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New species and subspecies of *Babiana*, *Hesperantha*, and *Ixia* (Iridaceae: Crocoideae) from southern Africa; range extensions and morphological and nomenclatural notes on *Babiana* and *Geissorhiza*

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Keywords: *Babiana* Ker Gawl., *Geissorhiza* Ker Gawl., *Hesperantha* Ker Gawl., Iridaceae, *Ixia* L., new species, southern Africa, taxonomy

ABSTRACT

Babiana **rivulicola** from stream banks in the Kamiesberg in Namaqualand and terete-leaved *Ixia* **teretifolia** from the Roggeveld, both in Northern Cape, are new species of these two largely winter-rainfall region genera. Late-flowering populations of *Hesperantha radiata* with crowded spikes of smaller flowers are segregated from the typical form as subsp. **caricina.** We also document the first record of *B. gariepensis* from Namibia, correct the authority for *B. purpurea* Ker Gawl., discuss morphologically aberrant populations of *B. tubiflora* from Saldanha, provide an expanded description for *B. lapeirousiodes* based on the second and only precisely localized collection of this rare Namaqualand species, and expand the circumscription of *Geissorhiza demissa* to accommodate a new record from the Kamiesberg, including revised couplets to the existing key to the species.

INTRODUCTION

Crocoideae, with ± 1 080 species, are the largest of the six subfamilies of Iridaceae, which now include over 2 200 species worldwide. Largely sub-Saharan African, subfamily Crocoideae is centred in southern Africa, where some 980 species occur, almost 850 of them restricted to the southwest of the subcontinent (the Greater Cape Floristic Region). The richness of the Cape flora is well established (e.g. Goldblatt & Manning 2000) and although the region has been explored botanically for over 250 years, novelties are still regularly recorded. Some are completely new discoveries but many others have reposed in herbaria, where they are recognized only after critical revisions of particular groups are undertaken. In Iridaceae alone, 97 species have been added to the family for the Cape flora over the past decade.

Here we describe one new species each of *Babiana* Ker Gawl. (now 93 spp.) and *Ixia* L. (now ± 90 spp.). Both genera are members of tribe Ixieae Dumort. (1822) as circumscribed by Goldblatt *et al*. (2006) and, apart from *Ixia*, have been revised or thoroughly reviewed in the past 25 years (Goldblatt 2003; Goldblatt & Manning 2007a, 2010). In *Hesperantha* (82 spp.), we also describe a new subsp. of *Hesperantha radiata* (L.f.) Ker Gawl and include a significant range extension into Namibia for *B. gariepensis* Goldblatt & J.C.Manning, morphological notes for variant populations of *B. tubiflora* (L.f.) Ker Gawl. and *Geissorhiza demissa* Goldblatt & J.C.Manning, nomenclatural notes for *B. bainesii* Baker, and a correction to the author citation for *B. purpurea* Ker Gawl.

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MATERIALS AND METHODS

We examined all relevant collections at BOL, NBG, PRE, and SAM, the primary southern African herbaria (acronyms after Holmgren *et al.* 1990).

SYSTEMATICS

New taxa

1. **Babiana** *Ker Gawl.*: Lewis's (1959) monograph of *Babiana* recognized 61 species, including one from the Indian Ocean island of Socotra, and set the stage for later studies of the genus, not least by stabilizing its complex synonymy. *Antholyza* L. (including *Anaclanthe* N.E.Br.), with two species, was added to the genus by Goldblatt (1990). In the recent revision of *Babiana* (Goldblatt & Manning 2007a) we recognized 88 species, excluding the Socotran *B. socotrana* Hook.f., which is now the new genus *Cyanixia* Goldblatt & J.C.Manning (Goldblatt *et al.* 2004). Subsequent exploration of western South Africa yielded an additional four new species (Goldblatt *et al.* 2008; Goldblatt & Manning 2010). The discovery by Cape Town biologist Nick Helme of yet another new species, described here as *B. rivulicola*, in a relatively well collected part of the Kamiesberg in central Namaqualand in 2009 is thus particularly surprising. *Babiana* now has 93 species, but additional taxa are likely to be recognized as the results of the molecular phylogenetic study (Schnitzler *et al.* 2011) are analyzed from a systematic perspective.

Babiana rivulicola *Goldblatt & J.C.Manning*, sp. nov.

TYPE.—Northern Cape, 3018 (Kamiesberg): southern Kamiesberg, Langkloof, ± 20 km from Doringkraal turnoff from N7, Farm Nartjiesdam, in rocky bed of perennial stream, (–AD), 22 Sept. 2010, *Goldblatt & Porter 13572* (NBG, holo.; K, MO, PRE, iso.).

