New Species of *Ixia* (Crocoideae) and *Moraea* (Iridoideae), and Taxonomic Notes on Some Other African Iridaceae

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ABSTRACT. In Iridaceae subfamily Crocoideae, the tropical African *Gladiolus erectiflorus* subsp. *verdickii* and South African *Tritonia marlothii* subsp. *delpierrei* are restored to species rank as *G. verdickii* and *T. delpierrei*, respectively, while in the South African *Ixia*, *I. frederickii* is reduced to synonymy in *I. dubia* and a new species, *I. superba*, is described. That species, a member of *Ixia* sect. *Ixia* (20 species) is restricted to the Montagu district of the western Little Karoo, Western Cape Province, and has large pink flowers with a large dark blackish central zone. Most closely allied to a second Little Karoo species, *I. gloriosa*, *I. superba* is distinguished by the relatively long filaments 5–6 mm long, straight anthers ca. 6 mm long, and a style. The perianth tube is ca. 6 mm long, narrow at the base, forming a wide cup in the upper 3 mm. In subfamily Iridoideae, *Ferraria uncinata* subsp. *macrochlamys* is accorded separate status as *F. macrochlamys*, distinguished from *F. uncinata* by flower color, tepal proportions, and leaf marginal morphology, while a lectotype is designated for *F. kamiesbergensis*, the species evidently most closely allied to *F. macrochlamys*. In *Moraea* a new species, *M. simplex* (*Moraea* subg. *Visciramosa*, 7 species), is a local endemic of the Piketberg north of Cape Town, Western Cape, South Africa. It is distinguished from its allies by the subequal, spreading tepals with short claws, and short style that divides into three filiform, terminally stigmatic branches that extend between the filaments. We also provide new combinations at subspecies rank that were inadvertently not made when *Hexaglottis* and *Homeria* were transferred to *Moraea*, namely *M. bulbifera* subsp. *anomala*, *M. lewisiae* subsp. *secunda*, and *M. virgata* subsp. *karooica*. Lastly, in subfamily *Nivenioideae* we reinstate *Aristea torulosa* as the earliest name for plants currently called *A. woodii*, a species that extends from Tanzania and Angola to eastern South Africa.

Key words: Africa, *Aristea*, *Ferraria*, *Gladiolus*, Iridaceae, *Ixia*, *Moraea*, *Tritonia*.

This paper deals with a variety of nomenclatural and taxonomic issues in the African Iridaceae that have accumulated over the past several years. We take the opportunity to describe two new species, one of the crocoid genus *Ixia*, and the other of the iridoid genus *Moraea*, the latter as far as we can determine, first collected in the spring of 2002. In *Moraea* several infraspecific taxa were not transferred to the genus when *Homeria* and *Hexaglottis* were previously reduced to synonymy in *Moraea* (Goldblatt, 1998). Taxonomic adjustments include changes in rank for *Gladiolus erectiflorus* var. *verdickii*, *Tritonia marlothii* subsp. *delpierrei*, and *Ferraria uncinata* subsp. *macrochlamys*. We formally include *Ixia frederickii* in *I. dubia*, and re-establish use of the name *Aristea torulosa*, which we regard as an earlier name for plants currently called *A. woodii*. We also designate a lectotype for the narrow Namaqualand endemic *Ferraria kamiesmontana* and emend its circumscription.

The new *Ixia superba* is a member of the largely beetle-pollinated section *Ixia*, and evidently most closely related to the Little Karoo endemic *I. gloriosa*. *Moraea simplex* is the seventh member of subgenus *Visciramosa* of *Moraea*, a large African and Eurasian genus of 197 species at the latest count (Goldblatt & Manning, 2002). It stands out in the subgenus and genus in having simple, filiform style branches that spread between the tops of the free filaments. In most other species of *Moraea* the filaments and anthers are appressed to enlarged, erect style branches that are flattened and petal-like, and have forked apices (Goldblatt, 1986).

We present our new species and taxonomic corrections below with genera arranged alphabetically

within their subfamilies, using the infrafamilial taxonomy of Goldblatt (1990).

CROCOIDEAE

Gladiolus verdickii De Wildeman & T. Durand, Bull. Soc. Nat. Bot. Belgique 40: 29. 1901. *Gladiolus erectiflorus* var. *verdickii* (De Wildeman & T. Durand) Geerinck, Taxonomania 4: 3. 2001. TYPE: Congo. Shaba, Lukafu, July 1900, *E. Verdick 612* (type, BR).

We do not agree with Geerinck (2001) in his reduction of *Gladiolus verdickii* of Shaba in Congo and adjacent northwestern Zambia to varietal rank in *G. erectiflorus* Baker, the latter a largely East African species that also occurs in Shaba. While the two species seem clearly to be immediately related, *G. verdickii* differs consistently in numerous features, and is unlikely to be mistaken for *G. erectiflorus* (Goldblatt, 1996). As noted by Geerinck, *G. verdickii* shows no overlap in the dimensions of critical characters, notably the length of the perianth tube (25–35 mm vs. 16–18 mm in *G. erectiflorus*), dorsal tepal (45–50 vs. 25–35 mm), filaments (ca. 30 mm vs. 12–14 mm), and ovary (5.5–6.5 mm vs. ca. 3.5 mm). Moreover, their geographic ranges overlap to some extent in southeastern Shaba Province of Congo, yet there is no indication, based on examination of all collections of the species available at the time, that their characters converge there (Goldblatt, 1996). In fact, the populations of the two species maintain their differences throughout their ranges. Geerinck's reduction of *G. verdickii* seems to us simply founded on their apparent immediate relationship based on morphological comparison. In the case of *G. verdickii*, we would expect it to differ only in one or two features to merit varietal status in a second species. For *G. verdickii* we re-emphasize one particular difference between it and *G. erectiflorus*: plants produce numerous small cormlets, ca. 1.5 mm in diameter, on short, flattened fasciated stolons (Goldblatt, 1996: plate 30), a feature unknown elsewhere in *Gladiolus*, whereas *G. erectiflorus* produces slender runners bearing one or a few larger terminal cormlets up to 4 mm in diameter.

Ixia dubia Ventenat, Choix. pl. 2: sub. pl. 10. 1803. TYPE: South Africa. Without precise locality, collector, or date (type, G, Herb. Ventenat).

