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Notes on African plants

VARIOUS AUTHORS

IRIDACEAE

A NEW SPECIES OF *THEREIANTHUS* (CROCOIDEAE) FROM WESTERN CAPE, SOUTH AFRICA, NOMENCLATURAL NOTES AND A KEY TO THE GENUS

The genus *Thereianthus* (Iridaceae: Crocoideae) was established by Lewis (1941) to accommodate the smaller, blue or mauve-flowered species included by Baker (1896) in *Watsonia* P.Mill. subgenus *Beilia* Baker. Differences between the two genera that were highlighted included the solitary basal leaf in *Thereianthus* versus a basal fan of several leaves in *Watsonia* and the straight, rather than curved perianth tube. Lewis (1941) also noted that the stamens were inserted in the mouth of the tube instead of some distance below it. This difference is most evident when species of *Thereianthus* are compared with ornithophilous species of *Watsonia*. At the time she commented on the similarity between *Thereianthus* and the genus *Micranthus*, an observation that was later supported by cytological studies, when it was shown that the two share a unique karyotype with x = 10 (all 2n = 20) (Goldblatt 1971a). Recent molecular studies of chloroplast DNA regions have confirmed the sister relationship between *Thereianthus* and *Micranthus*, which together are sister to the monospecific Cape genus *Pillansia* (Reeves *et al.* 2001). In a later molecular study using additional chloroplast DNA regions, *Thereianthus* and *Micranthus* are sister to *Pillansia* plus *Watsonia* (Goldblatt *et al.*, in press).

Thereianthus is endemic to the southwestern Cape, where it is found mainly on soils derived from sandstone in montane habitats. It is unusual among Cape Iridaceae in flowering during the hot summer months, mostly November to January (Manning *et al.* 2002). Seven species of *Thereianthus* were recognized by Lewis (1941) and the taxonomy of the genus has remained unchanged since then, apart from minor nomenclatural matters (Goldblatt 1971b; 1989). This is an uncommon situation among the Iridaceae of the Cape Floral Region, where new species are still regularly discovered. It was thus not surprising when an unusual *Thereianthus* was collected from high up in the poorly explored Riviersonderend Mountains of the Caledon District in 1999. Comparison with the known species of the genus indicated that it represented an undescribed species, which we included in *Cape plants*, an account of the Cape flora, and elsewhere as *Thereianthus* sp. 1 (Goldblatt & Manning 2000; Manning *et al.* 2002). With additional material now available, we are able to formally describe the species.

Thereianthus montanus *J.C.Manning & Goldblatt*, sp. nov.

TYPE.—Western Cape, 3419 (Caledon): Riviersonderend, Pilaarkop, ridge WNW of peak, (–BB), 31 January 2004, *E.G.H. Oliver 12197* (NBG, holo.; MO, iso.).

Plantae 200–350 mm altae, cormo globoso 7–10 mm diam., tunicis fibrosis, caule erecto eramoso, cataphyllis papyraceis rubro-brunneis, foliis 3, inferiore basale laminis linearibus 2–3 nervosis, spica erecta dense 7- ad 10-florum, bracteis breve imbricatis supra siccis brunneis externa 6–8 mm longa interna ± 1.5 mm breviore, floribus violaceis albis notatis, perianthio subactinomorpho, tubo 22–27 × 1.2–1.5 mm cylindrico, tepalis subaequalibus, anguste ellipticis ad lanceolatis patentibus 9–15 × 3.5–5.0 mm, staminibus unilateralibus, filamentis 6–8 mm longis erectis, antheris 4–5 mm longis purpureis, styli ramis furcatis ± 2.5 mm longis.

