

## Notes on the systematics and nomenclature of *Tritonia* (Iridaceae: Crocoideae)

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### ABSTRACT

Study of some early types of species now known to belong to the genus *Tritonia* Ker Gawl., a member of Iridaceae, subfamily Crocoideae, comprising some 28 species of southern and south tropical Africa, has shown the need for some nomenclatural adjustments. *Ixia undulata* Burm.f. (1768) is an earlier name for *T. crispa* (L.f.) Ker Gawl. based on *Gladiolus crispus* L.f. (1782) and the combination *T. undulata* (Burm.f.) Baker must be used for the species, which is native to the western half of Western Cape, South Africa. The variety *T. crispa* var. *parviflora* is also reduced to synonymy. The type specimen of *Ixia gladiolaris* Lam. (1789), currently considered a synonym of *Tritonia securigera* (Aiton) Ker Gawl., has flowers that lack the characteristic tooth-like ridges on the lower tepals of the latter, and corresponds closely to the eastern southern African *T. lineata* (Salisb.) Ker Gawl., based on *Gladiolus lineatus* Salisb. (1796). The new combination *T. gladiolaris* (Lam.) Goldblatt & J.C. Manning is made and *T. lineata* is reduced to synonymy. *Montbretia lacerata* and *Tritonia lacerata*, erroneously regarded as synonyms of *T. crispa*, are combinations based on *Gladiolus laceratus* Burm.f., a species that remains unidentified because no type is known and the description is too vague to permit its identification. Lastly, field studies have shown that the crisped-leaved *T. watermeyeri* is connected by a series of morphological intermediates to typical *T. securigera*, which has straight leaves and identical flowers. The new combination *T. securigera* subsp. *watermeyeri* (L.Bolus) J.C.Manning & Goldblatt is proposed for this taxon.

### INTRODUCTION

Our continuing studies of the systematics and biology of the African Iridaceae led us to examine type material of several species thought to belong to the genus *Tritonia* Ker Gawl. but excluded by De Vos (1982, 1983) from her revision of the genus as insufficiently known because of the difficulty in relating type material to any known species. Among the names in question are *Gladiolus flavus* [Sol. in] Aiton (1789), *G. laceratus* Burm.f. (1768), *G. undulatus* Burm.f. (1768), and *Ixia gladiolaris* Lam. (1789). The type of *Ixia gladiolaris* is what is currently called *Tritonia lineata* (Salisb.) Ker Gawl., which thus becomes *T. gladiolaris*. *Gladiolus flavus* was based on a specimen of *T. flabellifolia* (D.Delaroche) Ker Gawl., to which it is now assigned as a later synonym. The type of *G. undulatus* matches *T. crispa* (L.f.) Ker Gawl. The latter, based on *G. crispus* L.f. (1782), closely resembles the shorter-tubed *T. crispa* var. *parviflora* Baker, and the species must therefore be known by the earlier name *T. undulata*, a combination made by Baker in 1877. We have, however, failed to locate authentic material that can be associated with *G. laceratus* and this species must continue to be excluded from *Tritonia*. Taxonomic adjustments required as a result of our investigation are made below. Lastly, new collections of *T. securigera* (Aiton) Ker Gawl. have led us to re-examine the distinction between this species and the western Little Karoo plants referred to as *T. watermeyeri*. The latter species, defined by its crisped and undulate leaves, is now known to be connected by a series of intermediates to the widespread *T. securigera*, which has plane leaves but flowers identical to those of *T. watermeyeri*. We conclude that it

is most appropriate to treat the latter as a subspecies of *T. securigera*.

1. ***Tritonia flabellifolia*** (D.Delaroche) G.J.Lewis in Journal of South African Botany 7: 30 (1941). *Ixia flabellifolia* D.Delaroche: 24 (1766). Type: South Africa, without precise locality or collector (L–Herb. Van Rooyen, neo!), designated by Goldblatt & Barnard 1970: 310).

*Gladiolus flavus* [Sol. in] Aiton: 65 (1789). *Tritonia flava* (Aiton) Ker Gawl.: 228 (1804). Type: South Africa, without precise locality, cultivated in Great Britain, *Paterson s.n.* (BM, holo!), syn. nov.