Ixia frederickii M. P. de Vos, S. African J. Bot. 54: 596. 1988. Syn. nov. TYPE: South Africa. Western Cape: Darling District, Bokbaai, 16 Oct. 1987, "*F. Duckitt sub de Vos 2694*" fide de Vos, 1988: 596 (holotype, STE; no isotypes cited).

In our account of the Iridaceae in the Cape flora (Goldblatt & Manning, 2000), we did not recognize *Ixia frederickii* M. P. de Vos, and included it provisionally in *I. dubia*. After further consideration, we maintain our opinion that *I. frederickii* is a distinctive local color variant of *I. dubia* and formally reduce it to synonymy. It was distinguished by de Vos (1988) by its fiery red flower color [sometimes orange-red] with a small dark center, black filaments 3.5–4.5 mm long, connivent around the central style that divides opposite the middle of the filaments, and the firm, often suborbicular bracts, 6–8 mm long, that are pale or flushed light purple above, with reddish purple veins. De Vos regarded the species as most closely related to *I. maculata* L. and *I. dubia*. *Ixia maculata* has larger, tawny rust-colored bracts 8–15 mm long, an orange, rather than red, flower with a large light brown central mark, and longer filaments and style. The filaments, 3–5 mm long, are usually connate basally or up to the middle, and the style divides above the level of the filaments, usually opposite the middle of the anthers. The yellow- to orange-flowered *Ixia dubia*, however, has shorter, translucent bracts 5–9 mm long, often pink or sometimes purple above and with several darker veins, the filaments free, 3–5 mm long, and a style that reaches the middle or top of the filaments. Its perianth ranges from pale to deep yellow or light orange, often flushed red on the outside, and it sometimes has a small darker central mark while the filaments are yellow or partly dark brownish. It is typically a plant of sandy soils, either stony sandstone or granitic slopes, where it grows in fynbos or coastal bush.

Given the range of variation in the flowers of *Ixia dubia*, we see no reason to recognize *I. frederickii*. It falls within the range of variation of *I. dubia*, with the fiery red perianth its only unique feature.

Ixia superba J. C. Manning & Goldblatt, sp. nov. TYPE: South Africa. Cape Province: Montagu District, Klipheuwel, foot of the Langeberg, in loamy sandstone soils or light clay, 9 Sep. 1993, *P. Goldblatt, J. C. Manning & L. J. Porter 12180* (holotype, NBG; isotypes, K, MO, PRE, S). Figure 1.

Plantae 20–60 cm altae, cormo globoso 15–20 mm diam., foliis tribus basalibus inferioribus duobus anguste ad late lanceolatis (3–)5–10 mm latis marginibus moderate incrassatis folio superiore caulem vaginanti, caule simplice vel 1–3 ramoso, spica usitate 3–6 florum spicis lateralibus 1–4 florum, bracteis membranaceis translucentibus exteriore 8–10 mm longo interiore pauciter longo vel

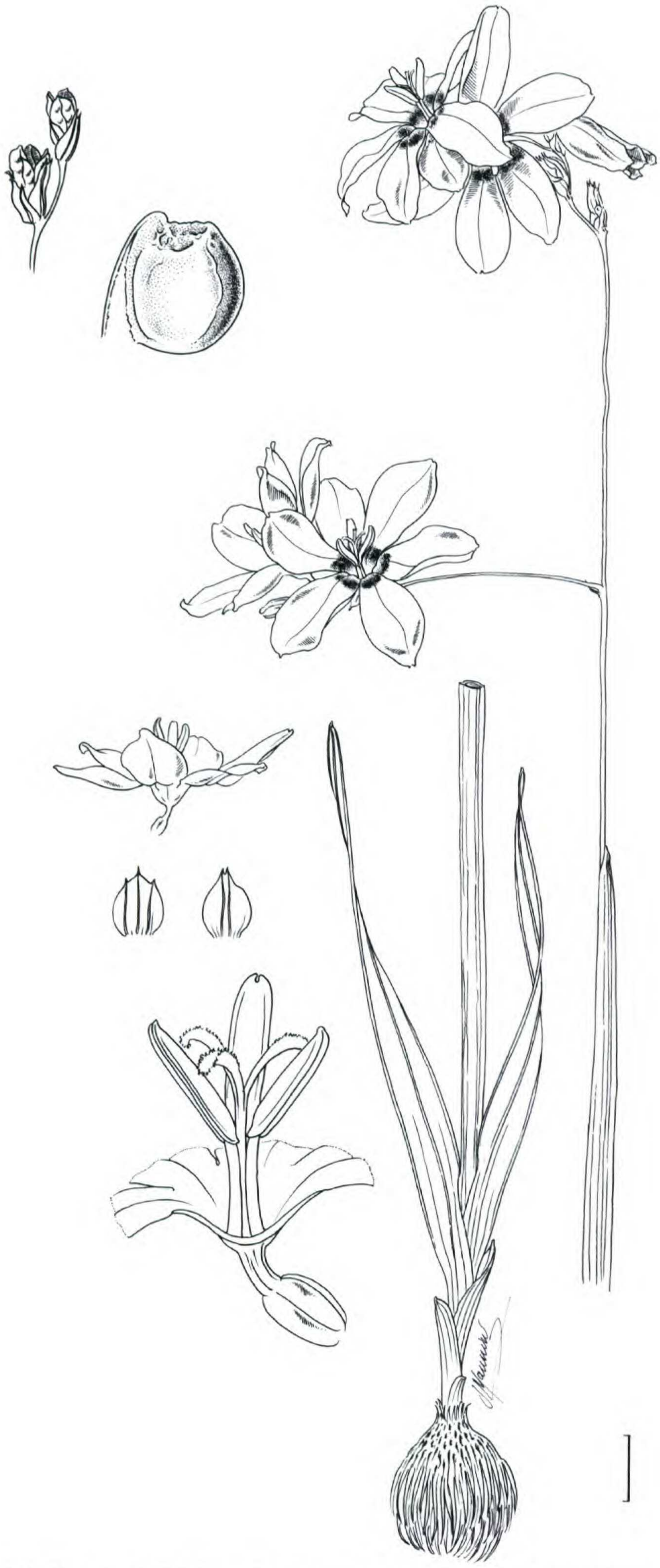

Figure 1. *Ixia superba* J. C. Manning & Goldblatt. Drawn from living plants from the type population, *Goldblatt & Porter 12180*, by John Manning. Scale bar 10 mm for entire plant, capsules, floral bracts, and side view of flower; detail of the perianth base, entire gynoecium and stamens of dissected flower, 3× scale bar, seed approximately 6× scale bar.

