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A Taxonomic Revision of the *Annesorhiza triternata* Group (Apiaceae, Apioideae): the Transfer of *Peucedanum triternatum* and *P. filicaule* and the Description of Five New Species

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Abstract—A taxonomic revision of the *Annesorhiza triternata* group is presented. The group is composed of seven species all endemic to the Cape Floristic Region of South Africa. Two of the species had previously been assigned to the genus *Peucedanum*, as *P. filicaule* and *P. triternatum*, based on the marginally winged and dorsally ribbed homomericarpic fruits. They are here transferred to the genus *Annesorhiza* based on the periodically replaced fleshy roots, hysteroanthous leaves, and fruits that have an oblong, more or less isodiametric body, a narrow commissure, and druse crystals scattered throughout the mesocarp. In addition, five new species clearly allied to *A. filicaulis* and *A. triternata* are described herein, viz. *A. bracteosa*, *A. elsiae*, *A. laticostata*, *A. radiata*, and *A. refracta*. The group is distinguished from other species in the genus by less sturdy synflorescences, ternate leaves with linear ultimate leaflets (except *A. refracta*), distinctly branched resin ducts in the petals (except *A. filicaulis*, *A. laticostata* and *A. radiata*), and mericarps with marginal wings and dorsal ribs (except *A. elsiae*). A comprehensive key to the seven species is provided together with an updated taxonomy with detailed morphological descriptions, a lectotypification, diagnostic illustrations, and maps of known geographical distributions.

Keywords—African *Peucedanum*, *Annesorhiza*, Cape Floristic Region, new species, South Africa, taxonomy.

Annesorhiza Cham. & Schtdl. is a South African endemic genus of Apiaceae centered in the Greater Cape Floristic Region, with only four species occurring in the summer rainfall regions of the country (Tilney and Van Wyk 2001). The last revision of the genus by Tilney and Van Wyk (2001) recognized 12 species and highlighted the need for further field studies before the full extent of diversity within the genus could be established. Most of the species are hysteroanthous (with leaves withering or absent at anthesis) and as a result are often overlooked by collectors. This is further exacerbated by the need to either return to the population at least twice or to cultivate them in order to obtain complete vegetative and reproductive material, ensuring that the vegetative and reproductive parts were collected from the same species. As part of a study to clarify the generic delimitations among *Annesorhiza*, *Chamarea* Eckl. & Zeyh., and *Itasina* Raf., extensive field excursions over the last few years have been undertaken, resulting in the clarification of species concepts and the identification of several new species (Vessio 2001; Magee and Manning 2010; Van Wyk and Tilney 2010). Together with the results presented herein, the genus now comprises 21 species, but this number is expected to increase pending further studies.

Tilney and Van Wyk (2001) excluded *Annesorhiza filicaulis* in their revision of the genus, transferring the species to *Peucedanum* L. because of the winged marginal ribs on both mericarps of the fruit, unlike that found in any other species of *Annesorhiza* (Van Wyk and Tilney 2001). At that time, *Peucedanum* was largely regarded to be a polymorphic assemblage characterized by unspecialized, dorsally compressed, and marginally winged fruits. However, the African species of *Peucedanum* have subsequently been shown to be only distantly related to the type of the genus and are now accommodated in six genera (Winter et al. 2008). Winter et al. (2008), however, considered only those peucedanoid species with a broad commissure extended from wing tip to wing tip. As a result *P. filicaule* and *P. triternatum*, both of which have a narrow commissure and hysteroanthous leaves (Van Wyk and

Tilney 2001), are the last African species to be transferred from the now largely Eurasian genus *Peucedanum*. The placement of these two species within *Annesorhiza* was suggested by Vessio (2001) based on a broader study of morphological and anatomical characters and confirmed by Calviño et al. (2006) using molecular sequence data. Calviño et al. (2006) showed that *Annesorhiza*, *Chamarea*, and *Itasina* formed a strongly supported clade, informally named the *Annesorhiza* clade, which occupied an early diverging position within subfamily Apioideae. This clade, together with *Astydamia* DC., *Ezoscium* B. L. Burt, and *Molopospermum* W. D. J. Koch, has subsequently been placed in the newly described tribe Annesorhizeae (Magee et al. 2010).

In this paper, the long overdue transfer of *P. filicaule* and *P. triternatum* to *Annesorhiza* is made and five closely related species are described. A detailed taxonomic treatment of these “peucedanoid” species, here called the *A. triternata* group, is presented.

MATERIALS AND METHODS

Morphology—With the exception of *Annesorhiza bracteosa* and *A. elsiae*, all species were studied and sampled in situ by the authors in the Western Cape Province of South Africa. These data were supplemented by a study of all collections from the following herbaria: BOL, JRAU, K, NBG (including SAM and STE), PRE, and S. Distributional data for each of the species were recorded using quarter degree grid cells (outlined in Leistner and Morris 1976). In this system, the basic unit is the one-degree square of latitude and longitude, which is designated by a degree reference number (viz., degrees of latitude and longitude of the north-west corner) and the district name of that square. Line drawings were made by the first author.

Anatomy—Fruits from herbarium specimens and material preserved in formaldehyde-acetic acid-alcohol (FAA) were used in the anatomical study. Herbarium material was first rehydrated and then placed in FAA for a minimum of 24 h. These samples were subsequently treated according to a modification of the method of Feder and O'Brien (1968) for embedding in glycol methacrylate (GMA) and sectioned using a Porter-Blum ultramicrotome. Prior to staining with the periodic acid Schiff/toluidine blue (PAS/TB) method of Feder and O'Brien (1968), the sections were examined for the presence of crystals with an Olympus CX41 polarising light microscope.

RESULTS AND DISCUSSION

***Annesorhiza triternata* Group**—Calviño et al. (2006) recovered strong support for the placement of *Peucedanum filicaule* and an undescribed species (described herein as *Annesorhiza elsiae*) within the *Annesorhiza* clade, using both chloroplast (*rps16* intron) and nuclear (ITS) DNA sequence data. However, incomplete taxon sampling and incongruence between the nuclear and chloroplast markers within the clade did not allow for any conclusions to be made regarding the monophyly of the three genera within the clade (viz. *Annesorhiza*, *Chamarea*, and *Itasina*). *Chamarea* species typically have small, ovoid to urceolate fruits without wings or ribs, while those of *Annesorhiza* and *Itasina* are usually larger and oblong, with all the primary ribs well-developed and often winged. *Peucedanum filicaule* and *P. triternatum* differ from *Annesorhiza* species in having only the marginal ribs winged (as in *Peucedanum* and other peucedanoid taxa) but the fruit body itself is clearly oblong (Fig. 1) and more or less isodiametric in transverse section (Figs. 2, 4, 6, 7, 8), rather than dorso-ventrally compressed, as is typical in peucedanoid taxa. Furthermore, the commissure is narrow and does not extend to the wings or wing tips. As a result *P. filicaule*, *P. triternatum*, and the five species described herein are hereafter referred to the genus *Annesorhiza*, as the *A. triternata* group. The *A. triternata* group is distinguished from other species in the genus by the less sturdy synflorescences similar to those found in *Chamarea*, the ternate leaves with linear ultimate leaflets (except *A. refracta*), the distinctly branched resin ducts in the petals (except *A. filicaulis*, *A. laticostata* and *A. radiata*), and the marginally winged and dorsally ribbed or narrowly winged mericarps (except *A. elsiae*).

Morphology and Anatomy—**Roots**—The species of the *Annesorhiza triternata* group are herbaceous perennials with fleshy roots that are replaced periodically, as in the rest of the genus (Van Wyk and Tilney 2001). In *A. filicaulis*, *A. laticostata*, *A. refracta*, and *A. triternata*, the roots are pencil-like, while those of *A. radiata* are prominently ellipsoid. Unfortunately, root material remains unknown for *A. bracteosa* and *A. elsiae*.

LEAVES—The plants are all summer-deciduous with the following season's leaves appearing only after they have flowered and produced fruits. As a result, the flowering or fruiting stem is either completely without leaves or surrounded by withered leaves from the previous season. Such hysteranthous leaves are typical of almost all species of *Annesorhiza* and *Chamarea* (Van Wyk and Tilney 2001). Within the *A. triternata* group, the leaves are usually suberect to spreading and prominently ternate. The rachis and pinnae remain straight in all except *A. refracta*, where the leaves are diagnostically different by being procumbent and having the rachis and pinnae prominently refracted (Fig. 8A). *Annesorhiza refracta* also has distinctive ultimate leaflets that are prominently 2- or 3-partite (Fig. 8B). All other species within the group are more finely divided so that the ultimate leaflets are 2- or 3-sect. In *A. triternata* there appears to be some degree of heterophyly, with the leaflets from the first-formed leaves conspicuously 3- to 5-partite.

