

Taxonomic Revision of the *Alectra sessiliflora* Complex (Orobanchaceae)

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Abstract—*Alectra sessiliflora* (Orobanchaceae) is the most widespread species within the genus, occurring throughout sub-Saharan Africa, and into India, China and the Philippines. Three varieties are currently recognized (*A. sessiliflora* var. *monticola*, *A. sessiliflora* var. *senegalensis*, and *A. sessiliflora* var. *sessiliflora*) and are distinguished by geographic range, calyx pubescence and stamen filament pubescence. Due to the overlapping nature of the characters used to distinguish among these varieties, accurate assignment of a specimen to a single variety is nearly impossible. We undertook a phenetic study of morphological characters to assess the validity of these varieties. Principal coordinate analysis and the unweighted pair-group method using arithmetic averages were used to explore whether specimens would cluster into the currently recognized varieties. Our analyses revealed no clustering based exclusively on geographic distribution. A small cluster of seven specimens was seen in the principal coordinate analysis using Gower's coefficient of similarity as input values, but this cluster was not diagnosable by unique characters. Based on these results we recommend that *Alectra sessiliflora* be recognized without infraspecific taxa. Finally, additional names are included as synonyms under *Alectra sessiliflora* based on extensive study of field-collected and herbarium specimens.

Keywords—hemiparasite, multivariate analysis, Orobanchaceae, principal coordinate analysis, species complex, UPGMA.

Alectra Thunb. is a genus of 12 primarily hemiparasitic species of herbaceous plants distributed mainly in sub-Saharan Africa (Morawetz, unpubl. data). Species of *Alectra* are characterized by sessile flowers with a yellow, marcescent corolla, a recurved or "horseshoe-shaped" style, and clavate stigma (*A. fruticosa* Eb. Fisch. is the exception to habit, inflorescence and corolla color typical of the genus; see Morawetz and Wolfe 2009). Species of *Alectra* occur in damp to inundated grasslands where they generally parasitize grasses and sedges (*A. fruticosa* is again an exception, occurring in high elevation montane rainforests in Madagascar; *A. schoenfelderi* Dinter & Melch. is also exceptional, occurring in arid areas of southeastern Angola, northeastern Namibia, and adjacent southwestern Zambia). The characters most often used to separate species are presence or absence of pubescence on the stamen filaments (which are didynamous, typical for the family), the shape of the anther theca base, and the shape of the leaves (see Hepper 1963; Philcox 1990; Fischer 2006; Ghazanfar et al. 2008).

Alectra sessiliflora (Vahl) Kuntze is the most widespread species with a range extending from the entirety of sub-Saharan Africa into India, China, and the Philippines; the plant is a weed of grasslands throughout its range (Morawetz 2007). Given this wide distribution and habit, it is unsurprising that many species have been described from throughout the range, with several having already been placed into synonymy (Melchior 1941; Hepper 1960; Wood 1997). Through the examination of taxonomic literature and loaned specimens for the purpose of producing a monograph of *Alectra* (Morawetz, unpubl. data), several additional species have been identified as conspecific with *A. sessiliflora*: *A. aberdarica* Chiov., *A. asperrima* Benth., *A. congolensis* Troupin, *A. hundtii* Melch., *A. ibityensis* Eb. Fisch., *A. ledermannii* Engl., *A. moeroensis* Engl., *A. schliebenii* Melch., and *A. trinervis* Hemsl. Considering the lack of a current comprehensive understanding of *A. sessiliflora*, a taxonomic revision of this species is necessary.

Recognition of the number of infraspecific taxa has also varied over time and specimens often are not annotated below species level. Currently three varieties of *A. sessiliflora* are recognized: *A. sessiliflora* var. *sessiliflora*, *A. sessiliflora* var. *senegalensis* (Benth.) Hepper, and *A. sessiliflora* var. *monticola* (Engl.)

Melch. Additionally, *A. sessiliflora* var. *sessiliflora* has been divided into two forms: *A. sessiliflora* var. *sessiliflora* forma *sessiliflora* and *A. sessiliflora* var. *sessiliflora* forma *barbata* (Hiern) Hilliard & B. L. Burtt. These varieties all overlap in their distributions within Africa, and it is only *A. sessiliflora* var. *monticola* that extends outside of Africa. The three varieties historically have been distinguished in keys based upon calyx pubescence (margins, nerves, or both), and stamen filament pubescence (all glabrous or longer pair pubescent), although these characters are not diagnostic. Relative leaf size and shape also often have been considered diagnostic, particularly for *A. sessiliflora* var. *monticola*; plants of this variety possess the smallest, most coarsely toothed leaves (see Melchior 1941; Hepper 1960; Philcox 1990). The calyx pubescence and stamen filament pubescence characters that are most commonly used to distinguish among the varieties are summarized concisely by Philcox (1990): plants of *A. sessiliflora* var. *sessiliflora* have calyces that are ciliate on the "upper margin" and rarely on nerves, filaments that are glabrous or the longer pair bearded; plants of *A. sessiliflora* var. *senegalensis* have calyces that are ciliate on nerves and margins, the longer pair of filaments always bearded; and plants of *A. sessiliflora* var. *monticola* have calyces ciliate on nerves and margins, the longer pair of filaments always bearded (the latter two varieties are identical in description). Hilliard and Burtt (1986) further distinguished among the character states within *A. sessiliflora* var. *sessiliflora* by defining forma *sessiliflora* as having all stamen filaments glabrous, and defining forma *barbata* as having the two longer filaments bearded (summarized in Table 1). These authors stated that they "do not feel that the trivial variants commonly ranked as formae have any place in a nomenclative classification," and also noted that they observed mixed populations where both states occur. The purported distribution of traits among putative varieties makes it impossible to identify any of these infraspecific taxa with confidence. Due to the lack of reliable resolution provided by these characters, combined with personal observations of continuous variation within individual plants (for leaf size and shape, calyx pubescence), within populations and among the alleged varieties, a study of this species complex is necessary.

TABLE 1. Summary of calyx and filament pubescence character states for each variety and form of *Alectra sessiliflora*. X = presence, - = absence, and +/- = sometimes present/sometimes absent.

		Calyx ciliate		Filaments	
		Margins	Nerves	Glabrous	Two longer bearded
var. <i>sessiliflora</i>	forma <i>sessiliflora</i>	X	+/-	X	-
	forma <i>barbata</i>	X	+/-	-	X
var. <i>senegalensis</i>		X	X	-	X
var. <i>monticola</i>		X	X	-	X

Here we address the species limits of *Alectra sessiliflora*, and whether the currently recognized infraspecific taxa are taxonomically meaningful.

MATERIALS AND METHODS

More than 1,300 specimens of this species complex were obtained on loan for study by JJM, and field collections were made during field trips to the following countries: Madagascar (2005–2006), South Africa (2003, 2004), Swaziland (2003), and Zambia (2004). A complete list of all specimens examined for the revision of the *Alectra sessiliflora* complex can be found in Appendix 1; type material was seen of all names associated with this complex. A morphological species concept was employed to delimit taxa within *Alectra* (Morawetz, unpubl. data), including the *A. sessiliflora* complex. Under this species concept, taxa are delimited based upon easily observable morphological features (reviewed in Stuessy 2008), using unique characters or suites of characters when feasible.

A total of 115 specimens representing localities from throughout the species range were included in the phenetic analyses (Appendix 2). The included taxa had all been annotated previously either as a variety of *Alectra sessiliflora*, or more commonly, as *Alectra sessiliflora* with no variety indicated. Of these specimens, 14 collections included two to nine plants (i.e. multiple plants on a single sheet or duplicates from the same collecting event) allowing assessment of variation within populations. Many of the borrowed specimens could not be included in the phenetic study due to specimen deterioration (e.g. lowest leaves were damaged or missing) or lack of sufficient floral material for dissection; type specimens were not included, often for these reasons. To examine geographic patterns, African specimens were grouped into four regions as follows (specimens from countries within these regions are indicated in parentheses): Western Africa (Ghana, Liberia, Nigeria), Central Africa (Cameroon, Democratic Republic of the Congo, Equatorial Guinea), Southern Africa (Angola, Malawi, Namibia, South Africa, Swaziland, Zambia, Zimbabwe), Eastern Africa (Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda). Madagascar (plus one specimen from Mauritius) was considered a separate region from Southern Africa due to the high level of endemism there and the paucity of previous collections of this species from the island. Specimens from Asia (China, India, Laos, Nepal, Philippines, Thailand) were treated as a separate geographic group.

Character states were recorded for 25 characters, seven qualitative and 18 quantitative (Table 2). Specimens were not assigned to a taxon a priori because the goal of this study was to test for the presence of distinct clus-

TABLE 2. Characters and states used in phenetic analyses.

1. Stem pubescence (0 = absent; 1 = present), 2. Leaf length/width ratio, top, 3. Leaf length/width ratio, bottom, 4. Petiole length, top (cm), 5. Petiole length, bottom (cm), 6. Leaf shape (width at 1/4 length, 3/4 length), top, 7. Leaf shape (width at 1/4 length, 3/4 length), bottom, 8. Number of teeth per leaf, top, 9. Number of teeth per leaf, bottom, 10. Leaf margin, top (0 = dentate, 1 = crenate, 2 = entire), 11. Leaf margin, bottom (0 = dentate, 1 = crenate, 2 = entire), 12. Bract length/width ratio, 13. Number of teeth per bract, 14. Bract petiole length (cm), 15. Bracteole length (cm), 16. Bracteole pubescence (0 = present; 1 = absent), 17. Pedicel length (cm), 18. Calyx pubescence: margins (0 = present; 1 = absent), 19. Calyx pubescence: nerves (0 = present; 1 = absent), 20. Calyx length (cm), 21. Corolla length (cm), 22. Stamen pubescence on the 2 longer filaments (0 = absent; 1 = present), 23. Stamen filament length (shorter 2, cm), 24. Stamen filament length (longer 2, cm), 25. Style length (cm).
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ters based on the characters scored. Given the unclear boundaries of these infraspecific taxa, it is rarely possible to unambiguously assign specimens to a single taxon. The characters used were chosen based on differences among varieties noted in previous treatments (Melchior 1941; Hepper 1960; Hilliard and Burt 1986; Philcox 1990) and personal observations by JJM. Several characters were scored in pairs, referring to the condition at the distal and proximal extremes of the plant. Particularly for leaf size, shape, and petiole length, differences between apex and base have been proposed to be important for distinguishing among varieties (e.g., *A. sessiliflora* var. *sessiliflora* is listed in Philcox (1990) as never having the upper leaves petiolate). The distal leaves measured were always from the first set of leaves below the inflorescence on the main axis, if branched; the lowest leaves measured were from the lowest pair on the stem (specimens were generally not included in the study if the lowest pair of leaves were not intact and thus unavailable for measurement). Measurements were recorded from one leaf of the pair, favoring the least damaged or folded leaf; in cases where both leaves in the pair were in the same condition, one leaf was chosen at random for measurement. Length was measured from the base of the blade to its apex, and width was measured at the widest point of the blade. Where margin was coded "entire," the number of teeth per leaf (or teeth per bract) was coded 0. In the case of length/width ratios and for shape, the quotient was calculated (e.g. length divided by width) and this value was used in the quantitative analyses.

The data were analyzed with NTSYSpc version 2.0 (Rohlf 1998). Principal coordinate analyses (PCoA) were performed in two ways: 1) the data were standardized and used to compute an OUT × OTU correlation matrix, which was transformed into a distance matrix, and 2) Gower's coefficient of similarity (Gower 1971) was calculated using GowerSim, a program written and provided by Richard J. Jensen. For binary characters 0/0 matches were treated as negative matches. For both methods, the eigenvectors were extracted, and the first three eigenvectors were used to plot the specimens in three-dimensional space. Principal coordinate analysis does not require the a priori classification of specimens, and can incorporate qualitative data, which is inapplicable in principal component analysis (PCA) (Gower, 1966); further, PCoA is more appropriate than PCA when there are missing values in the data matrix (Rohlf 1972). Phenograms were constructed using the unweighted pair-group method using arithmetic averages (UPGMA; Sneath and Sokal 1973), using average taxonomic distance. The UPGMA analysis was performed on the initial data, which were standardized and used to compute a distance matrix, and on the Gower's coefficient of similarity matrix. The cophenetic correlation coefficient was calculated to determine the consistency between the data matrices and their resulting phenogram.

RESULTS

Examination of the type specimens of several *Alectra* species (*A. aberdarica*, *A. congolensis*, *A. hundtii*, *A. ibityensis*, *A. ledermannii*, *A. moeroensis*, *A. schliebenii*, and *A. trinervis*) revealed that they could not be distinguished from *Alectra sessiliflora*. These names are synonymized with *A. sessiliflora* below. *Alectra sessiliflora* is distinguished from other *Alectra* species by being herbaceous with spreading leaves (not rigid or appressed to the stem) that vary broadly from ovate to lanceolate, with distinctly apiculate anther thecae.

The results of the ordination and clustering analyses were similar whether the initial matrix or Gower's coefficient of similarity matrix was used. For the PCoA performed on the initial data matrix, the first principal coordinate axis explains 18.85% of the variation, the second principal coordinate axis explains 14.44% of the variation, and the third principal coordinate axis explains 11.52% of the variation; there is no distinct clustering based on geography or corresponding to varietal delimitations (Fig. 1a). For the PCoA performed on the matrix of Gower's coefficient of similarity values, the first principal coordinate axis explains 13.5% of the variation, the second principal coordinate axis explains 11.55% of the variation, and the third principal coordinate axis explains 7.04% of the variation. There is no distinct clustering seen in the resulting plots based upon geography or that corresponds to varietal delimitations (Fig. 1b). In this latter analysis there is a

small cluster of seven specimens from Southern Africa separated from the main cluster of specimens. However, no characters shared by these specimens are unique to them; while all but one of the specimens have pubescence on the calyx nerves, this is a trait shared by a number of specimens not in this small cluster. Similarly, no distinct clusters were recovered in the UPGMA phenograms based upon geography or corresponding to varietal delimitations (results not shown; cophenetic correlation coefficient from the initial matrix = 0.84, and from the Gower's coefficient matrix = 0.78). Further, in no case did the duplicate collections from the same population group together to the exclusion of other specimens; the duplicate collections occurred in clusters with specimens from other regions.

DISCUSSION

The ordination and clustering analyses failed to reveal groupings corresponding to the currently recognized varieties of *Alectra sessiliflora*. This is contrary to the traditional ideas held by many authors, but consistent with observations of continuous variation among specimens made in the field, and on herbarium sheets from across the range. The characters historically used to distinguish among the varieties, namely calyx pubescence and stamen filament pubescence, are not useful at this taxonomic level. The lack of infraspecific structure in *Alectra sessiliflora* is not surprising given its large geographic range, its weediness, and the number of names already placed in synonymy prior to the treatment proposed here. It would be plausible to expect that the specimens from Asia would cluster together apart from the African specimens, given that *A. sessiliflora* var. *monticola* is the only variety in Asia, but this was not observed in any analysis. Similarly, the specimens from Madagascar could have been expected to cluster together, given the high degree of endemism in the Madagascan flora and that *Alectra sessiliflora* is the only nonendemic *Alectra* species occurring there (Fischer 1996). However, again, this was not observed in any of the analyses. Based on the results of these analyses, we recommend recognizing *Alectra sessiliflora* without infraspecific divisions.

In the PCoA based on the Gower Coefficient of similarity matrix, there is a small cluster of seven specimens that are separated from the main cluster (Fig. 1b). However, no single character differentiates these specimens from the rest. Six of the seven specimens have pubescence on the calyx nerves, but this is not unique to these six specimens: many specimens in the main cluster also possess this trait. Further, this cluster of seven specimens was not recovered in the UPGMA phenogram generated using the Gower coefficient of similarity matrix (not shown); in that analysis, the cluster containing these specimens also contains specimens from Eastern and Southern Africa. We believe these specimens represent one end of the spectrum of variation found within *Alectra sessiliflora*, and expect that with denser sampling, this cluster would intergrade with the main cluster.

