

Moraea intermedia and *M. vuvuzela* (Iridaceae–Iridoideae), two new species from western South Africa, and some nomenclatural changes and range extensions in the genus

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ABSTRACT

We describe two new species in the largely sub-Saharan genus *Moraea* Mill. (± 205 spp.) from its centre of diversity in the winter rainfall region of southern Africa. *Moraea intermedia*, from north-central Namaqualand near Springbok, is a member of the small section *Tubiflorae* (now eight species), remarkable in its growth habit with a long basal internode, leaves clustered at the first aerial node, and *Moraea*-type stamens and style branches but subequal tepals with very short claws that clasp only the base of the filament column. *Moraea vuvuzela*, a member of series *Galaxia* of the *Galaxia* group of the genus (now 17 species), has deeply fringed stigma lobes, filaments free in the upper 1 mm, \pm prostrate, lanceolate leaves and, remarkable for the series, dark brown to purple markings near the base of the tepal limbs. In the unusually variable *M. fugax*, currently with two subspecies, new collections of subsp. *fugax* co-occurring but on different soils with subsp. *filicaulis*, cast doubt on their current treatment as members of the same species. We now favour recognition of the diminutive subsp. *filicaulis* as a separate species, *M. filicaulis*. In the *M. tripetala* group we recommend recognition of the early blooming *M. punctata*, described in 1892 and later subsumed in *M. tripetala* but readily distinguished by the long inner tepals broader in the midline and short, relatively broad, plane rather than channelled leaves. We also report small but significant range extensions for *M. barkerae*, *M. macrocarpa* and *M. tricolor*.

INTRODUCTION

The largely sub-Saharan genus *Moraea* Mill. (Iridaceae: Iridoideae) now comprises ± 205 species of cormous geophytes (Goldblatt & Manning 2009) but new species continue to be discovered. Although florally diverse, *Moraea* is recognized in Iridoideae by a bifacial and channelled (rarely terete or plane) leaf blade, and corms of a single internode derived from a lateral bud. Most species have *Iris*-like flowers with flattened, petaloid style branches to which the stamens are appressed. The occurrence of a variety of other floral types makes exact floral definition of the genus impossible, but most *Moraea* species have free tepals and the filaments partially to completely united. One notable exception is the acaulescent *Galaxia* group of the genus, in which all 17 species have the tepals basally connate to form a closed perigonal tube with the filaments inserted at the base of the tepal segments. One of the two new species named here, *M. vuvuzela*, belongs to this group. The other, *M. intermedia*, is a member of the small section *Tubiflora* Goldblatt, an alliance now including eight species, all sharing distinctive, brown, woody rather than fibrous corm tunics, a yellow, fugaceous perianth, often with brown veins, and acute to obtuse or truncate rather than attenuate inflorescence spathes.

Field work in the southwestern Cape and western Karoo in the past several years has also made us aware that two variable species complexes, *Moraea fugax* D. Delaroché and *M. tripetala* (L.f.) Ker Gawl., both comprise more than a single species. This investigation

is continuing but we are now convinced that *M. fugax* subsp. *filicaulis* (Baker) Goldblatt merits species rank, as does *M. punctata* Baker (1904), which was previously subsumed by Goldblatt (1976b) in *M. tripetala* but is lacking one of the defining features of that species, namely reduced inner tepals, either filiform or reduced to minute cusps, and instead has linear inner tepals that are broader and sometimes lobed in the middle.

1. *Moraea intermedia* Goldblatt & J.C. Manning, sp. nov.

Plantae 150–450 mm altae, cormo globoso-ovoideo 12–15 mm diam. asymmetrico, tunicis brunneis stratis interioribus intactis exterioribus fibrescentibus, foliis 2 vel 3 supra terram insertis in nodo primo congestis linearibus canaliculatis arcuatis vel trahentibus, caule suberecto ramis congestis ad nodum primum, spathis rhipidialibus viridibus spatha interiore 38–45 mm longa exteriore \pm dimido longiore, floribus pallide flavis atrovirescentibus, tepalis liberis 27–30 mm longis unguibus angustis \pm 4 mm longis erectis cupulam angustam formantibus limbis patentibus 23–26 \times 9–12 mm, filamentis 8–10 mm longis in columnam glabram connatis, antheris \pm 8 mm longis atropurpureis, ovario \pm 8 mm longo exserto, ramis styli 6 \times 2 mm.

TYPE.—Northern Cape, 2917 (Springbok): Farm Ghoop (Modderfontein), west of Springbok, granitic gravel slope, (–DB), 18 September 2009, Goldblatt, Manning & Porter 13405 (NBG, holo; K, MO, PRE, iso.).