breve quam exteriore, floribus hypocrateriformibus actinomorphis pallide ad intense carneis tepalis purpureis ad basem nigris leviter dulce odoris, tubo perianthii pauce curvato cylindrico infime 2–3 mm abrupte expanso in cupulam ca. 3 mm profundam, tepalis obovatis patentibus subaequalibus (14–)18–22 × (6–)10–12 mm, filamentis conniventis 5–6 mm longis erectis nigris, antheris divergentibus 6–7 mm longis nigris, polline flavo, ovario ovoideo ca. 2 mm longo, stylo erecto furcato ad basem antherarum ramis 2–3 mm longis nigris, capsulis ovoideis 9–11 × 5 mm, seminibus subglobosis vel angulatis 1.2–1.5 mm diam. leviter rugosis.

Plants 20–60 cm high; corms globose, 15–20 mm diam., the tunics of medium to coarsely textured fibers; *cataphylls* membranous, the upper one reaching just above ground level and flushed reddish brown. *Leaves* 3, all basal, the lower two narrowly to broadly lanceolate, (3–)5–10 mm wide, usually about half as long as the stem, the margins and midribs moderately thickened, the uppermost leaf entirely sheathing, reaching at least to the middle or upper third of the stem. *Stem* erect, simple or 1- to 3-branched, 0.5–1 mm diam. at the base of the spike, branches held 45°–90° to the main axis; *spike* almost straight, the main spike usually 3- to 6-flowered, the lateral spikes 1- to 4-flowered; *bracts* membranous and translucent, the outer 8–10 mm long, with three light purple veins, lightly three-dentate, the inner as long as to slightly longer than the outer, forked at the apex, with two purple veins. *Flowers* salver-shaped, actinomorphic, pale to deep pink, the tepals each purple to blackish toward the base, lightly sweet scented; *perianth tube* slightly curved and cylindric for 2–3 mm, widening abruptly into a cup ca. 3 mm deep; *tepals* obovate, spreading at nearly right angles to the tube, subequal, (14–)18–22 × (6–)10–12 mm, the inner slightly wider than the outer; *filaments* inserted at the mouth of the narrow part of the tube, blocking the mouth, connivent, 5–6 mm long, straight and erect, black; *anthers* divergent, 6–7 mm long (before anthesis), black, the pollen yellow; *ovary* ovoid, ca. 2 mm long; *style* straight and erect, dividing opposite the base of the anthers, the branches arching outward, 2–3 mm long, black. *Capsules* ovoid, 9–11 × 5 mm; *seeds* subglobose or angled by pressure, 1.2–1.5 mm diam., yellow-brown, lightly wrinkled with surface cells colliculate.

Phenology. Flowering early to mid September, probably also in late August.

Etymology. From the Latin *superbus*, "superb, excellent," referring to the large, attractive, deep pink and purple-black flowers.

Distribution and biology. *Ixia superba* has a recorded range of just a few acres at the foot of the Langeberg in the Little Karoo east of Montagu. Plants grow on loamy sandstone ground that grades to a light clay at the interface of Table Mountain Sandstone and Bokkeveld Systems on the farm Klipheuwel. We collected plants in bloom there in early September 2002 close to the end of their flowering season. Associated plants were *Babiana patula* N. E. Brown, *Moraea gawleri* Sprengel, *Watsonia laccata* (Jacquin) Ker-Gawler (Iridaceae), and the shrub *Elytropappus rhinocerotis* (L. f.) Lessing. The flowers evidently have a bimodal pollination strategy that uses both hopliine scarab beetles (Scarabaeidae: Hopliini) and worker honey bees, *Apis mellifera* (and possibly female bees of other genera). The flowers have the typical attributes of the hopliine beetle pollination system, viz. a brightly colored perianth with dark markings, darkly pigmented stamens, relatively long anthers, and short style branches. The closed perianth tube and absence of nectar are also features associated with this pollination system in *Ixia* (Goldblatt et al., 2000a). Presence of a sweet floral odor is, however, an attribute of bee pollination and bees do visit the flowers, which evidently last three days, but close at night. Both hopliine beetles and honey bees were found visiting the flowers, the latter actively collecting pollen. Early in the morning hopliine beetles were found in half-closed flowers in which they had evidently spent the night. In one other collection of *I. superba* we have found (*Steiner 3239*, NBG), field notes indicate that the flowers were visited by the hopliine beetle *Peritrichia* sp.

Relationships. *Ixia superba* is readily confused with a second Little Karoo species, *Ixia gloriosa* G. J. Lewis (1962). Although both have deep pink flowers with a large blackish glossy central eye and blackish filaments and anthers, there are several important floral differences between them. The darker red-purple flowers of *I. gloriosa* have relatively short, slightly spreading filaments 3–5 mm long, and anthers, said by de Vos (1999b) to be 6–7 mm long and connivent at the tips. Plants studied by us alive (*Goldblatt, Manning & Porter 12179*, MO, NBG), however, had anthers ca. 4.5 mm long diverging throughout, thus not apically connivent. The style normally divides at the mouth of the tube, thus opposite the base of the filaments, and the style branches are ca. 4 mm long. The perianth tube is 4–7 mm long and widens abruptly into a small cup little more than 1 mm deep. Fresh flowers of *I. gloriosa* have a characteristic umbonate appearance, the result of the tepals being raised above the rim of the perianth cup before spreading. This is not apparent in pressed specimens or closed flowers. In contrast, *I. superba* has the perianth tube slender below for 3

mm, widening abruptly into a cup ca. 3 mm deep and the tepals spread uniformly from the rim of the tube. The filaments are 5–6 mm long, and the divergent anthers are ca. 6 mm long. The style is enclosed above by the closely connivent filaments and divides at or shortly above the top of the filaments into shorter style branches 2–3 mm long. In addition, *I. gloriosa* typically has linear leaves 15–55 × 1–3 mm and a long slender spike of 8 to 10 flowers on the main axis, whereas *I. superba* has shorter, lanceolate leaves 10–30 × (3–)5–10 mm and a shorter, crowded spike of 3 to 6 flowers. While the bracts of the two species are similar, those of *I. gloriosa* have more pronounced veins that when dry remain dark purple, while the veins in the bracts of *I. superba* fade and almost disappear.