SYNFLORESCENCES—In *Annesorhiza* the synflorescence consists of a dominant terminal compound umbel subtended by somewhat smaller secondary compound umbels which may themselves be further subtended by tertiary compound umbels. While the umbellules in the terminal umbel are always composed of hermaphroditic flowers, those in the

secondary and tertiary umbels may comprise either hermaphroditic or functionally male flowers. In most species within the *A. triternata* group, the umbellules in the subtending secondary umbels are composed of hermaphroditic flowers and those in the tertiary umbels largely of functionally male flowers. However, in *A. radiata* the umbellules in the secondary umbels are composed predominantly of functionally male flowers (Fig. 7C), while in *A. elsiae* the umbellules in all the umbels (terminal, secondary and tertiary) bear hermaphroditic flowers (Fig. 4B). The synflorescences are slender and variable in height, ranging from about 0.14 m in *A. radiata* and *A. refracta* to 1.0 m tall in *A. filicaulis*. The shape of the umbels and the number of rays is a useful diagnostic character within the group. In most species, the umbels are relatively few-rayed, and the rays remain suberect so that the umbel appears obtriangular in outline (Figs. 2C, 4B, 6C). In *A. radiata*, and to varying extents in *A. refracta* and sometimes *A. triternata*, the rays of the umbels are more or less equal in length and spreading so that they appear transversely ovate in outline. This is most distinctive in *A. radiata*, which also tends to have multiradiate umbels (Fig. 7C). As in the rest of the genus, the nodes along the peduncle are usually subtended by reduced scale-like peduncular bracts. However, in *Annesorhiza bracteosa* these peduncular bracts are distinctive in being well developed and foliose (Fig. 2D). This species is further distinguished by the relatively large (3.5–4 mm long),

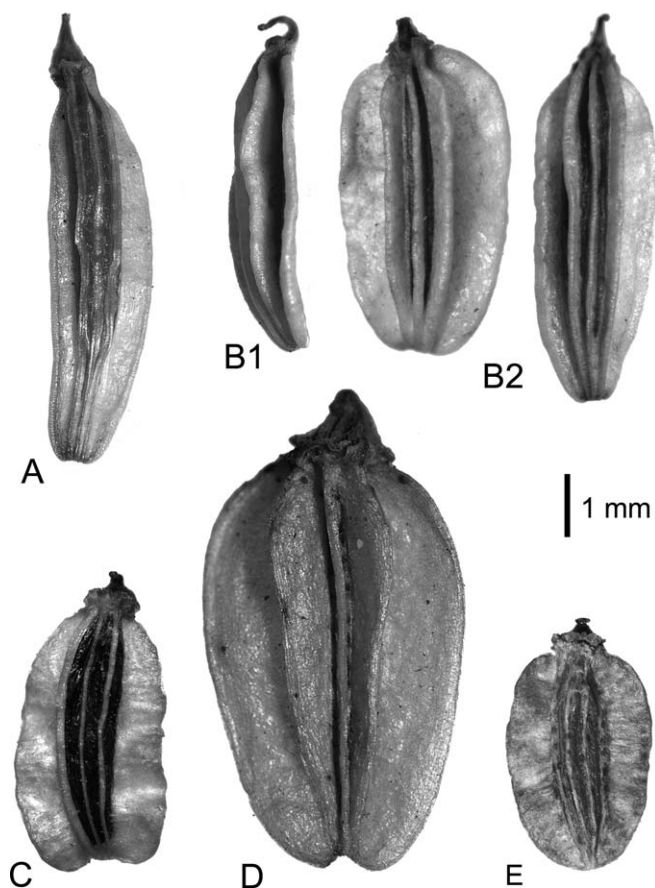


FIG. 1. Variation in mature fruit morphology between species in the *Annesorhiza triternata* group. A. *A. filicaulis* (Taylor 11492, NBG), dorsal view. B. *A. laticostata* (Le Roux 714, NBG), lateral (B1) and dorsal view (B2). C. *A. refracta* (Magee et al. 147, NBG), dorsal view. D. *A. triternata* (Magee et al. 140, NBG), dorsal view. E. *A. radiata* (Perry 63, NBG), dorsal view. Mature fruits of *A. bracteosa* and *A. elsiae* remain unknown.

ovate involucl bracts (Fig. 2E, F) as opposed to the smaller (1–2 mm long), lanceolate to narrowly or broadly oblong involucl bracts of the other species within the group.

FLOWERS—The flowers are largely typical for the family. The calyx lobes are usually broadly ovate to broadly oblong with the apex acute to obtuse or tridentate (Fig. 7G). However, in *A. bracteosa* the apices of the calyx lobes are truncate (Fig. 2H). Most species of this group (*A. bracteosa*, *A. elsiae*, *A. refracta*, *A. triternata*) are distinctive within the genus in that the resin ducts within the petals are conspicuously branched with two to five lateral branches arising from near the base of the central duct (Figs. 2I, 4G, 8G) or near its middle (Fig. 4G). Only *A. filicaulis*, *A. laticostata* (Fig. 6H), and *A. radiata* (Fig. 7H) share the typical petal feature (a single unbranched resin duct) with the rest of the genus. Petals with branched resin ducts have also been reported and used taxonomically in the genus *Anginon* (Allison and Van Wyk 1997; Van Wyk et al. 1997).

FRUITS—The fruits within this group are distinctive. They appear to be superficially compressed dorsally due to the prominent marginal wings and the filiform to prominent dorsal ribs (Fig. 1). However, on closer examination it is evident that the fertile body of the fruit is more or less isodiametric as found in the other species of *Annesorhiza*. Without the marginal wings the body of the fruit is oblong, as in all other species currently placed in *Annesorhiza*. Within the *A. triternata* group, only *A. elsiae* has fruits without marginal wings (Fig. 4H). Such secondary losses of marginal wings are not uncommon and have been reported in species from otherwise marginally-winged genera, such as *Notobubon pearsonii* (Adamson) Magee and *Afrologisticum elliotii* (Engl.) C. Norman (Winter

et al. 2008, Magee et al. 2009). *Annesorhiza radiata* has the smallest fruits in the group, which also appear somewhat maculate when dry (Fig. 1E). The fruits of the other species are usually much larger and immaculate when dry. *Annesorhiza filicaulis* differs from the other species in that fruits are about three times longer than wide due to the poorly developed marginal wings that are slightly narrower than the fertile portion (Fig. 1A). In the other species of the group, the fruits are only two times longer than wide and the wings are often broader than the fertile portion. In *A. laticostata*, the width of the wings can be somewhat variable depending on the development of the fruits, but well developed fruits consistently have broad marginal wings (Fig. 1B, 6J). Furthermore, the dorsal ribs of the fruits in *A. laticostata* (Fig. 1B) and *A. triternata* (Fig. 1D) are prominent to narrowly winged and sometimes unequally developed so that the fruits can be either homomericarpic or slightly heteromericarpic. The dorsal ribs of the fruits in *A. filicaulis* (Fig. 1A), *A. radiata* (Fig. 1E) and *A. refracta* (Fig. 1C) are only filiform to somewhat evident and equal so that the fruits are homomericarpic. Unfortunately mature fruits of *A. bracteosa* remain unknown. Immature fruits, however, show signs of marginal wing development similar to that seen in the fruits of comparable stages in other species.

In transverse section, the fruits appear superficially “peucedanoid”, but differ in the more or less isodiametric fertile portion, the narrow commissure, and the presence of druse crystals scattered throughout the mesocarp (Figs. 2J, 4H, 6J, 7J, 8I). The latter character is diagnostic for the early diverging lineages of the Apioideae (i.e. the protoapioids sensu Magee et al. 2010).

KEY TO THE SPECIES OF THE *ANNESORHIZA TRITERNATA* GROUP

1. Mericarps with marginal ribs as well developed as the dorsal ribs all other species of *Annesorhiza*.
1. Mericarps with marginal wings broader than the dorsal ribs (or if marginal wings absent then with distinct branched resin ducts in the petals – *A. elsiae*) *Annesorhiza triternata* group, continue with 2
2. Petals with branched resin ducts 3
 3. Leaf rachis and pinnae prominently refracted; leaves procumbent; ultimate leaflets 2- or 3-partite *A. refracta*
 3. Leaf rachis and pinnae straight; leaves erect to spreading; ultimate leaflets 2- or 3-sect 4
 4. Peduncular bracts of the synflorescence well-developed and foliose; involucl bracts ovate, ca. 2 mm wide; apices of calyx lobes truncate *A. bracteosa*
 4. Peduncular bracts of the synflorescence reduced, scale-like; involucl bracts narrowly to broadly oblong, ca. 1 mm wide; apices of calyx lobes acute to tridentate 5
 5. Fruits with broad marginal wings and prominent to narrowly winged dorsal ribs; umbels 4- to 7-rayed; synflorescence sparsely branched and consisting of a terminal umbel and up to 3 secondary and tertiary umbels; umbellules of tertiary umbels comprised of functionally male flowers *A. triternata*
 5. Fruits with marginal ribs inconspicuous; umbels 2- or 3-rayed; synflorescence much branched and consisting of a terminal umbel and up to 6 secondary and tertiary umbels; umbellules of tertiary umbels comprised of hermaphroditic flowers *A. elsiae*
2. Petals with a single unbranched resin duct 6
 6. Terminal umbel transversely ovate in outline, the rays (5) 6–18, spreading, ± equal in length; stylopodium shortly conical; umbellules of secondary umbels composed largely of functionally male flowers; root somewhat ellipsoid *A. radiata*
 6. Terminal umbel obtriangular in outline, the rays 3–5 (6), suberect, prominently unequal in length; stylopodium narrowly conical; umbellules of secondary umbels composed largely of hermaphroditic flowers with only tertiary umbels functionally male; root pencil-like 7
 7. Fruits with prominent to narrowly winged dorsal ribs; mature fruits two times as long as wide; Breede River Valley *A. laticostata*
 7. Fruits with filiform to somewhat evident dorsal ribs; mature fruits three times as long as wide; Cederberg Mountains *A. filicaulis*

TAXONOMIC TREATMENT

1. ***Annesorhiza bracteosa*** Magee, sp. nov.—TYPE: SOUTH AFRICA. Western Cape Province, Caledon district (3419): Ratelrivier flats (–DC); 12 Feb 1958; *Willems 19* (holotype: NBG!; isotypes: NBG!, K!).