Plants 150–450 mm high. *Corm* globose-ovoid, 12–15 mm diam., asymmetric with a fibrous downward extension on one side; tunics brown, inner layers unbroken, outer layers of vertical sections held together by cross fibres, sometimes becoming \pm fibrous with age. *Stem* \pm erect, firm, with a long basal internode, branch-

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ing above first aerial node 80–150 mm above ground, first branch inserted in leaf axil, main stem sometimes branched, axes each bearing a single rhipidium. *Leaves* 2 or 3, inserted well above ground and clustered at first aerial node, linear, channelled, lowermost longest, arching to trailing, up to 400 mm long, remaining leaves shorter. *Rhipidial spathes* green, apices acute to \pm truncate, turning brown with age, inner 38–45 mm long, outer \pm half as long, completely sheathing inner. *Flowers* pale dull yellow with darker veins, nectar guide at base of tepal limbs bright yellow with a brownish outline distally and dark green spots near base; tepals free, 27–30 mm long, claws narrow, \pm 4 mm long, erect, together forming a narrow cup around base of filaments, limbs spreading horizontally, 23–26 \times 9–12 mm, slightly undulate, inner smaller than outer, widest in distal third, 8–9 mm at widest. *Filaments* 8–10 mm long, united in a smooth, cylindrical column; anthers \pm 8 mm long, appressed to style branches, overtopping stigma lobe, dark purple; pollen red. *Ovary* \pm 8 mm long, fully exerted; style dividing at apex of filament column, branches \pm 6 \times 2 mm, narrowly diverging, with terminal, transverse, semicircular stigma lobes \pm 3 mm wide, dividing above stigma lobe into paired, erect crests 10–12 mm long. *Capsules* and *seeds* unknown. *Chromosome number* unknown. *Flowering time*: mid-September to mid-October. Figure 1.

Distribution and habitat: restricted to the granite hill country of northcentral Namaqualand, west of Springbok, *Moraea intermedia* grows in open places in sandy, granitic ground (Figure 2). At the type and only known locality, the Farm Ghoop west of Springbok, *M. intermedia* is sympatric with the closely related *M. margaretae* Goldblatt, which favours somewhat wetter sites near a small stream. Photographs shown to us by Alta Chambers, who discovered *M. intermedia*, indicate the existence of hybrids between the two species. The flowers of *M. intermedia* open soon after sunrise at \pm 7:00 and fade in the afternoon at \pm 15:30–16:00. Flowers of *M. margaretae* at this locality have inner tepals with a small brown dot at the limb bases, unusual not only for the species but for the entire genus (Goldblatt, Manning & Porter 13406A (MO, NBG)).

Diagnosis and relationships: clearly a member of section *Tubiflorae* Goldblatt of the genus (Goldblatt 1976a), *Moraea intermedia* has the brown corm tunics, relatively blunt rhipidial spathes and darkly veined tepals characteristic of the alliance. Vegetatively, the long basal internode with leaves clustered at the first aerial node recalls *M. nana* (L. Bolus) Goldblatt & J.C. Manning of the section but the flowers have typical *Moraea*-like style branches with a terminal, transverse stigma lobe and divided above the stigma into prominent, paired style crests. Unlike the typical *Moraea* flower, however, all six tepals of *M. intermedia* have short claws clasping the base of the filament column, the claws all bearing basal nectaries, and the spreading limbs each have nectar guides at their bases. Other *Moraea*-type flowers have inner tepals lacking both nectaries and nectar guides. The similarly marked inner and outer tepals recall the *Homeria*-type flower of the genus, thus the flowers of *M. intermedia* are in a sense intermediate between those of a typical *Moraea* and species of the *Homeria* group of

Moraea (Goldblatt 1986c, 1998). Both types of flower occur in section *Tubiflorae*: *M. maximiliani* (Schltr.) Goldblatt and *M. umbellata* Thunb. have *Homeria*-type flowers, whereas *M. cooperi* Baker, *M. linderi* Goldblatt, *M. longiflora* Ker Gawl. and *M. margaretae* Goldblatt, have *Moraea*-type flowers. The two species *M. cooperi* and *M. longiflora* have a perianth tube, unusual in the genus. The remaining member of the alliance, *M. nana*, has *Homeria*-type flowers except that the style branches are reduced to paired filiform arms extending between the anthers, thus recalling the flower of the *Hexaglottis* group of *Moraea*.