There are several other locally endemic species of *Ixia* in the Breede River valley that resemble one another closely in their deep pink flowers with a dark center and blackish filaments and anthers (Lewis, 1962). This flower type is adapted for pollination by hopliine beetles, a pollination system that seems to favor local differentiation among plant species, e.g., *Aristea* subg. *Pseudaristea* (Goldblatt & Manning, 1997) and *Sparaxis* (Goldblatt et al., 2000b). The species of *Ixia* in the Breede River valley with flowers adapted for this pollination system form a geographical series, replacing one another across relatively short distances. Moving down the river valley from its head in the northwest, the series comprises *I. vinacea* G. J. Lewis (Tulbagh), *I. rouxii* G. J. Lewis (Wolseley), *I. mostertii* M. P. de Vos (Romans River to Worcester), *I. vanzyliae* L. Bolus (Worcester to Roberston), *I. atrandra* Goldblatt & J. C. Manning (south of Worcester to Stettyn), *I. superba* (Montagu), and *I. gloriosa* (Barrydale). Among this alliance, *I. superba* is readily distinguished by the perianth tube that forms a wide cup ca. 3 mm long in the upper half and the style that divides at or slightly above the base of the filaments, thus close to the base of the anthers, rather than at the mouth of the perianth tube and well below the base of the anthers.

Paratypes. SOUTH AFRICA. **Western Cape:** 3320 (Montagu), Farm Rietvlei No. 1, ca. 10.5 km SE of Montagu, scattered on S-facing rocky slope (CC), ca. 370 m, 5 Sep. 1997, *Steiner 3239* (NBG); Scheepers Rust, 20 mi. E of Montagu, 22 Aug. 1936, *Martley s.n.* (BOL 26930).

Tritonia delpierrei M. P. de Vos, J. S. African Bot. 49: 403. 1983. *Tritonia marlothii* subsp. *delpierrei* (M. P. de Vos) M. P. de Vos, Fl. S. Africa 7(2,1): 121. 1999. TYPE: South Africa. Northern Cape: Richtersveld, top of Helskloof, *M. P. de Vos 2462* (type, STE).

We do not accept de Vos's (1999a) reduction of the South African *Tritonia delpierrei* to subspecific rank in *T. marlothii* M. P. de Vos. We have seen and examined both plants in the wild, and while they are evidently sister taxa, isolated geographically and phylogenetically within *Tritonia* (de Vos, 1983), there is little overlap in their critical taxonomic features. We prefer to maintain them as separate species differing in floral coloration and dimensions that apparently indicate different primary pollinators. *Tritonia delpierrei* has lightly sweet-scented, pale yellow flowers, the lower tepals with cream markings, a perianth tube 12–22 mm long, and the dorsal tepal 8–12 mm long. In contrast, *T. marlothii* has odorless flowers, a pale to deep purple perianth (not lilac as indicated by de Vos) with the lower tepals yellow with purple tips and a median dark violet spot, and new collections (e.g., *Goldblatt & Porter 11757*, MO, NBG) show the perianth tube is 28–42 mm long and the dorsal tepal (8–)10–12 mm long. The flowers of *T. marlothii* show the stereotyped adaptations for pollination by the long-proboscid fly *Prosoeca peringueyi* (Manning & Goldblatt, 1996), and we have captured this fly while visiting and evidently pollinating the flowers (unpublished obs.). The shorter perianth tube of *T. delpierrei* suggests pollination by a long-tongued anthophorine bee. The ranges of the two taxa largely overlap. *Tritonia marlothii* occurs in the southern Richtersveld of Namaqualand at Brakfontein, southwest of Eksteenfontein, and along the eastern foothills of the Stinkfontein Mountains north of Eksteenfontein, whereas *T. delpierrei* extends from near Eksteenfontein in the south to Helskloof in the north, a distance of some 60 km that includes a large part of the range of *T. marlothii.* While *T. delpierrei* seems to favor sandy slopes, we have only seen *T. marlothii* in rocky ground, an apparent habitat difference also consistent with separate species status.

Thus despite their evident immediate relationship, we see no reason to consider *Tritonia delpierrei* as a subspecies of *T. marlothii.* Their geographic ranges partly overlap while their habitats differ, and their critical morphological features show no evidence of convergence.

IRIDOIDEAE

Ferraria kamiesbergensis M. P. de Vos, J. S. African Bot. 45: 362. 1979. TYPE: South Africa. Northern Cape: Rondefontein, 1 Sep. 1976, *E. G. H. Oliver 5970* (lectotype, here designated, lower left plant on sheet, STE).

Described by M. P. de Vos in 1979, *Ferraria ka-*

miesbergensis is represented by four elements: the illustration accompanying the protologue (de Vos, 1979: 363), and three plants mounted on a single sheet, *Oliver 5970*. These were evidently all collected on the same date at Rondefontein in the Kamiesberg of central Namaqualand. We have visited the type locality (or as close to it as is possible) and found a small, uniform population of plants with small pale yellow flowers, stems 12–15 cm high, branching if at all, only from near the base, with distinctive dark green leaves, and subequal inflorescence spathes (*Goldblatt & Porter 12223*, MO, NBG). Most significantly, the lower leaves all curve inward in the same direction.

Only one specimen on the type sheet matches these plants, and it also has the paired inflorescence spathes almost equal in length with the inner sheathing only below. The other two plants are taller (one is ca. 30 cm tall), have narrower, evidently flat leaves, produce branches well above ground level, and the outer inflorescence spathes are about half as long as the inner and are largely sheathing. The plant illustrated in the protologue corresponds to the larger of these two taller specimens, and both appear to be a second species, possibly what is currently called *Ferraria divaricata* Sweet, either its subspecies *aurea* M. P. de Vos or subspecies *arenosa* M. P. de Vos. The flower illustrated is probably *F. kamiesmontana* (and is certainly not *F. divaricata*), while the smaller plant on the lower left of the type sheet alone matches plants in the wild and is the lectotype.

