

Monograph of the genus *Leonotis* (Pers.) R. Br. (*Lamiaceae*)

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Summary. In this revision of the genus *Leonotis* four new taxa are described and illustrated: *L. grandis* Iwarsson & Y. B. Harv. from the Southern Highlands of Tanzania, N Malawi and NE Zambia; *L. decadonta* Gürke var. *porotoensis* Iwarsson & Y. B. Harv. from the Southern Highlands of Tanzania; *L. myricifolia* Iwarsson & Y. B. Harv. from the Southern Highlands of Tanzania, E Zambia and N Malawi; and *L. myrothamnifolia* Iwarsson & Y. B. Harv. from the Mafinga Hills bordering Malawi and Zambia. The new combination *L. decadonta* Gürke var. *vestita* (Briq.) Iwarsson & Y. B. Harv. is made and differences between the varieties of *L. decadonta* are described. A lectotype is selected for *L. decadonta*. This work accepts both varieties of *L. nepetifolia* (L.) R. Br., var. *nepetifolia* and the recently much-ignored var. *africana* (P. Beauv.) J. K. Morton.

INTRODUCTION

Leonotis (Pers.) R. Br. is a striking member of the *Lamiaceae* with instantly recognisable flowering stems bearing dense verticils of predominantly orange-haired flowers. The need to complete the *Flora of Tropical East Africa* and *Flora Zambesiaca* exposed a gap in our knowledge of the genus in tropical Africa. In this region, *Leonotis* was last revised by Baker (1900). After field studies in the region (undertaken by the senior author during the late 1970s and early 1980s) and a study of herbarium specimens, it became evident that there were undescribed taxa. There have been recent treatments for South Africa (Iwarsson 1985a) and Ethiopia & Eritrea (Iwarsson in prep.), but none for West Africa. This monograph takes a pan-African view and brings together all the separate African treatments of *Leonotis*. It attempts to clarify the complicated synonymy that has resulted from numerous descriptions of the regionally distinct ecophenotypes of the polymorphic taxa.

The South African *Leonotis leonurus* (L.) R. Br. is the type species of the genus and has been grown in European gardens since about 1663 (Vos 1995). Only one taxon, *L. nepetifolia* (L.) R. Br. var. *nepetifolia*, has a pan-tropical distribution and is a well-known annual weed. All other taxa are restricted to Africa and, apart from *L. nepetifolia* var. *africana* (P. Beauv.) J. K. Morton, are perennial. The polymorphic *L. ocymifolia* (Burm. f.) Iwarsson var. *raineriana* (Vis.) Iwarsson is the most widely distributed taxon within Africa. *Leonotis ocymifolia* differs from all the other taxa in

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having only a single band of hairs within the corolla tube. Many taxa are used medicinally in a number of different ways throughout the continent, particularly for stomach ailments in tropical Africa, and are used as a substitute for cannabis in South Africa [although the senior author refutes this following extensive tests!].

With the exception of new taxa and *L. decadonta* (for the reasons given below), only one record per country or region is cited for each taxon. All specimens seen are listed in Appendix 2. Collections of the South African endemic, *L. leonurus*, have been extensively cited by Iwarsson (1985a). For a number of years, collections of *L. decadonta* Gürke var. *vestita* (Briq.) Iwarsson & Y. B. Harv. have been misidentified as *L. leonurus*. The distributions of the varieties of *L. decadonta* overlap. For this reason, and the mis-citing of non-South African material, it was decided to cite all studied specimens of this commonly encountered taxon.

AFFINITIES

Bentham (1834) placed *Leonotis* (Pers.) R. Br. between *Leucas* R. Br. (excluding sect. *Lasiocorys*) and *Phlomis* L. in tribe *Stachydeae*, characterised by a 3 – 10-toothed, 5 – 10-nerved calyx, ring(s) present within the corolla tube and a prominently 2-lipped corolla. *Leucas sensu* Benth. (1834) has an 8 – 10-toothed calyx, corolla with a shortly haired, hooded posterior lip and a style with uneven arms, while *Phlomis* has a tubular calyx with 5 – 10 veins and five teeth. Bentham (1876) placed *Leonotis* (Pers.) R. Br. between *Lasiocorys* Benth. [*Leucas* sect. *Lasiocorys*] [*Lasiocorys* having an unequally 5-lobed calyx and a hirsute hooded posterior corolla lip] and *Phlomis* L. in the tribe *Stachydeae*, subtribe *Lamieae*. This subtribe comprised genera with a "hairy, hooded upper lip" and a corolla tube not exerted from the calyx. Briquet (1895 – 1897) placed *Leonotis* in the subfamily *Stachyoideae*, tribe *Lamiinae*, between *Notochaete*, and *Eremostachys* and *Phlomis*. *Notochaete* differs from *Leonotis* in having a 5-lobed calyx with an apically pointed oblique tooth as opposed to a 5 – 10-lobed calyx with a straight apical tooth. *Phlomis* and *Eremostachys* differ from *Leonotis* in having either posterior and anterior corolla lips of similar lengths, or the posterior lip shorter than the anterior lip. In *Leonotis* the posterior lip is significantly longer than the anterior lip. This is where *Leonotis* has remained since (Cantino *et al.* 1992), although the subfamily is now referred to as *Lamioideae*.

Sebald (1980) considered *Leonotis* to be a close relative of *Leucas*, because of the similar simple-haired outer posterior corolla lip and because both genera contain species with 10-toothed and 10-nerved calyces. Sebald separated the genera by corolla colour (although he mentions that an Asiatic group of *Leucas* have white, pale pink and red corollas) and the size of the anterior corolla lip in comparison with the posterior lip (*Leonotis* has a shorter anterior lip whereas *Leucas* tends to have a longer anterior lip). Ryding's (1993) paper on pericarp structure of *Leucas* and related genera within subfamily *Lamioideae* suggested that *Leonotis*, *Acrotome* Benth. ex Endl. and most African *Leucas* were closely related because all possess a thin to strongly reduced sclerenchyma region in the nutlet. Ryding looked at 9 taxa in *Leonotis*, omitting only *L. decadonta* var. *vestita*, *L. ocymifolia* var. *ocymifolia* and *L. ocymifolia* var. *schinzii*, and also examined 58 of the 72 taxa of *Leucas* and 5 of the 8 taxa of *Acrotome*.

Using the results from the 1993 paper and other characters in a cladistic analysis,

Ryding (1998) concluded that *Leucas* is paraphyletic, with *Acrotome* and *Leonotis* as subgroups. *Leonotis* emerges as a sister group to *Leucas martinicensis* (Jacq.) R. Br. and *Acrotome* emerges as a sister group to *Leucas* sect. *Lasiocorys*. Ryding (1998) suggested that the circumscription of the well defined genera of the *Leucas* group should not be changed in order to avoid paraphyly.

On the basis of Ryding's (1998) conclusions and using only morphological characters, it might be suggested that a single band of hairs within the corolla tube (as in all *Leucas*) is the primitive state in *Leonotis*, and the more frequently encountered 3 bands of hairs is the derived state. *Leucas martinicensis* (mentioned above) is a pantropical taxon, but numbers of collections suggest that it is more frequent in East Africa, Congo (Kinshasa) and Ethiopia. It has a calyx with a prominent posterior tooth and partial fusion of the lower three anterior lobes into a deflexed lip, together with \pm velutinous ovate (to narrowly ovate) toothed leaves. These characters, including the single band of hairs within the corolla tube, are shared only with *Leonotis ocyimifolia* var. *raineriana*.

POLLINATION

Although the flowers are known to be visited by a variety of insects, the predominant pollinators are sunbirds (*Nectariniidae*). The upper lip of the corolla covers the anthers and stigma, so that during feeding, pollen is deposited on the sunbird's head. An unfeathered groove that extends from the base of the bill up the forehead has been described in the golden-winged sunbird (*Anthreptes reichenowi*) (Gill & Conway 1979). The pollen is held in place by its stickiness (pollenkitt) until it is transferred during subsequent visits to other corollas (Iwarsson 1979). Sunbirds are moderately to highly specialized plant pollinators in a number of ways: body size; bills; tongues; digestive tracts; aggressive, territorial and/or foraging behaviour; and annual cycles. Many taxa are known to visit *Leonotis*, these include: *Anthobaphes violacea* (southern Africa); *Anthreptes reichenowi* (E Africa); *Chalcomitra senegalensis* (widespread in Africa); *Cinnyris chalybea* (southern Africa); *Cinnyris talatala* (southern Africa); *Cinnyris venusta* (widespread in Africa); *Cyanomitra amethystina* (E central to SE Africa); *Cyanomitra verticalis* (central and E Africa); *Nectarinia afra* (NW Lake Tanganyika); *Nectarinia famosa* (East to southern Africa); *Nectarinia kilimensis* (southern Africa); and *Nectarinia olivacea* (widespread) (Gill & Conway 1979, Daugherty 1998, Getliffe-Norris 1989, Iwarsson 1979, Vos 1995). The birds also feed at the flowers of many other genera.

Leonotis have key characters of coadaptation between bird and flower (Stiles 1982):- highly coloured attraction units; a reward mechanism; and a filtering component.

The attraction unit of *Leonotis* is the bright red/orange corollas. Most bird-pollinated flowers have long-wavelength colours, visible to birds, in the attraction unit. The common buff-coloured *L. ocyimifolia* var. *raineriana* may well also reflect at long wavelengths. *L. nepetifolia* var. *africana* has yellow (-buff) corollas. *L. nepetifolia* var. *nepetifolia*, the widespread pantropical weed, is much used by flower-visiting birds in both the New and Old World tropics, but is not reliant on bird pollination and is known to be self-fertile and autogamous (Vos *et al.* 1994).

The reward is nectar. Bird-pollinated flowers have higher nectar volumes than insect-pollinated flowers (Stiles 1982). A high sugar production is one of the most important determinants of flower choice in nectarivorous birds (*ibid.*). In *Leonotis* nectar production is highest in younger verticils (*ibid.*). Although there is no significant difference early in the season, shaded plants have a greater rate of nectar production late in the season (Gill & Conway 1979). Gill & Wolf (1977) found that there are two daily periods of nectar production, the main one between 07.00 – 11.00 and a smaller one between 11.00 – 13.00.

The filtering components are numerous. The colour red is conspicuous to birds but relatively inconspicuous to insects such as bees (Stiles 1982). Nectar production, timing, composition and quantity can also play a part by excluding feeding taxa that need high amounts of nectar at specific times, of specific composition and higher energy levels from fewer feeds. Floral morphology is also an important filter. The curvature and length of the corolla, while not limiting successful visits to a single species, may limit feeding to a certain range of sunbirds. Gill & Conway (1979) studied the curvature of the corolla of *Leonotis nepetifolia* in Kenya. No species has a beak perfectly matching the dimensions of the corolla, although the size of the corolla made feeding easier for *Anthreptes reichenowi*, *Nectarinia kilimensis* and *N. famosa*, whilst *Cinnyris venusta* was excluded because of the shortness of its bill. The base of the tube is protected by a rather rigid calyx, tightly packed with others to form an impenetrable globular head and making access to the nectar difficult for an insect or bird trying to tunnel in from outside. The basal band(s) of hairs within the corolla also excludes many small insects, but not a long-billed sunbird with a highly specialized tongue.

One of the main avian adaptations to flower feeding is that of territoriality, although this restricts pollen flow. Gill & Wolf (1975) studied territoriality in Kenyan *Anthreptes reichenowi* and discovered that this taxon defends both intra- and interspecifically against all sunbirds in the near vicinity. Territories contain patches of flowering *Leonotis* and can be defended all day for a few weeks. Territories increase in size as numbers of new flowers decline, so that each always contains roughly the same numbers of flowers. When flowers become too scarce, territories are abandoned. Another adaptation is route foraging (sometimes called 'trap-lining'). Sunbirds forage in a non-random way (Gill & Wolf 1977) and have excellent spatial memory, so that they rarely revisit flowers on a verticil during a single visit. They also visit in a non-random way. In particular, they pattern their visits in the late morning when nectar volumes are lower, and also tend to feed in one plane/stratum at a time. Another adaptation is that of feeding on corollas facing outwards. Sunbirds are able to cling on to the stem with their strong feet and feed from the verticils by spinning slowly around the stem, in addition to hovering for very short periods.

Leonotis (*Pers.*) *R. Br.*, Prodr.: 504 (1810); Aiton, Hortus Kew., ed. 2, III: 409 – 411 (1811); Bentham, Labiat. Gen. Spec. fasc. 6 (III): 618 – 620 (1834) & 744 (1835); Bentham in Meyer, Comm. Pl. Afr. Austr.: 242 – 243 (1838); Spach, Hist. Nat. Veg.: 9: 210 – 211 (1838); Bentham & Hooker, Gen. Pl., II (2): 1214 (1876); Gürke, *Labiateae Africae III (Leonotis)*, Bot. Jahrb. Syst.: 141 – 144 (1897); Baker in Thiselton-Dyer (ed.), Fl. Trop. Afr. 5 (3): 491 – 494 (1900); Briquet, Bull. Herb. Boissier, sér. 2, 3:

1090 – 1094 (1903); Skan in Thiselton-Dyer (ed.), Fl. Cap. 5 (sect. 1, pt. 2): 374 – 382 (1910); Iwarsson in Codd (ed.), Flora of Southern Africa 28 (4): 31 – 37 (1985); Vos, A Systematic Study of *Leonotis* in Southern Africa (unpublished PhD thesis): 199 pp. (1995). Lectotype species: *L. leonitis* R. Br., now included in *L. ocyimifolia* (Burm. f.) Iwarsson var. *ocyimifolia* (selected by Britton, Fl. Bermuda: 324 (1918)).

Phlomis L. sect. *Leonotis* Pers., Syn. Pl. 2 (1): 127 (1806).

Hemisodon Raf., Fl. Tellur. 3: 88 (1837). Type species: *H. leonurus* (L.) Raf., now included in *L. leonurus* (L.) R. Br.

Annual or perennial herbs or shrubs to 8 m tall. Stems quadrangular, occasionally rounded at base, pubescent, nodes thicker than internodes, often with prominent leaf scars. Leaves petiolate or occasionally sessile, margins crenate. Inflorescence composed of 1 – 5 verticils per shoot; verticils dense, spherical to ellipsoid, many-flowered; bracts leaf-like; bracteoles linear, mucronate. Calyx tubular, 10-nerved, 8 – 10-toothed; teeth triangular, mucronate at apex. Corolla tubular, 2-lipped, white or faintly pink, covered by red, orange, yellow, buff (or sometimes white) hairs; tube with 1 – 3 basal rings of hairs within; upper corolla lip entire, slightly shorter than the tube, curved inwards at apex (hooded), with a fringe of long hairs within at the apex covering the anthers and stigma, occasionally coloured white; lower lip 3-lobed, considerably shorter than the upper lip, darker than the rest of the corolla, reflexed to patent, subglabrous, median lobe occasionally longer than the outer lobes. Stamens 4, inserted at the mouth of the corolla, didynamous, the lower pair longer, thecae 2, divaricate. Disc ventrally enlarged. Style (partially) bifid, dorsal stigma surface sessile. Nutlets obconic, three-angled in transverse section, distally truncate, with sessile glands, otherwise glabrous, dark or pale brown.

Nine species most only in Africa, although *Leonotis nepetifolia* is a pantropical weed. *L. leonurus* and *L. nepetifolia* are cultivated throughout the world. Measurements of verticil diameter exclude corollas

1. Calyx usually 10(–12)-toothed, teeth subequal, or with a one-veined dorsal tooth, less than 2(–3) mm longer than either lateral or ventral teeth; lower lip of corolla reflexed on corolla tube, with three separate lobes 2
 Calyx usually 8-toothed; dorsal calyx tooth three-veined, distinctly longer (3 – 8.5 mm) than either the lateral or ventral teeth; lower lip of corolla spreading, with three lobes united at the base, shrivelled and twisted 10
2. Leaf blades (equal to or) more than 50 mm long, linear, narrowly lanceolate (-elliptic) or narrowly ovate 3
 Leaf blades less than 50(–55) mm long, rounded, broadly ovate, oblanceolate, rhomboid or spatulate 7
3. Leaves narrowly ovate to linear, width less than 22 mm; nutlets 4.8 – 6.0 mm long, without marginal rim connecting ventral sides distally **1. L. leonurus**
 Leaves narrowly ovate or narrowly (lanceolate-) elliptic; width usually more than 22 mm; nutlets 3.0 – 4.4 mm long, with a marginal rim distally 4
4. Calyx constricted at throat, dorsal, ventral and lateral teeth of distinctly different length; banding within corolla tube distinct; stem almost glabrous
 **2. L. grandis**

- Calyx not constricted at throat, teeth subequal; banding within corolla tube diffuse; stem velutinous, shortly pubescent or pilose 5
5. Leaf-blade truncate or (occasionally) shortly attenuate at base, pubescence velutinous; calyx teeth 4–6 mm long **3a. L. decadonta** var. **decadonta**
 Leaf-blade attenuate at base, pubescence pilose or shortly pubescent; calyx teeth shorter, 0.5–3.5 mm long 6
6. Stem and leaves shortly pubescent; leaves less than 100 mm long; bracts as large as or smaller than mature leaves; calyx pubescent with orange hairs
 **3b. L. decadonta** var. **porotoensis**
 Stem and leaves loosely pilose, rarely almost glabrous; leaves more than 100 mm long; bracts as large as or larger than mature leaves; calyx pubescent with white hairs **3c. L. decadonta** var. **vestita**
7. Leaves orbicular or broadly ovate, velvety especially beneath; verticils small, 21–30(–35) mm in diameter **7. L. goetzei**
 Leaves oblanceolate, ovate, spatulate to rhomboid, not velvety below; verticils larger, (25–)30–52 mm in diameter 8
8. Corolla upper lip white-hairy on inner surface; dorsal calyx tooth 3–4 mm long, other teeth 2–3 mm long; leaf-blade margin toothed in apical two-thirds **6. L. pole-evansii**
 Corolla upper lip orange-hairy on inner surface; dorsal calyx tooth shorter, 2–3 mm long, the other teeth also shorter, 1–2 mm long; leaf-blade margin toothed only at apex 9
9. Leaf-blade obovate to narrowly oblanceolate, 3.5–10 mm wide (occasionally–18 mm wide), (mostly) eglandular; bracteoles 1–2 mm wide, calyx appearing pale green to brown **4. L. myricifolia**
 Leaf-blade obtrullate to rhombic, 12–18 mm wide, both surfaces glandular; bracteoles less than 1 mm wide; calyx appearing orange
 **5. L. myrothamnifolia**
10. Annuals or short-lived herbs (to 3 m high); not branched at base; usually with a tuft of long hairs at the nodes; corolla tube usually with three hair fringes inside 11
 Perennials, woody shrubs from a swollen base; without longer hairs at the nodes; corolla tube with one fringe of hairs inside 12
11. Corolla orange **9a. L. nepetifolia** var. **nepetifolia**
 Corolla yellowish cream **9b. L. nepetifolia** var. **africana**
12. Leaves, including petiole, more than 50 mm long, usually velvety beneath, rarely tomentose to almost smooth; main stem sparsely branched
 **8c. L. ocymifolia** var. **raineriana**
 Leaves usually less than 50 mm long; shortly pubescent to tomentose beneath; main stem with many short leafy shoots 13
13. Leaf-blades round to broadly ovate, base rounded to truncate, petiolate
 **8a. L. ocymifolia** var. **ocymifolia**
 Leaf-blades narrowly spatulate to oblanceolate or narrowly obovate, attenuate at base, sessile **8b. L. ocymifolia** var. **schinzii**

1. **Leonotis leonurus** (L.) R. Br. in Aiton, Hortus Kew., ed. 2, III: 410 (1811); Sprengel, Linnaeus Syst. Veg., ed. 16, II: 744 (1825); Bojer, Hortus Maurit.: 249 (1837); Gürke in "Labiatae", Bot. Jahrb. Syst. 30: 393 (1901); Spooner, Gard. Chron. (3rd series) 45: 139 (1908). Type: Cape of Good Hope, Herb. Linnaeus 740.19 (LINN, lectotype).

Phlomis leonurus L., Sp. Pl. II: 587 (1753); Linnaeus, Fl. Cap.: 8 (1759); Linnaeus, Mant. Pl., ed. II: 412 (1771); Linnaeus, Syst. Veg., ed. 13: 451 (1774); Sims, Bot. Mag. t. 478 (1800); Bentham in DC., Prodr. XII: 536 (1848). *Leonurus capitis Bonae Spei* Breyne, Exot. Pl. Cent. I: 171, t. 86 (1678); *Leonurus perennis Africanus* Herm., Hort. Lugd.-Bat. Cat.: 115 (1687); Boerhaave, Ind. alter hort. Lugd.-Bat.: 180 (1720); Breyne, Prodr. Fasc. Rar. Pl.: 76 (1739); Miller, Gard. Dict., ed. 4, II (1754). *Leonurus africanus* Mill., Gard. Dict., ed. 8 (1768). *Hemisodon leonurus* (L.) Raf., Fl. Tellur. III: 88 (1837).

Leonurus grandiflorus Moench, Methodus: 400 (1794). No type material known.

Leonotis leonurus (L.) R. Br. var. *albiflora* Benth. in Meyer, Comm. Pl. Afr. Austr.: 243 (1838). Type: Cape, in Hexrivier ad villam De Vries, alt. 1200 pd., *Drege* s.n. (K, lectotype; K, S, W).

