

# The Cape genus *Micranthus* (Iridaceae: Crocoideae), nomenclature and taxonomy

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## ABSTRACT

The genus *Micranthus* (Pers.) Eckl., has traditionally been treated as comprising three species, all with virtually identical, bilaterally symmetric, deep or pale blue to white flowers arranged in crowded, 2-ranked spikes and with divided style branches, but differing in their foliage. Examination of plants in the field and herbarium shows that there are four additional species. *M. filifolius* Goldblatt & J.C.Manning, from the Caledon District of the southwestern Western Cape, has up to six, filiform leaves, the blades of at least the lowermost terete and cross-shaped in section, and usually pale blue-mauve flowers. *M. simplex* Goldblatt & J.C.Manning from high elevations on Zebrakop, Piketberg, has the smallest flowers in the genus, white but tinged lilac as they age, linear leaves up to 1.5 mm wide, and undivided style branches. *M. cruciatus* Goldblatt & J.C.Manning, from the northern Cedarberg and Bokkeveld Mtns, has up to four leaves, the lower with linear or terete blades with heavily thickened margins and central vein and relatively large flowers, unusual in having the style dividing at the mouth of the perianth tube into particularly long branches, these deeply divided as is typical of the genus. *M. thereianthoides* Goldblatt & J.C.Manning, from the Paardeberg south of Malmesbury, is unique in the genus in having flowers with an elongate perianth tube. We also document the occurrence of large populations of putative hybrids at some sites. We provide a complete revision of *Micranthus* with original observations on leaf anatomy, pollen morphology and reproductive biology and discuss its confused taxonomic and nomenclatural history and that of the three common species of the genus, known for over 150 years. In so doing, we neotypify *Gladiolus alopecuroides* L. (1756) [= *Micranthus alopecuroides* (L.) Eckl. (1827)], type of the genus, and choose lectotypes for *M. plantagineus* Eckl. var. *junceus* Baker (1892) and *Gladiolus fistulosus* Jacq. Now with seven species, *Micranthus* remains endemic to the Cape flora region, extending from its extreme northern limit in the Bokkeveld Mtns south-eastwards to Port Elizabeth. We also deal with the genera *Paulomagnusia* Kuntze and *Beilia* Kuntze with which *Micranthus* has sometimes been associated, although both are nomenclatural synonyms of *Thereianthus* G.J.Lewis, a genus close allied to *Micranthus*.

## INTRODUCTION

*Micranthus* (Pers.) Eckl., endemic to the Cape flora region of South Africa, was first recognized as a genus when Ecklon (1827) raised *Gladiolus* subgen. *Micranthus* Pers. to generic rank. He admitted three species to the genus, in this order: *M. plantagineus* Eckl., *M. alopecuroides* (L.) Eckl. (based on *Gladiolus alopecuroides* L.), and *M. fistulosus* Eckl. The names *M. fistulosus* and *M. plantagineus* appear to be implicit references respectively to *Gladiolus fistulosus* Jacq. (1797) and *Ixia plantaginea* Aiton (1789), the latter a superfluous name for *G. alopecuroides*. An indirect reference opposite the genus name 'Watsonia Link', leads to Link (1821), in which *Watsonia plantaginea* Ker Gawl. (1803) is listed, and this work in turn cites *Ixia plantaginea*. We thus treat *M. plantagineus* Eckl. as a new name in *Micranthus* with its type that of *Ixia plantaginea*. We find no such indirect reference for *M. fistulosus* and the name must continue to be regarded as a nomen nudum and therefore invalid.

Until now, *Micranthus* has included just three species (Lewis 1950; Goldblatt & Manning 2000): *M. alopecuroides*, *M. tubulosus* (Burm.f.) N.E.Br. (1929) [with *Gladiolus fistulosus* a heterotypic synonym], and *M. junceus* (Baker) N.E.Br. (1929) [a combination based on *M. plantagineus* var. *junceus* Baker (1892) and a later name for *M. plantagineus* Eckl.]. *Micranthus* (Pers.) Eckl. (1827), itself a later homonym, is conserved against *Micranthus* J.C.Wendl. (1798), a genus of Acanthaceae, with *Gladiolus alopecuroides* L. (*M. alopecuroides* (L.) Eckl.) as its conserved type (Rickett & Stafleu 1959: 241; McNeill *et al.* 2006: 272).

These three species of *Micranthus* are mostly readily distinguished by their leaf morphology: *M. alopecuroides* has plane, ± lanceolate to falcate leaves with an evident main vein (Figure 1A); *M. tubulosus* has two or more short, inflated, terete, hollow (fistulose), falcate leaves, usually half as long as the stem (Figure 1E); and *M. plantagineus* is a taller plant with long, terete, hollow, straight foliage leaves (Figure 1F). All three species have apparently identical, small, mid to deep blue (sometimes described as violet), blue-mauve or occasionally white, bilabiate flowers arranged in congested, 2-ranked spikes subtended by dry, brittle bracts with broad membranous margins. The corms, capsules, and specialized, narrow, 3-sided, elongate seeds are also similar in all three species. Apart from their leaf differences, each species shows a modest preference for a different habitat: *M. alopecuroides* is most often found on sandy ground; *M. tubulosus* on dry, usually shale- or granite-derived soils; and *M. plantagineus* in wet habitats, often in marshes, seeps or along streams, most often in sandy or peaty soils. That said, we have seen two or even all

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three species growing together locally with only very small habitat differences, if any, so habitat preferences are far from absolute.

Several additional populations of *Micranthus* extend the range of leaf morphology in the genus. Plants at high elevations in the Piketberg (*Goldblatt & Manning 10172*, MO, NBG) have narrow, straight to falcate leaves with one or more strongly thickened veins, small, white flowers fading pale lilac, and undivided style branches. These plants grow in an un-

sual habitat for *Micranthus*, crevices and shallow pockets of soil on wet sandstone rocks.

A second series of populations (e.g. *Goldblatt 10438* MO, NBG) from the northern Cedarberg and Bokkeveld Mtns has long, slender, linear leaves with a heavily thickened main vein and equally thick margins, thus often cross-shaped in transverse section (Figure 1D). These slender, often tall, plants also stand out in having the style dividing at the mouth of the perianth tube, with unusually long style branches divided for less than a

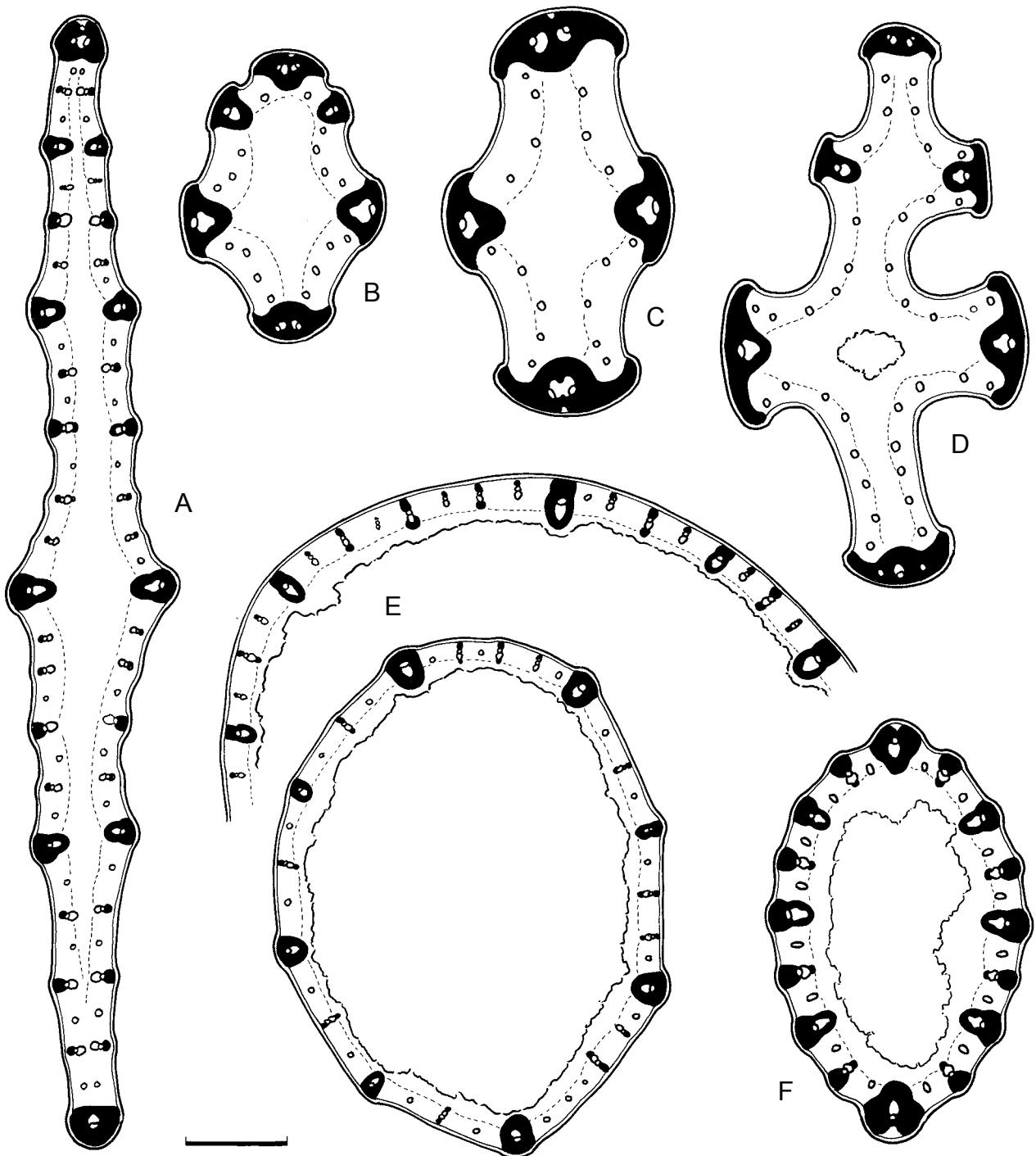


FIGURE 1.—Leaf anatomy in *Micranthus*. A, *M. alopecuroides*, Elandsberg Nature Reserve, *Goldblatt & Manning 13616*; B, *M. filifolius*, Kogelberg, no voucher; C, *M. filifolius*, Drayton, *Goldblatt & Manning 13623*; D, *M. cruciatus*, Pakhuis, *Goldblatt & Porter 13766*; E, *M. tubulosus*, Rondebosch Common, *Goldblatt & Manning 13620*; F, *M. plantagineus*, Drayton, *Goldblatt & Manning 13632*. Scale bar: 500  $\mu$ m.

quarter of their length. They grow in seasonally marshy sites in peaty soil, often in moss on sandstone pavement, and appear to flower particularly well after fire.

A third series of populations from the Caledon District of Western Cape has up to 6 leaves with linear to filiform blades, often cross-shaped in section (Figure 1B, C), with the bases persisting in a well-developed fibrous neck. These plants grow on stony, loamy clay or sandy soils, usually in well drained sites that are dry at flowering time.

Lastly, a population from the Paardeberg south of Malmesbury, only discovered in 2012, has hollow leaves reminiscent of those of *Micranthus tubulosus* but is unique in the genus in having dark blue flowers with an elongate perianth tube, 20–22 mm long, thus more than twice as long as in any other species of *Micranthus*.

Consistent treatment of the genus suggests that these divergent populations should logically be recognized as separate species. The circumscriptions of the existing species cannot be expanded to accommodate these plants. We describe these new species as *Micranthus cruciatus* Goldblatt & J.C.Manning, *M. filifolius* Goldblatt & J.C.Manning, *M. simplex* Goldblatt & J.C.Manning and *M. thereianthoides* Goldblatt & J.C.Manning. Other variants, which we believe are interspecific hybrids, occur locally and we discuss these below. One of them, evidently *Micranthus plantagineus* × *M. tubulosus*, is particularly common at the foot of the Elandsklouf Mtns. Plants have a flexuose stem, terete, hollow leaves and short spikes of up to 10 flowers, and appeared at first to be a separate species, so different were they from their putative parents.

We review the nomenclature of *Micranthus*, choose types for the two species currently lacking designated types, and present a systematic revision, thus dealing with collections that do not accord with the current circumscriptions of the three species included in the genus. We also deal with *Paulomagnusia* Kuntze (1891). When described, *Paulomagnusia* included two species, one a *Micranthus* and the other, *P. spicatus* (L.) Kuntze, now the type species of *Thereianthus* G.J.Lewis (1941). Our revision includes new observations on leaf anatomy, pollen morphology, and reproductive biology and pollination; these presented following the generic description and nomenclature.