The plants found at Rondefontein are matched at other sites in the southern Kamiesberg on the farm Karas, to the north, immediately adjacent to Rondefontein. Elsewhere on the Kamiesberg, the only other pale yellow-flowered species of the genus is the florally nearly identical *Ferraria macrochlamys* (treated by de Vos as *F. uncinata* subsp. *macrochlamys*, see below), which has quite different leaves.

The range of *Ferraria kamiesbergensis* according to de Vos is from Springbok (*Thompson 1301*, NBG) in the north to Wallekraal in the southwest (*Compton 5405*, BOL), and extending east as far as the Calvinia district (e.g., *de Vos 2347*, NBG). We have examined all the specimens on which de Vos based her assessment of the range of the species and consider them to correspond with what she called *F. divaricata*. None of the specimens she cited have the distinctive incurved leaves and subequal spathes of the southern Kamiesberg populations (flower color can no longer be determined). As circumscribed here, *F. kamiesbergensis* is restricted to the southern Kamiesberg at elevations above 1000 m where plants matching the lectotype occur.

Ferraria macrochlamys (Baker) Goldblatt & J. C. Manning, comb. nov. Basionym: *Lapeirousia macrochlamys* Baker, J. Bot. new ser. 5: 338. 1876. *Ferraria uncinata* subsp. *macrochlamys* (Baker) M. P. de Vos, J. S. African Bot. 45: 369. 1979. TYPE: South Africa. Namaqualand, without precise locality or date, Herb. Forsyth s.n. [probably collected by J. Niven in 1899] (type, K).

In her revision of *Ferraria* (Iridoideae) de Vos (1979) treated a series of central and northern Namaqualand populations (Northern Cape, South Africa) with pale yellow flowers as *F. uncinata* subsp. *macrochlamys*, while she regarded Western Cape populations with deep blue to violet flowers as *F. uncinata* Sweet subsp. *uncinata*. De Vos believed that subspecies *macrochlamys* merited subspecific status because it differed only in having flowers with a differently colored perianth. The two taxa share with *F. brevifolia* G. J. Lewis and *F. kamiesbergensis* M. P. de Vos a distinctive flower type in the genus in which the tepal claws are suberect and collectively form a narrow floral cup that contains relatively dilute nectar. Both these latter species also have predominantly pale yellow tepals virtually the same shade and size as those of subspecies *macrochlamys*. De Vos regarded *F. macrochlamys* and *F. uncinata* as sharing similar leaf blades with the margins thickened and the edges crisped and often undulate. In her key (1979: 329) to the species, *F. uncinata* (including subsp. *macrochlamys*) is distinguished by "margins of at least some of the foliage leaves crisped." De Vos commented of subspecies *macrochlamys* and subspecies *uncinata* that they "differ only in flower coloring and geographic distribution." Closer examination of specimens she included in subspecies *macrochlamys*, however, shows that the thickened, hyaline part of the leaf margins is crenate to lightly serrate and sometimes shortly velvety, but the leaf edges themselves are only occasionally lightly crisped. In *Ferraria uncinata* the thickened part of the leaf margin may be entire, or sometimes lightly serrated or crispulate, and not velvety but rather evidently smooth (but under 10× magnification papillate), while the edges of at least some of the leaves are crisped and usually undulate. Thus, examination of the leaf margins alone can usually distinguish the two taxa. In addition, the flowers of *F. uncinata* have outer tepals (18–)30–35 mm long, with claws 9–11 mm long, thus usually slightly less than one-third the

length of the entire tepal. In *F. uncinata* subsp. *macrochlamys* the outer tepals are 24–28 mm long and the claws 12.5–14 mm long, thus half as long as the entire tepal.

We believe the differences are sufficient that *Ferraria uncinata* subsp. *macrochlamys* should be treated as a separate species. In fact, we are not convinced that it is most closely related to *F. uncinata.* The central Namaqualand *F. kamiesmontana* has flowers virtually identical to those of *F. uncinata* subsp. *macrochlamys* in size, proportion, and orientation, as well as color, and can be distinguished from the subspecies solely by a few dark spots at the bases of the outer tepal limbs. Leaf margins of *F. kamiesmontana* are, however, entire, smooth, and barely thickened. Growth form of the two is similar: plants of both taxa are low growing and have a few subequal branches near the stem apex, whereas *F. uncinata* subsp. *uncinata* often branches above the base, is frequently taller, and the stems emerge from the leaf sheaths. Relationships of *F. uncinata* subsp. *macrochlamys* are by no means obvious, and it is most useful to treat it as a separate species, pending phylogenetic analysis of *Ferraria* using molecular techniques.

Regarding the type collection of *Ferraria macrochlamys*, the specimen bears the annotation "Forsyth 1835" suggesting a gathering by a Mr. Forsyth. No collector of this name in known in southern Africa, and the name Forsyth, listed by Gunn and Codd (1981) in their compilation of plant collecting in southern Africa, is without initials, dates of birth and death, and lacking additional information. We now believe the annotation refers to William Forsyth, son of W. F. Forsyth of the Chelsea Physic Garden, who maintained a herbarium collection. William Forsyth died in July 1835 and his library, presumably containing herbarium specimens, was auctioned in November of that year (C. Nelson, pers. comm.). Indications in the accounts of *Babiana spiralis* Baker, based on another Forsyth specimen (Baker, 1892, 1896), have led us to conclude that the Forsyth herbarium was purchased by Willam Banks, then Keeper of the Kew Herbarium, for the collection there. The most likely collector of the type of *B. spiralis* and *Ferraria macrochlamys* is the British botanist James Niven, who collected in Namaqualand in 1799 and later, and whose specimens are now widely dispersed (Gunn & Codd, 1981). The type citation above reflects this new information.

Moraea simplex Goldblatt & J. C. Manning, sp. nov. TYPE: South Africa. Western Cape: 21 km N of Piketberg, 18 Sep. 2002, *P. Goldblatt & L. J. Porter 12231* (holotype, NBG; isotypes, MO, PRE). Figure 2.