Woody shrub, 2–5 m high, from a swollen rootstock, stems erect. Shoots rounded at base, grooved and branched towards the apex. Stems with internodes 1–5 cm long on main shoot, striate, faintly tubercled, lenticels c. 1 × 10 mm, immature stem greyish green, mature stem pale brown, densely antrorsely pubescent, with scattered sessile glands and occasionally a few longer spreading hairs; nodes slightly thicker, usually more densely pubescent, with prominent leaf-scars. Leaves petiolate; petiole 0.5–10 mm long, densely pubescent with short curved hairs and a few sessile glands; blade narrowly ovate to linear 10:1–6:1 (–3:1), (30–)50–100 × (7–)10–20 mm, discolorous, apex narrowly acute, base narrowly cuneate, margin serrate with 15–30 teeth mostly in the apical half of the blade, slightly involute, upper surface laxly pubescent with sessile glands, green, lower surface more densely pubescent with sessile glands, paler green, margin and major side-veins with shorter, curved hairs, with 6–10 side-veins per leaf. Inflorescence of 2–11 verticils per branch, internodes 40–70 (–85) mm long. Bracts leaflike, 40–80 × 4–9 mm, indumentum as cauline leaves. Bracteoles linear, 6–20 × 0.5–1 mm, densely pubescent and with sessile glands, apiculate. Verticils conical to hemispherical, 25–40 mm in diameter, with branches c. 0–2 mm long, number of buds per branch unknown. Pedicels 1–4.5 mm long, shortly pubescent. Calyx 12–16 mm long, 4 mm in diameter at mouth, (9–)10-toothed, towards apex appearing pale green, yellowish towards base, subglabrous, shortly pubescent on nerves; apex of tube slightly bent forwards; mouth slightly oblique with the lower 3–5 teeth partially united and bent outwards to form a lower lip; teeth 0.9–3 mm long, occasionally the dorsal tooth slightly longer, narrowly triangular, apiculate. Corolla 40–49 mm long, with orange (rarely yellowish-white) hairs; tube 26–30 mm long, bending forwards, widening at the mouth, with (1–)3 or more diffuse fringes within (near base); upper lip 14–20 mm long with a small hump distally, the hair fringe at margin 1.5–2.5 mm long, the white or orange woolly hair

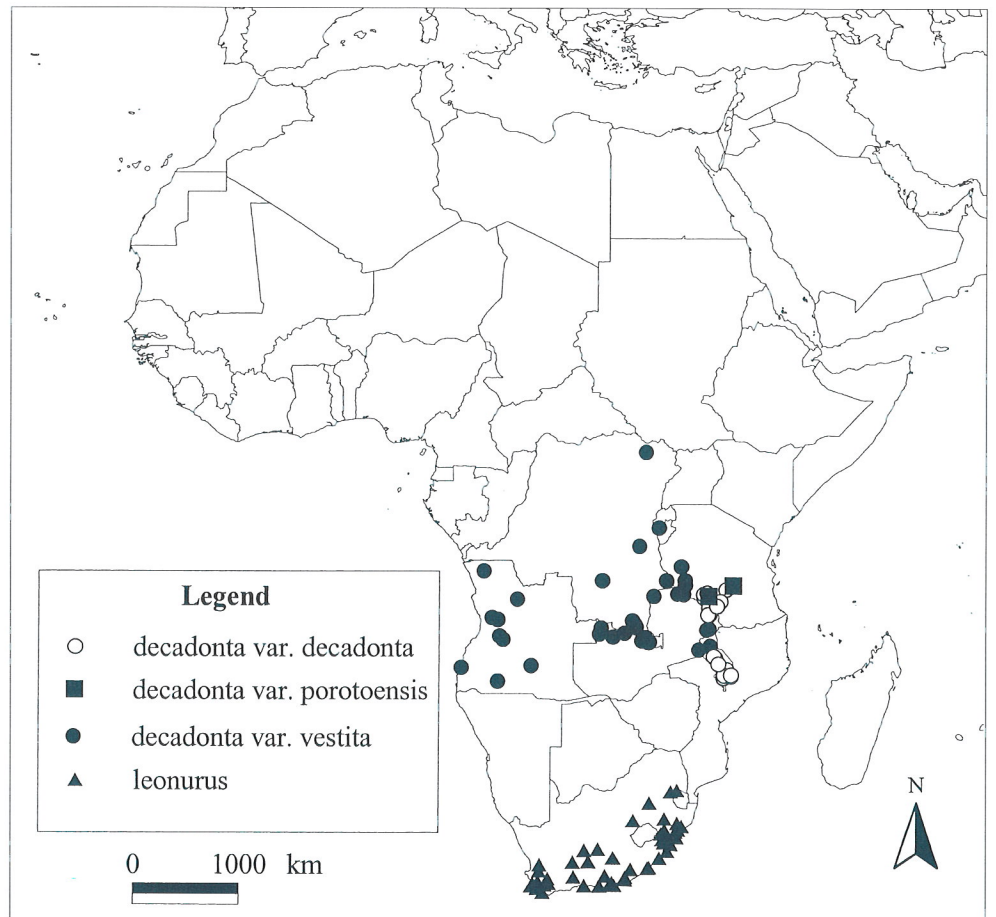
enclosing anthers and stigma well developed; lower lip 3-lobed, deflexed on tube, median lobe $4.2 - 5.5 \times 3.5$ mm, lateral lobes $4.5 - 7.2$ mm long, distally retuse, laxly covered with short orange hairs on the outer surface. Fresh pollen pale yellow. Nutlets $4.8 - 6 \times 1.6 - 1.9$ mm, brown, the distal glandular surface notably oblique (not distinctly bordered by a rim on the two ventral sides).

DISTRIBUTION. South Africa (Map 1).

HABITAT. Locally common at forest margins, often on river banks, on rocky hillsides or in tall grassland; 0 – 2000 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This South African endemic is found throughout the region in a wide range of habitats and there are many recent collections. This taxon is not presently threatened.

SPECIMENS EXAMINED. For an extensive collection list see Iwarsson (1985b).



MAP. 1. Distribution of *Leonotis leonurus*, *L. decadonta* var. *decadonta*, *L. decadonta* var. *porotoensis* and *L. decadonta* var. *vestita*.

NOTES. Apart from being the most widely horticulturally grown *Leonotis* (hedges and cut flowers), this taxon is distinct from all others in nutlet shape. *L. leonurus* has an oblique, undefined rim between the ventral surfaces rather than the distinct rim found on the nutlets of all other taxa. This character readily distinguishes *L. leonurus* from the morphologically similar *L. decadonta* var. *vestita* that has long been mistaken for *L. leonurus* in tropical Africa. The two taxa have similar stem pubescence (antrorse hairs and occasionally sessile glands), verticil shape and size, bracteole shape, size and pubescence, and have similar calyces (subequal teeth or occasionally the dorsal tooth slightly longer). They differ most significantly in leaf and seed size and shape. *L. leonurus* has linear leaf-blades with marginal teeth mostly in the apical half of the blade and significantly larger nutlets ($4.8 - 6 \times 1.6 - 1.9$ mm). *L. decadonta* var. *vestita* has (narrowly) lanceolate leaf-blades with marginal teeth to the base and much smaller nutlets ($3.3 - 3.7 \times 1.3 - 1.4$ mm). The distributions do not overlap. *L. leonurus* is native to South Africa (Transvaal, KwaZulu-Natal and the Cape) while *L. decadonta* var. *vestita* is known from Congo (Kinshasa), Rwanda, Burundi, Tanzania, Angola, Mozambique, Malawi and Zambia.

2. *Leonotis grandis* Iwarsson & Y. B. Harv. sp. nov., *Leonotis decadontae* var. *vestitae* similis sed calyce urceolato nec infundibulariformi atque dentibus calycis longioribus (2 - 5 mm nec 0.5 - 2(-3) mm longis), corolla aliquantum longiore (43 - 50 mm nec 30 - 45 mm longa), foliis lanceolato-ellipticis nec late lanceolatis differt. Typus: Malawi, Chitipa Distr., Chitipa-Chinunka road, near Kaseye Mission at bridge of Vumbo R., 1250 m, 25 July 1978, Iwarsson & Ryding 972 (UPS holotypus; DSM, EA, K, MAL, NHT, isotypi).

Shrub (1.8 -)3 - 5 m high, branched towards apex, with up to 40 shoots from a woody rootstock. Stems with internodes 1 - 3 cm long, with short, antrorse hairs and a few longer hairs, occasionally with scattered sessile glands, green at apex, pale brown at mid-point, grey-striate at base with lenticels c. 10×1 mm; nodes prominent and with ring-like leafscars. Leaves petiolate; petiole (6 -)8 - 12 mm long, densely covered with short antrorse hairs and occasionally with sessile glands; blade narrowly (lanceolate-) elliptic, $50 - 120 \times (5 -)10 - 30$ mm, apex acuminate, base attenuate, margin involute, crenate in only in the apical $\frac{1}{2} - \frac{2}{3}$, both surfaces sparsely pubescent to glabrous and covered with sessile glands, with 8 - 10 side-veins per leaf. Inflorescence of 2 - 3(-5) verticils per branch, internodes usually up to 100 mm long. Bracts leaflike, $42 - 90 \times 5 - 12$ mm, indumentum as cauline leaves. Bracteoles green, linear, $10 - 20(-30) \times 1 - 2(-3)$ mm, short antrorse hairs and occasional scattered glands, hairs occasionally brownish, particularly on margins and midvein. Verticils hemispherical, 37 - 66 mm diam., verticil with c. 12 branches, 2 - 5 mm long with c. 10 buds per branch. Pedicels 2 - 3 mm long, often extending in fruit to 4 - 6 mm long, pubescent, occasionally ridged. Calyx 18 - 25 mm long, 4 - 5 mm diameter at throat, brownish, buds urceolate (swollen at mid-point and constricted at throat), 10-toothed, shortly pubescent and covered with sessile glands; mouth oblique with the 3 ventral teeth partially united and bent outwards to form a lower lip; dorsal tooth 3 - 5 mm long, triangular, apiculate; lateral teeth 1 - 4 mm

long, triangular, apiculate; ventral teeth united for 1–2 mm, 2–3 mm wide, outer teeth 1–2 mm long, middle tooth slightly shorter, triangular, apiculate. Corolla 43–50 mm long, with flame-orange/red hairs; tube 23–29 mm long, with 3–4 distinct fringes (bands) within (near base); upper lip 17–22 mm long, with a small (10 mm long) hump distally, the hair fringe at margin c. 3 mm long, the orange woolly hair enclosing anthers and stigma well developed; lower lip 3-lobed, 3–6 mm long, deflexed on the tube, scantily covered with curved orange hairs on the outer surface, all lobes retuse at apex, lateral lobes asymmetrically so, the middle lobe retuse at mid-point. Fresh pollen pale yellow. Nutlets 3.7–4.4 × 1.7–2.2 mm, oblong, 3-angled, distinct marginal rim, truncate and glandular distally, glossy, glabrous. Fig. 1.

DISTRIBUTION. Tanzania (Southern Highlands), Malawi (Northern) and Zambia (North-Eastern) (Map 2).

HABITAT. Amongst dry shrubs in open montane grassland, margins of montane forest, riverbanks, occasionally spreading in secondary forest and roadsides in hard, well-drained sandy soil. Associated species: *Acacia* spp., *Crotalaria lachnophora* (*Leguminosae*) and *Nelsonia canescens* (*Acanthaceae*). 1150–2135 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: VU (D2). This taxon has been collected only once in both Malawi and Zambia but has been collected a number of times in the Southern Highlands of Tanzania. Threats here include encroaching settlement and potato farming. Further collections may show this not to be threatened.

SPECIMENS EXAMINED. TANZANIA. Mbeya Distr.: Iringa-Mbeya road at Chimala R., 1150 m, 11 Aug. 1984, *Iwarsson et al.* 1052 (DSM, NHT, UPS); Iringa-Mbeya road, Ilembula R. bridge, Halili, 1300 m, 11 Aug. 1984, *Iwarsson et al.* 1050 (DSM, NHT, UPS); Iringa-Mbeya road, Uyole, 1850 m, 11 Aug. 1984, *Iwarsson et al.* 1053 (DSM, NHT, UPS); along the Iringa-Mbeya rd., Inyala, 1500 m, 31 Aug. 1974, *Mhoro & Backéus* 2327 (UPS); Chunya Escarpment, 2133 m, 1 Sept. 1970, *Richards* 25805 (K, M); Uyole, along Iringa road, 1800 m, 8 Jan. 1982, *Hellqvist* 56 (UPS); Mbeya, near the guesthouse, Nov. 1967, *Prins-Lampert* 288 (WAG). Rungwe Distr., Mwakaleli, Rungwe, 2000 m, 20 Aug. 1969, *Issa* 69 (K, EA). Iringa Prov., 1200–2400 m, 1 May 1935, *Emson* 385 (EA, K, PRE).

MALAWI. Chitipa Distr., Chitipa-Chinunka road, near Kaseye Mission at bridge over Vumbo R., 1250 m, 25 July 1978, *Iwarsson & Ryding* 972 (UPS, DSM, EA, K, MAL, NHT).

ZAMBIA. Lundazi, 16 Aug. 1965, *Fanshawe* F9280 (K, NDO, WAG).

NOTE. This species is most similar to *L. decadonta* var. *vestita* in height, in the pubescence of stem, leaf, petiole, bracteole and calyx, in its long leaves, and in lacking long white woolly hairs within the upper corolla lip. *L. grandis* can be distinguished from *L. decadonta* var. *vestita* by the calyx that is constricted at the throat and has longer teeth (2–5 mm long); the longer corolla (43–50 mm, not 30–45 mm long), and leaves that are narrowly lanceolate-elliptic. In contrast the calyx of *L. decadonta* var. *vestita* is not constricted at the throat and has much shorter teeth (0.5–2(–3) mm long), the corolla is much shorter (30–45 mm long) and the leaves are more broadly lanceolate.

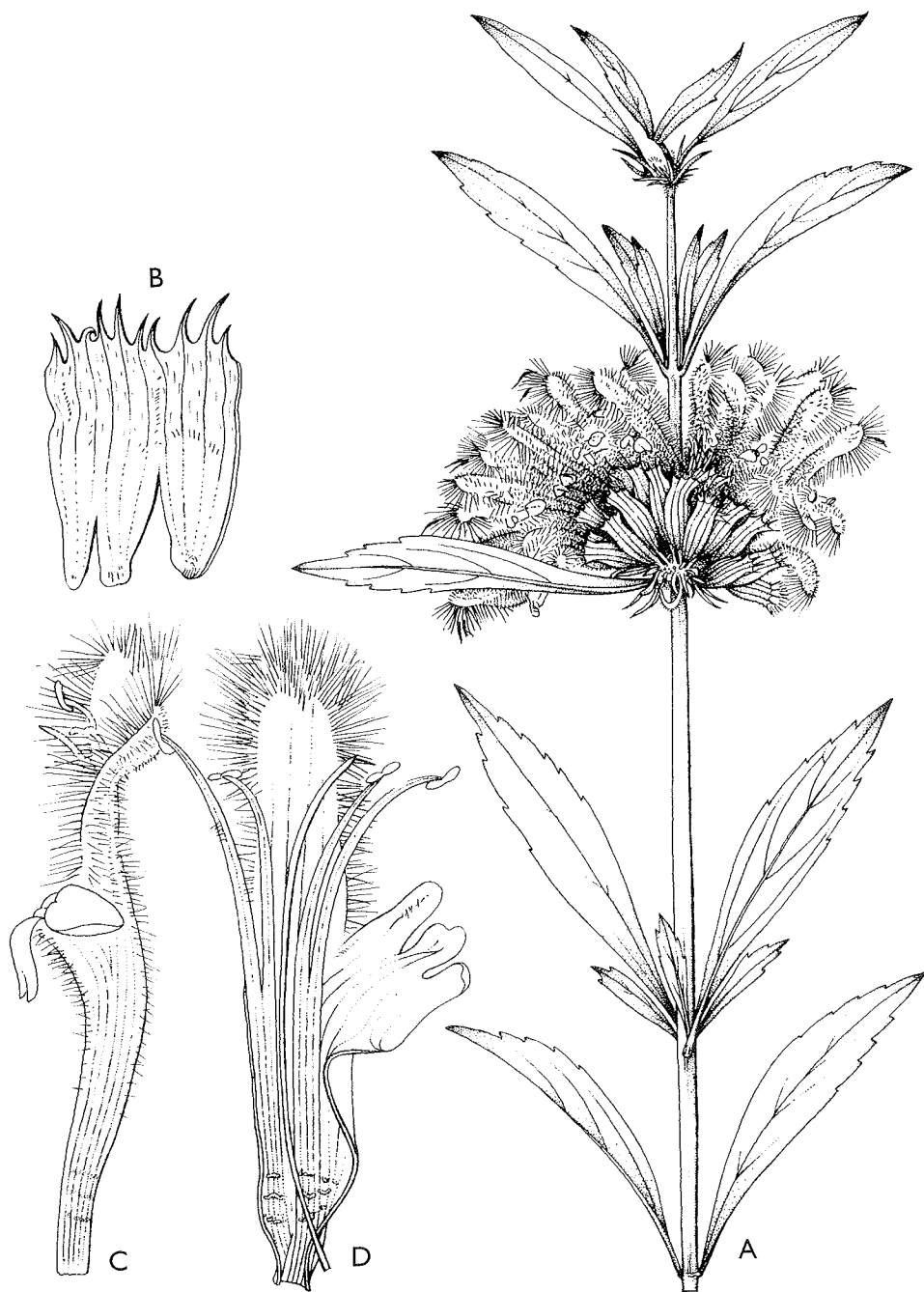
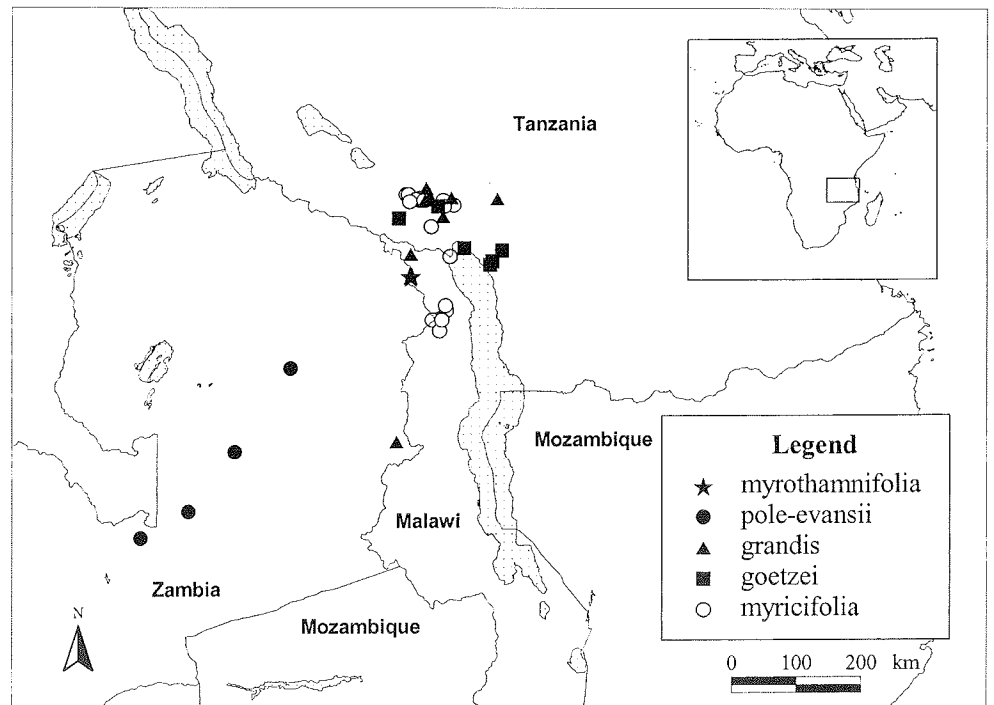


FIG. 1. *Leonotis grandis*. A habit $\times \frac{2}{3}$; B opened calyx (within) $\times 2$; C corolla $\times 2$; D opened corolla (within) $\times 2$. A - B drawn from *Fanshawe* 9280, C - D from *Issa* 69 by Emmanuel Papadopolous.



MAP. 2. Distribution of *Leonotis myrothamnifolia*, *L. pole-evansii*, *L. grandis*, *L. goetzei* and *L. myricifolia*.

It also resembles the South African species *Leonotis leonurus* (L.) R. Br. Plants are of a similar height (2–5 m tall), stem pubescence, petiole size, leaves to 120 mm long with marginal teeth only in the upper half, and corolla size. However, they differ in leaf-blade shape, calyx size and shape and teeth length, and nutlet size and shape (see above). *L. grandis* has narrowly lanceolate-elliptic leaves, a larger (18–25 mm long) calyx with a constricted throat, teeth of various sizes and smaller nutlets (3.7–4.4 mm long). *L. leonurus* has linear leaves, a smaller calyx (12–16 mm long) without a constricted throat, subequal teeth and larger nutlets (4.8–6 mm long).

3. *Leonotis decadonta* Gürke, Bot. Jahrb. Syst. 22: 144 (1895); Baker in Thiselton-Dyer, Fl. Trop. Afr. 5 (3): 493 (1900); Brenan *et al.*, Mem. New York Bot. Gard. 9: 55 (1954); Binns, A First Checklist of the Herbaceous Flora of Malawi: 58 (1968); Moriarty, Wild Flowers of Malawi: 108, pl. 54, f. 2 (1975). Type: Malawi, without locality, 1891, *Buchanan* 202 (B†, holotype, BM neotype **selected here**).

Shrub to small tree 1.2–8 m high, little to much-branched with one to more than 50 shoots from a woody swollen rootstock, shoots sometimes 15 cm in diameter. Stems with internodes 1–5 cm long, at apex with long antrorse velutinous hairs and sessile glands. 25–30 nodes below the apex the cortex is more corky, brown to grey and with a striate surface sometimes polished in between;

nodes are thicker, more velutinous and with prominent leaf scars. Leaves petiolate; petiole 2 – 39 mm long, densely adpressed-velutinous-pubescent, eglandular or with scattered sessile glands; blade ovate, lanceolate, rarely elliptic or narrowly rhomboidal, 50 – 184 × (13 –)15 – 80 mm, apex acute, base truncate to attenuate, margin crenate to serrate with 10 – 40 –(100) teeth almost to the base or basal third of leaf devoid of teeth, upper surface softly velutinous-pubescent to loosely pilose, occasionally with sessile glands, lower surface generally more densely hairy, occasionally with sessile glands, with 10 – 20(–22) side-veins, venation mostly yellowish on lower surface. Inflorescence of (1 –)3 – 5 verticils per branch usually spaced by prolonged internodes 38 – 330 mm long. Bracts leaflike, 26 – 117 × 6 – 36 mm, indumentum as cauline leaves. Bracteoles linear to narrowly ovate 5 – 20(– 26) × 1 – 2(– 3.5) mm, often a few broader (2 – 4 mm wide) and more leaflike, indumentum as cauline leaves, apiculate. Verticils hemispherical, 25 – 50 mm in diameter, with c. 10 – 20 branches, (1 –)3 – 5 mm long with 8 – 14 buds per branch. Pedicels 1 – 3(– 6) mm long, slightly extended in fruit, shortly pubescent. Calyx 12 – 20 mm long, c. 4 mm in diameter at mouth, (8 – 9 –)10-toothed, basally yellowish white and the distal half green (some material has a brown (c.) 2 mm broad zone 4 – 6 mm from the base of calyx) or calyx appearing orange, short velutinous hairs to pilose, eglandular or with scattered sessile glands; mouth sometimes oblique with the (3 –)5 – 7 lower teeth partially united and bent outwards to form a lower lip; teeth 0.5 – 6 mm long, equal or dorsal slightly longer, straight or recurved, acute and triangular, deltoid or broadly mucronate, apex apiculate. Corolla 30 – 45 mm long, with orange-scarlet hairs; tube 19 – 27 mm long, widening at mouth, with three (±) diffuse fringes within (near base); upper lip 11 – 19 mm long with a small hump distally, the hair fringe at margin 1 – 1.5 mm long, the (white or orange) woolly hair enclosing anthers and stigma well developed; lower lip 3-lobed, 5 – 7 mm long, 2 – 3 mm broad, deflexed on the tube, covered with orange hairs on the outer surface. Fresh pollen pale yellow or in Tanzania (T7) rarely orange. Nutlets 3.0 – 3.8 × 1.3 – 1.7 mm, with a marginal rim distally, brown glossy surface. Fig. 2

3a. var. *decadonta*

Leonotis leonurus sensu Brummitt, List of Nyika Botanical Collections. Reprinted from Wye College 1972 Malawi Project Final Report: 61 (1973).

