NOTES FROM THE
ROYAL BOTANIC GARDEN
EDINBURGH
VOLUME XXXVI · NO. 2 · 1978

THE GENUS WURMBEA IN AFRICA EXCEPT THE CAPE REGION

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ABSTRACT. The genus *Wurmbea* Thunb. (Liliaceae—Anguillarieae) occurs in Australia and Africa, with a concentration of species in the southwestern Cape. The present study is part of a taxonomic revision of the African species and deals with the 9 taxa of tropical and South Africa except the Cape Region. The majority of these belong to the new section *Heterophyllae* B. Nord., including the new species *W. burttii* B. Nord. and the widely distributed *W. tenuis* (Hook. fil.) Baker. The latter is divided into four subspecies, one of which is confined to the Drakensberg in South Africa (subsp. *australis* B. Nord., subsp. nov.), the others being tropical African. Sect. *Wurmbea* has two species outside its main range in the Cape, viz. *W. pusilla* Phillips and the new species *W. elatior* B. Nord.

INTRODUCTION

The genus *Wurmbea* Thunb. has a disjunct distribution in Africa and Australia. Together with *Anguillaria* R. Br. it constitutes the tribe "Wurmbaeae" in Buxbaum's (1937) arrangement of the Liliaceae. Hutchinson (1934, 1959) preferred to group it with the South African genera *Baeometra*, *Dipidax* and *Neodregea* in a larger tribe, *Anguillarieae*, and Krause (1930) applied an even wider concept. From a nomenclatural standpoint Buxbaum's tribal name is superfluous, and regardless of its circumscription, the tribe containing *Wurmbea* and *Anguillaria* should retain the old name *Anguillarieae*.

Apparently the genus is more homogeneous in Africa than in Australia. All African taxa have hexamerous monoclinous flowers, connate carpels with free styles not sharply demarcated from the ovary, and septicidal capsules. In Australia some taxa are dioecious, the flowers vary from hexa- to octomerous, the pistil is often less syncarpous with more or less discrete carpels, and the styles may be distinctly set off from the ovary. The distinction from *Anguillaria* is not clear, but this is not a problem affecting the African portion of the genus. *Anguillaria* is confined to Australia and Tasmania, and *Wurmbea* is the older generic name. The Australian taxa are under revision by T. Macfarlane of Canberra.

The present study deals with the African species except those confined to the Cape floristic region. In South Africa usually only two species are recognized in accordance with Baker's treatment in *Flora Capensis* (1897).

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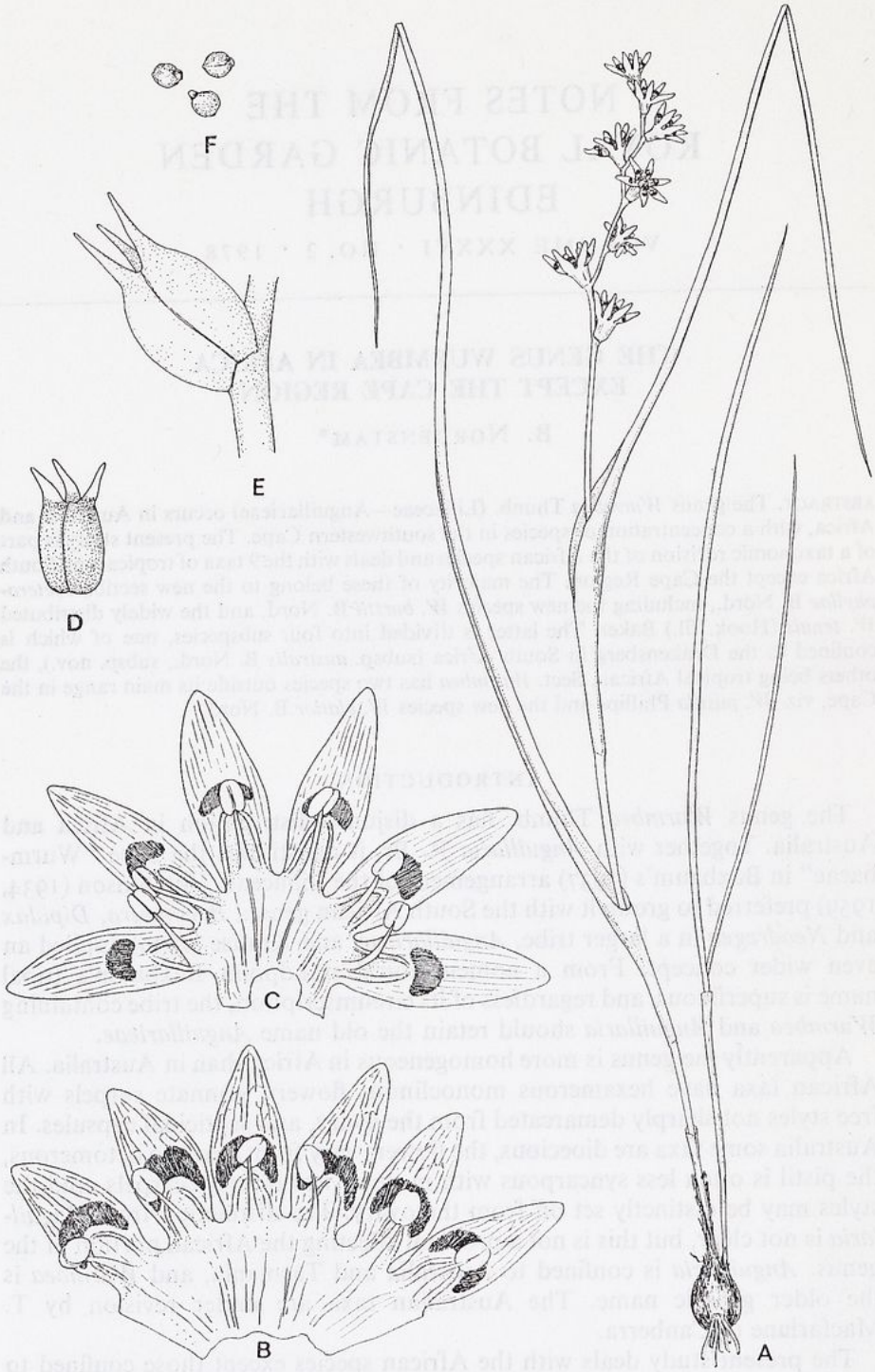

FIG. 1. *Wurmbea elatior* B. Nord.: A, habit × 0·5; B, C, perianth laid out × 2·85; D, gynoecium × 2·85; E, capsule × 2·85; F, seeds × 2·85. (A, *Galpin* 2034; B, *Acocks* 20216; C, D, *Williamson* 1048; E, F, *Bolus* 1318).

One of these is confined to the Cape and usually named *W. capensis* Thunb. or *W. spicata* (Burm.fil.) Durand & Schinz. This has turned out to be a very polymorphic complex, which has to be divided into more than a dozen species. Some were described in an earlier paper (Nordenstam 1964), and a full treatment will be published elsewhere.

The African species of *Wurmbea* can be arranged comfortably in two sections. All the Cape species belong to sect. *Wurmbea*, which is furthermore represented outside the Cape Region by two species in Natal and adjacent areas of the eastern Cape and Lesotho. The remainder of the African taxa belong to the new section *Heterophyllae* B. Nord., including Baker's second species, viz. *W. kraussii* Baker.

From a phytogeographical point of view it is interesting that the Australian taxa come closest to sect. *Heterophyllae*. Sect. *Wurmbea* is a homogeneous and probably advanced group with a pronounced centre in the southwestern Cape.

The present study has benefited greatly from the interest taken into this genus by Dr O. Hilliard and Mr B. L. Burtt. Their joint efforts in the field have resulted in a fine collection of herbarium specimens, sometimes supplemented by spirit material, colour photographs and detailed field notes. It is very appropriate to dedicate this study to Mr Burtt and a pleasure to name one new species for him.

I also wish to express my thanks to Dr O. Almborn, who kindly examined and approved my Latin diagnoses.

The revision is based on material from the following herbaria (abbreviations in accordance with Holmgren & Keuken 1974): B, BM, BOL, BR, E, G, GB, GRA, K, M, NBG, NU, PRE, S, SAM, and STE. Some taxa are being grown in Stockholm from corms and seeds kindly supplied by Mrs Hilliard and Mr Burtt, but unequivocal chromosome counts have so far not been obtained.

Key to the species of Wurmbea in Africa except the Cape region

1a Flowering shoot with only cauline leaves, all basally sheathing (sect. *Wurmbea*) 2

1b Flowering shoot with cauline leaves and a solitary basal leaf; the latter not stem-sheathing, but enclosed with the stem in a common basal sheath (sect. *Heterophyllae*) 3

2a Flowering stem tall, 10–40 cm high, with 2–3 suberect, long attenuate leaves . . . . . 1. *elatior*

2b Flowering stem dwarf, 1·5–6 cm high, with a single green leaf with erecto-patent or arcuate tip . . . . . 2. *pusilla*

3a Nectary an elevated scale with a free, obtuse or emarginate tip . . . . . 3. *kraussii*

3b Nectary grooved, without a distinct free tip 4

4a Perianth tube short (0·5–1·5 mm), $\frac{1}{5}$–$\frac{1}{12}$ of the length of the perianth . . . . . 4. *tenuis*

4b Perianth tube distinct (1·5–2·5 mm long), about $\frac{1}{3}$ of the length of the perianth 5

5a Perianth segments suberect. Basal leaf flat with inrolled, minutely scabrid margins . . . . . 6. *angustifolia*

5b Perianth segments ± erecto-patent. Basal leaf with smooth margins 6

6a Basal leaf flattened with inrolled margins. Perianth with purple nectar blotches . . . . . 4b. *tenuis* subsp. *hamiltonii*

6b Basal leaf thickish (reniform in transect). Perianth without nectar blotches . . . . . 5. *burttii*

Wurmbea Thunb. sect. **Wurmbea**

Type: *W. capensis* Thunb.

The section is phytogeographically centred in the south western Cape Province, and will be treated in a forthcoming publication. Only the following two species occur outside the Cape Region.

1. W. elatior B. Nord., **sp. nov.**

Type: *Galpin* 2034 (holo. PRE; iso. K).

Ic.: Trauseld 1969 p. 6; fig. nostrae 1, 6a.