#### TAXONOMIC HISTORY AND RELATIONSHIPS

*Micranthus* is most closely allied to *Thereianthus*, also endemic to the Cape flora region. Lewis (1950) first pointed out an unusual, specialized feature shared by the two genera, namely that the lowermost foliage leaf is inserted on the flowering stem as it is in *Lapeirousia* Pourret, also in tribe Watsonieae Klatt, rather than on the corm. This means that the corm tunics are formed solely from the cataphylls, without any contribution from the leaf bases as is found in *Watsonia* Mill. and some other members of the tribe. Molecular systematic studies of plastid DNA sequences confirm the immediate relationship of the two genera, which together are sister to *Watsonia* plus *Pillansia* L.Bolus (Reeves *et al.*

2002; Goldblatt *et al.* 2008), with *Lapeirousia* (*sens lat.*) retrieved as member of a second clade of the tribe, which includes *Cyanixia* Goldblatt & J.C.Manning and *Savannosiphon* Goldblatt & Marais. The close relationship of *Micranthus* and *Thereianthus* is reflected in their largely shared taxonomic and nomenclatural history.

Although *Micranthus* was maintained by most authors dealing with the genus since its recognition at generic rank by Ecklon (1827), species now recognized as *Thereianthus* have had a more chequered history, beginning with Ecklon (1827), who placed two species of that genus in ‘*Beilia*’, then lacking a validating description. Although species of *Micranthus* and *Thereianthus* had first been referred respectively to *Ixia* L. or to *Gladiolus* L., they were included by Ker Gawler (1804) in *Watsonia*, largely because they share divided style branches with that genus. Their nomenclature subsequently became intertwined. Heynhold (1847) included the two species of *Thereianthus* known at that time in *Micranthus* as *M. spicatus* (L.) Heyn. and *M. triticeus* (Thunb.) Heyn. The British botanist and specialist in the taxonomy of Iridaceae, Baker (1877), recognized *Micranthus* in its current sense and included one species of *Thereianthus* in *Watsonia* unranked *Beilia* Eckl. ex Baker, as *W. punctata* (Andrews) Ker Gawl. (now *Thereianthus bracteolatus* (Lam.) G.J.Lewis). Baker (1892) later formalized *Watsonia* unranked *Beilia*, then with several species, as *Watsonia* subgen. *Beilia* (Eckl. ex Baker) Baker. His German contemporary, Klatt (1882), completely misunderstood the situation, and in his worldwide account of the Iridaceae, he included two species of *Thereianthus* in *Micranthus*, as *M. spicatus* (L.) Klatt (evidently referring to what is now *T. spicatus* (L.) G.J.Lewis) and *M. triticeus* (Burm.f.[sic]) Klatt [he was evidently unaware of combinations in *Micranthus* for these species by Heynhold in 1847; we also assume that the basionym attributed to Burman fil. was an error for Thunberg, as *Ixia triticea* Burm.f. is a very different species, currently *Tritoniopsis triticea* (Burm.f.) Goldblatt]. Klatt (1882) also included one species of *Thereianthus*, *T. juncifolius* (Baker) G.J.Lewis, in *Anomatheca* Ker Gawl. as *A. calamifolia* Klatt, and several more in *Watsonia* unranked *Beilia*. Usually astute, Klatt apparently made no reference to any species we now regard as belonging to *Micranthus* but partly corrected the error when he recognized *M. plantagineus* with one variety, var. *junceus* (Klatt 1894). *Thereianthus spicatus*, however, remained in *Micranthus*.

Kuntze (1891) included both what are now *Micranthus alopecuroides* and *Thereianthus spicatus* in his new genus *Paulomagnusia*, evidently intended as a *nomen novum* for the later homonym, *Micranthus* (Pers.) Eckl. 1827 (non *Micranthus* J.C.Wendl. 1798). This genus has now been conserved, although not against *Paulomagnusia*. Kuntze (1898) validated Ecklon’s ‘*Beilia*’ at generic rank as *Beilia* Kuntze, and included in the genus only *B. spicata* (L.) Eckl. ex Kuntze, which is thus its type. Unfortunately *Beilia* is superfluous because Kuntze listed the valid *Paulomagnusia* in synonymy. It remained for Lewis (1941), over a century after Ecklon (1827) used the invalid ‘*Beilia*’, to erect the valid genus *Thereianthus* in which she placed the two species of Ecklon’s ‘*Beilia*’ and several more then included in

*Watsonia*. *Thereianthus* now has 11 species (Manning & Goldblatt 2011).

#### SYSTEMATICS

**Micranthus** (*Pers.*) *Eckl.*, Topographisches Verzeichniss der Pflanzensammlung von C.F. Ecklon: 43 (1827), name conserved, non J.C.Wendl. (1898, Acanthaceae). *Gladiolus* subg. *Micranthus* *Pers.*: 46 (1805). *Hebea* subg./unranked *Micranthus* (*Pers.*) *R.Hedw.*: 24 (1806). Type (conserved): *Gladiolus alopecuroides* *L.* (= *M. alopecuroides* (*L.*) *Eckl.*).

*Paulomagnusia* *Kuntze*: 702 (1891). Type: *P. alopecuroides* (*L.*) *Kuntze* [= *Micranthus alopecuroides* (*L.*) *Eckl.*], lectotype designated by Goldblatt & Manning: 133 (2008).

*Note*: although Persoon's (1805) infrageneric taxa appear at first to be unranked, the preface (ix) to his *Synopsis* has the following statement: *Melius autem iudicavi, eas species (nonnullis forte tamen excipiendis) ab aliis leviter in characterе aberrantes, imprimis si genus minus amplum sit, sub divisione peculiari aut SUBGENERE, quo etiam nonnulla Botanicorum recentium genera relata sunt, comprehendere, ne ultra necessitatem genera multiplicentur.* This is a clear statement that his infrageneric taxa are subgenera. [We have judged it better to include those species (with some exceptions) that in their character(s) are only slightly different from others, especially if the genus is not very large, under the 'particular division' or subgenus (which are some of genera of recent botanists), so that genera are not multiplied beyond necessity.]

Deciduous geophytes. *Corm* axillary in origin, subglobose, rooting from below; tunics coarsely fibrous. *Leaves* few, the lower 2 or 3 cataphylls, lowermost foliage leaf longest, inserted on stem above corm, blades either plane with a definite main vein and falcate or lanceolate with margins moderately to heavily thickened, or  $\pm$  tubular and hollow, or terete and  $\pm$  solid with heavily thickened central vein and margins separated by narrow longitudinal grooves. *Stem* erect and straight or  $\pm$  flexuose, simple or few- to several-branched. *Inflorescence* a congested, 2-ranked spike, usually weakly rotated; *bracts* short, overlapping, with leathery or dry central portion and broad membranous margins, inner forked apically and shorter than to  $\pm$  as long as outer. *Flowers* zygomorphic, lasting several days, blue to violet, mauve, white or flushed lilac, scentless or pleasantly scented, with nectar from septal nectaries; *perianth tube* short, curving outward,  $\pm$  cylindrical below, flaring in upper half; *tepals*  $\pm$  equal, dorsal slightly larger and arching over stamens, lower tepals extended  $\pm$  horizontally. *Stamens* unilateral and arcuate; filaments slender, free; anthers oblong, held under the dorsal tepal, splitting longitudinally. *Ovary* ovoid, sessile; style branches slender, usually deeply divided and recurved, or barely notched at apex. *Capsules* woody, small, narrowly ovoid-ellipsoid or urn-shaped with ovules in lower fourth. *Seeds* 2–4(5) per locule, 3(4)-sided below, elongate, widest at micropylar end with micropylar crest and micropyle above base, tapering and pointed at chalazal end, surface slightly wrinkled. *Basic chromosome number*  $x = 10$ .

The diagnostic features of *Micranthus* are the crowded, 2-ranked spike; small, bilaterally symmetric, tubular flowers; distinctive dry outer floral bracts with broad membranous margins; basal leaf inserted on the stem above the level of the corm (shared with *Lapeirousia* and *Thereianthus*); and small, narrow capsules, each locule containing up to four slender seeds almost as long as the locules and with a micropylar crest at the proximal end. *Micranthus* is unique among subfamily Crocoideae in having zonosulcate pollen grains (Figure 2). The sulci are distal as seen at the tetrad stage (S. Nilsson, pers. comm. Oct. 1996) and the zonosulcate condition in *Micranthus* is thus derived from the basic monosulcate grain by extension of the sulcus until it encircles the grain. Exine sculpturing is reticulate, grading to tectate-perforate close to the aperture margin. Among Crocoideae, only a few species of *Thereianthus* also have reticulate exine sculpturing (Manning & Goldblatt 2011). Most genera of Crocoideae, including *Thereianthus*, have sulcate pollen grains, with a pair (sometimes solitary) of narrow bands of exine (elongated opercula) lying parallel to one another along the long axis of the aperture. Other more complex apertures are known in *Geissorhiza* Ker Gawl. (Goldblatt & Manning 2009). *Cyanixia* and *Zygotritonia* have trisulcate grains. All these pollen types have tectate-perforate exine with small suprategical spinules.

Leaf marginal anatomy in species with plane leaves conforms to the norm for Watsonieae in combining unspecialized marginal epidermal cells and a marginal vein with a sclerenchyma cap below the epidermis. This condition prevails in *Watsonia* and the *Lapeirousia* clade (excluding *L. corymbosa* (*L.*) Ker Gawl. and its immediate allies), but notably not in *Thereianthus* or *Pillansia*, both of which lack a marginal vein or sclerenchyma strand below the unspecialized marginal epidermis (Goldblatt & Manning 1990; Rudall & Goldblatt 1991; Goldblatt *et al.* 2004; Manning & Goldblatt 2011).

*Chromosome cytology*: the basic chromosome number for *Micranthus* is  $x = 10$ . One population each of the four species counted, namely *M. alopecuroides*, the new *M. filifolius* (reported as *M. junceus*), *M. plantagineus* (as *M. junceus*) and *M. tubulosus*, are diploid,  $2n = 20$  (Goldblatt 1971; Goldblatt & Takei 1997). The base number and karyotype, consisting of one long and nine short chromosome pairs, are matched exactly in *Thereianthus*. The related genus *Watsonia* has  $x = 9$  and a derived karyotype with two long chromosome pairs. *Pillansia*, the fourth and last genus of this lineage of Watsonieae, also has  $x = 10$ , with its single species tetraploid,  $2n = 40$  (Goldblatt 1977; not 44 as originally published by Goldblatt 1971).

*Reproductive system, compatibility and pollination*: virtually nothing has been reported about the reproductive system in *Micranthus*, but we infer that self-incompatibility and compatibility are important in the evolution and distribution of the genus. It is notable that three species, *M. alopecuroides*, *M. plantagineus* and *M. tubulosus* typically have all flowers producing a full complement of capsules and we infer self-compatibility and facultative autogamy for these species. In contrast, *M. filifolius* and *M. thereianthoides* exhibit lower capsule production and we infer self-incompatibility for these species. We are unable to infer compatibility relations



FIGURE 2.—Pollen morphology of *Micranthus plantagineus*, Piketberg, Manning 2093. Scale bar: 20  $\mu$ m.

for *M. cruciatus* and *M. simplex* as good fruiting material is not available. Significantly, the putatively self-compatible species *M. alopecuroides*, *M. plantagineus* and *M. tubulosus* have the widest ranges in the genus, with *M. plantagineus* occurring over the entire range of the genus. *M. filifolius* has a modest range, entirely within the Caledon District of Western Cape but *M. cruciatus*, *M. simplex* and *M. thereianthoides* are local endemics, the latter two currently known from only one or few populations. Self-incompatibility is believed to be ancestral for Iridaceae (Goldblatt & Manning 2008). In genera that we have studied, we have found relatively few species to be facultatively autogamous, and we assume such species are specialized. Reversals from self-compatibility to incompatibility are believed to be unlikely. Thus in *Micranthus* we infer that the self-compatible *M. alopecuroides*, *M. plantagineus* and *M. tubulosus* are derived for this character. The latter two species are also derived in their hollow leaves as outgroup comparison indicates that plane, isobilateral leaves are the plesiomorphic condition (present in most members of the family and universal in sister genus *Thereianthus*). Reproduction through aerial cormlets that replace flowering on the spike axis is also known only in these three species. The arrangement of species in our account reflects our belief that the self-incompatible species are closer to the ancestral stock of *Micranthus*.