Previous authors have already commented on the difficulty of distinguishing taxa in this complex and have placed names in synonymy under *Alectra sessiliflora*. In his treatment of *Melasma* P. J. Bergius, Melchior (1940) transferred *Melasma indicum* var. *monticola* Engl. to *Alectra* as a synonym of *A. sessiliflora*, creating the new combination *Alectra sessiliflora* var. *monticola* (Engl.) Melch. The following year, Melchior (1941) commented on the similarity of a number of species of *Alectra*

and the unclear divisions between them. He stated that *A. communis* Hemsl. and *A. senegalensis* Benth. are not always separable (p. 439); similarly *A. communis* and *A. avensis* (Benth.) Merrill are difficult to distinguish (p. 440); there is a close affinity between *A. communis* and *A. moeroensis* (this distinction is further complicated by Melchior's reexamination of the type, discovering that all anthers were not pubescent, as Engler stated, but rather the two longer were pubescent and the two shorter were glabrous; p. 441); *A. barbata* (Hiern) Melch. is close to *A. sessiliflora*, differing only in flower size (the former having larger flowers; p. 438); *A. hundtii* is similar to *A. communis* and *A. sessiliflora*, differing from them both by having all filaments glabrous (p. 436); *A. communis* and *A. schliebenii* are similar, though the latter is distinguished by being covered in rough hairs (p. 442); and Melchior placed *A. indica* Benth. as a synonym of *A. avensis*. Nineteen years later, Hepper (1960) published his treatment of the *A. sessiliflora* complex, notably reducing *A. senegalensis* to the rank of variety. Hepper also reduced a number of names to synonymy based on his observations of specimens, several of which Melchior had already mentioned as closely related: *A. avensis*, *A. barbata*, *A. communis*, *A. cordata* Benth., and *A. indica*. Further, Hepper noted the inconsistencies in previous treatments regarding reports of stamen pubescence in *A. sessiliflora*: "Melchior makes no mention of the fact that most of the South African specimens (at least at Kew) have glabrous filaments and these plants would key out into the wrong group. In dealing with the Welwitsch collection, Hiern indicates that the filaments are glabrous, yet in 'Flora Capensis' he says they are more or less pubescent." This first effort to better characterize the *A. sessiliflora* complex was an important beginning, and Hepper himself stated "my treatment can by no means be regarded as exhaustive and I suspect there are other names that really belong to this aggregate." Three years later, Hepper (1963) stated, referring to *Alectra sessiliflora* varieties *monticola* and *senegalensis*, "the division between these two varieties is by no means distinct." Later, Hilliard and Burt (1986) made observations of the stamen pubescence in KwaZulu-Natal Province (at that time the region was named 'Natal'), South Africa, and decided to formally recognize the variants recorded within *Alectra sessiliflora* var. *sessiliflora* as formae. These taxa, *Alectra sessiliflora* var. *sessiliflora* forma *barbata* and forma *sessiliflora*, were not picked up in the literature, nor by workers outside of South Africa, and by the time Philcox (1990) published his treatment for Flora Zambesiaca, there was no further mention of divisions below the level of variety. Philcox followed Hepper's 1960 treatment regarding infraspecific divisions within *A. sessiliflora*, and did not include additional names in synonymy. Wood (1997) recognized *A. arabica* Deflers as a synonym of *A. sessiliflora*, the third Asian species to be included in synonymy after *A. avensis* and *A. indica*. Then surprisingly, in what can only be assumed to be an oversight in their literature review, the previously synonymized name *A. avensis* was recognized by Hong et al. (1998) without comment on its newly restored status; further evidence of an oversight is given by citing *Melasma* as a synonym of *Alectra*, despite *Melasma* having been published 17 yr before *Alectra* (Bergius 1767; Thunberg 1784). The recognition of this specific epithet was further perpetuated by Li et al. (2000) where they chose to recognize *Melasma avense* (Benth.) Hand.-Mazz. rather than *Alectra avensis*. Fischer (2006) recognized *A. sessiliflora* without any infraspecific divisions stating "Hepper (1960) distinguished 3 varieties which, however, all display intergradations, and therefore are not recognized in

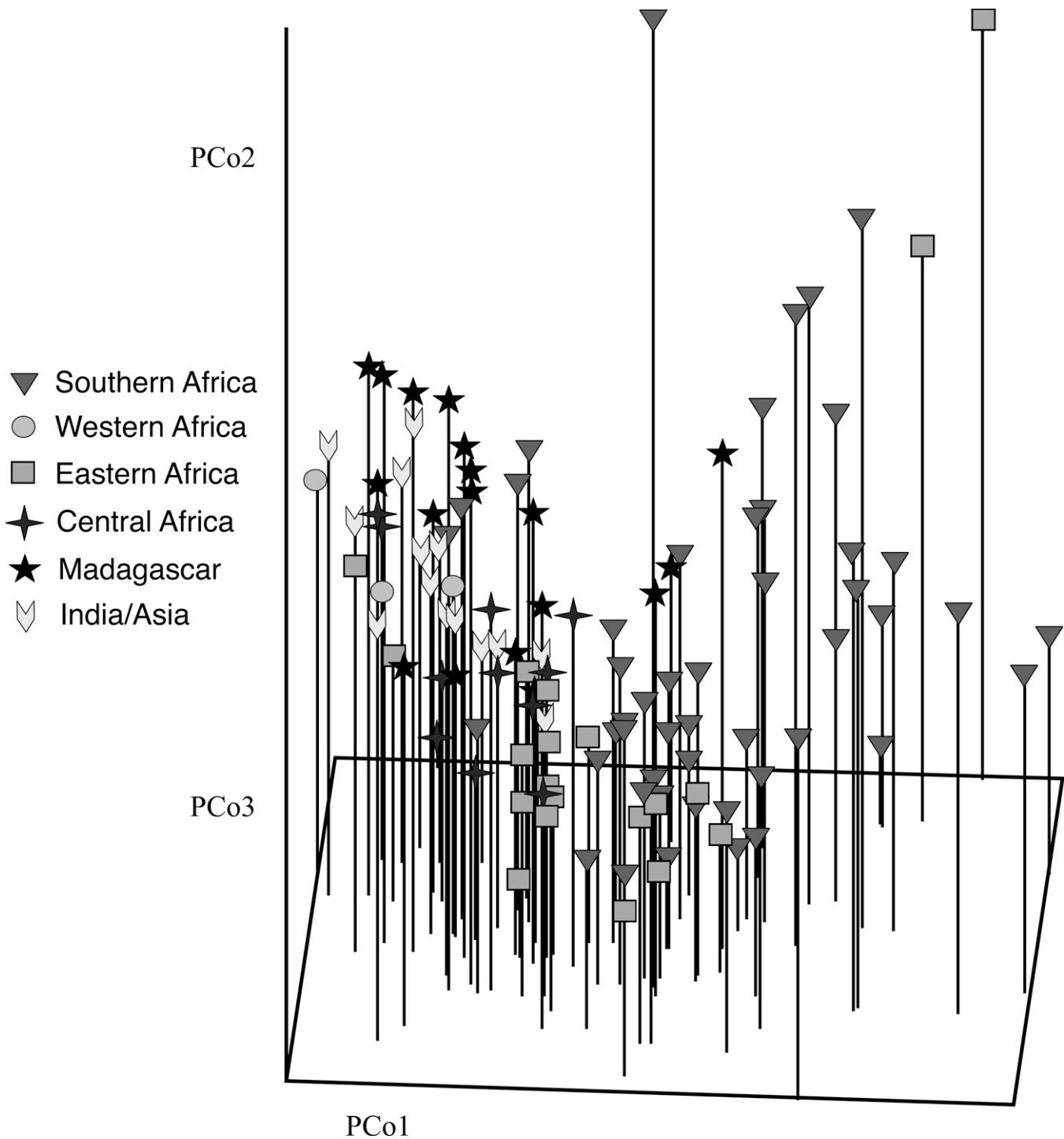


FIG. 1. Three-dimensional principal coordinate analysis (PCoA) plots of 25 characters from 115 *Alectra sessiliflora* specimens. 1a. Results from the initial data matrix after standardization. Percent variance explained by each axis: PCo1 18.85%, PCo2 14.44%, PCo3 11.52%. 1b. Results from using the Gower's coefficient of similarity matrix. Percent variance explained by each axis: PCo1 13.5%, PCo2 11.55%, PCo3 7.04%. Symbols represent regions, as defined in key inset in Fig. 1a

this revision." Ghazanfar et al. (2008) also did not recognize any infraspecific variants, and Ghazanfar herself comments that *A. sessiliflora* is "an extremely variable species" and that despite examining much material from East and West Africa, she has "found it very difficult to separate the varieties as recognized by Hepper (op. cit.) and Philcox (op. cit.)."

Here we include additional names in synonymy, expanding the broad circumscriptions posited by Fischer (2006) and

Ghazanfar et al. (2008). Several of these names are only known from their type specimens: *A. aberdarica*, *A. congolensis*, *A. hundtii*, *A. ledermannii*, *A. moeroensis*, *A. schliebenii*, and *A. trinervis*. Based on the results presented above, and on further specimen observations, we choose to again place *A. avensis* as a synonym of *A. sessiliflora* sensu Hepper 1960 and contra Hong et al. (1998) and Li et al. (2000). Despite having been clarified three times in the past (Melchior 1941; Pennell 1943; Lauener 1980), it bears

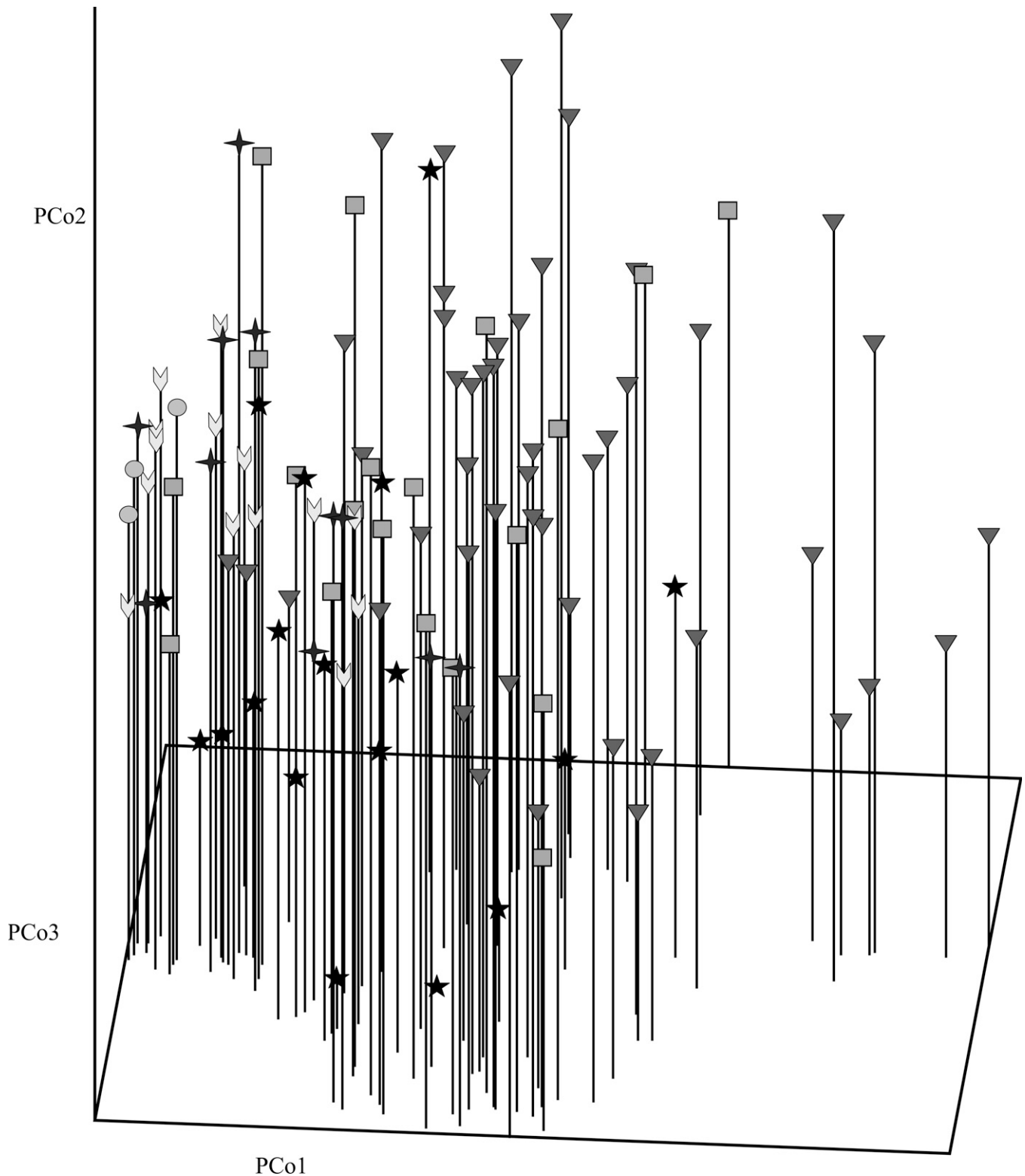


FIG. 1. Continued.

reiterating that the correct spelling of this epithet is "*avensis*" and not "*arvensis*." The basionym, *Glossostylis avensis* Benth., was correctly spelled by Bentham (1835), and is in reference to the village of Ava (Melchior 1941; Pennell 1943; Lauener 1980) near to Mandalay in present day Myanmar. When this name was transferred to *Alectra* by Merrill (1917), he added the erroneous "r" to the name, and also mistakenly cited the

basionym as *Glossostylis arvensis*. This orthographic error was perpetuated by Handel-Mazzetti (1936) when transferring the name to *Melasma*, and was most recently cited with this incorrect spelling by Li et al. (2000).

We include *A. asperrima* as a synonym of *A. sessiliflora*. This species has been characterized as having hairs with tuberculate or warty bases. Through the examination of over 1,300

specimens of this species complex, these hairs were found to vary in appearance, distribution, and density; while some specimens have primarily hairs of this type, others have few to none, and when they do occur, they are often interspersed with hairs that do not possess a particularly swollen, or tuberculate, base. We have observed continuous variation in this character across the range of the species complex (though *A. asperrima* was only described as occurring in Africa, we observed specimens of this complex from Asia that fit the description of *A. asperrima* based on the presence of tuberculate hairs).

We place *A. ibityensis* as a synonym of *A. sessiliflora*. In his treatment of *Alectra* on Madagascar, Fischer (1996) recognized five species, four of which he described as new. Few specimens of *A. ibityensis* exist aside from those cited in Fischer's treatment. Within the range of appearances in this complex, *A. ibityensis* is diminutive, being smaller in stature and with relatively small, orbicular leaves, and margins that are entire or with few dentations. Observed in isolation, this morphology would appear distinct; however, similar diminutive specimens have been observed from throughout the range of this complex, with a notably large population of similar looking plants found on Paarl Mountain in South Africa's Western Cape Province (*Morawetz 145*), as well as in a wooded locality in Swaziland (*Morawetz 133*); further, continuous variation in height, leaf shape, and margin type were observed.

Based on the results of the analyses presented here, plus observations from specimens and the literature cited above, we choose to recognize *A. sessiliflora* without infraspecific divisions. A description of this taxon, including an updated list of synonymy, is provided below.

Last, we clarify the confusion surrounding the typification of *A. communis*. Hemsley (Hemsley and Skan 1906) published *A. communis*, but did not designate a holotype. In Melchior's 1941 monograph, he listed a specimen cited by Hemsley as the type, which served to lectotypify the name: "Typus: leg. Whyte (Kaka town)" (p. 440). Philcox (1990), apparently unaware of Melchior's work, erroneously designated a lectotype for *A. communis*: "Type: Malawi, without locality, 1891, *Buchanan 520* (K, lectotype (chosen here); BM)" (p. 90); there was no reference to Melchior's earlier choice of a lectotype, and there is no reason Melchior's decision should be superseded as the conditions of Art. 9.17 of the code are not met. While Hemsley did not cite the *Buchanan 520* collection in his protologue, it could still be considered original material if he had the specimens in his presence when describing the species; however, given Melchior's previous designation of a lectotype, the specimens cited by Philcox as the lectotype and isoelectotype have no type status.