Cormus ovoideus vel subglobosus, tunicis brunneis papyraceis. Caulis plerumque elatus. *Folia* duo vel interdum tria, omnia caulina, e basi latiore vaginanti longe attenuata et acuminata. *Spica* plerumque satis laxa et multiflora, floribus usque 20, 0·5–2 cm distantibus. *Perianthium* late campanulatum album vel viridi-cremeum, segmentis per $\frac{1}{3}$ vel $\frac{2}{5}$ connatis, lobis liberis anguste oblongis vel (ob) lanceolatis, parum unguiculatis multinervis obtusis, in medio macula atropurpurea notatis. *Nectarium* ad instar sulci longitudinalis porcis duabus sub-parallelis limitati. *Filamenta* alba, segmentis liberis dimidio breviora. *Antherae* oblongae rubrae—fuscae vel aureae. *Ovarium* viride, stylis subulatis suberectis. *Capsula* rotundato-oblonga vel oblongo-ovoidea. *Semina* subglobosa subangulata brunnea breviter appendiculata.

Corm broadly ovoid-subglobose, 0·5–1·5 cm in diam., with light brown thin papery tunics easily peeling off the firm white body; neck rather loose and indistinct. Stem usually tall and stout, above ground 10–40 cm long, 1·5–5 mm thick. *Leaves* all cauline, 2 or seldom 3, indistinctly many-veined, long attenuate with slender tip from a broader sheathing base; lower leaf inserted near the stem base, 10–45 cm long, up to 7 mm wide near the base, involute so as to appear subterete, erect to suberect and somewhat flexuous; upper leaf (leaves) inserted about the middle of the stem, 10–40 cm long, with vaginate portion 3–10 cm long. *Spike* (2–)3–20-flowered, up to 15 cm long, usually lax with flowers spaced (0·2–)0·5–2(–3) cm apart, axis often somewhat flexuous. *Perianth* widely campanulate with erecto-patent—spreading segments, 8–16 mm long, white or greenish cream-coloured; perianth tube oblong, 2–6 mm long and 2–5 mm broad, with 3 veins on the connate part of each tepal and areas of thinner texture in between; free segments narrowly oblong–(ob)lanceolate, 6·5–12 mm long, 1–3·5 mm wide, somewhat unguiculate with a narrower basal portion, 7–9(–11)-veined with partly anastomosing veins, obtuse, marked below the middle with a distinct, deep red or purplish black, transversely oblong or often reniform or bilobed patch above the nectary. *Nectary* consisting of two sub-parallel round-backed elevations

2–3 mm long, separated by a narrow groove basally extended into a shallow pocket above the base of the filament. *Filaments* 3–5 mm long, white. *Anthers* oblong, 1–1·5 mm long, 0·6–1 mm wide, deep red to purplish brown or golden yellow. *Pistil* elliptic-oblong—ovoid, 5–10 mm long, green or sometimes with a purplish tinge; free styles subulate, usually slender, 2–4 mm long, whitish with small capitate stigmas, suberect. *Capsule* rounded-oblong—oblong-obovoid, c. 0·5 cm broad and 1 cm long incl. the c. 4 mm long subulate suberect or slightly erecto-patent styles. *Seeds* ellipsoid-subglobose, slightly angular, 1–1·5 mm long and c. 1 mm wide, brown, with a minutely reticulate surface and an obtuse submembranous appendage at one end.

Flowering period: Jan.–May.

CAPE. Graaff Reinet distr., summit of Gnadouw Mt, c. 2000 m, iv, *Bolus* 1318 (BOL). Somerset East distr., summit of Boschberg, 1465 m, iii, *MacOwan* 979 (BM, BOL, GRA, K, S). Stockenstroom distr., Katberg, 1830 m, *Hutton* s.n. (K). Victoria East distr., summit of Hogsback, 1675 m, iv 1885, *Scully* 245 (E, GRA, SAM); Kettlespont, Hogsback, v 1957, *Lang* s.n. (GRA). Stutterheim distr., summit of mt above Toise River railway station, 1220 m, iii 1894, *Flanagan* 2304 (PRE); summit of mt above Dohne, 1220 m, iii 1894, *Flanagan* 2304 (BOL, SAM). Queenstown distr., Andriesberg nr Bailey, 1900–1950 m, ii 1896, *Galpin* 2034 (K, PRE); Queenstown (also nr Kingwilliamstown), *Barber* s.n. (K). Aliwal North distr., Wittebergen, 2120–2420 m, *Drège* 3512 (G, K, S). Herschel distr., Majuba Nek, i 1916, *Hepburn* 272 (GRA). Barkly East distr., Ben McDhui, 3000 m, 11 iii 1904, *Galpin* 6870 (BOL, K, PRE); Saalboom Nek, 13·4 miles SSE of Clifford P.O., 2200 m, 15 i 1959, *Acocks* 20216 (PRE); Naude's Nek, c. 2420 m, 31 i 1963, *Nordenstam* 2036 (S); *ibidem*, c. 2500 m, 19 ii 1971, *Hilliard & Burtt* 6606 (E, PRE, S). Elliot distr., 2·5 miles NE of Barkly Pass, 2300 m, 27 i 1963, *Nordenstam* 2011 (S). Matatiele distr., Pack Ox Neck and Ongeluks Neck, ii 1917, *Hepburn* 289 (GRA, K). Mount Currie distr., Ingeli Mt, c. 2000 m, iii 1883, *Tyson* 1281 (BOL, G, GRA, K, PRE, SAM).

NATAL. Polela distr., Bulwer area, Sunset, Lusane Gorge, Mvulshwane, 7 v 1974, *Rennie* 585 (NU). Underberg distr., Sani, 2440 m, 15 iii 1938, *Brooke* 41 (BM); Forestry Reserve just beyond Bushman's Nek police post, 19 ii 1975, *Hilliard & Burtt* 8008 (E); Cobham Forestry Station, c. 1700 m, 19 iii 1977, *Hilliard & Burtt* 9708 (E). Estcourt distr., Culvers, 1830 m, iii 1924, *Rogers* 27782 leg. *Brown* (K); Giant's Castle, 2440 m, 22 ii 1915, *Symons* 437 (PRE); Giant's Castle Game Reserve, Thumb area, 2140 m, 27 iii 1965, *Trauseld* 381 (PRE).

ORANGE FREE STATE. Harrismith distr., Harrismith, 2300 m, ii 1905, *Sankey* 293 (K).

LESOTHO. Mohaleshoek distr., kloof of Mohlehli, Loang Mt, 10 ii 1917, *Dieterlen* 1261 (PRE). Maseru distr., Little Bokong Camp, [29° 14′ S, 28° 08′ E], 2600 m, 7 i 1947, *Jacot-Guillarmod* 343 (K, PRE); Semonkong, 2700 m, 11 i 1954, *Jacot-Guillarmod* 1726 (PRE). Berea distr., Mamalapi, 2600 m, 20 i 1957, *Marais* 1302 (K, PRE). Mokhotlong distr., Lekhalabalethse, 2140 m, 8 iii 1971, *Williamson* 1048 (K).

Since I introduced the name of this new species on herbarium labels many years ago, it has become widely adopted and even appeared as a *nomen nudum* in print (e.g. Trauseld 1969, Jacot-Guillarmod 1971).

W. elatior is found in montane to subalpine marshes and streambanks from about 1200 to 3000 m. The distribution ranges from Graaff Reinet and the Amatola Mts in the south northwards along the Drakensberg through Natal and Lesotho to Harrismith in the Orange Free State.

It is nearly always a tall plant with much attenuate leaves and a long and laxly many-flowered spike. The purple spots on the middle of the tepals are very conspicuous. In spite of some variation in size and shape of the perianth (cf. fig. 1B,C), this is a characteristic and easily recognized species. The scent is peculiar, like horse dung, or according to other collectors reminiscent of naphthalene, vanilla, Tonquin-beans, or even a sewage farm.

A vegetative shoot is often present contemporaneously with the flowering shoot. It carries two elongate narrowly linear leaves from a common basal sheath, and is clearly homologous to the conspicuous hysteranthous vegetative shoot of the following species, *W. pusilla.*

2. W. pusilla Phillips in Ann. S. Afr. Mus. 16:313 (1917).
Type: *Guthrie* 4937, leg. *A. Bolus* (holo. BOL).
Ic.: Trauseld 1969 p. 6; fig. nostrae 2, 6b.

Dwarf plant with an early flowering shoot and a later developing vegetative shoot. Corm subglobose, 0·5–1·2 cm in diam., with fairly thin brown tunics over a firm white body, produced into a short and loose, sometimes indistinct neck or only a submembranous sheath. Flowering stem dwarf, above ground 1·5–6 cm high (up to 10 cm in the fruiting stage). *Leaves* cauline, only one green during anthesis, another ± withered near the stem base. Basal leaf sheath-like, submembranous, brownish, 1–3 cm long, apically dilated and with a withered usually short remnant of lamina; the vaginate base distinctly set off from the slender stem. Green cauline leaf 3–8 cm long, inserted about the middle of the stem, with a pale submembranous veined sheath basally distinctly set off from the stem; lamina erecto-patent or arcuate, long-acuminate, subterete or complanate with connate margins, broader and conduplicate above the vaginate base. Hysteranthous vegetative shoot inconspicuous at anthesis, visible as a terete filiform sheath a few cm high (fig. 2A), later developing 1 or 2 elongate leaves from a basal sheath (fig. 2E); sheath 5–10 cm long, submembranous, apically truncate and often mucronate; leaves linear-filiform, flat or seemingly subterete with involute margins, up to 25 cm long, 1–5 mm wide. *Spike* 1–3 cm long, 1–8-flowered, fairly dense, the flowers spaced 2–7 mm apart. *Perianth* campanulate with erecto-patent or ± spreading segments, 7–15 mm long, white; perianth tube broadly cylindric or somewhat widening above, 2·5–7·5 mm long, 1·5–4 mm broad, pale and submembranous, closely 3-veined in the connate portion of each tepal; free segments narrowly oblong-lanceolate, 4–8 mm long, 1–1·5 mm wide, 3–7(–9)-veined, with a transversely ovate-oblong or thickly reniform purple blotch below the middle. *Nectary* a broadly grooved patch 1–2 mm long at the base of the free segment (below the blotch), with elevated margins. *Filaments* inserted in the nectary pocket, 3–4 mm long, white, slender. *Anthers* oblong, 1–1·5 mm long, 0·6–0·9 mm wide, red, turning brown at the time of dehiscence. *Pistil* oblong, 5–8 mm long incl. styles, dull reddish green; free styles 3·5–6 mm long, ± erect, subulate-filiform, slender, white, with small capitate stigmas. *Capsule* ovoid-ellipsoid, 8–13 mm long incl. styles, 4–6 mm wide; styles erect, 4–6·5 mm long. *Seeds* subglobose or