Etymology: the epithet *intermedia* alludes to the flowers, which are intermediate between those of a typical *Moraea* and species of the *Homeria* group of *Moraea*, having the petaloid style crests of the former and the subsimilar perianth whorls of the latter.

2. *Moraea vuvuzela* Goldblatt & J.C. Manning, sp. nov.

Plantae 15–45 mm altae, cormo subgloboso 12–15 mm diam. asymmetrico, tunicis e strato fibrorum tenuium stratoque duro costis verticalibus prominentibus, alternanti constantibus, foliis \pm prostratis anguste lanceolatis ad lineari-lanceolatis 20–35 \times 3–4 mm, non profunde canaliculatis marginibus hyalinis, floribus 2–4, hypocrateriformibus pallide flavis in medio brunneis ad purpureis notatis, tubo perianthii cylindrico 8–10 \times 1 mm, tepalis infra suberectis cupulam 7–10 mm altam formantibus, supra patulis, obovatis 20–25 \times 7–10 mm, filamentis \pm 7 mm longis infra connatis in supero 1 mm liberis, antheris 2.0–2.5 mm longis flavis, stylo erecto apices antherarum per 1.5–2.0 mm excedenti, lobis stigmaticis profunde fimbriatis horizontaliter extensis.

TYPE.—Western Cape, 3319 (Worcester): Rawsonville, hills between Breede River and Brandvlei Dam, burnt clay slope, (–CB), 21 July 2009, A. le Roux & Manning 591 (NBG, holo.; K, MO, PRE, iso.).

Plants \pm acaulescent or with stem exerted to 10 mm above soil surface, forming small tufts up to 40 mm high, sheathed by membranous, persistent cataphylls, accumulating below ground to form fibrous collar. *Corm* subglobose, asymmetric below, 10–15 mm diam.; tunics of alternating finely fibrous layer and hard, cartilaginous layer with vertical, claw-like ribs, accumulating with age. *Leaves* not clearly distinguished from floral bracts, lowermost inserted well below ground shortly above corm, short and inconspicuous, two other leaves not associated with a flower, inserted at ground level, bases partly enclosing inflorescence, blades \pm prostrate, narrowly lanceolate to linear-lanceolate, 20–35 \times 3–4 mm, shallowly channelled; margins hyaline, smooth or minutely cilio-serrulate; remaining leaves each associated with a flower, smaller, falcate, channelled. *Inflorescence* a cluster of 2–4 flowers, each subtended by a leaf and a shorter, sheathing bract; floral bracts 10–15 mm long, pale and membranous in lower half with closed sheath, green above, obscurely bicarinate. *Flowers* salver-shaped, pale yellow marked with median brown or purplish chevron or semi-lunate markings at top of darker yellow cup; perianth tube cylindrical, 8–10(–15) \times 1 mm, closed at apex, exerted 6–8 mm; tepals suberect