TAXONOMIC TREATMENT

ALECTRA SESSILIFLORA (Vahl) Kuntze, Rev. Gen. Pl. 2: 458. 1891. *Gerardia sessiliflora* Vahl, Symb. Bot. 3: 79. 1794. *Alectra melampyroides* Benth., in DC., Prodr., 10: 339. 1846. nom. superfl. *Nigrina sessiliflora* (Vahl) Kuntze, Rev. Gen. Pl. 3: 237. 1898. *Melasma sessiliflorum* (Vahl) Hiern, Cat. Afr. Pl. Welw. 3: 767. 1898. *Alectra sessiliflora* (Vahl) Kuntze var. *sessiliflora*.—TYPE: SOUTH AFRICA. Cape of Good Hope. *Bülow s. n.* (holotype: C!)

Rhinanthus scaber Thunb., in Prod. Fl. Cap. 98. 1800. *Bartsia scabra* (Thunb.) Sprengel, in Syst. Veget. 2: 773. 1825.

Glossostylis capensis Benth. in Scroph. Ind. 50. 1835. nom. superfl.—TYPE: *Thunberg s. n.* (holotype: UPS-THUNB!)

Glossostylis avensis Benth., Scroph. Ind. 49. 1835. *Alectra indica* Benth. in DC., Prodr. 10: 339. 1846. nom. superfl. *Melasma indicum* Wettst. in Engl. & Prantl, Naturl. Pflanzenfam. iv. 3b: 91. 1891. nom. superfl. *Alectra dentata* Kuntze Rev. Gen. Pl. 2: 458. 1891. nom. superfl. *Alectra avensis* (Benth.) Merrill, Philipp. Journ. Sci., Bot. 12: 109. 1917. *Melasma avensis* (Benth.) Hand.-Mazz., Simb. Sin. Pt. 7. 843. 1936.—TYPE: [MYANMAR, Mandalay Division, Kyauksae District] Taong Dong mountain, Ava. *Wallich* cat. no. 3963 (holotype: K!)

Alectra senegalensis Benth., in DC., Prodr., 10: 339. 1846. *Alectra sessiliflora* var. *senegalensis* (Benth.) Hepper, Kew Bull. 14: 405. 1960.—TYPE: SENEGAL. *Lepreur '9 and 10'* (lectotype: K!; designated by Hepper)

Alectra cordata Benth., in DC., Prodr. 10: 339. 1846. *Glossostylis cordata* (Benth.) Hochst. Ex Richard, Tent. Fl. Abyss. 2: 116. 1851. *Melasma cordatum* (Benth.) Engler, Pflanzenw. Ost-Afr. C: 358. 1895.—TYPE: ETHIOPIA. *Schimper II, n. 1229* (holotype: B, destroyed; lectotype: K!, here designated; isoelectotypes: BM! BR! G! L! M! MO! NY! P!)

Alectra asperrima Benth. in DC., Prodr. 10: 340. 1846. *Glossostylis asperrima* Hochst. ex Benth. in DC., Prodr. 10: 340. 1846. *Melasma asperrimum* (Benth.) Engler, Pflanzenw. Ost-Afr. C: 358. 1895.—TYPE: ETHIOPIA. *Schimper II 1094* (holotype: K!; isotypes: A! BM! G! M! NY! P!)

Alectra arabica Deflers, Voyage au Yemen. 179. 1889.—TYPE: YEMEN. Gorges of Mount Omeibe, between Hob and Taiz. 5 August 1887, *Deflers 669* (holotype: P!)

Melasma indicum var. *monticola* Engl., Bot. Jahrb. 30: 402. 1902. *Alectra sessiliflora* var. *monticola* (Engl.) Melch., Notizbl. Bot. Gart. Berl. 15: 126. 1940.—TYPE: TANZANIA. *Iringa. Goetze 807* (lectotype: BR!, here designated)

Melasma barbatum Hiern, Fl. Cap. 4 (2): 374. 1904. *Alectra barbata* (Hiern) Melch., Notizbl. Bot. Gart. Berl. 15: 125. 1940. *Alectra sessiliflora* var. *sessiliflora* forma *barbata* (Hiern) Hilliard & Burt, Notes RBG Edinb. 43 (3): 375. 1986.—TYPE: SOUTH AFRICA. Mpumalanga. *Barborton. Galpin 929* (holotype: K!; isotype: PRE!)

Alectra trinervis Hemsl., Fl. Trop. Afr. 4 (2): 370. 1906.—TYPE: ANGOLA. Loanda. *Gossweiler 378* (holotype: K!, isotypes: BM! P!)

Alectra communis Hemsl., Fl. Trop. Afr. 4 (2): 372. 1906.—TYPE: LIBERIA. Kaka town. *Whyte s. n.* (lectotype: K!, designated by Melchior)

Alectra ledermannii Engl., Bot. Jahrb. 57: 612. 1922.—TYPE: CAMEROON. Adamaua. *Ledermann 5262* (holotype: destroyed at B; no isotypes or other specimens located for lecto- or neotypification)

Alectra moeroensis Engl., Bot. Jahrb. 57: 613. 1922.—TYPE: DEMOCRATIC REPUBLIC OF THE CONGO. Pweto. *Kassner 2827* (holotype: K!)

Alectra aberdarica Chiov., Racc. Bot. Miss. Consol. Kenya. 90. 1935.—TYPE: KENYA. Mt. Aberdare E, Tusu nei campi. 1 Oct 1910, *Balbo 46*. (holotype: FT!)

Alectra hundertii Melch., Notizbl. Bot. Gart. Berl. 15: 436. 1941.—
TYPE: ANGOLA. Highland of Benguella, between
Ganda and Caconda, Xongorola, 1700 m, stream edges.
20 March 1934, O. Hundt 889 (holotype: B, destroyed; lec-
totype: BR!, here designated; isolectotypes: BM!, G!)

Alectra schliebenii Melch., Notizbl. Bot. Gart. Berl. 15: 441.
1941.—TYPE: TANZANIA. Mahenge. Plateau ca 900 m.
14.4.1932, Schlieben 2089 (holotype: B!; isotypes: P! PRE!)

Alectra congolensis Troupin, Bull. Jard. Bot. Brux. 19: 277.
1949.—TYPE: DEMOCRATIC REPUBLIC OF THE
CONGO. Kasai District, Kapanga. November 1932,
Overlaet 40 (holotype: BR!; paratype: K!)

Alectra ibityensis Eb. Fisch., Bull. Mus. Natl. Hist. Nat., 18: 56.
1996.—TYPE: MADAGASCAR. Ibity mountains ca. 20
km S of Antsirabe, on quartzite rocks, 27.III.1993, Fischer
54 (holotype: P!)

Alectra senegalensis Benth. var. *palescens* Bonati, Bull. Soc. Bot.
Fr. 74: 96. 1927. nomen nudum.

Alectra senegalensis var. *minima* A. Chev., Expl. Bot. Afr. Occ.
Franç. 475. 1920. nomen nudum.

Alectra rupestris Bonati, Bull. Soc. Bot. Fr. 74: 96. 1927. nomen
nudum.

Alectra madagascariensis Bonati, in sched.

Alectra principis Bonati, in sched.

Alectra ramosa Bonati, in sched.

Alectra stricta Bonati, in sched.

Erect annual, (5–)10–58(–80) cm tall; stems straight, slender to stout, simple or branched, variously pubescent. Leaves opposite, alternate within inflorescence, (5–)6–32(–42) × (3–)4–13(–24) mm., appressed to spreading, orbicular to broadly ovate or narrowly to broadly lanceolate, subtire to crenate to coarsely toothed, apex acute to obtuse, base rounded or cordate to cuneate, hispid to subglabrous, sessile to shortly petiolate, petiole 0–4(–8) mm long. Flowers solitary in the axils of leaf-like bracts; pedicels 0.5–1.5(–2) mm long. Bracts longer or shorter than flowers, typically coarsely toothed, pubescent to subglabrous. Bracteoles linear 3–6.5(–9) mm long, pubescent to glabrous. Calyx 5–10 mm long, 10-nerved, glabrous to pubescent; lobes triangular, acute. Corolla from pale to dark yellow, sometimes with reddish-purple venation, campanulate, marcescent, longer than calyx, 7–14(–17) mm long; lobes rounded. Stamens unequal, longer filaments bearded or all filaments glabrous; anther thecae apiculate. Style and stigma clavate, recurved, (3–)4–6(–8) mm, included in the corolla. Ovary (2.1–) 2.5–3.1 mm in diameter. Capsule 3.9–5 mm in diameter, ovoid to pyriform.

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APPENDIX 1. Specimens of *Alectra sessiliflora* examined for this revision.

Angola. Baum 424, 738 (BR); Gossweiler 378, 1089, 1094 (BM); Nalde 444 (BM); Huila, *Welwitsch* 5801 (BM, G); Huila-Lopolo, *Welwitsch* 5802 (BM, G); Benguella, Ganda, Caconda, 1,700 m, Hochland, *Hundt* 889 (BM, BR, G); Gauda, Catumbela, damp ground, *Faulkner* 313 (PRE); Huambo Dist., Nova Lisboa, *de Silva* 3570 (PRE); Kunzumbia, 4,200 ft, *Pococh* 548 (BOL); Pungo Andongo, *Welwitsch* 5894 (BM); 3800 ft, *Pococh* 352b (BOL); Vila Flor, Cacoma, Chavaca, 15°28'E 12°35'S, 1,570 m, savanna, *Bamps & Martins* 4417 (BR); Gabu, Pitche, rio Caium, *Unknown* 3464 (MO); **Botswana.** Northern Dist., 19°9' S 23°7' E, *Smith* 303 (MO); **Burkina Faso.** Orodara, 10°58' N 4°56' W, *Lejoly* 82/354 (BR); **Burundi.** Kihardo, *Michel* 1595 (BR); Kihilya, Mosso Urundi, *Michel* 3091 (BR); Kiluinya Molto, *Michel* 3446 (BR); Mt. Manga, Mugongo, 2,400 m, prairie, *Lewalle* 582 (BR); Mwaro, Mt. Mugero, 2,150 m, prairie rocheuse, *Lewalle* 732 (BR); Mt. Teza, *Rammello* 3761 (BR); BUJUMBURA: 900 m, savanna, *Lewalle* 5439 (G, MO); Kabezi, 1,200 m, savanna, *Reekmans* 1798 (MO); Kabezi, *Reekmans* 6894 (EA); Rushubi, 1,600 m, 3°21'S 29°28'E, *Reekmans* 9129 (BR, M, MO, PRE); Kabezi, 1,200 m, *Reekmans* 1798 (BR); 3°10'S 29°20'E, 800 m, *Reekmans* 5134 (BR, MO, PRE); BURURI: Sikwyaye valley, 1,800 m, *Reekmans* 924 (BR); Syguyvaye valley, 1,800 m, *Reekmans* 10978 (MO); *Michel* 4483 (BR); KITEGA: Bweru, 1,550 m, *Van der Ben* 2033 (BR); Bweru, 1,600 m, *Van der Ben* 2571 (BR, PRE); Kitega, 1,600 m, swamp, *Lewalle* 1553 (BR); MURAMVYA: Bugarama, 2,100 m, *Lewalle* 945 (BR); Bugarama, 2,200 m, *Lewalle* 1854, 3039 (BR); Bugarama, 2,000 m, *Lewalle* 3680 (BR, MO); Kisozi, marais, *Reekmans* 2501 (BR); Kibezi, 2,500 m, *Reekmans* 4481 (BR, EA, MO, PRE); Mweza, Ryarusera, 3°21'S 29°35'E, 2,000 m, *Reekmans* 11210 (BR, MO); SE Parc National de la Ruvubu, 1,600 m, *Saintenoy* 26 (BR); Bugarama, 2,200 m, *Reekmans* 573 (BR); Ngozi: Mukora, Rwegura, 2°55'S 29°30'E, 2,050 m, *Reekmans* 6052 (BR, MO, PRE); Campazi, 2°59'S 29°32'E, 2,350 m, *Reekmans* 7838 (BR, MO); RUYIGI: Gigamba, 3°6'S 30°32'E, 1,600 m, *Reekmans* 5938 (BR, MO); 3°23'S 30°14'E, 1,500 m, *Reekmans* 7274 (BR, EA); Muhweza, Nyakazi, 3°12'S 30°35'E, 1,650 m, *Reekmans* 9073 (BR, MO); **Cameroon.** Adamaoua plateau, Wakwa, *Breteler* 463 (BR); Buea, *Migeod* 115 (BM); Crateros, *Gironcourt* 523 (P); Bamenda, *Migeod* 361 (BR); Dankali, Meiganga, *Letouzey* 6094 (P); Douala, Bamboutos Mts., *Meurillon* 210 (P); Ekumba, Liona, *Dusen s. n.* (G); Foumban, 5°44'N 10°58'E, 700 m, savanna, *Leeuwenberg* 8870 (BR); Hossere Ngo, Tibati, *Letouzey* 5670 (P); ICP (Institut de Cultures Perennes), Bridge crossing Moun River, 5°28'N 11°34'E, 1,100 m, cultivated area, *deWilde* 8540A (MO); Kelbot, WNW Bafia, *Letouzey* 9650 (BR); Mafura, Mundame, *Schlechter* 12922 (BM, BR); Meiganga, 900 m, border of forest, *deWilde et al.* 4047 (MO); Mundemba town, 5°58'N 8°55'E, 100 m, forest relicts, *Thomas & Mambo* 4231 (BR, MO, PRE); Nkolbisson, 3°53'N 11°26'E, 800 m, *Lejoly* 86/414 (BR); Nkongssamba, Manengouba Mts., 4°58'N 9°53'E, 1,200 m, grazed woodland, *Leeuwenberg* 8544 (BR); Nkongssamba, Manengouba Mts., *Leeuwenberg* 8585 (BR, PRE); Serere, Bafia, *Letouzey* 7804 (P); Yaoundé, Nkolbisson, *Lisowski B-3215* (BR); *Unknown* 210 (BR); **Central African Republic.** Bamingui-Bangoran, *Harris* 2059 (MO); Boukoko, *Equipe* 1940 (P); Boukoko, Mbaiki, *Testu* 1940 (BM); Haute-Kotto, Oubangui-Chari AEF, *Testu* 4191 (BR); **China.** *Cavalerie* 657 (P); KOUY-TCHOU: *Bodinier* 2729 (P); *Cavalerie* 657 (P); *Esquiro* 2503 (P); KWANGSI: Tong Shan (Kwangtung border), *Tsang* 22705 (A); Shap Man Tai Shan, meadow, *Tsang* 24461 (A, MO); KWANGTUNG: Lin Fa Shan, *Tsang* 25679 (A); Loh Fau Shan, 800 m, *Levine* 1307 (A); YUNNAN: Mao Kou, *Delavay* 622 (P); *Delavay* 2513 (P); *Ducloux* 494 (P); *Ducloux* 3007 (A, P); Mar-li-po, 1,800 m, open scrub, *Feng* 12667 (A); *Maire* 610 (A, BM); Shang-pa Hsien, 2,300 m, Open slope, *Tsai* 54956 (A); *Tsai* 56617 (A); Meng-nun, 900 m, woods border, *Wang* 79999 (A); Meng-pung, 800 m, Waste field, *Wang* 80429 (A); Kuan-yeang, 1,180 m, mixed forest, *Wang* 81162 (A); Yu 17762 (A); Tihitung, 1,500 m, margin of thickets, *Yu* 20421 (A); Yuragan, 1,700 m, grassy place, *Yu* 23071 (A); **Côte d'Ivoire.** Bouna, P. N. Comoe Sud, 8°45'N 3°35'W, *Poilecot* 3626 (G); Bouna, P.N. Comoe Sud, *Poilecot* 3711 (G); Bouna, P. N. Comoe Sud, *Poilecot* 3770 (G); Mt. Miangbo, 5°12'W 8°48'N, wet hill slope, *Geertling & Bokdam* 1036 (BR, MO); **Democratic Republic of the Congo.** *Achten s. n.*, 675B (BR); *Bequart* 433, 3077 (BR); *Claessens* 1166, 1350 (BR); *deGraer* 748 (BR); *Donis* 4700 (BR); *Dubois* 1351 (BR); *Germain* 1303 (BR); *Ghesquiere* 6017 (BR); *Nioka* 92 (BR); *Pauwels* 7039 (BR); *Salesiens* 1141 (BR); *Steyaerl* 15 (BR); *Unknown* 15 (BR); *Unknown s. n.* (BR); *van Oye* 13 (BR); *Vanderyst* 22858, 22863 (BR); Ango-Bango, 700 m, *Germain* 4373 (BR); Arboretum Etoile, *Schmitz* 2767