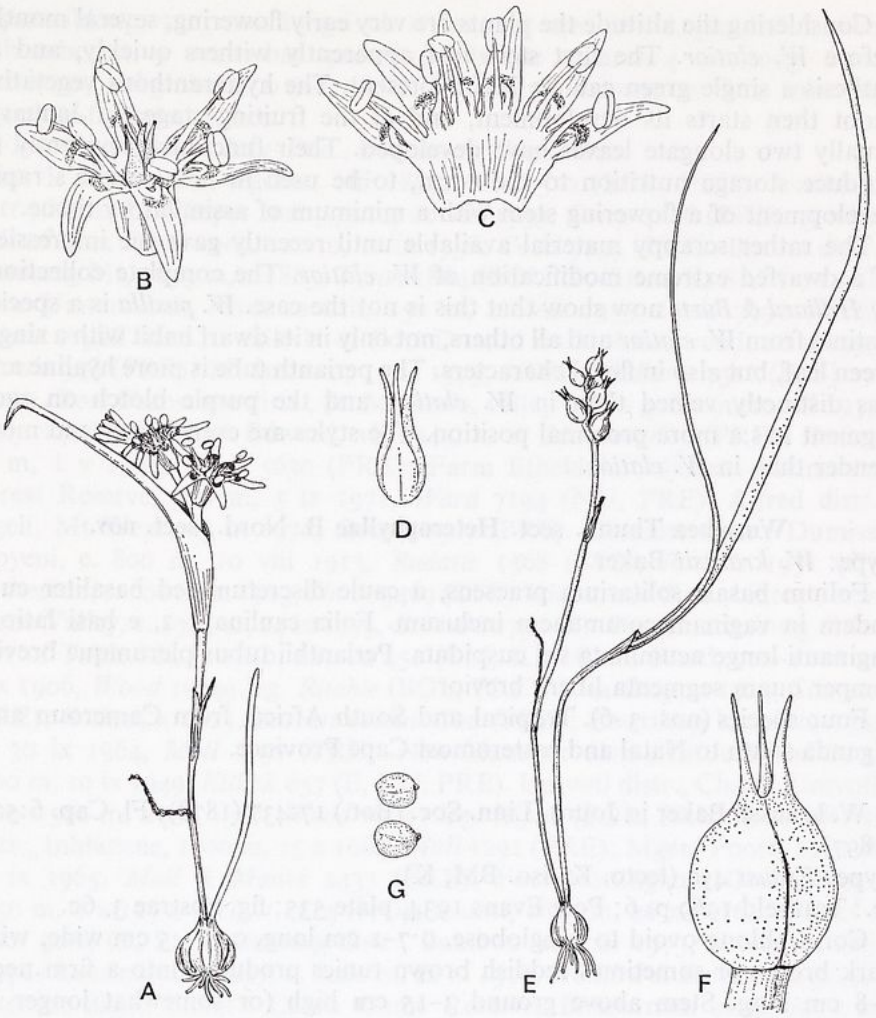

FIG. 2. *Wurmbea pusilla* Phillips: A, flowering plant × 1; B, perianth × 2·85; C, perianth laid out × 2·85; D, gynoecium × 2·85; E, fruiting plant × 0·5; F, Capsule × 2·85; G, seeds × 2·85. (A-D, *Hilliard & Burtt* 7073; E-G, *Hilliard & Burtt* 8801).

somewhat compressed, c. 2 mm long and 1·5–2 mm wide, brown, somewhat reticulate, with a short obtuse darker brown beak at one end.

Flowering period: Oct.–Nov.

NATAL. Bergville distr., Mont aux Sources, 3050 m, 26 x 1897, *Guthrie* 4937 leg. *A. Bolus* (BOL); *ibidem*, on plateau, 21 xi 1930, *Schweickerdt* 691 (PRE). LESOTHO. Mokhotlong distr., Black Mts, between Sani and Mokhotlong, c. 3050 m, 5 xi 1973, *Hilliard & Burtt* 7073 (E, S); Langalibalele Pass, Basutoland plateau, c. 2870 m, 20 xi 1973, *Wright* 1579 (E); Sani Top, E of pass, c. 3000 m, 14 i 1976, *Hilliard & Burtt* 8801 (E, S).

This interesting little species lives under extreme conditions on the highest mountains of South Africa, viz. the summit plateau of the Drakensberg. The habitats are seasonally flooded, swampy depressions with wet grass turf or gravelly silt on the alpine summit about 3000 m.

Considering the altitude the plants are very early flowering, several months before *W. elatior*. The first stem leaf apparently withers quickly, and at anthesis a single green cauline leaf is present. The hysteranthous vegetative shoot then starts its development, and at the fruiting stage (in January) usually two elongate leaves have developed. Their function is evidently to produce storage nutrition to the corm, to be used in next season's rapid development of a flowering stem with a minimum of assimilatory tissue.

The rather scrappy material available until recently gave the impression of a dwarfed extreme modification of *W. elatior*. The complete collections by *Hilliard & Burtt* now show that this is not the case. *W. pusilla* is a species distinct from *W. elatior* and all others, not only in its dwarf habit with a single green leaf, but also in floral characters. The perianth tube is more hyaline and less distinctly veined than in *W. elatior*, and the purple blotch on each segment has a more proximal position. The styles are even longer and more slender than in *W. elatior*.

Wurmbea Thunb. sect. **Heterophyllae** B. Nord., **sect. nov.**

Type: *W. kraussii* Baker.

Folium basale solitarium praesens, a caule discretum sed basaliter cum eodem in vaginam communem inclusum. Folia caulina 1–2, e basi latiore vaginanti longe acuminata vel cuspidata. Perianthii tubus plerumque brevis, semper quam segmenta libera brevior.

Four species (nos. 3–6). Tropical and South Africa, from Cameroun and Uganda south to Natal and easternmost Cape Province.

3. W. kraussii Baker in Journ. Linn. Soc. (Bot.) 17:437 (1878); Fl. Cap. 6:522 (1897).

Type: *Krauss* 450 (lecto. K; iso. BM, K).

Ic.: Trauseld 1969 p. 6; Pole Evans 1934, plate 535; fig. nostrae 3, 6c.

Corm oblong-ovoid to subglobose, 0·7–2 cm long, 0·6–1·5 cm wide, with dark brown or sometimes reddish brown tunics produced into a firm neck 1–8 cm long. Stem above ground 3–15 cm high (or somewhat longer in fruiting stage). Basal sheath vaginate; free apex short, ovate-oblong, membranous, obtuse or mucronate, distinctly veined. *Basal leaf* solitary, 2·5–15 cm long (or even longer in fruiting specimens), 1–2(–2·5) mm wide, linear-filiform, subterete, shallowly channelled adaxially, glabrous. *Cauline leaves* 1 or 2, spathaceous, close to the inflorescence, 1–3(–4) cm long, (2·5–)3–7 mm wide near the base, acuminate. *Spike* 1–6(–10)-flowered, usually short, up to 3·5 cm long, with flowers spaced 3–8 mm apart. *Perianth* 6–12 mm long, pure white or pink–mauve–purple, with stellately spreading segments; perianth tube 0·7–1·5(–2) mm long; free segments 5–10 mm long, 1·5–3·5 mm wide, oblong or elliptic-oblong to lanceolate-oblong, basally somewhat unguiculate, usually distinctly 3–7-veined, sometimes speckled with small rectangular dots, apically obtuse to subacute. *Nectary* distinctly elevated, boat-shaped with an entire or shallowly bilobed obtuse free apex, 2–3 mm long, white or mauve-tipped or purplish mauve. *Filaments* 3–5 mm long, white or light-coloured. *Anthers* oblong, 0·7–1·8 mm long, 0·5–1 mm wide, reddish brown. *Pistil* oblong, markedly triquetrous, 5–8 mm long; free styles 2–4 mm long, green with purplish tinge and whitish style tips, brownish when dry except for the light style tips, tapering to small capitate stigmas. *Capsule*

elliptic-oblong, 7–13 mm long incl. styles, 3–5 mm broad, greenish brown, with suberect or somewhat spreading subulate styles 2–4 mm long. *Seeds* numerous, subglobose, 0·9–1·2 mm long, light brown, with a minutely reticulate-foveate surface.

Flowering period: July–Dec., but mostly Sept.–Oct.

CAPE. E Pondoland, Egossa, viii 1899, *Sim* 2510 (BOL, PRE). Lusikisiki distr., Mkambati Leper Inst., 75 m, 20 viii 1953, *Story* 4236 (PRE); 3 miles NW of Port Grosvenor, 120 m, 10 ix 1956, *Codd* 9735 (PRE). Bizana distr., Zuurberg Mt, 1675 m, x 1883, *Tyson* 1864 (BOL, G, GRA, K, SAM); 1 mile from Umtamvuna River mouth, 150 m, 11 viii 1953, *Codd* 7996 (PRE). Mount Ayliff distr., 1 mile N of Fort Donald on Kokstad road, 26 x 1955, *Marais* 948 (PRE); Mt Insizwa, 17 xi 1973, *Hilliard & Burtt* 7310 (E, S).

NATAL. Port Shepstone distr., St. Michaels, valley below golf-course, vii 1933, *Letty* 14 (PRE); Port Edward, vii 1943, *v. d. Merwe* 2665 (PRE); *ibidem*, 15 m, 1 v 1966, *Ward* 5630 (PRE); Farm Etheldale, adjacent Mtamvuna Forest Reserve, 370 m, 5 ix 1971, *Ward* 7194 (NU, PRE). Alfred distr., Ingeli, Mt Weza, 23 ix 1971, *Strey* 10507 (PRE). Umzinto distr., Dumisa, Moyeni, c. 800 m, 10 viii 1913, *Rudatis* 1568 (STE), *Rudatis* 1951 (G); Kenterton, c. 600 m, ix 1913, *Thode* 3469 (STE). Richmond distr., hilltop above Byrne Valley, c. 1525 m, 14 ix 1975, *Stewart* 1755 (E). Pietermaritzburg distr., foot of Table Mt, ix 1840, *Krauss* 450 (BM, K); Hilton Road, 900–1200 m, 7 ix 1906, *Wood* 10049 leg. *Ritchie* (BOL, PRE); Zwartkop, x 1924, *Sim* s.n. (PRE); *ibidem*, x 1925, *Barratt comm. Sim* (PRE); Zwartkop location, 1350 m, 30 ix 1964, *Moll* 1157 (PRE). New Hanover distr., Little Noodsberg, 1000 m, 10 ix 1949, *Killick* 657 (E, NU, PRE). Umvoti distr., Chard. Umvoti, 1200–1500 m, 24 ix 1906, *Wood* 10043 leg. *Wylie* (BOL, PRE). Lions River distr., Inhluzane, 1800 m, 15 x 1964, *Moll* 1291 (PRE); Mgeni Poort, 1770 m, 29 ix 1965, *Moll & Mauve* 2433 (PRE); Fort Nottingham Commonage, 1750 m, 8 x 1975, *Wright* 2214 (NU); *ibidem*, 1675 m, 26 x 1976, *Hilliard & Burtt* 9063 (E, S). Underberg distr., Bamboo Mt, xii 1973, *Grice* s.n. (E); Upper Umzimouti Valley, c. 2000 m, 26 xi 1976, *Hilliard & Burtt* 9356 (E, S). Estcourt distr., Giant's Castle Game Reserve, Bannerman area, 2300 m, 12 xi 1966, *Trauseld* 686 (PRE); summit of Kamberg, c. 2080 m, 2 xi 1974, *Wright* 1888 (E). Bergville distr., Oliviers Hoek Pass, 1800 m, xi 1908, *Thode* 3339 (STE); Royal Natal National Park, Tugela River valley, 29 x 1938, *Hafström & Acock* 215 (PRE, S); *ibidem*, 1680–2000 m, 31 x 1938, *Wall* s.n. (GB, S); *ibidem*, 2100 m, 1 x 1939, *West* 1278 (PRE); Mont aux Sources, 1680 m, 6 x 1946, *Allanson* 5 (NU); *ibidem*, 1 x 1950, *Sidey* 2031 (S), 2100–2400 m, 5 x 1950, *Sidey* 2031 (PRE, S); Cathedral Peak Forest Research Station, SW boundary of Catchment II, 2250 m, 1 xii 1950, *Killick* 1186 (K, PRE); Mont aux Sources, x 1964, *Trauseld* 282 (PRE); Royal Natal National Park, path to Witzieshoek gate, c. 2100 m, 28 xii 1975, *Hilliard & Burtt* 8684 (E, S). Weenen distr., Silver Top, 2400 m, xii 1923, *Rogers* 28161 (STE). Vryheid distr., Hlobane, 1 x 1950, *Johnstone* 464 (NU). Ngotshe distr., Ngome top, 29 vii 1944, *Gerstner* 4833 (PRE); Ngome, 15 ix 1971, *Strey* 10477 (PRE). Hlabisa distr., St Lucia, ix 1945, *Crundall* s.n. (PRE). *Sine loco*, "Zululand", *Gerrard* 549 (BM).

