and a half times longer and wider than leaves of those in light shade. It is known from altitudes of 30 to 250 m above sea level.

Conservation status: Lower risk-Near Threatened (LRnt) as it appears to be localised and rare.

Etymology: named from the Latin *niveus* (pure white) in reference to white flowers.

Common name: White star-flower.

Uses: Like *H. angustifolia*, *H. nivea* has potential as a garden or pot plant; its dainty form and white flowers are quite attractive.

Vouchers: Cloete 1251 (NH); Jordaan 952, 1118 (NH, PRE); Nicholas & Smook 2412 (K, KEI, NH, PRE); Van Rooyen 2005 (PRE); Wood 771 (BOL, NH, K).

26. ***Hypoxis angustifolia*** Lam. Encyclopedia Méthodique Botany 3: 182 (1789); Schult.: 767 (1819); Fischer & C.A. Meyer: 49 (1845); Baker: 369 (1877); Baker: 111 (1878b); Baker in Thiselton-Dyer: 180 (1896); Baker in Thiselton-Dyer: 378 (1898); Rendle in Hiern.: 31 (1899); Nel: 303 (1914) pro parte; Perrier de la Bathie: 10 (1950); Geerinck: 5, fig. pro parte (1971); Nordal *et al.*: 24 (1985); Zimudzi: 15 (1996); Nordal: 87 (1997); Retief & Herman: 69 (1997); Nordal & Zimudzi: 6–7 (2001); Wiland-Szymańska & Adamski: 145–147 (2002); Wiland-Szymańska & Nordal: 5 (2006); Singh: 361 (2007). Type: Mauritius, *Commerson s.n.* (P-LA, holo, image!).

H. biflora Baker: 181 (1876). Type: South Africa, Eastern Cape, Transkei, *Baur 347* (K!).

Soft almost glabrous herb, 50–150 mm high, growing singly or in tufts forming large clumps. *Rhizome* deep seated, small, oblong, up to 60 mm long, 1½ to 5 times longer than wide, with few contractile roots, crowned with leaves and few fine bristles, proliferating by means of short stolons giving rise to new rhizomes each bearing a shoot, white inside. *Leaves* few, 6–10, bases wrapped in a membranous white or brown tunic, linear, 50–300 x 3–18 mm, arranged in three ranks in smaller plants, hanging laxly in taller plants, erect or semi-erect, V- or inverted W-shaped in cross section, grass-green, flaccid, membranous; veins 7–11, flush with surface, 2–4 near each margin slightly thickened and raised on upper surface, sparsely covered in long, weak hairs (pilose) mainly scattered along veins and margins; hairs simple, bifurcate or stellate (3 or 4 arms), filiform, 0.3–0.4 mm, one arm more strongly developed 1½ to 2 times longer than rest, ascending, white. *Inflorescence* 1–4 per plant, corymbose, lightly pilose; scapes as tall as or shorter than leaves, 5–20 x 0.5–1 mm, slender, weak, flattened in cross section (ancipitous). *Flowers* 2–4(–6); pedicels slender, lax, unequal in length bringing flowers to about same height, 4.5–6.0 mm long when flowers open. *Bract* subulate, 6–12 mm long, pilose below. *Tepals* 3+3 (rarely 4 or 8 in two whorls); yellow adaxially, outer tepals elliptic or narrowly elliptic, 3.5–9 x 1.5–3.5 mm; inner tepals elliptic or ovate-elliptic, 4–10 x 2–4 mm, yellow, green and sparsely hairy along midrib abaxially, sometimes midrib red striped. *Stamens* 3+3, with filaments subulate, 1–3 mm long; anthers 1–3 mm long, sagittate, apex split. *Ovary* 2–4 mm long; style 0.5–3 mm long, variable in shape, subulate or filiform; stigma pyramidal with 3 concave faces, variable in shape, 0.5–2.5 mm long. *Capsule* turbinate, 4–10 x 2–5 mm, opening by a circular

slit, then splitting longitudinally into 3 lobes. *Seeds* ovoid, 1–1.2 x 0.5–1.0 mm, black, glossy, testa papillate. *Flowering time*: mostly November–January, less often March to October.