(BR); Bambesa, jachere, *Gerard* 2449 (BR); Bas-Congo, *Flamigni* 70743 (BR); Bas-Uele, *Deroill* 390 (BR); Bishaba, *Meurillon* 897 (BR); Boyawaza (Karawa), *Evrard* 1894 (BR); Buhara, 2,300 m, *Fiche* 400 (BR); Bukombo, Masisi, 1,300 m, savanna, *Gutzwiller* 3518 (BR); Butembo, ETSAV, 1,800 m, *Baudet* 504 (BR); Bwona, *Gutzwiller* 819 (BR); Dembo, *Quarre* 224 (A, BR); Dorunya (Nawbosa), *deGraer* 748 (BR); Dwana Mutombo, forêt sèche, *Callens* 2959 (BR); Elote du Congo, 1,200 m, *Robyns* 1774 (BR); Eshumba, 2,200 m, *Fiche* 174 (BR); Etoile (Minidu), Katanga, 1,250 m, *Malaisse* 7700 (BR); Faraoye, Kibali, 1,800 m, *Lebrun* 3542 (A, BR); Fungurume, 1,800 m, *Malaisse* 10333 (BR); Fungurume, 1,200 m, *Malaisse & Gregoire* 12 (BR); Gandajika, Kasai, 800 m, *Risopoulos* 195 (BR); Hbwari, *vanMeel* 1716 (BR); Kabare-Kivu, *Unknown* 5 (BR); Kadjudju, *Babault* 302 (P); Kafubu, *Detilleux* 696 (BR); Kahooyu, *Lebrun* 8556 (BR); Kasai, *Achten s. n.* (BR); Kaseke, Mutongo, 1,070 m, *Gutzwiller* 2714 (BR); Katala, Nyabiondo, 1,300 m, *Gutzwiller* 3309 (BR); Kiandu, *Vanderyst* 31471 (BR); Kibali-Truri, Trurme, *Lebrun* 4203 (BR); Kikomero, 1,850 m, *Lebrun* 8471 (BR); Kindu, Koutakokambe, *Lebrun* 6018 (BR); Kingi, Nyofunze, 2,000 m, *Lebrun* 7829 (BR); l'Etoile, Lushasha, *Babault* 37 (P); Kishinorike, Kubuku, *Bequaert* 6767 (BR); Tompa, Haut-Mazungu, 2,000 m, *Dubois* 1351 (BR); Viadana, *Gerard* 336 (BR); Tukpwo, savanna, *Gerard* 2665 (BR); Kurukwata, *Gerard* 3706 (BR); Tukpwo, *Gerard* 4705 (BR); Tshibinda, *Hendrickx* 156 B (BR); Luemba, *Hendrickx* 3432 (BR); Luishia, *Malaisse* 9773 (BR); *Kisimba* K 71 (BR); Lekwa-Djugu, *Deville* 343 (BR); Likimi, *DeGiorgi* 1499 (BR); Lilene, Gemena, *Lebrun* 1845 (BR); Lubere, Beni, 2,200 m, *Louis* 5514 (BR); Malamfu Pez Kipako, *Vanderyst* 31393 (BR); Manyema, Mutongo, 1,300 m, *Gutzwiller* 2958 (BR); Manzonga, *Gerard* 4335 (BR); Marungu, Ferme Van Hyfte, 1,740 m, *Quarre* 7384 (BR); Melamfu Pez, Kipako, *Vanderyst* 31422 (BR); Mgoaya, 1,700 m, *Robyns* 1733 (BR); Mine de Likali, 1,400 m, *Robyns* 1703 (BR); Moshi, Kamogonogo, *Laurent* 506 (BR); Mulungu, *Hendrickx* 121 (BR); Mt. Muhi, 3,000 m, growing near/on bamboos, *Hendrickx* 5391 (BR); Mulamba Terr., Kabare, *Leonard* 3634 (BR); Mumo Terr., Masisi, *Leonard* 2681 (BR); Mumungu, *Sapin s. n.* (BR); Muoggo Terr., Kabare, *Leonard* 4094 (BR, PRE); Mwananamba, Kilabelobe Valley, 1,100 m, *Malaisse* 10653 (BR); Mwene, Kanda, *Dandoy* 73 (BR); Mwibu, Kolwesi, *Pauwels* 7034 (MO); Tshikamba, Lutombe-Mukuku, *Quarre* 2501 (BR); Ngonza Bata, *Vanderyst* 1913 (BR); Kihondo, Bwito, *Van Ysacker* 192 (BR); Nyakoziba, *Laurent* 460 (BR); Nyamuragira Crater, 3,000 m, *Leonard* 346 (BR); Nyamuragira Volcan, 2600 m, *Louis* 5028 (BR); Nyange, Bukombo, 1,300 m, *Gutzwiller* 3623 (BR); Nzuru, *Louis* 4919 (BR); Nzuzu, 1,470 m, *Lebrun* 6992 (BR); Rusingo, Buyogswa, *Michel* 4106 (BR); Rutshuru, *Ghesquiere* 4349 (A, BR, MO); Shaba, Luiswishi, 11°29'42"S 27°25'55"E, 1,350 m, TROPOMETEX 13 (BR); Tungurumi, Versant, W. Dembo, *Symoens* 8389 (BR); *Unknown* 162 (BR); *Unknown* 6342 (BR); KAHASHA: Mulungu, *Hendrickx* 3454 (BR); Tshibinda, *Hendrickx* 3767 (BR); Tshiragaga, *Hendrickx* 5150 (BR); KAHUNDU: Kahanja, *Zappelli* 286 (BR); KAMBOVE: Jadotville, *Schmitz* 7232 (BR); 1,400 m, *Robyns* 1713 (BR); KAPANGA: *Overlaet* 931, 936 (BR); savana boisee, *Overlaet* 1047, 1183 (BR); prairie, *Overlaet* 40, 494 (BR); KATANA: 2,000 m, *Houdt* 251, 254, 303 (BR); KATANGA: Manika Plateau, 1,485 m, *Lisowski et al.* 13279 (BR); Kwatebala, *Malaisse* 10918 (BR); KINSHASA: *Gillet s. n.*, 2694 (BR); KIPOPO: Lubumbashi, *Breyne* 4007 (BR); Kipushi, *Breyne* 4809 (BR); 1,230 m, *Symoens* 12334 (BR); Kivu: Kabare, 2,400 m, *Eryn* 89 (BR); Kalehe, 2,400 m, *Ntakyimana* 66 (BR, MO); Virunga-Kette, 2,957 m, *Stauffer* 250 (BR, PRE); Virunga volcano, 2,700 m, *Stauffer* 171 (M); Kabare Territory, 1,700 m, *Christiansen* 2330 (BR); Walikale, *Lebrun* 5348 (BR); Kabare Terr., 1,500 m, *Meurillon* 802 (BR); Kalehe Terr., 2,850 m, *Ntakyimana* 55 (BR); Nyamgaleka, *Osmaston* 2095 (BM); Kalehe Terr., 2,220 m, *Petit* 107 (BR); Kalehe Terr., 2,170 m, *Petit* 158 (BR); Lulenga -Kivu, *Houdt* 115 (BR); LUBUMBASHI: *Ndjele* 1146 (BR); *Pauwels* 5315 (BR); *Schmitz* 5113, 7225 (BR); Katanga, 1,000 m, *Humbert* 15947 (BR); Keyberg, *Schmitz* 2339, 3394 (BR); Lubumbashi valley, *Schmitz* 7424 (BR); Keyberg, Kimilolo Valley, *Detilleux* 385 (BR); LUPOTO: *Schmitz* 5447 (BR); MAGIDI: *Vanderyst* 1906 (BR); MAHAGI: Kibali, 2,400 m, *Lebrun* 3878 (BR); Mt. Adjigu, 1,800 m, *Taton* 465 (BR); NIOKA: *Claessens* 113 (BR); Korda, 1,700 m, *Froment* 240 (BR); PARC NATIONAL DE L'UPEMBA: Buye-Bala, *deWitte* 3579 (BR); Pungapunga, *deWitte* 3354 (BR); *deWitte* 5991, 11646 (BR); 1,120 m, *deWitte* 6697 (BR, PRE); RUWENZORI: Kalonge, 2,200 m, *Hauman* 211 (BR); Bulagu, 2,000 m, *Lebrun* 4586 (BR); Lume, 2,000 m, *Maichol* 31 (BR); UELE: Gangala na Bodio, *d'Elzius et al.* 407 (BR); Bambesa, *Pittery* 768 (BR); VIRUNGA NATIONAL PARK: Mobenga, 1,200 m, *Bequaert* 3500 (BR); Ruwenzori, 1,700 m, *Bequaert* 3543 (BR); Ruwenzori, *deWilde* 410 (BR); 2,400 m, *deWitte* 2223 (BR); 2,350 m, *deWitte* 2297 (BR); Kabonge, *deWitte* 7963 (BR); 2,750 m, *deWitte* 9978 (BR); 2,500 m, *deWitte* 9999 (BR); 2,600 m, *deWitte* 10060 (BR); 2,150 m, *deWitte* 12174 (BR); 2,200 m, *deWitte* 12224 (BR); *deWitte* 13154 (BR); Volcan Miamlagyra, 2,600 m, *Germain* 1303 (BR); **Equatorial Guinea.** Musola, Conception, 2,000 ft, lava flow, *Melville* 452 (BM, MO, PRE); ANNONON ISLAND: Pico de Fogo, *Melville* 189 (BM); Bioco: Luba, Riaba, 750 m, *Carvalho* 2584 (BM, BR, G, MO); Basile, 2,050 m, *Carvalho* 2687 (BR, G,