Plants to 300 mm high, excluding longer leaves, growing in dense clumps; stem erect, simple or

1–3-branched, angled. *Corm* wedged in crevices in rock, unknown. *Leaves* mostly 6 or 7, linear, 250–450 × 5–10 mm, exceeding stem, firm but arching toward ground, shallowly pleated to almost flat, glabrous. *Spike* flexed outward with flowers initially in two ranks, mostly 6–9-flowered; bracts green below, dry and light brown toward tips, outer mostly up to 35 mm long but lowermost much longer, attenuate, inner ± 2/3 as long as outer, divided apically, attenuate, 2-keeled below. *Flowers* zygomorphic, pale blue to blue-mauve, paler in throat, lower 3 tepals with central, white, lanceolate blotch and darker violet marking toward base, darkly lined on abaxial side of throat, lightly sweet-scented; perianth tube funnel-shaped, 42–44 mm long, lower part cylindric, upper ± 10 mm expanded into wide throat; tepals lanceolate, unequal, dorsal ± 30 × 8 mm, lower three tepals united with upper laterals for ± 3 mm, arching outward, 25 × 6 mm. *Stamens* unilateral; filaments straight, suberect, ± 15 mm long, included in floral cup, reaching almost to middle of dorsal tepal; anthers ± 5 mm long, pale mauve, pollen white. *Ovary* glabrous, style dividing opposite or slightly beyond anther tips, style branches ± 5 mm long, recurved distally. *Capsules* and *seeds* not known. *Flowering* mid- to late Oct. Figure 1.

Eponymy: from the Latin, *rivulicola*, growing in a riverine habitat.

Distribution and ecology: so far *Babiana rivulicola* is known only from the southern Kamiesberg in Northern Cape, where it is restricted to the perennial stream that runs through the Langkloof, between Farms Karas (Welkom) and Doringkraal (Figure 2). Plants grow in cracks in smooth granite along the edges of the stream above the waterline. Plants are regularly inundated after heavy rains but the corms are wedged in crevices in bedrock and secure from being washed away. It proved impossible to extract corms for examination and they remain unknown. The species was first collected in October 2009 by Cape Town biologist N.A. Helme. Despite its narrow range, we see no current threat to *B. rivulicola* and suggest a conservation status of (LC), least concern, using the definitions and terminology of Raimondo *et al.* (2009).

Diagnosis and relationships: *Babiana rivulicola* most closely resembles a second, more widespread Namaqualand endemic, *B. dregei* Baker, and both species share glabrous leaves, stem and bracts, an unusual feature in a genus where pubescence of some kind on vegetative

FIGURE 1.—*Babiana rivulicola*, *Goldblatt & Porter 13572* (NBG). A, portion of flowering plant; B, outer (left) and inner (right) bract; C, half flower. Scale bar: 10 mm. Artist: J.C. Manning.

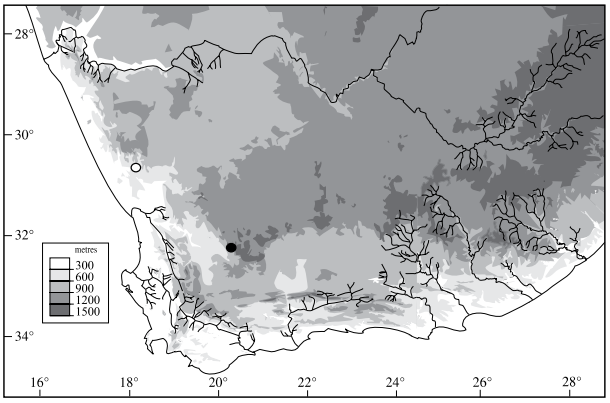

FIGURE 2.—Distribution of *Babiana rivulicola*, ○; and *Ixia teretifolia*, ●.

organs is almost universal. The leaves of *B. dregei* are characteristically relatively broadly lanceolate and rigid with sharply pungent tips and the stem is very short and concealed among the leaves. In *B. rivulicola* the stem reaches up to 250 mm high and the linear leaves are longer and relatively softly textured, with acute but not pungent tips. The flowers in the two species are broadly similar, ± funnel-shaped with the lower two thirds of the perianth tube cylindric, but *B. dregei* has a ± cylindric perianth tube (45–)50–65(–70) mm long, curved just below the apex, unlike the shorter, funnel-shaped perianth tube of *B. rivulicola*, 42–44 mm long. Additional floral differences include the longer anthers, ± 8 mm long and shorter style branches, 3–4 mm long in *B. dregei* vs. anthers ± 5 mm long and style branches ± 5 mm long in *B. rivulicola*.