The small flowers of all species except *Micranthus thereianthoides* are so similar in size, shape and colour (perianth tube 3–5 mm long) that they almost certainly share the same generalist pollination ecology, though we have only recorded insect visitors for *M. alopecuroides*,

*M. plantagineus* and *M. tubulosus*. Goldblatt & Manning (2006) regarded these three species as having a generalist pollination strategy and insect visitors to these species include large-bodied bees (Apidae), bee-flies (Bombyliidae), hopliine beetles (Scarabaeidae: Hopliini) and butterflies. Among the latter are *Pieris helice* (Pieridae) (*M. plantagineus*) and *Cynthia cardui* and *Colias electo* (Pieridae) (*M. tubulosus*). New observations confirm to the generalist pattern with anthophorine bees and wasps including *Delta* cf. *caffra* (Eumenidae), a species of Sphecidae visiting *M. plantagineus*. The longer perianth tube of *M. thereianthoides*, 22–25 mm long, suggests a specialized pollination system using a long-proboscid pollinator, possibly a long-proboscid fly species or large butterfly. The nectar reward, retained in the lower part of the perianth tube, is only accessible to pollinators with a proboscis at least 18 mm long, thus excluding access to smaller butterflies, bees, bee-flies and wasps that visit flowers of other *Micranthus* species.

#### Key to the species

Note: plants with the lower part of the spike bearing smaller, paler floral bracts subtending one or more small cormlets may be *Micranthus junceus* or *M. tubulosus* or may be hybrids involving these two species or with *M. alopecuroides* and are not accommodated in the key.

- 1a Leaf blades either plane with evident central vein or one or two prominently thickened veins, or terete and 4-grooved with thickened margins, not hollow; style variously dividing between mouth of perianth tube to opposite middle of anthers:
- 2a Lowermost leaves plane and linear to lanceolate or falcate, (2)–4–12 mm wide; style branches divided  $\pm$  halfway . . . . . 1. *M. alopecuroides*
- 2b Lowermost leaves either plane and linear or terete and cross-shaped in section, up to 2 mm wide; style branches divided up to halfway or undivided:
- 3a Flowers white, outer tepals tipped palest lilac, fading slightly darker lilac; style branches undivided or barely notched at apex . . . . . 2. *M. simplex*
- 3b Flowers pale blue, blue-mauve or deep blue or white; style branches divided up to halfway:
- 4a Style dividing at mouth of perianth tube opposite middle of filaments; style branches  $\pm$  2.5 mm long, divided less than one third; leaves at least 1.5 mm wide . . . . . 6. *M. cruciatus*
- 4b Style dividing between base and middle of anthers; style branches usually  $\pm$  1.0 mm (up to 1.5 mm) long, divided up to halfway; leaves < 1 mm wide . . . . . 5. *M. filifolius*
- 1b Leaf blades tubular and hollow, round or  $\pm$  compressed in section; style dividing opposite base to middle of anthers (rarely just below anther bases):
- 5a Perianth tube elongate and  $\pm$  twice as long as bracts, 22–25 mm long; bracts 8–15 mm long . . . . . 3. *M. thereianthoides*
- 5b Perianth tube shorter than bracts, < 10 mm long; bracts 5–7 mm long:
- 6a Flowering stem  $\pm$  flexed at each aerial node; stem with prominent, coarsely fibrous collar around base . . . . . *M. plantagineus*  $\times$  *M. tubulosus*
- 6b Flowering stem straight, stiffly erect; stem with or without collar of fibres around base:

7a Blade of lowermost leaf terete or oval in section, ± straight, green at flowering and smooth when fresh (with evident thickened veins when dry); stem without collar of fibres around base; capsules narrowly ovoid to ± urn-shaped . . . . . 7. *M. plantagineus*

7b Blade of lowermost leaf tubular and inflated, falcate with prominent apical mucro, often dry at flowering, without prominent veins when alive or dry; stem with collar of fibres around base; capsules narrowly ovoid . . . . . 4. *M. tubulosus*

1. ***Micranthus alopecuroides* (L.) Eckl.**, Topographisches Verzeichniss der Pflanzensammlung von C.F. Ecklon: 43 (1827). *Gladiolus alopecuroides* L.: 5 (1756). *Ixia alopecuroides* (L.) L.f.: 92 (1782). *Ixia plantaginea* Aiton: 59 (1789), nom. illeg. superfl. pro *Gladiolus alopecuroides* L. [see note 1]. *Paulomagnusia alopecuroides* (L.) Kuntze: 702 (1891). Type: South Africa, [Western Cape], Somerset West, 19 Nov. 1944, *Barker 3384* (NBG, neo., here designated; PRE isoneo.) [see note 2].

*Watsonia compacta* Lodd.: t. 1577 (1830), nom. nud.

Plants mostly 200–450 mm high, base usually sheathed with collar of short fibres. *Corm* mostly 10–12 mm diam., tunics of dark brown, relatively coarse, reticulate fibres, drawn into short bristles above. *Stem* usually simple or 1- or 2(3)-branched, when unbranched often with one or more scales below base of spike, usually bearing 1 or more cormlets in axil of lowermost foliage leaf. *Leaves* 2–4(5), lowermost 1 or 2 plane, broadly to narrowly falcate (occasionally ± lanceolate) or linear, (2–)5–10(–15) mm wide, with moderately prominent main vein; margins slightly or occasionally heavily thickened (*De Vos 2288*), hyaline when dry; upper 1 or 2(3) leaves largely sheathing. *Spike* mostly 40–80-flowered, often much congested, with internodes 1.5–3.0 mm long; bracts 5–7 mm long, outer with broad to narrow brown centre and translucent membranous margins, inner ± as long as outer, notched apically, translucent with 2 dark veins slightly broader toward base; lower or all nodes sometimes vegetative and then bracts paler in colour and subtending one (or more) cormlets in each axil. *Flowers* usually dark blue, sometimes pale blue, often lower third to fourth of tepals paler blue or white, distally edged with a thin darker blue line, unscented; perianth tube ± 5 mm long; tepals subequal, elliptic, 7–8 × ± 3 mm, with short narrow, claw-like base. *Stamens* with filaments ± 5 mm long, diverging in upper half; anthers oblong, 3–4 mm long, pale mauve; pollen white to pale blue. *Style* ± 7 mm long, mostly dividing between upper third of filaments and lower third of anthers; branches ± 1.2–1.6 mm long, divided for ± half their length. *Capsules* oblong to narrowly ovoid, ± 5 mm long but ± 4 mm long when dry. *Seeds* angular-elongate, 3.5–4.0 mm long, 3 or 4 per locule. *Flowering time*: October in the north, November to December in the south.

*Distribution*: centred in the southwestern Western Cape, *Micranthus alopecuroides* has a relatively narrow range, extending from the Cape Peninsula north into the Olifants River Valley and east locally to Hermanus and Swellendam (Figure 3). Plants typically grow on well-drained clay or loamy, seasonally wet, slopes and flats

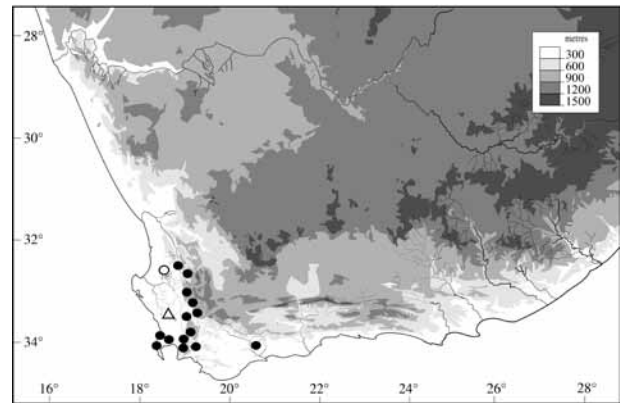


FIGURE 3.—Distribution of *Micranthus alopecuroides*, ●; *M. simplex*, ○; *M. thereianthoides*, △.

but have also been recorded on sandy ground. The Olifants River Valley populations grow in thin clay or sandy gravel, often over rocky pavement that is totally dry even before flowering commences.

*Diagnosis*: *Micranthus alopecuroides* is distinctive in its plane (Figure 1A), sometimes very broad basal leaves; the blades lanceolate to linear or falcate, sometimes up to 12 mm wide or exceptionally to 15 mm in plants from the Roman's River area of the upper Breede River Valley. Exceptions are numerous and there are collections with ± linear leaves 3–5 mm wide and only up to 25 mm long (notably *Purcell s.n.*, NBG). The flowers are typical of the genus, usually dark blue, with a perianth tube ± 5 mm long. The spikes of 40 or more flowers are often unusually congested with the internodes ± 1.5 mm long.

Populations from the Olifants River Valley and flowering in October, at least three weeks earlier than elsewhere, stand out in their relatively lax spikes with internodes 2.5–3.0 mm long (vs. ± 1.5–2.0 mm elsewhere) and relatively short, straight leaves, 5–8 mm wide with particularly prominent mucronate tips. The outer bracts of these plants also differ from those in populations to the south in their broader translucent margins, thus with a significantly narrower central band of green tissue (brown when dry). These plants are typically restricted to thin clay or light sandy soils over rocky pavement and represent a distinctive race of the species.

*Hybrids*: certain collections from sandy flats south of Malmesbury constitute a puzzle. They consist of plants with abnormally elongated spikes up to 120 mm long, more than 3/4 of their length bearing small, pale bracts each enclosing not a flower but a small cormlet. Only the top fourth of the spikes have properly formed, dark brown bracts subtending either pale blue flowers (e.g. *Goldblatt & Manning 10431*, MO, NBG, with tubular leaves) or deep blue flowers (*Goldblatt & Manning 10432*, MO, NBG, with plane leaves). The leaves, either tubular or plane with a central vein, correspond to *Micranthus tubulosus* or *M. alopecuroides* respectively. We conclude that these plants constitute hybrids or a hybrid swarm with *M. alopecuroides* as one parent and *M. tubulosus* or possibly *M. plantagineus* as the other. Microscopic examination of the pollen shows some apparently normal grains and others smaller than normal

and evidently sterile. The available collections of this putative hybrid were made too early in the life cycle to have capsules, which if developed, would have appeared later in the season.

Similar specimens from other sites show the same striking feature (e.g. *Goldblatt 8711* MO, from Greyton; *Leighton 722* BOL from Camp Ground, Rondebosch; and *Williams 1195* MO, NBG from near Vogelgat, Hermanus). This last collection consists of plants with the sterile part of the spikes 180–250 mm long and the fertile part 20–30 mm long. Populations at Elandsberg near Bo-Hermon, with plane, narrowly lanceolate leaves (e.g. *Goldblatt & Manning 13616*) have the inflorescence sterile throughout and bearing a cormlet in all bract axils as do many individuals of the species from Rondebosch Common, Cape Town (*Goldblatt & Manning 13619*). The status of these plants is uncertain but we suspect them to have a hybrid origin.

[*Note 1.* Daniel Solander, the unacknowledged author of *Hortus kewensis* published under William Aiton's name (1789), described the new species *Ixia plantaginea* 'foliis linearibus strictis, spica disticha imbricata', based on a collection of Francis Masson and, for reasons that are obscure, at the same time cited Linnaeus's *Gladiolus alopecuroides* in synonymy. The epithet *plantaginea*, alluding to the similarity of the inflorescence to that of *Plantago* L., is no more apt than Linnaeus's recalling the resemblance to the grass, *Alopecurus* L., and constitutes an illegitimate superfluous name. Nevertheless, the broad-leaved species remained known by the later epithet *plantagineus*, until well into the 20th century (e.g. Lewis 1950) despite the leaves being described as narrow and linear in the protologue. The epithet *plantagineus* was applied to *M. alopecuroides* by, among others, Ker Gawler (1803), who evidently did not realize it applied to two different species. Baker (1892, 1896), who also used the name *M. plantagineus* for *M. alopecuroides*, compounded this error and recognized *M. plantagineus* var. *junceus* not realizing that the type of the species was in fact identical with his new variety.]

[*Note 2.* Described in 1756 by Linnaeus as *Gladiolus alopecuroides*, with the brief diagnosis 'foliis linearibus, spica disticha imbricata,' the species was transferred to *Micranthus* by Ecklon (1827), when he raised Persoon's *Gladiolus* subg. *Micranthus* to generic rank. Of the three sheets identified as *G. alopecuroides* in the Linnaean herbarium, one [LINN 59.13] is a Sparrman collection post-dating the protologue, and the other two cannot be unambiguously related to the name. One [LINN 59.15] is *M. tubulosus* and the other [LINN 59.14] may be *M. alopecuroides* but is atypical in its large size, numerous branches and particularly broad leaves that hardly accord with the protologue [leaves linear]. We prefer to choose a neotype: *Barker 3384*, which has relatively narrow leaves and conforms exactly to the protologue. This action unambiguously preserves the current application of the name to the plane-leaved species (Lewis 1950; Goldblatt & Manning 2000).]