MO); Moca, 1,150 m, *Carvalho* 4565 (BR, G, MO); *Hepper* s. n. (BR); **Ethiopia**. Agheremariam, *Gillett* 14674 (BM, BR, EA); Addis Ababa, Bole Canyon, 5,640 ft, Riparian forest, *Ash* 2760 (MO); Ambo, Gheddo, 1,900 m, *deWilde* 8763 (BR, EA, MO); Godjam Prov., Bahar Dar, 11° 33'N 37°21'E, 1,850 m, cultivated fields, *deWilde* 5793 (BR, MO, PRE); Illubabor Prov., Yayio, 8°20'N 35°55'E, 1,500 m, *Friis et al.* 2015 (BR); JIMMA: *deWilde* 5411, 7571 (BR); 1,800 m, *deWilde* 9261 (BR); Maji area, 6°08'N 35°34'E, *deWilde* 6222 (BR, M, MO); 7°25'N 36°55'E, *Friis et al.* 1634 (BR); KEFA: Aman, 6°55'N 35°14'E, 1,300 m, *Friis et al.* 7081 (BR); SIDAMO: Soddo, 6°49'N 37°32'E, grassy, *deWilde* 5591 (BR, MO); **Ghana**. Kumasi, *Adams* 4449 (BR); Kpandai Leprosarium, *Hall & Duodu* 42209 (MO); Brong-Ahafo, Techiman, 7°40'33"N 1°51'32"W, 360 m, cultivated fields, *Schmidt et al.* 1965 (MO); Volta, Agumatsa Wildlife Sanctuary, 7°6'38"N 0°35'58"E, 220 m, *Schmidt et al.* 2169 (MO); **Guinea**. Nzérékoré, Hzo Village, *Adan* 26534 (PRE); **India**. Bengal, *Biswas* s. n. (A); Khasia, *Unknown* s. n. (A); Calcutta, Khasia Hills, *Unknown* s. n. (M); Chotah Nagpur, Parasnath Mt., Hazaribagh Dist., *Kerr* 2350 (BM); Darjeeling, *Clarke* 12572 (BM); Darjeeling, *Clarke* 9156 (BM); Deberay, *Biswas* 5640 (A); East Bengal, *Griffith* 3878/1 (M); Khalyné, *Griffith* 234 (G); Khasia, *JDH & Jj* s. n. (BM, G, M); Khasia Hills, *Native Coll.* s. n. (L); Ranjgur Gat, Lohardugga, *Clarke* 33884 (BM); Singhbhoom, *Clarke* 34124 (G); ASSAM: Wokha Hill, *Bor* 6187 (A); *Jenkins* s. n. (L); Mangaldan, 200 ft, *Schlagintweit* 13487 (A); СИККИМ: Toogloo, 7,000 ft, *Anderson* 1005 (A, M); *Beddome* 5730 (BM); *Clarke* 36036 (G); *Gammie* s. n. (L); *He* s. n. (G); *JDH* s. n. (BM); **Indonesia**. Java, Soerakarta, Bloembang, 1,300 m, *Brinkman* 791 (L); Lombok, Kleine Soenda Eiland, 2,000 m, *Voogd* 2600 (A, L); **Kenya**. *Beckford* 5 (EA); *Fries* 307a (BR); *Rogers* 251 (BM); *Starzenski* 159 (BR); Central Prov., Fort Hall Dist., *Kerfoot* 484 (EA); GRS Kitale, *Knight* AB4733B (EA); Hoey's bridge, *McDonald* 2016 (EA, MO); Lessos, Nandi Hills, K3, *Gilbert & Tadesse* 6743 (EA); Kericho Dist., *Kerfoot* 2955 (EA); Kikuyu Reserve, *Watt* 1170 (EA); Kilifi Dist., Vitengeni River, K7, *Luke* 1332 (EA); Kitale, K3, *Greenway* 955 (EA); Koru, *Hopwood* 25 (BM); Machakos Dist., Chyulu Mts., K4, *Friis & Hansen* 2704 (EA); Meita Mts., NE slope Yale Mt., 3°24'S 38°19'E, 2,050 m, *Gillett* 17254 (BR); Nakuru, *Gillett* 19316 (EA); Nanyuki Dist., Nanyuki, *Gilbert* 4897 (EA); Northwest, Kedowa Railway Station, *Rogers* 516 (BR); S Kinangop, *Unknown* s. n. (MO); SW Mau Forest, *Kerfoot* 2932 (EA); Upper Kyambu, *McDonald* 941 (MO); Vuria Summit, Teita hills, 2,000 m, *Lavranos* 11914 (MO, PRE); KAKAMEGA: 0°14'N 34°50'E, *Gilbert & Tadesse* 6663 (EA); *Paulo* 527 (EA); *Bally* 13686 (EA); KWALE: Shimba Hills, 400 m, grassland, *Drummond* 3940 (BR); Mwela Mdogo Forest, Shimba Hills, *Drummond & Hemsley* 3970 (EA); *Robertson* 6213 (EA); NAIVASHA: S. Kinangop, 7,550 ft, *Verdcourt et al.* 3029 (BR, PRE); TAITA: Yale Rock, *Beentje et al.* 935 (EA); *Drummond & Hemsley* 4346 (EA); 1,400 m, *Drummond & Hemsley* 4385 (BR); **Laos**. *Poilane* 16185 (P); Lao-Koy Prov., Conkin, *Chevalier* 29463 (P); Phong Zhau, Bok Kao, *Poilane* 15999 (P); Vientiane, Phou Khao Khouay, 800 m, *Vidal* 5582 (P); Xieng, Khouang, *Mieville* s. n. (P); **Lesotho**. Mokhotlong, *Jacot-Guillarmod* 1090 (GRA); *Mateka*'s, Berea, *Jacot-Guillarmod* 1262 (GRA); Pulane, Berea, *Jacot-Guillarmod* 1286 (GRA); Masoeling, *Jacot-Guillarmod* 2447 (PRE); Molimo Nthuse, Blue Mtn. Pass, *Schmitz* 8171 (PRE); LERIBE: *Dieterlen* 684 (NH, PRE); *Dieterlen* 4602 (BM); **Liberia**. Mt. Nimba, 600 m, roadside, *Bos* 2429 (BR); *YEKPA*: *Adan* 24830 (PRE); Crete mine, 1,000 m, *Adam* 29867 (MO); **Madagascar**. *Alleizete* s. n. (L); Tananarive, *Alleizette* s. n. (L); *Baron* 1895 (P); Fort Carnot, Tamala Reg., *Beaujard* 199 (P); Tamatave Prov, Andasibe (Peronet), 930 m, *D'Arcy* 15297 (MO); *de la Bathie* s. n., 8451, 12428 (P); Ankaratra, Manjakatomp, *Benoist* 1674 (P); Augalupena, *Elliot* 2114 (BM); Fort Dauphin, *Elliot* 2407 (BM); Ambohimitombo forest, Tanala, 1,350 m, *Forsyth Major* 361 (G); Emerinae, *Hisenburgh & Bojer* s. n. (BM); Antananarivo Province, Ankazobe Dist., Manankazo, in damp grassland flanking Manankazo River, 18°09.43S 47°12.61E, 1,460 m, *Morawetz et al.* 222 (OS, TAN); Fianarantsoa Province, Ambalavao Dist., Vohitsaoka, Parc National d'Andringitra, plateau E of Andriampotsy camp, 22°10.41S 46°55.17E, 2,000 m, *Morawetz et al.* 245 (OS, TAN); Fianarantsoa Province, Ambositra Dist., 35 km S Ambositra on road to Fianarantsoa, damp grassland, 20°46.50S 47°1.91E, 1,700 m, *Morawetz et al.* 249 (OS, TAN); Lac Alaotra, *Peltier* 16 (P); Fianarantsoa Prov., Eastern Domain, 21°16'S 47°25'E, 1,000 m, roadside, *Schatz et al.* 1714 (MO); Ombohiurimbo forest, *Unknown* 361 (G); *Unknown* s. n. (L); *Unknown* s. n. (P); Andovoranto, Anivorano Dist., *Viguié* 504 (P); **Malawi**. *Buchanan* 155 (BM, PRE); *Buchanan* 520 (BM); Lunyangwa, 1,320 m, in grass, *LaCroix* 3800 (MO); Mlanje Mtn., *Chapman* 457 (BM); BLANTYRE: *Coft* s. n. (BR); Eucalyptus plantation, *Nachamba & Usi* 321 (MO); grassland, *Patel & Balaka* 2343 (NBG); plantation, *Salubeni & Tawakali* 4567 (MO); *Tawakali & Kaunda* 1538 (MO); CENTRAL PROVINCE: Dedza Dist., 5,500 ft, damp drainage from Brachystegia woodland, *Pawek* 11553 (MO); Dedza Dist., 2,050 m, Grassland seepage in rocks, *Pawek* 14261B (MO); MPONDA: Mponda stream, *Tawakali* 25 (BR); *Balaka* 25 (PRE); MULANJE: Chisambo Estate, Cassava field, *Banda et al.* 3546 (MO); Likulezi Valley, 1,050 m, *Chapman* 7507 (PRE); Mt. Mulanje, 2,000 m, path-side, *Chapman* 9065 (MO); Brachystegia/Julbernardia woodland, *Banda & Kaunda* 2667 (MO); Mulanje Massif, 1,850 m, open grassland, *Link* 16/9 (MJG); NORTHERN PROVINCE: Mzimba Dist., 5,000 ft, Brachystegia woodland, *Pawek* 11444 (MO); Mzimba Dist., 4,500 ft, Sandy soil, *Pawek* 6521 (MO, PRE); Mzimba Dist., 4,800 ft, *Pawek* 8503 (MO); Rumpfi Dist., 6,600 ft, Roadside grassland, *Pawek* 9639 (MO); Nyika Plateau, 7,500 ft, Damp ground, *Phillips* 1644 (MO); Chitipa Dist, 5,200 ft, grassland, *Phillips* 2690 (MO); Chitipa Dist., 5,000 ft, grassland, *Phillips* 2712 (MO); Nyika Plateau, grassland, *Phillips* 312 (MO); Nyika Plateau, 7,800 ft, damp grassland, *Phillips* 1517 (MO); SOUTHERN PROVINCE: Bvumbwe, 1,150 m, *La Croix* 2927 (PRE); Chiradzulu Dist., 1,380 m, Grassy areas, *LaCroix* 3056 (MO); Bvumbwe, 1,150 m, grassy areas, *LaCroix* 2927 (MO); ZOMBA: grassy area, *Masiye* 72 (BR, MO); grassland, *Tawakali & Balaka* 1510 (MO, PRE); Malosa Mt. Forest, Brachystegia woodland, *Balaka & Tawakali* 2138 (MO); *Masiye & Tawakali* 80 (BOL, BR, MO); Namitembo, maize garden, *Salubeni & Kaunda* 5416 (MO); riverbank, *Banda* 1791 (MO); Chirunga Forest, maize field, *Chikuni & Patel* 181 (MO, PRE); *Chapman* 5578 (BR); *Whyte* s. n. (G); **Mali**. *Chevalier* 3297 (BR); **Mauritius**. Le Pouce Mt., Mtn Forest, *Schlieben* 757 (PRE); Mondrain Nature Reserve, Vacoas Ridges, 20°19'S 57°27'E, 400 m, grassy area, *Lorence* 7584 (MO); **Mozambique**. *Gomes & Sousa* 4096 (PRE); Inhaca Island, Central, cultivated plot, *Mogg* 29873 (J); Lagoa Poelela, Inharrime, *Eccles* 27 (BM); Lugela-Mocuba Dist., Mtn Forest, *Faulkner* s. n. (BR); Maputo, Maputo Elephant Park, grassland, *Govender* 99 (NH); Nhacoongo, *Cedro* 264 (PRE); Porta Barra Falsa, marsh, *Mogg* 28944 (J); Tete, Macanga (Furancungo), 1,420 m, *Pereira et al.* 1729 (BR); **Myanmar**. Rangoon, *Dickson* 1039 (A); Shinday, *Mokim* 1175 (G, RSA-POM); **Namibia**. Caprivi (East), *Leistner* 3241 (PRE); Popa-Falle, *Merxmüller* 2016 (PRE); Rubango, Kalolo, Ravanga, 1,100 m, *Baum* 424 (BM, G, M); Rampulube, Ruito, 1,200 m, *Baum* 738 (BM, G, M); Runtu Dist., Grootfontein North, sand, *Volk* 1995b (M); Singalamwe, dry marsh, *Killick et al.* 3241 (M); *Strey* 534 (M); **Nepal**. 4,500 ft, *Kaintan* 8405 (BM); Arun Valley, Maghang Kola, E of Num, *Stainton* 1724 (BM); Dhaulahat, *Polunin et al.* 5626 (BM); Gurjang, *Dhwoj* 522 (BM); Maikol, *Sykes & Willimas* 4726 (BM); **Nigeria**. East Central State, Nsukka Dist., *Daramola* 04837 (MO); Forest Hill Arboretum, Ibadan Dist., *Onochie* 7498 (BM); Oban, *Talbot* 317 (BM); Onitsha, Awka, *Foues* 6730 (BM); Oyo State, Iwo Dist., savanna, *Olorunfemi et al.* OBB252 (MO); **Philippines**. LUZON: Baguio, Benguet, *Elmer* 8491 (G, L, MO); Baguio, Benguet Prov., *Merrill* 11653 (G, L); Benguet, *Ramos* BS 5324 (L); Baguio, Mt. Province, *Steiner* PNH 39609 (L); *Whitehead* s. n. (BM); Mt. Province, *Beyer* 5849 (A); **Rwanda**. *Van der Veken* 9544 (BR); Masamuna, Masi-Manimba, *Breyne* 4354 (BR); Buxinbilibiri, Ruhinga, *Neel* 15 (BR); Gahororo, Kibungo Prefecture, *Bouxin & Radoux* 2217 (BR); Kabgayi, Gitarama Prefecture, 1,800 m, *Bouxin & Radoux* 1587 (BR); Karehe, Bumba, *Bequet* 642 (BR); Moryaga, *Liben* 1577 (BR); Parc des Volcans, *D'Arcy* 8800 (MO); Kibuye Prefecture, *Gisovu*, 2,350 m, *Etienne* (BR); Vulkane, Steinbruch Nahe Talstation, *Frankenhauser* 205/88 (MJG); Ruurere, 2,200 m, *Michel* 6055 (BR); Mata, Rwamiko, *Troupin* 15147 (BR); BUTARE: *Reynders* 349 (BR); Astrida, *Hendrickx* 7546 (BR); Astrida, *Reynders* 290 (BR); 1750 m, *Bouxin* 1410 (BR); Kanzi, *Bouxin & Radoux* 1833 (BR); Mamaba, 1,700 m, *Runyinya* 994 (BR); RUHENGARI: 2,300 m, *Van der Veken* 10271 (BR); Kiningi, 2,300 m, *Fischer* RWA 91 (MJG); Sortie vers l'Uganda, 1,870 m, terrain vague, *Auquier* 4539 (L, MO); SHANGUGU/ UWINKA: Nyungwe Forest, *Bouxin* 458 (BR); Kagano, Nyungwe Forest, *Bouxin* 735 (BR); Mayebe, Nyungwe Forest, 2,380 m, *Bouxin* 879 (BR, MO); Mt. Bigugu, 2,950 m, *Christiansen* 1650 (BR); *Troupin* 9777, 10400, 11094, 11131, 11553, 11914 (BR); *Troupin* 9908, 11293 (BR, EA); 2,450 m, *Troupin* 12251 (BR); 2,380 m, *Troupin* 12375 (BR); RUBONA: *Michel* 5237, 5395, 6035 (BR); INEAC, 1,700 m, *Michel* 4908 (BR); 1,700 m, *Michel* 6413 (BR); **São Tomé & Príncipe**. PRINCIPE: Esperanca, 350 ft., plantation, *Exell* 662 (BR, BM); **Senegal**. *Hewelot* s. n. (P); Zigunichor, Tabor Village, *Jacques-Georges* 18386 (MO, PRE); *Mowan* s. n. (L); *Perrotet* 569, 573 (G); *Silbermann* s. n. (P); BASSE-CASAMANCE: *Van den Berghen* 2423 (BR); Bofa Bayst, *Vanden Berghen* 1350 (BR); Pointe Saint-Georges, *Van den Berghen* 1762 (BR); Senegal, Niokolo-Koba, Gambie Bassin, *Berhaut* 1609 (P); **Sierra Leone**. *Elliot* 4150 (BM); Luseniya, Samu, *Elliot* 4217 (BM); **South Africa**. *Allsorr* 57, 1027 (NU); *Boissier* s. n. (G); *Drège* s. n. (G); *Drège* s. n. (G); Cap de Bonne-Esperance, *Ecklon & Zeyher* s. n. (G); *Ecklon & Zeyher* s. n. (B); *Unknown* s. n. (A); *Wood* 142 (BOL); Pinetown Dist., kloof, *Acutt* 57 (NU); Wonderboompoort, 2528 CD, *Bremenkamp* s. n. (PRU); Hogge veld, *Rehmann* 6617 (BM); *Stainbank* s. n. (NH); *Borle* 438 (PRE); *Burchell* 4546 (A); *Harvey* 212 (BM); Alfred Dist., *Hilliard* 1301 (NU); Richmond Dist., *Hilliard* 8104 (NU); Bergville Dist., *Hilliard* 8143 (NU); *Jepon* 1219 (BM); *Krauss* 1839 (G); Paaskloof, *Malau* 387 (PRU); marsh, *Moss* 7465 (J); *Rudatis* 2085 (NBG); Cathedral Pk., *Schutze* 217 (NU); Stutterheim, *Sim* 20355 (NU); *Wood* 142 (BM); *Erasmus* 183 (PRU); Klip River, *Hancock* s. n. (J); Breedsnek, *Erasmus* 308 (PRU); Willowmore, 3323, *Acoks* 20327 (NBG);