When collecting *Babiana rivulicola* in the second half of September we noted plants of *B. dregei* on adjacent slopes well past flowering and with developing capsules. Although sympatric in distribution, the two taxa are isolated by flowering time and ecology, and thus allotopic (Wiley 1981).

Additional specimen

NORTHERN CAPE.—**3018** (Kamiesberg): southern Kamiesberg, Langkloof, ± 1 km S of Farm Nartjiesdam, in rocks in stream, (–AD), 10 Oct. 2009, *Helme 6110* (NBG).

2. **Hesperantha** *Ker Gawl.*: the southern and tropical African *Hesperantha* with 82 species (Goldblatt 2003; Goldblatt & Manning 2007b), is distinguished in Crocoideae by the style dividing at the mouth of the perianth tube (rarely within the tube) into long, spreading, relatively long, more-or-less straight, laxly spreading style branches and, with a few exceptions, by hard, woody corm tunics (Goldblatt & Manning 2008). In the most widespread species of the genus, *H. radiata*, Goldblatt (2003) drew attention to collections of small-flowered plants from the Cape Peninsula and surrounding hills, as far north as Piketberg and as far east as Hermanus in the southwestern corner of the southern African winter-rainfall zone, which were then included in the more widespread and common form which extends from Namaqualand to Swaziland. These small-flowered plants have unusually crowded spikes with shortly imbricate bracts, and the uppermost leaf is always entirely sheathing and reaches almost to the base of the spike. The flowers have tepals 7–12 mm long, a tube 6–10 mm long, anthers 4(–5) mm long, and the stems have a weakly developed neck of fine fibers around the base (Table 1). Including this morph in *H. radiata*, of which typical larger flowered populations occur in the same area, seems counter to the concept of biological species. Elsewhere, the distinction between the two forms is not always entirely clear, which argues against treating them as distinct species. As Goldblatt (2003) also pointed out, it is especially notable that the small-flowered plants bloom later than typical *H. radiata* and are sometimes sympatric but not co-blooming [allotopic (Wiley 1981)], as for example, *Oliver 4332* (NBG) collected on 21 Aug. 1973 and *4756* (NBG) collected on 17 Oct. 1973, both in the hills at Langverwacht near Stellenbosch. The August-flowering plants are typical *H. radiata* and those flowering in October are the small-flowered morph with crowded spikes. Specimens of this morph collected by C.F. Ecklon and C.L. Zeyher in the early 19th century are annotated *H. setacea* Eckl. (e.g., *Ecklon & Zeyher Irid. 233* 89.9), the name a nomen nudum and thus invalid (Ecklon 1827), while some sheets of the small-flowered plants at the Kew Herbarium are annotated *H. tenuifolia*. This is R.A. Salisbury's (1812) name at species rank for *H. radiata* var. γ *caricina* of *Curtis's Botanical Magazine* t. 790 (Ker Gawler 1804). Salisbury's epithet alludes to the characteristic narrow leaves, also found in some populations of larger-flowered plants that correspond to the type of *H. radiata*.

We propose to recognize late-blooming plants with smaller flowers as a separate subspecies, in line with our treatment of late-flowering *Moraea tripetala* subsp. *jacquiniana* (Schltr. ex G.J.Lewis) Goldblatt & J.C.Manning, which is sympatric with early flowering subsp. *tripetala* (Goldblatt & Manning 2012a).

TABLE 1.—Comparison of flowers of *Hesperantha radiata* subsp. *caricina* and subsp. *radiata.* Only plants with well pressed, fully open flowers were measured.

	Outer floral bract (mm)	Perianth tube (mm)	Outer tepal length × width (mm)	Filament length (mm)	Anther length (mm)	Style branches (mm)
Subsp. *caricina*	10–13	6–10	7–12 × 2.5–3.5	4–5	4(–5)	5–6
Subsp. *radiata*	11–15	8 × 14	13–15(–17) × 3–5	5–6	5.0–8.5	8–11

Hesperantha radiata subsp**. caricina** *(Ker Gawl.) Goldblatt & Manning* stat. nov. *H. radiata* var. γ *caricina* Ker Gawl.: t. 790 (1804). *H. tenuifolia* Salisb.: 321 (1812), nom. nov. pro *H. radiata* var. γ *caricina* Ker Gawl. (1804). *H. caricina* (Ker Gawl.) Klatt: 395 (1882), nom. illegit. superfl. pro *H. tenuifolia* Salisb. (1812). *H. angustifolia* Loudon: 91 (1841), nom. illegit. superfl. pro *H. tenuifolia* Salisb. (1812). Type: South Africa, without precise locality, illustration in Curtis's Botanical Magazine 21: t. 790 (1804).