The type of *Gladiolus flavus* is readily identified as a specimen in the British Museum (Natural History) collected in early bloom (Figure 1). The long-tubed flowers are quite evident, and the characteristic dry, brown, long-attenuate and acuminate bracts immediately identify the plant as the Western Cape species, *Tritonia flabellifolia*. This plant has white to cream-coloured flowers and it is puzzling that Solander, who drew up the description, should have called it *G. flavus* (actually describing the flower as intensely yellow). Possibly the flower buds were sufficiently cream-coloured for him to have thought they deserved the epithet he chose. Despite the apparent inconsistency in flower colour we are confident that *G. flavus* is a synonym of *T. flabellifolia*.

2. ***Tritonia gladiolaris*** (Lam.) Goldblatt & J.C.Manning, comb. nov.

*Ixia gladiolaris* Lam., Encyclopédie méthodique 3: 341 (1789). Type: South Africa, Cape of Good Hope, cultivated in Paris, flowering March and April, original collector unknown (P–Herb. Lamarck, holo!).

*Gladiolus lineatus* Salisb.: 40 (1796). *Tritonia lineata* (Salisb.) Ker Gawl.: 228 (1804); M.P.de Vos: 369 (1983); M.P.de Vos: 111 (1999). *Montbretia lineata* (Salisb.) Baker: 169 (1877). *Tritonixia lineata* (Salisb.) Klatt: 357 (1882). Type: South Africa, without precise locality, grown at the Royal Botanic Gardens, Kew in 1781 (BM, lecto., designated by M.P.de Vos 1983: 371), syn. nov.

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FIGURE 1.—Holotype of *Gladiolus flavus* [Sol. in] Aiton (BM).

*Ixia gladiolaris*, represented by a single sheet in the Herbarier Lamarck in the Laboratoire de Phanerogamie, Paris, was included in the synonymy of *T. securigera* by De Vos (1983, 1999) in her accounts of *Tritonia*. The narrowly sword-shaped leaves have prominent submarginal veins, and the four or six flowers on the two preserved spikes have large, firm, dry bracts that are rust-coloured in the upper half. The flowers still show the rather prominent darker venation on the tepals characteristic of the genus, particularly of *T. lineata*, as well as the low, thickened ridges (raised, yellow, truncate scales according to Lamarck) on the lower tepals. Lamarck described the corolla as orange or yellow, lightly flushed with red. The association by De Vos (1983, 1999) of *Ixia gladiolaris* with *T. securigera* is refuted by two features: the presence of prominent submarginal veins on the leaves,

and the low ridges on the lower tepals. The leaves of *T. securigera* have no obvious submarginal veins and the lower tepals of the flower bear large, tooth-like ridges, 3–4 mm high, that resemble elaborate axeheads.

We regard the type and associated description of *Ixia gladiolaris* as representing one of two largely eastern southern African species, either *Tritonia disticha* (Klatt) Baker or *T. lineata*. Both these species have leaves with prominent submarginal veins, unusual in *Tritonia*, and flowers with low median ridges on the lower tepals. The two species are distinguished largely by flowering time, flower size and perianth colour (De Vos 1999): *T. disticha* blooms in summer, mainly January to March, and has red to pink (or rarely yellow) flowers 20–30 mm long, whereas *T. lineata* flowers earlier, mainly September to



November, and has yellow to apricot (pale orange) flowers (25–)30–40 mm long. *Ixia gladiolaris* most closely matches the latter morphologically and is evidently also early flowering. Plants grown in Paris bloomed in spring, March and April in the northern hemisphere, whereas we would expect *T. disticha* to flower in June or July, even under glass. *I. gladiolaris* is an earlier name for *T. lineata*, which thus falls into synonymy under the new combination *T. gladiolaris*.

3. ***Tritonia undulata* (Burm.f.) Baker** in Journal of the Linnean Society 16: 163 (1877). *Ixia undulata* Burm.f.: 1 (1768). *Tritonixia undulata* (Burm.f.) Klatt: 357 (1882). Type: South Africa [Western Cape], without precise locality, collector unknown (G-BU, holo.!).

*Gladiolus crispus* L.f.: 94 (1782). *Tritonia crispa* (L.f.) Ker Gawl. 18: t. 678 (1803); M.P.de Vos: 144 (1982); M.P.de Vos: 99 (1999). Type: South Africa [Western Cape], without precise locality, A. Sparrmann s.n. (LINN 59.18, holo.–microfiche!), syn. nov.