[*Note 3.* *Gladiolus minutiflorus* Schrank (1822) has been associated with *Micranthus alopecuroides*, which Schrank also recognized (as *Gladiolus*), but the description is vague (flowers small, secund, tepals subequal

and we are unable to determine the plant to genus with confidence, let alone to species. Schrank did, however, explicitly describe the leaves as short, striate and narrow, the lower  $\pm 5$  inches (125 mm) long. No authentic material has been located either at the Munich (M) or Brussels (BR) Herbarium, the institutions where the types of Schrank's species, where they exist, are believed to be located.]

#### Representative specimens

WESTERN CAPE.—**3218** (Clanwilliam): clay hillside S of Algeria turnoff on Clanwilliam–Citrusdal road (N7), (–BD), 13 Oct. 1974, *Goldblatt 3030* (MO). **3220** (Wuppertal): near Citrusdal on old Clanwilliam road, (–CA), 11 Oct. 1984, *Bean & Viviers 1504* (BOL); N of Citrusdal, (–CA), 16 Oct. 1935, *Taylor 1224* (BOL); clay slope near Farm Klawervlei on road to Algeria, (–CA), 11 Oct. 2011, *Goldblatt & Porter 13864* (MO, NBG, PRE). **3318** (Cape Town): Cape Peninsula, Wynberg Hill, (–CD), Nov. 1950, *Pillans 10208* (BOL, MO); Wynberg Hill, Edinburgh Drive, (–CD), 25 Jan. 2011 (fr.), *Goldblatt & Manning 13631* (MO, NBG); fields near Cape Town, (–CD), Aug.–Nov., *H. Bolus 2829* (BOL); Devil's Peak above Vredehoek, clay slopes, (–CD), 30 Oct. 1982, *Goldblatt 6637* (MO); slopes of Lions Head, (–CD), 20 Nov. 1938, *Penfold s.n. SAM53159* (SAM); Jonkershoek, Bosboukloof, (–DD), 27 Nov. 1973, *Smith 140* (NBG); Jonkershoek Valley, (–DD), 27 Nov. 1975, *Kruger 84* (NBG). **3319** (Worcester): Grootwinterhoek, (–AA), without date, *Pappe s.n. SAM21101* (SAM); Mostertshoek, (–AC), 8 Dec. 1973, *De Vos 2288* (NBG); slopes at Wabooms R., foot of Waaihoek Peak, (–AD), 11 Dec. 1948, *Esterhuysen 14822* (BOL); Bo-Hermon, Elandsberg Nature Reserve, entrance to Bosplaas, (–AC), 22 Jan. 2011 (fr. and sterile); *Goldblatt & Manning 13616* (MO, NBG); Wemmershoek, (–CC), 2 Nov. 1947, *Barker 4903* (BOL, NBG). **3418** (Simonstown): Cape Peninsula, Bergvliet Farm, E of sandpit, (–AB), 22 Nov. 1918, 5 Dec. 1944, *Purcell s.n.* (NBG); Helderberg, Somerset West, (–BB), 2 Dec. 1944, *Parker 3959* (BOL, NBG). **3419** (Caledon): Elgin Basin, Arieskraal, well drained clay ground, (–AA), 5 Dec. 1994, *Rode & Boucher 0207* (NBG); Elgin, (–AA), 19 Nov. 1944, *Barker 3369* (NBG). **3420** (Bredasdorp): Swellendam, Bontebok Park, (–AB), 2 Nov. 1965, *Grobler 552* (NBG).

#### 2. *Micranthus simplex* Goldblatt & J.C.Manning, sp. nov.

TYPE.—Western Cape, 3218 (Clanwilliam): Piketberg, southwestern slopes of Zebrakop, (–DB), shallow soil on sandstone pavement, 4 Jan. 1995, *Goldblatt & Manning 10172* (NBG, holo; K, MO, PRE, iso.).

Plants (100–)140–200 mm high, base sheathed by short collar of brittle fibres. *Corm* tunics of dark brown, reticulate fibres. *Stem* usually simple, rarely 1-branched. *Leaves* (2)3, plane, linear or falcate,  $\pm 1$  mm wide, usually with 1 or 2 prominent veins, margins thickened, hyaline when dry. *Spike* 16- to 40-flowered; bracts purple-brown with broad translucent, brown-flecked membranous margins,  $\pm 5$  mm long, inner bracts  $\pm$  as long as outer, membranous with 2 dark keels, notched at apex. *Flowers* white fading to lilac, outer tepals tipped pale lilac, with subapical brown ridge on reverse; perianth tube  $\pm 3$  mm long; tepals oblong,  $\pm 4 \times 1.2$  mm. *Stamens* with filaments  $\pm 2.5$  mm long; anthers oblong,  $\pm 2.5$  mm long. *Style*  $\pm 7$  mm long, dividing opposite middle of anthers; branches  $\pm 1$  mm long, barely notched at apex. *Capsules* oblong, slightly warty in distal half,  $\pm 4$  mm long. *Seeds* elongate-angular,  $\pm 3$  mm long. *Flowering time*: December to at least mid-January.

*Distribution*: known only from the slopes of Zebrakop, highest peak in the Piketberg, *Micranthus simplex*, like *M. cruciatus*, grows in shallow soils in moss or in rock crevices on wet sandstone rocks (Figure 3). The



habitat remains moist as late as January when the species blooms.

*Diagnosis:* unusually small for the genus, stems of *Micranthus simplex* rarely exceed 180 mm and the white flowers with lilac-tipped outer tepals are distinctive, other species having flowers in shades of deep to pale blue or blue-mauve, or occasionally white. The inflorescence has the appearance of being relatively lax, the bracts of the lower flowers of the spike not overlapping those above them, but the upper bracts are as closely set as in other species. It is one of two species of *Micranthus* with consistently plane leaves; the other, *M. alopecuroides*, is a taller plant with congested spikes of 40 to 80 flowers and broader leaves mostly 5–12 mm wide. The flowers of *M. simplex* are the smallest in the genus, the perianth tube just 3 mm long and the short anthers  $\pm 2.5$  mm long. The short, undivided style branches,  $\pm 1$  mm long, are likewise unusual for *Micranthus*, other species of which normally have the style branches somewhat to considerably longer and divided for at least one third their length.

#### *Additional specimens*

WESTERN CAPE.—3218 (Clanwilliam): Piketberg, Zebrakop, (–DB), in moist sand, 800 m, 3 Jan. 1973, *Linder 193* (BOL).

### 3. *Micranthus thereianthoides* Goldblatt & J.C.Manning, sp. nov.

TYPE.—Western Cape, 3318 (Cape Town): Paardeberg, Vondeling, (–DB), rock cracks and sands along stream, 9 Jan. 2013, *Nicolson 995* (NBG, holo.; K, MO, iso.).

Plants 300–800(–1200) mm high, base weakly sheathed by fine fibres. *Corm* 10–15 mm diam., tunics of fine to moderately coarse, dark brown, reticulate fibres. *Stem* simple or rarely branched, with solitary cormlet in axil of second leaf and sometimes also third leaf. *Leaves* (4)5 or 6, green or drying at flowering, lowermost 2 or 3 longest, blades 100–300(–800) mm long, 2.5–5.0 (–15) mm diam., tubular and hollow, sometimes inflated, acute-mucronate, upper leaves progressively shorter and narrower, uppermost bract-like and entirely sheathing. *Spike* 10- to 40(–70)-flowered, bracts brown with broad translucent membranous margins, 8–11(–15) mm long, as long as 1.5–2.0 spike internodes, inner bracts slightly shorter than outer, forked apically, membranous with 2 dark keels broadened toward base. *Flowers* suberect, dark violet or purple, unscented; perianth tube  $\pm$  cylindrical, 22–25 mm long, tepals oblong, 5–6  $\times$  1.5–2.5 mm, reverse of outer tepals with prominent subapical ridge. *Stamens* with filaments 6–8 mm long, exerted  $\pm 3$  mm; anthers oblong, 3.5–4.0 mm long. *Style* 24–27 mm long, dividing between middle and slightly beyond anthers, branches  $\pm 1.5$ (–2.0) mm long, divided for  $\pm$  half their length. *Capsules* ovoid, smooth, 5–6 mm long, with  $\pm 4$  seeds per locule. *Seeds* elongate-angular, tapering to points at both ends,  $\pm 3.5$  mm long. *Flowering time:* January. Figure 4.

*Distribution:* a highly local endemic, *Micranthus thereianthoides* is restricted to the Paardeberg near Malmesbury (Figure 3), where it grows at mid to upper altitudes along the banks of seasonal streams, the corms

usually wedged among granite rocks, sometimes in humic loam, where the plants are more robust. Plants are locally plentiful along several streams on the range. The long-tubed, violet flowers are evidently adapted to pollination by long-proboscid flies. The incomplete fruit set in wild plants suggests that *M. thereianthoides* is an obligate outcrosser.

*Diagnosis:* *Micranthus thereianthoides* closely resembles *M. plantagineus* and some forms of *M. tubulosus* in its cylindrical leaves but is unique in the genus in the relatively large floral bracts, 8–11 mm long, and most strikingly in its dark violet flowers with elongate, cylindrical perianth tube 22–25 mm long, thus  $\pm$  twice as long as the bracts (Figure 4). The species appears never to develop cormlets in the floral bract axils.

The long-tubed flowers suggest the genus *Thereianthus*, but the hollow leaves, the small, obtuse tepals, and the bracts with broad, membranous margins are characteristic for *Micranthus*. The zonasulcate pollen grains with reticulate exine conform exactly to those of other species of *Micranthus*, leaving no doubt as to its generic placement.

This extraordinary species was discovered in January 2012 by local plant enthusiasts Greg Nicholson and Dewan Roets during a botanical survey of the Paardeberg.

#### *Additional specimens*

WESTERN CAPE.—3318 (Cape Town): Paardeberg, between Wellington and Malmesbury, Paardeberg Nature Reserve next to Malmesbury Dam, (–DB), rocky crevices near water, 10 Jan. 2012, *Nicolson & Roets 788* (NBG); Vondeling, (–DB), Feb. 2012 (fruiting), *Nicolson 994* (MO, NBG).

4. *Micranthus tubulosus* (Burm.f.) N.E.Br. in Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew 1929: 133 (1929). *Gladiolus tubulosus* Burm.f.: 2 (1768). *Ixia cepacea* Basseporte ex DC. in Redouté: t. 96 (1804), nom. nov. in *Ixia*, non *I. tubulosa* Burm. f. (= *Babiana tubulosa* (Burm.f.) Ker Gawl.). Type: South Africa, without precise locality or collector (G: Herb. Burman, holo., image seen).

*Gladiolus fistulosus* Jacq.: 8 (1797). *Ixia fistulosa* (Jacq.) Sims: t. 523 (1801), hom. illegit. non Andrews (1799) [= *Hesperantha radiata* (L.f.) Ker Gawl.]. *Micranthus fistulosus* (Jacq.) Eckl. ex Baker: 179 (1892), nom. superfl. pro *G. tubulosus* Burm.f. Type: South Africa, without precise locality or collector, illustration in Jacq.: t. 16 (1797), left hand plant, lectotype designated here.

*Watsonia spicata* Sol. ex Ker Gawl.: sub t. 553 (1803). nom. superfl. pro *G. spicatus* L. (1753), *G. tubulosus* Burm.f. (1768) et *G. fistulosus* Jacq. (1797). [The citation *Watsonia spicata* (L.) Ker Gawl. in Annals of Botany (König & Sims) 1: 229 (1804) is an error]. Type: South Africa, without precise locality, illustration in Curtis's Botanical Magazine 15: t. 523 '*Ixia fistulosa*' (1801).

*Ixia teretifolia* Herb. Banks ex Sims: t. 523 (1801), nom. nud. pro syn.





FIGURE 4.—*Micranthus thereianthoides*, Paardeberg, Nicolson 995 (NBG). A, flowering plant; B, flower; C, outer (left) and inner (right) bract; D, capsule; E, seed. Scale bar: A, 10 mm; B–D, 2.5 mm; E, 1.25 mm. Artist: John Manning.

*Micranthus fistulosus* Eckl.: 44 (1827), nom. nud. [Probably intended as a combination but basionym not cited.]