Plants like subsp. *radiata* but corms often with a collar of fibres around base. *Leaves* 1–2 mm wide, uppermost leaf entirely sheathing, reaching close to base of spike. *Spike* crowded with outer bracts 10–13 mm long,

as long as or longer than next internode and thus imbricate. *Flowers* cream to dull yellow, outer tepals reddish on reverse; perianth tube 6–10 mm long; tepals 7–12 × 2.5–3.5 mm. *Stamen* filaments 4–5 mm long; anthers 4(–5) mm long. *Style* branches mostly 5–6 mm long. *Flowering time*: mostly late Sept. and Oct., but until Dec. at higher elevations.

Diagnosis: subsp. *caricina* is usually recognized by the crowded spike of relatively small flowers, the tepals 7–12 × 2.5–3.5 mm and perianth tube 6–10 mm long, and shortly overlapping bracts 10–13 mm long. Plants are typically late flowering, in September and October, but there are collections from higher elevations that bloom as late as December. Populations of typical *H. radiata* occur throughout the range of subsp. *caricina* (from Piketberg to Caledon and Hermanus) but invariably flower earlier, from late July to mid-September, and have larger flowers, with tepals 13–15(–17) × 3–5 mm, perianth tube 8–14 mm long, and anthers mostly 4 mm long (Table 1). The leaves of subsp. *caricina* are also somewhat narrower than in subsp. *radiata*,1–2 mm wide, and often dry at flowering time vs. 2.0–3.5 mm wide and green at flowering.

Representative specimens

WESTERN CAPE.—**3318** (Cape Town): Riebeek Kasteel, Farm Remhoogte, (–BD), 24 Oct. 1968, *Marsh 1034* (NBG); Table Mtn, top of Oudekraal Ravine, (–CD), Nov. 1972, *McKinnon s.n.* (NBG); Rosebank, Cape Town, Nov. [without year], *H. Bolus 3769* (BOL, K, NBG, PRE, Z); Langverwacht above Kuils River, (–DC), 17 Oct. 1973, *Oliver 4756* (K, NBG, PRE); Stellenbosch flats, (–DD), 30 Sept. 1958, *Perold 7* (NBG); Sept. 1964, *Holzapfel 10* (NBG); Blauwklip, (–DD), 24 Oct. 1928, *Gillett s.n.* (NBG); Uitkyk, (–DD), Oct. 1982, *Gillett s.n.* (NBG). **3418** (Simonstown): flats between Gordon's Bay and Strand on Disa Street, (–BB), 29 Sept. 2001, *Goldblatt & Nänni 11944* (MO, NBG). **3419** (Caledon): hills near Farm Die Vlei E of Bot River, (–AA), 30 Sept. 2000, *Goldblatt & Nänni 11944* (MO); western outskirts of Caledon, (–AB), 29 Sept. 2001, *Goldblatt & Nänni 11942* (MO); Fernkloof Nature Reserve, Hermanus, (–AD), 18 Oct. 1979, *Orchard 4485* (MO). Without precise locality: Piketberg, renoster hills, 9 Oct. 1922, *Marloth 11484* (NBG).

3. **Ixia** L.: restricted to South Africa and to the winter rainfall zone and adjacent areas, *Ixia* comprises an estimated 90 species in four sections. Sects. *Hyalis* (18 spp.), *Morphixia* (now 32 spp.), and *Dichone* (now 17 spp.) have recently been revised (Goldblatt & Manning 2011, 2012b) and we are currently revising the systematics and taxonomy of sect. *Ixia* (± 25 spp.). Here we describe a species in sect. *Morphixia* that we discovered on the edge of the Roggeveld Escarpment, in September 2011, and later collected in fruit in November.

Ixia teretifolia *Goldblatt & J.C.Manning*, sp. nov.

TYPE.—Northern Cape, 3220 (Sutherland): Roggeveld Escarpment, Farm Blesfontein, in dense tall grass tufts below sandstone cliffs at escarpment edge, (–AD), 25 Sept. 2011, *Goldblatt & Manning 13671* (NBG, holo., K, MO, PRE, iso.).