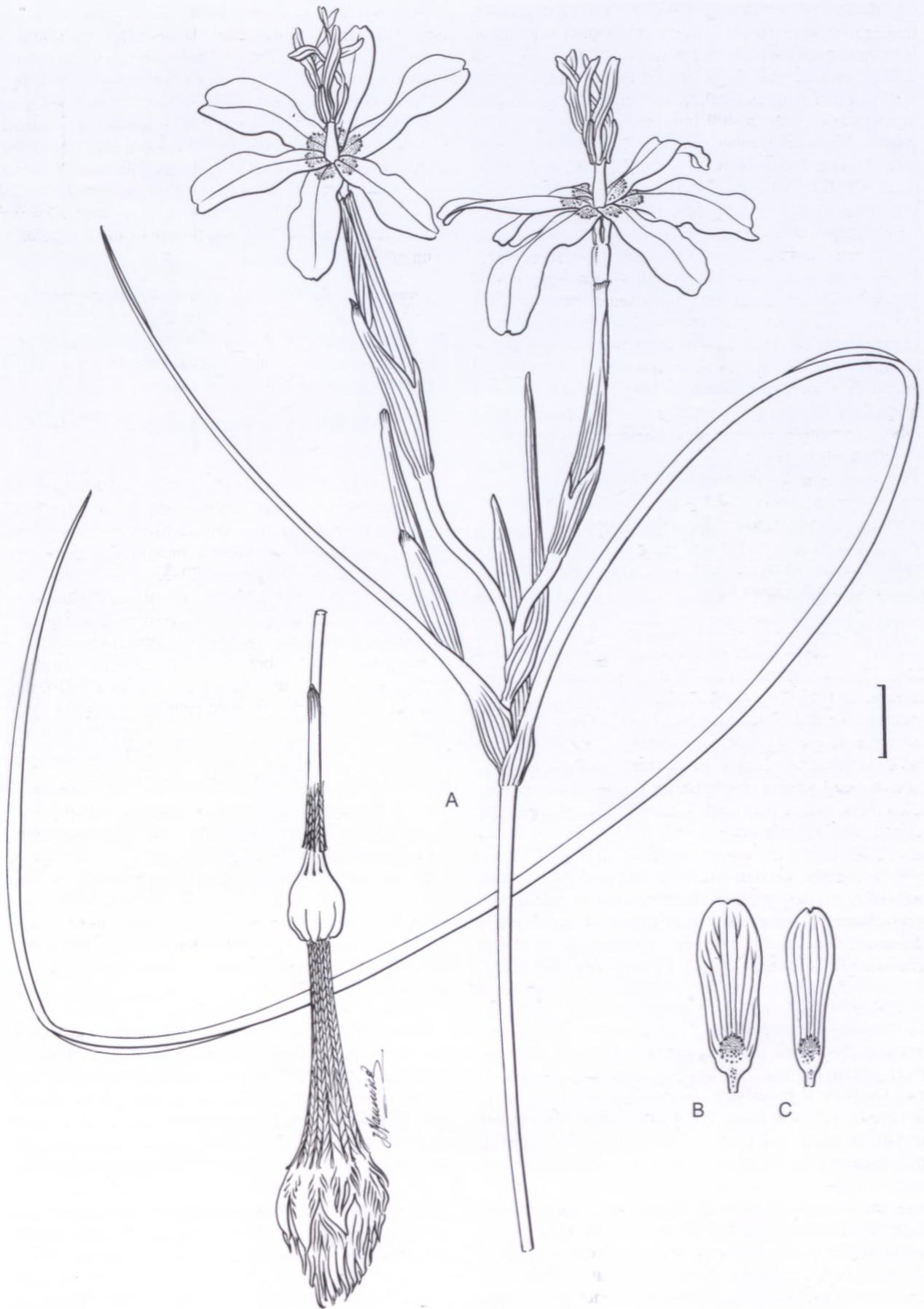


FIGURE 1.—*Moraea intermedia*, Goldblatt, Manning & Porter 13405 (NBG). A, plant; B, outer tepal; C, inner tepal, Scale bar: 10 mm. Artist: John Manning.

below to form cup 7–10 mm deep, spreading above, obovate, 20–25 × 7–10 mm. Filaments united to form a

baluster-shaped column, free in upper ± 1 mm, erect but diverging apically, ± 7 mm long, yellow; anthers 2.0–2.5

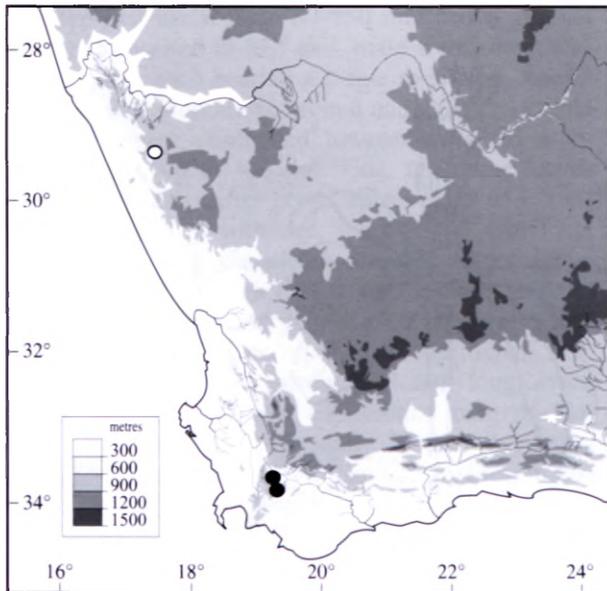


FIGURE 2.—Known distribution of *Moraea intermedia*, ○; and *M. vuvuzela*, ●.

mm long, yellow with yellow pollen. Ovary ellipsoid, $\pm 4 \times 2$ mm; style erect, reaching 1.5–2.0 mm beyond anther apices, dividing into three deeply fringed lobes spreading horizontally above anthers. Capsules and seeds unknown. Flowering time: late July to September, rarely to early October. Figure 3.

Distribution and ecology: *Moraea vuvuzela* is known from a handful of sites between Rawsonville and Villiersdorp (Figure 2), where it occurs in loamy clay soils in renosterveld shrubland, typically on cooler south- or southeast-trending slopes. Flowering in *M. vuvuzela*, as in many other geophytes, is stimulated by removal of the surrounding shrubs as occurs after a summer fire but it is not an obligate pyrophyte.