Plants 200–350 mm high. *Corm* globose, 7–10 mm diam.; tunics of fine-textured, netted fibres accumulating with age and forming a neck around base of stem. *Stem* erect, flexed outward above sheath of second leaf and inclined ± 30°, unbranched, 1.0–1.5 mm diam. below spike. *Cataphylls* 2, dry and papery, reddish brown. *Leaves* 3, lower one basal, blade reaching or exceeding spike, drying from tip at flowering, linear, 150–300 × 2.5–2.8 mm, thick-textured, without distinct midrib and with 2 or 3 equally prominent veins, margins not thickened when fresh, upper two leaves cauline, inserted respectively on lower and upper thirds of stem, the second sheathing for half to two thirds its length with short blade, 15–25 mm long, upper entirely sheathing or with blade up to 7 mm long. *Spike* erect, compact, densely 7–10-flowered; bracts shortly imbricate, green and leathery below, dry and brown in upper half, outer 6–8 mm long, obtuse to truncate, inner ± 1.5 mm shorter, notched apically. *Flowers* violet; lower three or all tepals each with spear-shaped, purple median streak near base, throat and lower part of tube white, unscented; perianth sub-actinomorphic; tube straight or slightly arching in upper ± 5 mm, 22–27 × 1.2–1.5 mm, cylindrical and widening slightly in upper ± 5 mm; tepals narrowly elliptical to lanceolate, subequal, spreading and slightly cupped, 9–15 × 3.5–5.0 mm. *Stamens* unilateral; filaments erect, 6–8 mm long, exserted 3–4 mm from top of tube; anthers purple, 4–5 mm long; pollen violet. *Ovary* ovoid, 2.0–2.5 mm long; style arching over stamens, dividing between base and middle of anthers, branches recurved, divided for ± half their length, ± 2.5 mm long. *Capsules* and *seeds* unknown. *Flowering time*: late January to February. Figure 1.

Distribution and biology: known from a single population on steep, south-facing slopes of Pilaarkop in the Riviersonderend Mountains (Figure 2). Plants of *Thereianthus montanus* are scattered in moist, loamy soil in short, grassy fynbos at an altitude of ± 1 500 m. Frequent summer cloud, driven by strong southeasterly winds, is a feature of many of the high, coastal moun-

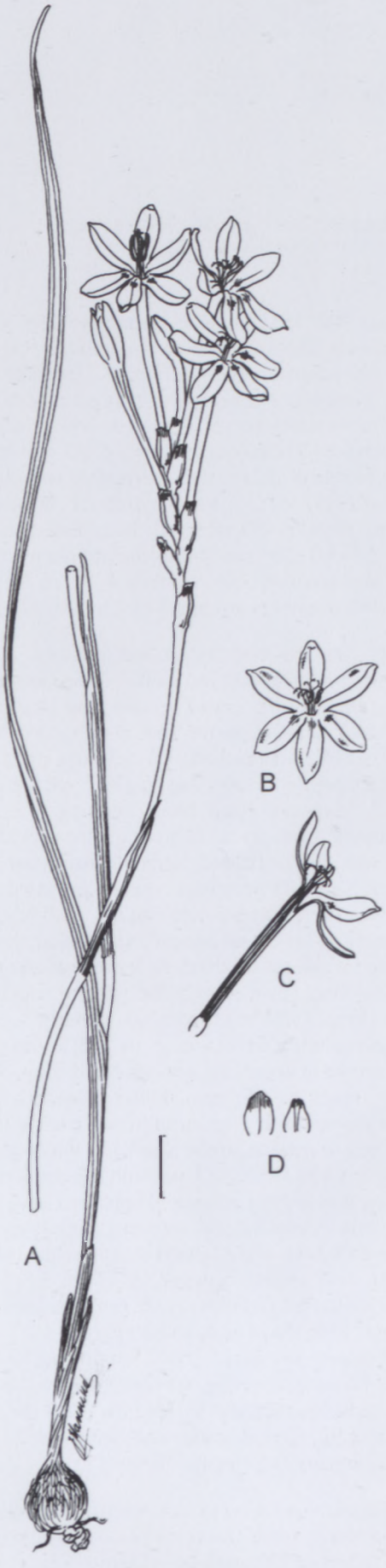

FIGURE 1.—*Thereianthus montanus*. A, whole plant; B, flower, front view; C, l/s flower; D, outer (left) and inner (right) bracts. Scale bar: 10 mm. Artist: John Manning.