Plants (70–)150–350(–600) mm high, base sheathed by collar of short, stiff, bristly fibres. *Corm* 14–18 mm diam., tunics of coarse, dark brown, reticulate fibres. *Stem* simple or branched, occasionally with cormlets in axil of lowermost leaf and of uppermost cataphyll. *Leaves* (2)3–5, usually dry at flowering, lowermost 1 or 2 longest, blades 50–200 mm long (to 300 mm in sterile plants), 4–7 mm diam., inflated, tubular and hollow, apex obtuse-mucronate, upper leaves progressively shorter and narrower. *Spike* 16- to 40-flowered; bracts mid to dark brown, 5–6 mm long, outer with broad translucent membranous margins, inner bracts  $\pm$  as long as outer, forked apically, membranous with 2 dark keels broadened toward base; lower nodes sometimes vegetative with one or more cormlets and bracts then pale. *Flowers* pale or dark blue or white, sweetly scented; perianth tube 5–6 mm long; tepals oblong, 5–6(–10)  $\times$  1.2–2.5 mm, reverse of outer tepals with prominent subapical ridge. *Stamens* with filaments 6–8 mm long; anthers oblong, 3.5–4.0 mm long. *Style* 7–8 mm long, dividing opposite or slightly below base of anthers, branches  $\pm$  1.5(–2.0) mm long, divided for  $\pm$  half their length. *Capsules* ovoid, smooth, 4–5 mm long, with 3 or 4 seeds per locule. *Seeds* elongate-angular, tapering to points at both ends,  $\pm$  3 mm long. *Flowering time*: November to December.

*Distribution*: typically a species of lower slopes usually on clay and granite-derived soils but also on sandstone, *Micranthus tubulosus* is restricted to the western half of Western Cape. It extends north of the Cape Peninsula as far as the northern Cedarberg, where an early (1923) collection documents its occurrence at Heuningvlei, and no further east of the Peninsula than Suurbraak near Swellendam and the Agulhas Peninsula (Figure 5). Like other species of the genus, it blooms late in the season when the hollow, inflated leaves are often dry and brown. Plants from the Pakhuis Mtns growing in moist, sandy ground are exceptional in their small size (leaves up to 100 mm long) and require additional study. A much dwarfed fragment of *Micranthus tubulosus*, said to be from Garies (*Caporn s.n.*, ex hort. Kirstenbosch (as Nat Bot Gard. 915/15) in BOL) is unlikely to be from there as no other records of the genus from Namaqualand exist.

*Diagnosis*: the inflated, tubular, falcate leaves (Figure 1E) are diagnostic for the species, the spikes and flowers of which differ hardly at all from those of *Micranthus alopecuroides*. A particularly distinctive feature of the leaves is the prominent brown mucro at the obtuse to  $\pm$  truncate apices. The leaves are often  $\pm$  dry at flowering time—Marloth's (1915: plate 41) has a particularly apt illustration of the species. As in *M. plantagineus*, one or more cormlets may be produced in the lower axils of the spike, a phenomenon first noted by Ker Gawler (in Sims 1801) and later confirmed by Lewis (1950). The condition is more frequent, although not consistent, in *M. plantagineus*. Despite its apparently preferred habitat on relatively dry slopes, *M. tubulosus* can occasionally be found on moist sandy flats, sometimes co-occurring with *M. alopecuroides* and *M. plantagineus* (*Wurts 519*

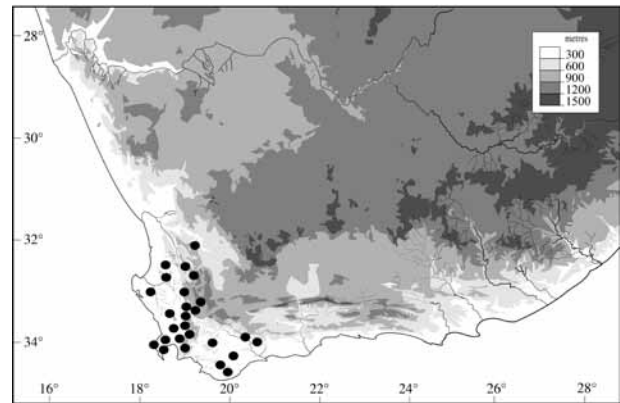


FIGURE 5.—Distribution of *Micranthus tubulosus*.

consists of just such a mixture, *M. tubulosus* and *M. plantagineus* evidently found growing in close proximity). Hybrids between these two species at shared sites blur their usually clear foliar differences. We discuss putative hybrids between *Micranthus tubulosus* and *M. alopecuroides* or *M. plantagineus* in more detail below.

Plants collected near Saron (e.g. *Schlechter 10618*) are unusually small, mostly 100–150 mm but some just 70 mm tall, and have shorter, fewer-flowered spikes than usual. They appear linked to taller, more robust specimens by a range of intermediates. In contrast, plants from Gouda (*Barker 9861*), nearby, are exceptionally robust, up to 600 mm tall, with leaves almost as long, and the white flowers have tepals 10 mm long, the outer 2.5 mm wide.

A curious feature of *Micranthus tubulosus* is that populations may consist of a mixture of some plants with entirely fertile spikes and others with the lower part of the spike sterile (e.g. *Ecklon & Zeyher Irid 192 and 190*). All three specimens of *Goldblatt 8711* and several of *Purcell 43* have spikes sterile in the lower half. Particularly short leaves in *Goldblatt 8711* are also puzzling but not unique.

*History*: Long known as *Micranthus fistulosus* (Jacq.) Eckl. (e.g. Baker 1896), based on *Gladiolus fistulosus* Jacq. (1797), that combination was in fact not valid, though it was used as *M. fistulosus* Eckl. (a nomen nudum assumed to be a valid combination) by Baker (1892, 1896). By citing the basionym, Baker's use of the name *M. fistulosus* becomes a valid (albeit unintended) combination, also superfluous through his citing of valid earlier synonyms, including *Gladiolus tubulosus* Burm.f. (1768). Jacquin's illustration of *G. fistulosus* has two plants: we designate as lectotype the left hand one, which has dark blue flowers and leaves typical of *M. tubulosus*. The right hand plant, which has pale blue flowers and the upper leaf more typical of *M. plantagineus*, may be a hybrid with that species. The sterile lower nodes of the spike, bearing silvery bracts, are more typical of *M. plantagineus* and represent at least a different genotype from the right hand plant.

Brown (1929) identified the type of *Gladiolus tubulosus* among specimens in Burman's herbarium, and realizing that it was an earlier name for *M. fistulosus*, provided the combination *M. tubulosus*. A fine illustra-

tion of the species in Redouté's *Les Liliacées* (1804), as *Ixia cepacea*, a name coined by the artist, Madeleine Françoise Basseporte, shows that *M. tubulosus* was cultivated in France in the late 18th and early 19th centuries. The Basseporte painting, which indeed represents *M. tubulosus*, is part of an unpublished collection of vélins (paintings on parchment), which document plants and animals in the Jardin Royal in Paris and the Ménagerie Royale in Versailles, now in the Bibliothèque Centrale of the Muséum National d' Histoire Naturelle in Paris. We treat the name as having been validated by De Candolle in 1804 in the Redouté volume. De Candolle's citation of the earlier *Gladiolus tubulosus* Burm.f. appears to render his epithet superfluous, but the name *Ixia tubulosa* Burm.f. (now *Babiana tubulosa* (Burm.f.) Ker Gawl.) prevents transfer of *Gladiolus tubulosus* to *Ixia*. *Ixia cepacea* must be regarded as legitimate and a new name in *Ixia* for *G. tubulosus*.

**Hybrids:** the following interspecific hybrids are known involving *Micranthus tubulosus*: *M. tubulosus* × *M. alopecuroides* and *M. tubulosus* × *M. plantagineus*. Those with *M. plantagineus* can form large populations locally, probably backcrossing with one other parental species. We discuss these separately at the end of the species account.

#### Additional specimens

WESTERN CAPE.—**3218** (Clanwilliam): Goedverwacht, Piketberg, (–DC), 23 Nov. 1982, *Koutnik 1037* (BOL, MO); Piketberg, top of Versfeld Pass, (–DC), 2 Nov. 2011 (in bud), *Goldblatt & Porter 13707* (MO, NBG). **3219** (Wuppertal): Cedarberg, Heuningvlei, sandy vlakte, (–AA), 23 Oct. 1923, *Pocock 586* (NBG); Olifants River near Villa Brakfontein [Citrusdal], (–?CA), Nov., *Ecklon & Zeyher Irid 190* (MO, SAM); Elandskloof, bridge ± 10 miles [± 16 km] SE of Citrusdal, (–CA), 21 Sept. 1952 (sterile), *Maguire 1832* (NBG). **3318** (Cape Town): near Hopefield, (–AB), 19 Oct. 1932, *Lavis s.n.* (BOL); Malmesbury, clay slope, (–BC), 3 Nov. 1986, *Goldblatt 8048* (MO); Cape Town, Camps Bay, (–CD), *Barker 7191* (NBG); Signal Hill, (–CD), Nov. 1939, *Lewis 707* (SAM); Rondebosch Common, dry, hard ground, (–CD), 24 Jan. 2011, *Goldblatt & Manning 13620* (MO, NBG); Wynberg Hill, (–CD), Nov. 1922, *L. Bolus s.n.* (BOL17188); Langverwacht, Kuils River, main kloof, (–DC), 14 Dec. 1973, *Oliver 4820* (NBG); Stellenbosch Mtn, S of Paradys Kloof, (–DD), 3 Dec. 1989, *Buys 132* (NBG); Muldersvlei, (–DD), Nov. 1916, *Duthie 352* (BOL). **3319** (Worcester): near Saron, 800' [244 m], (–AC), Oct. 1896, *Schlechter 10618* (MO); Elandsberg Estate, Vangkraal road near Mountain road, (–AC), 22 Jan. 2011 (fr.), *Goldblatt & Manning 13610* (MO); Gouda, (–AC), 6 Dec. 1962 (white flowers, very robust), *Barker 9861* (NBG); Worcester [District], Waterfall, (–CC), Nov., *Ecklon & Zeyher Irid 192* (MO); Ceres, Schurfdeberg, lower slopes, (–AD), Dec. 1944, *Lewis 863* (SAM). **3320** (Montagu): Swellendam, hill below Eleven O'Clock Mtn, (–CD), 25 Nov. 1952, *Wurts 519* (mixed with *M. plantagineus*) (NBG). 3418 (Simonstown): Bergvliet Farm, flats near sand pit, (–AB), Nov. 1915, *Purcell 43* (SAM); Helderberg Nature Reserve, (pale blue or white), (–BB), 23 Dec. 1993, *Runnals 647* (NBG). **3419** (Caledon): Greyton Nature Reserve, dry flats, 1000' [305 m], 5 Dec. 1987, *Goldblatt 8711* (MO). **3420** (Bredasdorp): Suurbraak, Middelploas, (–BA), 5 Dec. 1982 (sterile), *Viviers 274* (NBG); Struisbaai to Elim near Springfontein turnoff, hard sandy gravel, (–DB), 9 Nov. 2011 (in bud), *Goldblatt & Porter 13738* (growing with *M. plantagineus*) (MO, NBG); 4 km W of Elim (growing with *M. filifolius*), (–DA), 9 Nov. 2011, *Goldblatt & Porter 13738* (MO, NBG). Unknown locality: Leeufontein, burned veld, 28 Nov. 1908, *Pearson 3185* (BOL).

**5. *Micranthus filifolius* Goldblatt & J.C.Manning, sp. nov.**

**TYPE.**—Western Cape, 3419 (Caledon): Akkedisberg Pass, sandy hillside, (–AC), 18 Nov. 2011, *Goldblatt & Porter 13370* (NBG, holo.; MO, PRE, iso.).

Plants 180–300 cm high, base sheathed with sparse to well-developed collar of fibres. *Corm* 12–16 mm diam., tunics of relatively soft, fine or thicker fibres. *Stem* unbranched or rarely with single short branch, without cormlets in leaf axils. *Leaves* 4–6, green or beginning to dry from tips at flowering time, lowermost longest, reaching to middle of spike to shortly exceeding it, blade either ± terete and ± 1 mm diam. or ± plane and ± 2 mm wide, with heavily thickened central vein and margins, separated when dry by narrow longitudinal grooves, upper leaves shorter, with sheaths overlapping, uppermost 1 or 2 leaves sheathing for most of their length, with short free tips. *Spike* mostly 18–50-flowered, closely congested, lower bracts always subtending flowers; bracts mid to dark brown, ± 5 mm long, outer with broad translucent membranous margins, inner slightly shorter than outer, with 2 dark keels broadened toward base, notched apically. *Flowers* pale mauve or mid-blue, unscented; perianth tube ± 5 mm long; tepals oblong, ± 5 × 2.2–2.8 mm. *Stamens* with filaments ± 5 mm long, exerted ± 2.5 mm; anthers oblong, ± 3 mm long. *Style* ± 7 mm long, dividing between base and middle of anthers; branches 1.0–1.6 mm long, divided for up to half their length, rarely only notched at apex. *Capsules* narrowly ovoid, smooth, 4–6 × ± 2 mm, with up to 4 seeds per locule. *Seeds* elongate-angular, mostly 3-sided, tapering to points at both ends, 3–5 mm long. *Flowering time:* mid-November to late February. Figure 6.