A. triternatae foliis ternate divisis, foliolis ultimis 2- vel 3-sectis segmentis linearibus, et canalibus resiniferis ramosis in petalis similis, sed bracteis peduncularibus manifeste foliosis (in *A. triternata* bractea pedunculares deminutae, quasi squamae), bracteis involuclli maioribus magis prominentibus ovatis, ca. 2 mm latis (in *A. triternata* oblongis anguste ad

late, ca. 1 mm latis), et truncatis sepalis (acutis ad obtusos in *A. triternata*) differt.

Deciduous geophyte. Roots unknown. Leaves in basal rosette, suberect to spreading, dying at time of flowering, (80–) 120–380 × (30–)60–100 mm, 2- or 3-ternate; rachis and pinnae straight. Ultimate leaflets 2- or 3-sect; segments linear, 15–50 mm × 1–2 mm, concolorous, glabrous; margins and midrib thickened and extending into a sharp point. Synflorescences 0.45–1.0 m long, with terminal primary umbel subtended by 1–5 smaller, secondary and tertiary umbels; peduncle brownish, glabrous, nodes subtended by well developed foliose peduncular bracts. Umbels compound, obtriangular in outline; involucre bracts 3 or 4, 4–7 mm long, ovate to broadly oblong, acuminate, glabrous; rays 3–6, 25–55 mm long at anthesis, ± equal, suberect, glabrous; involucre bracts 5 or 6, 3.5–4 mm long, ovate, shortly acuminate, glabrous, raylets 10–18, glabrous, 2–3 mm long at anthesis. Flowers hermaphroditic in terminal and secondary umbels, functionally male in tertiary umbels; calyx lobes 5, truncate; petals 5, cream?, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct conspicuously branched, lateral branches 2–5, arising from near the base of the central duct; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium shortly conical; styles at first erect, later becoming somewhat reflexed. Fruits (immature, Note 1) isodiametric; mericarps homomorphic, glabrous, immaculate when dry; median and lateral ribs 3; marginal ribs 2, winged?; vascular tissue at base of all ribs and towards apex of some ribs with rarely some conducting elements in between; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp. Figure 2.

Diagnostic Characters—This species shares the straight leaf rachis and pinnae (Fig. 2A), 2- or 3-sect ultimate leaflets with linear segments (Fig. 2B) and the branched resin ducts in the petals (Fig. 2I) with *Annesorhiza triternata*, but can be distinguished by the prominently foliose peduncular bracts (Fig. 2D; peduncular bracts reduced, scale-like in *A. triternata*), the larger ovate involucre bracts, ca. 2 mm wide (Fig. 2F; narrowly to broadly oblong, ca. 1 mm long in *A. triternata*), and the truncate calyx lobes (Fig. 2H; calyx lobes acute to obtuse in *A. triternata*). The petals are reported by Maguire, on the label of a herbarium specimen (*Maguire 844*, NBG), to be cream-colored. If confirmed, this would be another distinguishing character since all other species within the *A. triternata* group have yellow petals.

Distribution and Ecology—*Annesorhiza bracteosa* is known only from two collections around Elim in the Western Cape Province (Fig. 3). A flowering time from February to March has been recorded and mature fruits are likely to be borne from April to May, with leaves produced thereafter.

Note—Unfortunately, mature fruits of *A. bracteosa* remain unknown despite a recent attempt by the first author to relocate the known populations. However, immature fruits of this species do show signs of marginal wing development consistent with that observed in immature fruits of *A. triternata*.

Additional Specimen Examined—SOUTH AFRICA. Western Cape: 3419 (Caledon); 4 miles N. of Elim (–DD), 18 February 1951, *Maguire 844* (NBG, 3 sheets).

2. *Annesorhiza elsiae* Vessio, Tilney & B.-E. van Wyk, sp. nov.—TYPE: SOUTH AFRICA. Western Cape Province, Worcester district (3319): Audensberg Ridge Peak, above the Brandwacht valley (–CB); 4 February 1962; *Esterhuysen 29462* (holotype: BOL!).

Foliis ternate divisis, foliolis ultimis 2- vel 3-sectis segmentis linearibus, et canalibus resiniferis ramosis in petalis *Annesorhizae triternatae* similis, sed inflorescentia multum ramosa umbellis omnibus constaturis ex floribus hermaphroditis, umbellis 2 vel 3 radiatis (in *A. triternata* 4 vel 7), et fructu marginaliter costato (costis marginalibus late alatis) differt.

Deciduous geophyte. Roots unknown. Leaves in basal rosette, suberect to spreading, dead or dying at time of flowering, 150–200 × 60–80 mm, 3-ternate; rachis and pinnae straight. Ultimate leaflets 2- or 3-sect; segments linear, 20–30 mm × ± 1.5 mm, concolorous, glabrous; margins and midrib prominently thickened; extending into a sharp point. Synflorescences ca. 0.45 m long, with terminal primary umbel subtended by 10 slightly smaller, secondary and tertiary umbels; peduncle brownish, glabrous, nodes subtended by reduced scale-like peduncular bracts. Umbels compound, obtriangular in outline; involucre bracts 3–5, 3–5 mm long, lanceolate, acuminate, glabrous, caducous; rays 2 or 3, 80–95 mm long, equal, suberect, glabrous; involucre bracts 4–6, 1.5–2 mm long, lanceolate, acuminate, glabrous, raylets 9–14, glabrous, 2–3 mm long. Flowers hermaphroditic in terminal, secondary and tertiary umbels; calyx lobes 5, acute; petals 5, yellow?, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct conspicuously branched, lateral branches 2–5, arising from near the base of the central duct; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium conical; styles suberect to spreading. Fruits (immature) isodiametric, narrowly elliptic in dorsal view, 3.5–4.0 mm × ± 1.5 mm; mericarps homomorphic, glabrous, immaculate when dry; median and lateral ribs 3, equal, inconspicuous; marginal ribs 2, inconspicuous; vascular tissue observed at base of ribs only; ribs without lignification; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp. Figure 4.

Etymology—This species is named in honor of Ms Elsie Esterhuysen (1912–2001) who, through her dedicated collecting efforts, made a valuable contribution to our knowledge of the species of *Annesorhiza* and *Chamarea*. In remote places, she painstakingly collected herbarium specimens of flowering and fruiting material and also live plants which were subsequently grown at the Bolus Herbarium, University of Cape Town, in order to obtain corresponding leaf material.

Diagnostic Characters—*Annesorhiza elsiae* shares the ternately divided leaves, 2- or 3-sect ultimate leaflets with linear segments (Fig. 4A) and branched resin ducts in the petals (Fig. 4G) with *A. triternata* but can be distinguished by the much branched synflorescence bearing more than six secondary and tertiary umbels all of which are composed of hermaphroditic flowers (Fig. 4B; as opposed to a synflorescence that is sparsely branched and consisting of a single primary umbel and up to three secondary umbels with the tertiary umbels, if present, composed of functionally male flowers in *A. triternata*), the few rayed primary umbels with only two or three rays (Fig. 4B; four to seven in *A. triternata*), and the marginally ribbed fruits (Fig. 4H; marginal ribs broadly winged in *A. triternata*).

Distribution and Ecology—*Annesorhiza elsiae* is known from a single collection made by Ms Elsie Esterhuysen on the peak of the Audensberg Mountains near Worcester (Fig. 3), where it was growing in shale. The recorded flowering time is in February and mature fruits are likely to be borne in April.