26a. var. **angustifolia**

H. lata Nel: 324 (1914). Syntypes: South Africa, KwaZulu-Natal, Van Reenen, *Wood*, 9646 (B!, NBG!); South Africa, KwaZulu-Natal, Van Reenen, *Wood*, 6254 (B!, BM!, K!, NH!).

Diagnostic characters and relationships: *H. angustifolia* is recognised by its soft appearance, leaves grass green, membranous in texture and corymbose, lax inflorescences. *H. angustifolia* var. *angustifolia* is separated from variety *buchananii* in growing as solitary plants, usually less than 120 mm tall, narrow leaves, 3–4 mm wide and two veins near each margin raised on the upper surface of leaves. Variety *buchananii* includes plants growing in tufts, usually more than 120 mm tall, with broad leaves, 8–18 mm wide and four veins near each margin prominent on upper surface. *H. angustifolia* var. *angustifolia* is most similar to *H. nivea* in habit, leaf and inflorescence characters but differs from *H. nivea* in its yellow flowers. Although variable in its ratio of filaments:anthers and style:stigma and approaching the limits of *H. nivea*, filaments and style are predominantly subulate and stigmas mostly pyramidal in southern African material of *H. angustifolia*, a character typical for the genus. In *H. nivea*, flowers are white, filaments and style filiform and stigma oblong or spherical. Further, *H. angustifolia* var. *angustifolia* is more widespread in southern Africa and occurs in grassland, savanna and forest margins, while *H. nivea* is restricted to riverine forest habitats, in the Eastern Cape and KwaZulu-Natal in South Africa. Figure 12.2.

Distribution and ecology: *H. angustifolia* var. *angustifolia* occurs in South Africa, Lesotho and Swaziland. In South Africa it is found in the Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga and Limpopo (Figure 12.34B). The variety has a coastal to inland distribution and occurs in grassland, dune banks, shrubland and forest margins. It grows in full sun or partial shade in well-drained sandy soil or marshy ground, forming strong populations in marshy depressions. The variety occurs at altitudes of 15 to 1700 m above sea level. *H. angustifolia* var. *angustifolia* is also found in disturbed areas like mowed patches, grazed fields and roadside banks where it becomes plentiful. With elongation of leaves later in the season, plants appear much taller than at the start of the season.

Etymology: Named from the Latin *angusti* (narrow) and *folia* (leaf) in reference to its slender leaves.

Common names: Molinyana (Sesotho).

Conservation status: Lower Risk Least Concern (LRlc).

Notes: *H. angustifolia* is the most widespread species in Africa. It extends from the Eastern Cape Province in South Africa to Ethiopia in the north. Varieties *angustifolia* and *buchananii* are known only from southern Africa, while *H. angustifolia* var. *luzuloides* is known from Tropical Africa. The fourth variety, *H. madagascariensis* is restricted to Madagascar. See Wiland-Szymańska & Adamski (2002) for delimitation of varieties. These authors record *H. angustifolia* var. *luzuloides* (Robyns & Tournay) Wiland as the most widespread species that occurs in intertropical and southern Africa, Madagascar and the Mascarenes. During this study, specimens *Moll 251* (in NBG), Chipinga, Zimbabwe, *Mulligan s.n.* Jan. 1953 (GRA), Zambia and *Groenedijk, Koning & Dungo 1063* (LMU), Nampula, in the northern part of Mozambique were found to match the seeds described for var. *luzuloides*. Other specimens *Faden et al. 96/24*, *Vesey-FitzGerald 6152* and *Renvoize & Ardallah 1531*, all from Tanzania and in EA, also match var. *luzuloides*. However, no specimen of *H. angustifolia* with a seed sculpture of var. *luzuloides* was found among the southern African material. Therefore, the two varieties described by Baker (1878b) are upheld for southern Africa. It is possible to separate the plants with leaves 3–4 mm wide as var. *angustifolia* and those with leaves more than 8 mm as var. *buchananii*.

Of note is a specimen *Ash 2016* (EA) collected in Sire in Ethiopia that matches *H. angustifolia* var. *buchananii* in habit and seed morphology. Such specimens were previously determined as *H. villosa* which brought about the use of the name in tropical Africa. *H. villosa* is endemic to South Africa. Such specimens require further study.