**Distribution:** centred in the Caledon District of Western Cape, *Micranthus filifolius* is largely coastal with populations recorded from Steenbras and Cape Hangklip eastward to Hermanus and inland to Shaw's Mtns, the lower slopes of Caledon Swartberg and east to Akkedisberg Pass and Elim (Figure 7). Collections are mostly from clay and clay-loam soils, occasionally from sandy sites, but even collections from the Klein River Mtns above Hermanus at elevations of up to 400 m are from a shale band. The species is particularly abundant after fire (e.g. *Drewe 495, 1101*) but will flower in unburned veld unless shaded out by taller vegetation. Plants bloom unusually late in the season, with most flowering collections made after mid-January, and two (*Gillett 520; Levyns 11269*) were in mid- to late February. We have confirmed late flowering at near-coastal sites ourselves but inland populations, as from Drayton Siding, east of Caledon, and Akkedisberg Pass, flower from mid-November to early January and are in fruit before any coastal populations come into flower. We suggest that this early flowering is due to warmer and drier conditions well inland of the coast. The coarser corm tunic fibres and collar of fibres around the base of the stems in these populations are perhaps adaptations to the drier habitat. Plants sometimes co-occur with or grow close to *M. plantagineus*, which is in fruit when *M. filifolius* begins to bloom, two or three weeks after the last flowers of *M. plantagineus* have faded, both at the coast and at inland sites. We have also found *M. filifolius* growing together with *M. tubulosus*.

**Diagnosis:** with its narrow leaves, the lowermost of which is linear or terete (Figure 1B & C), *Micranthus filifolius* is most like *M. plantagineus* in general appearance. It differs, however, from that species in several respects, particularly in the solid leaf blades of the

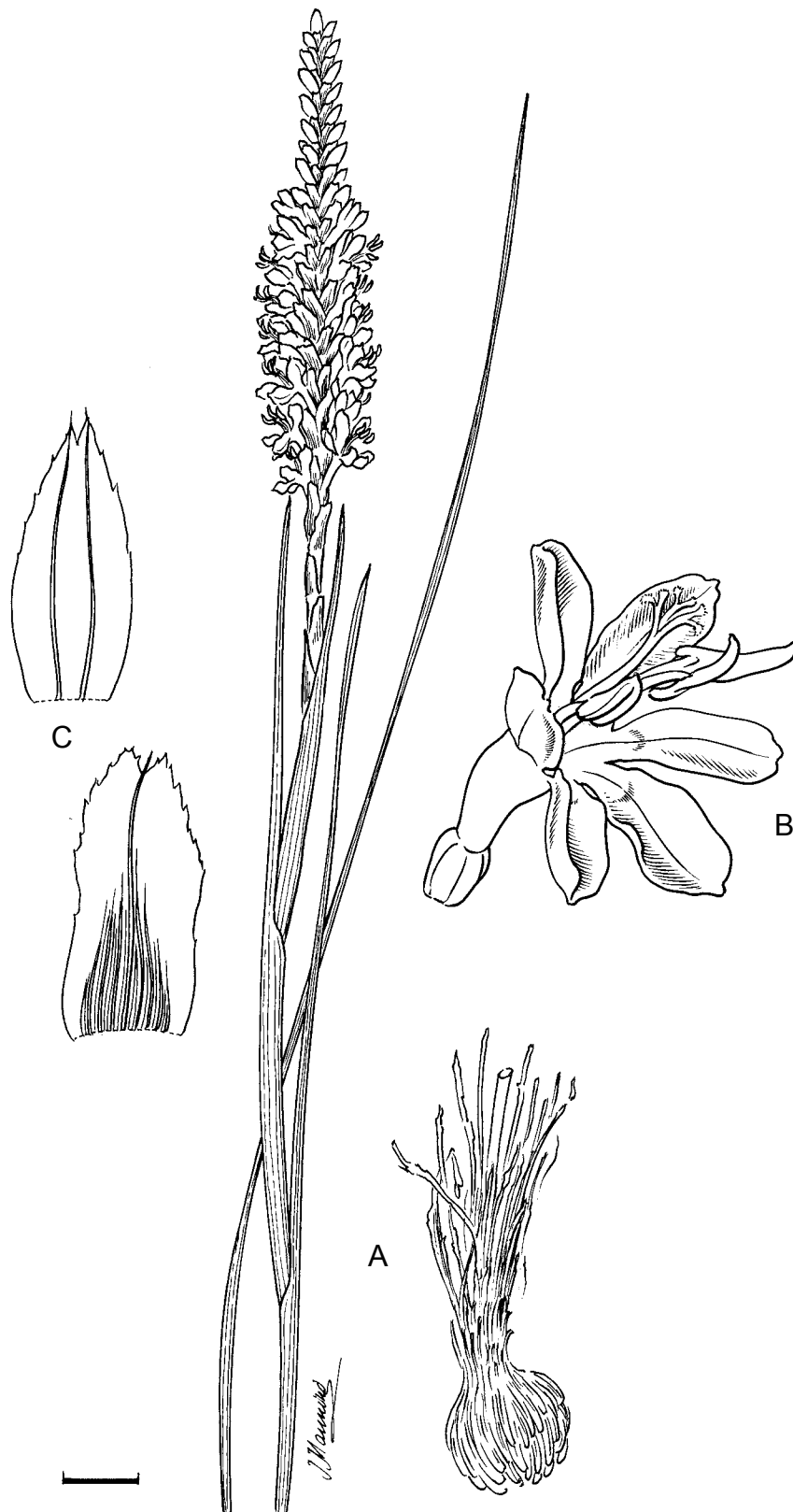


FIGURE 6.—*Micranthus filifolius*, Akkedisberg Pass, Goldblatt & Porter 13370 (NBG). A, flowering plant; B, flower; C, outer (lower) and inner (upper) bract. Scale bar: A, 10 mm; B, C, 1.25 mm. Artist: John Manning.

lowermost and sometimes the upper leaves. The leaves closely overlap one another and sheath the stem up to the base of the spike. Plants typically have four or five leaves but several specimens have six leaves, the upper one or two largely to entirely sheathing. Unlike *M. plantagineus*, plants do not produce cormlets in the leaf axils and the corm tunics are usually soft-textured with the base enclosed by a collar of fibres, whereas *M. plantagineus* has coarser corm tunics, lacks a basal collar of fibres, and cormlet production is conspicuous in the lowermost and sometimes other leaf axils. In addition, the flowers, although typical of *Micranthus*, are somewhat smaller than in *M. plantagineus*, having a perianth tube mostly 4–5 mm long and tepals  $\pm$  4 mm long, and are more often pale mauve (drying white), although the western populations are dark blue (drying blue), the flower colour in most populations of *M. plantagineus*. Typical *M. plantagineus* has been recorded close to most localities of *M. filifolius*, flowering in November and December, supporting our conclusion that *M. filifolius* is not a local variant but a different species, flowering later, sometimes in the same habitats as *M. plantagineus*, or in drier sites.

*Additional specimens*

WESTERN CAPE.—**3418** (Simonstown): Steenbras, (–BB), Sept. 1944 (late fr.), *Stokoe s.n. SAM68012* (SAM); Buffels River dam area [near Rooiels], (–BD), 19 Feb. 1972, *Boucher 1822* (NBG, PRE); Cape Hangklip, peaty marsh, (–BD), *Levyms 10220* (BOL); Kogelberg Nature Reserve, (–BD), 19 Mar. 1983, *Kroon 10200* (PRE); Betty’s Bay, sandy slopes, (–BD), 13 Feb. 1962, *Levyms 11269* (BOL). **3419** (Caledon): Drayton Siding, pale blue (–AB), 16 Dec. 1968, *Goldblatt 395* (BOL); field E of Drayton siding, (–BA), 25 Jan. 2011, *Goldblatt & Manning 13623* (MO, NBG); Kleinmond, near Palmiet River mouth, (–AC), 31 Jan. 1933, *Gillett 615* (NBG); Kleinmond, road to reservoir, (–AC), 27 Jan. 1947, *De Vos 485* (NBG); Hermanus, (–AC), Jan. 1920, *Burt Davy 18711* (BOL); top of Shaw’s Pass, (–AD), Jan. 1957, *Lewis 2904* (SAM); Shaw’s Pass, east side, (–AD), 29 Dec. 1955, *Lewis 4454* (SAM); Hemel-en-Aarde, mountain side, (–AD), 15 Jan. 1933, *Gillett 520* (NBG); Vogelgat, Hermanus, Vogelpool to Fernkloof, S slopes on shale band, (–AD), 2 Jan. 1979, *Williams 2710* (NBG); Fernkloof, Hermanus, 350 m, clay area, 1 year after fire, (–AD), 17 Jan. 1987, *Drewe 495* (MO); 400 m, shale band, after fire, 25 Jan. 1996, *Drewe 1101* (MO); 4 km W of Elim, stony clay in renosterveld, (growing with *M. tubulosus*), (–DA), 9 Nov. 2011 (in bud), *Goldblatt & Porter 13745* (MO, NBG).

**6. *Micranthus cruciatus* Goldblatt & J.C.Manning, sp. nov.**

TYPE.—Western Cape, 3219 (Wuppertal): Pakhuis Mts, trail to Heuningvlei, (–AA), local in wet seep on rocky sandstone slope, 19 Dec. 1995, *Goldblatt 10438* (NBG, holo.; MO, iso.).

Plants 300–450 mm high. *Corm* globose, 8–10 mm diam., tunics of brown, soft membranous layers not accumulating. *Stem* simple or 1-branched, usually with 1 or 2 small cormlets in lowermost leaf axil. *Leaves* (3)4 or 5, lower 3 linear to subterete,  $\pm$  1.5 mm wide, margins and midrib heavily thickened with narrow longitudinal grooves between (often cross-shaped in section with 4 narrow longitudinal grooves), reaching to base or middle of spike, uppermost leaf sheathing stem almost to base of spike, with short free portion. *Spike* up to 70-flowered; bracts brown or straw-coloured with broad translucent membranous margins,  $\pm$  4 mm long, inner  $\pm$  as long as outer, membranous with 2 dark keels, apically notched. *Flowers* pale blue-mauve (drying  $\pm$

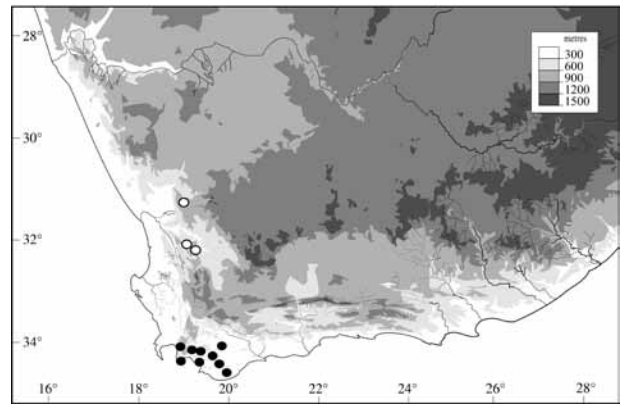


FIGURE 7.—Distribution of *Micranthus filifolius*, ●; *M. cruciatus*, ○.

white) or deep blue, perianth tube  $\pm$  3 mm long, tepals oblong,  $\pm$  4  $\times$  1.5 mm. *Stamens* with filaments  $\pm$  5 mm long; anthers oblong-linear,  $\pm$  3 mm long. *Style*  $\pm$  4 mm long, dividing  $\pm$  at mouth of tube opposite middle of filaments, branches  $\pm$  2.5 mm long, divided for  $\pm$  one third their length. *Capsules* oblong, smooth, 5.0–5.5 mm long. *Seeds* elongate-angular, mostly 3-sided, tapering to points at both ends,  $\pm$  3 mm long. *Flowering time*: mid-November to late December, possibly lasting into January.