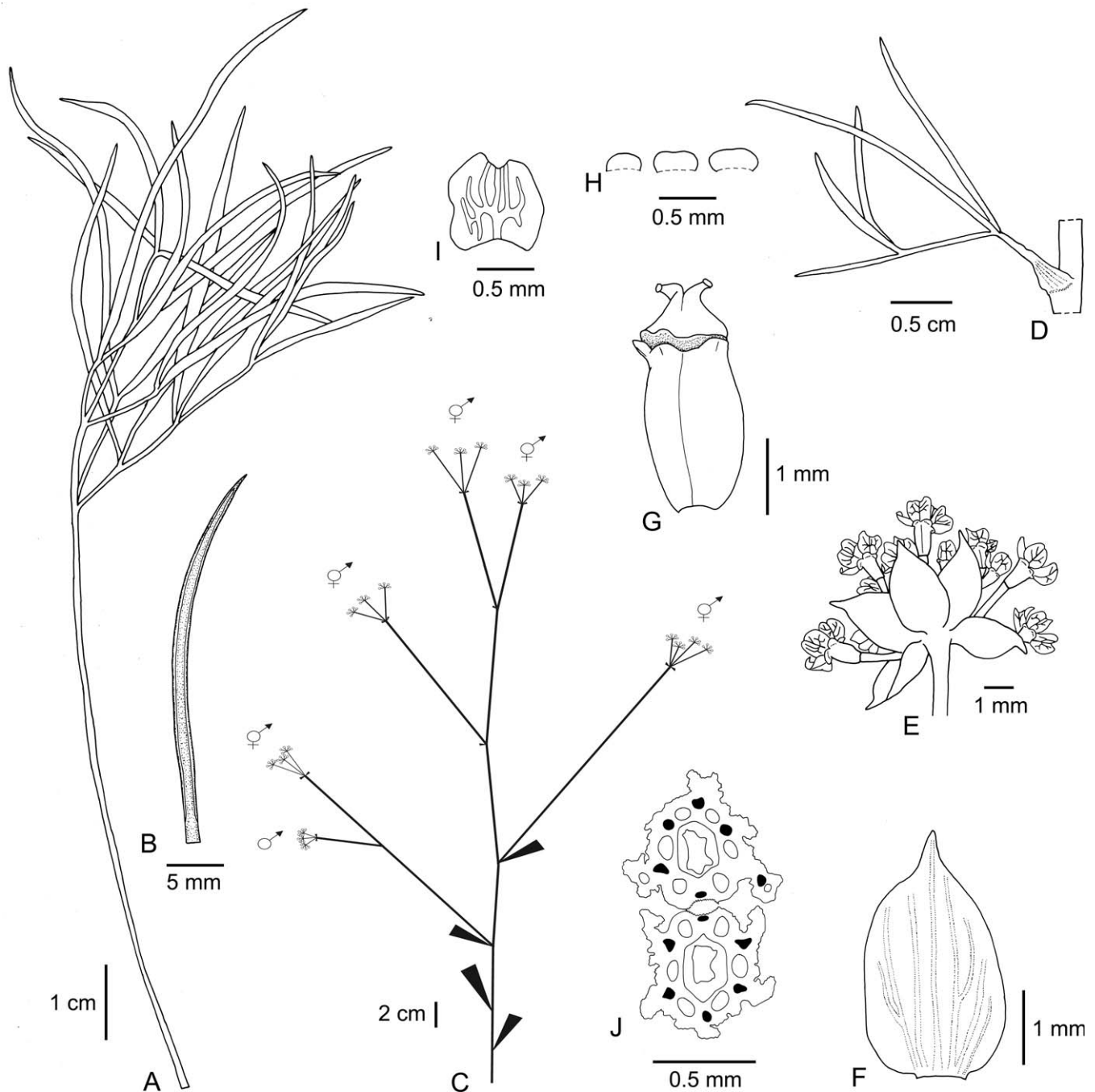


FIG. 2. *Annesorhiza bracteosa*. A. leaf, B. ultimate leaflet segment, ventral surface, C. schematic drawing of synflorescence structure, D. peduncular bract, E. umbellule; F. involucler bract, G. immature fruit; H. calyx lobes, I. petals, dorsal surface, J. transverse section through the immature fruit. A, B & D–J: Willemse 19 (NBG); C: Maguire 844 (NBG).

3. *ANNESORHIZA FILICAULIS* Eckl. & Zeyh., Enum. pl. afric. austral. 3: 345 (1837); Sonder in Fl. Cap. 2: 545 (1862); Burt in Edinb. J. Bot. 48(2): 178 (1991); Goldblatt & Manning, Cape Pl.: 274 (2000). *Oenanthe filicaulis* (Eckl. & Zeyh.) D. Dietr. Syn. Pl. 2: 953 (1840). *Peucedanum filicaule* (Eckl. & Zeyh.) B-E.van Wyk & Tilney in Edinb. J. Bot. 58(3): 385 (2001).—TYPE: SOUTH AFRICA. Western Cape Province, Clanwilliam district (3218): sandy places near the Olifant's River (Clanwilliam) (–BB); Ecklon & Zeyher 2216 (lectotype: S!, designated by Van Wyk and Tilney 2001; isolectotype: SAM!).

Deciduous geophyte. Roots replaced periodically, clustered, 1–4, pencil-like, slightly and evenly fleshy. Leaves in basal rosette, suberect to spreading, dead or dying at time of flowering, 160–200 × 90–160 mm, 4- to 5-ternate; rachis and pinnae straight. Ultimate leaflets 2- or 3-sect; segments linear, 10–25 mm × ± 0.5 mm, concolorous, glabrous; margins slightly thickened, involute; midrib slightly prominent and extending into a sharp point. Synflorescences 0.6–1.0 m long, with terminal primary umbel subtended by 2–6 smaller, secondary and tertiary umbels; peduncle brownish, glabrous, nodes subtended by reduced scale-like peduncular bracts.

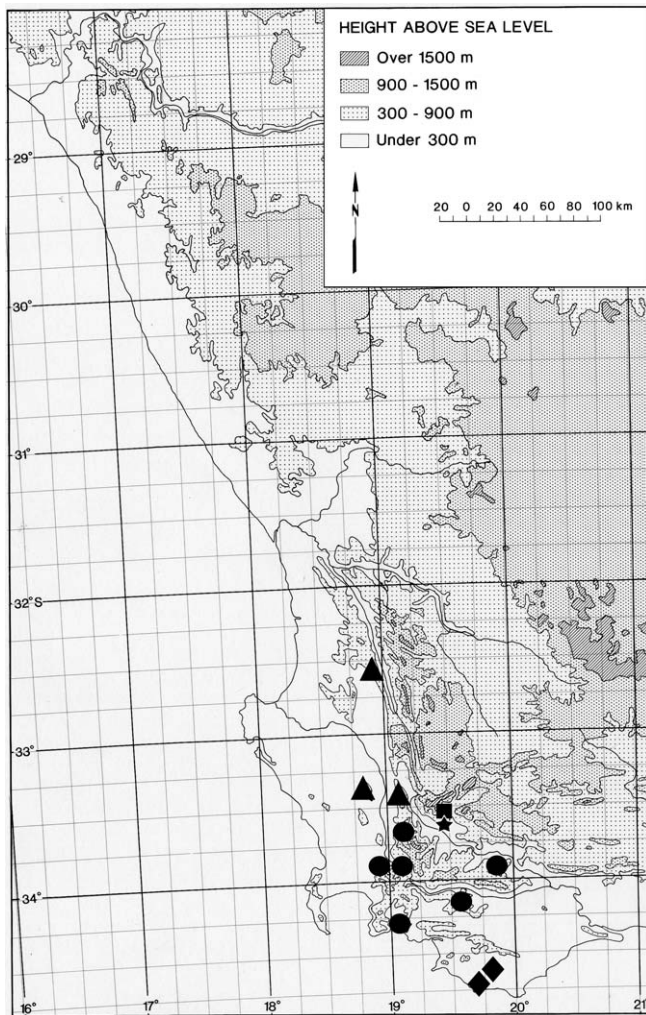


FIG. 3. Known geographical distribution of *Annesorhiza bracteosa* (diamonds), *A. elsiae* (square), *A. radiata* (star), *A. refracta* (triangles), and *A. triternata* (circles).

Umbels compound, obtriangular in outline; involucre bracts 3–4, 2–4 mm long, narrowly oblong to lanceolate, acuminate, glabrous; rays 3–5(–7), 10–40 mm long at anthesis, unequal, suberect, glabrous; involucre bracts 4–6, 1.5–2 mm long, narrowly oblong, acuminate, glabrous, raylets 6–14, glabrous, 2–3 mm long at anthesis. Flowers hermaphroditic in terminal and secondary umbels, functionally male in tertiary umbels; calyx lobes 5, acute to obtuse; petals 5, yellow, elliptic, acuminate with tips inflexed, glabrous, resin duct unbranched; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium narrowly conical; styles suberect to spreading. Fruits isodiametric, narrowly oblong to lanceolate in dorsal view, 5.0–6.5 mm × ca. 1.5 mm; mericarps homomorphic, glabrous, immaculate when dry; median and lateral ribs 3, equal, filiform to somewhat evident; marginal ribs 2, narrowly winged, straight, margins entire; vascular tissue observed at base of ribs only, somewhat dispersed; ribs with most cells lignified; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp.

Diagnostic Characters—Within the *A. triternata* group, only *A. filicaulis*, *A. laticostata*, and *A. radiata* have petals with a single unbranched resin duct. *Annesorhiza filicaulis* can be distinguished from *A. radiata* by the fleshy pencil-like roots

(roots somewhat tuberous and elliptic in *A. radiata*), the obtriangular terminal umbel with three to six suberect, prominently unequal rays (terminal umbel transversely ovate with six to 18 spreading, ± equal rays in *A. radiata*), the narrowly conical stylopodium of flowers and young fruits (shortly conical in *A. radiata*), and the larger, ≥ five mm long, narrowly oblong to lanceolate, narrowly winged fruits (fruits ≤ four mm long, elliptic and broadly winged in *A. radiata*). It can be distinguished from *A. laticostata*, from which it is geographically isolated, by the narrower fruits, thrice as long as broad, which have filiform to somewhat evident dorsal ribs and consistently narrow marginal wings. In *A. laticostata* the fully developed fruits are broader, twice as long as broad, with prominent to narrowly winged dorsal ribs.

Distribution and Ecology—*Annesorhiza filicaulis* was until recently known from only two incomplete collections around Clanwilliam in the Western Cape Province (Fig. 5). As leaf and root material was unknown, one of the populations was revisited to collect vegetative material (Van Wyk et al. 4066). The plants are rare and grow in sandy places. Flowering time for this species is in February with mature fruits present from March to April.

Additional Specimens Examined—SOUTH AFRICA. Western Cape: 3218 (Clanwilliam): Boskloof Farm, path from Amon se Poort to Dwarsrivier (–BB), 4 April 1986, Taylor 11492 (NBG); 2 March 2001, Van Wyk, Tilney & Vessio 4066 (JRAU, NBG).

4. *Annesorhiza laticostata* Magee sp. nov.—TYPE: SOUTH AFRICA. Western Cape Province, Worcester district (3319): Hills between the Breede River and the Brandvlei Dam, S of Worcester next to the road to Rawsonville (–CB); 15 February 2010 (leaves added on 16 August 2010); Magee & Le Roux 188 (holotype: NBG!; isotype: K!, PRE!).