Plants mostly 1.2–1.5 m high. *Corm* subglobose, 12–18 mm diam., tunics of relatively fine fibres. *Stem* erect in flower, nodding in fruit; sheathed below by prominent, pale, dry-membranous, often irregularly torn cataphylls accumulating with age in a dense mass; usually with 3–5 short branches up to 4 mm long, branches subtended by pale, dry, attenuate scale-like bracts and prophylls 2–4 mm long. *Leaves* 3, lower 2 with long terete blades ± half as long as stem, mostly 1.5–2.0 mm diam., firm-textured without evident veins when alive; uppermost leaf entirely sheathing or almost so, reaching to base of spike or to lowermost branches. *Main spike* (1)2(3)-flowered, lateral spikes 1- or 2(3)-flowered; bracts silvery membranous, translucent with narrow, dark purple veins, ± 7 mm long, outer 3 veined and 3-toothed or 3-lobed; inner 2-veined and shallowly forked at apex. *Flowers* upright to half nodding, pale blue but pale green in throat, faintly rose-scented, with bright yellow anthers prominently displayed; perianth tube broadly funnel-shaped, ± 5 mm long, narrow part ± 2 mm long; tepals spreading, fully patent distally, ovate, ± 12 × 6.0–6.5 mm, outer tepals slightly wider than inner. *Stamens* with filaments ± 6 mm long, exserted ± 4 mm from tube; anthers 4–5 mm long, ± parallel throughout anthesis, yellow; pollen yellow. *Style* dividing opposite lower third of anthers, branches ± 3 mm long, slender, extending between anthers. *Capsules* globose, ± 5 mm diam., showing outline of seeds. *Seeds* subglobose, ± 2.0 × 1.6 mm, light yellow-brown, (5)6 per locule. *Flowering time*: mostly mid-Sept.–mid-Oct., possibly later. Figure 3.

Eponymy: from the Latin, *teres*, round in section, *folia*, leaf.

Distribution and ecology: so far known from just one site, *Ixia teretifolia* grows at the base of sandstone cliffs of the Beaufort Series at the edge of the Roggeveld Escarpment west of Sutherland on the Farm Blesfontein (Figure 2). Plants grow among broken rocks, nested in dense tufts of the grass *Tenaxia* (*Merxmuellera*) *stricta* (Schrad.) N.P.Barker & H.P.Linder. Extensive searching on the escarpment itself revealed no sign of the species, but the white-flowered morph of the related *I. marginata* Salisb. ex G.J.Lewis was relatively common there, growing in mountain renosterveld vegetation together with other geophytes, including *I. trifolia* G.J.Lewis, *Geissorhiza heterostyla* L.Bolus, the deep pink-flowered morph of *Hesperantha pilosa* (L.f.) Ker Gawl. (all Iridaceae) and *Bulbinella elegans* P.L.Perry (Asphodelaceae). We estimated that the population of *I. teretifolia* consisted of about 70 mature, flowering individuals along a 200 m stretch of the escarpment edge. Although we found no plants to the south of our site on the adjacent farm Boplaas, we suspect the range of *I. teretifolia* may be more extensive further north toward Ouberg Pass, where we recommend further exploration to establish its complete range.

Diagnosis and relationships: the short, widely funnel-shaped perianth tube, ± 5 mm long, distally spreading tepals, partly exserted filaments with prominently displayed anthers, and the several short lateral branchlets place *I. teretifolia* in the informal series *Marginatae* of *Ixia* sect. *Morphixia* (Goldblatt & Manning 2011). Its tall stature and habit are shared in the section with *I. alata* Goldblatt & J.C.Manning, but the several very short branches, each with 1 or 2(3) flowers differ from that species, and recall particularly *I. linearifolia* Goldblatt & J.C.Manning. The centric leaves lacking visible veins are unique in sect. *Morphixia* and unusual in the genus, almost all species of which have plane, isobilateral leaves, apart from *I. linearifolia*, which has linear,

FIGURE 3.—*Ixia teretifolia*, *Goldblatt & Manning 13671* (NBG). A, portion of flowering plant; B, T/S leaf blade; C, leaves and flowering stem. Scale bar: A–C, 10 mm; B, 1 mm. Artist: J.C. Manning.

fleshy leaves with the margins raised at right-angles to the blade surface. Except for their slightly smaller size, the flowers of *I. teretifolia* differ very little from other members of series *Marginatae*, all of which have a short, funnel-shaped perianth tube, distally outspread tepals and fully exserted anthers.

Internally, the leaf margins in *I. teretifolia* have paired strands of sclerenchyma separated by parenchyma tissue (Figure 3B). As in other species of *Ixia* the sclerenchyna strands are not associated with a marginal vein ((Rudall & Goldblatt 1991); Rudall's (1995) statement to the contrary for *Ixia* is an error), and there are just two opposed major vein pairs in the leaf in a lateral position, well separated internally by mesophyll. The anatomy of *I. teretifolia* does not conform to that of a truly centric (or terete) leaf as it is not radially symmetric, e.g. as seen in terete-leaved species of *Bobartia* (Rudall 1995), and the leaves are in fact internally bilaterally symmetric. Related *I. linearifolia* has fairly typical leaf anatomy for *Ixia* with a wide strand of sclerenchyma extending the width of the thickened, but slightly winged margins, themselves unusual in *Ixia*.