*Distribution*: restricted to the northern Cape flora region, *Micranthus cruciatus* is known from the northern Cedarberg immediately south of Pakhuis Pass and in the Bokkeveld Mtns southwest of Nieuwoudtville (Figure 7). Plants grow on rocky slopes, in seeps on thin sandy soil over sandstone pavement, flowering in December as the habitat dries out in the hot weather. No doubt the species is rare but the very few collections are probably due to its midsummer flowering when little plant collecting is undertaken. We suspect that *M. cruciatus* occurs in suitable sites between its few stations, thus in the southern Bokkeveld Mtns and the Gifberg/Matsikamma Mtn complex and perhaps elsewhere in the Cedarberg. First collected by the late Elsie Esterhuysen in 1941 according to available records, *M. cruciatus* has elicited no attention until now and was assigned to the broadly similar *M. plantagineus* (as *M. junceus*) in herbaria.

*Diagnosis*: linear- to terete-leaved *Micranthus cruciatus* is immediately distinguished by its solid, narrow leaf blades,  $\pm$  1.5 mm wide, with heavily thickened veins and margins separated by narrow longitudinal grooves (Figure 1D). Leaves are either linear or terete becoming cross-shaped in section distally with only the margins and central vein thickened. Plants broadly resemble *M. plantagineus* although they are more slender than is usual in that species, which has hollow leaves 2–3 mm diam. and is conspicuous in the production of cormlets in the lowermost and sometimes upper leaf axils. In contrast, *M. cruciatus* has no more than one or two small cormlets, these borne in the axil of the lowermost leaf. The pale mauve-blue or sometimes dark blue flowers are typical of the genus in shape but notable in the short perianth tube,  $\pm$  3 mm long, in the style dividing at the mouth of the perianth tube and in the unusually long style branches up to 2.5 mm long, divided for up to one

third their length. Most species of *Micranthus* have the style dividing opposite the base to middle of the anthers and style branches typically less than 1.6 mm long. The narrow, heavily thickened leaf in *M. cruciatus* is convergent with that in *M. filifolius*, but in other critical details the two are very different, the latter with coarsely fibrous corm tunics and a collar of fibres around the base of the stem.

It is noteworthy that typical, hollow-leaved *M. plantagineus* with dark blue flowers also occurs in the Pakhuis and Bokkeveld Mtns (e.g. *Leipoldt 3596* BOL, NBG, PRE) as well as in the Cedarberg, but it has not been recorded growing near *M. cruciatus* and they evidently have somewhat different habitat preferences.

#### Additional specimens

NORTHERN CAPE.—**3119** (Calvinia): sandstone slope between Nieuwoudtville and Vanrhyns Pass on road to Keyserfontein, (–AD), 27 Nov. 1985, *Goldblatt 7399* (MO, PRE).

WESTERN CAPE.—**3218** (Clanwilliam): Zandfontein, Farm Verkeerde Vley (Klip-op-mekaar), 12 km N of Pakhuis Pass, (–BB), July 2013 (fr.), *Helme 7778* (NBG). **3219** (Wuppertal): Cedarberg, Pakhuis to Heuning Vlei (–AA), 28 Dec. 1941, *Esterhuysen 7436* (BOL); Pakhuis Pass, Kliphuis campsite, wet seep on sandstone pavement, (–AA), 15 Nov. 2011 (in bud), *Goldblatt & Porter 13766* (MO, NBG).

**7. *Micranthus plantagineus*** Eckl., Topographisches Verzeichniss der Pflanzensammlung von C.F. Ecklon: 43 (1827), nom. nov. pro *Ixia plantaginea* Aiton: 59 (1789), nom. illeg. superfl. pro *Gladiolus alopecuroides* L. *Watsonia plantaginea* Ker Gawl.: t. 553 (1803), nom. nov. pro *Ixia plantaginea* Aiton et nom. illeg. superfl. pro *G. alopecuroides* L. *Gladiolus plantagineus* Pers.: 46 (1805), nom. nov. pro *Ixia plantaginea* Aiton et nom. illeg. superfl. pro *G. alopecuroides* L. Type: South Africa, without precise locality, *Masson s.n. BM922008* (BM, holo.!— narrow-leaved specimens mounted with *Nelson 1777* with broad, flat leaves [= *M. alopecuroides*]).

*Phalangium spicatum* Burm.f.: 3 (1768), nom. nud. [cited illustration, Plukenet: t. 310, f. 1 (1694) lacks text or figure analysis; it probably represents *Ixia scillaris* L.; specimen in G: Herb. Burman is *Micranthus* and designated the ‘type’]. *Micranthus spicatus* (Burm.f.) N.E.Br.: 138 (1929), nom. inval.

*Phalangium spicatum* Houtt.: 115 (1780). Type: South Africa, without precise locality or collector, illustration in Houtt., *Nat. Hist. ed. 2*, 12: t. 80 f. 2 (1780).

*Micranthus plantagineus* var. *junceus* Baker: 179 (1892). *Micranthus junceus* (Baker) N.E.Br.: 138 (1929). Type: South Africa, [Western Cape], Groenekloof and vicinity, *Zeyher 1611* (K, lecto!, designated here, K000320508; PRE!, isolecto.; other collections numbered *Zeyher 1611* in PRE and SAM are from Klipfontein or Tulbagh, thus not type material).

Plants 200–400(–650) mm high, base without collar of fibres. *Corm* globose, 12–15 mm diam., tunics of dark brown, medium-textured, reticulate fibres drawn into fine points above. *Stem* erect, simple or with up to 9 short branches, with cormlets in axil of lowermost leaf and sometimes of upper cataphyll and rarely other leaf axils. *Leaves* (2)3(4), green at flowering, lower-

most leaf longest, blades terete or oval in section, hollow, 2.0–3.5 mm diam., smooth when fresh with translucent veins, when dry, veins appearing thickened with homologue of marginal vein pair more prominent, usually reaching to middle of spike to shortly exceeding spike, uppermost 1 or 2 leaves sheathing for most of length, with free part often slightly longer than sheath. *Spike* (16–)40–100-flowered, lower bracts sometimes subtending cormlets; bracts mid- to dark brown, ± 6 mm long but slightly smaller if subtending cormlets, outer with broad translucent margins, apices sharply acute and ultimately curved outward, inner bracts ± as long as outer, with 2 dark keels broadened toward base. *Flowers* usually dark blue, occasionally pale blue or white, evidently sometimes slightly sweetly scented, perianth tube 6–7 mm long, tepals oblong, with thickened subapical ridge on reverse, (4–)6–7 × ± 1.2 mm. *Stamen* filaments ± 5 mm long; anthers oblong, 3–4 mm long. *Style* ± 7 mm long, dividing between lower one third and middle of anthers (rarely ± 1 mm below anther bases), branches 1.0–1.8 mm long, divided for one third to half their length. *Capsules* smooth, ± urn-shaped or narrowly ovoid, (3)4–5 × 2–3 mm, with (2)3 or 4 seeds per locule, 5 mm long. *Seeds* elongate-angular, 3(4)-sided, tapering to points at both ends. *Flowering time*: October to December (rarely in May).

*Distribution*: *Micranthus plantagineus* has a wide range across the Cape flora region, extending from the Bokkeveld Plateau near Nieuwoudtville south to the Cape Peninsula and east to Port Elizabeth (Figure 8). An isolated population from the Anysberg Nature Reserve in the Little Karoo (*Vlok 2545*) appears typical of the species except for the shorter perianth tube, ± 4 mm long. Plants typically grow in seasonally wet habitats, often in marshy sites, along streams, or at least in places that are waterlogged in the winter months.

*Diagnosis*: the elongate inflorescence with up to 100 flowers and a perianth that is often deep blue, but sometimes pale blue or white, are unexceptional for the genus and identification of *Micranthus plantagineus* depends on leaf morphology. The two to four leaves are straight, stiffly erect, hollow and terete to oval in section, ± 2–3 mm diam., and reach or shortly exceed the spike (Figure 1F). When alive the leaves are smooth with the veins evident as paler, translucent lines. On drying, the veins appear hyaline and the veins at the adaxial and abaxial poles are somewhat more prominent. In addition, the stem is often branched, and as many as four (exceptionally nine) short branches may be produced shortly below the base of the main spike, these seldom exceeding half the length of the main spike. Lewis (1950) noted that the lower flowers of the spike are often replaced by cormlets [as many as five may be present in an axil]. That feature is not universal and many otherwise typical plants may have normal flowers and capsules from base to apex of the spike. A second characteristic feature of *M. plantagineus* is the presence of one or more cormlets in the lowermost leaf axil (not invariably present in other species) and occasionally in the axils of the upper cataphyll and one or more of the upper leaves. Plants lack a collar of fibres around the base (in contrast to superficially similar *M. filifolius* and *M. tubulosus*).

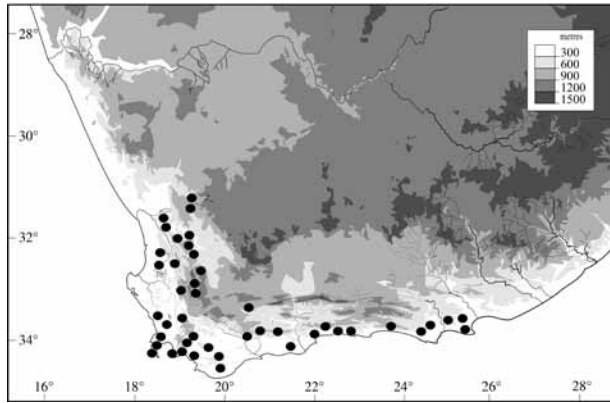


FIGURE 8.—Distribution of *Micranthus plantagineus*.

There are two, somewhat poorly defined, morphs of the species. One has narrow leaves,  $\pm 2$  mm diam. when alive, and slender capsules,  $\pm 4.3 \times 1.5$  mm. Plants with mature capsules have 2(1) fusiform-angular seeds per capsule,  $\pm 3.7$ –4.0 mm long. The second morph has broader leaves, 2–3 mm diam. when alive, and urn-shaped capsules  $\pm 5 \times 2$ –3 mm. Capsules have 4 seeds per locule, these flattened-angular, 3.0–3.5 mm long.

Collections of *Micranthus plantagineus* from Grootwinterhoek Forestry Station exemplify this situation: *Goldblatt 10451* with dark blue flowers represents the robust morph of the species, but slender-leaved plants (*Goldblatt 10452*), growing adjacent to stands of the robust morph, have white flowers. Other slender-leaved *M. plantagineus* (*Goldblatt 10453*) growing nearby have blue flowers. These last two collections consist of shorter, less robust plants, 200–250 mm tall, and have more slender, but still hollow leaves  $\pm 1.5$  mm diam. No other *Micranthus* species were found in the area making the possibility that hybridization has played a role in this pattern of variation unlikely.

We must also mention a collection made by T.M. Salter in May 1935 from Viljoen's Pass. The morphology conforms closely to *Micranthus plantagineus* in the three terete and hollow foliage leaves, stems without a collar of fibres at the base, cormlets in axils of all leaves and in floral dimensions. Thus the only difference we see is the flowering time, noted as anomalous on the specimen label by Salter. The marshy habitat likewise conforms to the species. A search for the population in May 2013 failed to find any *Micranthus* species in bloom at this time of year, but the site may simply be lost to farming activity or dam construction.

Putative hybrids between *Micranthus plantagineus* and *M. alopecuroides* are discussed under the latter species.

*Related species:* until now, several collections of plants with filiform-linear and plane or terete, but not hollow, leaves with a thickened central vein and margins (cross-shaped in section) have been included in *Micranthus plantagineus* (as *M. junceus*) in herbaria. We believe these are separate species. The several southern Western Cape populations with this leaf type, here referred to *M. filifolius*, always have four or five, rarely

six leaves, the blades  $\pm 1$  mm wide vs, mostly three (rarely two or four) leaves in *M. plantagineus*. These plants have flowers with a consistently shorter perianth tube  $\pm 4$  mm long and shorter tepals, also  $\pm 4$  mm long vs, both perianth tube and tepals mostly  $\pm 6$  mm long in *M. plantagineus* and often a pale blue mauve to almost white (less often deep blue) perianth. *M. filifolius* is rarely branched and we have seen no specimens with the lower flowers aborted and replaced by cormlets, both common but not universal traits of *M. plantagineus*.