The species was brought to our attention by Rawsonville resident and conservationist Anso le Roux, who encountered scattered flowering plants of an unknown *Moraea* of the *Galaxia* group in unburned veld near Rawsonville in August 2006 but it was only after a controlled burn in February 2009 that the species appeared in flower in any number. In July of that year she alerted us to the appearance of hundreds of flowering individuals and we were then able to gather material for description and illustration. Shortly thereafter, conservationist Rupert Koopman and members of the Custodians of Rare and Endangered Wildflowers (CREW) located a second flowering population of the species near Villiersdorp. We have subsequently associated the species with at least two of the collections assigned to the insufficiently known *Galaxia* sp. 1 discussed by Goldblatt (1979) in his revision of the group. Here, he reported the existence of three collections of an unidentified species, two with pale yellow flowers with a dark dot at the base of the tepals from Franschoek Forest Reserve, and a third from Berg River Hoek. Colour notes from the latter merely mention that the flowers are yellow. Unfortunately details of the style branches were obscured, preventing description of the species. We have examined these collections and are confident that those from Franschoek Forest Reserve represent earlier gather-

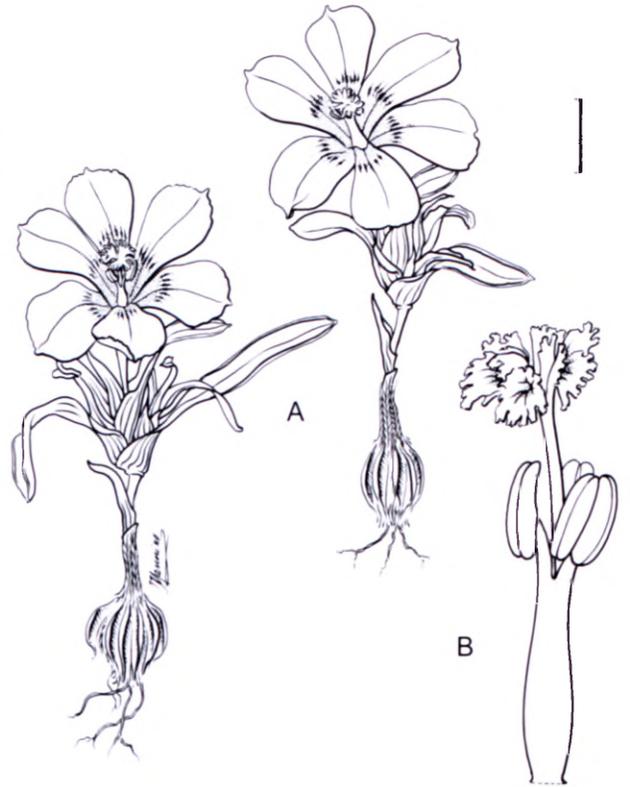


FIGURE 3.—*Moraea vuvuzela*, A. le Roux & Manning 591 (NBG). A, plants; B, androecium and style. Scale bar: A, 10 mm; B, 2 mm. Artist: John Manning.

ings of *M. vuvuzela*, which they match perfectly in the unusual perianth colour and patterning, and in the thickened, woody longitudinal ribs on the corm tunics. Careful examination of the style branches in *Salter 6891* (BOL) confirms that they are spreading and fringed, and that the filaments are free in the distal 1 mm, as in *M. vuvuzela*. The relatively short perianth tube, 10–15 mm, is also consistent with the species. The Theewaterskloof Dam has now inundated extensive, potentially suitable renosterveld habitat in which the species might have occurred. The third collection, from Berg River Hoek, has more fibrous corm tunics and evidently unmarked flowers and we exclude it from the species for the moment.

Diagnosis and relationships: *Moraea vuvuzela* has the spreading, \pm fringed stigmatic lobes of series *Galaxia* (Goldblatt 1998), all of which have yellow flowers (Goldblatt 1979). It stands out in the series (and the section) in its pale yellow flowers with brown or purplish markings at the top of the darker yellow floral cup. The remaining members of the series have uniformly bright yellow flowers, except the Cedarberg–Gifberg endemic, *M. luteo-alba* (Goldblatt) Goldblatt, which has pale yellow tepals fading to cream or white distally but filaments united only in the lower third.