Plantae 28–40 cm altae, cormo ovoideo ca. 10 mm diametro tunicis reticulatis fibrosis brunneis obtecto, foliis productis 1 canaliculatis 2–3 mm latis, caule perramoso, spatha interne inflorescentiis 18–22 mm longis, floribus flavo-cremeis, tepalorum limbis leviter reflexis unguibus ascendentibus ca. 2 mm longis, limbis externis 18–20 × 7.5–8.5 mm internis ca. 18 × 7 mm, filamentis liberis ca. 5 mm longis inferne in columnam gracilem conniventibus superne per 1 mm divergentibus, antheris albis ca. 3 mm longis, stylo ramis filiformibus indivisis ca. 4 mm longis inter filamenta arcuatis, ovario exserto anguste ovato ca. 3 mm longo.

Plants 28–40 cm high; *corm* ovoid, ca. 10 mm diam., the tunics of coarse, light brown fibers, with a neck of fairly fine fibers surrounding the base of the stem; *cataphylls* papery, the uppermost reaching shortly above the ground, becoming dry and light brown by flowering time, then often irregularly broken. *Foliage leaf* solitary, inserted on the first aerial node, the blade channeled, exceeding the stem, arching outward or trailing distally, 2–3 mm wide. *Stem* erect, lightly flexuose, sticky below the nodes for half the length of an internode, bearing a sheathing bract-like leaf at each of the upper nodes, these 24–35 mm long, green, becoming dry and light brown above, the apices acute, bearing two or three short branches of one internode each at the upper three or four nodes, branches at the lower nodes sometimes two internodes long and also branched, the branches erect and parallel to the stem below, flexed outward above the sheathing leaf. *Inflorescence* a rhipidium, terminal on the branches, several-flowered; *spathes* subequal, green, with dry, brown tips, 18–22 mm long, the outer slightly shorter than the inner. *Flowers* uniformly pale creamy yellow, the outer tepals each with a pale yellow mark at the base of the limb, unscented, the tepal claws ascending, forming a cup enclosing the base of the filaments; *tepals* clawed, the outer slightly larger than the inner, the claws ascending, ca. 2 mm long, the limbs ovate, obtuse, initially spreading horizontally, later dipping up to 30° below the horizontal, the outer 18–20 × 7.5–8.5 mm, the inner ca. 18 × 7 mm; *filaments* ca. 5 mm long, free but connivent below and forming a slender column, diverging in the upper 1 mm; *anthers* ca. 3 mm long, oblong, appressed to one another, white, the pollen white; *ovary* exserted, narrowly ovoid, ca. 3 mm long; *style* dividing shortly below the base of the anthers into 3 filiform branches, each stigmatic apically and extended between the filaments, ca. 4 mm long. *Capsules* and *seeds* unknown.

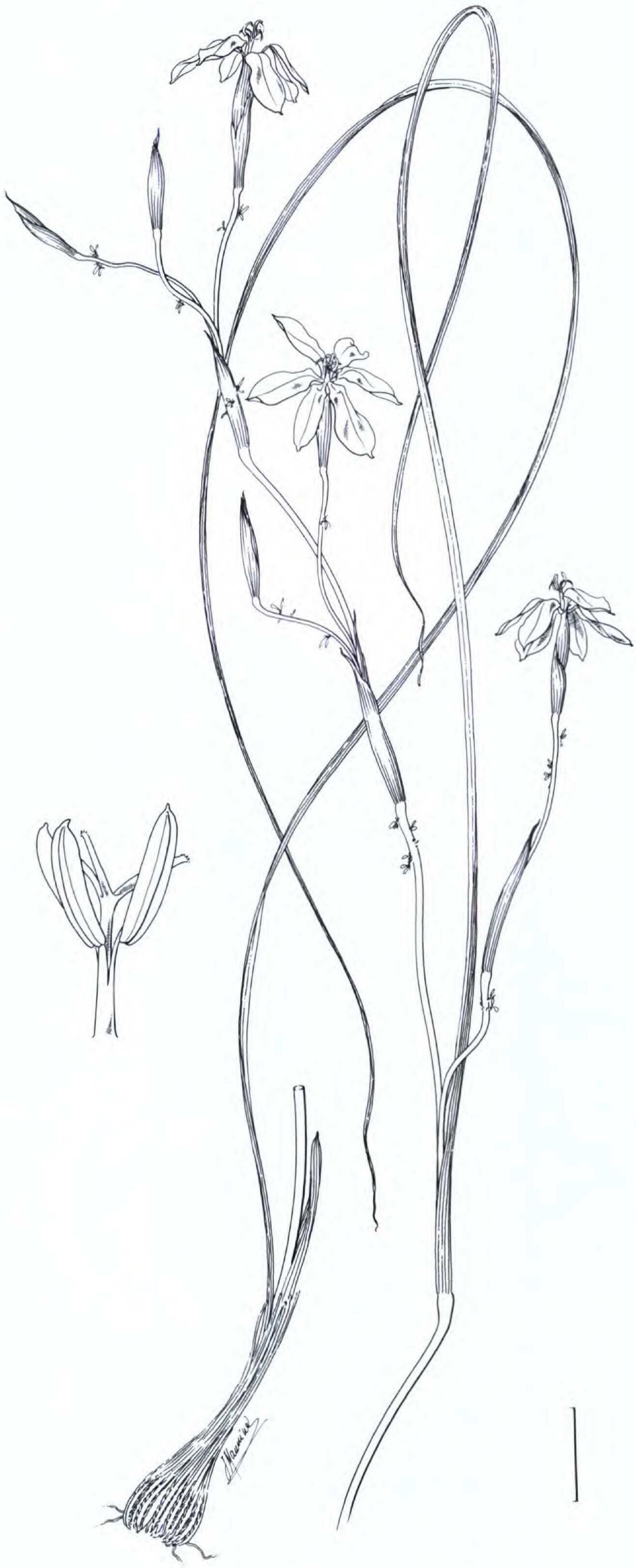

Figure 2. *Moraea simplex* Goldblatt & J. C. Manning. Drawn from living plants from the type population, *Goldblatt & Porter 12231*, by John Manning. Scale bar 10 mm for entire plant, side view of stamens and style branches approximately 3× scale bar.

Phenology. Flowering in mid to late September, probably into mid October.

Etymology. From the Latin *simplex*, "unadorned, plain," referring both to the pale-colored flowers without markings, the spreading subequal tepals, and the filiform style branches lacking style crests.