Shrub to 8 m high. Cortex of stem greyish-brown to grey, with antrorse velutinous pubescence and sessile glands. Leaves petiolate; petioles (6 –)15 – 39 mm long, velutinous-pubescent; blade truncate to shortly attenuate at base, hairs on veins occasionally yellowish; marginal teeth almost to base. Internodes of inflorescence 4 – 22 cm long; verticils 25 – 50 mm in diameter (excluding corollas). Bracts 27 – 48 (– 80) × 9 – 36 mm, petiole 7 – 20 mm long. Bracteoles few and insignificant, 7 – 11(– 15) × 1 – 2 mm, often a few broader (2 – 4 mm), apiculate with white apex, more leaflike, with antrorse hairs and occasionally sessile glands present. Calyx usually not two-lipped, with short antrorse velutinous pubescence, eglandular, with a basal yellowish zone c. 4 mm broad, distally green; calyx teeth usually straight, (1 –)4 – 6 mm long, linear, apiculate with white apex, broader at base, subequal. Upper

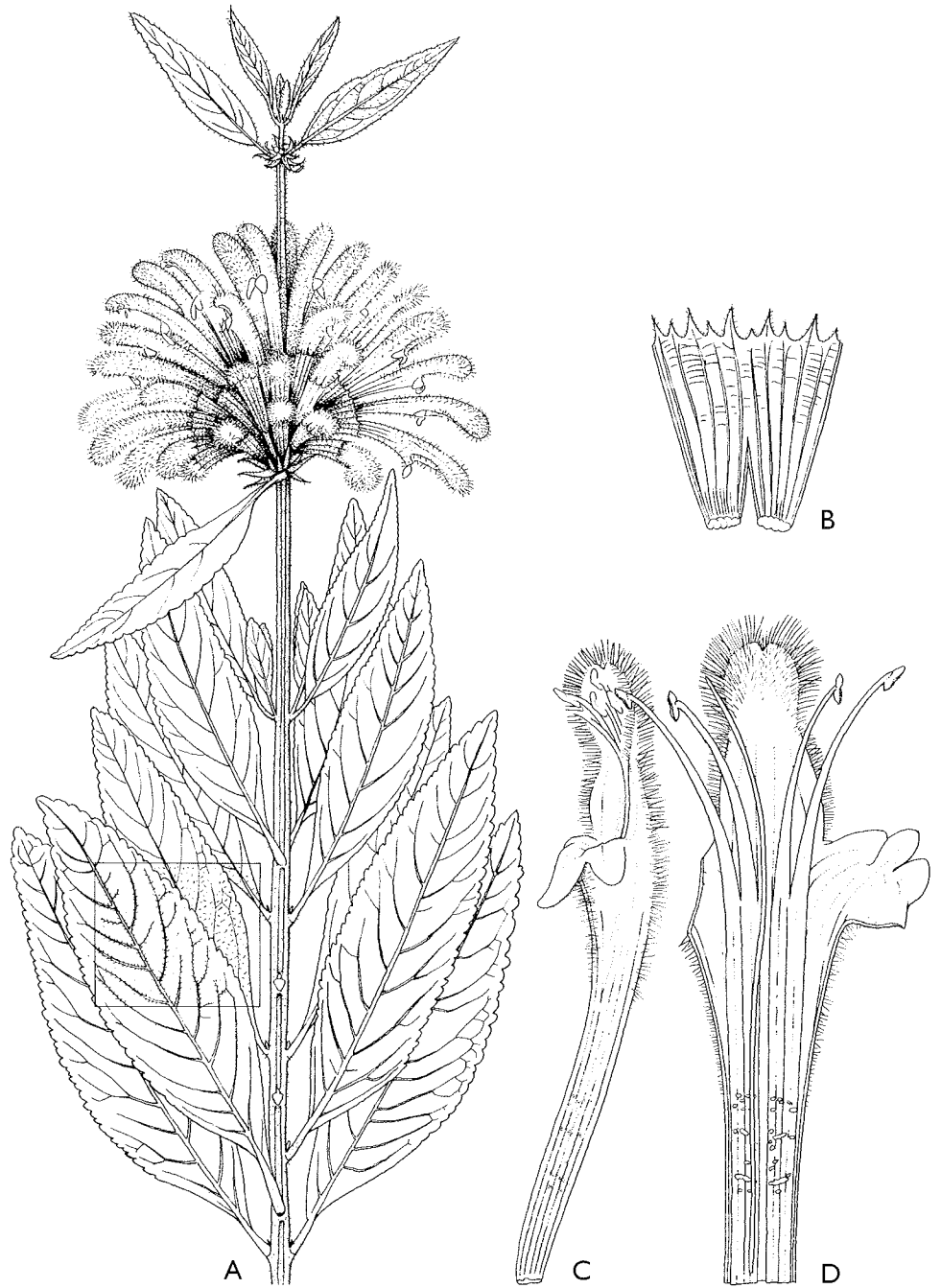


FIG. 2. *Leonotis decadonta* var. *porotoensis*. **A** habit $\times \frac{2}{3}$; **B** opened calyx (within) $\times 2$; **C** corolla $\times 2$; **D** opened corolla (within) $\times 2$. All drawn from *Richards 9727* by Emmanuel Papadopolous.

corolla lip with white woolly hair enclosing the anthers and stigma. Nutlets 3.4 – 3.8 × 1.3 – 1.7 mm.

DISTRIBUTION. Tanzania (Southern Highlands), Zambia (Eastern) and Malawi (Northern, Central & Southern) (Map 1).

HABITAT. In loose brown and black soils among shrubs in montane forest margins; juniper forest margins; along streams and in open *Brachystegia* woodland with high *Hypharrhenia* grass. Often associated with *Gnidia glauca* (Thymelaeaceae); *Kotschyia recurvifolia*, *Rhynchosia clivorum* (Leguminosae); *Hypericum conjungens* (Hypericaceae); *Dissotis* sp. (Melastomataceae). 1200 – 2400 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This taxon occurs in a wide range of habitats and altitudinal range. There are numerous recent collections, strongly suggesting that it is not threatened.

SPECIMENS EXAMINED. TANZANIA. Southern Highlands: Iringa Distr., Mufindi, 1800 m, 10 Aug. 1934, *Balbo* 944 (FT); Iringa Distr., western slopes of Irundi Hill, 9 miles due N of Lugoda Tea Factory, 16 Aug. 1971, *Perdue & Kibuwa* 11131 (K); Mbeya Distr., Mbeya Peak Forest Reserve, 3 July 1962, *Mgaza* 516 (EA, K); Mbeya Mt peak, N slope, 2400 m, 12 Aug. 1984, *Iwarsson et al.* 1059 (UPS); Mbeya Distr., Mbeya Peak, N slope, 2400 m, 13 Aug. 1984, *Iwarsson et al.* 1084 (UPS); Mbeya Distr., Mbeya-Chunya road, 2400 m, 14 Aug. 1984, *Iwarsson et al.* 1098 (UPS); Mbeya Distr., SE approaches to Mbogo Mt, 2200 m, 7 Nov. 1966, *Gillett* 17609 (BR, EA, K); Makete Distr., Njombe Distr., 15 km from Uwemba on Mlangali road, 2200 m, 28 Aug. 1984, *Iwarsson et al.* 1194 (UPS); Njombe Distr., 8 km from Madunda on Mlangali road, 1950 m, 28 Aug. 1984, *Iwarsson et al.* 1198 (UPS); Njombe Distr., Livingstone Range, Ligala Mt over Madunda, 2200 m, 29 Aug. 1984, *Iwarsson et al.* 1216 (UPS).

ZAMBIA. Eastern: Nyika Plateau, 2200 m, 24 Sept. 1956, *Benson* 198 (BM, BR, COI, LISC, SRGH); Nyika Plateau, c. 2.5 miles SW of Rest House, 2150 m, 22 Oct. 1958, *Robson & Angus* 260 (BM, K, LISC, SRGH); Nyika Plateau, Chowo Forest, 2230 m, 14 Nov. 1967, *Richards* 22539 (K, SRGH).

MALAWI. Northern: Nyika Plateau, 2250 m, 11 Aug. 1946, *Brass* 17152 (BM, BR, K, PRE, SRGH); Chitipa Distr., N end of Nyika Plateau, NW foot of Nganda, 2350 m, 24 July 1972, *Brummitt & Synge* WC17 (K, MAL, SRGH, UPS); W boundary of Mugesse Forest Reserve, Timbwa, Sept. 1952, *Chapman* 13B (BM); Nyika Plateau, Chelinda track, 2200 m, 1 Sept. 1966, *Michel & Hinceley* 947 (MAL); Nyika Plateau, 5 km NE of Zambia Rest House, 2300 m, Sept. 1967, *Pawek* 1420 (MAL, SRGH); Rumphi Distr., Nyika, 2400 m, 1 Oct. 1969, *Pawek* 2059 (K). Central: Dedza Distr., Dedza Mt, 1770 m, 16 Aug. 1976, *Pawek* 11622 (K, MO); Dedza Distr., Dedza Mt, over the radio station, 2000 m, 2 July 1978, *Iwarsson et al.* 868 (K, MAL, UPS); Dedza Distr., Chongoni Mt, E slopes, 1800 m, 3 July 1978, *Iwarsson et al.* 886 (K, MAL, UPS). Southern: Ntcheu Distr., Mvai Mt, 1850 m, 28 June 1978, *Iwarsson et al.* 842 (K, MAL, UPS); Thyolo Mt, 1200 m, 22 Sept. 1946, *Brass* 17749 (K, SRGH); Blantyre Distr., Ndirande Mt, SW side, 1370 – 1530 m, 28 June 1970, *Brummitt* 11713 (K, UPS); Shire Highlands, "Zambesia" [area above 915 m from Thyolo to the Chikala Hills], 1881, *Buchanan* 78 (K); Thyolo Distr., Thyolo Mt Forest, 25 Aug. 1960, *Chapman* 894 (K, MAL, SRGH); Zomba Mt, 1200 – 1500 m, 25 July 1937, *Emson* 8 (PRE); Zomba (Nyankhava Mt), 1500 – 1800 m, Sept. 1937, *Humbert* 16906 (P);

Zomba, Sept. 1901, *Connie* 174 for *A. Sharpe* (K); Zomba Mt, mountain road, 1200 – 1500 m, 25 July 1937, *Lawrence* 427 (K); Mulanje Distr., Mchese Mt, path from Fort Lister Gap, 1300 m, 20 June 1978, *Iwarsson et al.* 807 (K, MAL, UPS); Manganja Hills, Sangue, E of Bangwe Pass, 16°35'S 34°45'E, 950 m, Sept. – Oct. 1861, *Meller* s.n. (K); Blantyre Distr., Ndirande Mt, 24 Aug. 1969, *Moriarty* 136 (K, MAL); Mt Mulanje, Chiphalombe Shelf, 1300 m, 7 Aug. 1986, *Chapman et al.* 7895 (K, MO).

3b. var. porotoensis *Iwarsson & Y. B. Haru*. **var. nov.**, a varietate typica lamina anguste rhombica sparse pubescenti (nec velutina) subtus griseo-viridi (nec alba neque pallide hinnulea neque luteola), margine foliorum in parte tertia basali integra (nec fere ad basin dentata), venis lateralibus magis numerosis 16 – 22 (nec 10 – 20), et calyce in dimidio distali indumentum cupreum ornato, inflorescentia calyceque igitur cupreo-tinctis nec viridibus differt. Typus: Tanzania, Makete Distr., 3 km from Ifupa on Kitulo road, 2650 m, 21 Aug. 1984, *Iwarsson, Abdallah, Macha & Magogo* 1160 (UPS holotypus; BR, DSM, EA, K, NHT, S isotypi).

Leonotis leonurus sensu Gürke, Bot. Jahrb. Syst. 30: 393 (1902).

Shrub 2 – 6 m high. Cortex of stem pale to mid-brown with long and short antrorse hairs and sessile glands. Leaves petiolate; petioles 8 – 12 mm long, densely covered with appressed velutinous hairs, eglandular; blade attenuate at base, sparsely pubescent and with sessile glands, marginal teeth only in upper $\frac{2}{3}$ of blade. Internodes of inflorescence 50 – 130 mm long; verticils 35 – 43 mm diam. (excluding corollas). Bracts 26 – 54 × 6 – 13 mm, petiole 7 – 10 mm long. Bracteoles numerous, 5 – 20 × 0.5 – 3.5 mm, apiculate, with white or orange antrorse hairs and sessile glands. Calyx faintly two-lipped, shortly pubescent with sessile glands, yellowish white at base, distal $\frac{1}{3}$ green with orange hairs on the veins, the combination appearing coppery from a distance, calyx teeth 1.5 – 2 mm long, straight or slightly recurved, dorsal teeth occasionally to 3.5 mm long, linear, apiculate with white apex, ventral teeth united to a lower lip, c. 1.5 mm long. Upper corolla lip with white woolly hair enclosing the anthers and stigma. Nutlets 3.0 – 3.3 × 1.4 – 1.7 mm.

DISTRIBUTION. Tanzania (Southern Highlands) (Map 1).

HABITAT. Forest margins (with *Podocarpus* sp.), in semi-shade or exposed in ravine valleys, sometimes extensively grazed. Associated with *Gnidia glauca* (Thymelaeaceae), *Hagenia abyssinica* (Rosaceae), *Tacazzea galactogoga* (Apocynaceae), *Pittosporum abyssinicum* (Pittosporaceae), *Kiggelaria africana* (Flacourtiaceae). In light, brown soil. 2300 – 2650 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: VU (D2). Restricted to the Southern Highlands, and with a smaller altitudinal range and number of habitat types, this taxon is likely to be under threat since, as with *L. grandis*, the region is becoming inhabited and extensively farmed.

SPECIMENS EXAMINED. TANZANIA. Njombe Distr., "Kingagebirge, Nyunda-Berges" (= Mgunda, 9°13'S, 34°05'E), 2500 m, May 1899, *Goetze* 956 (BM, P); Poroto Mts, Ifupa, 2500 m, 24 June 1979, *Leedal* 5561 (UPS); Mbeya Distr., Poroto Mts, 2340 m, 15 May 1957, *Richards* 9727 (BR, K); Makete Distr., 3 km from Ifupa on Kitulo road, 2650 m, 21 Aug. 1984, *Iwarsson et al.* 1157 (DSM, K, NHT, UPS).

NOTES. This variety is easily distinguished from var. *decadonta* by leaf-shape. Var. *decadonta* has truncate leaf-bases, whereas in var. *porotoensis* these are attenuate. The orange indumentum on the calyx of var. *porotoensis* is a feature shared only with *L. myrothamnifolia*.

3c. var. vestita (Briq.) Iwarsson & Y. B. Haru. comb. nov.

Basionym: *Leonotis leonurus* auct. non (L.) R. Br. var. *vestita* Briq., Bot. Jahrb. Syst. 19: 194 (1894); T. & H. Durand, Syll. Fl. Congol.: 453 (1909); Brenan *et al.*, Mem. New York Bot. Gard. 9: 55 (1954). Type: Oberes Kongogebiet, am Luluafloss, 9½° Südl Br. [Congo (Kinshasa), Kasai prov., at Lulua R., Lunda], May 1876, Pogge 360 (?B†).

Leonotis bequaertii De Wild., Repert. Spec. Nov. Regni Veg. 13: 212 (1914). Type: Katanga: Elisabethville [Congo (Kinshasa), Shaba prov., Lubumbashi], 4 June 1912, J. Bequaert 473 (BR, holotype).

Leonotis leonurus sensu Baker in Thiselton-Dyer, Fl. Trop. Afr. 5 (3): 492 (1900); *sensu* T. & H. Durand, Syll. Fl. Congol.: 453 (1909); *sensu* Brenan, Mem. New York Bot. Gard. 9: 54 (1954); *sensu* Binns, A First Checklist of the Herbaceous Flora of Malawi: 58 (1968); *sensu* Richards & Morony, Checklist of the Flora of Mbala (Abercorn) & District: 246 (1969); *sensu* Fanshawe, Checklist of the Woody Plants of Zambia Showing Their Distribution: 26 (1973).

Shrub to 3 m high. Cortex of stem pale brown with long and short spreading antrorse pilose hairs and sessile glands, occasionally nearly smooth. Leaves petiolate; petioles 2 – 22 mm long, laxly pilose to velutinous, occasionally with sessile glands; blade attenuate at base, laxly pilose, notably on the midvein; marginal teeth almost to base. Internodes in the inflorescence 38 – 130 mm long, verticils 28 – 39(–50) mm in diameter (excluding corollas). Bracts 41 – 117 × 11 – 36 mm, petiole 5 – 20 mm long. Bracteoles frequently numerous, 5 – 18(–26) × 1 – 2 mm, occasionally with a few slightly broader, apiculate with white apex, with antrorse hairs and sessile glands. Calyx often faintly two-lipped, shortly pubescent to pilose, with sessile glands, hairs white, yellowish to pale brown at base, distal half green; calyx teeth bent to recurved, 0.5 – 3 mm long, deltoid, apiculate with white apex, more or less oblique, subequal or the dorsal slightly longer. Upper corolla lip with orange (occasionally white) woolly hair enclosing the anthers and stigma. Nutlets 3.3 – 3.7 × 1.3 – 1.4 mm.

DISTRIBUTION. Congo (Kinshasa), Rwanda, Burundi, Tanzania, Angola, Mozambique, Malawi and Zambia (Map 1).

HABITAT. This variety is found growing in marshy to damp loose black well-drained alluvial soils in gallery forest with *Acacia* sp. (*Leguminosae*); streamsides; in “foret katangaise”, dambos and in tall grass (*Hypharrhenia* sp.) often near termite mounds in burnt areas, or sometimes in areas of abandoned cultivation or roadside edges. Altitude: 950 – 2300 m

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This taxon grows in a number of different countries, habitat types and has a wide altitudinal range. It cannot be considered threatened.

SPECIMENS EXAMINED. CONGO (KINSHASA). Kivu: Ruzizi Plain, May 1950, *Germain*

6967 (BR); Uruvira Distr., Lubarika, 1000 m, May 1959, *Leonard* 4356 (BR); 33 km on road Abville – Kabambare, 8 July 1932, *Luxen* 141 (BM, BR, C, K). Katanga [Shaba]: Lubumbashi (Elisabethville), 4 June 1912, *Bequaert* 473 (BR holotype); Keyberg, April 1957, *Detilleaux* 829 (BR); Kafubu, May 1957, *Detilleaux* 1065 (BR); Baudouinville [Moba], Pepa, July 1957, *Devred* 3665 (BR); Momba Territ., Marungu – Kisinde, 2300 m, April 1944, *Dubois* 1072 (BR, EA, K); Katentania, Oct. 1911, *Hock* s.n. (BR); Lubumbashi, Katuba, May 1927, *Quarré* 457 (S); without precise locality, *Quarré* 575 (BR, K, PRE, S); Munama, June 1928, *Quarré* 1242 (BR); Koipila, Goffara, March 1929, *Quarré* 1666 (BR); Grelco — Section I, July 1931, *Quarré* 2587 (BR, K); Lubumbashi, 1500 m, 10 Aug. 1911, *Rogers* 10007 (K, Z) & 22 Oct. 1911, *Rogers* 10192 (K, SRGH) & May 1914, *Rogers* 10930 (BOL) & June 1920, *Rogers* 26303 (BOL, PRE) & 1200 m, June 1920, *Rogers* 26304 (BM, K, PRE, Z) & 1938, *Salésiens* 632 (BR); Keyberg, April 1947, *Schmitz* 526 (BR); 25 km NW of Lubumbashi, Kipopo, Aug. 1961, *Schmitz* 7285 (BR); Luwowoshi R., 1150 m, June 1962, *Somona* 96 (BR); Kambove Territ., Bretelles N Domaine Mangombo (Bord marécage de Lupembashi), 1100 m, 2 Sept. 1958, *Streel* 233 (BR, K); Tumbwe, Phragmitaie, rive gauche de la Kilafuifui, au pont de la piste Tumbwe-Masika, 1290 m, 20 July 1961, *Symoens* 8825 (BR, K, LISC); Bord petit “lac” Kasali, le long rivière Mukululive, 6 km from Tondo, 1300 m, 2 July 1970, *Symoens* 13592 (BR, K); “Kilundru” – Kasiki, June 1931, *de Witte* 427 (BR); Upemba National Park, Ganza, Kamandula, June 1949, *de Witte* 6495 (BR); Kiamadota, June 1949, *de Witte* 6574 (BR); Kenia R., 1600 m, July 1949, *de Witte* 7103 (BR). Route vers Kisanga, June 1950, *Hoffman* 930 (K, BR); Plateau des Marungu, a 9 km au N de Pye [Mpie], 1900 m, 14 July 1986, *Malaisse* 13923 (K, BR); Niemba R., 27 May 1908, *Kassner* 3008 (BM, BR, K, P, Z); Route Lumbashi-Kipopo, 15 July 1977, *Wechuysen* 392 & 393 (BR).

RWANDA. Kamembe, Mashyuzu, 1100 m, July 1934, *Bequet* 811 (BR).

BURUNDI. Bubanza Distr., near the R. Kitima, Murgwi, 1500 m, 16 Aug. 1958, *Christiaensen* 2470 (BR); near Bubanza, 1100 m, 9 Feb. 1966, *Lewalle* 423 (BR, EA, K); Bubanza Distr., Kabuyekere, 1200 m, 5 June 1980, *Reekmans* 9290 (K, MO).

TANZANIA. Western: Sumbawanga Distr., 1900 m, June 1938, *MacInnes* 465 (BM); Ufipa Distr., Nsanga Forest, near Mala [Molo] village, 1800 m, 6 Aug. 1960, *Richards* 12954 (EA, K); Ufipa Distr., Malonji Farm land, Sumbawanga, 2100 m, 19 June 1962, *Richards* 16810 (EA, K); Ufipa Distr., Wipanga, 14 km NNE of Sumbawanga town, Nziga stream, 2150 m, 21 June 1987, *Mwasumbi et al.* 13192 (K, DSM); Mpanda Distr., Uruwira Plateau, Mpanda, 8 Aug. 1954, *Smith* 1198 (EA, K, PRE); Mbizi Forest, July 1962, *Whellan* 1962 (SRGH); Mpanda-Uvinza road, 1300 m, 28 May 2000, *Bidgood, Leliyo & Vollesen* 4472 (K, NHT, DSM).

ANGOLA. Cuanza Sul: 100 – 122 km on Dondo – Quibala road, June 1965, *Mendes dos Santos* 1512 (COI, LISC). Malange: Quela, April 1938, *von Nolde* 163 (BM); “Cambo - Niederung”, June 1880, *Mechow* 498 (M, W, Z). Benguela: Nova Lisboa, Cunhongamua R., May 1937, *Carisso & Sousa* 129 (BM, COI); Cuito R., near Quipeio, 1500 m, 11 May 1937, *Exell & Mendonca* 1887 (BM, COI); Ganda, Carrenbe, June 1915, *Gossweiler* 6413 (COI); Ganda, “Posto Zootecnico”, June 1915, *Gossweiler* 6414 (BM); “Caluniango (E)”, 1800 m, 5 Nov. 1940, *Gossweiler* 12329 (BM, LISC); Chianga, 1700 m, 2 May 1962, *Teixeira & Andrade* 6531 (COI, LISC). Mossamedes: Tunda, 1923, *Mazzocchi-Alemanni* 158 (FT, K).