Additional specimen

NORTHERN CAPE.—**3220** (Sutherland): Roggeveld Escarpment, Farm Blesfontein, in dense tall grass tufts below sandstone cliffs at escarpment edge, (–AD), 4 Nov. 2011 (fr.), *Goldblatt & Porter 13723* (MO, NBG).

Morphological and nomenclatural notes and a range extension

1. **Babiana tubiflora** *(L.f.) Ker Gawl.*: a population of a *Babiana* species on the inland side of high sand dunes north of Jacobsbaai on the Saldanha Peninsula is somewhat puzzling in its unusual flowers. These plants are currently included in the widespread *Babiana tubiflora*, which extends along the coast of Western Cape from Lambert's Bay in the north to Still Bay in the east (Goldblatt & Manning 2007a), thus surrounding the Jacobsbaai population. We were unable to distinguish the Jacobsbaai plants vegetatively from specimens of *B. tubiflora* collected nearby at Langebaanweg when compared side-by-side, but the flowers are strikingly different. Largely a coastal species, *B. tubiflora* rarely extends more than 20 km inland, and has zygomorphic flowers with a white to cream-coloured perianth, the lower tepals often with a red streak on the limbs of the lower three tepals. The tepals are narrowed into an ascending claw-like lower portion with wider, spreading limbs, the dorsal tepal 18–23 × 5–7 mm and the lower tepals 15–19 × 3–4 mm. The unilateral stamens have filaments 13–16 mm long and anthers 4–5 mm long. In contrast (Table 2), the tepals of the Jacobsbaai plants are ovate without a narrowed claw, the dorsal tepal is 12 × 6 mm, and the lower three tepals are ± 10 × 4 mm (*Goldblatt & Porter 13512* MO, NBG, 9 Sept. 2010; *Goldblatt & Porter 13572*, MO, NBG, 23 Sept. 2010). The stamens have filaments ± 6 mm long (< half the length of those of *B. tubiflora* as currently circumscribed) and anthers ± 3 mm long. The relatively short style divides opposite the base to lower third of the anthers into branches ± 2.5 mm long, whereas that in typical *B. tubiflora* divides between the middle and slightly beyond the anther tips and the style branches are 3–4 mm long. We note that the Jacobsbaai *B. tubiflora* population was sympatric and co-blooming with closely related but larger-flowered *B. tubulosa* (Burm.f.) Ker Gawl. (*Goldblatt & Porter 13566*, MO, NBG, PRE, 22 Sept. 2010).

We remain uncertain whether to regard the Jacobsbaai plants as a separate taxon or merely a trivial mutant race of no taxonomic significance. Until more is known about this distinctive population we simply report its existence and defer a decision about its status pending further study.

2. **Babiana purpurea** *Ker Gawl.*: *Ixia purpurea* Jacq. was based on a plate in his *Icones plantarum rariorum* vol. 2: t. 286 (Jacquin 1793), but with the description published earlier (Jacquin 1791). The name was later transferred to *Babiana* by Ker Gawler (1807a) and has been cited until now as *B. purpurea* (Jacq.) Ker Gawl., but it has come to our attention that *I. purpurea* Jacq. is a later homonym for *I. purpurea* Lam. (1789). Dating of Jacquin's plates is complicated because the dates on the title pages of the three volumes of the *Icones* do not represent the first publication of the individual plates, which were released in fascicles earlier than the bound volumes. The dating of the fascicles and the plates included in each was resolved by Schubert (1945). Some fascicles were predated by the publication of Jacquin's *Collectanea* and the dates on the title pages of the several volumes evidently do not reflect the actual year of publication. *Ixia purpurea* Jacq. was first published in *Collectanea* vol. 3, published in 1791 (title page 1789). Fascicle 9 of the *Icones*, which included *I. purpurea* Jacq. was, according to Schubert's analysis, published in 1793.

Jacquin's species is thus evidently predated by *I. purpurea* Lam. (1789), a valid and legitimate name typified by the plant in the Thunberg Herbarium named *I. crocata* var. c, *flore purpurea*. Lamarck was evidently providing a name to one of the variants listed by Thunberg (1783) in his account of Linnaeus's *I. crocata* (now *Tritonia crocata* (L.) Ker Gawl.), thus excluding typical *I. crocata* (which Lamarck recognized as such), and *I. purpu-*

TABLE 2.—Comparison of flowers of typical *Babiana tubiflora* and the Jacobsbaai population. Only well pressed, fully open flowers were measured.