*Tritonia crispa* var. *parviflora* Baker: 192 (1892); M.P.de Vos: 149 (1982); M.P.de Vos: 100 (1999). Type: South Africa [Western Cape], Winterhoek, Tulbagh, C.L. Pappé s.n. (K, holo. not seen), syn. nov.

The identity and generic disposition of *Ixia undulata*, described by N.L. Burman in 1768, has proved enduringly controversial. It was referred to *Tritonia*, as *T. undulata* by Baker (1877), and remained so treated in *Flora capensis* (Baker 1896). Klatt (1882), however, referred *I. undulata* to his new genus *Tritonixia*, a segregate of *Tritonia* erected for the shorter-tubed members of the genus (but including the type of *Tritonia*, *T. crocata*). Brown (1929) actually made a new combination, *T. undulata*, because although Baker had already made the same combination, he had included plants of *Ixia crispa* L.f. (now *I. erubescens* Goldblatt) under the same.

Later, Lewis (1962) in her monograph of *Ixia* excluded *Ixia undulata* from that genus but did not explicitly say to what genus she thought the plant belonged. Then, De Vos (1983, 1999) excluded the species from *Tritonia* in her accounts of the genus, commenting that although it superficially resembled a *Tritonia*, the short, stout anthers recalled *Ixia* subgenus *Dichone*, although the funnel-shaped tube did not. She therefore suggested that the type might represent a hybrid between *I. crispa* and *I. vanzijliae* M.P.de Vos.

We have examined the type specimen of *Ixia undulata*, a single plant without a corm, in the Burman Herbarium at Geneva (Figure 2), and are amazed that its identity could have caused such confusion. It is an exact match for plants from the Tulbagh District of Western Cape, referred by both Baker (1892, 1896) and De Vos (1983, 1999) to *Tritonia crispa* var. *parviflora*. The leaf margins are tightly crisped and the entire blade is loosely undulate and twisted, while the salver-shaped flower has a narrow, almost cylindric (not funnel-shaped as De Vos stated) perianth tube, ± 18 mm long with [apparently] spreading tepals, stamens with filaments exserted ± 5 mm from the tube, and anthers ± 3 mm long.

We have no hesitation in regarding *Ixia undulata* as conspecific with *Tritonia crispa* (basionym *Gladiolus crispus* L.f. (1782)). *I. undulata* is the earlier name, and *T. crispa* now falls into the synonymy of *T. undulata*.

We also question the merit of recognizing infraspecific taxa in this species. Perianth tube length is variable, ranging from 18–85 mm across its range. Flowers with the longest tubes are recorded from the Olifants River Mountains (85 mm in Goldblatt & Manning 10345, NBG), south to Joostenberg (60 mm in Lewis 5901, NBG). Plants with shorter-tubed flowers, 25–40 mm long, occur inland and in the south, as at Sir Lowry's Pass (35–40 mm in Barker 3378, NBG), and Somerset West (25–30 mm in Lewis 5675, NBG). Some plants from the Tulbagh Valley fall at the lower extreme of the range with a tube 22–25 mm (Hansford 4 from Welgelegen House, NBG). In contrast, plants from the slopes of Roodezandberg, not far from Tulbagh, have a tube ± 50 mm long (Compton et al. 1882/36, NBG). The pattern is not entirely clear but there is a trend for shorter tubes in populations in the south and interior of its range and any division into subspecific taxa based on tube length would be arbitrary. Tube length is closely associated with the local pollinators, long-proboscid flies (Manning & Goldblatt 1997). Where the long-proboscid species *Moegistorhynchus longirostris* occurs within the range of *T. undulata*, the perianth tube is longest but inland and on the Cape Peninsula where *M. longirostris* does not occur, shorter-proboscid flies, presumably either *Philoliche gulosa* or *P. rostrata*, are the inferred pollinators. Predictably, tube length tracks the proboscis length of the pollinator, a situation that has been documented in *Disa draconis* and *Geissorhiza confusa* (Johnson & Steiner 1997). We therefore include var. *parviflora* in *T. undulata*.