MOZAMBIQUE. Niassa: Massangulo Mt, June 1933, *Gomes e Sousa* 1483 (COI).

MALAWI. Without precise locality, July 1935, *Smuts* 2275 (PRE). Northern: Mzimba Distr., Viphya link road at Mzimba Stream, 1700 m, 31 Aug. 1970, *Pawek* 3712 (K, MAL) & 28 July 1973, *Pawek* 7270 (WAG); Nkhata Bay Distr., 4 km S of Chikangawa Dam edge, 1866 m, 2 July 1978, *Phillips* 3419 (K, MO). Central: Ntchisi Distr., Mndilangadzi Forest Reserve, 1280 m, 18 June 1970 *Brunmitt* 11532 (K, UPS); Dedza Distr., Dedza Mt slopes, near Mala compound, 23 April 1968, *Salubeni* 1064 (K, MAL, SRGH).

ZAMBIA. Northern: Mbala, Goddard's farm, 1700 m, 11 June 1936, *Burt* 6014 (BM, BR, K); Kalungwishi R. at Lake Mweru, *Carson* 19 (K); Mbala Distr., Kambole - Mbala road, 1500 m, 15 June 1961, *Richards* 15275 (K, SRGH); Mbala Distr., Zombe plain, 1666 m, 11 Sept. 1969, *Sanane* 910 (K); Mbala Distr., Kawimbe, Lake Tanganyika, 1894, *Carson* 31 (K). Western: Solwezi Distr., Near Kifubwa R., 5 km E of Solwezi, 17 March 1961, *Drummond et al.* 6971 (K, LISC, PRE, SRGH); Mwinilunga Distr., 20 km from Mwinilunga on Kabompo road, 31 May 1963, *Edwards* 561 (K, SRGH); Mufulira, 14 June 1934, *Eyles* 8170 (BM, K, SRGH); Ndola (16 miles to NW), 1220 m, May 1961, *Wilberforce* 121 (K); Ndola Distr., Chichele, 24 July 1953, *Fanshawe* 170 (BR, K, SRGH); Ndola Distr., Chichele Dambo, 1949, *Holmes* 256 (FHO, K); 24 km from Ndola on Mufulira road, at Mwekera Stream, 1250 m, 15 July 1961, *Linley* 167 (SRGH); Mwinilunga Distr., 67 km S of Mwinilunga on Kabompo road, Mwozi R., 31 May 1963, *Loveridge* 702 (B, BR, K, LISC, PRE, SRGH); Mwinilunga Subdistr., 1500 - 1666 m, *Marko* 64 (K); Chati, Chingola, 4 Aug. 1972, *Fanshawe* F11475 (K, NDO, UPS); Solwezi, Lualaba PFA, 13 June 1962, *W. D. Holmes* 1477 (K, NDO).

NOTES. This variety differs in its smaller verticils, 28 - 39 mm diam. as opposed to 25 - 50 mm diam. in var. *decadonta* and 35 - 43 mm diam. in var. *porotoensis*. From var. *decadonta* it is distinguished by its smaller stature (to 3 m as opposed to 8 m tall); by its attenuate rather than truncate leaf-bases, by the sessile-glandular (not eglandular) calyx, by the orange (not white) woolly hairs enclosing the anthers and stigma, by the shorter petioles (2 - 22 mm, not 15 - 39 mm) and much shorter calyx teeth (0.5 - 3 mm, not 4 - 6 mm, long). See also the notes after both *L. leonurus* and *L. grandis*.

LOCAL NAMES. Congo (Kinshasa): Kamukisasa (Kiholoholo) & Fuwi. Angola: Omupaya (Lunyaneka).

4. *Leonotis myricifolia* *Iwarsson & Y. B. Harv. sp. nov.*, a *L. pole-evansii* foliis minoribus anguste obovatis eorum *Myricae gale* similibus, venis lateralibus saepe pluribus 4 - 8 (nec 4 - 6), margine foliorum involuta atque dentibus paucioribus 3 - 7(-19) (nec 12 - 34) ornata, surculis apicalibus fuscioribus et calyce longiore (12 - 22 mm nec (10 -)17 - 20 mm) differt. Typus: Malawi, Northern Reg., Nyika National Park, 8 km from the gate on Rumphu - Chelinda road, 1750 m, 31 July 1978, *Iwarsson & Ryding* 986 (UPS holotypus; DSM, EA, K, MAL, P isotypi).

Shrub (0.6 -)2 - 3 m high, laxly branched throughout, with up to 25 shoots from a woody rootstock. Stems with internodes usually 5 - 8 cm long, cork-coloured to

pale buff-brown with lenticels 5–25 × 1–2 mm, with antrorse long and/or short hairs, ± eglandular, branches darker brown towards shoot apex; nodes minutely thicker and with a transverse pattern, upper 15 nodes with short (less than 2 cm long), sterile but leafy shoots. Leaves shortly petiolate; petiole 1–9 mm (usually 2–3 mm) long, dorsiventrally flattened, pubescent, occasionally with sessile glands; blade narrowly oblanceolate to obovate, 10–30(–54) × 3.5–10(–18) mm, apex acute to rounded, base attenuate, both surfaces with a mixture of short hairs and sessile glands on both surfaces (or sessile glands present only on lower surface), margin involute, crenate towards apex, with 3–7(–19) teeth, entire towards base, with 4–8 side-veins per leaf, the basal parallel to the leaf margin. Inflorescence of (1–)2–3(–4) verticils per branch, internodes up to 90 mm long. Bracts leaf-like, 20 × 5 mm, indumentum as cauline leaves. Bracteoles linear (occasionally broader), 8–16 × 1–2 mm, covered with short hairs and occasionally with sessile glands. Verticils hemispherical but flat below, 30–45 mm diam., with 10 branches, short (2–3 mm long), with 7–9 buds per branch. Pedicels 2–3 mm long, extending in fruit to 5–6 mm, densely covered with long antrorse hairs, appearing eglandular. Calyx 12–22 mm long, 10–12-toothed, pale green to brown, densely covered with short hairs and sessile glands or eglandular; mouth occasionally oblique with the lower teeth partially united and bent outwards to form a lower lip; dorsal tooth 2–3 mm long, lateral and ventral teeth 1–2 mm long, narrowly triangular, apiculate, the 3-ventral teeth partially united to c. 1 mm. Corolla (37–)40–50 mm long, with orange hairs; tube 22–30 mm long, with 3–4 hair fringes within (near base); upper lip 14–20 mm long, the orange woolly hair enclosing anthers and stigma well developed; lower lip 3-lobed, deflexed on corolla, central lobe 6–9 mm long, sometimes retuse, lateral lobes shorter and oblique, glabrous to laxly covered with short orange hairs on the outer surface. Fresh pollen pale yellow. Nutlets 3.8–4.4 × 2–2.2 mm. Fig. 3.

DISTRIBUTION. Tanzania (Southern Highlands), Zambia (Eastern) and Malawi (Northern) (Map 2).

HABITAT. Grassland by rocky outcrops and secondary growth on clay soil. 1500–2800 m

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: VU (D2). This taxon is known from a very restricted habitat. Although the Nyika Plateau cannot be considered under threat, the Tanzanian specimens are from an area that is becoming inhabited and extensively farmed.

SPECIMENS EXAMINED. TANZANIA. Mbeya Distr.: Mbeya, 1650 m, 30 Aug. 1936, *Burt* 6013 (BM, EA, K); Rukwa West escarpment, 2200 m, July 1938, *Champion* B469 (EA); Uyole, 1900 m, 29 Dec. 1981, *Hellqvist* 8 (UPS); Mbeya Range, 2500 m, 30 Nov. 1961, *Kerfoot* 3166 (EA); Mbeya Peak Forest Reserve, 2400 m, 27 May 1958, *Myembe* 40 (EA, K); Mbeya Distr., 8°55'S, 33°30'E, 1500 m, 26 Nov. 1966, *Robertson* 276 (EA, K); Isyesye, about 1 mile SE of Ilomba, 1950 m, 18 April 1963, *Harwood* 36 (K); Mbeya Mt peak, N slope, 2400 m, 13 Aug. 1984, *Iwarsson et al.* 1085 (DSM, EA, K, NHT, UPS); 11 km from Mbalizi on Isangati road, 1700 m, 16 Aug. 1984, *Iwarsson et al.* 1111 (DSM, K, NHT, UPS); Mbeya-Chunya road, 2200 m, 14 Aug. 1984, *Iwarsson et al.* 1095 (DSM, K, NHT, UPS); Mbeya-Kawetiri Forest Camp-Mbeya Mt peak road, 2350 m, 13 Aug. 1984, *Iwarsson et al.* 1072 (DSM, NHT, UPS); & *ibid.*,

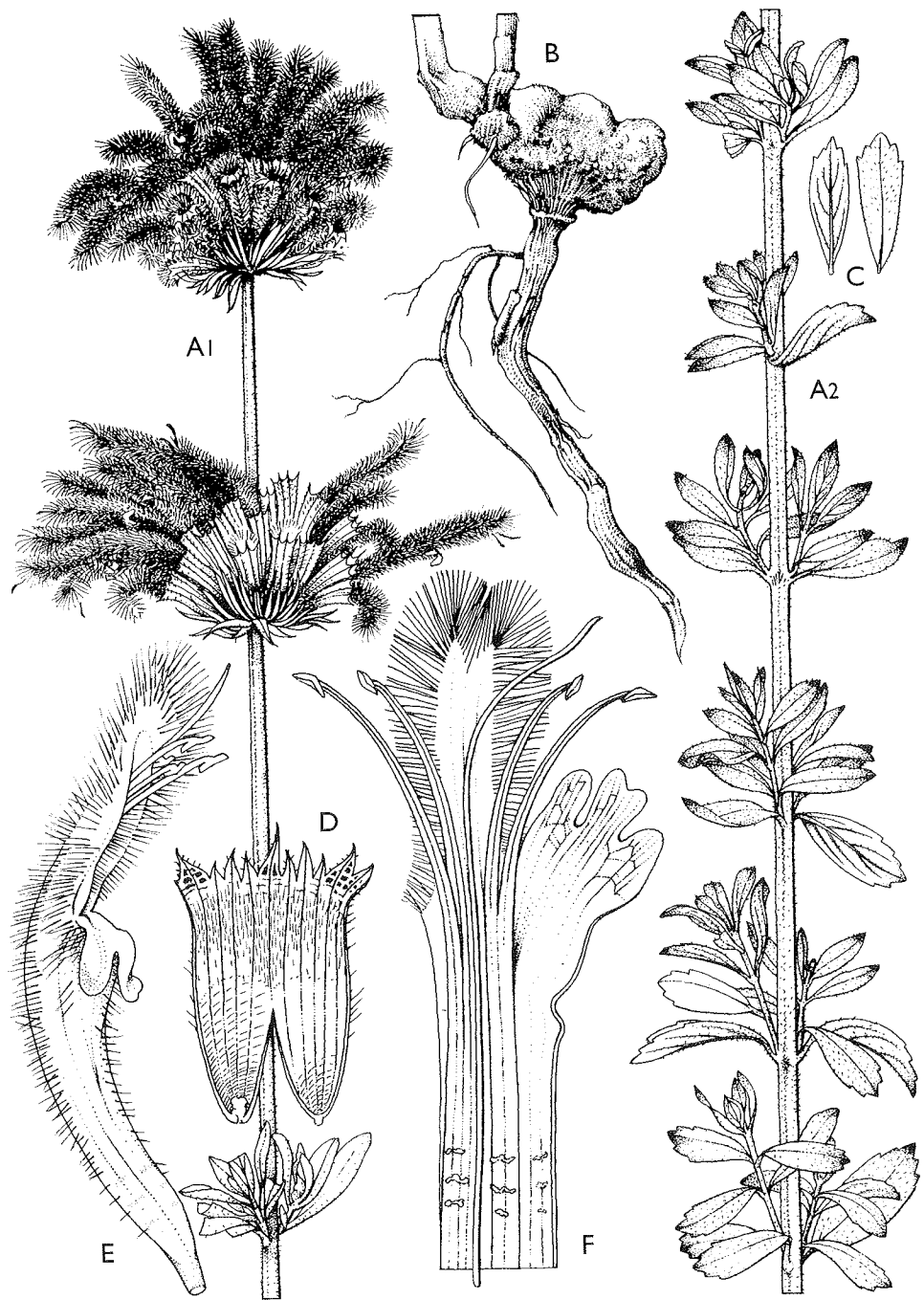


FIG. 3. *Leonotis myricifolia*. A1 & A2 habit $\times \frac{2}{3}$; B roots $\times \frac{2}{3}$; C leaves $\times \frac{2}{3}$; D opened calyx (within) $\times 2$; E corolla $\times 2$; F opened corolla (within) $\times 2$. A, C - F drawn from Brummitt 10821, B from Brummitt & Syngé WC15 by Emmanuel Papadopolous.

2300 m, 12 Aug. 1984, *Iwarsson et al.* 1067 (DSM, EA, K, NHT, UPS); S facing site at Itundu, 12 July 1999, *P. Latham* s.n. (K). Njombe Distr.: Matamba Uwanjii, 2800 m, 12 June 1962, *Mgaza* 500 (EA, K). Rungwe Distr.: "Station Kyimbila", 15 – 1800 m, 1912, *Stolz* 2115 (B, BM, C, PRE, S, SAM, UPS, Z). Makete Distr.: Kitulo Plateau, between Mt Ishinga and Sanshashi Hill, 2430 m, 26 May 1987, *Iversen et al.* 87692 (UPS); 5 km from Matamba on Kitulo road, 2400 m, 20 Aug. 1984, *Iwarsson et al.* 1147 (DSM, NHT, UPS); 8 km from Matamba on Inyala road, 2150 m, 20 Aug. 1984, *Iwarsson et al.* 1145 (DSM, NHT, UPS); 54 km from Kitulo on Tandala road, 2100 m, 27 Aug. 1984, *Iwarsson et al.* 1192 (NHT, UPS); Ifupa, 2650 m, 21 Aug. 1984, *Iwarsson et al.* 1154 (DSM, EA, K, NHT, UPS).

ZAMBIA. Eastern Reg.: Nyika Plateau, 5 Aug. 1957, *Crockett* 212 (WAG); Nyika Plateau, Kangampande Mt, 2100 m, 6 May 1952, *White* 2738 (BR, FHO, K); Nyika Plateau, Chowo forest 11 miles W of Chilinda, 1800 m, 3 June 1978, *Phillips* 3395 (K, MO).

MALAWI. Northern Reg., Nyika Plateau: 2200 m, 4 June 1957, *Boughey* 1837 (SRGH); N end of Nyika Plateau, NW foot of Nganda, 2350 m, 24 July 1972, *Brummitt & Synge* WC15 (K, UPS); 8 km NW of Lake Kaulime, 2020 m, 16 May 1970, *Brummitt* 10821 (K, UPS); 3 km SW of Rest House, 2150 m, 21 Oct. 1958, *Robson* 203 (BM, K, LISC, SRGH); near road to Chelinda, 3 May 1960, *Willan* 41 (MAL, SRGH); outskirts of Chowo forest, 2200 m, 14 April 1960, *Williams* 30 (MAL); Rumphu Distr., Nyika National Park, 8 km from the gate on Rumphu-Chelinda road, 1750 m, 31 July 1978, *Iwarsson et al.* 986 (DSM, EA, K, MAL, P, UPS); Nyika Plateau, Chowo Rocks, Malawi side, 2200 m, July 1980, *Dowsett-Lemaire* 136 (BR); Rumphu Distr., Nyika Plateau, NW of Nganda base-camp, 2263 m, 28 March 1997, *Patel et al.* 5032 (K); Mbuzinandi, 1800 m, 28 Dec. 1975, *Phillips* 762 (K, MO); Majimbula, 1800 m, 7 March 1976, *Phillips* 1398 (K, MO); between Khondowe, Karonga, 600 – 1800 m, July 1896, *Whyte* 320 (K).

NOTE. With the exception of *Iwarsson et al.* 1154 & 1192, the majority of the Tanzanian specimens have obovate leaves with more numerous marginal teeth, and sessile glands on both leaf surfaces, stem and calyx. The Malawian and Zambian specimens have more narrowly oblanceolate leaves with fewer marginal teeth, eglandular upper leaf surface, stem and calyx.

As mentioned in the diagnosis, *L. myricifolia* is close to *L. pole-evansii* in leaf-shape. *Leonotis myrothamnifolia* and *L. goetzei* also have small leaves on short sterile leafy shoots (appearing clustered). The four taxa differ in a combination of characters (Table 1).

This taxon was tentatively named *Leonotis nyikensis* Iwarsson by the senior author. This name may have been inadvertently picked up and used by other authors.

Leonotis myricifolia resembles *L. ocymifolia* (Burm. f.) Iwarsson var. *schinzii* (Gürke) Iwarsson in its sterile leafy branches, similar leaf-shape and "prominent" dorsal toothed calyx. However, *L. ocymifolia* var. *schinzii* has only 1 basal ring of hairs inside the corolla tube, retrorse hairs on its glandular stems and much smaller corollas (27 – 32 mm long). *L. myricifolia* has 3 basal rings of hairs inside the corolla tube, antrorse hairs on its eglandular stems and very much longer corollas (40 – 50 mm long).

LOCAL NAME. Tanzania, T7: Nasungwi (Kisafwa).

TABLE 1. Comparison of character states in *Leonotis myricifolia*, *L. myrothamnifolia*, *L. pole-evansii* & *L. goetzei*.

		<i>L. myricifolia</i>	<i>L. myrothamnifolia</i>	<i>L. pole-evansii</i>	<i>L. goetzei</i>
leaf blade	size (mm)	10 – 30(– 54) × 3.5 – 10(– 18)	15 – 20 × 12 – 18	13 – 55 × (7 –)23 – 40	14 – 50 × 13 – 33
	shape	obovate-narrowly oblanceolate	obtrullate to rhombic	rounded-obovate to spatulate	broadly ovate to rounded
	marginal teeth	at apex only	at apex only	in apical $\frac{2}{3}$	in apical $\frac{3}{4}$
	glands	occasionally	both surfaces	both surfaces	occasionally
	side-veins	4 – 8	4	4 – 6	4
	indumentum	puberulous	loosely puberulous	velutinous/ tomentose	velutinous
calyx	size (mm)	12 – 22	15 – 20	(10 –)17 – 20	11 – 12(– 14)
	dorsal tooth (mm)	2 – 3	2 – 3	3 – 4	2
	other teeth (mm)	1 – 2	1 – 2	2 – 3	1
corolla	size (mm)	(37 –)40 – 50	39 – 46	35 – 46 long	30 – 43
	hairs within	orange	orange	white	white
distribution		Southern Highlands of Tanzania to Nyika Plateau (Malawi & Zambia)	Mafinga Hills (Zambia & Malawi)	Northern & Central Zambia	Southern Highlands of Tanzania

5. *Leonotis myrothamnifolia* Iwarsson & Y. B. Harv. **sp. nov.**, *Leonotis goetzei* Gürke similis sed foliis minoribus, 15 – 20 × 12 – 18 mm non 14 – 50 × 13 – 33 mm, puberulis (nec velutinis eorum *Myrothamni* similibus), obtrullatis vel rhombicis (nec late ovatis neque rotundis), calyce indumento cupreo (nec albo neque pallide hinnuleo) ornato et tubo corollae ad orem dilatato differt. Typus: Malawi, Northern Reg, Chitipa Distr., Mafinga Mt, 5 km W of Chisenga, 2150 m, 23 July 1978, Iwarsson & Ryding 959 (UPS holotypus; DSM, EA, K, MAL, P isotypi).

Shrub, 1.2 – 3 m high, branching towards apex (mostly within the final 15 nodes) with only a few shoots from a woody rootstock, shoots to 10 cm in diameter. Stem with internodes usually about 1 – 3 cm long, brown, becoming corky and with narrow lenticels only on mature wood (over 2 years old), with antrorse velutinous hairs and scattered sessile glands; nodes minutely thicker and leaf-scars present on young shoots, upper 15 nodes with short (less than 3 cm long) sterile but leafy shoots. Leaves shortly petiolate; petiole 4 – 7 mm long, with velutinous hairs and sessile glands; blade dark green, obtrullate to rhombic, 15 – 20 × 12 – 18 mm, apex bluntly rounded, base cuneate, both surfaces laxly puberulous, with sessile glands on both upper and lower surfaces, venation not prominent below, margin

occasionally involute, crenate only at apex, with 6–12 teeth, with 4 side-veins per leaf, the basal parallel to the leaf margin. Inflorescence of 1–3 verticils per branch, internodes 30–60 mm long. Bracts leaflike, 10–16 × 5–8 mm, indumentum as cauline leaves. Bracteoles green, linear, 6–10 × <1 mm, covered by long, shiny orange hairs and sessile glands, spinescent. Verticils hemispherical, 25–40 mm diam., with 12 branches, 0–2 mm long, with 6–8 flowers per branch. Pedicels to 2 mm long, antrorsely velutinous-pubescent. Calyx 15–20 mm long, 10–12-toothed, yellowish-orange-velutinous and sessile-glandular, making the calyx appear orange, straight (not bending forwards); mouth slightly oblique; dorsal tooth 2–3 mm long, lateral and ventral teeth 1–2 mm long, all straight and narrowly acuminate. Corolla 39–46 mm long, dilated at mouth, orange-hairy; tube 20–26 mm long, curved, with 3–4 transverse hair fringes within (near base), outer surface with scattered sessile glands; upper lip 15–26 mm long, the orange woolly hair enclosing the anthers and stigma well developed, to 2.5 mm long; lower lip 3-lobed, 6–9 mm long, lobes deflexed on tube, faintly emarginate, laxly covered with short orange hairs on the outer surface. Fresh pollen orange-buff. Nutlets 3.6–3.9 × 1.4–1.8 mm, blackish-brown. Seedlings hairy on hypocotyl, cotyledons bluntly ovate. Fig. 4.

DISTRIBUTION. Malawi and Zambia (Mafinga Hills) (Map 2).

HABITAT. Steep slopes in evergreen forest margins with stunted *Brachystegia*-woodland and in montane grassland dominated by *Xerophyta* sp. (*Velloziaceae*). Found with *Protea* sp. & *Faurea* sp. (*Proteaceae*), *Plectranthus malawiensis*, *Aeollanthus buchnerianus*, *Leonotis ocyimifolia* var. *raineriana* (*Lamiaceae*), *Dierama pendulum* (*Iridaceae*) and *Diplolophium zambesiacum* (*Apiaceae*). Growing in sandy, stony soil; stones mainly quartz. 2000–2200 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: VU (D2). Only known from small populations in the Mafinga Hills. However, where it occurs, it is protected.

SPECIMENS EXAMINED. MALAWI. Northern Reg.: Mafinga Hills, 5 km W of Chisenga, 2025 m, 26 Aug. 1962, *Tyrer* 618 (BM, BR, SRGH); Chitipa, Mafinga-Ridge, N of Malawa R., 2100 m, 20 Aug. 1980, *Patel* 635 (BM).