Wupperthal, 3,219, in water, *Hanekom* 1531 (NBG); Vanrhynsdorp, 3118DA, 1,500 ft, moist seepages, *Negin* 3914 (NBG); EASTERN CAPE: Nsikeni, 4 km NW, 3029 AB, 1,400 m, *Abbott* 5730 (PRU); Ntsikeni Nat. Res., 3029 AB, 1,830 m, Grassland, *Abbott* 7602 (PRU); Mzamba, 3031 AA, grassland, *Arkel* 60 (NH); Matatiele, Rhodes, 1,970 m, stream bed, *Batten* AB1119 (NBG); Maclear, 3128 AB, 1,340 m, grassland, *Bester* 115 (PRU); Maclear, 3128 AA, 1,280 m, grassland, *Bester* 2254 (PRU); Maclear, 3128 AA, 1,320 m, grassland, floodplain, *Bester* 239 (PRE, PRU); Maclear, 3128 AA, grassland, *Bester* 2409 (PRU); Maclear, 3028 CC, 1,890 m, grassland, *Bester* 2420 (PRU); Maclear, 3128 AA, 1,410 m, grassland, *Bester* 2432 (NH, PRU); Maclear, 3128 AA, 1,400 m, afro montane forest, *Bester* 2562 (NH, PRU); Grahamstown, *Bodi* 66 (GRA); East London, Gonubie, 350 ft, *Bokelmann* 4 (NBG); Maclear Dist., Maclear, 4,400 ped, *Bolus* s. n. (BOL); Lusikisiki, 3,129 BC, grassland, *Cloete* 806 (NH); Port St. John, 3129 DA, Grassland, *Cloete et al.* 3279 (NH); Fern Kloof, *Darbyshire* 4969 (GRA); Grahamstown, *Dold* 1009 (GRA); Beechamwood, *Dold & Cocks* 1651 (GRA); Kongha, 2000, Marshy places near Kongha, *Flanagan* 696 (BR, GRA, L); Humansdorp, *Fourcade* s. n. (BOL); Tzitzikama, 750 ft, *Fourcade* 1152 (BOL); Humansdorp, *Galpin* 9368 (PRE); Katberg, *Galpin* 2083 (PRE); Grahamstown, 3326BD, *Glass* 455 (NBG); Elliotdale Dist., The Haven, savanna sandy, *Gordon-Gray* 751 (NU); Albany Dist., *Guillarmod* 4008 (GRA, PRE); Grahamstown, *Harvey* s. n. (A); Albany Dist., *Heeg* 75 (GRA); East London Dist., 3327 BB, grassland, *Hilliard & Burt* 11132 (NU); Umtata, 3128 BC, 5,000 ft., soggy ground, *Hilliard & Burt* 16335 (NU); Grahamstown, 3326 AD, *Jacot-Guillarmod* 9398 (GRA); Mountain Drive, *Jenkinson* 1172 (GRA); Humansdorp, *Liebenberg* 7841 (BR, M); Grahamstown, Feathstone Kloof, *Martini* 2867 (GRA); Ciskei, *Meadows* 31 (GRA); Grahamstown, Featherstone Kloof, 33°19.92'S 26°29.97'E, *Morawetz et al.* 109, 110 (OS); Port St. John, grassland, *Moss* 3604 (J); Tor Dun, *Noel* 1521 (GRA); Schoenmakerskop, *Olivier* 2489 (GRA); Cala, *Pegler* 1678 (PRE); Kentani Dist., *Pegler* 703 (BM, BOL); Alexandra Cty, Friedenau, *Rudatis* 71 (NBG); East London, Westbank, *Strong* 54 (GRA); East London, grassy places, *Thode* 8204 (NBG); Mzimkhulu Dist., 3029 AB, wetland, *Sikhakhane* 179 (NH); King William's Town, *Sim* 20094b (PRE); Stutterheim, *Sim* 20355 (PRE); King Williams Town, *Sim* 20306 (NU); East London, 20 m, slopes, *Steiner* 2453 (MO, NBG); East London, 3227BB, 30 m, grassland, *Steiner* 3261 (NBG); Naudes Nek, *Strever* 753 (PRE); Mazeppa Bay, *Theron* 1217 (PRE); Humansdorp, *Thode* A974 (PRE); Keutau, Transkei, 1,200 ft, Veld, *Unknown* s. n. (L); Port St. Johns, *Wager* s. n. (PRE); Grahamstown, *Wirminghaus* 215 (GRA); Queenstown, *Young/Moss* 14981 (J); Kalberg, *Young/Moss* 15282 (J); FREE STATE: Memel Dist., 2729 CB, 1,850 m, grassland, *Eckhardt* 305 (PRU); Ficksburg, *Fawkes* 149 (NBG); Vitkomst Farm, 2627 DC, 1,430 m, grassland, *Kroon* 15196 (PRE); Bloemfontein, 2926AA, *Mueller* 193 (NBG); Wintervally, *Muller* 250 (PRE); Paulina, *Thode* 4569 (NBG); Harrismith, 2828 DB, grassveld, *Zietsman* 3038 (PRE); Leefontein, *Barker* 3961 (NBG); Harrismith, 2829AD, 1,700 m, grassveld, *Jacobsz* 1596 (NBG, PRE); GAUTENG: Johannesburg, *Bredenkamp* 535 (PRE); Johannesburg, 2628 CA, 5,300 ft, grassland, *Bredenkamp* 429 (PRU); Magaliesberg, 2527 DB, *Bredenkamp* s. n. (PRU); Bairaansklouf, 2528 CB, *Bredenkamp* s. n. (PRU); Witwatersrand, *Cunliff* 5 (PRE); Donkerhoek, *Jonker* 19 (PRE); Rikatla, *Junod* 178 (PRE); Sandton Dist., 26d 28d AA, 1,650 m, moist veld, *Maguire* s. n. (J); Krugersdorp, *Mogg* 34024 (J, PRE); Johannesburg, 1,550 m, Koppies, *Moss* 11018 (J); Riesfontein, *Rehm* s. n. (M); Johannesburg, 1,500 m, wet places, *van Rensburg* s. n. (J); Johannesburg, 1,500 m, wet places, *van Rensburg* s. n. (J); Pretoria, *Young* 2439 (J); Greytown Dist, New Hanover, *Wylie* s. n. (NU); KwaZULU-NATAL: Transkei, 3029 AB, *Abbott* 5730 (PRE); Port Edward, Clearwater Estates, 3130 AA, 230 m, *Abbott* 3469 (NH, PRU); Bergville Dist., Mount-aux-sources, streambank, *Physick* 31 (NU); Port Edward, Clearwater Estates, 3130 AA, 230 m, *Abbott* 3470 (NH, PRU); Port Edward, Clearwater Estates, 3130 AA, 230 m, grassland, *Abbott* 3472 (NH, PRU); Port Edward, Clearwater Estates, 3130 AA, wet land, *Abbott* 3509 (NH, PRU); Port Shepstone, 3030 CC, grassland, *Abbott* 870 (NH); Dundee Dist., *Acocks* 10283 (NH); Pietermaritzburg, *Allsopp* 1027 (NH); Umzinto Dist, *Bajjnath* 296 (NU); Durban Dist., 2930 DD, *Bajjnath* 127 (NU); Umtamvuna Nat Res, 3030 CC, grassland, *Balkwill & Manning* 432 (NU); Lions River Dist., 2930 AC, 1,500 m, *Balkwill* 1422 (NU, PRE); Ingwavuma Dist., < 500 ft., pan, *Edwards* 2566 (NU); Ingwavuma, *de Winter* 8566 (PRE); Ingwavuma Dist., 2732 BB, 50 m, *Balkwill* 632 (NU); Umzinto Dist., 3030 BC, 420 m, *Balkwill* et al. 1172 (NU); Mooi Riv. Dist., 2929 BC, 1,700 m, marshy grassland, *Balkwill* et al. 1328 (NU); Kosi Bay, *Balsinhas* 3104 (PRE); Stanger, 2931 CC, open grass, *Coleman* 268 (NH); Drower's Plot, *Davidson* 2436 (J); Carry's Port, *Deane* 18 (NU); Utrecht, *Devenish* 1255 (PRE); Port Natal, *Drege* s. n. (G); Ixopo Dist., *Edwards* 3110 (M, NU); Bulwer, *Edwards* 2028 (NU); Hazelare River Dam, alluvial sands, *Edwards* 2331 (NU); Hlatikulu Vlei, *Edwards* 897 (NU); *Germishuizen* 3194 (PRE); Port Edward, 3130 AA, *Germishuizen* 1725 (PRE); Midlands, 2929 BD, grassland, *Greene* 626 (NH);

Underberg Dist., *Grice* s. n. (NU); Howick Twin Falls, 29°16'S 30°19'E, *Grove* 244 (NU); *Gueinzus* 512 (G); Alfred Dist., *Hilliard* 5477 (NU, PRE); Underberg Dist., 6,000 ft., *Hilliard & Burt* 10073 (NU); Alfred Dist., grassland, *Hilliard & Burt* 10196 (NU); Umzinto Dist., 2,000 ft., Grassland, *Hilliard & Burt* 10312 (NU); Underberg dist., 2929 CB, 6,500 ft., *Hilliard & Burt* 14061 (NU); Royal Natal Nat. Park, 2828 DB, 5,500 ft., wet grass slope, *Hilliard & Burt* 14438 (NU); Alfred Dist., 3029DB, 2,500 ft., grass/streambank, *Hilliard & Burt* 16720 (B, J, NU); Mpendhle Dist., 2929 BC, 6,600 ft., damp grassland, *Hilliard & Burt* 18421 (NU); Underberg Dist., *Hilliard & Burt* 7929 (NU); Bushmans Nek, *Hilliard & Burt* 7978 (NU); Ixopo Dist., marsh, *Hilliard & Burt* 9041 (NU); Underberg Dist., grassland, *Hilliard & Burt* 9706 (NU); Ngotshe Dist., 4,000 ft., *Hilliard & Burt* 9859 (NU); Ngotshe Dist., grassland, *Hilliard & Burt* 9928 (NU); Durban Dist., *Hilliard* 677 (NU); Underberg Dist., Cobham Forest Sta., *Hilliard* 5512 (NU); Lions River Dist., *Hilliard* 5561 (MO, NU); Richmond, Pk. of Byrne, rocky, grassy, *Hilliard* 8091 (NU); Richmond Dist., *Hilliard* 8147 (NU); Eastern Shores State Forest, Lake St. Lucia, *Hobson* 182, 780 (GRA); Ndoda Res., Lake St. Lucia, *Hobson* 497, 569 (GRA); Howick, *Junod* 59 (G); Bergville, *Killick* 1498, 1922 (PRE); Umlaas, *Krauss* 168 (BM, G); Bergville Dist., *L'Ange* s. n. (NU); Itala Game Reserve, 2731 AD, scrub forest, *Louwsburg et al.* 70 (NH); Kosi Bay Coastal Forest Res., 2732 BC, vlei, *Lubbe* 294 (NH, PRU); Himeville, *Lund* s. n. (PRE); Mtubatuba, 2832 AD, grassland, *MacDevette* 24 (NH); Port Shepstone, *Mara* 785 (GRA, NU, PRE); Port Edward, 500 m, grass, *Marneweck* s. n. (J); Oribi Flats, *McClean* 521 (PRE); Nat. Res., stream bank, *McDonald* 385 (NU); Illovo, *Medley* 6441 (G); Clairwood, *Meebold* 12925 (M); Port Shepstone, 3030 CB, *Mogg* 11902 (PRE); Mpendle, grassland, *Moll* 713 (M, NU); Mpendle Dist, *Moll* 675 (NU); Port Edward, Umtamvuna Reserve, Clearwater Chalets, between chalets and gate, 31°02.70'S 30°10.05'E, 220 m, *Morawetz* 136, 137, 139 (OS); Port Edward, Umtamvuna Reserve, rocky grassy slopes, 31°03.48'S 30°10.61'E, 175 m, *Morawetz* 140, 141 (OS); Bushman's Nek, 700 m from South African border post along Cave Trail, 29°50.64'S 29°12.61'E, *Morawetz* 143, 144 (OS); Garden Castle, along trail to Three Pools, 29°44.72'S 29°12.54'E, 1,830 m, *Morawetz* 153 (OS); Sani Pass, 29°36.13'S 29°19.4E, 2,000 m, *Morawetz* 155 (OS); Mpati Hill Plateau, 2830 AA, rocky grassland, *Ngwenya* 1414 (NH); Northern Natal, 2831 AC, rocky grassland, *Ngwenya* 1450 (NH, PRE); Verulam Nat. Res., 2931 CA, *Ngwenya* 454 (NH); Port Shepstone, St. Michael-on-sea, open grassland, *Nicholson* 80 (NH); Dundee Dist, *Pentz & Acocks* 10283 (PRE); Impendle Dist., river edge, *Phelan* 319 (NU); Impendle Dist., Floodplain, *Phelan* 79 (NU); Hlabisa Dist., open grassland, *Pooley* 1722 (NU); Hlabisa Dist., marsh, *Pooley* 2193 (NU); Ngeli area, grassy roadside, *Potgieter & Thompson* 442 (NU); Polela Dist., 2929 DC, 6,000 ft., *Renanie* 1663 (NU); Polela Dist., vlei, *Rennie* 1127 (NU); Alexandra Dist., 600 m, *Rudatis* 870 (BM, G, L); Alexander Co., 3030 AD, *Rudatis* 2085 (PRE); Drakensberg, Biggarsberge, *Rehmann* 7056 (BM); Port Shepstone, *Rump* s. n. (MO, NU); Richmond Rd., *Schlechter* 6744 (GRA); Port Edward, 3130 AA, grassland, *Schrire* 577 (NH); Kosi Bay, 2632 DD, grassland, *Schrire* 976 (NH); Transkei, 3029 AB, *Sikhakhane* 179 (PRE); New Castle/Memel Dist., 2729 DD, vlei, *Smith* 380 (PRU); Stanger, 2931 AD, *Stirton* 389 (PRE); Nkandla, *Stirton* 409 (PRE); Durban, *Stirton* 514 (PRE); Ubombo Dist., lake shore, *Steyn* 4986 (BR, NH); Dukuduku, moist grassland, *Steyn* 5696 (BR, NH, NU); Port Shepstone, St. Michael-on-sea, grassland, *Steyn* 7083 (NH); Pietermaritzburg, 2930 CC, grassland, *Steyn* 10877 (NH); Ixopo, 2930 CC, grassland, *Swanepoel* 27 (NH); Royal Natal Nat. Park, *Trousel* 225 (NU); Griqualand East, *Tyson* 1219 (G); Port Edward, 3030 CC, *van Wyk* 2606 (PRE, PRU); Ubombo, 2732 DC, grassland, *Van Wyk* 614 (NH); Pietermaritzburg, *Venter* 1872 (PRE); Helion Rd, *Victoria College* s. n. (NBG); Pietermaritzburg, *Vos* 80 (NU); Lake St. Lucia, 2832 AB, *Ward* 8133 (PRE); Ingeli Mtn., *Ward* 170 (NU); Ubombo, 2732 BC, grassland, *Ward* 1218 (NH); Zululand, Hlabisa Dist., 100 ft., vlei, *Ward* 2867 (NU); Hlabisa Dist., *Ward* 4370 (NH, NU); Durban, *Ward* 4735 (NH, NU, PRE); *Weeks* 89 (J); *West* 1116 (PRE); Estcourt/Mooi River, Griffins Hill, *West* 2495 (NH); Pietermaritzburg, *Wiigland* 2111 (M); Ingwavuma, vlei, *Winter et al.* 8566 (M); Durban, *Wood* 142 (NU); Illovo, *Wood* 6441 (PRE); Durban, *Wood* s. n. (NH); Martizburg, *Wylie* s. n. (G); LIMPOPO: Letaba Dist., Duiwelsklouf, *Scheepers* 938 (M, PRE, PRU); Letaba Dist., 1,300 m, *Balkwill* 5617 (J); Pietersburg, 4,000 ft, *Bolus* 10862 (BOL); Pietersburg, *Bredenkamp* 258 (PRE); Zoutpansberg, Macoukie, *Breyer* 10665 (PRE); *Breyer* 16078 (PRE); Pietersburg Dist., 2329 CD, *de la Harpe* 12 (PRE, PRU); Tzaneen, 2330 CC, *Hanekom* 2288 (PRE); Tate, *Hemm* 1108 (J); Pietersburg, *McCallum* 137 (PRE); Tzaneen, Wolkgberg, 1,500 m, *Muller et al.* 233 (M, PRE); Messina, *Rogers* 10483 (PRE); Pietersburg, *Smith* 266 (PRE); Legkalamete, *Stalmans* 1206 (PRE); Louis Trichardt, *Unknown* s. n. (PRE); Messina, 2230 CD, *van Wyk* 2734 (PRE, PRU); Messina, *Stopp* 13 (M); MPUMALANGA: Barberton Dist., 2530 DD, 1,000 m, *Balkwill* 1461 (NU); Mt. Sheba Nature Reserve, rock clumps, *Balkwill* MS1.89 (J); Nelspruit, *Breyer* 17703 (PRE); Wakkerstroom, marshy, *Codd* 6948 (NU); Bethal, 1,550