Uses: Rhizomes eaten by children in times of famine and used as toys in Kenya (Burkill 1994).

Vouchers: *MacDevette 284* (NH); *Nicholas 666* (PRE); *Reid 525* (PRE); *Singh 163* (NH); *Snijman 1617* (NBG).

26b. var. ***buchananii*** Baker, *Journal of the Linnean Society* 17: 111 (1878b); Baker in Thiselton-Dyer: 180 (1896); Retief & Herman: 69 (1997). Type: South Africa, without locality, *Buchanan s.n.* (K, holo!).

H. woodii Baker: 3 (1889); Baker in Thiselton-Dyer: 183 (1896); Wood: 132 (1907). Type: KwaZulu-Natal, Inanda, *Wood, 426a* (K, image!; NBG!).

H. obliqua Jacq. var. *woodii* (Baker) Nel: 309 (1914). Type: KwaZulu-Natal, *Wood 426a* (K, image!; NBG!).

Diagnostic characters: *H. angustifolia* var. *buchananii* is recognised from var. *angustifolia* by its larger, flaccid habit, broader leaves, 8–18 mm wide and usually four veins slightly raised on the upper surface. It also proliferates by short stolons to form tufts and like *H. nivea* and *H. membranacea* is associated it with forest localities. Two forms are recorded in the variety based on leaf dimensions. A short form with leaves arranged distinctly in distinct ranks [*Bole s.n.*, *Wood 426*, *Haygarth 79*, *Singh, 647*], all in NH. This form was described as *H. woodii* by Baker (1889). As in var. *angustifolia* later in the season, leaves elongate and plants have a lanky appearance, losing the the three-ranked arrangement of leaves [*Pegler 690* (PRE), *Strey 5974* (PRE), *Thode 2549* (PRE)]. The short form of *H. angustifolia* var. *buchananii* is most closely related to and often confused with *H. zeyheri* in leaf shape and corymbose inflorescences but differs in texture and distribution and type of leaf hairs. In *H. angustifolia* var. *buchananii*, leaves are membranous, sparsely hairy throughout (pilose) and hairs mostly bifurcate. In *H. zeyheri*, leaves are thick (not membranous), glabrous, hairs restricted to leaf margins and midrib on lower surface and stellate, breaking off with age. Figure 12.3.

Distribution and ecology: *H. angustifolia* var. *buchananii* occurs in South Africa and Swaziland. In South Africa, it occurs in the Eastern Cape, KwaZulu-Natal, Free State and Mpumalanga. The variety is concentrated in the Eastern Cape and KwaZulu-Natal with a coastal and inland distribution (Figure 12.34C). It grows in partial shade in forest margins or cliff faces in sandy or loamy soil, and at altitudes from 15 to 1800 m above sea level. *H. angustifolia* var. *buchananii* grows sympatrically with the other soft species, *H. membranacea* on cliff faces.

Conservation status: Lower Risk Least Concern (LRlc).

Etymology: Named in honour of Reverend John Buchanan, clergyman who collected mainly in the KwaZulu-Natal Province.

Uses: *H. angustifolia* var. *buchananii* is suitable for garden beds as they proliferate easily by short stolons to produce new rhizomes, each bearing a shoot, and over a short period form masses with plentiful flowers.

Vouchers: *Baker TM14171* (PRE); *Jordaan 317* (NH); *Singh, 647* (NH.); *Strey 5974* (PRE); *Thode 2549* (NH).

27. ***Hypoxis membranacea*** Baker, Journal of the Linnean Society, Botany 17: 106 (1878b); Baker in Thiselton-Dyer: 182 (1896); Retief & Herman: 70 (1997). Type: South Africa, KwaZulu-Natal, Tugela, *Gerrard 1835* (K, holol., P!).