ZAMBIA. Northern Reg.: near Malawi-Zambia border, Mafinga Range above Chisenga, 22 Nov. 1952, *Angus* 825 (K); Mafinga Mt, 24 May 1973, *Chisumpa* SMC50 (K).

NOTE. This species is similar to *L. myricifolia*, *L. pole-evansii* and *L. goetzei*. Apart from the character differences seen in Table 1, *L. myrothamnifolia* is easily distinguished from the other taxa by its copper-coloured calyx hairs (the others have white to pale buff hairs).

6. *Leonotis pole-evansii* Hutch., *A Botanist in Southern Africa*: 501 (1946) [as *Leonotis Pole Evansii* Hutch.]; White, *Forest Flora of Northern Rhodesia*: 375 (1962); Binns, *A First Checklist of the Herbaceous Flora of Malawi*: 58 (1968); Fanshawe, *Checklist of the Woody Plants of Zambia showing their distribution*: 26 (1973). Type: Zambia: near Serenje, 5200 ft [1560 m], 15 July 1930, *Pole Evans* 2884 (41) (K, holotype; PRE, SRGH, isotypes).

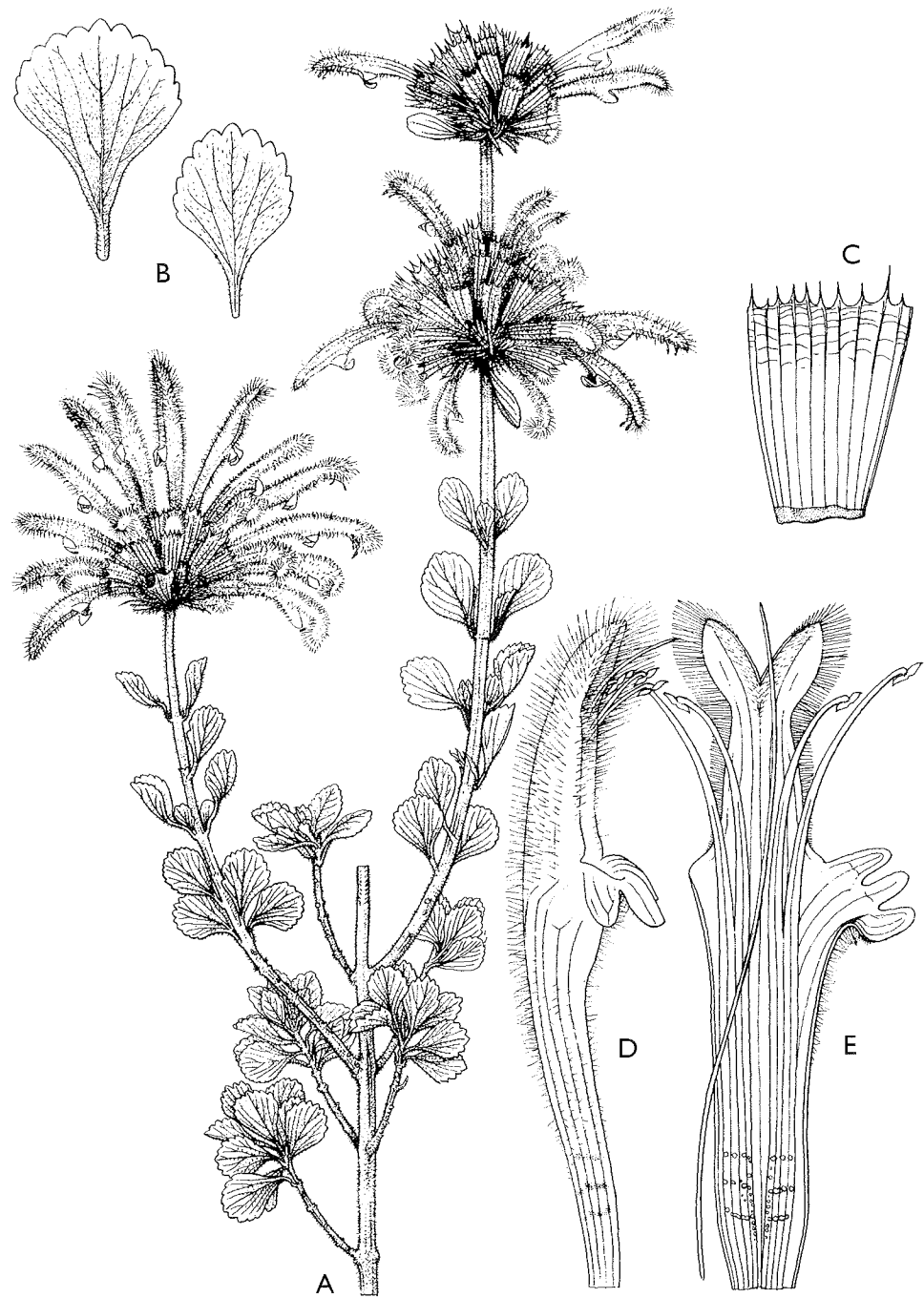


FIG. 4. *Leonotis myrothamnifolia*. **A** habit $\times \frac{2}{3}$; **B** leaves $\times 1\frac{1}{2}$; **C** opened calyx (within) $\times 2$; **D** corolla $\times 2$; **E** opened corolla (within) $\times 2$. All drawn from *Chisumpa* 50 by Emmanuel Papadopolous.

Erect shrub 1.2–3 m high, branching scantily at base (branching mainly within the final 15 nodes at the apex). Stem with internodes usually about 1.5–6.5 cm long on main shoot, pale brown, covered with a velutinous mixture of long and short antrorse hairs and sessile glands; especially velutinous on the nodes, upper 15 nodes with short, sterile but leafy shoots. Leaves petiolate; petioles 2–25 mm long, tomentose with long and short hairs and sessile glands; blade rounded-obovate to spatulate, 13–55 × (7–)23–40 mm, apex truncate to rounded, base attenuate, margin crenate in the apical $\frac{2}{3}$ of blade with 12–34 rounded teeth, both surfaces tomentose with long and short hairs and sessile glands, with 4–6 prominent side-veins and secondary venation appearing reticulate below. Inflorescence of (1–)2–3 verticils per branch, internodes 10–85 mm long. Bracts leaf-like, 14–27 × 8–11 mm, indumentum as cauline leaves. Bracteoles linear, 5–16 × <1 mm, subvelutinous with short antrorse hairs and sessile glands. Verticils hemispherical, (25–)30–52 mm in diameter (excluding corollas), number of branches and buds per branch unknown but branches very short. Pedicels 2–4 mm long, tomentose with scattered sessile glands. Calyx (10–)17–20 mm long with (8–)10 teeth, densely tomentose with antrorse long and short grey hairs, sessile glands; mouth oblique; dorsal tooth 3–4 mm long, lateral teeth 2–3 mm long, ventral teeth partially united, 2–3 mm long, slightly subtended, all teeth narrowly triangular, apiculate. Corolla 35–46 mm long with orange, orange-red or brick-red hairs; tube (20–)25–30 mm long, widening at mouth, with 3–4 fringes within (near base); upper lip 15–16 mm long, white woolly hairs enclosing anthers and stigma well developed; lower lip 3-lobed, (5–)7–8 mm long, subglabrous, deflexed on the tube, central lobe retuse, lateral lobes obliquely retuse. Fresh pollen pale yellow. Nutlets 3.7–4.1 × 1.8–2 mm, blackish-brown.

DISTRIBUTION. Zambia (Northern and Central) (Map 2).

HABITAT. Grassland among rocks, and rocky places in *Brachystegia microphylla* woodland and on rocky mountain slopes. Growing in association with *Brachystegia microphylla*, *Erythrophloeum africanum* (Leguminosae), *Monetes* sp. (Dipterocarpaceae), *Faurea* sp. (Proteaceae), *Parinari curatellifolia* (Chrysobalanaceae). 1560–1800 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. Although there are collections from both Northern and Central regions of Zambia this taxon seems to be rarely collected. However, it also occurs within a National Park so is unlikely to be threatened.

SELECTED SPECIMEN. ZAMBIA. Central: Serenje Corner, 15 July 1930, *Hutchinson & Gillett* 3711 (K, BM).

7. *Leonotis goetzei* Gürke, Bot. Jahrb. Syst. 30: 393 (1901); Brenan & Greenway, Checklist of the Forest Trees and Shrubs of the British Empire 5 (2): 256 (1949); Cribb & Leedal, The Mountain Flowers of Southern Tanzania: 115 (1982). Type: Kingagebirge, an mit Gras und *Protea* bestandenen Abhängen des Djilulu-Berges, um 2200 m ü M [Tanzania: Njombe Dist., Djilulu mt.], 9°20'S, 34°09'E, 2200 m], May 1899, *Goetze* 918 (B† holotype, Z lectotype **selected here**; BM, BR isotypes).

Shrub to 2.5 m high, with few shoots from a woody rootstock; shoots usually laxly branched with one or a few side-branches and occasionally with short, sterile but

leafy shoots in the upper nodes. Stem with internodes 1–3 cm long, pale brown, covered with a velutinous mixture of long and short antrorse hairs, eglandular, especially velutinous around the leaf-scars and shoot apex. Leaves petiolate; petiole 5–11 mm long, velutinous with long and short antrorse hairs, eglandular; blade broadly ovate to rounded, 14–50 × 13–33 mm, apex rounded to obtuse, base truncate, margin shallowly crenate in the upper $\frac{3}{4}$ of blade, c. 17–33 teeth, both surfaces velutinous with a mixture of long and short hairs, upper surface eglandular, lower surface greyish, occasionally with sessile glands, reticulate venation prominent below, usually with 4 side-veins narrowly angled in relation to the midvein. Inflorescence of 2–4 verticils per branch, spaced by internodes 10–40(–75) mm long. Bracts leaflike, 15–18 × 12–13 mm, indumentum as cauline leaves. Bracteoles linear, 4–12 × 1 mm, densely to laxly covered with short, antrorse hairs, eglandular. Verticils hemispherical, 21–35 mm diam., with 10 branches, 2–3 mm long, 7–10 buds per branch. Pedicels 1 mm long, antrorse hairs appearing velutinous. Calyx 11–12(–14) mm long, densely velutinous in basal $\frac{2}{3}$, laxly pubescent towards apex, eglandular or with scattered sessile glands, appearing brown, venation prominent, 10-toothed; mouth slightly oblique; teeth narrowly triangular, dorsal tooth c. 2 mm long, apiculate, lateral and ventral teeth to 1 mm long, apiculate, straight or slightly spreading. Corolla 30–43 mm long, with orange, orange-red or brick-red hairs; tube 19–26 mm long, with (2–)3 fringes within (near base); upper lip 11–17 mm long, the white woolly hair enclosing the anthers and stigma well developed; lower lip 3-lobed, 3–4(–5) mm long, deflexed on the tube, subglabrous, the middle lobe retuse at apex. Fresh pollen colour unknown. Nutlets 3.9 × 1.5 mm.

DISTRIBUTION. Tanzania (Southern Highlands) (Map 2).

HABITAT. Mountain slopes and ravines with shrubby grassland, sometimes burned and extensively grazed, occasionally found by roadsides. Growing in association with *Protea* sp. (*Proteaceae*), *Polygala virgata* (*Polygalaceae*), *Geniosporum paludosum* (*Lamiaceae*), *Erica* sp., *Agarista* sp. (*Ericaceae*), *Dissotis* sp. (*Melastomataceae*), *Buchnera* sp., *Sopubea* sp. (*Scrophulariaceae*), *Helichrysum* sp. (*Asteraceae*), *Geranium* sp. (*Geraniaceae*). Growing in light, brown soil. 1750–2250 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: VU (D2). Although known only from one region, this taxon is known from a number of different habitat types. As with *L. grandis*, the region where it grows is becoming inhabited and extensively farmed.

SELECTED SPECIMEN. TANZANIA. Makete Distr. [Rungwe Distr.], 2 km from Tandala on Kitulo road, 2000 m, 27 Aug. 1984, *Iwarsson et al.* 1193 (DSM, K, NHT, UPS).

NOTES. Local uses “ni dawa ya kifua” [medicine for chest complaints] (*Kayombo* 473).

LOCAL NAME. Muunandeke (Kipangwa)

8. *Leonotis ocymifolia* (*Burm. f.*) *Iwarsson* in Leistner (ed.), *Flora of Southern Africa* 28 (4): 32 (1985).

Phlomis ocymifolia *Burm. f.*, *Fl. Indica*: 16 (1768). Type: South Africa: Cape of Good Hope, Herb. *N. L. Burman* s.n. (G, holotype).

Woody, lanky shrub 0.6 – 5 m high, sparsely branched from a woody swollen rootstock 20 – 150 mm diam., shoots up to 10 cm diam. and appearing rounded in transverse section. Inflorescence sometimes (in South Africa) with a few sterile, leafy nodes between verticils. Stem internodes 2 – 11 cm long, greyish buff to brownish buff, occasionally smooth and shiny, with velutinous pubescence of antrorse or occasionally retrorse hairs and sessile glands, prominent leaf-scars (occasionally with a marginal rim); nodes prominent with a transverse line connecting the leaf-scars, more densely pubescent than internodes. Leaves usually petiolate; petiole absent or 2 – 55(– 110 in South Africa) mm long, velutinous with (occasionally yellowish) antrorse or retrorse hairs, eglandular or with sessile glands; blade (in South Africa sometimes broadly-) ovate to narrowly obovate, lanceolate to narrowly spatulate, 9 – 190(– 230) × 3 – 90 mm, apex acute to acuminate (Ethiopia), base cordate, truncate or attenuate, margin crenate almost to base with 7 – 65 teeth, both surfaces laxly pubescent to velutinous with short, white to yellow hairs and sessile glands, with (4 –)10 – 16 side-veins, venation covered with slightly longer hairs, occasionally adpressed. Inflorescence of 1 – 5 verticils per branch usually spaced by prolonged internodes (10 –)45 – 325 mm long. Bracts leaflike, (4 –)17 – 85(– 130) × 2 – 25(– 85) mm long, indumentum as cauline leaves. Bracteoles linear, 6 – 22 × 0.3 – 2.5 mm long, covered with short hairs and occasionally with sessile glands, apiculate. Verticils hemispherical, 28 – 67(– 90) mm diam., with (8 –)12 – 18 branches, (1.5 –)5 – 20 mm long, with 5 – 19 buds per branch. Pedicel 0.5 – 5(– 7) mm long, covered with short hairs and occasionally sessile glands. Calyx 14 – 31 mm long at anthesis, slightly enlarged in fruit, 4 – 5.5 mm in diameter at mouth, 8(– 9 – 11)-toothed, sometimes teeth obsolete (S Africa), green, densely covered with short white (occasionally orange) hairs, eglandular or occasionally with sessile glands; mouth occasionally oblique with the 3 – 5 lower teeth partially united and bent outwards to form a lower lip; dorsal tooth 2 – 14 mm long, lateral and ventral teeth 0.5 – 5.5 mm long, straight to slightly recurved, narrowly triangular, apiculate. Corolla 24 – 45 mm long, with white, buff, pale salmon-pink, orange or orange-red hairs (although predominantly orange or cream-buff); tube 15 – 25 mm long with 1 (very rarely 2) diffuse fringe within (near base), with 2 slightly higher markings; upper lip 12.5 – 22 mm long with white woolly hair enclosing anthers and stigma well developed; lower lip 3-lobed, (4 –)6 – 10 mm long, the median lobe retuse, subglabrous, eglandular or with sessile glands, lobes shrivelled and twisted. Fresh pollen orange. Nutlets 2.4 – 4.3 × 1.2 – 2.1 mm, blackish-brown, glossy.

There are three varieties of this taxon, all with similar calyx morphology. They are separated on leaf morphology and a combination of other characters.

8a. var. *ocymifolia*; Iwarsson in Leistner (ed.), *Flora of Southern Africa* 28 (4): 32 (1985).

Phlomis ocymifolia Burm. f., *Fl. Indica*: 16 (1768). Type: Cape of Good Hope, Herb. N. L. Burman s.n. (G, holotype).

Phlomis leonitis L., *Mant. Pl. I*: 83 (1767); *Leonotis leonitis* R. Br. in Aiton, *Hortus Kew.*, ed. 2, III: 410 (1811); White, *Forest Flora of Northern Rhodesia*: 374 (1962);

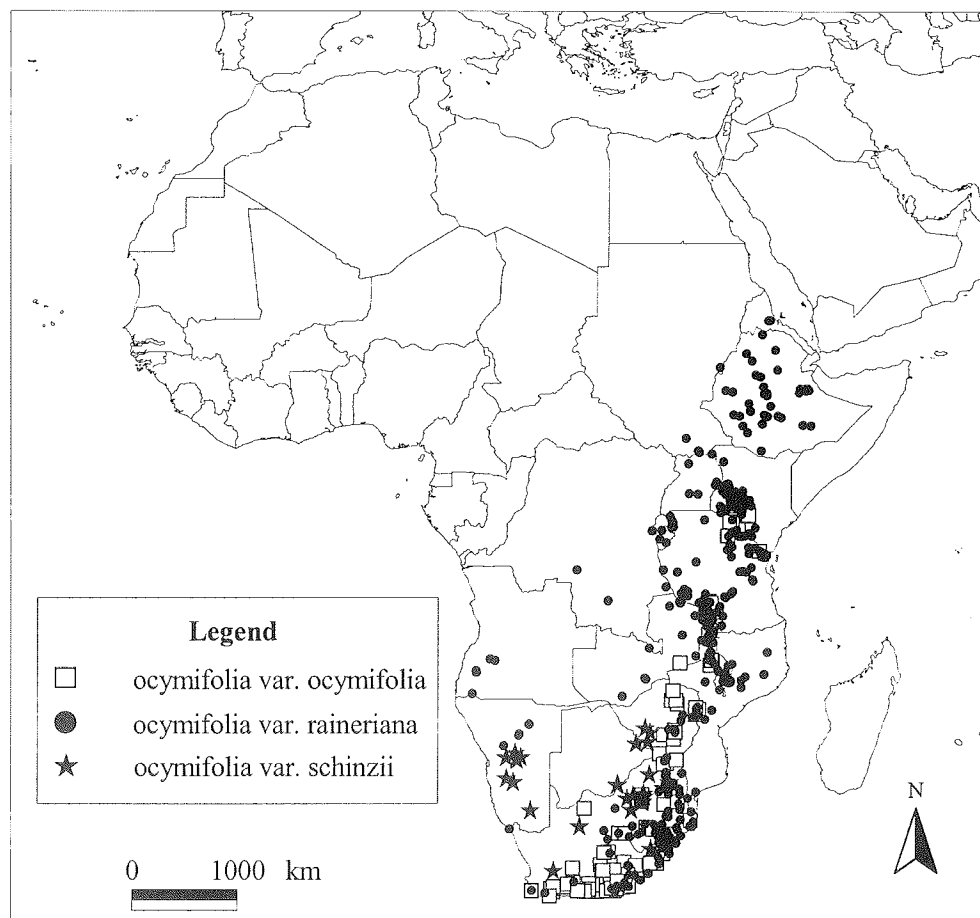
- Fanshawe, Check List of the Woody Plants of Zambia showing their distribution: 26 (1973); Agnew, Upland Kenya Wild Flowers: 620 (1974); *Leonotis ovata* Spreng., Syst. Veg., ed. 16, II: 744 (1825); Binns, A First Checklist of the Herbaceous Flora of Malawi: 58 (1968); *Leonotis capensis* Raf., Fl. Tellur. III: 88 (1837). Type: Cape of Good Hope, Herb. Linnaeus 740: 21 (LINN, lectotype).
- Leonotis parvifolia* Benth., Labiat. Gen. Spec.: 619 (1834). Type: Hab. ad Caput Bonae Spei Masson (v. s. sp. in herb Banks (BM)).
- Leonotis dubia* E. Mey. ex Benth. in Meyer, Comm. Pl. Afr. Austr.: 242 (1838); Bentham in DC., Prodr. XII: 536 (1848); Baker in Thiselton Dyer (ed.), Fl. Trop. Afr., 5 (3): 493 (1900); Binns, A First Checklist of the Herbaceous Flora of Malawi: 58 (1968). Type: Cape, Witrivier, near Enon, *Drege* 4831 (K).
- Leonotis mollis* Benth. in Meyer, Comm. Pl. Afr. Austr.: 242 (1838); Skan in Thiselton-Dyer (ed.), Fl. Cap. 5 (sect. 1, pt. 2): 378 (1910); Bentham in DC., Prodr. XII: 536 (1848). Type: Cape. In montosis Nieuwereldsbergen prope Beaufort, alt. 3000 – 4000 ped., *Drege* 7953a (K, left specimen, lectotype).
- Leonotis hirtiflora* Benth. in DC., Prodr. XII: 536 (1848); *Leonotis leonitis* R. Br. var. *hirtiflora* (Benth.) Skan in Thiselton-Dyer (ed.), Fl. Cap. 5 (sect. 1, pt. 2): 377 (1910). Type: Cape, in Africâ australi ad Ludwigsburg, *Zeyher* 206 (K, lectotype; BM).
- Leonotis ocymifolia* (Burm. f.) Iwarsson var. *raineriana* (Vis.) Iwarsson *sensu* A. D. Q. Agnew & Shirley Agnew, Upland Kenya Wild Flowers (2nd ed.): 285 (1994).

ILLUSTRATION. P. Miller (1760). Fig. Pl. Gard. Dict., II: f. CLXII (1) 'Leonuris, minor, capititis Bonae Spei....'.

Erect, slender shrub 0.6 – 3 m tall. Stems covered with either antrorse or retrorse hairs and sessile glands. Leaves round to broadly ovate, 9 – 53(– 60) × 8 – 28(– 30) mm, shortly pubescent to tomentose beneath, apex rounded, base rounded to truncate; petioles with short hairs and sessile glands, 2 – 20 mm long. Inflorescence terminal, sometimes with the median shoot persistent and producing a new inflorescence next season; 1(– 2) verticils per stem, 0 – 65 mm apart; verticils (excluding corollas) 40 – 52 mm diam. Bracts similar to cauline leaves, 6 – 25 mm long; bracteoles 7 – 11 mm long. Pedicels 1 – 2 mm long, covered with short hairs and sessile glands. Calyx 16 – 22 mm long at anthesis, densely to laxly covered with short hairs and sessile glands, apex asymmetric; dorsal tooth 3 – 6 mm long, lateral and ventral teeth 1 – 2 mm long. Corolla with long dull to bright orange hairs, 32 – 45 mm long; tube 18 – 25 mm long, laxly covered with short hairs and sessile glands; lower lip 7 – 10 mm long, glabrous or laxly covered with short hairs and sessile glands.

DISTRIBUTION. Congo (Kinshasa), Kenya, Tanzania, Northern Malawi, Eastern Zambia, Zimbabwe, South Africa and Lesotho (Map 3).