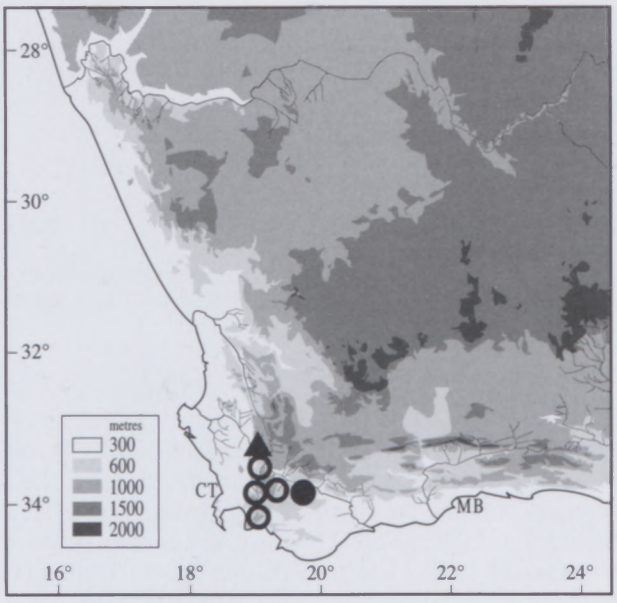

FIGURE 2.—Distribution of *Thereianthus montanus*, ●; *T. longicollis*, ▲; and *T. spicatus*, ○.

tains in the southwestern Cape, particularly Pilaarkop. At this altitude the soil around the plants is still moist in midsummer when they flower. Several other plant species are endemic to the moist, south-facing slopes of Pilaarkop and adjacent peaks, including *Gladiolus stokoei* and *Nivenia dispar* (Iridaceae), *Lonchostoma esterhuyseniae* (Bruniaceae), and a number of *Erica* species, among them *E. alfredii*, *E. columnaris* and *E. orthiocola*.

The pollination biology of species of *Thereianthus* is poorly known, although the variation in floral morphology among the species indicates some diversity in pollination strategies (Manning *et al.* 2002). Short-tubed *T. racemosus* (Klatt) G.J.Lewis is believed to be pollinated by hopliine scarab beetles (Goldblatt *et al.* 1998), and papilionid butterflies (*Papilio demodocus*) have been seen visiting flowers of *T. spicatus* (L.) G.J.Lewis (original observation). The long-tubed flowers of *T. longicollis* (Schltr.) G.J.Lewis are evidently adapted for pollination by long-proboscid flies (Goldblatt & Manning 2000) and a similar inference can be drawn for *T. montanus*. Its long-tubed, violet flowers accumulate nectar only in the lower few millimetres, which is consistent with pollination by long-proboscid flies with mouthparts 20–25 mm long.

History: a single flowering stem of the species was first collected by botanists Ted and Inge Oliver in February 1999. The type material was collected by Dr Ted Oliver five years later, in January 2004.

Diagnosis and relationships: the relationships of *Thereianthus montanus* lie with *T. spicatus* and *T. longicollis*, with which it shares thick, linear leaves without a distinct midrib, and flowers with a cylindrical perianth tube at least as long as the tepals and erect, unilateral stamens. It is distinguished from *T. spicatus* by its fine-textured corm tunics, 7–10-flowered spikes, short, obtuse or truncate bracts, 6–8 mm long, violet flowers with perianth tube 22–27 mm long and short anthers, 4–5 mm long. The corm tunics in *T. spicatus* are coarse-textured,

the spikes are mostly more than 10-flowered and up to 25-flowered, the bracts are longer, (9–)12–18 mm long, and the pale blue to mauve flowers have a perianth tube 12–16(–20) mm long with anthers 5–6 mm long. *T. longicollis* resembles *T. montanus* in its long perianth tube, 25–45 mm long but in other respects is similar to *T. spicatus*. The three species occupy complimentary ranges, replacing one another along the coastal mountains of the southwestern Cape, with the two longer-tubed species at the edges of the range of *T. spicatus*. *T. longicollis* extends from the Grootwinterhoek Mountains as far south as Tulbagh Waterfall; *T. spicatus* is distributed from just southeast of Tulbagh to the Palmietrivier Mountains above Kleinmond, with a single record from the western Riviersonderend Mountains above Genadendal; and *T. montanus* is restricted to the eastern end of the Riviersonderend Mountains (Figure 2). A fourth species in this alliance of long-tubed species, *T. ixioides* G.J.Lewis, is distinguished by its compact, subcapitate spike of white flowers with a filiform perianth tube clasping the style throughout its length and lacking any nectar, and a short style that divides opposite the base of the anthers.