A. filicaulis foliis ternate divisis, foliolis ultimis 2- vel 3- sectis segmentis linearibus, canalibus resiniferis irramosis in petalis, stylopodio anguste conico et costis marginalibus fructuum alatis similis, sed fructu late alato, duplo longo quam lato (in *A. filicaulis* semper anguste alato, triplo longo quam lato) et elevatis dorsalibus bene manifeste costatis ad bene anguste alatas (in *A. filicaulis* costae dorsales filiformes ad leviter costatas) differt.

Deciduous geophyte. Roots replaced periodically, clustered, 1 or 2, pencil-like, slightly and evenly fleshy. Leaves in basal rosette, suberect to spreading, dead or dying at time of flowering, 100–210 × 60–120 mm, 3- to 4-ternate; rachis and pinnae straight. Ultimate leaflets 2- or 3-sect; segments linear, 3–25 mm × ± 0.5 mm, concolorous, glabrous; margins slightly thickened, involute; midrib extending into a sharp point. Synflorescences 0.6–1.0 m long, with terminal primary umbel subtended by 4–15 smaller, secondary and tertiary umbels; peduncle straw colored, glabrous, nodes subtended by reduced scale-like peduncular bracts. Umbels compound, obtriangular in outline; involucre bracts 3–4, 2–3 mm long, narrowly oblong, acuminate, glabrous; rays 3–6, 10–45 mm long at anthesis, unequal, suberect, glabrous; involucre bracts 4–6, 1.0–2 mm long, narrowly oblong, acuminate, glabrous, raylets 8–15, glabrous, 2–3 mm long at anthesis. Flowers hermaphroditic in terminal and secondary umbels, functionally male in tertiary umbels; calyx lobes 5, acute to obtuse; petals 5, yellow, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct unbranched; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium narrowly conical; styles erect to suberect. Fruits isodiametric,

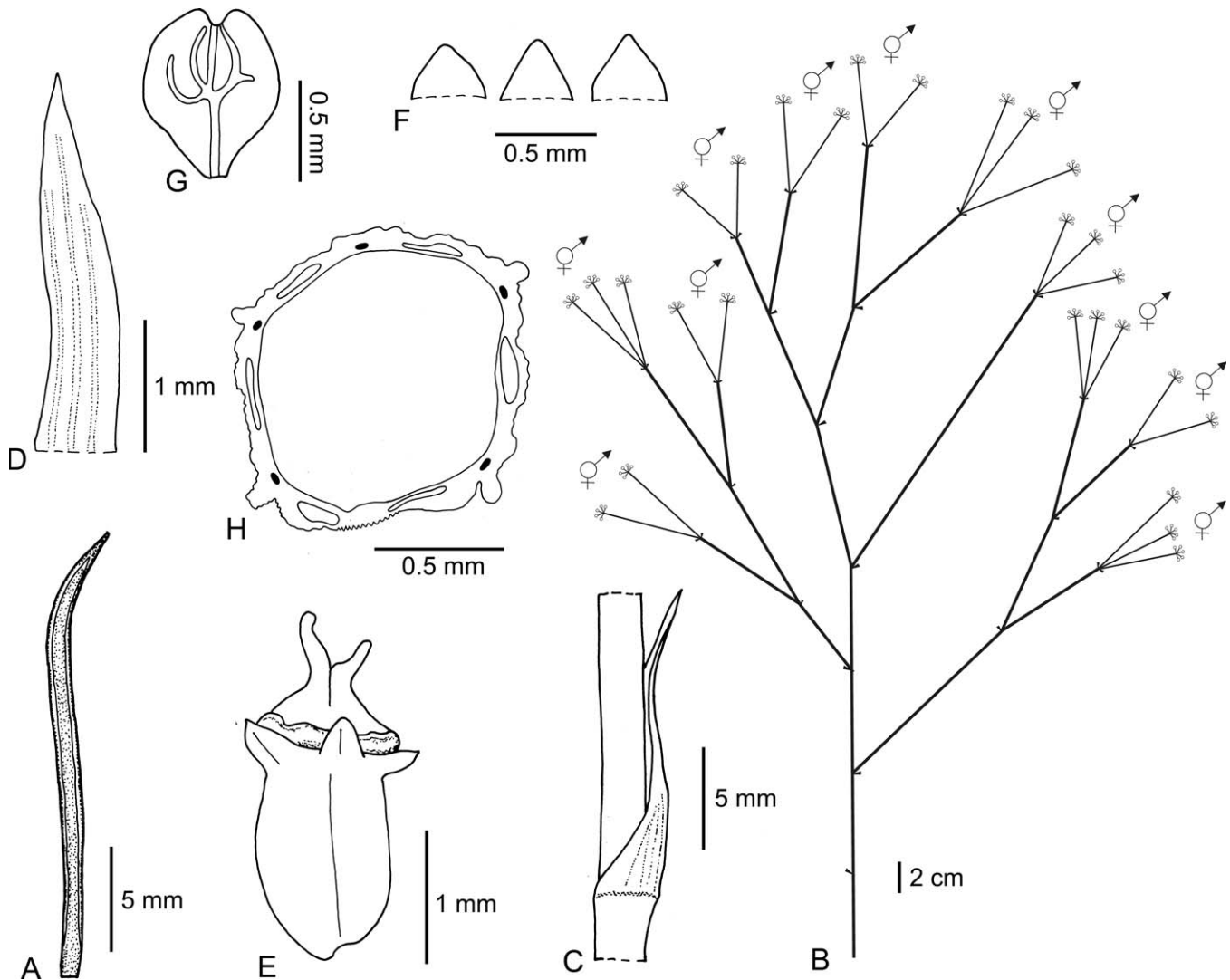


FIG. 4. *Annesorhiza elsiae*. A. Ultimate leaflet segment, ventral surface, B. schematic drawing of synflorescence structure, C. peduncular bract, D. involucel bract, E. immature fruit; F. calyx lobes, G. petals, dorsal surface, H. transverse section through the immature fruit. A–H: Esterhuysen 29462 (NBG)

oblong to narrowly obovate or elliptic in dorsal view, 4.5–5.5 mm × 2.0–3.0 mm; mericarps homomorphic or heteromericarpic, glabrous, immaculate when dry; median and lateral ribs 3, equal or ± unequal, prominent to narrowly winged; marginal ribs 2, broadly or sometimes narrowly winged, straight or slightly flexuose, margins entire; vascular tissue at base of ribs only, somewhat dispersed; ribs with most cells lignified; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp. Figure 6.

Diagnostic Characters—This species shares the ternately divided leaves (Fig. 6A), the 2- or 3-sect ultimate leaflets with linear segments (Fig. 6B), the unbranched resin duct in the petals (Fig. 6H) and the winged marginal ribs of the fruits (Fig. 6I, J) with *A. filicaulis* and *A. radiata*. It differs most notably from both of these species in the prominent to narrowly winged dorsal ribs of the fruits (Fig. 6I, J; dorsal ribs filiform to somewhat evident in *A. filicaulis* and *A. radiata*). While the fruits are usually broadly winged and twice as long as broad, some poorly developed fruits may appear somewhat narrowly winged and therefore superficially similar to the geographically

isolated *A. filicaulis*. However, in the latter, the fruits are consistently narrowly winged and three times as long as wide. *Annesorhiza laticostata* can be further distinguished from *A. radiata* by the suberect unequally rayed umbels which as a result appear obtriangular in outline (Fig. 6C), the narrowly conical stylopodium (Fig. 6F) and the fleshy pencil-like roots.

Distribution and Ecology—*Annesorhiza laticostata* is only known from the area around Rawsonville, where it grows in alluvial sands near the Breede River (Fig. 5). Flowering time for this species is from January to February with mature fruits present from March to May.

Additional Specimens Examined—SOUTH AFRICA. Western Cape: 3319 (Worcester): Hills between the Breede River and the Brandvlei Dam, S of Worcester next to the road to Rawsonville (–CB), 1 February 2010, *Le Roux 714* (BOL, NBG, PRE).

5. *Annesorhiza radiata* Magee, sp. nov.—TYPE: SOUTH AFRICA. Western Cape Province, Worcester district (3319): Worcester, Karoo Desert National Botanical Garden, clay soils near the bottom of the reserve (–CB); 20 April 2010 (leaves added on 16 August 2010); *Magee 242* (holotype: NBG!; isotypes: K!, PRE!).

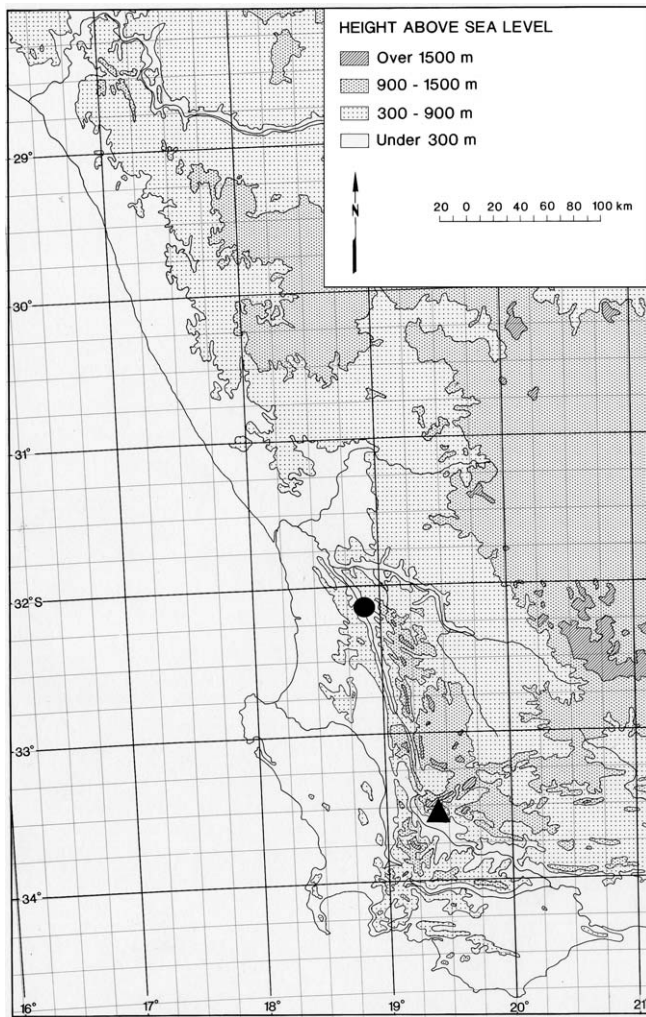


FIG. 5. Known geographical distribution of *Annesorhiza filicaulis* (circle) and *A. laticostata* (triangle).