Other collections with this derived leaf type are known from the northern Cedarberg and Bokkeveld Mtns and are here treated as the new *Micranthus cruciatus* Goldblatt & J.C.Manning. These plants have only four, rarely five leaves, the two basal with linear or terete, four-grooved blades,  $\pm 1.5$  mm wide, similar to but broader than those of *M. filifolius*. An important associated character is the style, which divides at the mouth of the perianth tube into unusually long branches 2.0–2.5 mm long, divided for  $\pm$  one third their length. Other species of *Micranthus* have the style dividing between the base and middle of the anthers and the style branches never exceed 1.5 mm.

*History:* long known as *Micranthus junceus* (Lewis 1950; Goldblatt & Manning 2000), *M. plantagineus* was evidently first recognized as a distinct species, called *Phalangium spicatum* by Burman (1768), at least as to the specimen in his collection (now at the Delessert Herbarium, Geneva). Burman provided no validating description, instead merely citing Plukenet's (1694) illustration in part 3 of the *Phytogeographia*. There is no accompanying text or even polynomial identifying the illustration, plate 310, f. 1., nor does the figure constitute a validating illustration with analysis. *Phalangium spicatum* Burm.f. is thus a nomen nudum and invalid. Plukenet's illustration is of a broad-leaved plant and does not, in our opinion, represent any species of *Micranthus* but is probably *Ixia scillaris* L. Even if any text associated with this illustration is found and if the name is lectotypified on the specimen rather than the Plukenet illustration, the combination *M. spicatus* (L.) Heyn. (1847) (= *Thereianthus spicatus*) prevents the use of Burman's epithet at species rank in *Micranthus*.

Curiously, *Phalangium spicatum* Houtt. (1780), typified by a good illustration, marks this as the first valid naming of *M. plantagineus*. Although seeming to refer to Burman's *P. spicatum*, Houttuyn makes it clear this is his species (*Phalangium scapis spicatis mihi*, i.e. Houttuyn) and that the Plukenet figure cited by Burman is an entirely different plant. As noted above, Heynhold's combination *M. spicatus* (L.) Heyn. bars transfer of Houttuyn's epithet to *Micranthus*.

In Aiton's (1789) *Hortus Kewensis*, Daniel Solander, the unacknowledged author of the species in this work, described *Ixia plantaginea* based on a collection of Francis Masson. The sheet at BM includes two plants with narrow, stiffly erect, centric leaves (the Masson collection) and three specimens with shorter, plane leaves (*Nelson 1777*) that are *M. alopecuroides*. The Masson specimens conform to the diagnosis, '*foliis linearibus strictis, spica disticha imbricata* [leaves linear, straight and upright] and constitute the holotype. The name is



unfortunately superfluous as *Gladiolus alopecuroides* was cited in synonymy and, likewise, transfers of *Ixia plantaginea* to *Watsonia* (Ker Gawler 1803), and *Gladiolus* Pers. (1805), are superfluous as both authors cited *Gladiolus alopecuroides* as synonyms. Ecklon (1827), however, intended to transfer the species to *Micranthus*, where it becomes valid and is treated as a new name from that date rather than a new combination based on *I. plantaginea* Aiton. Ecklon (1827) recognized *M. alopecuroides* as a separate species, the first author to differentiate it from *M. plantagineus*, but whether deliberately or by accident is uncertain.

Baker (1892) described *Micranthus plantagineus* var. *junceus*, citing no specimens, but later listed several *exsiccatae* (Baker 1896), all of which were available to him in 1892. We choose a lectotype from among these, *Zeyher 1611*, a specimen in good condition and representative of the species. The taxon was raised to species rank by Brown (1929), who, at the time also identified *Phalangium spicatum* Burm.f. as the same species, at least as to the specimen in Burman's herbarium. *M. junceus*, a name used until now for this plant, becomes a synonym of *M. plantagineus*.

#### Additional specimens

NORTHERN CAPE.—**3119** (Calvinia): Nieuwoudtville waterfall, damp washes along stream, on sandstone, (–AC), 5 Dec. 1996, *Manning 2129* (NBG); Nieuwoudtville Escarpment, small vlei in arid fynbos, (–AC), 28 Nov. 1993, *MacGregor s.n.* (NBG153534); Oorlogskloof Nature Reserve, (–AC), 14 January 2000, *Pretorius 664* (NBG).

WESTERN CAPE.—**3118** (Vanrhynsdorp): Matsikammaberge, among sandstone rocks, (–DB), 11 Nov. 1985, *Van Jaarsveld & Bodenstern 8283* (NBG); top of Gifberg Pass, Farm Van Taakskom, (–DD), 11 Nov. 1985, *Snijman 946* (NBG). **3218** (Clanwilliam): Piketberg, road to Sun Mtn, (–DA), 16 Nov. 1993, *Manning 2093* (NBG). **3219** (Wuppertal): Pakhuis Mtns above 3500 ft [1 065 m], (–AA), 30 Dec. 1940, *Leipoldt 3596* (BOL, PRE), Nov. 1929, *Thode A2141* (PRE); Biedouw Valley, (–AA), 25 Nov. 1955, *Middlemost 1897* (MO, NBG); Wuppertal, (–AA), Oct. 1929, *Thode A2083* (NBG); Driehoek Vlei, Cedarberg, (–AC), 3 Dec. 1934, *Compton 4798* (NBG); banks of the Olifants River at Citrusdal, sandy ground, (–CA), 5 Nov. 1982, *Goldblatt 6707* (MO), Feb. 1982, *Goldblatt 6556* (fr.) (MO); Citrusdal, Farm Kleinplaas, moist hillocks in loamy clay among restios, (–CA), 11 Dec. 1997, *Hanekom 2972* (MO, NBG, PRE); Gonnafontein, seasonally damp sand, (–CB), 3 Dec. 2000, *Pond 254* (NBG); Leeu River, Ceres, (–CD), 18 Dec. 1944, *Compton 16741* (BOL, NBG). **3318** (Cape Town): Darling Flora Reserve, (–AD), 17 Nov. 1964, *Thompson 76* (NBG); 13 Nov. 1956, (–AD), *Winkler 166* (BOL); Kenilworth Racecourse, low lying areas wet in winter, (–CD), 5 Jan. 1970 (fr.), *Esterhuysen s.n.* (MO); Devil's Peak, 300 ft [± 90 m], Dec., *Pappe s.n.* (SAM). **3319** (Worcester): Groot Winterhoek Forest Station, rocky sandstone flats, (–AA), 27 Dec. 1995, *Goldblatt 10451* (MO, NBG); Keerom hills at foot of Twenty Four Rivers Mtns, (–AA), 3 Dec. 1950, *Esterhuysen 17869* (BOL, PRE); wet flats 9.4 miles [± 14 km] NE of Hermon Station, (–CC), 18 Oct. 1959, *Acocks 20744* (MO, PRE). **3320** (Montagu): Anysberg Nature Reserve, deep loamy sand, edge of seep, 12 Oct. 1991, (BC), *Vlok 2545* (MO); Swellendam, hill below Eleven o'Clock Mtn, (–DC), 25 Nov. 1952, *Wurts 519* (mixed with *M. tubulosus*) (NBG); Langeberg between Lemoenshoek and Naauwkrans, Farm Strawberry Hill, (–DD), 11 Jan. 1957, *Stokoe s.n.* (NBG). **3321** (Ladismith): Garcias Pass, 1300 ft, (–CC), Dec. 1904, *Luyt s.n.* (BOL). **3323** (Oudtshoorn): Saasveld, George, (–DC), 1 Dec. 1985, *Vlok 1299* (MO, NBG). **3418** (Simonstown): Bergvliet Farm, E of sand pit, (–AB), 5 Dec. 1918, *Purcell s.n.* (SAM90106); Cirkels Vlei, Cape Peninsula, (–AB), 15 Jan. 1946, *Barker 3954* (NBG), *Lewis 1495* (SAM); Betty's Bay, (–BB), 5 Jan. 1962, *Tijmans 25B1962* (NBG); Cape Hangklip, marsh (with *M. filifolius*), (–BB), 25 Jan. 2011, *Goldblatt & Manning 13625* (MO, NBG). **3419** (Caledon): Rivieronderend Bridge, foot of Franchhoek Pass, (–AA), 1 Jan. 1936, *Barker s.n.* (BOL45075); Nuweberg Forest Reserve, below Forestry offices, (–AA), 31 Dec. 1989, *Goldblatt 9035* (MO); Viljoen's Pass, in marsh, (–AA), 4 May 1935, *Salter 5255* (BOL, K). Drayton siding, Caledon, near stream, (–BA),

25 Jan. 2011, *Goldblatt & Manning 13622* (MO, NBG); Fernkloof Nature Reserve, Hermanus, deep sand, (–AD), 5 Dec. 1975, *Orchard 349* (MO, NBG); Fairfield Farm, W of Napier, clay ground, (–BD), 9 Dec. 1994, *Kemper IPC750* (NBG). **3421** (Riversdale): Stilbaai, Farm Klipfontein, shale ground near water, (–AD), 26 Nov. 1990, *Bohnen 9152* (NBG). **3422** (Mossel Bay): Mossel Bay, grassy plains, (–AA), Jan. 1926, *Taylor 316* (BOL); inland of Oubaai, George, (–AB), 3 Jan. 1994, *Victor 558* (BOL); Belvedere, churchyard, (–BB), 30 Dec. 1928, *Duthie s.n. STE29795* (NBG). Without precise locality, as Stellenbosch, Somerset [West] and Hottentots Holland, without date, *Ecklon & Zeyher Irid 193* (83) (SAM).

EASTERN CAPE.—**3324** (Steytlerville): Honeyville Farm, 10 km along Humansdorp–Hankey road, (–DC), 9 Feb. 2009, Van Wyk FBG293/CR3761/ (NBG); 'Galgebosch, Uitenhage' [near Hankey], (–DD), 1935, *MacOwan s.n.* (SAM). **3325** (Port Elizabeth): Loerie Forest Reserve, (–CC), 21 Dec. 1933, *Long 1* (NBG); Uitenhage Division, between Vanstadensberg and Bethelsdorp, (–CD), 1840, *Drège 8445* (K); between Port Elizabeth and Thornhill, (–CD), 31 Dec. 1939, *Barker 604* (NBG). **3424** (Humansdorp): Witte Els Bosch, flats, (–AA), Dec. 1920, *Fourcade 1025* (BOL, NBG, SAM); Humansdorp, (–BB), Jan. 1932, *Wagner s.n. STE17114* (NBG). Without precise locality, as 'Uitenhage,' Dec., *Ecklon & Zeyher Irid 194* (MO, SAM).

#### Hybrids

Interspecific hybrids are not uncommon in *Micranthus* and are likely to occur when two or more species co-occur. Most striking of the hybrids is that between *M. plantagineus* and *M. tubulosus*. The two species flower together at the foot of the Elandskloof Mtns in Elandsberg Nature Reserve and present a remarkable sight. The hybrids are locally very common growing with typical *M. tubulosus* and are always slightly shorter than the parent, 100–150 cm high, and like it have a well-developed collar of fairly coarse fibres around base. The other parent is less common, but present in small clumps, recognized by its erect habit, straight leaves and pale blue flowers. The hybrid is evidently fertile (plants in fruit have well developed capsules with apparently normal seeds) and stand out in having a slightly flexuose stem and narrower leaves than either parent. Unlike *M. tubulosus*, which they otherwise most closely resemble, hybrid individuals bear small cormlets at aerial nodes and sometimes at the base of the spike. We have seen similar hybrid plants near Elim where *M. tubulosus* and *M. plantagineus* also grew side-by-side.

WESTERN CAPE.—**3319** (Worcester): Elandsberg Estate, foot of the Elandskloof Mtns, (–AC), 2 Mar. 2000 (sterile), *Goldblatt & Manning 11281* (MO, NBG), *13617*(fr.) (MO, NBG); Jan. 2011 (fr.; growing with *M. plantagineus* and *M. tubulosus*), *Goldblatt & Manning 13605* (MO, NBG), 22 Jan. 2011 (sterile), *13609* (MO, NBG, 11 Nov. 2011, *Goldblatt & Manning 13751* (MO, NBG, PRE).

Less common are hybrids between *Micranthus tubulosus* and *M. alopecuroides*, but at Elandsberg Nature Reserve we noted both species growing close to one another with apparent hybrids among them. The putative hybrids have short, plane leaves, in outline like those of *M. tubulosus* but not round in section, although the leaves have an airspace between the two surfaces and lack the visible main veins of *M. alopecuroides*.

WESTERN CAPE.—**3319** (Worcester): Elandsberg Estate, foot of the Elandskloof Mtns, Vangkraal road, (–AC), 22 Jan. 2010 (sterile), *Goldblatt & Manning 13611* (MO, NBG).

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