m, seepage area on riverbank, *Davidse* 6709 (MO, PRE); Vertroosting Nat. Res., *Deall* 1486 (PRE); Wakkerstroom, 6,600 ft, *Devenish* 1120 (M); Graskop Dist., 1,500 m, grassland, *Dyer* s. n. 3 (J); Belfast, *du Toit* 353 (PRE); Belfast, *Evans* 11559 (PRE); Belfast escarpment, 2530 CA, hillside, *Fabian* 1160 (PRE); Barberton, 3,000 ft, *Galpin* 1302 (BOL); Lydenberg, *Galpin* 13817 (PRE); Lydenberg, Sabie Valley, 4,000 ft, *Galpin* 13292 (BOL, BR); Elandshoogte, 2530 CB, 5,500 ft., damp grass, *Hilliard & Burt* 14167 (NU); Lydenburg, 2530 AB, wet grassland, *Hilliard & Burt* 14199 (NU); Wolkberg, 2330 CC, *Hilliard & Burt* 14314 (NU); Graskop, 2430 DD, grass slope, *Hilliard & Burt* 14336 (NU, PRE); Lydenburg, 2430 CD, marsh, *Hilliard & Burt* 14391 (M, NU); Witklip Forest Station, 2530 BB, vlei, *Hilliard & Burt* 14248 (NU); Pilgrims Rest, 2430AD, *van Jaarsveld* 5995 (NBG); Wakkerstroom Dist., 2730 AD, wet grassland, *Jordaan* 2767 (PRE); Lydenberg, *Kilms* 6471 (PRE); Lydenberg Dist., 2530 BD, 4,800 ft, grassland, *Kluge* 503 (PRU); *Krynauw* 389 (PRE); Barberton, *Liebenberg* 2587 (PRE); Bethal, vlei, *Malan & de la Harpe* 257 (NBG, PRU); Pilgrims Rest, 2430 DC, grassland, *Matthews* 405 (MO, PRU); Pilgrims Rest Dist., 2430 DD, mtn grassland, *Matthews* 438 (MO, PRU); Waterval-Boven Dist., 22 km S Machadodorp on R541, Skurweberg Pass, 25°48.195'30"23.37"E, 1,320 m, *Morawetz* 117 (OS); Pilgrims Rest, R37 from Sabie to Lydenberg, Long Tom Pass, 25°08.485'30"36.35"E, 2145 m, *Morawetz* 120 (OS); Pilgrims Rest, MacMac Pools Secretary Bird Day Trail, 25°0.47'S 30°50.49'E, 1,420 m, *Morawetz* 121, 122, 123 (OS); Barberton, Fortuna Mining Trail, trailside, 25°47.875'31°02.86'E, 500 m, *Morawetz* 149 (OS); Reitkuil, Ermelo Dist., *Moss* 16349 (J); Haenertsburg, *Musselman & Visser* s. n. (BM); Pilgrims Rest, 2430DB, 1,600 m, amongst rocks, *Smith* 114 (J); Blyfstaanhoogte, *Stirton* 1837 (PRE); Graskop, *Stirton* 6983 (PRE); Roossenekal, 2529 BB, 1,420, mtn grassland, *van Wyk* 1420 (PRU); Carolina, 2630 DA, *van Wyk* 2297 (PRE, PRU); Lydenburg, *Wilms* 1090 (BM, G, L, P); NORTHERN CAPE: Douglas Dist, Griqualand West, *Anderson* 6466 (PRE); Altemooi, stony places, *Thode* 4579 (NBG); Griqualand West, *Marloth* 1001 (A, PRE); Clydendale, Gringaland, 2500 ped, *Tyson* 1219 (BOL); NORTHWEST PROVINCE: *Botha* 41 (PRE); Ventersdorp, *Evans* 3126 (PRE); *Jenkins* 11677 (PRE); Vryburg, *Tomagge* 8468 (PRE); Rustenburg, *Venter* 659 (PRE); WESTERN CAPE: Paradise Kloof, *Archibald* s. n. (GRA); Tradouw Pass, Riversdal, 615 m, *Bohnen* 9262 (NBG); Langeberg, 370 m, *Bohnen* 9263 (NBG); Simonstown, Betty's Bay, 3418 BD, 50 ft, sandy loam, *Boucher* 1082 (NBG); *Browne* 17 (BM); Caledon, *Bruyn* 188 (PRE); Caledon Div., Arrrust, 100 ft, *Compton* 3367 (BOL); Ceres, Roodeberg, 4,500 ft, *Compton* 8445 (NBG); Arends Kop, *Compton* 10299 (NBG); Smitswinkel, *Compton* 16938 (NBG); Smitswinkel Vlei, *Compton* 21194 (NBG); Silvermine Swamp, swamp, *Compton* 16621 (NBG); Paarl, Weuwers Hoek, 500 ft, *Compton* 10124 (NBG); Ceres, *Cross* 10 (NBG); Montagou Pass, *Davy* 12598 (PRE); Cape Peninsula, *Dod* 418 (BM, BOL); Belvidere, Sand Hill, *Duthie* 669 (NBG); Ceres Div., Valsch Gat Kloof, *Esterhuysen* 1574 (BOL); Knysna, Doacammer uplands, 1,000 ft, *Gillet* 1582 (NBG); Ceres, *Guthrie* 2193 (NBG); Ceres, *Hanekom* 1531 (PRE); Franschhoek, Moebaskloof, *Hanekom* 2288 (BR); Kirstenbosch, Newlands, pond edge, *Hort Kirstenbosch* s. n. (NBG); Riversdale, 3321CC, 1,800 m, firebreak, *Hugo* 1081 (NBG); Caledon, Buffeljagsberg, *Hugo* 1619 (NBG, PRE); Kogelberg State Forest, stony soil, *Kruger* 263 (NBG); Kogelberg State Forest, 3418 BD, 60 m, roadside, *Kruger* 65 (NBG); Caledon, Pringle Bay, 80 ft, damp places, *Levy's* 10196 (BOL); *Moss* 7450 (J); Muizenberg, damp dunes, *Moss* 7519 (J); West Pine, *RVC Biol exped* s. n. (GRA); Humansdorp, *Haigh* 46 (GRA); Camps Bay, *Marloth* s. n. (PRE); Knysna, *Michell* 16118 (BOL); Kraalfontein, *Mogg* 3733 (PRE); George, Outeniqua Nature Reserve, trailside in damp run-off, 33°55.94'S 22°25.63'E, 300 m, *Morawetz* 107 (OS); Paarl Mountain Nature Reserve, along banks of stream leading to Bethel Dam, 33°43.51'S 18°55.64'E, 490 m, *Morawetz* 145 (OS); Riversdale, *Muir* 598 (PRE); Rondebosch, *Pappe* s. n. (BOL); Caledon Div., Betty's Bay, damp mud, *Parker* 4734 (BOL, NBG); Van Staaden, *Paterson* 2674 (BOL); Hexriverberge, Axellfarm, *Rehmann* 2698 (BM, BOL); Stellenboschberg, *Rehm* 1950 (M); George, *Schlechter* 2439 (A, BM, BR, BOL, G, PRE); Simonstown, 3418AB, *Snijman* 831 (NBG); Van Rhyn's Dorp Div, Gift Bers, *Salter* 7265 (BOL); Klaver Valley, *Salter* s. n. (BM); Caledon, *Taylor* 4301 (NBG); Worcester Dist., Badsberg, 1,000 ft, *Taylor* 4814 (NBG, PRE); Caledon, Betty's Bay, damp mud, *Sarker* 4734 (A); Barrydale, 3320DC, 1,100 ft, *Viviers* 368 (NBG); Caledon, reservoir, *de Vos* 490 (NBG); Caledon Div., Hermanus, 6th St. Voelklip Hermanus, 40 m, damp sand, *Williams* 111 (MO); Worcester, 3319AC, wet soil, *van Wyk* 457 (NBG); **Sudan.** Gilo Village, 4°2'N 32°51'E, 1,850 m, *Friis & Vollesen* 17 (BR); Kajiko, *Kesper* 119b (EA); Equatorial Prov., R. Napere, *Wylid* 348 (BM); Equatorial Prov., *Wylid* 644 (BM); **Swaziland.** Hhohho, Nkwalini, *Braun* 1385 (PRE); Malolotja Nat. Res., 1,478 m, *Braun* 945 (PRE); Hlatikulu, *Compton* 31340 (PRE); Mankaiana, W. Mankaiana, 4,500 ft, *Compton* 28672 (NBG); Pigg's Peak, Havelock, 3,200 ft, grassland, *Miller* 5848 (NBG); MBABANE: Ukutula, *Compton* 25731 (PRE); Forbes Reef, *Compton* 25739, 27580 (PRE); Brown Ridge, *Compton* 32022 (PRE); *Compton* s. n. (PRE);

Ukutula, *Compton* 24952, 24984 (NBG); Ukutula, 4,000 ft, *Compton* 25731 (NBG, NH); Forbes Reef, swamp, *Compton* 30557 (NBG); Forbes Reef, swamp, 4,500 ft, *Compton* 31965 (NBG, NH, PRE); Forbes Reef, 26°11'S 31°5'E, 1,400 m, marsh, *Kemp* 1287 (MO); Lion-Castle, *Maguire* 7626/101 (J); S. Oshoek, 2631AC, 1,350 m, roadside, *McCallum* 564A (J); Forbes Reef, Malolotja Nature Reserve, roadside, 26°08.08'S 31°08.10'E, 1,530 m, *Morawetz* 127, 128, 130, 131 (OS); Mlilwane Game Reserve, trailside 1 km from Rest Camp, 26°29.565'31°11.08'E, 720 m, *Morawetz* 132, 133, 134 (OS); **Tanzania.** Mafinga Dist., *Abdallah* 951 (EA); Mtimbira, *Anderson* 1095 (EA); *Drake* s. n. (BR); Kilosa Dist., Kuana Valley, 500 m, *Bidgood & Lovett* 264 (MO); Norogwe Dist., W Usambara, 4,500 ft, grassland, *Faulkner* 2052 (BR); *Goetze* 1137 (BM, BR); *Goetze* 807 (BR); S. Pare Mts., *Greenway* 6520 (EA); Nakatimbo, Ifakara, *Haerdi* 338/0 (BR); *Holst* 8945 (M); Usambara, *Holst* 9100 (P); Shinganga, *Karitschaner* 2162 (EA); Madaba, Njombe woodland, 1,000 m, *Keeley* 397 (MO); Uzungwa Mtn. Nat. Park, T7, *Luke* 5105 (EA); *Mucke* 225 (PRE); *Sacleux* s. n. (BR); Morogoro, Uluguru, Gebirge, 1,000 m, savanna, *Schlieben* 3839 (BR); Kyimbila Sta., *Stolz* 267 (B, BM, G, L, PRE); Kyimbila Sta, Nyassa Hochland, *Stolz* 790 (BM, G, L, MO, PRE); West Lake Prov., Nyakiziba, Ngara Dist., *Tanner* 4909 (BR, G); ITULA: *Haerdi* 539/0C (EA); Itula/Ifakara, *Haerdi* 338/0 (BR); Itula, *Unknown* 508 (G); KILIMANDJARO: 4°18'47"S 37°54'51"E, 1,920 m, *Elia et al.* 14 (MO); Mt. Kilimandjaro, Mandara, *Goyens* 59 (PRE); Kilimandjaro, 1,800 m, *Schlieben* 4350 (B, BM, BR, G, M); Maranga, *Volkens* 244 (BM, G); 1,500 m, *Volkens* 1402 (BR); LUPEMBE: *Schlieben* 912 (BR, G); *Schlieben* 1052 (BR); LUSHORO: Shagai Forest, Sunga, 200 m, *Drummond & Hemsley* 2404 (BR, EA); W. Usambara Mts., grassland, *Faulkner* 4621 (BR); Chambogo, *Kisena* 546 (BR); MBEYA: Tukuyu, Musekera stream, 1,250 m, *Bidgood et al.* 111 (MO); 8°58'S 33°39'E, 2,200 m, fields, *Gereau et al.* 4516 (BR, MO, PRE); Mshewe, *Lovett & Kayombo* 232 (PRE); *Lovett & Kayombo* 4510 (G); 8°50'S 33°20'E, 1,250 m, Combretum woodland, *Lovett & Kayombo* 4330 (MO); 8°50'S 33°20'E, 1,250 m, streamside, *Lovett & Kayombo* 4510 (BR); MUFINDI: 8°34'5"S 35°37'12"E, 1,525 m, maize farm, *Kayombo & Mwangoka* 2616 (MO); 8°31'S 35°10'E, 1,850 m, wet grassland, *Kayombo* 228 (MO); 8°37'20"S 35°38'38"E, 1,125 m, *Kayombo* 2675 (MO); 8°36'48"S 35°37'49"E, 1,000 m, *Kayombo* 2721 (MO); 8°31'S 35°10'E, 1,850 m, weed, *Kayombo* 643 (MO); 8°37'4"S 35°36'43"E, 1,200 m, riparian forest, *Kayombo & Mwangoka* 2562 (MO); 8°30'S 35°30'E, 1,800 m, forested stream, *Lovett* 2063 (MO); Kasanga, 6,400 ft, grassland, *Polhill & Paulo* 1866 (BR, EA); SONGEA: *Milne-Redhead* 9426 (EA); Nangurukuru, 1,020 m, *Milne-Redhead & Taylor* 9551 (BR); Songea, 960 m, grassland, *Milne-Redhead & Taylor* 9849 (BR); ZANZIBAR: Mkokotoni, sea level, rice field, *Faulkner* 2714 (BR); Mkokotoni, sea level, damp ground, *Faulkner* 3429 (BR); Mahonda Plain, swampy, *Vaughan* 2087 (BM); **Thailand.** *Kerr* s. n. (3 sheets, BM); *Kerr* 2232 (BM); Chiangchao, *Kerr* 6516 (BM); Pa Mawn spur, I. Angka, 1,600 m, partly open ridge, *Garrett* 601 (L); CHIANG MAI: Wiengbahbao, 925 m, *Maxwell* 97-1465 (A); Chiang Dao, 775 m, *Maxwell* 90-1353 (A, MO); Muang, 1,550 m, *Maxwell* 92-843 (A, P); Hawt (Hot, Hod), 1,100 m, *Maxwell* 96-1540 (A); Doi Sagnet, 1,400 m, *Maxwell* 97-161 (A); Chiang Dao, 1,550 m, *Maxwell* 95-1068 (A); Muang, 850 m, deciduous dipterocarp-oak forest, primary habitat, *Maxwell* 87-1440 (L); Sahn Gahm Pang, 1,025 m, Mostly open, overgrown, weedy area in a tea plantation, *Maxwell* 96-1407 (A, L); Mae Chan, 1,150 m, *Maxwell* 93-1362 (A); Doi ANGKA: 1,600 m, *Garrett* 601 (L); 1,600 m, *Samett* 601 (A); **Uganda.** Hoima, Umzoro, *Bagshawe* 938 (BM); Lolui Island, Lake Victoria, *Jackson* 460 (BR); Khashari, E. Ankole, 0°20'S 30°30'E, 1,550 m, *Rwaburindore* 1205 (MO); Katunguru, Queen Elizabeth Nat. Park, *Lock & Synott* 68/303 (EA); Kyagwe County, Mukone Dist., 0°21'N 32°55'E, 1,200 m, grassland, *Rwaburindore* 2041 (MO); Toro, Mwenya, *Snowden* 62 (BM); Bungangabo, Ruwenzori, *Snowden* 112 (BM); Mt. Ruwenzori, *Wollaston* s. n. (BM); Eastern Prov., Mbale Dist., Kabururoni, *Wood* 445 (EA); BUGANDA: Entebbe Dist, *Taylor* 2387 (BM); Kyadondo Co., *Katende* 1979 (EA, MO); BUNJEJU: W. Ankole Dist., 0°20'S 30°30'E, 1,840 m, arable land, *Rwaburindore* 1265 (MO); W. Ankole, 0°22'S 30°29'E, 1550 m, swamp edge, *Rwaburindore* 1751 (MO); W. Ankole, 0°23'S 30°28'E, 1,800 m, bushland, *Rwaburindore* 2480 (BR, MO, PRE); W. Ankole, 0°22'S 30°29'E, 1,550 m, swamp, *Rwaburindore* 3044 (MO, PRE); W. Ankole, 0°22'S 30°29'E, 1,550 m, grassland, *Rwaburindore* 3558 (MO); KIGEZI: Buhungi, *Godman* 236 (BM); Rubanda, 1°3'S 29°47'E, 2,350 m, roadside, *Rwaburindore* 2898 (MO); Ruwenzori, *Ross* 417 (BM); 2,300 m, *Stauffer* 893 (BR, PRE); 8,000 ft., *Taylor* 1859 (BM); KYADONDO: W. Mengo, 0°19'S 32°37'E, 1,200 m, open bushland, *Rwaburindore* 43 (MO); W. Mengo, Kikandwa Primary School, 0°25'N 32°22'E, 1,200 m, bushland, *Rwaburindore* 717 (MO); W. Mengo dist., 0°22'N 32°35'E, 1,200 m, *Rwaburindore* 1057 (MO); W. Mengo Dist., 0°23'N 32°36'E, 1,200 m, *Rwaburindore* 1148 (MO); W. Mengo Dist., 0°21'N 32°35'E, 1,200 m, Bushland, *Rwaburindore* 2194 (MO); **Vietnam.** 700 m, *Chevalier* 29326 (P); *Cuong* 1731 (P); *Hautefeuille* 86 (P); *Petelot* 5122 (P); Annam, Dalat, *Chevalier* 30694 (P); Annam, Danai, *Poilane* 21013 (P); Cha-pa, Lao-Kay, *Chevalier* 29463 (P); Dalat, *Evrard* 195 (P); Dalat, *Evrard*