A. filicaulis similis foliis ternate divisis, foliolis ultimis 2- vel 3-sectis segmentis linearibus, canale resinifero singulari irramoso in petalis et costis fructuum dorsalibus filiformibus sed radicibus tuberosis ellipsoideis (in *A. filicaulis* succulentae, quasi penicilli), umbella transverse ovata 6–18 radiis effusis \pm paribus (*A. filicaulis* umbella termina obtriangulata radiis 3 ad 6 suberectis manifeste imparibus) umbellis secundariis magnopere constaturis ex floribus fungentibus masculis (in *A. filicaulis* umbellae secundariae constituturae ex floribus hermaphroditis), stylopodio breviter conico (in *A. filicaulis* anguste conicum) et fructu minore late alato, minus quam 4.0 mm longo (plus quam 5 mm longo et anguste alato in *A. filicaulis*) differt.

Deciduous geophyte. Roots replaced periodically, clustered, 1–3, elliptic, tuberous. Leaves in basal rosette, suberect to spreading, dead at time of flowering, 150–200 \times 60–120 mm, 3- to 4-ternate; rachis and pinnae straight, branching at acute angles to one another. Ultimate leaflets 2- or 3-sect; segments linear, 3–15 mm \times \pm 0.5 mm, concolorous, glabrous; margins and midrib slightly thickened and extending into a sharp point. Synflorescences 0.14–0.6 m long, with terminal primary umbel subtended by 3–5 smaller, secondary and tertiary umbels; peduncle dark brownish, glabrous, nodes subtended by reduced scale-like peduncular bracts.

Umbels compound, transversely ovate; involucre bracts 3–6, \pm 1 mm long, narrowly oblong, acuminate, glabrous; rays (5–)6–9, 20–30 mm long at anthesis, \pm equal, spreading, glabrous; involucre bracts 4–6, \pm 1 mm long, narrowly oblong, acuminate, glabrous, raylets 6–12, glabrous, 3–5 mm long at anthesis. Flowers hermaphroditic in terminal umbels, largely functionally male in secondary and tertiary umbels; calyx lobes 5, acute to obtuse or sometimes slightly tridentate; petals 5, yellow, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct unbranched; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium shortly conical; styles at first erect, later becoming reflexed to the base of the stylopodium. Fruits isodiametric, elliptic in dorsal view, 3.0–4.0 mm \times 2.0–2.5 mm; mericarps homomorphic, glabrous, slightly maculate when dry; median and lateral ribs 3, equal, filiform; marginal ribs 2, broadly winged, straight to slightly flexuose, margins entire; vascular tissue at base of all ribs and seemingly a few elements dispersed towards apex of marginal ribs; ribs with most cells lignified; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp. Figure 7.

Diagnostic Characters—*Annesorhiza radiata* shares the ternately divided leaves (Fig. 7A), 2- or 3-sect ultimate leaflets with linear segments (Fig. 7B) and the single unbranched resin duct in the petals (Fig. 7H) with *A. filicaulis* and *A. laticostata* but differs from both in the somewhat tuberous, elliptic roots (vs. fleshy, pencil-like), the secondary umbels composed largely of functionally male flowers (secondary umbels composed largely of hermaphroditic flowers in *A. filicaulis*), the transversely ovate umbel with six to 18 spreading, \pm equal rays (Fig. 7C; vs. terminal umbel obtriangular with three to six suberect, prominently unequal rays), the shortly conical stylopodium (Fig. 7F; vs. narrowly conical), and the smaller broadly winged fruits, less than 4.0 mm long (Fig. 7I; more than 5.0 mm long, narrowly winged in *A. filicaulis*). In *A. radiata* the fruits are twice as long as broad with a broad marginal wing as in *A. laticostata* (and the rest of the *A. triternata* group, except *A. elsiae* and *A. filicaulis*) but differs in the filiform dorsal ribs of the fruits (Fig. 7I, J). In *A. laticostata* the dorsal ribs of the fruits are prominent to narrowly winged.

Distribution and Ecology—*Annesorhiza radiata* is known only from a few collections around Worcester in the Western Cape Province (Fig. 3). It grows among bushes on tillite derived clay soils of the drainage line, favoring small mounds. The species appears to be naturally rare with small groups of individuals widely separated from one another. Flowering time for this species is from March to April with mature fruits present from May and leaves produced thereafter.

Additional Specimens Examined—SOUTH AFRICA. Western Cape: 3319 (Worcester) (–CB), 16 May 1939, Peers s. n. (BOL, NBG); Worcester, Karoo Garden (–CB), 26 July 1945, Leighton 1034 (BOL); April 1997, Perry 63 (NBG).

6. *Annesorhiza refracta* Magee sp. nov.—TYPE: SOUTH AFRICA. Western Cape Province, Clanwilliam district (3218): Near Eendekuil, western foot of Piekenierskloof Pass (–DB); 27 May 2009; Magee, Manning and Boatwright 147 (holotype: NBG!; isotype: PRE!).

A. triternata petalis canalibus oleiferis ramosis et fructibus marginaliter alatis et dorsaliter costatis similis, sed foliis procumbentibus (folia erecta ad effusa in *A. triternata*), foliosis ultimis 2- vel 3-partitis segmentis ovatis ad lanceolata (in *A. triternata* foliola ultima 2- vel 3-secta segmentis linearibus),

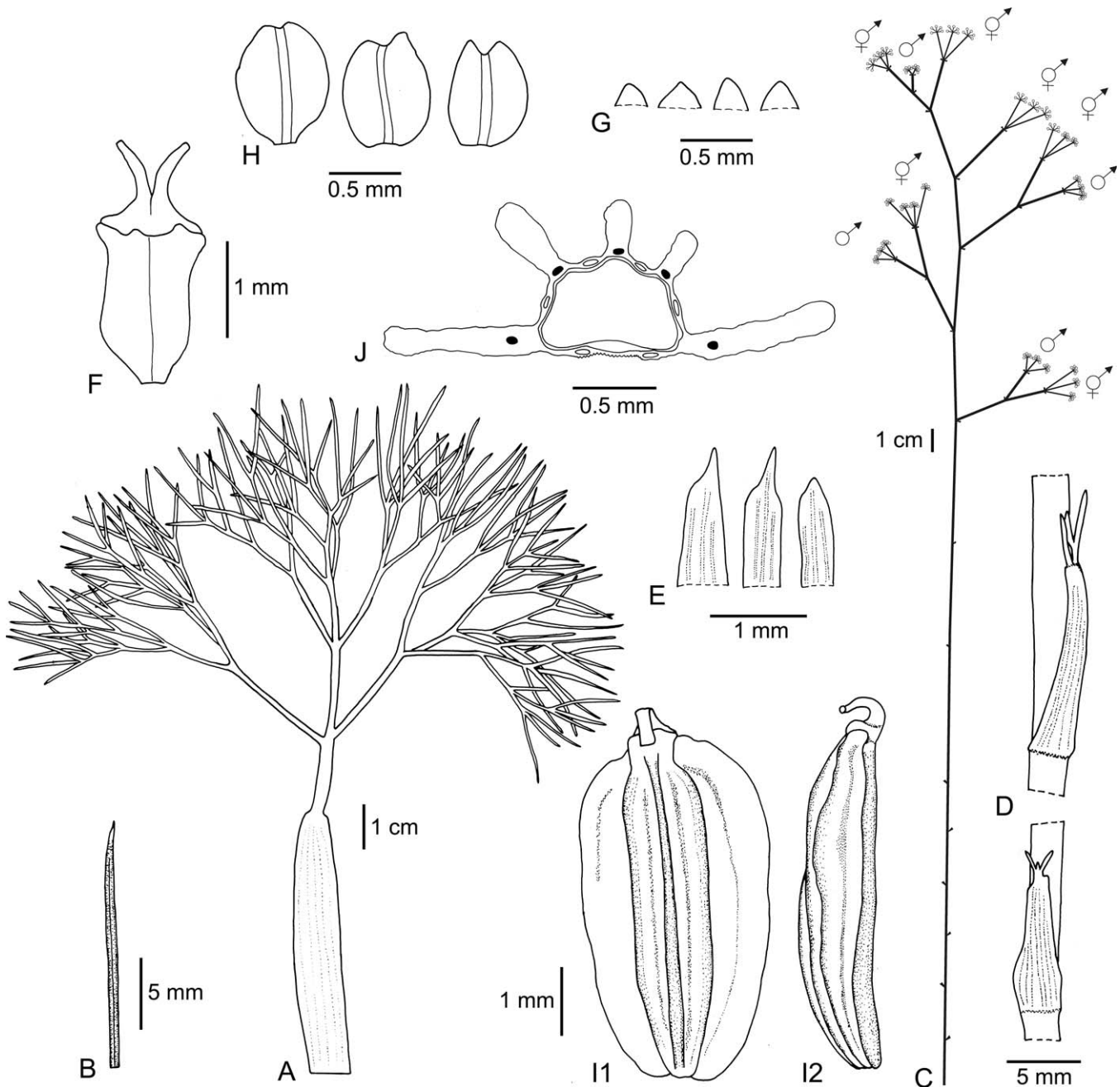


FIG. 6. *Amesorrhiza laticostata*. A. leaf, B. ultimate leaflet segment, ventral surface, C. schematic drawing of synflorescence structure, D. peduncular bracts, E. involucral bracts, F. immature fruit, G. calyx lobes, H. petals, dorsal surface, I. Fruit, dorsal (I1) and lateral view (I2), J. transverse section through the mature fruit. A–C & E–J: *Le Roux 714* (NBG); D: *Magee & Le Roux 188* (NBG).

rhachidi et pinnis foliorum manifeste refractis (in *A. triternata* rhachides et pinnae rectae) et costis dorsalibus fructuum fili-formibus (in *A. triternata* manifeste elevatae ad bene anguste alatas) differt.