Small, delicate, lightly hairy herb, up to 100 mm high, growing in tufts. *Rhizome* oblong, 10–12 x 5–6 mm or 2 times longer than wide, with few contractile roots, crowned by leaves and a few fine bristles, white inside. *Leaves* few, 6–8, wrapped at base in a membranous, brown tunic, lanceolate or ovate, 80–150 x 8–25 mm, flat, tapering rapidly to a narrow apex, scattered with pustules, translucent and visible against the light; veins 13–14, all flush with surface, covered in long, weak hairs; hairs stellate (3–5 arms), white; arms unequal in length, 0.5–0.6 mm long, more developed arms 1.8–2 mm long, ascending, white. *Inflorescence* 1 or 2 per plant, corymbose, covered in long, weak, white hairs; scapes shorter than or as tall as leaves, delicate, 40–90 mm long, flattened in cross section (ancipitous). *Bract* subulate, 3–6 mm long, lightly hairy below. *Flowers* (1)2 or 3; pedicels weak, lax, 12–40 x 0.5 mm when flowers open. *Tepals* 3+3, white adaxially; outer tepals narrowly elliptic, 4.5–7 x 1.5–2 mm, green abaxially; inner tepals ovate-elliptic, 5–8 x 2–2.5 mm, white, green and sparsely hairy abaxially. *Stamens* 3+3, with filaments subulate, 1.5–2 mm long; anthers 1.2–1.5 mm long, sagittate, apex split. *Ovary* 1–1.5 mm long; style filiform, 2.0–2.5 mm long; stigma minute, spherical, ±0.5 mm in diameter. *Capsule* turbinate, 2–3 x 1.5–3 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid, 1–1.2 x 0.7–0.8 mm, black, dull; testa papillate. *Flowering time*: mostly during November to February, less frequently until April. Figure 12.18.

Diagnostic characters and relationships: *H. membranacea* is easily distinguished from all other species by its broad, membranous leaves covered in long, weak hairs, white flowers and minute, spherical stigmas. The species is most closely related to *H. parvula* in leaf texture, shape and stigma shape, and similar to *H. parvula* var. *albiflora* in its white flowers. It differs from *H. parvula* var. *albiflora* in its larger leaves and usually two to three flowers per inflorescence. In *H. parvula* var. *albiflora*, inflorescences usually bear a single flower, very rarely are there two flowers. *H. membranacea* is also similar to *H. angustifolia* var. *buchananii* in its soft leaves and lax inflorescences, but differs in having white flowers. In *H. angustifolia* var. *buchananii*, flowers are yellow.

Distribution and ecology: *H. membranacea* is a South African endemic, restricted to KwaZulu-Natal and the Eastern Cape, with a coastal to inland (Figure 12.34R). The species is plentiful in coastal forest where it often occurs with *H. angustifolia* var. *buchananii*. It grows on forest floor or cliff faces in rock crevices. *H. membranacea* also occurs in grasslands of mountains and outliers of

the Drakensberg range among boulders at the side of rivers and streams. It is associated with damp rock and partial-shade habitats, and grows at altitudes of 20 to 900 m above sea level.

Etymology: named from the Latin *membranaceus* which translates to membranous in reference to the thin leaf texture in the species.

Common names: Small white hypoxis.

Vouchers: Flanagan 1172 (BOL, PRE); Ngwenya 489 (NH); Oliver 6732 (PRE); Pegler 109A,B (PRE); Singh 826 (NH).

28. **Hypoxis parvula** Baker, *Journal of Linnean Society, Botany* 17: 113 (1878b); Burt: 190 (1988). Type: South Africa, KwaZulu-Natal, Sanderson s.n. anno 1854 (K!, holo!).