Conservation status: known from a single small population high on the Riviersonderend Mountains, the species is not currently under any threat and must be regarded as Vulnerable (B1 + 2c, D).

Other material examined

WESTERN CAPE.—3419 (Caledon): Riviersondered, Pilaarkop, ridge WNW of peak, (–BB), 26 Feb. 1999, *E.G.H. & I.M. Oliver 11228* (NBG).

Reduction of *Thereianthus spicatus* var. *linearifolius* and *T. lapeyrousioides* var. *elatior*

Lewis (1941) distinguished two varieties within *Thereianthus spicatus*: var. *linearifolius* G.J.Lewis, with narrowly linear or subeterete leaves as long as or longer than the stem, and smaller flowers in which the perianth tube is as long as or slightly longer than the tepals; and var. *spicatus* with linear leaves up to 6 mm wide and mostly shorter than the stem, and larger flowers with the perianth tube 12 mm long and slightly shorter than the tepals. There are now numerous collections available, e.g. *Boucher 377*, *Hansford 242* (NBG), in which plants with leaves shorter than the stem have the perianth tube longer than the tepals, whereas many plants with leaves longer than the stem have leaves as wide as in var. *spicatus*, e.g. *De Vos 2307*, *Jordaan 1141* (NBG). Moreover, specimens cited by Lewis as var. *linearifolius* encompass the entire geographic range of the species. Examination of specimens collected since Lewis published her account of the genus confirms the widespread occurrence of narrow-leaved plants but fails to show any correlation between leaf width and flower size or tube length. Narrow-leaved plants are often just younger plants within a population or merely local forms and do not warrant recognition at any taxonomic rank. Finding no merit in var. *linearifolius*, we reduce it to synonymy.

Thereianthus spicatus *(L.) G.J.Lewis* in Journal of South African Botany 7: 39 (1941). *Gladiolus spicatus* L.: 37 (1753). Type: South Africa, Western Cape, without precise locality, collector unknown (holo., LINN!).

Thereianthus spicatus var. *linearifolius* G.J.Lewis: 40 (1941), syn. nov. Type: South Africa, Western Cape, mountains near Franschoek, *T.M. Salter 2973* (holo., BOL!).

Collections of *T. minutus* (Klatt) G.J.Lewis (= *T. lapeyrousioides* (Baker) G.J.Lewis) that have accumulated since the publication of Lewis's (1941) account of the genus render the recognition of the variety *T. lapeyrousioides* var. *elatior* G.J.Lewis unnecessary. Var. *elatior* was recognized for populations of the species from the mountains around Ceres in the north of the range and is separated from the typical variety by its taller, more slender habit and shorter bracts, ± 5 mm vs. 6–8 mm long in var. *lapeyrousioides*. Subsequent collections of the species from Ceres and near Clanwilliam in the north accord with var. *elatior* in these features but more extensive collections from Bain's Kloof in the centre of the species' range, comprise a full range of intermediates between the two varieties. Indeed, collections actually seen by Lewis herself, such as *Loubser 866* (NBG) and *Middlemost 1638* (NBG) from Bain's Kloof, comprise plants that exhibit the whole range of variation found in the species, from slender individuals with leaves 1.5 mm wide and bracts 5 mm long to others with leaves 5 mm wide and bracts 11 mm long. A taxonomic separation between the northern and southern populations does not accurately reflect the biological situation as we understand it and var. *elatior* is reduced to synonymy in *T. minutus*.