Vegetatively, *Moraea vuvuzela* is characterized by its linear-lanceolate, smooth or minutely cilio-serrulate leaves and \pm woody corm tunics with prominent, thickened longitudinal ribs only partially separated from one another by transverse fibres. The corm tunics in most other species are less woody, with the longitudinal ribs separated by transverse fibres, with the exception of *M.*

angulata Goldblatt (= *Galaxia alata* Goldblatt), a rare species of seasonally wet flats along the west coast of Western Cape. That species has unique, woody or corky tunics with wing-like longitudinal ribs, distally terete leaves, and uniformly bright yellow flowers with the filaments completely united.

Etymology: the epithet *vuvuzela* derives from the air horn, approximately one metre in length, that is commonly blown by fans at soccer matches in South Africa, and commemorates the country's hosting of the first Soccer World Cup on the African continent in June 2010. The colourful, flared flowers and their massed, synchronous anthesis are appropriate associations with the name. *Moraea vuvuzela* is severely threatened by agriculture, and this dedication is linked to a conservation programme initiated by the non-profit association BIOPAT-Patrons for Biodiversity (www.biopat.de), and sponsored by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), the German Technical Development Cooperation Agency, which supported the South African Government in the preparations for the FIFA World Cup 2010 on behalf of the German Government.

Additional specimens

WESTERN CAPE.—3319 (Worcester): near Villiersdorp, Hentic De Wet's Farm, sandstone fynbos, (–CD), 16 August 2009, *Koopman CR3890* (NBG). 3419 (Caledon): Franschoek Forest Reserve, near Bushman's Castle, (–AA), rather pale yellow with small dark spot near base of perianth segment, 30 August 1937, *Salter 6891* (BOL, SAM); 3 October 1942, *Isaac s.n.* (BOL).

CHANGES IN RANK

1. The *Moraea fugax* complex

One of the most widespread of the winter rainfall species of the genus, *Moraea fugax*, as circumscribed by Goldblatt (1986a, b), extends from the Cape Peninsula north to the Richtersveld and east to Swellendam. It has not been recorded in the Karoo Mountain (KM) or Southeast (SE) centres of the Cape Floristic Region, but does occur locally in the western Karoo as well as widely across Namaqualand. The species, or complex, is distinguished by the long basal internode with the solitary or two leaves inserted at the first aerial node, two or more short branches, flowers with the ovary included in the spathes, and capsules with a short, sterile beak. As noted by Goldblatt, *M. fugax* is strikingly variable. The taller subsp. *fugax* has large or medium-sized white to blue flowers and two foliage leaves, whereas the slightly shorter, yellow-flowered plants (the type form) usually have a single leaf and flowers with broader tepals. In contrast, subsp. *filicaulis*, a much smaller plant, has small flowers and two, subequal or unequal, narrow to almost filiform leaves. Cytologically the complex is remarkably variable (Goldblatt 1986b). Tall plants with blue or white flowers have a diploid number of $2n = 20$, 18, 16 or rarely 14; yellow-flowered plants mostly have $2n = 10$, occasionally 16 or 14; and subsp. *filicaulis* has $2n = 12$ or 10 (with one doubtful record of 18). Goldblatt (1986b) postulated that dysploid decrease in chromosome number has occurred in all three lineages and that a basic chromosome number of $x = 10$ is ancestral for the complex and that base is shared with *M. graci-*

lenta Goldblatt and *M. macrocarpa* Goldblatt, remaining members of the *M. fugax* alliance.

The ranges of the two larger-flowered morphs (white to blue or yellow perianth) overlap along the Western Cape Atlantic coast, but we have noted that the white- or blue-flowered morph favours deep, coarse sands and granitic slopes and is more common along the coast in sandveld, although plants also occur in strandveld and in fynbos; yellow-flowered plants favour rocky habitats usually in hard, stony sand and typically occur in fynbos. Subsp. *filicaulis* most often grows in hard sandy ground (*hardeveld*) as well on rocky granitic gravel of the Namaqualand hill country and on the west coast of Western Cape in sandy limestone or calcrete. New collections of the two subspecies suggest that the habitat distinctions are significant. For example, we have found subsp. *filicaulis* growing adjacent to tall, white-flowered subsp. *fugax* in Namaqualand (e.g. *Goldblatt & Porter 13310, 13311* MO, NBG), one in hard, compact sand and the other immediately adjacent on deeper sands of stabilized dunes. Likewise, plants matching subsp. *filicaulis* are common in the Saldanha Bay area on limestone or lime enriched sands (e.g. *Goldblatt & Porter 13258* MO, NBG) and grow within a few metres of the large blue- or white-flowered morphs of the common subsp. *fugax* that grow on deeper sands. Separation at subspecies rank of these plants that are morphologically, ecologically and cytologically distinct seems to inadequately reflect biological reality, and treatment as separate species seems appropriate.