SWAZILAND. Mbabane distr., Ukutula, 3 x 1954, *Compton* 24503 (NBG); *ibidem*, c. 1075 m, 16 x 1955, *Compton* 25191 (NBG); hills NE of Mbabane, c. 1500 m, 11 x 1958, *Ben Dlamini* s.n. (K, M, NBG, PRE).

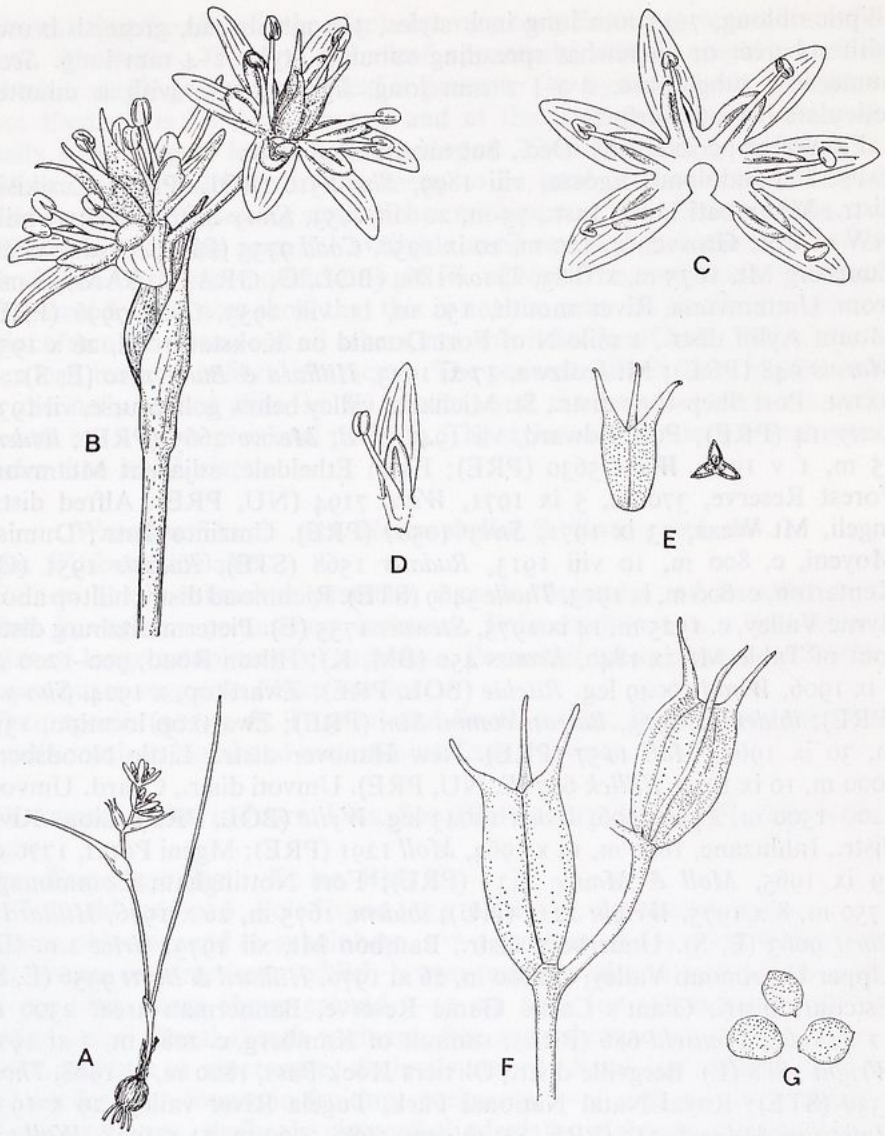

FIG. 3. *Wurmbea kraussii* Baker: A, habit × 0·5; B, inflorescence × 2·85; C, perianth, laid out × 2·85; D, perianth segment with nectary and stamen × 2·85; E, pistil in side view and transect × 2·85; F, capsules × 2·85; G, seeds × 5·75. (A, *Story* 4236; B-E *Strey* 10507; F, G, *Hilliard & Burtt* 8684).

W. kraussii occurs from the lowlands of northern Transkei and Natal to the Drakensberg in the west and northwards to the Mbabane area in Swaziland. The recorded altitudes range from near sea level (15 m) to about 2400 m. Thus the species does not extend to the alpine summit of the Drakensberg range and is not known from Lesotho (the record in Jacot-Guillarmod 1971: 136 being referable to *W. angustifolia*).

The species prefers moist habitats such as bogs and stream banks, but is also frequently found in grassland especially on well-drained, seasonally wet slopes. In montane habitats it is recorded from *Danthonia*-veld as well as *Themeda triandra*-veld, and it seems to be favoured by burning.

The variation is considerable especially in size and colouring of the perianth. Many populations are apparently homogeneous as to flower colour, i.e. either pink or white, but not seldom white and pink flowered forms grow together with or without transitions. The pink or mauve colour may be restricted to the nectary region or be diffusely to evenly distributed. Small rectangular dots may occur on the perianth, either sparsely or rarely densely distributed all over the segments. In dried material these dots are visible as brown or orange-brown short streaks.

The smallest flowers are found in montane populations from the Drakensberg (e.g. *Killick* 1186), and the largest in lowland populations e.g. from northern Transkei. The variation seems continuous, however, and not deserving taxonomic recognition.

W. kraussii is nevertheless an easily recognized species. Distinctive characters are the narrow basal leaf and the broad-based short cauline leaf or leaves, together with the short perianth tube, the usually distinctly veined segments, and particularly the characteristic elevated nectary with its free tip.

4. W. tenuis (Hook. fil.) Baker in Journ. Linn. Soc. (Bot.) 17:436 (1880). Syn.: *Melanthium tenue* Hook. fil. in Journ. Linn. Soc. (Bot.) 7:229 (1864). Type: *Mann* 1459 (holo. K).
Ic.: see under the subspecies.

Corm ovoid–subglobose, 0·7–2 cm long 0·5–1·5 cm wide, with brown or blackish papery or firmly chartaceous tunics with a somewhat glossy and minutely scalariform-reticulate surface produced into a distinct firm or loose or indistinct neck up to 5 cm long. Stem above ground 2–20 cm high, usually slender. Basal sheath submembranous–subhyaline, 1–5 cm long, apically ± dilated, truncate–obtuse and usually mucronate, 5–11-veined. Solitary *basal leaf* linear or linear-filiform, 3–22 cm long, 0·5–5 mm wide, erect and straight or curved, flat or flattened to semiterete and channelled, with often inrolled smooth or minutely scabrid margins, indistinctly veined, gradually tapering to an acuminate or apiculate point. *Cauline leaves* 1 or 2, acuminate or cuspidate from a broader sheathing base 2–5 mm wide, 1–7 cm long, erect or recurved. *Spike* usually short, 1–7-flowered, somewhat flexuous or zigzagged, with the flowers spaced 0·5–1·5 cm apart. *Perianth* 5–10 mm long, widely campanulate with erecto-patent to stellately spreading segments, white or cream-coloured to pink, mauve or lilac; perianth tube short ($\frac{1}{3}$–$\frac{1}{12}$ of the perianth length), 0·5–1·5 mm long, 18-veined (3 veins below each segment); free segments oblong-ovate or elliptic-oblong to (ob)lanceolate, 3·5–8 mm long, 0·7–2 mm wide, 3–7-veined, with or without small dots, apically rounded or obtuse to subacute. *Nectary* a longitudinal groove at the base of the free segment, bordered by two ridges apically contiguous or nearly so, closely adjacent to 1–2 purple blotches below or around the middle of the segment. *Filaments* 1·5–4 mm long, white or whitish. *Anthers* oblong or elliptic-oblong, 0·6–1·5 mm long, 0·3–0·8 mm wide, yellow or orange-coloured to brick-coloured or pale–purplish brown. *Pistil* oblong or elliptic-oblong, somewhat 3-angled, green or purplish; free styles subulate, 2–4 mm long, initially erect or suberect, often becoming curved or hooked, with small capitate or somewhat elongate stigmas. *Capsule* (narrowly) elliptic-oblong, somewhat triquetrous, 0·8–1·5 cm long, 3–5 mm wide, greenish or

purplish brown; styles suberect to curved or hooked. *Seeds* subglobose, often somewhat compressed, 1–1·5 mm in diam., brown, with a minute beak on one end.

The tropical African Wurmbeas form a widespread polymorphic complex, and it is not surprising that four species have been recognized. Of these, *W. goetzei* Engl. and *W. homblei* De Wild. are clearly synonymous. (The latter was erroneously described as having styles free to the base, which is not the case in any of the African taxa of the genus.)