4. ***Tritonia lacerata* (Burm.f.) Klatt**, Ergänzungen und Berichtigungen zu Baker's Systema Iridacearum. Abhandlungen der Naturforschenden Gesellschaft zu



FIGURE 2.—Holotype of *Ixia undulata* Burm.f. (G-BU).



Halle 15: 358 (1882). *Gladiolus laceratus* Burm.f.: 2 (1768). *Montbretia lacerata* (Burm.f.) Baker: 168 (1877). Type: unknown, not in G-BU (Brown 1929) or L (J.Veldkamp pers. comm.).

No type for this species, described by Burman fil. in 1768, has ever been identified, and the description is too brief to permit its association with any known species. Baker (1877), who referred the species to *Montbretia* (now included in *Tritonia*), believed it to be an earlier name for *T. crispa*, now *T. undulata*. Both Baker and Klatt, who made the combination in *Tritonia*, are silent on their reasons for identifying Burman's species as a *Tritonia*. In her most recent account of *Tritonia*, De Vos (1999) placed *Montbretia lacerata* Baker (sic) and *T. lacerata* (Baker) Klatt (sic) as synonyms of *T. crispa*, and designated the type of *T. crispa* as the lectotype of *M. lacerata*. She thus ignored the fact that Baker's name is a combination based on Burman's *Gladiolus laceratus* (and thus has no type of its own but is nomenclaturally identical to *G. laceratus*). De Vos did not specifically deal with the identity of the latter. In our search for type material we have confirmed that no type is located at G (Herb. Burman) or L (the Leiden Herbarium), the only places where it is likely to be preserved.

5. *Tritonia securigera* (Sol. in Aiton) Ker Gawl. in Annals of Botany 1: 228 (1804); M.P.de Vos: 384 (1983); M.P.de Vos: 115 (1999). *Gladiolus securiger* Sol. in Aiton: 65 (1789). Type: South Africa, without precise locality or date, cultivated at Chelsea Gardens in 1778, F. Masson s.n. (BM, lecto., designated by De Vos 1983).

*Ixia thunbergii* Roem. & Schult.: 391 (1817), replacement name for *I. squalida* Thunb. in Hoffmann, Phytogeographische Blätter: 4 (1803), nom. illeg. non Aiton (1789). Type: South Africa, Cape of Good Hope, without precise locality, Thunberg s.n. (UPS-Herb. Thunberg 996, microfiche!).

There is no question about the identity of the type of this predominantly Little Karoo species, to our knowledge first collected by Masson and Thunberg in the early 1770s. Masson's collection was later grown at the Royal Botanic Gardens, Kew, where plants in flower were described as *Gladiolus securiger* a decade later by Solander for Aiton's *Hortus kewensis* (Aiton 1789). Plants of the same collection were illustrated in *Curtis's Botanical Magazine* in 1797 under that name (Ker Gawler 1797) but the species was later transferred to *Tritonia* (Ker Gawler 1804).

Distinctive features of the species, in the narrow sense, are a basal fan of firm, plane leaves (4–)6–12 mm wide with acute tips, a typically unbranched stem (robust plants may have one or more lateral branches), and an erect spike of (3)4–8 orange, rarely yellow, and evidently unscented flowers. The dorsal tepal is largest, 16–18 × 13–15 mm, and the lower tepals each bear a pronounced bright yellow median tooth, ± 4 × 2.5 mm, shaped like an axehead (*securiger* is Latin for axe-bearer). These teeth, called calli in the early literature and calluses by De Vos (1982, 1983, 1999) in her accounts of *Tritonia*, are not unique to the species but are frequent in *Tritonia*. They are particularly well developed in most species of section *Montbretia*, but in the remaining sections usually form low, thickened ridges, and are not developed at all in some species, such as *T. tugwelliae* L.Bolus. The teeth

are especially well developed in *T. securigera* and its western Little Karoo relative, *T. watermeyeri* L.Bolus. In fact there is little difference between the flowers of the two taxa, apart from the slightly smaller tepal teeth (± 3.0 × 1.3 mm) and faint woody scent in *T. watermeyeri*. The major difference between the two are in their leaves, and the crisped and undulate leaf blades of *T. watermeyeri* contrast strikingly with the plane leaves of typical *T. securigera*. Scent in flowers of Iridaceae is notoriously variable, even within a species (Goldblatt & Manning 1998) and little reliance can be placed on it alone as a specific character.