The seeds of *T. minutus* are highly unusual and appear to be unique in the genus. Seeds of *T. bracteolatus* and *T. spicatus* are similarly angular with the funicle more or less shortly prolonged and somewhat flap-like, and the testa lightly rugulate or reticulate with the cell surface colliculate. They measure 1–2 mm long and are black or blackish brown (Figure 3A, B). In sharp contrast, seeds of *T. minutus* are fusiform with a thread-like funicle about as long as the body of the seed and hooked at the end, and the testa is longitudinally rugose with the cell surface smooth. The body of the seeds measures 1.5–2.0 mm long and is pale reddish brown (Figure 3C). Seeds of the remaining species are not known.

Thereianthus minutus *(Klatt) G.J.Lewis* in Journal of South African Botany 7: 43 (1941). Type:

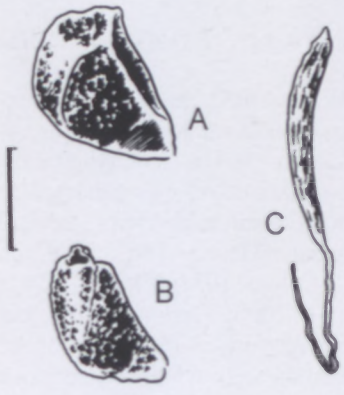

FIGURE 3.—Seeds of *Thereianthus*. A, *T. bracteolatus* (*Goldblatt & Manning 9567*, NBG); B, *T. spicatus* (*SU360*, NBG), C, *T. minutus* (*Bolus 4010*, NBG). Scale bar: 1 mm. Artist: John Manning.

South Africa, Western Cape, Tulbagh Waterfall, *Ecklon & Zeyher Irid. 189* (lecto., B!, designated by Goldblatt 1989: 143; isolecto., MO!, S!).

Thereianthus lapeyrousioides var. *elatior* G.J.Lewis: 38 (1941), syn. nov. Type: South Africa, Western Cape, Ceres hills, *L.Guthrie 2208* (holo., BOL!).

Key to *Thereianthus* species

1a Perianth tube short, 1–2 mm long, less than half as long as tepals and included in bracts; bracts 3–5 mm long; pollen exine reticulate ..... *T. racemosus*
1b Perianth tube well developed, at least 5 mm long, as long as or longer than bracts; bracts 3–18 mm long; pollen exine perforate:
2a Leaves sword-shaped to falcate, with definite midrib; flowers reddish purple; seeds fusiform with thread-like funicle ..... *T. minutus*
2b Leaves linear and subterete, or terete, without definite midrib; flowers white, mauve or bluish purple; seeds (as far as known) angular without thread-like funicle:
3a Spike lax with bracts short, 3–4 mm long, distant, less than half as long as internodes; leaves terete, ± filiform, less than 1 mm diam.; perianth tube 12–20 mm long ..... *T. juncifolius*
3b Spike dense with bracts 6–18 mm long, at least two internodes long; leaves terete or flattened but not filiform, at least 1.5 mm diam.; perianth tube 10–45 mm long:
4a Perianth tube more than twice as long as bracts, 22–45 mm long:
5a Perianth tube 25–45 mm long; corm tunics of coarse fibres; anthers ± 6 mm long; bracts 12–18 mm long ..... *T. longicollis*
5b Perianth tube 22–27 mm long; corm tunics of fine fibres; anthers 4–5 mm long; bracts 6–8 mm long ..... *T. montanus*
4b Perianth tube slightly longer than, to about twice as long as bracts, 10–16(–20) mm long:
6a Perianth tube filiform throughout, not widening above, clasping style; inflorescence compact, subcapitate; flowers white, rarely pale mauve; style dividing opposite base of anthers ..... *T. ixioides*
6b Perianth tube wider, cylindrical and dilating above, not clasping style; inflorescence elongate; flowers usually blue to violet or lilac, rarely whitish; style reaching to at least middle of anthers:
7a Tepals with 3 inconspicuous veins with spreading side branches; leaves with distinct and fairly prominent veins; flowers facing upwards with tepals spreading more or less horizontally; stamens erect with anthers facing lower tepals; filaments ± 4 mm long ..... *T. spicatus*
7b Tepals with 3–5 prominent veins without side branches; leaves with veins not or scarcely visible; flowers facing sideways with tepals spreading almost vertically; stamens held horizontally with anthers facing dorsal tepal; filaments ± 10 mm long ..... *T. bracteolatus*

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