Taxon	Perianth tube length (mm)	Tepal shape,	Dorsal tepal (mm)	Anther length (mm)	Filament length (mm)	Style branches
Typical *B. tubiflora*	45–80(–100)	Narrowly lanceolate, ± clawed below.	18–23 × 5–7	6.0–8.5	13–16	3–4 mm, dividing between middle and apex of anthers.
Jacobsbaai population	40–45	Ovate, without claws.	± 12 × 6	4–5	± 6	± 2.5 mm, dividing between base and lower third of anthers.

rea Lam. is not nomenclaturally superfluous. Thunberg's *I. crocata* var. c was later regarded by De Vos (1983) as merely a purple-flowered variant of *Tritonia crocata*.

The name *Babiana purpurea* is to be treated as a new name (McNeill *et al.* 2006: Art. 58) dating from its apparent transfer to *Babiana* by Ker Gawl., thus becoming *B. purpurea* Ker Gawl. (1807a).

Babiana purpurea *Ker Gawl.* in Curtis's Botanical Magazine 26: sub. t. 1019 (1807a), nom. nov. pro *Ixia purpurea* Jacq., Coll. 3: 268 (1791, as '1789'), hom. illegit. non Lam. (1789). *Gladiolus purpureus* (Ker Gawl.) Willd.: 198 (1797). *Gladiolus purpureus* (Jacq.)Vahl: 114 (1805), hom. illegit. non Willd. (1797). *Babiana stricta* var. *purpurea* (Ker Gawl.) Ker Gawl.: (1807b) [name misapplied to *B. villosa* (Gmelin) Ker Gawl. ex Steud.]. Type: South Africa, without precise locality or collector, illustration in Jacq., Icones Plantarum Rariorum 2: t. 286 (1793).

3. **Babiana bainesii** *Baker*: in our revision of *Babiana* (Goldblatt & Manning 2007a) we cited *B. schlechteri* Baker (1904) as a synonym of *B. bainesii* Baker (1876). Unfortunately, we overlooked the fact that this is a homonym for *B. schlechteri* Baker (1901) (= *B. nana* subsp. *maculata* (Klatt) Goldblatt & J.C.Manning). We also neglected to note that the replacement name *B. bakeri* Schinz (1906) had been provided for Baker's second *B. schlechteri*. This correction has no nomenclatural consequences at present. These names must be added to the synonymy of *B. bainesii* as follows:

Babiana bainesii *Baker* in Journal of Botany 14: 335 (1876). Type: South Africa, [Gauteng,] 'Gold Fields', Witwatersrand, near Johannesburg, 1870, *Baines s.n.* [K, lecto.!, designated by Goldblatt & Manning: 92 (2004)].

Babiana bakeri Schinz: 712 (1906), as nom. nov. pro *B. schlechteri* Baker: 1005 (1904), hom. illegit. non Baker (1901). Type: South Africa, [Mpumalanga], near Middleburg, 22 Dec. 1893, *Schlechter 4055* (Z, ?holo.).

4. **Babiana gariepensis** *Goldblatt & J.C.Manning*: currently known from three collections from the Richtersveld in Northern Cape, *B. gariepensis* is a relatively poorly known species of *Babiana* sect. *Teretifolieae* (Goldblatt & Manning 2007a: 31). It is distinguished by the unusually broad leaves mostly 70–110 × 18–25 mm, a stem produced shortly above the ground, pale, grey-green flowers, the lower tepals with white streaks edged dark red, and a relatively long perianth tube 20–24 mm long. A new collection of the species has now come to our attention from southwestern Namibia in the Namuskluft hiking trail near Rosh Pinah. Although a modest range extension, some 50 km north of the nearest station in South Africa, this represents the first record of the species in Namibia. The one of the two specimens of the collection is somewhat unusual for the species in being particularly robust and has a stem reaching ± 120 mm above the ground; including the spike the specimen is 280 mm tall.

Additional specimen

NAMIBIA.—**2716** (Witpütz): Rosh Pinah, Namuskluft, on hiking trail from campsite, (–DD), 27 July 2011, *R. & R. Saunders s.n.* (NBG).

5. **Babiana lapeirousioides** *Goldblatt & J.C.Manning*: described in 2007 and based on a specimen and painting of a plant collected by C.L. Leipoldt and grown to flowering at the National Botanical Gardens, Kirstenbosch, in 1943, *B. lapeirousioides* was then known only from the cryptic locality 'Gariep' (Goldblatt & Manning 2007a: 49). This distinctive, long-tubed, white flowered species was discovered in the wild by Helga van der Merwe and Gretel van Rooyen in October 2011 at Vaalputs, the Nuclear Waste Disposal site (between Gamoep and Platbakkies) in Northern Cape. This collection allows us to expand the description of the species, now with a specific locality (we associated the original locality, Gariep, with an area of the Richtersveld northeast of Port Nolloth and that now seems to be mistaken and we wonder if 'Gariep' was a mistranscription of Gamoep).