Typical representatives of *W. goetzei* Engl., *tenuis* (Hook. fil.) Baker and *hamiltonii* Wendelbo may be quite characteristic, but an examination of a wider range of herbarium material reveals a considerable variability obscuring the differences. There is a certain pattern in the variation, however, and a correlation with phytogeographical data. Interestingly, a single collection from South Africa is related to the assemblage, adding considerably to its range and complexity.

The most adequate taxonomic solution appears to be the recognition of a single species with four allopatric subspecies.

KEY TO THE SUBSPECIES OF W. TENUIS

1a	Cauline leaf solitary, recurved	4d. subsp. *australis*
1b	Cauline leaves 2, ± erect	2
2a	Basal leaf narrowly linear-filiform, ± semiterete with channelled adaxial side. Perianth (6–)7–10 mm long, with stellately spreading segments	4c. subsp. *goetzei*
2b	Basal leaf narrowly linear, ± flat but with often inrolled margins. Perianth 4·5–7·5 mm long, campanulate with erecto-patent or almost spreading segments	3
3a	Perianth segments connate to $\frac{1}{3}$–$\frac{1}{5}$; perianth tube 1–1·5 mm long	4b. subsp. *hamiltonii*
3b	Perianth segments connate to $\frac{1}{6}$–$\frac{1}{10}$; perianth tube 0·5–1 mm long	4a. subsp. *tenuis*

4a. W. tenuis subsp. **tenuis**

Ic.: Engler 1908, fig. 201B; Krause 1930, fig. 95B; Hutchinson 1936, fig. 300; Hepper 1968, fig. 354; fig. nostrae 4A–E, 7a.

Stem above ground 3–15 cm high. *Basal leaf* erect, linear, 5–17 cm long, 1–3 mm wide, flat with often inrolled margins. *Cauline leaves* shorter than the spike, or lower leaf somewhat longer. *Perianth* 5·5–7·5 mm long, connate to $\frac{1}{6}$–$\frac{1}{10}$, widely campanulate with almost spreading segments, white or light pink to lilac; perianth tube 0·5–1 mm long; free segments narrowly oblong-ovate, 4·5–6·5 mm long, 1–2 mm wide, 3–5-veined, obtuse–rounded apically, with small rectangular dots distally or all over, with 1–2 purple blotches below the middle. *Filaments* 2–3 mm long. *Anthers* oblong, 0·8–1 mm long, 0·5–0·7 mm wide, brownish. *Styles* subulate, becoming recurved or hooked on the capsule, 2–3 mm long, with small subcapitate stigmas. *Seeds* 1·2–1·5 mm in diam.

Flowering period: Apr.–May.

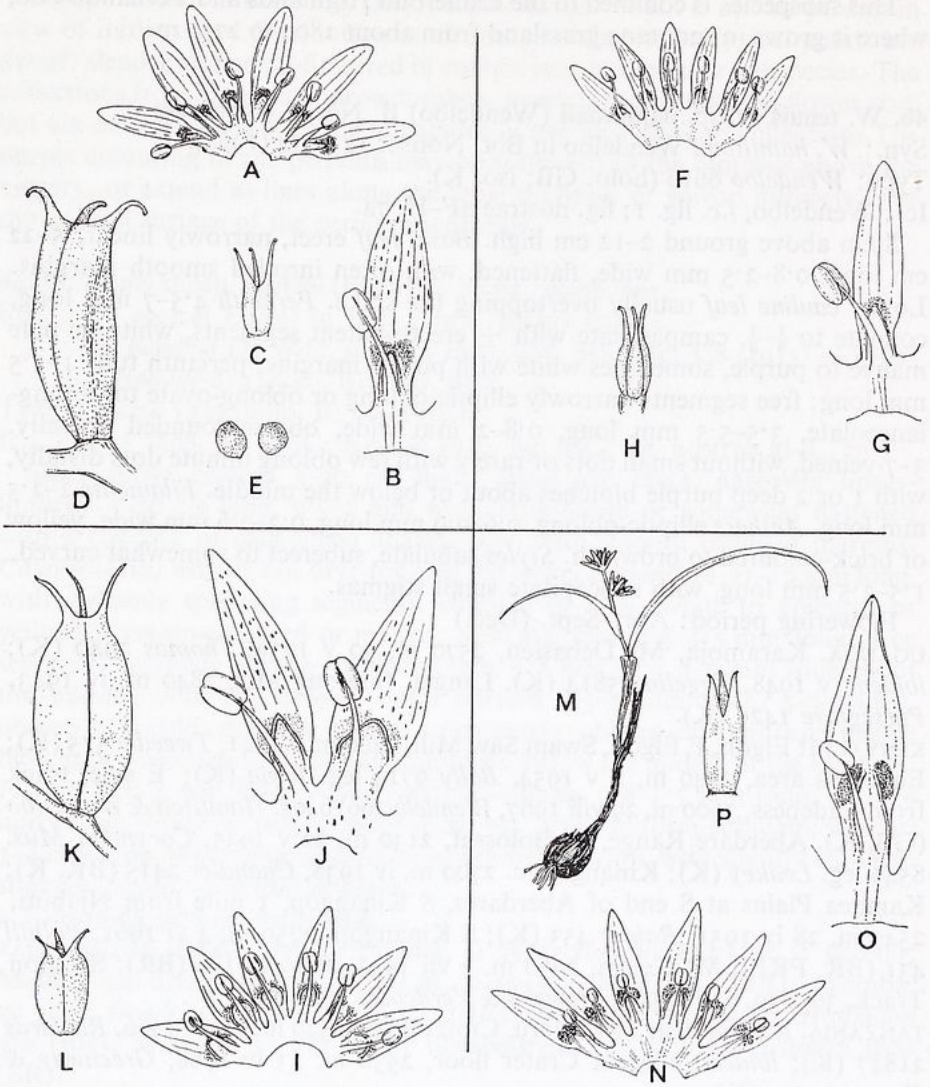

FIG. 4. *Wurmbea tenuis* (Hook. fil.) Baker subsp. *tenuis* (A-E), subsp. *hamiltonii* (Wendelbo) B. Nord. (F-H), subsp. *goetzei* (Engl.) B. Nord. (I-L) and subsp. *australis* B. Nord. (M-P). A,F,I,N, perianth laid out × 2·85; B,G,J,O, perianth segment(s) with nectary and stamen × 5·75; C,H,L,P, gynoecium × 2·85; D, K, capsule × 2·85; E, seeds × 2·85; M, flowering plant × 0·5. (A,C, *Maitland* 1511; B, *Mann* 1454; D,E, *Forest Herb. Ibadan* 29385 leg. *Ejiofor*; F-H, *Chandler* 2415; I-K, *Hilliard & Burtt* 6185; L, *Pawek* 4308; M-P, *Flanagan* 2027).

CAMEROUN (formerly Brit. Cameroun). Bamenda distr., Lakom, 1830 m, iv 1931, *Maitland* 1407 (K), *Maitland* 1511 (K); Bafut Ngemba Forest Reserve, 30 iv 1951, *Forest Herb. Ibadan* 63272 leg. *Ejiofor* (K); Mba Kokeka, 21 iii 1955, *Richards* 5322 (K); above Bafut Ngemba Rest House, 18 v 1959, *Forest Herb. Ibadan* 41175 leg. *Daramola* (K). Mambilla distr., Gotel Mt, 5 iv 1970, *Forest Herb. Ibadan* 63272 leg. *Gbile & Daramola* (K), FERNANDO PÓO: 2750 m, iv–v 1862, *Mann* 1454 (K).

This subspecies is confined to the Cameroun Highlands and Fernando Póo, where it grows in montane grassland from about 1800 to 2750 m.

4b. W. tenuis subsp. **hamiltonii** (Wendelbo) B. Nord., **comb. nov.**
Syn.: *W. hamiltonii* Wendelbo in Bot. Notiser 121:114 (1968).
Type: *Wendelbo* 6616 (holo. GB; iso. K).
Ic.: Wendelbo, *l.c.* fig. 1; fig. nostrae 4F–H, 7a.

Stem above ground 2–12 cm high. *Basal leaf* erect, narrowly linear, 5–22 cm long, 0·8–2·5 mm wide, flattened, with often inrolled smooth margins. Lower *cauline leaf* usually overtopping the spike. *Perianth* 4·5–7 mm long, connate to $\frac{1}{5}$–$\frac{1}{3}$, campanulate with ± erecto-patent segments, white or pale mauve to purple, sometimes white with purple margins; perianth tube 1–1·5 mm long; free segments narrowly elliptic-oblong or oblong-ovate to oblong-lanceolate, 3·5–5·5 mm long, 0·8–2 mm wide, obtuse–rounded apically, 3–7-veined, without small dots or rarely with few oblong minute dots distally, with 1 or 2 deep purple blotches about or below the middle. *Filaments* 2–2·5 mm long. *Anthers* elliptic-oblong, 0·6–0·9 mm long, 0·3–0·6 mm wide, yellow or brick-coloured to brownish. *Styles* subulate, suberect to somewhat curved, 1·5–2·5 mm long, with subcapitate small stigmas.

Flowering period: Apr.–Sept. (Dec.)

UGANDA. Karamoja, Mt Debasien, 2570 m, 30 v 1939, *Thomas* 2940 (K); *ibidem*, v 1948, *Eggeling* 5814 (K). Langia, Imatong Mts, 2840 m, iv 1943, *Purseglove* 1429 (K).

KENYA. Mt Elgon, E Elgon, Swam Saw Mill, 2400 m, v 1941, *Tweedie* 575 (K); Endebess area, 2440 m, 2 v 1954, *Bally* 9714 leg. *Irwin* (K); E side, track from Endebess, 3600 m, 29 viii 1967, *Wendelbo* 6616 leg. *Hamilton & Wendelbo* (GB, K). Aberdare Range, Ol Bolossat, 2130 m, 22 v 1935, *Coryndon Mus.* 8549 leg. *Leakey* (K); Kinangop, c. 2700 m, iv 1938, *Chandler* 2415 (BR, K); Kamuea Plains at S end of Aberdares, S Kinangop, 1 mile from Njabini, 2540 m, 28 iv 1951, *Rainer* 453 (K); S Kinangop, 2750 m, 4 vi 1961, *Polhill* 431 (BR, PRE). Mt Kenya, 2930 m, 2 vii 1943, *Moreau* 180 (BR); Sirimon Track, 3050 m, 22 ix 1963, *Howard & Verdcourt* 3766 (K).

TANZANIA. Arusha distr., Mt Meru, Crater floor, 2520 m, 28 xii 1966, *Richards* 21827 (K); *ibidem*, edge of Crater floor, 2530 m, 23 iv 1968, *Greenway & Kanuri* 13501 (K).