Distribution and biology. Moraea simplex is known only from the relatively moist clay flats at the eastern foot of the Piketberg Mountains. Numerous plants were found at the beginning of their flowering or still in bud on September 18 at the single known site for the species, which had been burned the previous summer. We infer that flowering continues until at least early October. The flowers each last a single afternoon, opening at about 14:00H and wilting shortly after nightfall.

Relationships. The seventh member of the taxonomically isolated subgenus *Visciramosa* (Goldblatt, 1986; Goldblatt & Manning, 2000b), *Moraea simplex* has the typical attributes of the subgenus, including sticky internodes, multiple leaves, branched stems, relatively short inflorescence spathes, and free, connivent filaments. Plants are readily mistaken for the common and widespread *M. inconspicua* Goldblatt in the vegetative state as both species share narrow leaves, short, subequal rhipidial spathes, and relatively small flowers. However, *M. inconspicua* usually has two foliage leaves, unequal tepals, the outer larger than the inner, the tepal limbs strongly reflexed, and relatively broad, flattened style branches with paired erect crests, and the anthers appressed to the opposed style branches, the latter condition typical of the genus. In contrast, *M. simplex* has solitary foliage leaves, the inner and outer tepals nearly equal in size and spreading to slightly dipping below the horizontal, and simple, filiform style branches that extend between the filaments.

That the species belongs in *Moraea* cannot be doubted despite the unusual filiform style branches that extend between the filaments, for the resemblance to other species of subgenus *Visciramosa* is striking. It has firm, channeled leaves, sticky nodes and internodes, and the distinctive lateral branching pattern in which the branch axis is parallel to the main stem below, before arching outward almost horizontally above the sheathing bract, but with the rhipidia held erect, and the subequal, obtuse rhipidial spathes of the subgenus. Only the flowers are discordant, not only with the subgenus, but with *Moraea* in general. Reduced style branches, not or hardly wider than the anthers they subtend, are relatively common in *Moraea* and were the hallmark of the genus *Homeria* (Goldblatt, 1981), now included in *Moraea* (Goldblatt, 1998; Goldblatt et al., 2002). Even in *Homeria*, however, the style branches have forked apices and lie opposite the stamens and appressed to the anthers. Completely undivided style branches, not opposed to the stamens, were the feature that distinguished *Roggeveldia* (Goldblatt, 1979). The two species of *Roggeveldia* are now also included in *Moraea* (Goldblatt, 1998) and are most probably related to *Moraea crispa* Thunberg and its immediate allies (Goldblatt, 1986). Thus the filiform, undivided style branches held alternate to the stamens are a parallel development in a second lineage of *Moraea*. Discovery and description of *Moraea simplex* brings the number of species in the genus to 197 (Goldblatt & Manning, 2002).

In *Moraea* the following combinations at subspecies rank were inadvertently not made when species of *Hexaglottis* and *Homeria* were transferred to that genus (Goldblatt, 1998).

Moraea bulbillifera subsp. **anomala** (Goldblatt) Goldblatt, comb. nov. Basionym: *Homeria bulbillifera* subsp. *anomala* Goldblatt, Ann. Missouri Bot. Gard. 68: 458. 1981. TYPE: South Africa. Western Cape: Witsands near Ossekop, *P. Goldblatt 4885* (holotype, MO; isotypes, BR, K, NBG, PRE, WAG).

Representative specimen. SOUTH AFRICA. **Western Cape:** 3321 (Ladismith) Cloete's Pass to Wagenbooms (DD), Sep. 1976, *Goldblatt 4157* (K, MO, PRE, S, WAG).

Moraea lewisiae subsp. **secunda** (Goldblatt) Goldblatt, comb. nov. Basionym: *Hexaglottis lewisiae* subsp. *secunda* Goldblatt, Ann. Missouri Bot. Gard. 74: 558. 1987. TYPE: South Africa. Northern Cape: near the top of Spektakel Pass, *P. Goldblatt 6673* (holotype, PRE; isotypes, K, MO, NBG, S, US, WAG).

Representative specimen. SOUTH AFRICA. **Northern Cape:** 3119 (Calvinia) Nieuwoudtville, karroid hills NE of Klipkoppies (AC), Sep. 1981, *Goldblatt 7073* (MO).

Moraea virgata subsp. **karooica** (Goldblatt) Goldblatt, comb. nov. Basionym: *Hexaglottis virgata* subsp. *karooica* Goldblatt, Ann. Missouri Bot. Gard. 74: 568. 1987. TYPE: South Africa. Northern Cape: 22 km W of Middelpos, *D. Snijman 765* (holotype, NBG; isotypes, K, MO, PRE).

Representative specimen. SOUTH AFRICA. **Northern Cape:** 3120 (Williston) Roggeveld Escarpment, 71 mi. SE of Calvinia on Middelpos road via Blomfontein (CC), Sep. 1981, *Goldblatt 4621* (MO, NBG).

NIVENIOIDEAE

Aristea torulosa Klatt, Abh. Naturf. Ges. Halle 15: 382. 1882. TYPE: South Africa. Eastern Cape: Transkei, betw. Gekau & Bashee, Dec. 1832, *J. F. Drège 4558* (lectotype, effectively designated by Weimarck (1949: 27), B not seen, photo, K; isotype, P).

Aristea torulosa var. *monostachya* Baker, Fl. Cap. 6: 49. 1896. TYPE: South Africa. Natal, without precise locality or date, *Buchanan s.n.* (type, K).

Aristea woodii N. E. Brown, Kew Bull. 1931: 192. 1931. Syn. nov. TYPE: South Africa. KwaZulu-Natal, Inanda, *J. M. Wood* 757 (type, K).

Aristea torulosa has been overlooked in recent times, and Vincent (1985) excluded the species from his account of *Aristea* in eastern southern Africa because he considered that no specimens could be assigned to it. J. G. Baker (1896) and Weimarck (1940), however, had no misgivings about its identity and status, and Baker (1896) actually regarded what was later described as *A. woodii* as *A. torulosa* var. *monostachya* Baker. *Aristea woodii* and *A. torulosa* have identical derived, relatively large rhipidial spathes and bracts that are dark green below, aging reddish brown, that grade unevenly into broad translucent margins, darker along the veins thus giving them a feathered appearance. The pale edges of the spathes and bracts become torn and irregularly fringed with age.