H. brevifolia Baker: 183 (1896). Type: South Africa, KwaZulu-Natal, Liddesdale, Wood 3940 (K; NH!).

Small, delicate, sparsely hairy herb, up to 80 mm high, growing singly. *Rhizome* mostly oblong, sometimes globose, 50–100 mm in diameter or 1.5–2 times longer than wide, with a few contractile roots, crowned by leaves and few fine bristles, white inside. *Leaves* few, 3–5, wrapped at base in a membranous, white or brown tunic, lanceolate, 15–70(–90) x 5–10 mm; veins 14–18, all flush with surface; sparsely hairy throughout, mainly on lower surface; hairs a mixture of simple (one arm), bifurcate or stellate (3–5 arms); arms of unequal length, 0.5–5.0 mm long, weak, ascending, white. *Inflorescence* 1(–3) per plant, corymbose; scapes as tall as or taller than leaves, weak, lax, 30–50 mm long, covered with soft, white hairs. *Flowers* 1(2); pedicels, long, weak, 30–40 x 0.5 mm when flower open. *Bract* subulate, 2–2.5 mm long, lightly hairy below. *Tepals* 3+3, yellow or white (occasionally pink) adaxially; outer tepals narrowly elliptic, 2.0–6.5 x 1–2 mm, green and hairy adaxially; inner tepals ovate-elliptic, 2.5–7 x 1.5–2.5 mm, yellow or white, green and lightly hairy along midrib abaxially. *Stamens* 3+3, with filaments subulate, 2–3 mm long; anthers 1–1.5 mm long, apex split. *Ovary* minute, ± 1 mm long; style filiform, 3.5 mm long; stigma minute, spherical, ±0.5 mm in diameter. *Capsule* turbinate or globose, 3–4 x 2–3 mm, opening by a circular slit, splitting longitudinally into 3 lobes. *Seeds* ovoid, 0.9–1.1 x 0.8 mm, black, testa papillate. *Flowering time*: November–April.

28a. var. **parvula**

H. limicola Hilliard & Burt: 188 (1988) syn. nov. Type: South Africa, Mpumalanga, Mac Mac Pools, *Hilliard & Burt 18455* (NU, iso!).

Diagnostic characters and relationships: *H. parvula* var. *parvula* is distinguished by its short, thin-textured leaves, covered in long, weak white hairs, inflorescences usually overtopping the leaves, mostly with a solitary flower, and spherical stigmas. The variety is most closely related to *H. membranacea* in its habit; thin leaves; long, slender inflorescences, delicate flowers and spherical stigmas. It differs from *H. membranacea* in producing mostly a single flower per inflorescence and yellow flowers. In *H. membranacea*, inflorescences usually bear two to three white flowers. Figure 12.25.

Distribution and ecology: *H. parvula* var. *parvula* occurs in South Africa and Lesotho. In South Africa, it is found in Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga and Limpopo (Figure 12.34Y). It is widespread in the Drakensberg mountains, where it grows in masses on the summit and slopes of the mountains, usually with *Rhodohypoxis*. *H. parvula* var. *parvula* is found in rock crevices or moist areas among short grass in full sun. It also occurs in coastal forest, along cliff faces, in partial shade. The variety prefers high altitude areas of 1200 to 2800 m above sea level.

Etymology: Named from the Latin *parvulus* (very small) alluding to the small stature of plants in the species.

Vouchers: *Haygarth 12077* (NH); *Hilliard & Burt 13687* (NU); *Jacobsz 1662* (PRE); *Killick 1539* (PRE); *Singh 556* (NH).

28b. var. **albiflora** *B.L.Burt*, Notes from the Royal Botanic Garden Edinburgh 45: 190 (1988). Type: South Africa, KwaZulu-Natal Richmond District, escarpment above Byrne Valley, *Hilliard 5589* (E, holo, NU!).

Diagnostic characters: *H. parvula* var. *albiflora* is separated from variety *parvula* by its white (not yellow) flowers. Figure 12.24.

Distribution and ecology: *H. parvula* var. *albiflora* is a south African endemic and occurs in the Eastern Cape, KwaZulu-Natal and Mpumalanga (Figure 12.34X). It appears to be plentiful in the midlands and uplands of KwaZulu-Natal. Burt (1988) recorded that the species is widespread in

southern and western KwaZulu-Natal along foothills of the Drakensberg Mountains from Kokstad through to the Karkloof range. The variety forms large colonies in damp areas on mountain ridge grasslands of high altitudes, between 1500 to 2200 m. above sea level. When growing with *H. parvula* var. *parvula*, it is usually found at slightly lower (about 20 m) altitudes and they seldom overlap.

Etymology: Named from the Latin *albi* (white) and *floralis* (flower) in reference to its white flowers, unusual for the genus of yellow-flowered plants.