Babiana lapeirousioides *Goldblatt & J.C.Manning* in Strelitzia 18: 49 (2007). Type.—South Africa, [Northern Cape,] without precise locality, as 'Gariep', 30 Sept. 1943, *Leipoldt s.n.* (NBG, holo.).

Plants (5–)10–20 cm high including leaves, stem reaching shortly up to 70 mm above ground level, usually simple, rarely with 1 branch. *Leaves* sword-shaped, blade 50–150 × 5–9 mm, rigid, plicate, pungent, smooth, primary veins thickened and yellowish. *Bracts* (17–)20–25(–35) mm long, glabrous or minutely scabrid above, closely veined, dry and brownish above, inner slightly shorter than outer, forked apically. *Flowers* in a compact, 2–4-flowered spike, zygomorphic, white with red or purplish markings near base of lower tepals, presence of scent unknown; perianth tube 22–35(–40) mm long, cylindric and straight, flaring slightly toward the mouth; tepals subequal or upper three slightly larger, spreading, narrowly oblanceolate, 10–20 × 3–4 mm. *Stamens* unilateral; filaments erect, 7–8 mm long; anthers 4.5–5.5 mm, cream-coloured. *Ovary* smooth; style dividing from near base of anthers to shortly beyond anther tips, branches ± 2.5 mm long. *Flowering time*: late Sept.–early Oct.

Distribution and ecology: until now known only from the type, the species has been recollected at Vaalputs east of the Kamiesberg at the transition into Bushmanland. The type locality, 'Gariep' is unlocalized and we assumed it to refer to the Richtersveld but in the light of the recent collection we consider that it might equally refer to one or other of the inselbergs in south of the Orange River in Bushmanland. The species grows wedged in cracks among granite boulders, sometimes forming large clumps. When not in flower the rigid, pungent leaves are readily confused with *B. dregei* which has a similar habitat in granite outcrops but at higher elevations in the Kamiesberg.

Additional specimen

NORTHERN CAPE.—**3018** (Kamiesberg): Vaalputs, NECSA site, (–AB), 1 Oct. 2011, *G. van Rooyen 3048* (NBG, PRE).

6. **Geissorhiza demissa** *Goldblatt & J.C.Manning*: most closely resembling *G. aspera* in its minutely puberulous stems and radially symmetric flowers with only slightly unequal filaments, *G. demissa* has relatively small, white flowers tinged violet at the tips of the

tepals (Goldblatt & Manning 2009). A new collection, flowering after fire in the Kamiesberg, that we refer to *G. demissa*, is unusually robust with larger flowers than recorded until now for the species, the tepals ± 10 mm long, anthers ± 3 mm long and up to four flowers per spike. Floral dimensions previously recorded were tepals 7 × 3.5 mm and anthers ± 2 mm long and spikes had 2 or 3 flowers. The distinction between *G. demissa* and *G. aspera* is less clear for this population. We revise a portion of the key to subg. *Geissorhiza* (Goldblatt & Manning 2009) below.

5a Stamens unequal, one filament at least 0.5 mm shorter than other two:

6a Leaves ± plane with margins and central vein slightly to moderately thickened, but not obviously winged; margins and central vein smooth or minutely puberulous:

7a Perianth predominantly purple, pale in throat; short filament at least 4 mm shorter than long filaments; tepals 18–23 mm long . . . . . 81. *G. inaequalis*

7b Perianth predominantly blue to violet or white with pale throat or purple with dark purple throat; short filament no more than 2 mm shorter than long filaments; tepals 7–20 mm long:

8a Flowers radially symmetric except for eccentric style; tepals 7–11 mm long; flowers violet to pale blue, purple or predominantly white:

9a Tepals blue to violet with white throat edged in dark violet, or uniformly white; mostly 11–14 × 4–6 mm; main spike mostly with 3–7 flowers; anthers 3–5 mm long . . . . . 79. *G. aspera*

9b Tepals white, sometimes flushed dull purple outside and tepals tips light violet, 7–10 × 3.5–4.0 mm; main spike with 1–4 flowers; anthers 2–3 mm long . . . . . 80. *G. demissa*

Additional specimen

NORTHERN CAPE.—**3018** (Kamiesberg): Langkloof, slopes of Rooiberg between Farms Karas and Nartjiesdam, (–AD), 22 Sept. 2010, *Goldblatt & Porter 13579* (MO, NBG)

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