The type was collected at an altitude of 3600 m, which on Mt Elgon corresponds to the borderline between the Ericaceous Belt and the Alpine Belt (Hedberg 1951). Wendelbo (1968) referred to the taxon as 'afroalpine', but its range is otherwise entirely within the vegetation zones below the Alpine Belt. It ranges from about 2100 to 3600 m and is presently known from several of the famous high mountains of East Africa, including Elgon, Aberdare, Mt Kenya and Mt Meru. It can be expected also to occur on Cherangani and Kilimanjaro, at least.

The habitats are various types of grassland, such as tussocky grass (e.g. *Pennisetum schimperi*) on shallow soil over rocks, or short swampy grass or mossy turf on deeper soil.

The flowering time is less well-defined than in the other subspecies as may be expected in the equatorial afromontane climate.

Subsp. *hamiltonii* is a fairly polymorphic taxon, which is not surprising in view of its disrupted distribution in afromontane habitats. Typical plants are dwarf, slender and small-flowered in comparison to the other subspecies. The collections from Uganda approach subsp. *tenuis* in leaf shape and flower size, but are best classified with the remainder of the East African collections. The purple colouring of the perianth may be restricted to the blotches above the nectary, or extend as lines along the tepal margins, or spread diffusely over the adaxial surface of the perianth segments.

4c. W. tenuis subsp. **goetzei** (Engl.) B. Nord., **comb. nov.**

Syn.: *W. goetzei* Engler in Bot. Jahrb. 30:272 (1901).
W. homblei De Wild. in Bull. Jard. Bot. Bruxelles 5:8 (1915).—Type: *Homblé* 814 (holo. BR; iso. BR).

Type: *Goetze* 1430 (holo. B; iso. PRE).

Ic.: Engler 1908, fig. 210C; Krause 1930, fig. 95C; fig. nostrae 4I–L, 7a.

Stem above ground 3–20 cm high. *Basal leaf* erect, narrowly linear-filiform, 3–20 cm long, 0·5–2 mm wide, semi-terete or somewhat flattened with a concave or channelled adaxial side, with smooth rounded margins. *Cauline leaves* usually not over-topping the spike. *Perianth* (6–)7–10 mm long, with stellately spreading segments, connate to $\frac{1}{6}$–$\frac{1}{12}$, white to greenish or yellowish cream-coloured or mauve; perianth tube 0·5–1·5 mm long; free segments narrowly oblong–(ob)lanceolate, 5–8 mm long, 1–2 mm wide about the middle, with a narrower basal portion 0·5–1 mm wide, 5–7-veined, obtuse–subacute, marked with a transversely oblong or reniform purple blotch, or two close or contiguous blotches, below the middle of the segment. *Filaments* 3–4 mm long. *Anthers* elliptic-oblong, 0·8–1·5 mm long, 0·5–0·8 mm broad, yellow or pale to purplish brown. *Styles* filiform-subulate, slender, 2–4 mm long, remaining ± erect or somewhat curving, with slightly elongate stigmas. *Seeds* 1–1·2 mm in diam.

Flowering period: Nov.–Jan.

ZAIRE. Biano Plateau, nr Katentania, xi 1912, *Homblé* 814 (BR, 2 sheets); Mulungoshi area, Marungu, 1700 m, xi 1945, *Quarré* 7231 (BR); Luemba, xii 1946, *Hendrickz* 4370 leg. *Kinet* 47 (BR); Mukumbi, 11 xi 1951, *Hoffmann* 978 (BR); Masowa, 15 km SE of Elisabethville, 27 xi 1954, *Schmitz* 4800 (BR).

ZAMBIA. Pans nr Abercorn, 1525 m, 14 xii 1954, *Richards* 3631 (BR, K). Nyika, 29 xii 1962, *Fanshawe* 7295 (K). Luano, 26 xi 1968, *Mutimushi* 2850 (K). Mwinilunga distr., Kalenda dambo, 9 xi 1937, *Milne-Redhead* 3173 (BR); valley below Matonchi farm, below Kalenda village, 1200 m, 19 xi 1962, *Richards* 17297 (BR, K).

TANZANIA. Ufipa distr., Mao village, 1800 m, 14 xii 1958, *Richards* 10321 (K). Unyika, undulating plateau at Suntas village, c. 1600 m, 13 xi 1899, *Goetze* 1430 (B, PRE). Kyimbila distr., N of Lake Nyasa, *Stolz* 2352 (BM, BR, PRE). Mbeya distr., upper Kiwarar Fishing Camp, between Poroto and Rungwe Mts, c. 2100 m, 29 xi 1958, *Napper* 1139 (K); Elton Plateau, 2100 m, 24 i 1961, *Richards* 14148 (K). Iringa prov., Mbosi, 1620 m, 16 xi 1932, *Davies* 702 (K); Mbosi, c. 1600 m, 14 xii 1935, *Horsbrugh-Porter* s.n. (BM); Sao Hill, 1890 m, xii 1959, *Watermeyer* 201 (K).

MALAWI. Nyika Plateau, Lake Kaulime, 2300 m, 4 i 1959, *Robinson* 3043 (K, M, PRE). Mzimba distr., Lunyangwa River at Mzuzu Govt Sec. Sch.,

Mzuzu, 1340 m, 8 i 1971, *Pawek* 4308 (K). Vipya Plateau, 1830–2130 m, 1948, *Benson* 1493 (BM). Dedza distr., foot of Chongoni Mt, 1550 m, 17 i 1959, *Robson* 1235 (K). Mt Mlanje, NE slopes of Namasele, c. 1340 m, 16 i 1971, *Hilliard & Burtt* 6185 (E, S).

This subspecies differs from subsp. *hamiltonii* in distribution (fig. 7a) as well as altitudinal range and to some extent also flowering time. It grows in mostly short and rather wet grassland on peaty or sandy soil at altitudes between 1200 and 2300 m.

Subsp. *goetzei* is a usually characteristic slender and narrow-leaved plant with starry white flowers almost without a perianth tube. The purple nectar blotches are variable in size and shape, and sometimes the perianth is cream-coloured, greenish yellow or more rarely mauve. In the dried state a mauve perianth is marked with small, rounded-oblong dots.

4d. W. tenuis subsp. **australis** B. Nord., **subsp. nov.**
Type: *Flanagan* 2027 (holo. PRE; iso. BOL, SAM).
Ic.: Fig. nostrae 4M–P, 7a.

Cormus ovoideus, tunicis firmis fuscis. Caulis humilis. *Folium basale* lineare recurvum, basin et apicem versus angustatum, margine scabriusculo. *Folium caulinum* solitarium curvatum, e basi latiore vaginanti cuspidatum. *Spica* brevis 1–3-flora. *Tepala* 5·5–7·5 mm longa, per $\frac{1}{8}$ vel minus connata, segmentis liberis erecto-patentibus anguste ovatis basi sulco nectarifero et maculis 1–2 purpureis notatis. *Filamenta* 2–3 mm longa. *Antherae* oblongae 0·7–0·8 mm longae. *Ovarium* anguste oblongum, stylis suberectis subulatis.

Corm ovoid, 1–1·5 cm long and 0·7–1 cm wide, with dark brown firm tunics, produced into a somewhat twisted and rather firm neck 2–5 cm long. Stem above ground 2–6 cm high. Basal sheath submembranous, apically somewhat inflated with a truncate or rounded tip, c. 10-veined. *Basal leaf* linear, 5–12 cm long, 2–5 mm wide, broadest below the middle, gradually tapering to a long-acuminate subterete tip with involute margins, otherwise flat or somewhat U-shaped, distinctly recurved, obscurely mid-veined, with minutely muricated margins. *Cauline leaf* solitary, inserted about the middle of the stem, 2–4 cm long, distinctly curved, long-acuminate with a fine point from a broader (2–5 mm wide) basal portion above the short vaginate base. *Spike* short, 1–3-flowered, with flowers 5–8 mm distant. *Perianth* 5·5–7·5 mm long, broadly campanulate with erecto-patent segments, probably white; perianth tube 0·5–1·5 mm long; free segments narrowly ovate, 4·5–6 mm long, c. 1·5 mm wide about the middle, with a narrower basal portion (1–1·5 mm long, 0·7–0·9 mm wide), 3–5-veined, obtuse–subacute or slightly apiculate. *Nectary* a distinct groove at the base of the free segment, with elevated ridge-like margins apically contiguous or nearly so, and bordering a reniform purplish blotch near the middle of the tepal, or two separate blotches, one on each side of the nectary apex. *Filaments* 2–3 mm long, light coloured. *Anthers* oblong, 0·7–0·8 mm long, c. 0·5 mm wide. *Pistil* narrowly oblong, 5–9 mm long, 3-angled; free styles c. 2·5 mm long, subulate, suberect, with small subcapitate or somewhat elongate stigmas.

Flowering period: Jan.

NATAL–LESOTHO–ORANGE FREE STATE BORDER. Summit of Mont aux Sources, 2900–3000 m, i 1894, *Flanagan* 2027 (BOL, PRE, SAM).

This single but ample collection (13 specimens in all) from the South African Drakensberg range seems to come closest to the tropical African *W. tenuis* and is here described as a fourth subspecies of the latter. In flower morphology it is very close to the other races of *W. tenuis*. Distinguishing features are mainly vegetative, such as the single cauline leaf, the curved leaves, and the slightly scabrid leaf-margins.

From the other South African members of sect. *Heterophyllae* the new taxon is readily distinguished by the short perianth tube. Only *W. kraussii* is similar in this respect, but very different in leaf-shape and nectary. Subsp. *australis* further differs from *W. angustifolia* by the more spreading perianth segments, the erect and slender styles, and the more distinct nectar blotches. From *W. burttii*, another dwarf species from the Drakensberg, it is further distinguished by the broader flat leaves and the purple nectary blotches.

The single locality is on the summit of the Drakensberg range at about 3000 m, and it is noteworthy that this is the only truly alpine region in the whole of South Africa. The exact ecology is not known, but the dwarf habit with a rather firm neck and curved leaves are suggestive of a stony or rocky environment rather than a grassland habitat.

5. W. burttii B. Nord., **sp. nov.**

Type: *Hilliard & Burtt* 8816 (holo. E; iso. S).

Ic.: Fig. nostrae 5A–G, 6d.

Cormus ovoideus vel globosus, tunicis brunneis. Caulis humilis. *Folium basale* lineari-filiforme erectum semiteres, margine obtuso laevi. *Folia caulina* 1–2 suberecta, e basi vaginanti abrupte acuminata canaliculata, apicem versus teretia. *Spica* 1–3(–4)-flora. *Perianthium* album immaculatum 6–8 mm longum, segmentis per c. ¼ connatis, lobis liberis erecto-patentibus anguste ovato-oblongis vel oblongo-lanceolatis 3–5-nervis obtusis. *Nectarium* sulcatum leviter elevatum, porcis duabus apice subconfluentibus constatum. *Filamenta* subulata albida, segmentis liberis quasi dimidio breviora. *Antherae* oblongae rubrae vel fuscae. *Ovarium* elliptico-oblongum, stylis suberectis subulatis gracilibus.