We note here that this revision to the taxonomy of the complex does not fully reflect its morphological variation: flower colour and markings and leaf dimensions in *Moraea filicaulis*, and *M. fugax* may, when studied in more detail, require further refinement, for both are variable for these features. The nomenclature and synonymy of *M. filicaulis* is presented below. A full description of the species, as *M. fugax* subsp. *filicaulis*, is presented in Goldblatt's (1986b) account of the *M. fugax* species group.

***Moraea filicaulis* Baker** in Bulletin de l'Herbier Boissier, sér. 2: 1005 (1904). *M. fugax* subsp. *filicaulis* (Baker) Goldblatt: 155 (1986b). Type: South Africa, [Northern Cape], Kamiesberg between Roodeberg and Ezelskop, *Drège 2605* (K, lecto!., designated by Goldblatt 1976b: 725; MO!, P!, iso.).

M. diphylla Baker: 42 (1906). Type: South Africa, [Western Cape], Olifants River, *Penther 734* (K, lecto!., designated by Goldblatt 1976b: 725).

2. The *Moraea tripetala* complex and *M. punctata*

As treated by Goldblatt (1976b, 1986a), *Moraea tripetala* was a variable complex of mostly blue- to purple-flowered species with a single foliage leaf, inner tepals much reduced and usually cusp-like, and filaments free or basally united for up to 2 mm. Typical *M. tripetala*, from the Cape Peninsula and nearby, has a narrowly channelled leaf but plants from the western Karoo and mountains surrounding the mid-Olifants River Valley have leaf blades \pm flat distally, as does an early flowering series of populations from the Western Cape coastal forelands. These latter plants have, in addition, unusu-

ally long inner tepals for the species, up to 15 mm long and expanded in the middle, sometimes into distinct lobes. The leaves are also relatively short, rarely exceeding the short stem, itself usually less than 200 mm long (rarely up to 250 mm). Plants with these characteristics have twice been accorded species rank, as *M. punctata* Baker (1904) and *M. monophylla* Baker (1906), but were both included in a broadly circumscribed *M. tripetala* by Goldblatt (1976b, 1986a). It has become clear to us that a more narrowly drawn *M. tripetala* would be more useful as several recognizable morphs have overlapping ranges, flower at the same time or at different times, and sometimes have different habitat preferences. *M. punctata* is the most obvious of these and we recommend its recognition as a separate species. The nomenclature and a brief description are provided below.

***Moraea punctata* Baker** in Bulletin de l'Herbier Boissier, sér. 2, 4: 1003 (1904). Type: South Africa, [Western Cape], Piketberg Road [Gouda], 17 August 1897, *Schlechter 4851* (K, lecto!, designated by Goldblatt 1976: 751; B!, GRA!, PRE!, iso.).

M. monophylla Baker: 24 (1906). Type: [Western Cape], Clanwilliam, Olifants River, August 1894, *Penther 685* (K, lecto!, designated by Goldblatt 1976: 751).

Plants 150–250 mm high; stem simple, rarely 1-branched (1 plant of 16 seen), smooth on vegetative parts, rarely pilose (1 plant seen), sheathed below by brown, fibrous cataphylls, these often accumulating. *Corms* mostly 10–15 mm diam., evidently without cormlets at base; tunics of medium to coarse fibres, vertical fibres usually thickened into prominent claws below. *Foliage leaf* solitary, linear, shallowly channelled below, flat and slightly twisted in distal third, \pm as long as stem, 3–5 mm wide, smooth (rarely pilose abaxially); cauline sheathing leaves 20–40 mm long. *Rhipidial spathes* smooth, inner 35–40(–45) mm long, outer \pm half as long. *Flowers* pale blue or white, nectar guides triangular, white with dark blue dots and edged in darker colour, velvety (or smooth); outer tepal limbs obovate, widest in distal third, 14–15 \times \pm 10 mm, plane, margins curling under later, held at 45°, claws narrow, 9–12 mm long, inner tepals \pm linear to \pm tricuspidate, obtuse, 7.5–12.5 mm long. *Filaments* 3.0–3.5 mm long, united for 0.5–1.5 mm; anthers 4.5–6.5(–7.5) mm long; pollen colour unknown. *Ovary* narrowly ovoid, 7–8 mm long; style 1–2 mm long, style branches 7–9 mm long, crests linear, 8–10 mm long. *Capsules and seeds* unknown. *Flowering time*: mid-August to mid-September, rarely later.