Vouchers: *Abbott 4764* (NH, PRU, UMTAMVUNA); *Galpin 10245* (PRE); *Greene 426, 886* (NH); *Hilliard & Burt 7377, 7931* (NU); *Wood 4979* (PRE).

SPECIES INSUFFICIENTLY KNOWN

Hypoxis beyrichii Nel in Engler, Botanische Jahrbücher 51: 318 (1914). Type: South Africa, *Beyrich 326* (B!).

Named in honour of Conrad Beyrich, engineer and traveller, who joined Frans Bachman on a collecting trip to Pondoland in 1888. Insufficient material to decide on status.

Hypoxis exaltata Nel in Botanische Jahrbücher 51: (1914). Type: South Africa, without closer locality, *Poppe s.n. B412000-19* (B, image!).

Named from the Latin *exaltata* (raised high), referring to the tall leaves of the species. Known only from type specimen. Most likely a synonym of *H. argentea* var. *argentea*.

Hypoxis jacquinii Baker in Gardener's Chronicle VIII: 552; Baker: 112 (1878b); Baker: 182 (1896). Type South Africa, [Northern Cape], Colesberg sent to Kew in 1855, flowered in June 1870.

Named after Baron Nikolaus von Jacquin (1727-1817), a Dutch scientist According to descriptions by Baker (1878b, 1896), the rhizome is oblong with a long neck and brown membranous tunic and the leaves are thin in texture. Most likely a synonym of *H. obtusa* or *H. villosa*.

Hypoxis longipes Baker in Vierteljahrsschrift der Naturforschenden Gesellschaft: 176 (1904). Type: Northern Transvaal [Limpopo] (Spelonken), Shiluvane *Junod 1446*. Named from the Latin *longus* (long) and *pes* (foot) in reference to the long leaves in the species. Listed by Nel under Species non visae: 337 (1914). Specimen seemingly not at K and Z.

Hypoxis mollis Baker in Vierteljahrsschrift der Naturforschenden Gesellschaft: 177 (1904). Type: South Africa, Northern Transvaal [Gauteng], Modderfontein, *Conrath s.n.*
Named from the Latin *mollis* meaning soft, pliant in reference to the leaves. Listed by Nel under Species non visae: 338 (1914). Specimen seemingly not at K and Z.

Hypoxis nigricans Conrath ex Baker in Herb Univ. Turic; Baker in Vierteljahrsschrift der Naturforschenden Gesellschaft: 177 (1904). Type: North Transvaal [Gauteng], Modderfontein, *Conrath s.n.*
Named from the Latin *niger* (black) probably referring to its dirty brown leaves. Presumably examined by Nel (1914) as not listed under Species non visae: 337. Specimen seemingly not at K.

Hypoxis sagittata Nel in Engler, Botanische Jahrbücher 51: 323 (1914). Type: South Africa, [Eastern Cape] Kat und Klipplaatrivier *Ecklon 3515 (B!)*.
Described by Nel from a single specimen. Second collection made by *Hilliard & Burt 13264 (NU)* at top of Katberg Pass. Similar to *H. filiformis* and *H. tetramera*. Hilliard & Burt suggest that it is closer to *H. tetramera* as it has entire anther tips as opposed to split anther tips as in *H. filiformis*. Field knowledge insufficient and specimens lacking to decide on status of *H. sagittata*.

Hypoxis setosa Baker: 113 (1878b). South Africa, Eastern Cape, Grahamstown, *MacOwan 72 (TCD, holo, image!; GRA!)*.
Named from *setosus* meaning bristly, referring to the dense mass of fibrous bristles from remains of old leaves. The type specimen resembles *H. zeyheri* closely but requires further field studies to confirm status.

Hypoxis uniflorata Markötter in Annals of the University of Stellenbosch 8: 15 (1930). Type: South Africa, Free State, Koolhoek, *Thode 2548 (PRE, holo!)*.
Named from the Latin *uni* (one) and *florus* (flower) referring to the plant bearing a single-flowered inflorescences. Known only from the type specimen. Most likely synonym of *H. parvula* var. *parvula*. Requires field studies to confirm status.