HABITAT. Steep, exposed rock outcrops, inselbergs, kopjes, among riverbeds and near evergreen forests. Growing in association with *Vellozia* sp. (*Velloziaceae*), *Aloe* sp. (*Liliaceae*), *Dombeya* sp. (*Sterculiaceae*) *Kotschya recurvifolia* (*Leguminosae*), *Artemisia afra* (*Asteraceae*), *Pappia capensis* (*Sapindaceae*), *Boscia* sp. (*Capparaceae*), *Ziziphus mucronata* (*Rhamnaceae*), *Turraa mombassana* (*Meliaceae*), *Blepharis* sp. (*Acanthaceae*), *Rhus natalensis* (*Anacardiaceae*), *Combretum molle* (*Combretaceae*), *Aeollanthus* sp.



MAP. 3. Distribution of *Leonotis ocymifolia* var. *ocymifolia*, *L. ocymifolia* var. *raineriana* (in Africa) and *L. ocymifolia* var. *schinzii*.

(*Lamiaceae*). Growing in thin black, brown or red soil. Altitude: 960 – 3000 m (Flora Zambesiaca area), 0 – 2000 m (Flora of Southern Africa area).

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This taxon has a wide distribution and altitude range, and is known from a number of different habitat types. It cannot be considered threatened.

SELECTED SPECIMENS. CONGO (KINSHASA). Shaba Prov., Bakania Terr., near Namopala, Mt Kampongo, 1400 m, 28 April 1971, *Lisowski* 23579 (POZG). KENYA. Machakos Distr., Lukenya [Lukenia], 21 May 1961, *Lucas & Williams* EA12352 (EA, FT, K, UPS, WAG). TANZANIA. Rungwe Distr., 20 km from Mbalizi on Isangati road, 2000 m, 16 Aug. 1984, *Iwarsson et al.* 1112 (DSM, K, NHT, UPS). MALAWI. Central Region: Lilongwe Distr., Mkhoma Mt, on the S peak, 1650 m, 6 July 1978, *Iwarsson & Ryding* 900 (K, MAL, UPS). ZAMBIA. Eastern Prov., Petauke Distr., Gt. East Rd., 130 km on Chitipa [Fort Jameson] to Lusaka road, 24 May 1952, *White* 2873 (FHO,

K). ZIMBABWE. Masvingo [Victoria], Zimbabwe, in "Acropoli", 13 Oct. 1930, *Fries* 2089 (K, LD, PRE, SRGH). SOUTH AFRICA & LESOTHO: For an extensive collection list see Iwarsson (1985b).

8b. var. *schinzii* (Gürke) Iwarsson in Leistner (ed.), *Flora of Southern Africa* 28 (4): 35 (1985). Type: as for *L. schinzii*.

Leonotis schinzii Gürke, *Bot. Jahrb. Syst.* 22: 143 (1895); Baker in Thiselton-Dyer, *Fl. Trop. Afr.* 5 (3): 494 (1900). Type: Gross-Namaland: Homeib, April 1885, *Schinz* 40 (B†, Z, lectotype).

Leonotis randii S. Moore, *J. Bot.* 38: 465 (1900). Type: Rhodesia, Bulawayo, Dec. 1897, *Dr. Rand* 165 (BM, holotype).

Leonotis microphylla Skan in Thiselton-Dyer (ed.), *Fl. Cap.* 5 (sect. 1, pt. 2): 377 (1910). Type: Kalahari region: Transvaal; Jeppesstown Ridges, Johannesburg, 6000 ft, *Gilfillan* in *Herb. Galpin* 6169 (K, lectotype, BOL).

Leonotis dysophylla Benth. *sensu* Plowes & Drummond, *Wild flowers of Rhodesia: a guide to some of the common wild flowers of Rhodesia*, pl. 141 (1976).

ILLUSTRATION. Plowes & Drummond, *Wild flowers of Rhodesia: a guide to some of the common wild flowers of Rhodesia*, pl. 141 (as *Leonotis dysophylla* Benth.) (1976).

Erect shrub 0.9 – 1.8 m tall. Stems slender, covered with retrorse hairs and sessile glands. Leaves narrowly spatulate to oblanceolate or narrowly obovate, 15 – 50 (occasionally to 70) × 3 – 13 mm, shortly pubescent to tomentose beneath, apex acute, base attenuate; sessile. Inflorescence terminal; 1 – 3 verticils per stem, 75 – 160(– 278) mm apart; verticils (excluding corollas) 35 – 60(– 78) mm diam. Bracts similar to cauline leaves, sometimes deciduous (8 –) 12 – 23(– 30) × 3 – 5 mm; bracteoles 6 – 13(– 20) mm long. Pedicels 1.5 – 3.5 mm long, covered with short hairs and occasionally sessile glands. Calyx 15 – 18(– 28) mm long at anthesis, covered with short hairs and sessile glands; dorsal tooth (3 –) 4.5 – 6(– 9) mm long, lateral and ventral teeth 0.5 – 4 mm long. Corolla with long orange to reddish orange hairs, (24 –) 32 – 44 mm long; tube 15 – 25 mm long, subglabrous, occasionally with sessile glands; lower lip 6 – 7 mm long, subglabrous, occasionally with sessile glands.

DISTRIBUTION. Botswana (SE), Zimbabwe (N & W) and Southern Africa (Map 3).

HABITAT. Open sites on rocky slopes, kopjes, by roadsides often in sandy soil and tributaries, in sometimes burnt areas. Growing in association with *Acacia* (*Leguminosae*), *Hypharrhenia* (*Poaceae*). 960 – 1025 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This taxon has a more restricted habitat and altitudinal range than var. *ocymifolia*. However, since it is known from more than one locality and has been widely collected it is unlikely to be threatened.

SELECTED SPECIMENS. BOTSWANA. At foot of Mokolodi Hill (roadside), 15 Oct. 1978, *Hansen* 3492 (C, GAB, K, PRE, SRGH, WAG). ZIMBABWE. Nyamandhlovu, Gwayi R., 43 km W of Nyamandhlovu, 20 April 1972, *R. K. Grosvenor* 731 (S, SRGH). SOUTH AFRICA & NAMIBIA: For an extensive collection list please see Iwarsson (1985b).

8c. var. raineriana (Vis.) Iwarsson in Leistner (ed.), *Flora of Southern Africa* 28 (4): 35 (1985). Type: as for *L. raineriana*.

Leonotis raineriana Vis., *Orto Bot. Padova*: 142 (1842). *Leonotis velutina* Fenzl var. *raineriana* (Vis.) Benth. in DC., *Prodr.* XII: 535 (1848). Type: ex hort., seeds from Kotschy 519, Sudan, near Camamil and Kassan, Tumat (K, lectotype; BM, B, FI, FI-W, K, M, P, W).

Leonotis intermedia Lindl., *Bot. Reg.* 10: t. 850 (1824); Sprengel in Linnaeus, *Syst. Veg.*, ed. 16 (vol. II): 744 (1825); Meyer, *Comm. Pl. Afr. Austr.*: 242 (1838); Benth. in DC., *Prodr.* XII: 536 (1848). Type: ex hort., "the material illustrated came from the garden of the Horticultural Society from seed sent from Delagoa [Algoa] Bay, in southern Africa by the late Mr Forbes" (CGE holotype; BM, BR, G-DC, K).

Leonotis dysophylla Benth. in Meyer, *Comm. Pl. Afr. Austr.*: 242 (1838); Benth. in DC., *Prodr.* XII: 536 (1848). Type: Between Omsamwubo and Omcomas, Dregre 4832a (K, lectotype).

Leonotis velutina Fenzl, *Flora* 27: 312 (1844); Benth. in DC., *Prodr.* XII: 535 (1848); Baker in Thiselton-Dyer, *Fl. Trop. Afr.*, 5(3): 492 (1900); Binns, *A First Checklist of the Herbaceous Flora of Malawi*: 58 (1968). Type: seeds from Sudan: Blue Nile "In confiniis Camamil et Kassan: Tumat", 23 Jan. 1838, Kotschy 519 ((K, lectotype; BM, B, FT, FT-W, K, M, P, W).

Leonotis rugosa Benth. in DC., *Prodr.* XII: 535 (1848). *Leonotis velutina* Fenzl var. *rugosa* (Benth.) Baker in Thiselton-Dyer, *Fl. Trop. Afr.* 5 (3): 492 (1900). *Leonotis raineriana* Vis. var. *rugosa* (Benth.) Cufod., *Bull. Jard. Bot. Belg.* 32 (4) suppl. [Enumeratio Plantarum Aethiopiae Spermatophyta]: 808 (1962). Type: Ethiopia, in montibus prope Genniam regionis Memsach [Tigre Reg.: Memsah Distr., near Adua, Gennia], 13 Dec. 1837, Schimper 371 (K lectotype; B, BM, FI-W, G-DC, M, P, S, UPS, W, Z).

Leonotis laxifolia MacOwan, *Bull. Misc. Inform., Kew*: 13 (1893). Type: Cape, Malowe, Tyson 2766, in *Herb. A.A.* 1300 (GRA, holotype; BM, BOL, K, SAM, UPS, W, Z).

Leonotis mollissima Gürke, *Bot. Jahrb. Syst.* 22: 141 (1895); Baker in Thiselton-Dyer, *Fl. Trop. Afr.* 5 (3): 493 (1900); Moore, *J. Linn. Soc., Bot.* 40: 180 (1911); Gomes e Sousa, *Plantas Menyarthianus in Sociedade de Estudo da Colónia de Moçambique*, *Separate Bulletin* No. 29, 30, 31 & 32: 87 (1936); Brenan *et al.*, *Mem. New York Bot. Gard.* 9: 55 (1954); Chapman, *The Vegetation of the Mlanje Mountains, Nyasaland*: 45 (1962); Binns, *A First Checklist of the Herbaceous Flora of Malawi*: 58 (1968); Richards & Morony, *Check List of the Flora of Mbala (Abercorn) & Distr.*: 246 (1969); Fanshawe, *Check List of the Woody Plants of Zambia showing their distribution*: 26 (1973); Agnew, *Upland Kenya Wild Flowers*: 620 (1974); Banda & Morris, *Common Weeds of Malawi*, 100, pl. p. 102 (1986); Blundell, *Collins Photo Guide to the Wild Flowers of East Africa*, 2nd edition: 403, pl. 431 (1992). Types: Usambara: Mlalo, im Gebüsch niederer Hügel, Feb. 1892, Holst 3873; Kwa Mshusa, in Lichtungen des Hochwaldes, 1570 m, Viofia, 15 Aug. 1893, Holst 9075 (B†, K lectotype; COI, M, P, W, Z). Kilimandscharo: zwischen 100 – 1600 m [according to Gürke, although 4 – 5000 ft is written on the collection label], Johnston s.n. (BM, K); an der unteren Urwaldgrenze, 2000 m, July 1887, H.

- Meyer* 111. Angola: Humpata, March 1883, *Newton* 106 (Z, COI).
- Leonotis mollissima* Gürke var. *carnea* Gürke, Bot. Jahrb. Syst. 22: 141 (1895); Brenan *et al.*, Mem. New York Bot. Gard. 9: 55 (1954). Type: Tanzania: Kilimandscharo: bei der Missionsstation Kilema [Kilimanjaro at Kilema], 1540 m, unter Exemplaren der Hauptform, 19 Dec. 1893, *Volkens* 1688 (B†, BM, lectotype).
- Leonotis mollissima* Gürke var. *fulva* Gürke, Bot. Jahrb. Syst. 22: 141 (1895); Brenan *et al.*, Mem. New York Bot. Gard. 9: 55 (1954). Type: Tanzania: Kilimandscharo: im Gebüsch bei der Marangustation [Kilimanjaro at Marangu], bei 1430 m, 14 April 1893, *Volkens* 235 (B†, K lectotype (labelled 235a); BM (labelled 235a, Maranga, 1530 m, April 1893)).
- Leonotis malacophylla* Gürke, Bot. Jahrb. Syst. 22: 142 (1895). Type: Natal, Clydesdale, 800 m, March 1886, *Tyson* 1508 (K, lectotype; SAM, UPS, W); Camperdown, *Rehmann* 7750 (Z); Howick, 1000 m, *Junod* 403 (Z).
- Leonotis bachmannii* Gürke, Bot. Jahrb. Syst. 22: 143 (1895). Type: Transvaal, Barberton, hillsides, 900 m, 19 April 1890, *E. E. Galpin* 922 (Z, lectotype); Natal in Pondoland, *Bachmann* 1170 & 1175 (no material seen).
- Leonotis latifolia* Gürke, Bot. Jahrb. Syst. 22: 143 (1895). Type: Natal, Biggarsberge bei Drakensberg, *Rehmann* 7057 (Z, lectotype); Pondoland, Murchison, Alfred County, April 1888, *Bachmann* 1174 (no material seen); Van Reenens Pass, 1700 – 1900 m, 20 March 1894, *O. Kuntze* s.n. (K); Movi R., 1500 m, 20 Feb. 1895, *Schlechter* 6839 (BOL, Z).
- Leonotis laxifolia* MacOwan f. *pilosa* Gürke, Bot. Jahrb. Syst. 22: 144 (1895). Type: Natal: Karkloof, *Rehmann* 7374 (Z, lectotype).
- Leonotis melleri* Baker in Thiselton-Dyer, Fl. Trop. Afr. 5(3): 491 (1900); Binns, A First Checklist of the Herbaceous Flora of Malawi: 58 (1968). Type: Mozamb. Distr., British Central Africa: Nyasaland: Manganja Hills [Shire Highlands], 3000 ft, *Meller* (K, holotype); Mount Chiradzulu, 4000 ft, *Whyte* s.n. (K).
- Leonotis elliotii* Baker in Thiselton-Dyer, Fl. Trop. Afr. 5(3): 492 (1900). Type: Nile land. British East Africa [Kenya]: Mau forest, 7000 – 8000 ft, *Scott-Elliot* 6950 (K holotype, BM isotype).
- Leonotis dinteri* Briq., Bull. Herb. Boissier III (2nd series): 1090 (1903). Type: Namibia, Hereroland, near Okahandja, Tabakstuijn, *Dinter* 249 (Z, holotype).
- Leonotis urticifolia* Briq., Bull. Herb. Boissier III (2nd series): 1091 (1903). Type: South Africa, Natal, 1862, *Cooper* 1182 (as *Cooper* 1152 in Briquet 1903) (BM, K, W, Z holotype).
- Leonotis hereroensis* Briq., Bull. Herb. Boissier III (2nd series): 1092 (1903). Type: Namibia, Hereroland, *L. Nels* s.n. (Z).
- Leonotis newtoni* Briq., Bull. Herb. Boissier III (2nd series): 1093 (1903). Type: Angola: Mossamedes, Humpata, March 1833 [1883], *Newton* 106 (Z lectotype; COI).
- Leonotis engleri* Gürke, Bot. Jahrb. Syst. 36: 121 (1905). Type: Tanzania, West Usambaras, near Magamba, 2000 – 2400 m, Oct. 1902, *Engler* 1264 (B†).
- Leonotis longidens* S. Moore, J. Bot. 45: 98 (1907). Type: Uganda, Entebbe, 4 Oct. 1905, *Bagshawe* 829 (BM, holotype).
- Leonotis brevipes* Skan in Thiselton-Dyer, Fl. Cap. 5 (sect. 1, pt. 2): 378 (1910). Type: Transvaal, Medingen Mission Station, Zoutpansberg, 17 June 1906, *Burtt-Davy* 2657 (K, holotype).

Leonotis galpini Skan in Thiselton-Dyer, Fl. Cap. 5 (sect. 1, pt. 2): 378 (1910). Type: Cape, Queenstown Division; mountain sides near Queenstown, 4500 ft, 10 June 1894, *Galpin* 1825 (K, holotype; Z isotype).

Leonotis westae Skan in Thiselton-Dyer, Fl. Cap. 5 (sect. 1, pt. 2): 382 (1910). Type: Cape, Port Elizabeth, *Miss West* 75 (K, holotype).

Leonotis mollis Benth. var. *albiflora* Skan in Thiselton-Dyer, Fl. Cap. 5 (sect. 1, pt. 2): 378 (1910). Types: Cape, Boschberg, *MacOwan* s.n. (K, lectotype).

Leonotis intermedia Lindl. var. *natalensis* Skan in Thiselton-Dyer, Fl. Cap. 5 (sect. 1, pt. 2): 381 (1910). Types: Natal, near Durban, 1840, *Peddie* s.n. in Herb. Harvey (K, lectotype); Port Natal, *Grant* s.n. (K); *Williamson* s.n. (no material seen); Bushmans R., *Gerrard* 362 (no material seen).

Leonotis spectabilis S. Moore, J. Linn. Soc., Bot. 40: 180 (1911). Type: Zimbabwe, Chimanimani Mts, 26 Sept. 1906, *Swynnerton* 2013 (BM, holotype).

Leonotis kagerensis Lebrun & Touss., Exploration du Parc National de la Kagera, Mission J. Lebrun (1937–1938), Fasc. 1, 121 (1948). Type: Rwanda, Entre Gabiro et Kidehe [Kagera National Park, between Gabiro and Kadehe], 1600–1700 m d'altitude, Jan. 1938, *Lebrun* 9643 (BR holotype, K isotype).

Leonotis velutina Fenzl var. *angustifolia* Chiov. in Senni, Nuovo Giorn. Bot. Ital. 59 (1): 73 (1952). Type: Eritrea, Bassopiano orientale, Faghenà, 28 April 1947, *F. Cappelletti e V. Nastasi* 213 (FT).

Leonotis ocymifolia (Burm. f.) Iwarsson var. *ocymifolia sensu* A. D. Q. Agnew & Shirley Agnew, Upland Kenya Wild Flowers (2nd edition): 285 (1994).

ILLUSTRATIONS. Lindley, Bot. Reg. 10: t. 850 (*L. intermedia*); Prain, Bot. Mag. 137: t. 8404 (*L. dysophylla*) (1911); Burger, Families of Flowering Plants in Ethiopia: p. 199, f. 61 (1) (*L. velutina*) (1967); Agnew, Upland Kenya Wild Flowers, p. 621 (*L. mollissima*) (1974); Cribb & Leedal, The Mountain Flowers of Southern Tanzania, p. 114, pl. 27c (*L. mollissima*) (1982);

Robust, erect, semi-woody shrub, 0.9–5 m tall. Stems covered with retrorse (occasionally antrorse), velutinous hairs and sessile glands. Leaves lanceolate to narrowly lanceolate or ovate, (32–)46–190(–230) × 22–56(–90) mm, velutinous, rarely tomentose to subglabrous beneath, apex acute, base attenuate to cordate; petioles velutinous with retrorse and occasionally antrorse hairs, eglandular or with sessile glands, (6–)17–40(–110 (in South Africa)) mm long. Inflorescence terminal; 1–5 verticils per stem, 80–150 mm apart; verticils (excluding corollas) 35–90 mm diam, in Ethiopia rarely with two opposite cyme halves, pedunculate. Bracts similar to cauline leaves or absent, 30–85 mm long; bracteoles 9–17 mm long. Pedicels 1–3(–4) mm long, covered with short hairs and occasionally sessile glands. Calyx 14–31 mm long at anthesis, covered with short hairs and occasionally sessile glands, apex asymmetric; dorsal tooth 2–14 mm long, lateral and ventral teeth, 0.5–5.5 mm long, approximately the same size. Corolla with long whitish buff to pale salmon pink or orange to orange-red hairs (colour forms sometimes mixed at a locality), (24–)30–37(–45) mm long; tube 10–25 mm long, subglabrous, occasionally with sessile glands; lower lip 5–8 mm long, subglabrous, eglandular.

DISTRIBUTION. Congo (Kinshasa), Rwanda, Burundi, Ethiopia, Eritrea, Sudan,

Kenya, Uganda, Tanzania, Malawi, Mozambique, Zambia, Zimbabwe, Angola, Namibia, Lesotho, Swaziland and South Africa (Map 3).

HABITAT. Streamsides, damp, sheltered sites, edges of montane forest, open parts of *Brachystegia* woodland, grassland to roadsides and edges of cultivated areas; (50 –)600 – 3700 m. For more regionally-specific habitats, see notes after selected specimens.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. Widely distributed throughout the continent and known from a range of habitats. It cannot be considered threatened.

SELECTED SPECIMENS (1 specimen from each country).

CENTRAL AFRICA: CONGO (KINSHASA). Kamina Terr., Lovoi R., April 1932, *Quarré* 3025 (BM, BR, K); RWANDA. Kibungu Territory, Rwinkwavu to S of Parc de la Kagera, 1400 m, 13 April 1966, *Lewalle* 676 (BR, K); BURUNDI. Bujumbara Terr., near Mayuyu, road to Karonge, 2100 m, 18 May 1966, *Lewalle* 802 (BR, K).

NORTH EAST AFRICA: SUDAN. Imatong Mts, Katire to Itibol, 1900 m, 17 Dec. 1935, *Thomas* 1620 (BM, K); ERITREA. Mt Bizen, 2000 m, 10 May 1892, *Schweinfurth & Riva* 2071 (FT, K, Z); ETHIOPIA. Kaffa Prov., Mt Maigudu, 2550 m, 3 Dec. 1972, *Friis et al.* 1506 (C, K, WAG).

EAST AFRICA: UGANDA. Karamoja Distr., Mt Morongole, 11 Nov. 1939, *Thomas* 3274 (K); KENYA. Masai [Narok] Distr., Olokurto, 13 May 1961, *Glover, Gwynne & Samuel* 988 (K, EA); TANZANIA. Ludewa Distr., Itimbo, 6 Nov. 1987, *Mwasumbi, Magehema, Thomas & Lovett* 13414 (K, MO).

SOUTHERN TROPICAL AFRICA: MOZAMBIQUE. Manica e Sofala, W face of Gorongosa Mt, 10 July 1969, *Leach & Cannell* 14299 (K, SRGH); MALAWI. Blantyre Distr., Mpingwe Hill, 17 June 1986, *Banda, Tawakali & Nachamba* 2577 (K, MAL); ZAMBIA. Uningi Pans, Mbala, 1550 m, 16 May 1968, *Sanane* 122 (BR, K); ZIMBABWE. C: Wedza Distr., SE slope of Wedza Mt, 22 May 1968, *J. E. Rushworth* 1055 (K, SRGH); ANGOLA. Huíla, Lubango, ao 12 km na estrada Sá da Bandeira Humpata, 16 July 1972, *Clara Couto* 243 (K, LUAI).

SOUTHERN AFRICA: SOUTH AFRICA, NAMIBIA, LESOTHO & SWAZILAND. See Iwarsson (1985b).

NOTES. Habitat notes (continued from above). For specified regions var. *raineriana* is found growing in association with:

Ethiopian area: Montane, *Juniperus-Podocarpus*-forest margins and in grazed montane grassland sometimes at rocky places often near cultivation and along roads. In some areas cultivated for medicinal use. Commonly accompanied by: *Hagenia abyssinica*, (*Rosaceae*), *Gnidia* sp. (*Thymeleaceae*), *Brucea* sp. (*Simaroubaceae*), *Discopodium* sp. (*Solanaceae*), *Euphorbia obovalifolia* (*Euphorbiaceae*), *Maesa* sp., (*Myrsinaceae*), *Ekebergia* sp. (*Meliaceae*), *Schefflera* sp. (*Araliaceae*), *Erica* sp. (*Ericaceae*), *Hypericum* sp. (*Hypericaceae*), *Lobelia rhyncopetalum* (*Campanulaceae*). Annual rainfall 500 – 2000 mm. Black, brown or red light soil, pH given at one locality 6.5 – 7.8.