Distribution and habitat: evidently a species of renosterveld vegetation, *Moraea punctata* is centred in the Western Cape lowlands between Dassenberg (near Mamre) and Piketberg, extending inland locally to Tulbagh. A record said to be from the Olifants River Valley at or near Clanwilliam (*Penther 685*, the type of *M. monophylla*) is almost certainly a mistake and was more likely made en route from Porterville to Clanwilliam. Soils on which *M. punctata* grows are described as shale, consistent with renosterveld and we have seen plants on loamy clay.

Diagnosis: as already outlined, *Moraea punctata* has some of the critical features of the *M. tripetala* group,

notably a blue (rarely white) perianth and filaments united for less than 2 mm, but the inner tepals are linear and expanded to obtusely lobed in the middle and spreading distally instead of being reduced to erect, filiform, acute cusps. Unlike the southwestern Cape populations of *M. tripetala*, which have narrowly channelled leaves longer than the stems, *M. punctata* has relatively short leaves, 3–5 mm wide, plane in the distal half, and about as long as the stems. As in *M. tripetala*, leaves are occasionally pilose on the abaxial surface, a character that appears to have no taxonomic significance.

Representative specimens

WESTERN CAPE.—3218 (Clanwilliam): flats north of Piketberg at Eendekuil turnoff, renosterveld, (–DB), 1 September 1981, *Goldblatt 6127* (MO, NBG). 3318 (Cape Town): Dassenberg north of Mamre, west slopes, (–AD), 23 September 1974, *Nordenstam & Lundgren 1998* (MO, S); near Moorreesburg, Klein Swartfontein, renosterveld on shale, (–BA), 25 August 1970, *Acocks 24320* (MO); near Wellington, (–DB), 15 August 1926, *Grant 2361* (MO). 3319 (Worcester): flats south of Tulbagh Road station, (–AC), 11 August 1974, *Goldblatt 2310* (MO).

RANGE EXTENSIONS

1. *Moraea barkeri* Goldblatt

This relatively rare Western Cape species of the Cedarberg and northern Cold Bokkeveld Mountains (Goldblatt 1986a) was recorded in October 2008 at the northern end of the Piketberg Range (I. Ebrahim pers. comm.). Plants flowering there after a fire resemble the Cedarberg populations closely in the pale pink perianth, violet nectar guides on the outer tepal limbs and a particularly long tepal claw exceeding the limb. The species remains endemic to the Northwest Centre of the Cape Floristic Region (Goldblatt & Manning 2000).

Specimen seen

WESTERN CAPE.—3218 (Clanwilliam): Piketberg, Farm Wagenpad, (–DA), 30 October 2008, *Ebrahim s.n.* (NBG, photograph only).

2. *Moraea macrocarpa* Goldblatt

Described from the Piketberg District (Goldblatt 1986b), the species is closely allied to the *Moraea fugax* group but the one or two basal leaves subtending the rhipidia are inserted on the stem at or close to ground level. Plants have, for their small size, a relatively long ovary and capsule, the latter 18–25 mm long. *M. macrocarpa* is currently known from the Piketberg and the Olifants River Valley and adjacent mountains, where it is common and fairly well represented in herbaria. Recently, we have recorded the species at the Farm Avontuur in the Bokkeveld Mountains, northwest of Nieuwoudtville, and well to the south in the Saldanha–Langebaan area of the Western Cape coast. This latter collection represents the first record for the Southwest Centre of the Cape Floristic Region.

Specimens seen

NORTHERN CAPE.—3119 (Calvinia): Bokkeveld Mountains, Farm Avontuur, NW of Nieuwoudtville, (–AC), 28 August 2008, *Goldblatt & Manning 13052* (NBG).

WESTERN CAPE.—3318 (Cape Town): sandy flats between Langebaan and Saldanha, (–AA), 8 September 2009, *Goldblatt & Porter 13287* (NBG).

3. *Moraea tricolor* Andrews

In 2009 we reported range extensions of this member of the *Moraea ciliata* group from its centre in the Malmesbury–Tulbagh Districts of Western Cape eastward to Still Bay and north to Langebaan near Saldanha (Goldblatt & Manning 2009). The species was subsequently photographed by ecologist Greg Nicolson during his survey of the road reserve along the N7 at the foot of Piekenierskloof Pass, thus extending the known range some 80 km north of Gouda, the nearest recorded population. The Piekenierskloof plants have pale yellow flowers with darker yellow nectar guides, whereas the Gouda populations have pink to red flowers with yellow nectar guides outlined in darker pink or red.

Specimen seen

WESTERN CAPE.—3218 (Clanwilliam): foot of Piekenierskloof Pass, (–DB), 29 June 2007, Nicolson s.n. (NBG, photograph only).

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