Corm ovoid or globose, c. 1–1·5 cm long and 0·7–1 cm wide, with brown tunics produced into a rather thin and loose neck 1–3 cm long. Stem above ground 3–5(–6) cm long. Basal sheath membranous, apically dilated and with a shortly ovate 5–10-veined usually mucronate tip. *Basal leaf* solitary, erect, linear-filiform, 4–10 cm long, 1–2 mm wide, tapering to an acuminate apex, almost semiterete and shallowly channelled adaxially (± reniform in transect), with rounded-obtuse not manifestly inrolled margins, glabrous and smooth. *Cauline leaves* 1 or 2, suberect, glabrous; uppermost leaf inserted c. 0·5 cm below the lowermost flower, above the vaginate base boat-shaped and 2–3 mm wide, then rather abruptly acuminate with a semiterete shallowly channelled narrow lamina, becoming terete towards the apex, 1–3 cm long, shorter than the spike; lower cauline leaf long-acuminate from a sheathing base and overtopping the spike, 3–5 cm long, semiterete, shallowly channelled adaxially. *Spike* 1–3(–4)-flowered, with 5–7 mm distance between the flowers. *Perianth* 6–8 mm long, white, without distinct dots or marks, at most somewhat yellowish above the nectary; perianth tube 1·5–2·3 mm long; free segments erecto-patent, narrowly ovate-oblong or oblong-lanceolate, 4·5–6

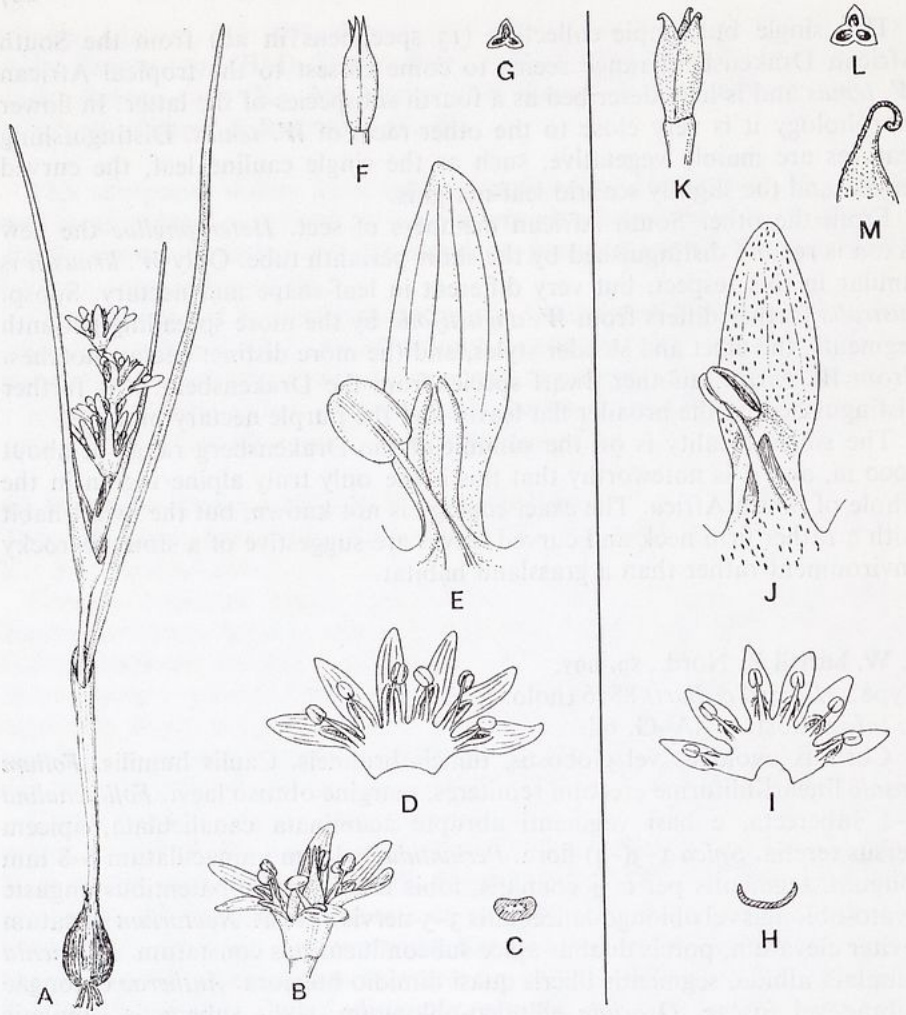

FIG. 5. *Wurmbea burttii* B. Nord. (A-G) and *W. angustifolia* B. Nord. (H-M). A, habit × 1; B, flower × 2·85; C,H, transect of basal leaf × 2·85; D,I, perianth laid out 2.85; E,J, perianth segment with stamen × 12; F,K, gynoecium × 2·85; G,L, transect of ovary × 2·85; M, style apex × 12. (A,C, *Hilliard & Burtt* 8816; B,D-G, *Hilliard* 5400; H, *Hilliard & Burtt* 8936; I-M, *Hilliard* 5356 A).

mm long, 1–1·5 mm wide, distinctly 3–5-veined, obtuse. *Nectary* a longitudinal groove near the base of the free segment, bordered by two subparallel round-backed ridges almost contiguous apically. *Filaments* subulate, 2–2·5 mm long, light-coloured, inserted at the base of the free segment. *Anthers* oblong, 0·8–1 mm long, 0·4–0·5 mm wide, red or brown. *Pistil* elliptic-oblong, 5–7 mm long; free styles suberect, subulate, slender, c. 2 mm long, with subcapitate stigmas.

Flowering period: Dec.–Jan.

NATAL. Underberg distr., Sani Pass, c. 2440 m, 6 i 1977, *Hilliard & Burtt* 9627 (E, S).

LESOTHO. Mokhotlong distr., Sani Top, rocky ridge on S side of pass, behind border post, 2900 m, 30 xii 1973, *Hilliard* 5400 (E); *ibidem*, valley W of border post, c. 2870 m, 16 i 1976, *Hilliard & Burtt* 8816 (E, S).

It is most appropriate to link the name of this new species with Mr B. L. Burtt who, together with Dr O. Hilliard, has collected it repeatedly at Sani Pass. It is thanks to their thorough observations and well-preserved herbarium and spirit material, that the new species could be distinguished and described.

W. burttii is apparently rare, but it may turn out to be less local than indicated. The habitats are wet gravelly patches among rocks at high altitudes (2400–2900 m), and the tiny plants are likely to be easily overlooked. In ecological preference the species differs from *W. angustifolia*, which usually grows in dense turf of grass or sedges.

The new species is no doubt close to *W. angustifolia*, but differs, *inter alia*, in leaf-shape. Instead of being flat with inrolled margins (fig. 5H), the basal leaf is thickish and sometimes almost semiterete with a concave upper surface, i.e. more or less reniform in transect (fig. 5C). The cauline leaves are also more or less semiterete above the broader basal portion. The spike is few-flowered with somewhat larger flowers than in *W. angustifolia* and with more spreading segments. The perianth is almost pure white without nectar blotches. The anthers are purplish red to brown and somewhat larger than the yellow anthers of *W. angustifolia*. Finally, the pistil is more oblong with less recurved and more slender styles with smaller stigmas.

6. W. angustifolia B. Nord. in Bot. Notiser 117:175 (1964).
Type: *Flanagan* 2669, Katberg (holo. PRE; iso. SAM).
Ic.: Nordenstam, *l.c.* fig. 1E–H; fig. nostrae 5H–M, 6e, 7b.

Corm subglobose, 0·5–1·2 cm long and wide, with light to dark brown tunics produced into a thin and loose, easily disintegrating, submembranous short neck up to 4 cm long. Stem above ground 3–20 cm high, usually slender, 0·6–2 mm thick. Basal sheath membranous, apically usually truncate, shortly cuspidate or mucronate, not much dilated, few-veined. Solitary *basal leaf* narrowly linear, 5–28 cm long, 1–4·5 mm wide, usually erect and rather straight, sometimes flexuous, flat with inrolled scabrid margins, adaxially midveined and with faint parallel veins. *Cauline leaves* 2 (or occasionally 1), usually erect and ± straight; lower leaf inserted about the middle of the stem or somewhat below, 2–15 cm long, long-acuminate and seemingly subterete with inrolled margins above the broader spathaceous basal portion; upper cauline leaf inserted 0·5–4 cm below the spike, 0·7–7(–10) cm long, short- or long-acuminate from the broader portion above the vaginate base. *Spike* 1–7-flowered, with 3–10 mm distance between the flowers. *Perianth* 4·5–6·5 mm long, cup-shaped–campanulate with suberect segments, greenish white to cream-coloured; perianth tube 1·5–2·5 mm long; free segments narrowly ovate-oblong–oblong-lanceolate, 3–4·5 mm long, 0·8–1·5 mm wide, slightly narrowed basally, 3–5-veined or without distinct veins, often minutely dotted all over (except nectary) with numerous rounded-oblong orange-brown (when dry) dots. *Nectary* a reniform or horseshoe-shaped pocket at the base of the free segment, its margin somewhat elevated and minutely papillate, bordering a double or bilobed mauve to purple (sometimes faint or absent) blotch below the middle of the segment. *Filaments* 1·5–2 mm long, pale. *Anthers* rounded-oblong, 0·5–0·7(–0·8) mm long, 0·3–0·5(–0·7) mm wide, bright yellow. *Pistil* oblong-elliptic, 4–6 mm long, 3-angled, green to brown except for the light style tips; free styles conical-