East African and Congo (Kinshasa) area: Montane evergreen forest margins, in the bamboo zone, also the ericaceous belt and at lower altitudes in *Brachystegia* woodland often on streamsides. It occurs in well-drained, brown or reddish-orange volcanic soil. Commonly accompanied by: *Hagenia abyssinica* (*Rosaceae*), *Cussonia* sp. (*Araliaceae*), *Cassipourea* sp. (*Rhizophoraceae*), *Acacia lahai*, *Crotalaria imperialis*

(*Leguminosae*), *Helichrysum* sp., *Stoebe kilimanscharica*, *Vernonia* sp., *Artemisia afra* (*Asteraceae*), *Heteromorpha trifoliata* (*Apiaceae*), *Combretum molle* (*Combretaceae*), *Commiphora* sp. (*Burseraceae*). In field layer *Pennisetum schimperi*, *P. clandestinum*, *Eleusine jaegeri*, *Themeda triandra*, *Andropogon schirensis* (*Poaceae*).

Flora Zambesiaca area: *Brachystegia* or *Isoberlinia* woodland, montane grassland and montane *Juniperus-Widdringtonia*-forest margins often at rock outcrops along streams and roads. Growing in generally well-drained light, brown or red soils. Commonly associated with *Uapaca* sp., (*Euphorbiaceae*), *Protea* sp., *Faurea* sp. (*Proteaceae*), *Cussonia* sp. (*Araliaceae*), *Markhamia* sp. (*Bignoniaceae*), *Annona senegalensis* (*Annonaceae*), *Pterocarpus angolensis*, *Albizia* sp. (*Leguminosae*), *Maytenus heterophylla?* (*Celastraceae*), *Berkheya* sp., *Coreopsis* sp., *Vernonia* sp., *Ximea* sp. (*Asteraceae*), *Rhoicissus* sp. (*Vitaceae*), *Combretum* sp. (*Combretaceae*), *Bersama* sp. (*Melianthaceae*), *Conopharyngia* sp., *Diplorhynchus* sp. (*Apocynaceae*), *Ocimum gratissimum*, *Pycnostachys urticifolia* (*Lamiaceae*), *Polygala virgata* (*Polygalaceae*), *Lippia* sp., *Lantana* sp. (*Verbenaceae*), *Thespesia* sp. (*Malvaceae*).

Southern African area: Growing in well drained soils in grassland slopes and dune depressions, in forest margins and at rocky outcrops, also found along streams and roads. Sometimes associated with tree ferns, *Leucosidea sericea* (*Rosaceae*), *Andropogon nardus* var. *marginatus* (*Poaceae*).

ALTITUDE. Ethiopia area 500 – 3700 m; East Africa and Congo (Kinshasa) area 750 – 3350 m; Zambesiaca area 500 – 2300 m; Southern Africa area 50 – 1900 m.

LOCAL NAMES:

Ethiopian area: YeFeres zeng, Jeffarassengh (Amharic — source Edwards pers. comm. (1976)).

East African and Congo (Kinshasa) area: Orbibi, Olbibbi, Lijujunoi (Masai); Mosipit, Mosibit (Kipsigis); Ezewe (Kikamba); Mucii, Muchii (Kikuyu); Ibicumucumu, Igitshumutshumu (Kinyarwanda); Karunda (Kiluba); Sankiamut (Shaba area); Agianzu (Kilur); Gera (Kilur); Aganza (Kilur); Ifwonfwo, Yafifi (Kiunijika); Sonja (Kifojoro); Nakatenge (Kihehe); Umutongatonga; Luliyolwe (Kitongwe); Fio-fio, Fyo-fyo, Vyo-vyo, Fofiofio (Kishambaa); Nihifiofio (Bugu); Ireng (Chag); Muhasi (Sukuma); Ikitongotongo (Kishubi).

Southern Tropical Africa area: Otyingalalandyamba, Nakfundu (Lungu); Chigantuto (Mozambique); Mudzutzu, Mu'Yaboto (Eastern Zimbabwe).

9. *Leonotis nepetifolia* (L.) R. Br. in Aiton, Hort. Kew., ed. 2 III: 409 (1811); Ker-Gawler, Bot. Reg. IV: t. 281 (1818); Moon, Cat. Pl. Ceylon: 44 (1824); Sprengel in Linnaeus Syst. Veg., ed. 16, II: 744 (1825); Bentham, Labiat. Gen. Spec. 3 (fasc. 6): 618 (1834); Hooker, Bot. Mag. 65: t. 3700 (1839); Bentham in DC., Prodr. XII: 535 (1848); Baker, Fl. Mauritius: 261 (1877); Hooker, Fl. Brit. India 4 (12): 691 (1885); Trimen, Handb. Fl. Ceylon III: 387 (1895); Briquet in Engler, Nat. Pflanzenfam., teil 4, abt. 3a: 246 (1896); Baker in Thiselton-Dyer, Fl. Trop. Afr. 5 (3): 491 (1900); Britton, Fl. Bermuda: 324 & pl. (1918); Broun & Massey, Fl. Sudan: 363 (1929); Mukerjee, Rec. Bot. Surv. India XI5 (1): 185 (1940); Robyns, Flore de Spermatophytes du Parc National Albert II: 155 (1947); Williams, Useful and Ornamental Plants in Zanzibar & Pemba: 327, pl. 329 (1949); Wiehe, Catalogue of

Flowering Plants in the Herbarium of the division of Plant Pathology, Zomba: 29 (1952); Andrews, Fl. Pl. Sudan III: 212 (1956); Cufodontis, Bull. Jard. Bot. Belg. 32 (2): 808 (1962); Lind & Tallantire, Some Common Flowering Plants of Uganda: 152, f. 96 (1962); Morton in Hepper (ed.), Fl. W Trop. Afr. (2nd edition) 2: 470 & pl. (1963); Binns, A First Check List of the Herbaceous Flora of Malawi: 58 (1968); Richards & Morony, Check List of the Flora of Mbala (Abercorn) & District: 246 (1969); Launert & Schreiber, Prodrömus einer Flora von Südwestafrika Hermann Merxmüller 123: 16 (1969); Fanshawe, Check List of the Woody Plants of Zambia showing their distribution: 26 (1973); Agnew, Upland Kenya Wild Flowers: 619 (1974); Keng, Flora Malesiana, (ser. 1) 8 (3): 335 (1978); Cramer in Dassanayake & Fosberg (eds.), Rev. Handb. Fl. Ceylon III: 180 (1981); Blundell, Collins Photo Guide to the Wild Flowers of East Africa, 2nd edition: 403, pl. 432 (1992); A. D. Q. & S. Agnew, Upland Kenya Wild Flowers, 2nd edition: 285 (1994).

Phlomis nepetifolia L., Sp. Pl., II: 586 (1753); Linnaeus, Sp. Pl., ed. 2: 820 (1763); Linnaeus, Syst. Veg., ed. 13: 451 (1774); Linnaeus f., Suppl. Pl.: 274 (1781).

Leonurus globosus Moench, Methodus: 400 (1794). Type as for *Phlomis nepetifolia*.

Leonurus nepetaefolia (L.) Mill., Gard. Dict., ed. 8 (1768). Type: plate p. 117 in Hermann, Hort. Lugd.-Bat. Cat. (1687), labelled "Cardiaca americana annua nepetaefolia...." (lectotype).

ILLUSTRATIONS. Hooker, Bot. Mag. 65: t. 3700 (1839); Cook & Collins, Contr. U.S. Natl. Herb. 8 (2): 174 & pl. 44 (1903); Morton in Hepper (ed.), Flora of West Tropical Africa (2nd edition) 2: 470 & pl. (1963).

Annual or short-lived perennial herb, (0.32 –)1 – 3(–4.5) m tall, with a single erect stem from small (less than 10 cm long), easily uprooted, wrinkled tap-root. Stem with internodes 20 – 150 mm long, less than 40 mm diam., usually repeatedly branching in the nodes below the inflorescence, green (brown at base), occasionally striate, with short antrorse or retrorse hairs and sessile glands; usually with a tuft of 1 – 4 mm long, white or yellowish hairs on the upper half of the leaf-nodes, occasionally extending a few cm above the node. Leaves petiolate; petiole (5 –)30 – 80(–125) mm long, laxly to densely covered with adpressed antrorse or retrorse hairs, eglandular or with sessile glands; blade ovate, (25 –)50 – 200 × (20 –)40 – 150 mm, apex acute to acuminate, base cuneate-attenuate to cordate, margin deeply crenate with 25 – 51 teeth from apex to base, both surfaces laxly to densely covered with short hairs and sessile glands, lower surface more densely pubescent (especially on veins) and subsequently more greyish-green, with 6 – 10 side-veins, venation yellowish white, pseudodichotomously branched at leaf-margin. Inflorescence of (1 –)2 – 5(–7) verticils per branch, usually spaced by prolonged internodes (50 –)70 – 280 mm long. Bracts narrowly lanceolate or absent, 25 – 90(–150) × 4 – 13 mm, apex acute, base attenuate, indumentum as cauline leaves. Bracteoles linear, (3 –)7 – 15(–20) × 0.5 – 1.5 mm, indumentum as cauline leaves, acuminate, apically white. Verticils spherical to cylindrical, 30 – 67 mm in diameter, with c. 20 – 28 branches, 2 – 16 mm long with 9 – 18 buds per branch. Pedicels 0.5 – 2 mm long (slightly enlarging in fruit), alternating on verticil branches, shortly pubescent. Calyx 14 – 25 mm long at anthesis, slightly

enlarged in fruit, 4–5.6 mm diam. at mouth, 8(–10)-toothed, basally yellowish-white and the distal half green, covered with short hairs, occasionally with a tuft of long, spreading hairs on the distal third, subglabrous in fruit, with sessile glands; mouth oblique; tube slightly bent dorsally; teeth deltoid to narrowly triangular, apiculate; dorsal tooth 4–7(–11) mm long; lateral teeth 4, 1–3 mm long; ventral teeth 3, united at base, forming a recurved lower lip 4–7 mm long (including apiculate teeth, 0.5–3 mm long), to 5 mm wide. Corolla 19–38 mm long, with orange or whitish-yellow hairs; tube 9–20 mm long, widening at mouth, with three distinct hair fringes within (near base); upper lip 10–20 mm long with white (or occasionally orange) woolly hair enclosing anthers and stigma well developed; lower lip 3-lobed, (3–)5–7 mm long, deflexed on the tube (but shrivelled and twisted), subglabrous, eglandular or with scattered sessile glands. Fresh pollen pale yellow. Nutlets 2.9–4.3 × 1.1–1.9 mm, with a grey and brown marble-like, non-glossy, slightly waxy surface.

Two distinct varieties occur. Var. *nepetifolia* is distinguished by the long orange hairs on the corolla. Although this variety is found throughout the distribution of *L. nepetifolia*, it is rarely found in West Africa, Central Africa and NE Africa. In these regions the pale yellow haired var. *africana* is commonly found. Var. *africana* is only rarely encountered in East Africa and Malawi.

9a. var. *nepetifolia*

Leonotis kwebensis N. E. Br., Bull. Misc. Inform., Kew 1909: 132 (April 1909). Type: Botswana, Kwebe Hills, 3,300 ft, *Mrs Lugard* 222 (K, holotype).

Corolla indumentum orange-coloured.

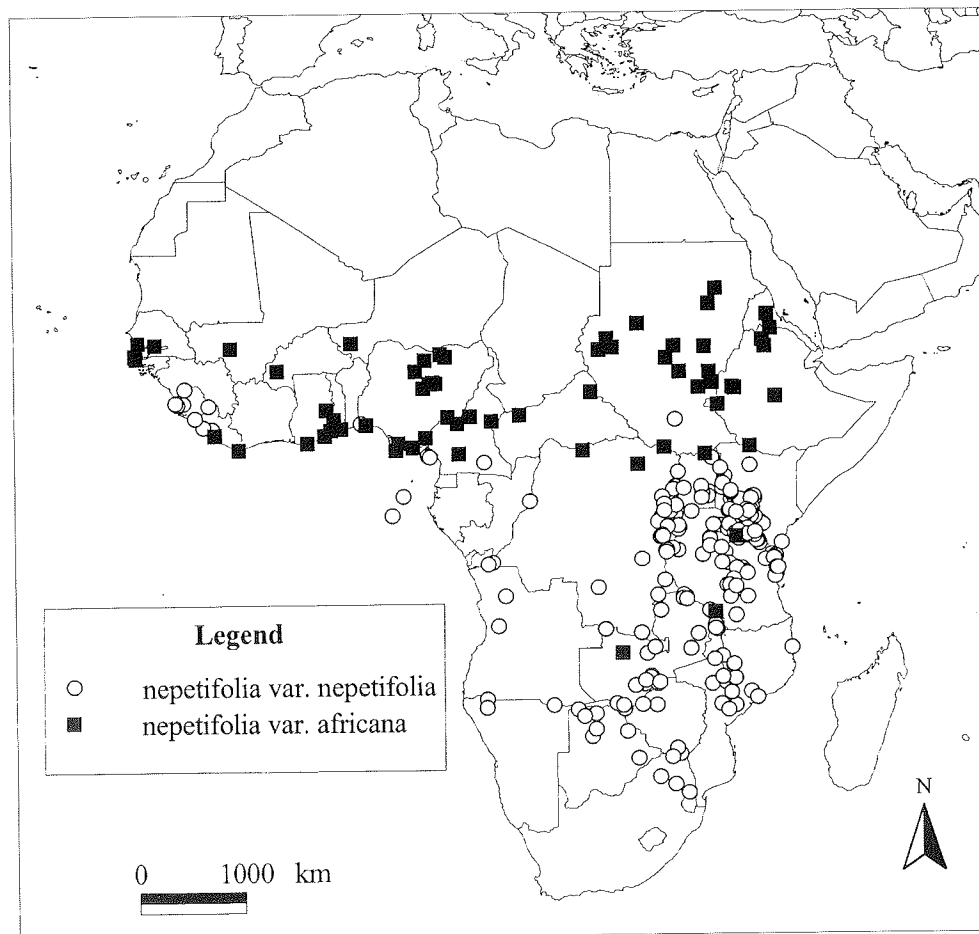
DISTRIBUTION. Throughout much of the tropics where this species is regarded more as a weed, in addition to much of Africa (Map 4).

HABITAT. In cultivated fields, along roadsides, in mixed woodland, along stream banks, in grassland and rubbish dumps, on sandy soil, gneiss outcrops, stony soil and heavy black fissuring clay; 0–2760 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. This is most commonly thought of as a weed and is not threatened.

SELECTED COLLECTIONS FROM AFRICA (1 SPECIMEN FROM EACH COUNTRY):

SIERRA LEONE. Colony, base of Mount Aureol, 18 Aug. 1958, *Melville & Hooker* 238 (K). LIBERIA. Within a radius of 20 miles from Kakatown, April 1904, *Whyte* s.n. (K). NIGERIA. SE State, Ikom Distr., Agbokun Waterfall, bank of Cross River North, *Latilo & Oguntayo* FHI 67696 (FHI, K). CAMEROON. 18 km on road E from Lomié, 12 Feb. 1977, *Lowe* 3152 (FHI, K). BIOKO. Malabo-iaba, cerca de Baó Basuala, km 26.5, 12 Feb. 1989, *Fernández Casas* 11507 (K, MA). SÃO TOMÉ. 20 Aug. 1990, *Sequeira* 35 (K). ANNOBON ISLAND. Ambo, 13 July 1959, *Wrigley & Melville* 141 (K). CONGO (KINSHASA). Mt Senga, 1908, *Kassner* 2975a (K). RWANDA. Gihin a muyaga (pret Btare), de la route du monastère, 8 June 1978, *Raynal* 20349 (K, P). BURUNDI. Bubanza Prov., Plaine Rusizi km 29, bord route, 11 May 1982, *Reekmans* 11128 (K, MO). UGANDA. Mengo Distr., Bugaia, 16 Oct. 1960, *Richardson, Kendall*



MAP. 4. Distribution of *Leonotis nepetifolia* var. *nepetifolia* (in Africa) and *L. nepetifolia* var. *africana*.

& Livingstone 129 (K, EA). KENYA. Machakos Distr., western division near Kitandi Market, c. 32 miles from the Machakos township, 1 Jan. 1968, *Mwangangi* 530 (K, EA). TANZANIA. Pare Distr., Pangani R., 8 km S of Nyumba ya Mungu power station, 13 Aug. 1974, *Mhoro & Backéus* 2160 (K, UPS). MOZAMBIQUE. Maríngué [Meringua] Distr., Save [Sabi] R., 25 June 1950, *Chase* 2448 (GH 29398) (K, SRGH). MALAWI. Mangochi Distr., Kamuzu Bridge, Mangochi Boma, 8 March 1986, *Salubeni & Balaka* 4410 (K, MAL). ZAMBIA. Mt Makulu Research Station, 12 miles S Lusaka, 9 June 1956, *Angus* 1334 (BR, K, SRGH). ZIMBABWE. Hwange [Wankie] Distr., Victoria Falls, 11 April 1978, *Mshasha* 51 (K, SRGH). BOTSWANA. Nata area at Nata river delta, 14 April 1976, *Ngoni* 490 (K, SRGH). ANGOLA. Huíla, sá da Bandeira, Huíl, 20 May 1966, *Henriques* 991 (K, LUAI). SOUTH AFRICA. see Iwarsson (1985b).

9b. var. africana (*P. Beauv.*) *J. K. Morton*, *J. Linn. Soc., Bot.* 58: 275 (1963); *Morton* in *Hepper* (ed.), *Flora of West Tropical Africa* 2: 470 (1963). Type: Nigeria, South-Western Prov.: Warri [Oware], 1786–88, *Palisot de Beauvois* s.n. (G-DE holotype, G-DE isotype).

Phlomis africana *P. Beauv.*, *Fl. Oware* II(19): 82, t. 111 (although wrongly painted with blue/purple corollas at K) (1819). *Leonotis africana* (*P. Beauv.*) *Briq.* in *Engler & Prantl* (eds.), *Nat. Pflanzenfam. Teil. IV* (abt. 3a): 246 (1896); *Baker* in *Thiselton-Dyer*, *Fl. Trop. Afr.* 5 (3): 491 (1900); *Chevalier*, *Explor. Bot. Afrique Occ. Franç.* I: 524 (1920); *Andrews*, *The Flowering Plants of the Anglo-Egyptian Sudan* 3: 212 (1956); *Agnew*, *Upland Kenya Wild Flowers*: 620 (1974). *Leonotis africana* (*P. Beauv.*) *T. & H. Durand*, *Syll. Fl. Congol.*: 453 (1909) — comb. superfl.

Phlomis pallida *Schumach. & Thonn.*, *Beskr. Guin. Pl.*, 262 (1827); *Leonotis pallida* (*Schumach. & Thonn.*) *Benth.*, *Labiata. Gen. Sp.*: 619 (1834); *Benth.* in *DC.*, *Prodr.* XII: 535 (1848); *Hooker*, *Niger Fl.*: 490 (1849); *Richard*, *Tent. Fl. Abyss.* II: 200 (1850); *Vatke*, *Oesterr. Bot. Z.* 25: 96 (1875); *Dewerre*, *Bull. Soc. Roy. Bot. Belg.* 33: 105 (1895); *Avetta*, *Materiali per la flore dello Scioa pel Prof. C. Avetta* VI: 61 (1895); *Baker* in *Thiselton-Dyer*, *Fl. Trop. Afr.* 5 (3): 491 (1900); *De Wildeman*, *Ann. Mus. Congo, Sér. V, Bot.*, II: 338 (1908) & III: 469 (1912); *Broun & Massey*, *Fl. Sudan*: 363 (1929); *Cufodontis*, *Bull. Jard. Bot. État* 32: 807 (in synonymy) (1962). Type: Hab. in Africa aequinoctiali occidentali: in Senegambia *Leprieur et Perrottet* in *Guinea prope Quitta et Ursue Thonning* (v. s. sp in herb. Delessert) [Ghana, Keta (Quitta) and Osu (Ursue), 1799–1803, *Thonning* 1 (C, holotype, Microfiche IDC 2203 80:1:3,4)].

Corolla indumentum pale yellow/yellow-cream.

DISTRIBUTION. Predominantly found in a band running from West Africa to NE tropical Africa. Becoming less frequent in East Africa and rare in Southern Tropical Africa (Map 4).

HABITAT. Weed of waste-places and cultivated areas; 400–1900 m.

CONSERVATION. IUCN Red List (3.1, IUCN 2001) rating: LC. Like *L. nepetifolia* var. *nepetifolia*, this taxon is considered a weed and is not threatened.

SELECTED COLLECTIONS (1 SPECIMEN FROM EACH COUNTRY):

SENEGAL. Casamance, 1910, *Etesse* 57 (P). GAMBIA. *Hancock* 11 (K). GUINEA-BISSAU. Bissau city, Oct. 1981, *Pettersson* 3044 (LISJC, UPS). GUINEA. Around Boudou, 1837, *Heudelot* 188 (P). LIBERIA. Cape Palmas, July 1841, *Vogel* 36 (K). IVORY COAST. Orumbo - Boka, Assakra, Oct. 1956, *J. De Wilde* 651 (WAG). MALI. Between Senegal R. and Niger R., *Bellamy* 230 (P). UPPER VOLTA. Bobo-Dioulasso, Oct. 1962, *Geerling & Bokdam* 1425 (K, WAG). SIERRA LEONE. 1915, *Thomas* 107 (K). GHANA. Accra, Legon Botanic Garden, Jan. 1958, *de Wit* 653 (WAG). TOGO. Near Lomé, *Warnecke* 288 (BM, BR, EA, K, P). NIGER. Niamey, Oct. 1927, *Hagerup* 541 (C, K). NIGERIA. Oban, 1912, *Talbot* 2064 (BM, K). CHAD. Haut-Oubangui, between Dekouv and Nana, Nov. 1902, *Chevalier* 6196 (P). CENTRAL AFRICAN REPUBLIC. Vakaga, Konbo creek on W side of Konbo Mt, 5 Nov. 1989, *Harris & Fay* 2228 (K, MO). CAMEROUN. 15 km NNE of Mokolo, near Koza, Sept. 1964, *Letouzey* 6956 (K, P, WAG). GABON. Libreville, March 1900, *Debeaux* 129 (P). CONGO (KINSHASA). Garamba National Park, June 1950, *De*

Saeger 726 (BR). SUDAN. Jabel Kon (Kohn Mt), Nov. 1839, *Kotschy* 396 (BM, FI-W, G-DC, K, LD, M, P, S, W). ETHIOPIA. NNW of Adua, Hamedo Plains, Sept. 1862, *Schimper* 178 (BM, FI-W, FI, G-DC, K, M, P, S, W). ERITREA. Near Ghinda, 2 April 1902, *Pappi* 4499 (EA, FI, S, W). UGANDA. Acholi Distr., Agoro, Chua, 12 Nov. 1945, *Thomas* 4354 (K). TANZANIA. Northern Prov.: Lake Manyara National Park, April 1962, *Dingle* 88A (EA). MALAWI. Northern Reg.: near Chaminade, Bwiba Residential Area, Dec. 1978, *Iwarsson & Ryding* 985 (K, MAL, UPS). ZAMBIA. North Western Province, Kasempa Distr., Kasempa, Kamusongwe Hill directly adjacent to Kamusongwe Prison, c. 2 km from city centre, 7 March 1995, *Luwiika, Hardey, Zimba & Nawa* 162 (K, MO).