Deciduous geophyte. Root 1?, pencil-like, slightly and evenly fleshy. Leaves in basal rosette, procumbent, dead at time of flowering, 15–30 × 12–20 mm, 3- to 5-ternate; rachis and pinnae prominently refracted. Ultimate leaflets 2- or 3-partite, 5–22 mm × 3–10 mm; segments ovate to lanceolate, 3–20 × 1–4 mm, concolorous, glabrous; margins and midrib thickened and extending into a sharp point. Synflorescences 0.14–0.5 m long, with terminal primary umbel sometimes subtended by 1–4 smaller, secondary and tertiary umbels,

peduncle brownish, glabrous, nodes subtended by reduced scale-like peduncular bracts. Umbels compound, transversely ovate or sometimes shortly obtriangular; involucral bracts 2.5–3 mm long, 3–4, narrowly oblong, acuminate, glabrous; rays 3–5, 15–30 mm long at anthesis, ± equal, spreading or sometimes suberect, glabrous; involucral bracts 4–6, 1–1.5 mm long, narrowly oblong, acuminate, glabrous, raylets 10–18, glabrous, 3–7 mm long at anthesis. Flowers hermaphroditic in terminal and secondary umbels, functionally male in tertiary umbels; calyx lobes 5, acute; petals 5, yellow, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct conspicuously branched, lateral branches 2–5, arising from near the base of the central duct; stamens 5,

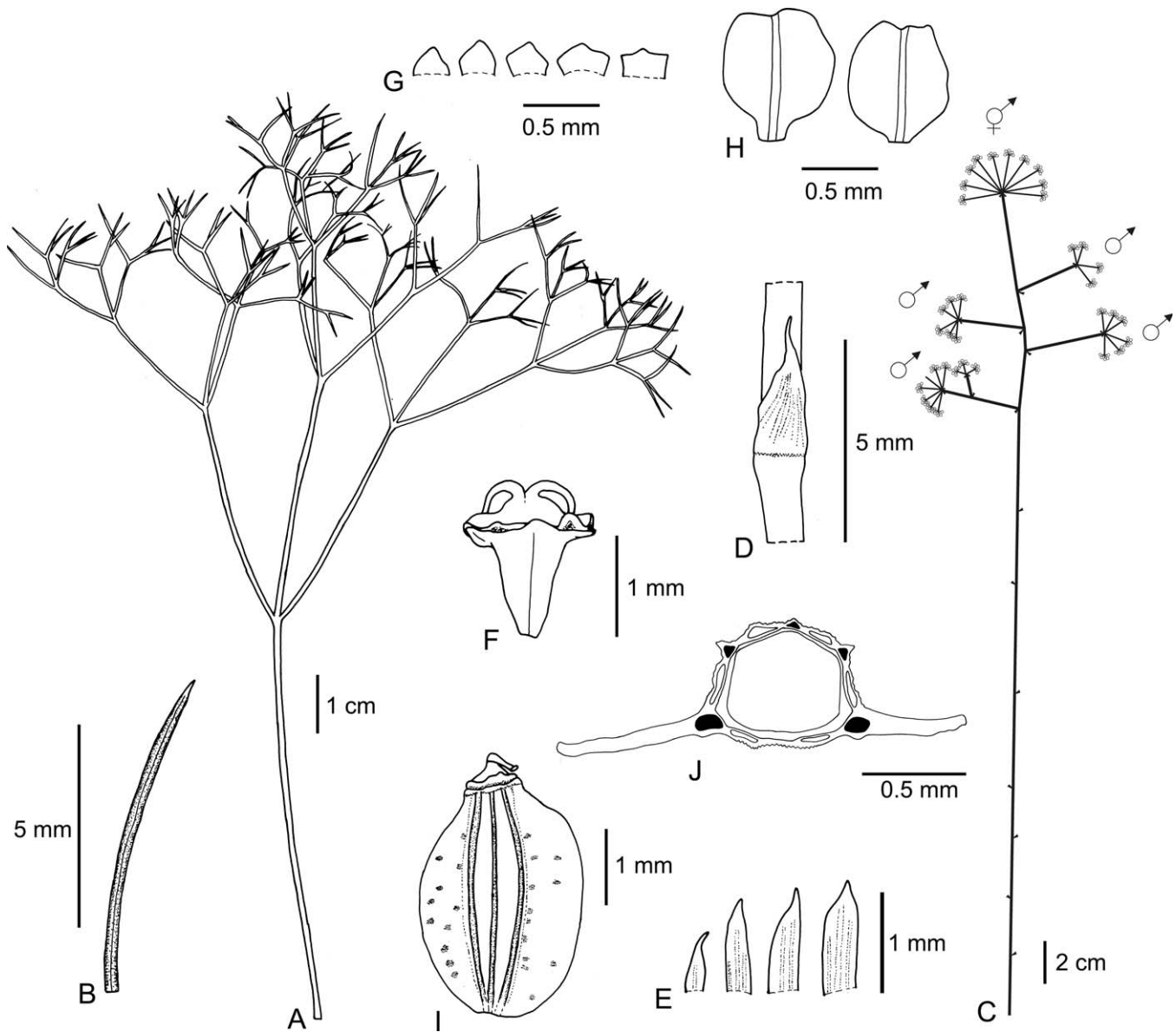


FIG. 7. *Annesorhiza radiata*. A, leaf, B, ultimate leaflet segment, ventral surface, C, schematic drawing of synflorescence structure, D, peduncular bract, E, involucel bracts, F, immature fruit, G, calyx lobes, H, petals, dorsal surface, I, fruit, dorsal view, J, transverse section through the mature fruit. A, B, E–J: Perry 63 (NBG); C, D: Magee 242 (NBG).

with anthers inflexed; ovary bilocular, glabrous; stylopodium shortly conical; styles at first erect, later becoming reflexed to just above the base of the stylopodium. Fruits isodiametric, elliptic to narrowly ovate in dorsal view, 4.0–5.0 mm × 2.5–3.5 mm; mericarps homomorphic, glabrous, immaculate when dry; median and lateral ribs 3, equal, filiform; marginal ribs 2, broadly winged, flexuose, margins slightly sinuous; vascular tissue at base of ribs only; ribs with most cells slightly lignified; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp. Figure 8.

Diagnostic Characters—This distinctive species shares the conspicuously branched resin ducts in the petals (Fig. 8G) and the broadly winged, elliptic to narrowly ovate fruits (Fig. 8H) with *Annesorhiza triternata* but can be readily distinguished by the procumbent leaves (Fig. 8A; leaves erect to spreading

in *A. triternata*), the prominently refracted rachis and pinnae (Fig. 8A; leaf rachis and pinnae straight in *A. triternata*), the 2- or 3-partite ultimate leaflets with ovate to lanceolate segments (Fig. 8B; ultimate leaflets usually 2- or 3-sect with linear segments in *A. triternata*), as well as fruits which have filiform dorsal ribs (Fig. 8H, I; fruit ribs prominent to narrowly winged in *A. triternata*).

Distribution and Ecology—*Annesorhiza refracta* may be more common than the meager herbarium record currently suggests and, like the other species of the group, it has likely been overlooked (even avoided as being incomplete) by collectors. It has been recorded in clay or ferricrete soils from the foot of the Piekenierskloof Pass to Paarl in the Western Cape Province (Fig. 3). Flowering time for this species is from February to March with mature fruits present from April to May and leaves produced shortly thereafter.