The distinction between *Tritonia securigera* and *T. watermeyeri* becomes even less clear when plants with flowers matching the two species from sandy habitats in the Anysberg and at the foot of the Little Swartberg in the western Little Karoo are taken into consideration. These plants are often dwarfed, up to 0.6 m high, and have either fairly soft-textured, undulate leaves (Goldblatt & Porter 12060, NBG, from the foothills of the Little Swartberg), or narrow, twisted leaves with straight to slightly crisped margins (Martin 60, NBG, from Anysberg Nature Reserve) while the spikes may have 1–3 flowers in the most dwarfed individuals, or up to 4 flowers in taller plants. Both *T. securigera* and typical *T. watermeyeri* are usually taller plants, at least 150 mm high, and grow on shale slopes. The plants with undulate leaves seem perfectly intermediate between typical examples of *T. securigera* and *T. watermeyeri* and maintenance of the latter as a separate species seems arbitrary. Existence of plants with leaves of intermediate form, either undulate or loosely twisted, make it more appropriate to treat *T. watermeyeri* as a subspecies of *T. securigera*. Typical *T. securigera* ranges widely through the southern Cape, from the Touwsberg in the western Little Karoo to Bedford in the Eastern Cape, whereas subsp. *watermeyeri* is restricted to the extreme west, between Montagu and Anysberg (Figure 3).

subsp. **watermeyeri** (L.Bolus) J.C.Manning & Goldblatt, comb. et stat. nov.

*Tritonia watermeyeri* L.Bolus in Annals of the Bolus Herbarium 4: 44 (1926); M.P.de Vos: 395 (1983). Type: South Africa [Western Cape], allegedly Vanrhynsdorp, without date, *Watermeyer s.n.* (BOL18050, holo.).

#### Specimens examined

WESTERN CAPE.—3320 (Montagu): Allemorgens, 1 km N of T-junction near Syfer-se-Kop on road to Bloutoring, red sandy loam, (–CB), 7 Sept. 1979, *Malan 112* (NBG); 8 km from Montagu on road to Ouberg Pass, (–CB), 27 Sept. 1981, *Perry 1682* (NBG); 26 Sept. 1995, *Goldblatt & Manning 10329* (MO, NBG). 3321 (Ladismith): sandy slopes north of Anysberg, (–BC), 18 Aug. 2002, *Goldblatt & Porter 12066* (MO, NBG, PRE); Anysberg Nature Reserve, NW boundary, (–BC), 3 Sept. 1989, *Martin 60* (NBG); Laingsburg–Ladismith road, E of Anysberg turnoff, (–BD), 17 Aug. 2002, *Goldblatt & Porter 12060* (MO, NBG). Without precise locality: Hoëveld naby Touwsrivier, Apr. 1930, *Huyssteen s.n.* (NBG179592).

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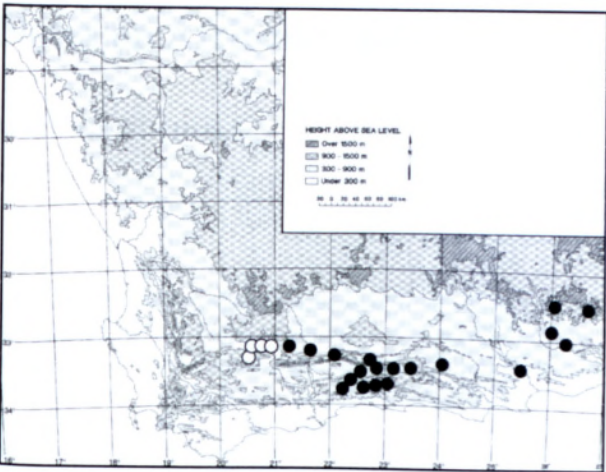


FIGURE 3.—Distribution of *Tritonia securigera* subsp. *securigera*, ●, and subsp. *watermeyeri*, ○.

helped us identify *Ixia gladiolaris* in the Herbar Lamarck at P; and J. Veldkamp, Leiden Herbarium, for searching for a possible type of *Gladiolus laceratus*. We are also grateful to Mary Stiffler who cheerfully helped solve bibliographic questions and provided copies of numerous articles not readily available to us.

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