The only significant difference between plants assigned to *Aristea woodii* and the type of *A. torulosa* is the crowded flowering axis of the latter, which has the lower nodes bearing short lateral branches. Typical *A. woodii* has a more slender flowering stem usually bearing only sessile flower clusters. Plants readily referable to *A. woodii* may, however, have one or even two of the lowermost nodes bearing stalked flower clusters; thus, in effect, the flowering stem is branched. The type of a second species, regarded as a synonym of *A. torulosa* by Weimarck (1940) but excluded by Vincent (1985), *A. congesta*, described by N. E. Brown in 1931 and based on plants from the Transkei, South Africa, is just such a plant, and we see no reason to distinguish it from *A. woodii*. The more congested floral axis of *A. congesta* in turn, is little different from that of *A. torulosa*. Plants similar to the types of *A. congesta* and *A. torulosa* are matched by *Krauss s.n.* (K) from Port Natal and *Rehmann s.n.* (K) from Woodbush in Limpopo Province. The Krauss collection was referred by Weimarck to *A. torulosa*, while the Rehmann collection was not cited by either Weimarck (1940) or Vincent (1985). More extensive collections now available, at NBG, MO, and PRE, suggest that all three named species represent single taxon. The earliest name for this widespread species that extends from Tanzania and eastern Angola (Goldblatt, 1993, 1996) in the north to eastern South Africa in the south thus becomes *A. torulosa*.

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Literature Cited

Baker, J. G. 1892. Handbook of the Irideae. George Bell & Sons, London.

———. 1896. Irideae. Pp. 7–71 *in* W. T. Thiselton-Dyer (editor), Flora Capensis 6. Ashford, Kent.

Brown, N. E. 1931. XXIX—Notes upon some South African plants. Kew Bull. Misc. Inform. 1931: 191–197.

de Vos, M. P. 1979. The African genus *Ferraria*. J. S. African Bot. 45: 295–375.

———. 1983. The African genus *Tritonia* Ker-Gawler: Part 2. Sections *Subcallosae* and *Montbretia*. J. S. African Bot. 49: 347–422.

———. 1988. Three new species of *Ixia* L. (Iridaceae) from the Cape Province. S. African J. Bot. 54: 596–602.

———. 1999a. *Tritonia* (Iridaceae). *In* G. Germishuizen (editor), Flora of Southern Africa 7(2: 1): 89–128. National Botanical Institute, Pretoria.

———. 1999b. *Ixia* (Iridaceae). *In* G. Germishuizen (editor), Flora of Southern Africa 7(2: 1): 3–87. National Botanical Institute, Pretoria.

Geerinck, D. 2001. Nouvelle espèce: *Gladiolus goldblattianus* Geerinck ainsi que les deux combinations nouvelles: *G. erectiflorus* var. *verdickii*, *G. gregarius* var. *angustifolius* pour la famille des Iridaceae en Afrique centrale. Taxonomania 4: 2–3.

Goldblatt, P. 1979. *Roggeveldia*, a new genus of southern African Iridaceae–Irideae. Ann. Missouri Bot. Gard. 66: 839–844.

———. 1981. Systematics and biology of *Homeria* (Iridaceae). Ann. Missouri Bot. Gard. 68: 413–503.

———. 1986. The Moraeas of Southern Africa. Ann. Kirstenbosch Bot. Gard. 14: 1–224.

———. 1990. Phylogeny and classification of Iridaceae. Ann. Missouri Bot. Gard. 77: 607–627.

———. 1993. Iridaceae. *In* G. V. Pope (editor), Flora Zambesiaca 12(4): 1–106. Flora Zambesiaca Managing Committee, London.

———. 1996. *Gladiolus* in Tropical Africa. Timber Press, Portland, Oregon.

———. 1998. Reduction of *Barnardiella*, *Galaxia*, *Gynandriris*, *Hexaglottis*, *Homeria*, and *Roggeveldia* in *Moraea* (Iridaceae: Irideae). Novon 8: 371–377.

——— & J. C. Manning. 1997. New species of *Aristea* (Iridaceae) from South Africa and notes on the taxonomy and pollination biology of section *Pseudaristea*. Novon 7: 137–144.

——— & ———. 2000. Cape Plants: A conspectus of the vascular plants of the Cape Region of South Africa. Strelitzia 7. National Botanical Institute of South Africa, Cape Town.

——— & ———. 2002. Notes and new species of *Moraea* (Iridaceae: Iridoideae) from the southern African winter-rainfall zone. Novon 12: 352–359.

———, P. Bernhardt & J. C. Manning. 2000a. Adaptive radiation of pollination mechanisms in the African genus *Ixia* (Iridaceae: Crocoideae). Ann. Missouri Bot. Gard. 89: 564–577.

———, J. C. Manning & Peter Bernhardt. 2000b. Adaptive radiation of pollination mechanisms in *Sparaxis* (Iridaceae: Ixioideae). Adansonia sér. 3, 22: 57–70.

———, V. Savolainen, O. Porteous, I. Sostaric, M. Powell, G. Reeves, J. C. Manning, T. G. Barraclough & M. W. Chase. 2002. Radiation in the Cape flora and the phylogeny of peacock irises *Moraea* (Iridaceae) based on four plastid DNA regions. Molec. Phylogenet. Evol. 25: 341–360.

Gunn, M. & L. E. Codd. 1981. Botanical Exploration of Southern Africa. Balkema, Cape Town.

Lewis, G. J. 1962. South African Iridaceae. The genus *Ixia*. J. S. African Bot. 28: 45–195.

Manning, J. C. & P. Goldblatt. 1996. The *Prosoeca peringueyi* (Diptera: Nemestrinidae) pollination guild in southern Africa: Long-tongued flies and their tubular flowers. Ann. Missouri Bot. Gard. 83: 67–86.

Vincent, L. P. D. 1985. A partial revision of the genus *Aristea* (Iridaceae) in South Africa, Swaziland, Lesotho, Transkei and Ciskei. S. African J. Bot. 51: 209–252.

Weimarck, H. 1940. Monograph of the genus *Aristea*. Acta Univ. Lund (Lunds Univ. Arsskr.) n. s. 36: 1–140.