925 (P); Dok Ha, *Poilane* 18383 (P); Lam Dong, Lac Duong Dist., 12°8'N 108°39'E, 1,500 m, forest, *Averyanov et al.* 3245 (MO); Prens, *Unknown* 1155 (P); **Yemen**. Jebelain, Aludayn, *Wood* Y775/298 (BM); **Zambia**. Northern Prov., Mpika Dist., *Brummitt et al.* 17009 (MO); Barotseland, *Cockl* 7304 (PRE); Chichele Dist., Ndola, *Fanshawe* 452 (BR); Nkumbo Hill, Chibuli Hill, 28°14'30"E 13°24'00" S, 1,250 m, *Leteinturier et al.* 551 (BR); Kansanshi Hill (mine), *Malaise & Matera* 187 (BR); Lusaka, 15 km W Lusaka, Nosarka's Farm, 15°24.10S 28°08.56E, 1,230 m, *Morawetz* 159; Lusaka East Forest Reserve, miombo woodland, 15°28.51S 28°25.22E, 1,320 m, *Morawetz* 163 (OS); Mpulungu Dist., along road to Mporokoso from Mbala, roadside dambo, 9°40.95S 30°53.98E, 1,470 m, *Morawetz et al.* 180 (OS); Northwestern Province, Mwinilunga Dist., Mundwizi Dambo, 40 km from Mwinilunga along road to Solwezi, 11°45.02S, 24°46.43E, 1,470 m, *Morawetz* 189 (OS); Chinsali Dist., Chinsali-Isoka, road side, *Philcox et al.* 9922 (BR, MO); Choma, 1,300 m, swamp, *Robinson* 2189 (M); Ndola Dist., Kitwe Zool. Garden, moist drainage ditch, *Philcox et al.* 10229 (BR); Kasama Dist., Chishimba Falls, riverbank, *Robinson* 4005 (M); Mwinilunga Dist., Kabompo Gorge, *Robinson* 6653 (M); Mongu, 10 km E Mongu, damp grassland, *Robinson* 6694 (M); Lunzua Valley, Laka Village, 3,800 ft, sandy, dry soil, *Richards* 5580 (BR); Victoria Falls, *Rogers* 5075 (GRA); Livingstone, *Rogers* 5780 (A, BM, PRE); *Verdoorn* 2056 (PRE); BROKEN HILL: *Fanshawe* 8016 (BR); *Rogers* 8132 (GRA); MBALA: 35 km along road from Mbala toward Nakonde, damaged dambo, 9°07.51S 31°34.41E, 1,560 m, *Morawetz* 178 (OS); Rd to Chinakila, grassland, *Philcox et al.* 10103 (BR); Ndundu, 1680 m, *Richards* 9495 (BR); *Siame* 28A (BM, MO); Saisi Valley, 5,000 ft, grass & mud, *Sanane* 519 (BR); MUNSHIWEWEMBA: 4,200 ft, Marsh, *Stohr* 192 (BOL, PRE); vlei, *Stohr* 559 (BOL); **Zimbabwe**. Melssetter Dist., *Chase* 4857 (BM); Melssetter Dist., *Chase* 4858 (BM); Umtali Dist., *Chase* 6053 (BM, PRE); Vumba, *Ferrar* 4105 (PRE); Victoria Falls, Knife Edge, *Gibbs* 293 (BM); Nuza Plateau, *Gilliland* 1661 (BM); Chipinga, Gungunyama Forest Reserve, 3,500 ft, *Goldsmith* 73/67 (BR); Lomagundi Dist., *Jacobsen* 3140 (PRE); Honde View, 1,650 m, *Philcox et al.* 8890 (BR); Makabuzi Woodland, woodland, *Philcox et al.* 9052 (BR, MO); Melssetter Dist., Chinokwe Dam, 1,290 m, *Philcox et al.* 9002 (BR, MO); Mutasa Dist., *Pope & Miller* 1698 (PRE); Salisbury, *Rutherford-Smith* 561 (PRE); Chirinda, Gazaland, *Swynnerton* 1975 (BM); Robins Game Reserve, *Taylor* 3048B (NBG); Marandellas Dist., *Wild* 3259 (M); **No locality**. (M); *Anderson s. n.* (BR); *Banks & Solander* (BM); *Buck s. n.* (L); *Griffith* 233/234 (BR); *Hooker s. n.* (L); *Hooker s. n.* (L); *Jaeger* 7696 (G); *Lypin* 9 (G); *Maire s. n.* (P); *Mann s. n.* (A); *Oldenburg* 1772 (BM); *Penolud* 9 (G); *Penotta* 10 (G); *Roberty* 15859, 16769 (G); *Sacleux s. n.* (BM); *Schmid* 1114 (P); *Trimen* 1864 (BM); *Unknown s. n.* (BM); *Unknown s. n.* (L); *Ventnat* 6 (G); *Wallich* 3963 (BM).

APPENDIX 2. Specimens of *Alectra sessiliflora* used in the phenetic analyses. Specimen number, country, locality, collector, collection number, herbarium.

1-2. Tanzania. Songea Dist., Songea; 30 Mar 1956, *Milne-Redhead* 9426 (EA); 3. Zimbabwe. Nuza Plateau, March 1935, *Gilliland* 1661 (BM); 4. Zimbabwe. Melssetter District, 15 Mar 1953, *Chase* 4857 (BM); 5. South Africa. KwaZulu-Natal Prov., 10 Mar 1924, *Weeks* 89 (J); 6. South Africa. Gauteng, Johannesburg, Forest Hill, Thorntree Kloof, 29 Mar 1924, *Moss* 11018 (J); 7-8. China. Yunnan, *Maire* 610 (BM); 9. China. Yunnan, 1933, *Tsai* 56617 (A); 10-11. China. Yunnan, Mao Kou, 15 Oct 1886, *Delavay* 2513 (P); 12. Thailand. Chiang Rai, Mae Chan, 7 Nov 1993, *Maxwell* 93-1362 (A); 13-14. Thailand. Chiang Mai, Muang, 16 Dec 1992; *Maxwell* 92-843 (A); 15. Laos. Xieng, Khonang, 27 May 1919, *Mieville s. n.* (P); 16-19. South Africa. Mpumalanga Prov., Pilgrims Rest 2 Dist.: Mac Mac Pools, 14 Mar 2003, *Morawetz* 122 (OS); 20-21. South Africa. Mpumalanga Prov., Lydenburg Dist.: Long Tom Pass, 13 Mar 2003, *Morawetz* 120 (OS); 22-23. South Africa. Eastern Cape Prov., Albany Dist.: Grahamstown, Featherstone Kloof, 4 Mar 2003, *Morawetz* 110 (OS); 24. Swaziland. Mlilwane Game Reserve, 21 Mar 2003, *Morawetz* 133 (OS); 25. Swaziland. Mlilwane Game Reserve, 21 Mar 2003, *Morawetz* 132 (OS); 26-27. Swaziland. Forbes Reef, Malolotja Nature Reserve, 20 Mar 2003, *Morawetz* 127 (OS); 28. Swaziland. Forbes Reef, Malolotja Nature Reserve, 20 Mar 2003, *Morawetz* 131 (OS); 29-30. South Africa. KwaZulu-Natal Prov., Port Edward, Umtumvuna Nature Reserve, Clearwater Chalets, 25 Mar 2003, *Morawetz* 139 (OS); 31-34. South Africa. Western Cape Prov., Paarl Mountain Nature Reserve, Bethel Dam, 2 Apr 2003, *Morawetz* 145 (OS); 35. South Africa. KwaZulu-Natal Prov., Port Edward, Umtumvuna Nature Reserve, Clearwater Chalets, 25 Mar 2003, *Morawetz* 136 (OS); 36. South Africa. Mpumalanga Prov., Pilgrims Rest 2 Dist.: Mac Mac Pools, 14 Mar 2003, *Morawetz* 123 (OS); 37. Zambia. Lusaka East Forest Reserve, 18 Apr 2004, *Morawetz* 163 (OS);

38. Zambia. Northern Prov., Mbala Dist.: 32 km along road to Nakonde from Mbala, 7 May 2004, *Morawetz* 178 (OS); 39-40. Zambia. NorthWest Prov., Mwinilunga Dist.: Luakela Bridge, along road to Ikelenge, 16 May 2004, *Morawetz* 184 (OS); 41. Zambia. Kalabo Dist., Bulozhi Plain, 1 Dec 2003, *Bingham* 12715 (OS); 42. Zambia. Lusaka East, Miombo woodland, 11 Apr 2004, *Bingham* 12756 (OS); 43. South Africa. KwaZulu-Natal Prov., Sani Pass, 6 April 2004, *Morawetz* 155 (OS); 44. South Africa. Mpumalanga Prov., Waterval-Boven Dist., Skurweberg Pass, 11 Mar 2003, *Morawetz* 117 (OS); 45. South Africa. KwaZulu-Natal Prov., Port Edward, Umtumvuna Nature Reserve, Clearwater Chalets, 26 Mar 2003, *Morawetz* 140 (OS); 46. South Africa. KwaZulu-Natal Prov., Port Edward, Umtumvuna Nature Reserve, Clearwater Chalets, 26 Mar 2003, *Morawetz* 137 (OS); 47. Uganda. Katunguru: Queen Elizabeth Nat. Park, 18 Nov 1968, *Lock* 68/303 (EA); 48. Tanzania. Iringa Dist.: W. Mufindi, Kasanga, 24 Mar 1962, *Polhill* 1866 (EA); 49. Burundi. Ruyigi Prov.: Muhweza (Nyakazi), 4 May 1980, *Reekmans* 9073 (MO); 50. Ethiopia. Godjam Prov.: Bahar Dar, 30 Sep 1969, *deWilde* 5793 (MO); 51. Burundi. Ruyigi Prov.: Kigamba, 3 Apr 1977, *Reekmans* 5988 (MO); 52. Burundi. Muramwya Prov.: Mweza (Ryarusera), 14 May 1982, *Reekmans* 11210 (MO); 53. Uganda. Western Prov.: Kigezi Dist., 21 Nov 1934, *Taylor* 1859 (BM); 54. Malawi. Mlanje Mtn., 25 Apr 1957, *Chapman* 457 (BM); 55. Tanzania. T3: S Pare Mtns, Kilimanjaro, Chome Forest Reserve, 11 June 1999, *Elia* 14 (MO); 56. Rwanda. Parc des Volcans, March 1975, *D'Arcy* 8800 (MO); 57. Democratic Republic of the Congo. Kivu Prov.: Kalehe Terr., 24 Mar 1960, *Petit* 107 (BR); 58. Democratic Republic of the Congo. Kivu Prov.: Kalehe Terr., 25 Mar 1960, *Petit* 158 (BR); 59. Rwanda. Kaganu: Nyungwe Forest, 15 May 1971, *Bouxin* 735 (BR); 60. Rwanda. Shungu: Uwinka, 5 Sep 1959, *Troupin* II.094 (BR); 61. Equatorial Guinea. Bioco, 11 Nov 1986, *Carvalho* 2687 (BR); 62. Equatorial Guinea. Bioco: Moca, 20 Nov 1990, *Carvalho* 4565 (BR); 63. Malawi. Blantyre: Michiru Mt. Forest, 26 July 1989, *Tawakali* 1538 (MO); 64. Tanzania. Iringa Dist.: Mufindi, Igowole, 30 May 1989, *Kayombo* 643 (MO); 65. Ghana. Brong-Ahafo: Techiman, 6 Dec 1995, *Schmidt* 1965 (MO); 66. South Africa. KwaZulu-Natal Prov.: Underberg, Cobham Forestry Station, 19 Mar 1977, *Hilliard* 9706 (NU); 67. South Africa. KwaZulu-Natal Prov.: Durban Dist., Brighton Beach, Jan 1950, *Hilliard* 677 (NU); 68. Namibia. 26 Feb 1900, *Baum* 738 (BR); 69. Mauritius. Mondrain Nature Reserve, Vacoas Ridges, 13 Aug 1994, *Lorenz* 7584 (MO); 70. Democratic Republic of the Congo. Tshikamba: Lutombe-Mukuku, *Quarre* 2501 (BR); 71. Democratic Republic of the Congo. Kurukwata, 5 Oct 1957, *Gerard* 3706 (BR); 72. Burundi. Muramwya: Bugarama, *Lewalle* 945 (BR); 73. Cameroon. Nkongsamba, Manengouba Mts., 11 Oct 1971, *Leeuwenberg* 8544 (BR); 74. Cameroon. Nkongsamba, Manengouba Mts., 21 Oct 1971, *Leeuwenberg* 8585 (BR); 75. Cameroon. ICP (Institut de Cultures Perennes), bridge over Moun River, 28 Oct 1975, *deWilde* 8540a (MO); 76. Tanzania. August 1893, *Holst* 8945 (M); 77. Liberia. Mt. Nimba, 15 Dec 1966, *Bos* 2429 (BR); 78. Zimbabwe. Queensdale, 28 Mar 1981, *Philcox* 9052 (MO); 79. Ethiopia. Gheddo, 10 Nov 1965, *deWilde* 8763 (MO); 80. Zambia. Northern Prov.: Mpika Dist., 30 Mar 1984, *Brummitt* 17009 (MO); 81. India. Chotah Nagpur, Hazaribagh Dist., Parasnath Mt., 30 Oct 1953, *Kerr* 2350 (BM); 82. Philippines. Luzon, 1896, *Whitehead s. n.* (BM); 83. Angola. Benguella, Gonda, Caconda, *Hundt* 889 (BM); 84. Angola. May 1928, *Nalde* 444 (BM); 85. Nigeria. Buea, 6 Nov 1927, *Migeod* 56 (BM); 86. Namibia. 26 Feb 1900, *Baum* 738 (BR); 87. Thailand. Siam: Chiengchao, 2 Nov 1922, *Kerr* 6516 (BM); 88. Nepal. 14 Sep 1954, *Kaintan* 8405 (BM); 89. Zambia. Chinsali Dist.: Chinsali-Isoka, 14 Mar 1986, *Philcox* 9922 (MO); 90. Zimbabwe. Melssetter Dist.: Chinokwe Dam, 17 Mar 1981, *Philcox* 9002 (BR); 91. South Africa. KwaZulu-Natal Prov.: Ngotshe Dist., Ngome, 1 Apr 1977, *Hilliard* 9928 (NU); 92. Uganda. Western Prov.: Toro Dist., Kilembi, Ruwenzori, 17 Dec 1934, *Taylor* 2445 (BM); 93. Equatorial Guinea. Bioco: Luba, Riaba, 18 Oct 1986, *Carvalho* 2584 (BM); 94. Thailand. Chiang Mai, Hawt, 14 Nov 1996, *Maxwell* 96-1540 (A); 95. Burundi. Mworo: Mt. Mugeru, 27 Apr 1966, *Lewalle* 732 (BR); 96. Burundi. Muramwya, Bugarama, 29 Apr 1967, *Lewalle* 1854 (BR); 97. South Africa. KwaZulu-Natal Prov.: Ixopo Dist., 27 Mar 1963, *Edwards* 3110 (NU); 98. Democratic Republic of the Congo. Kadjudju, 22 Sep 1934, *Babault* 302 (P); 99. Madagascar. Andovoranto: Anivorano Dist., 1912, *Viguier* 504 (P); 100. Madagascar. Lac Alaotra, 11 May 1952, *Peltier* 16 (P); 101. Madagascar. Fort Carnot, Tamala Reg., 1986, *Beaujard* 199 (P); 102. Madagascar. Fianarantsoa Prov.: Ambalavao Dist., Vohitsaoka Commune, Parc National d'Andringitra, 12 Jan 2006, *Morawetz* 245 (OS); 103. Madagascar. Antananrivo Prov., Ankazobe Dist., Manankazo Commune, 4 Jan 2006, *Morawetz* 222 (OS); 104-105. Madagascar. Antananrivo Prov., Ankazobe Dist., Manankazo Commune, 4 Jan 2006, *Morawetz* 222 (OS); 106-114. Madagascar. Fianarantsoa Prov., Ambositra Dist., 16 Jan 2006, *Morawetz* 249 (OS); 115. Madagascar. *Andriantiana s. n.* (OS).