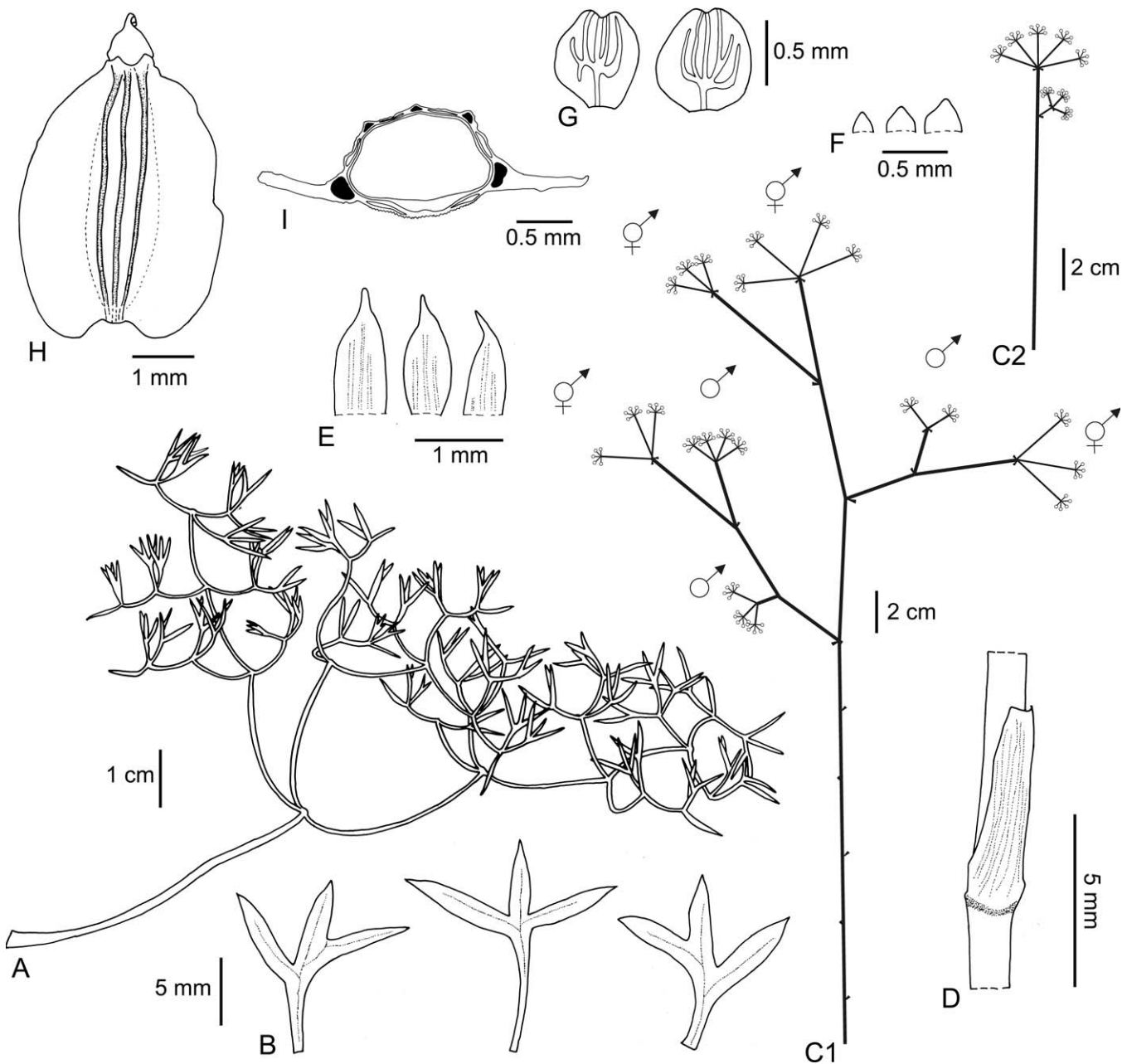


FIG. 8. *Annesorhiza refracta*. A, leaf, B, ultimate leaflets, ventral surface, C, schematic drawing of synflorescence structure, D, peduncular bract, E, involucel bracts, F, calyx lobes, G, petals, dorsal surface, H, fruit, dorsal view, I, transverse section through the mature fruit. A, B, C2 & I: Esterhuysen 18840 (BOL); C1, D–H: Magee *et al.* 147 (NBG).

Additional Specimens Examined—SOUTH AFRICA. Western Cape: 3218 (Clanwilliam): Near Eendekuil, western foot of Piekienerskloof Pass (–DB), 28 August 2009, Magee *et al.* 161 (NBG, PRE, K, BOL). 3318 (Cape Town): Moorreesburg, Watervlei Farm along Bergriver, remnant patch of veld N of farm buildings (–BB), Cowell & Stall MSBP 3986 (NBG). 3319 (Worcester): Tulbagh (–AC), September 1919, Bolus 16734 (BOL); roadside near Gouda (–AC), 9 September 1951, Esterhuysen 18840 (BOL, 3 sheets, K, PRE).

7. *Annesorhiza triternata* (Eckl. & Zeyh.) Vessio, Tilney & B-E. van Wyk comb. nov. *Peucedanum triternatum* Eckl. & Zeyh., Enum. pl. afric. austral. 3: 349 (1837); Sonder in Fl. Cap. 2: 556 (1862); Burt in Edinb. J. Bot. 48(2): 239 (1991); Goldblatt & Manning, Cape Pl.: 278 (2000).—TYPE: SOUTH AFRICA. Western Cape Province, Caledon district (3419): Hottentots Holland Mountains, above

Palmiet River (–AA); Ecklon & Zeyher 2235 (lectotype: S!, here designated; isolectotype: SAM!).

Deciduous geophyte. Roots replaced periodically, clustered, 1–3, pencil-like, slightly and evenly fleshy. Leaves in basal rosette, spreading, dead or dying at time of flowering, 150–300 × 40–100 mm, 2- to 4-ternate; rachis and pinnae straight. Ultimate leaflets 3- to 5-partite with lanceolate segments in first formed leaves but becoming 2- or 3-sect with linear segments in mature leaves; segments 5–75 mm × 0.5–1.5 mm, concolorous, glabrous; margins and midrib slightly thickened and extending into a sharp point. Synflorescences 0.4–0.8 m long, with terminal primary umbel subtended by 0–3 smaller, secondary and tertiary umbels; peduncle brownish, glabrous, nodes subtended by reduced scale-like peduncular

bracts. Umbels compound, transversely ovate to usually obtriangular; involucre bracts 3–4, 3–5 mm long, oblong to lanceolate, acuminate, glabrous; rays 4–7, 15–90 mm long at anthesis, usually unequal, suberect to spreading, glabrous; involucre bracts 4–8, 1.5–2 mm long, oblong to broadly oblong, acuminate, glabrous, raylets 10–18, glabrous, 3–5 mm long at anthesis. Flowers hermaphroditic in terminal and secondary umbels, functionally male in tertiary umbels; calyx lobes 5, acute to tridentate; petals 5, yellow, broadly ovate to broadly elliptic, acuminate with tips inflexed, glabrous, resin duct conspicuously branched, lateral branches 2–5, arising from near the base of the central duct; stamens 5, with anthers inflexed; ovary bilocular, glabrous; stylopodium shortly conical; styles at first erect, later becoming reflexed to just above the base of the stylopodium. Fruits isodiametric, elliptic to narrowly ovate in dorsal view, 7.0–9.0 mm × 3.0–5.0 mm; mericarps homomorphic or heteromorphic, glabrous, immaculate when dry; median and lateral ribs 3, equal or ± unequal, prominent to narrowly winged; marginal ribs 2, broadly winged, straight, margins entire; vascular tissue at base of ribs only; ribs with most cells lignified; commissural vittae 2; vallecular vittae 4; commissure narrow; carpophore bipartite; druse crystals present, scattered throughout mesocarp.

Diagnostic Characters—This species shares the straight leaf rachis and pinnae, the branched resin ducts in the petals, and the broadly winged, elliptic to narrowly ovate fruits in dorsal view with *Annesorhiza bracteosa*, but can be distinguished by the reduced scale-like peduncular bracts (prominently foliose in *A. bracteosa*), the smaller involucre bracts, ≤ two mm long (≥ four mm long in *A. bracteosa*), and the acute to tridentate calyx lobes (calyx lobes truncate in *A. bracteosa*).

Distribution and Ecology—*Annesorhiza triternata* occurs along the Du Toits Kloof and Hottentots Holland Mountains to Genadendal (Fig. 3), where it grows on rocky sandstone slopes. It appears to be rare but may also simply be overlooked by collectors. As indicated by the collection record, these plants are most prominent in recently burnt vegetation. *Annesorhiza triternata* flowers from February to March and bears mature fruits from April to May, with leaves produced thereafter.

Note—The specimen in S is the most complete and has a rich collection of fruit material. Since one of the most complete sets of the Ecklon and Zeyher collection is housed at S and as this specimen bears the characteristic printed label associated with the Enumeratio of 1837 it is here chosen as lectotype.

Additional Specimens Examined—SOUTH AFRICA. Western Cape: 3318 (Cape Town): Stellenbosch, Guardian Pk., Jonkershoek, on steep rocky slopes, E. aspect, below the top of the ridge leading to the beacon from the south end of the peak (–DD), 20 February 1972, *Esterhuysen*

32825 (BOL, K, PRE); 16 April 1972, *Esterhuysen* 32857 (BOL, K, PRE). 3319 (Worcester): Suurvlakte above Du Toits Kloof nek at the top of the pass (–CA), 7 March 1954, *Esterhuysen* 22780 (BOL, PRE); 2 May 1954, *Esterhuysen* 22899 (BOL, PRE); slightly swampy S slopes between Fransch Hoek Pass and Paardeberg (–CC), 10 May 1956, *Esterhuysen* 25821 (BOL); Vrolijkheid Nature Reserve (–DD), 27 September 1974, *Van der Merwe* 2522 (PRE). 3419 (Caledon): Fernkloof Nature Reserve, in recently burnt veld along the contour path (–AC), 1 April 2009, *Magee et al.* 140 (NBG); 1 April 1992, *Drewe* 913 (HER, NBG); Genadendal, “in montibus” (–BA), 1 April 1897, *Schlechter* 10289 (BOL, PRE).

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