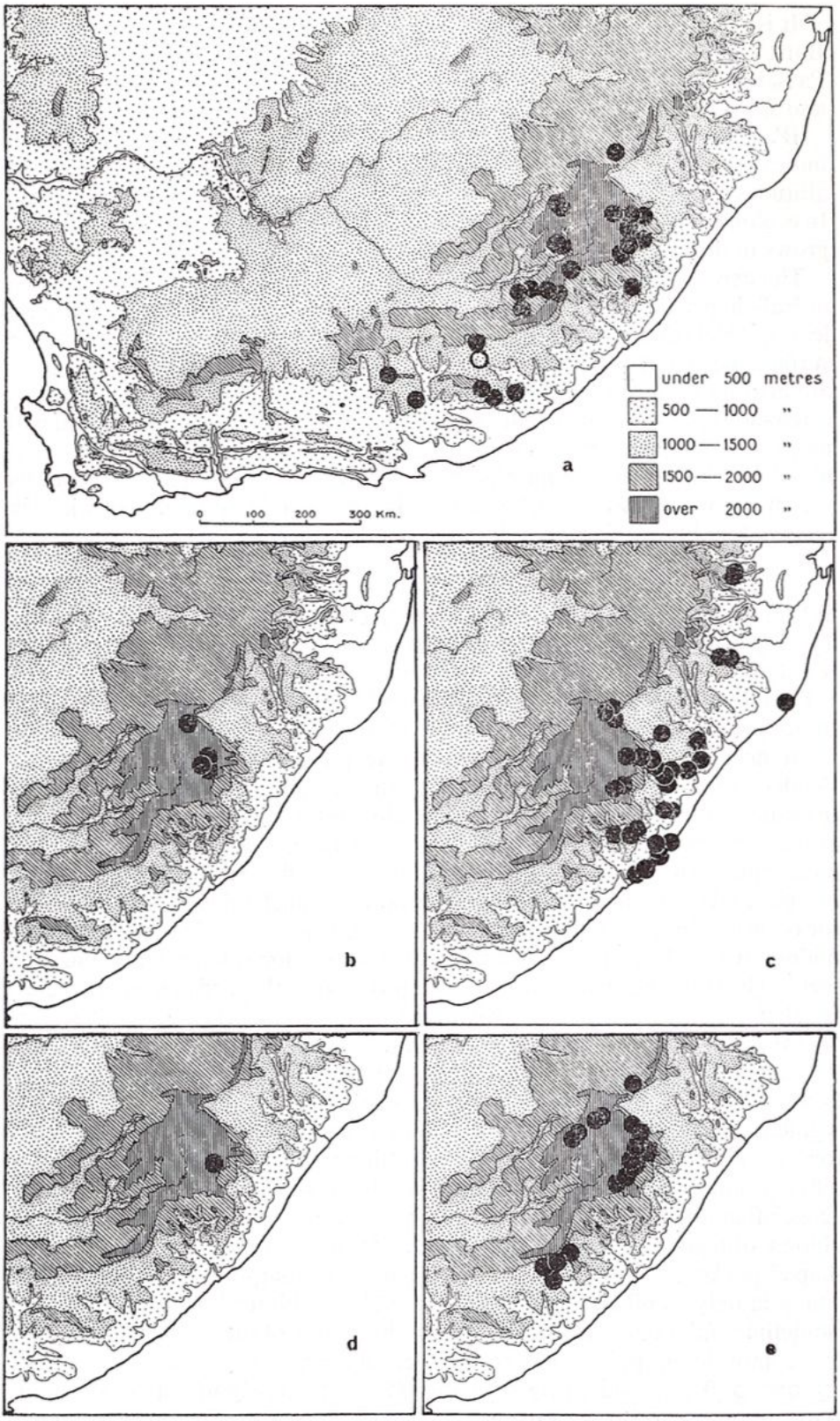

FIG. 6. Distributions of: a, *W. elatior* B. Nord., the ring denotes an inexact locality; b, *W. pusilla* Phillips; c, *W. kraussii* Baker; d, *W. burttii* B. Nord.; e, *W. angustifolia* B. Nord. in South Africa. (For total range, see fig. 7b).

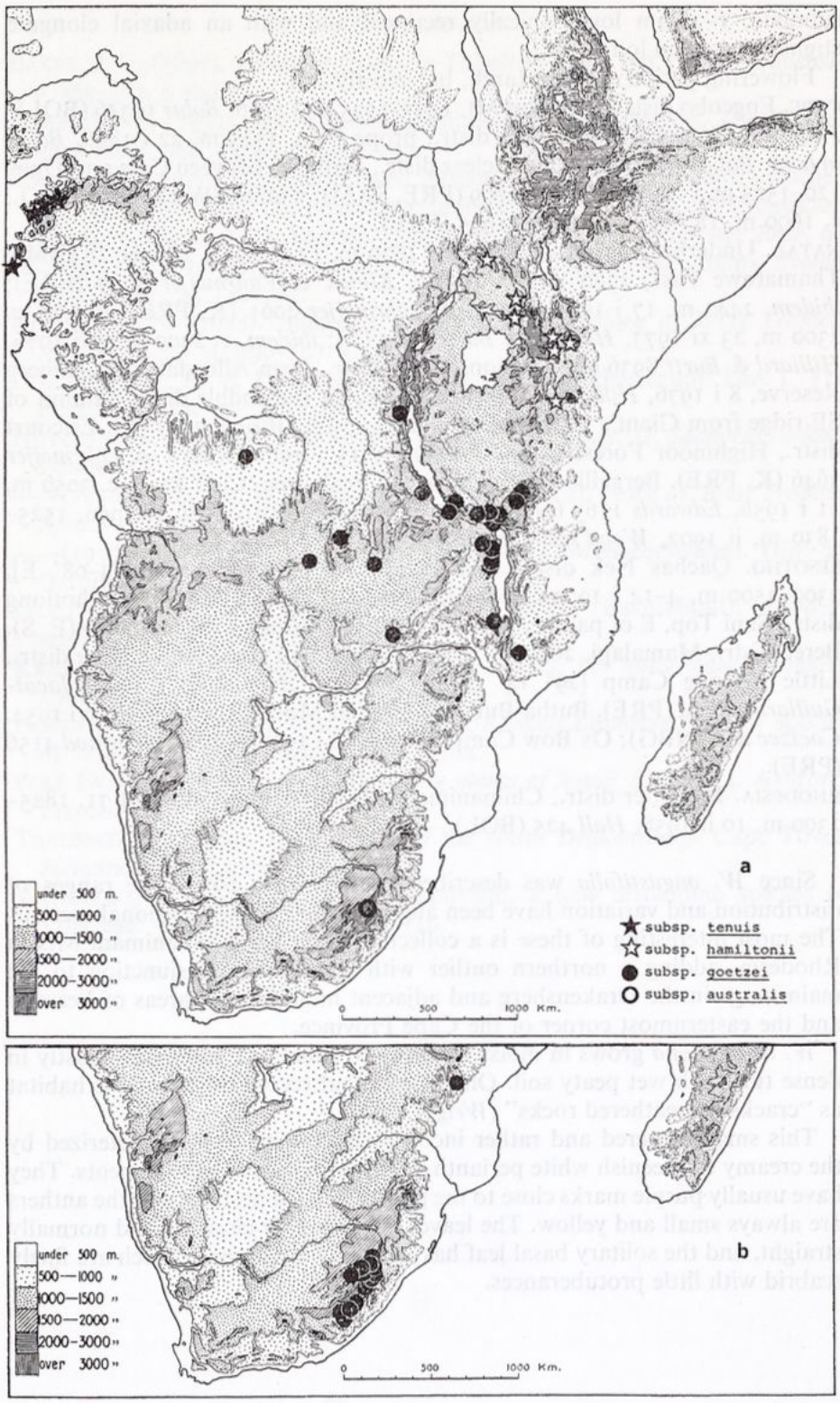

FIG. 7. Distributions of: a, *W. tenuis* (Hook. fil.) Baker, with four subspecies; b, *W. angustifolia* B. Nord., total range.

subulate, 1–2 mm long, apically recurved and with an adaxial elongate stigma c. 0·5 mm long.

Flowering period: Nov.–March, but mostly Jan.

CAPE. Engcobo distr., Engcobo Mt, 1435–1525 m, i 1896, *Bolus* 10346 (BOL), *Flanagan* 2669 (PRE). Xalanga distr., prope Cala, 1525 m, 22 i 1896, *Bolus in herb. Bolus.* 27252 (BOL). Maclear distr., Katberg, between Cala and Ugie, 120–1525 m, i 1896, *Flanagan* 2669 (PRE, SAM); 3 miles SW of Katkop P.O., c. 1600 m, 18 i 1962, *Acocks* 21915 (PRE).

NATAL. Underberg distr., Sani Valley, 1830 m, 13 iii 1938, *Brooke* 28 (BM); Thamatuwe Pass, 2380 m, 17 i 1969, *Killick & Vahrmeijer* 3997 (PRE); *ibidem*, 2440 m, 17 i 1969, *Killick & Vahrmeijer* 4001 (K, PRE); *ibidem*, c. 2300 m, 23 xi 1973, *Hilliard & Burtt* 7467 (E); *ibidem*, c. 2300 m, 4 ii 1976, *Hilliard & Burtt* 8936 (E, S). Lions River distr., farm Allendale nr Kamberg Reserve, 8 i 1976, *Hilliard & Burtt* 8749 (E, S). Impendhle distr., summit of SE ridge from Giant's Castle, c. 2600 m, 8 i 1971, *Wright* 1071 (E). Estcourt distr., Highmoor Forest Station, 2140 m, 15 i 1966, *Killick & Vahrmeijer* 3646 (K, PRE). Bergville distr., Cathedral Peak area, Cleft Peak, c. 3050 m, 21 i 1956, *Edwards* 1165 (NU, PRE). Klip River distr., Van Reenen, 1525–1830 m, ii 1902, *Wood* 9817 (SAM).

LESOTHO. Qachas Nek distr., Sehlabatebe [29° 52–59′ S, 29° 03–08′ E], 2300–2500 m, 4–14 i 1973, *Jacot-Guillarmod et al.* 132 (PRE). Mokhotlong distr., Sani Top, E of pass, c. 2900 m, 14 i 1976, *Hilliard & Burtt* 8800 (E, S). Berea distr., Mamalapi, 2600 m, 20 i 1957, *Marais* 1319 (PRE). Leribe distr., Little Bokong Camp [29° 14′ S, 28° 08′ E], 2600 m, 7 i 1947, *Jacot-Guillarmod* 344 (PRE). Butha-Buthe distr., E of Mota-pass, 2740 m, 30 i 1954, *Coetzee* 436 (NBG); Ox Bow Camp, 2600 m, 6 i 1960, *Jacot-Guillarmod* 4156 (PRE).

RHODESIA. Melsetter distr., Chimanimani Mts, SW slopes of point 71, 1825–2300 m, 10 ii 1958, *Hall* 425 (BOL).

Since *W. angustifolia* was described (Nordenstam 1964), the ranges of distribution and variation have been augmented by many additional records. The most interesting of these is a collection from the Chimanimani Mts in Rhodesia, adding a northern outlier with considerable disjunction to the main range in the Drakensberg and adjacent mountainous areas of Lesotho and the easternmost corner of the Cape Province.

W. angustifolia grows in moist montane to subalpine grassland, mostly in dense turf with wet peaty soil. One exceptional record describes the habitat as "cracks in weathered rocks" (*Wright* 1071).

This small-flowered and rather inconspicuous species is characterized by the creamy to greenish white perianth with more or less erect segments. They have usually purple marks close to the pocket-shaped nectary, and the anthers are always small and yellow. The leaves are narrowly elongate and normally straight, and the solitary basal leaf has inrolled flat margins, which are finely scabrid with little protuberances.

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