EXCLUDED NAMES

Leonotis caribea Raf., Fl. Tellur. III: 88 (1837) = *Leucas martinicensis* (Jacq.) R. Br.

Leonotis tuberosa (L.) Hoffmanns., Verz. Pfl.-Kult., no. 11: 71 (1824) = *Phlomis tuberosa* L., Sp. pl., II: 586 (1753).

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APPENDIX I. INDEX TO NAMES

Names in **bold** type face are accepted in this paper. Synonyms are italicised and the accepted name for the taxon is indicated [by its number]

- Hemisodon leonurus* (L.) Raf. = 1
Leonotis africana (P. Beauv.) Briq. = 9b
Leonotis africana (P. Beauv.) T. & H. Durand . . = 9b
Leonotis bachmannii Gürke = 8c
Leonotis bequaertii De Wild. = 3c
Leonotis brevipes Skan = 8c
Leonotis capensis Raf. = 8a
Leonotis caribea Raf. = *Leucas martinicensis*
 (Jacq.) R. Br. = 9b
Leonotis decadonta Gürke = 3
 var. **decadonta** = 3a
 var. **porotoensis** Iwarsson & Y. B. Haru.
 var. **vestita** (Briq.) Iwarsson & Y. B. Haru.
 comb. nov. = 3c
Leonotis dinteri Briq. = 8c
Leonotis dubia E. Mey. ex Benth. = 8a
Leonotis dysophylla Benth. in Meyer = 8c
Leonotis dysophylla Benth. *sensu* Plowes &
 Drummond = 8b
Leonotis elliotii Baker = 8c
Leonotis engleri Gürke = 8c
Leonotis galpini Skan = 8c
Leonotis goetzei Gürke = 7
Leonotis grandis Iwarsson & Y. B. Haru. **sp. nov.** = 2
Leonotis hereroensis Briq. = 8c
Leonotis hirtiflora Benth. = 8a
Leonotis intermedia Lindl. = 8c
Leonotis intermedia Lindl. var. *natalensis* Skan . . = 8c
Leonotis kagerensis Lebrun & Touss. = 8c
Leonotis kwebensis N. E. Br. = 9a
Leonotis latifolia Gürke = 8c
Leonotis laxifolia MacOwan = 8c
Leonotis laxifolia MacOwan f. *pilosa* Gürke . . . = 8c
Leonotis leonitis R. Br. = 8a
Leonotis leonitis R. Br. var. *hirtiflora* (Benth.)
 Skan = 8a
Leonotis leonurus (L.) R. Br. = 1
Leonotis leonurus (L.) R. Br. var. *albiflora* Benth. . = 1
Leonotis leonurus auct. non (L.) R. Br. var.
vestita Briq. = 3c
Leonotis leonurus sensu Baker = 3c
Leonotis leonurus sensu Binns = 3c
Leonotis leonurus sensu Brenan = 3c
Leonotis leonurus sensu Brummitt = 3a
Leonotis leonurus sensu Fanshawe = 3c
Leonotis leonurus sensu Gürke = 3b
Leonotis leonurus sensu Richards & Morony . . . = 3c
Leonotis leonurus sensu T. & H. Durand = 3c
Leonotis longidens S. Moore = 8c
Leonotis malacophylla Gürke = 8c
Leonotis melleri Baker = 8c
Leonotis microphylla Skan = 8b
Leonotis mollis Benth. = 8a
Leonotis mollis Benth. var. *albiflora* Skan = 8c
Leonotis mollissima Gürke = 8c
Leonotis mollissima Gürke var. *carnea* Gürke . . = 8c
Leonotis mollissima Gürke var. *fulva* Gürke . . . = 8c
Leonotis myricifolia Iwarsson & Y. B. Haru.
sp. nov. = 4
Leonotis myrothamnifolia Iwarsson &
 Y. B. Haru. **sp. nov.** = 5
Leonotis nepetifolia (L.) R. Br. = 9
 var. **africana** (P. Beauv.) J. K. Morton = 9b
 var. **nepetifolia** = 9a
Leonotis newtoni Briq. = 8c
Leonotis ocyimifolia (Burm. f.) Iwarsson = 8
 var. **ocyimifolia** = 8a
 var. *ocyimifolia sensu* Agnew & S. Agnew . . . = 8c
 var. *raineriana* (Vis.) Iwarsson *sensu* Agnew
 & S. Agnew = 8a
 var. **raineriana** (Vis.) Iwarsson = 8c
 var. **schinzii** (Gürke) Iwarsson = 8b
Leonotis ovata Spreng. = 8a
Leonotis pallida (Schumach. & Thonn.)
 Benth. = 9b
Leonotis parvifolia Benth. = 8a
Leonotis pole-evansii Hutch. = 6
Leonotis raineriana Vis. = 8c
Leonotis raineriana Vis. var. *rugosa* (Benth.)
 Cufod. = 8c
Leonotis randii S. Moore = 8b
Leonotis rugosa Benth. = 8c
Leonotis schinzii Gürke = 8b
Leonotis spectabilis S. Moore = 8c
Leonotis tuberosa (L.) Hoffmanns. = 9b
Leonotis urticifolia Briq. = 8c
Leonotis velutina Fenzl = 8c
Leonotis velutina Fenzl var. *angustifolia* Chiov. . = 8c
Leonotis velutina Fenzl var. *raineriana* (Vis.)
 Benth. = 8c
Leonotis velutina Fenzl var. *rugosa* (Benth.)
 Baker = 8c
Leonotis westae Skan = 8c
Leonurus africanus Mill. = 1
Leonurus capitis Bonæ Spei Breyne = 1
Leonurus globosus Moench = 9
Leonurus grandiflorus Moench = 1
Leonurus nepetaefolia (L.) Mill. = 9
Leonurus perennis Africanus Herm. = 1
Phlomis africana P. Beauv. = 9b
Phlomis leonitis L. = 8a
Phlomis leonurus L. = 1
Phlomis nepetifolia L. = 9
Phlomis ocyimifolia Burm. f. = 8a
Phlomis pallida Schumach. & Thonn. = 9b
Phlomis tuberosa L. = 9b

APPENDIX II. INDEX TO EXSICCATAE

Only exsiccatae seen by the authors are cited. The format of each record is as follows:— *Collector* number (herbarium in which collection logged abbreviated according to Index Herbariorum and supplements) [taxon number in this paper].

Abdullah et al. 493 (UPS) [9a]; *Abeljung* 564 (UPS) [8c]; 625 (UPS) [?8c]; *Acocks, JPH* 17690 (K) [8c]; 17996 (K, PRE); [8a]; 21137 (K, PRE) [8a]; 24032 (K, PRE) [8a]; *Acocks, JPM* 9781 (K, PRE) [8c]; 13984 (K, PRE) [8c]; 18731 (K, PRE) [8b]; *Adamson* 82 (K) [8c]; *Albany Museum, Grahamstown* 16 [8a]; *Allen Turner for Napier* 360 (K) [8c]; *Althurstone* 38 (K) [1]; *Andersen* 226 (S) [9a]; *Angus* 825 (K) [5]; 1334 (BR, K, SRGH) [9a]; 3268 (B, K) [8c]; *Archbold* 772 (K) [9a]; *Ash* 6 (K) [8c]; *Auquier* 4226 (BR) [8c]; *Aweke & Gilbert* 945 (K) [9b]; *Ayres s.n.* (K) [9a].

Bagshawe 829 (BM) [8c]; *Bainbridge* 806 (K) [9a]; *Balbo* 944 (FT) [3a]; *Balkwill & Cadman* 3329 (B) [8c]; *Balkwill & Manning* 471 (K) [1]; *Balkwill & Balkwill* 4318 (E, K, J) [8a]; *Bally, J [in Bally, PRO]* 114 [3314] (K) [8c]; *Bally, PRO* 1045 (K) [9a]; 2295 (K) [9a]; 2417 (K) [8c]; 2617 (K) [9a]; 3879 (K) [9a]; 4736 (K) [8c]; 5543 (C, K) [9a]; 7898 (K) [8c]; 8375 (K) [8a]; 8376 (K) [8c]; 8377 (K) [9a]; *Balsinhas* 2977 (K, PRE) [8a]; *Banda, Tawakali & Nachamba* 2577 (K, MAL) [8c]; *Banker* 6907 (C) [8a]; *Barnard & Mogg* 917 (K, PRE) [8c]; *Bates s.n.* (K) [1]; *Batty* 250 (K) [9a]; 564 (K) [9a]; 586 (K) [9a]; *Baum* 822 (K) [9a]; *Baumann* 47 (K [ex B]) [9b]; *Baur* 95 (K) [8a]; 160 (K) [1]; s.n. (K) [8c]; *Bax* 354 (K) [9a]; *Bayliss* 275 (C) [8a] [see also Bayliss in BRI.B 275]; 2215 (B) [1]; 7049 (K) [1]; 7414 (B) [8a]; 7467 (B) [8a]; BRI.B 275 (K, PRE) [1]; BRI.B.500 (K, PRE) [8a]; *Becquet* 811 (BR) [3c]; *Beentje* 3326 (K, EA) [8a]; *Bellamy* 230 (P) [9b]; *Benson* 198 (BM, BR, COI, LISC, SRGH) [3a]; *Bequaert* 473 (BR) [3c]; *Bernardi* 9141 (G, K) [8c]; *Beshir* 87 (K) [9b]; *Bidgood, Leliyo & Vollesen* 4472 (DSM, K, NHT) [3c]; *Bie* 66387 (UPS) [9a]; *Biegel, Muller & Gibbs Russell* 5051 (K, SRGH) [9a]; *Bingham* 773 (K, SRGH) [9a]; 10602 (K) [6]; 10626 (K) [8c]; *Bjornstad* 880 (K, UPS) [9a]; *Blackmore et al.* 1200 (K, MAL) [8c]; 1265 (K, MAL) [9a]; *Blomberg et al.* BMP 713 (GAB, UPS) [?8b]; *Bolus* 545 (K) [8a]; 2431 (K) [8a]; 8583 (K) [8a]; *Booi* 13 (K, PRE) [8a]; 41 (K, PRE) [1]; *Borhidi et al.* 84693 (UPS) [8c]; 85526 (K) [8c]; *Bos* 957 (K, WAG) [8a]; *Boston C* 38 (K) [9b]; *Boucher* 974 (K) [1]; *Bouhey* 1837 (SRGH) [4]; *Bowker* 107 (K) [8a]; *Brain* 6143 (K, SRGH) [8a]; 9627 (K) [9a]; *Brass* 16259 (K) [8c]; 17084 (K) [8c]; 17085 (K) [8c]; 17152 (BM, BR, K, PRE, SRGH) [3a]; 17749 (K, SRGH) [3a]; *Brink* 619 (K) [1] *Britten* 16 (K, P) [1]; *Brodhurst Hill for ER Napier* 518 (K) [8c]; *Brown* 2725 (K) [9a]; *Bruce* 159 (K) [8c]; *Brummitt* 10036 (K, UPS) [8c]; 10244 (K) [8c]; 10283 (K) [9a]; 10667 (K) [8c]; 10821 (K, UPS) [4]; 10897 (K, UPS) [8c]; 10981 (K, UPS) [8c]; 11013 (K) [9a]; 11154 (K) [9a]; 11201 (K) [8c]; 11317 (K, UPS) [8c]; 11532 (K, UPS) [3c]; 11544 (K) [8c]; 11713 (K, UPS) [3a]; 11743 (K, UPS) [8c]; 12169 (K) [8c]; 12296 (K) [8c]; *Brummitt & Synge* WC15 (K, UPS) [4]; WC17 (K, MAL, SRGH, UPS) [3a]; *Buchanan* 78 (K) [3a]; 202 (BM) [3a]; 7098 (K) [8c]; *Buchwald* 19 (K) [8c]; *Bullock* 2949 (K) [8c]; *Burchell* 108 (K) [1]; 2732 (K) [8a]; 3008 (K) [8a]; 5288 (K) [1]; *Burger* 1201 (K) [8c]; *Burger* 2343 (K) [8c]; *Burke s.n.* (Cape Flat) (K): [1]; s.n. (Orange Div.) (K) [8a]; s.n. (Orange River) (K) [8c]; *Burman s.n.* (G) [8a]; *Burnett* 48/15 (K) [8c]; *Burtt* 2358 (K) [8c]; 2508 (K) [9a]; 4239 (K) [8a]; 4366 (K) [8c]; 6013 (BM, EA, K) [4]; 6014 (BM, BR, K) [3c]; *Burtt-Davy* 2657 (K) [8c]; 3936 (K) [8b].

Cameron 48 (K) [8c]; 49 (K) [8c]; s.n. (K) [9a]; *Cappelletti & Nastasi* 213 (FT) [8c]; *Carisso & Sousa* 129 (BM, COI) [3c]; *Carmichael* 1550 (EA, K) [8c]; *Carson* 19 (K) [3c]; 31 (K) [3c]; 32 (K) [9a]; *Carter, Abdallah & Newton* 2553 (K) [8c]; *Carvalho [Hort]* 3107 (B, K) [9a]; *Carvalho* 4315 (K) [9a]; *Casas* 11507 (K) [9a]; *Cayley s.n.* (K) [1]; *Cecil* 188 (K) [8c]; *Chaffey* 1192 (K) [8c]; *Chandler* 160 (K) [9a]; 452 (K) [8c]; *Champion* B469 (EA) [4]; *Chapman, HM* 130 (K) [9b]; *Chapman, JD* 598 (K, SRGH) [8c]; 629 (K, SRGH) [8c]; 894 (K, MAL, SRGH) [3a]; 1313 (BM) [3a]; 1403 (K, SRGH) [8c]; 1670 (K) [8c]; 5870 (BR, K, MAL) [8c]; 6152 (BR, K, MAL) [8c]; *Chapman, JD & EG* 7857 (K) [8c]; 7895 (K, MO) [3a]; *Chase* 2207 [GH 27993] (BM, K, SRGH) [8a]; 2448 [29398] (K, SRGH) [9a]; 4667 [SRGH 39687] (K, SRGH) [8c]; 8385 (K, PRE, SRGH) [8a]; 8497 (K, SRGH) [8c]; 8587 (K, SRGH) [8c]; *Cheesman* 82 (BM) [8a]; *Chevalier* 6196 (P) [9b]; *Chipp s.n.* (K) [8c]; *Chisumpa* 50 (K) [5]; 568 (K, NDO) [8c]; *Christiansen* 2470 (BR) [3c]; *Churwa* 2574 (K) [?8a]; 3711 (K, PRE) [8b]; 5238 (K, PRE) [9a]; 6016 (K, PRE) [8c]; 6930 (K, PRE) [9a]; *Clement et al.* 2127 (E, K, MO) [9a]; *Codd & de Winter* 5547 (K, PRE) [8a]; *Collins* 61 (K) [?8b]; *Compere* 1100 (K) [9a]; *Compton* 24945 (K, PRE) [8c] 29994 (K, PRE) [8c];

Cooper 1041 (K) [8c]; 1115 (K) [1]; 1182 (BM, K, W, Z) [8c]; 1499 (K) [1]; 2897 (K) [8c]; *Copley [in Bally PRO]* 415 (K) [8c]; *Couto* 243 (K, LUAI) [8c]; *Credell* 19 (K, PRE) [8a]; *Crocker* 212 (WAG) [4]; *Crook* M77 [29158] (K, S, SRGH) [8c].

Dale U.118(K) [8c]; *Daly & Cherry* 952 (K) [8a]; *Daly & May* 943 (K) [1]; *Datzel* 110 (K) [9b]; *D'Arcy* 7460 (K) [8c]; *Davies* E.46 (K) [8c]; *Dawoda* 84(K) [9b]; *de Beauvois* s.n. (G-DE) [9b]; *de Beer* 695 (K, SRGH) [9a]; *de Gomes Sousa* 410 (K) [8c]; *de Koning* 7470 (BR, K) [8c]; *de Koning & Zunguze* 8060 (BR, WAG) [?8c]; *de Menezes* 510 (K, LUAI) [8c]; *de Saeger* 726 (BR) [9b]; 1408 (BR, K) [9b]; *de Souza* 272(K, PRE) [?8c]; *de Vilmorin* s.n. [?113] (BR) [9b]; *De Wilde, JJE* 651 (WAG) [9b]; 4139 (B, WAG) [8c]; 6809 (BR, K, WAG) [8c]; *de Wilde, WJJO & de Wilde-Duyffes, BEE* 6410 (K) [8c]; 8448 (BR, K, WAG) [8c]; 9211 (BR, K, WAG) [8c]; *de Winter* 2612 (K, PRE) [8b]; 7728A (K, PRE) [8a]; *de Winter & Leistner* 5283 (B) [9a]; 5283 (K, PRE) [9a]; *de Winter & Mavais* 5036 (K) [9a]; *de Wit* 653 (WAG) [9a]; *de Witte* 427 (BR) [3c]; 6495 (BR) [3c]; 6574 (BR) [3c]; 7103 (BR) [3c]; *Debeaux* 129 (P) [9b]; *Capt. Descamp* s.n. (both sheets) (BR) [?8c]; *Dechamps* 11687 (BR) [9a]; *Dehra* 1129 (K, EA) [9a]; *Deighton* 2542 (K) [9a]; 5500 (K) [9a]; *Detilleaux* 829 (BR) [3c]; 1065 (BR) [3c]; *Devenish* 603 (K, PRE) [8c]; 634 (K, PRE) [?8c]; 1714 (K, PRE) [8c]; *Devred* 3665 (BR) [3c]; *Dieterlen* 6954 (K) [8c]; *Dingle* 88A (EA) [9b]; *Dinklage* 2980 (B) [9a]; *Dinter* 249 (Z) [8c]; 5449 (B) [8c]; 7242 (B, K) [9a]; *Dowsett-Lemaire* 136 (BR) [4]; *Dowson* 461 (K) [9a]; *Drege* 36.7 (LD) [8a]; 4828b (K) [1]; 4829 (K) [1]; 4830 (K) [8c]; 4831 (K) [8a]; 4831a (K) [8c]; 4832a (K) [8c]; 7952a&b (K) [8a]; 7953 (K) [8a]; 7953a (K) [8a]; 7953b (K) [8a]; 7954 (K) [8a]; 7955 (K) [1]; C (K) [8a]; s.n. (Cape) (K, LD) [8a]; s.n. (Cape) (K) [8c]; s.n. (Worcester Div.) (K, S, W) [1]; *Drummond* 5305 (K, SRGH) [8b]; 5538 (K, SRGH) [9a]; 6023 (K, SRGH) [8a]; 7910 (BR, K, LISC, SRGH) [8a]; *Drummond & Hemsley* 2779 (B, BR, EA, K, S) [8a]; 2646 (K, B, S) [8c]; *Drummond & Rutherford-Smith* 6971 (K, LISC, PRE, SRGH) [3c]; *Dubois* 1071 (BR, K) [8c]; 1072 (BR, EA, K) [3c]; *Dummer* 336 (K) [9a]; 1274 (K) [8c]; 1581 (K) [8c]; 1843 (K) [9a]; 1932 (K) [9a]; 3620 (K) [8c]; *Dyer* 2014 (K) [8c]; *Dyson-Hudson* 135 (K) [9a].

Ecklon 48 (B, K) [1]; *Ecklon & Zeyher* s.n. (C) [8a]; *Edwards* 21 (K) [8c]; 561 (K, SRGH) [3c]; *Eggeling* 2392 (K) [9a]; 2769 (K) [9a]; *Emanuelsson* 447 (S) [8a]; 980 (S) [8b]; *Emson* 8 (PRE) [3a]; 385 (K) [2]; *Elesse* 57 (P) [9b]; *Evans* 578 (K) [8c]; *Evans-Pritchard* 28 (K) [9b]; *Exell & Mendonca* 1887 (BM, COI) [3c]; *Eyles* 462 (BM, SRGH) [8a]; 4912 (BOL, K, SRGH) [8a]; 8170 (BM, K, SRGH) [3c]; 8563 (K) [8c].

Faden 67/485 (K) [9a]; *Fanshawe* F170 (BR, K, SRGH) [3c]; F1156 (K) [8c]; F1199 (K) [9a]; F3421 (BR, K) [6]; F4480 (K) [8c]; F9237 (K, NDO) [8c]; F9280 (K, NDO, WAG) [2]; F11475 (K, NDO, UPS) [3c]; *Faultkner* 19 (K, S) [9a]; 115 (K, LD, PRE, S) [8c]; 176 (K, PRE, S) [8c]; 4612 (K) [8c]; 4909 (K, UPS) [9a]; 4918 (K, UPS) [9a]; *Fay, Ngaindira, Jules, Raymond & Remy* 5044 (K) [9b]; *Flock* 666 (S) [9a]; 666a (S) [9a]; *Forbes* s.n. (CBS) (K) [1]; s.n. (Algoa) (BM, BR, K, G-DC) [8c]; *Foster* 333 (K) [9b]; *Fourcade* s.n. (Knyma Div.) (K) [1]; s.n. (Amys Pass) (K) [8a]; *Frame* 55 (EA, K) [8c]; *Friedmann* 1630 (P) [9a]; *Friend* 2 (K, EA) [9a]; *Fries, RE* 186 (UPS) [9a]; *Fries, RE & TCE* 486 (B, S) [8c]; 1280 (B) [8c]; 1450 (B, UPS) [9a]; *Fries, Norlindh & Wienavck* 562 (K, LD) [8a]; 1032 (LD) [8a]; 2089 (K, LD, PRE, SRGH) [8a]; *Friis* 283 (C) [8c]; *Friis et al.* 509 (C, K) [8c]; 711 (C, K) [9b]; 1095 (C, K) [8c]; 1506 (C, K, WAG) [8c]; 1327 (C, K) [8c]; 7838 (C) [9b].

Gachathi 76/48 (B) [8a]; 253 (B) [9a]; *Gairdner* 551 (K) [9a]; *Galpin* 922 (Z) [8c]; 1825 (K, Z) [8c]; 2633 (K) [8a]; 5734 (K) [8c]; 9070 (K, PRE) [?8b]; 9799 (K, PRE) [8c]; 9894 (K, PRE) [1]; 10658 (K, PRE) [8c]; 10792 (K, PRE) [1]; 11113 (K, PRE) [1]; 11893 (K, PRE) [8c]; 13289 (K, PRE) [8c]; 14238 (K, PRE) [8a]; 14454 (K, LD, PRE) [8c]; 14900 (K, PRE) [8a]; *Gereau et al.* 1724 (C, MO) [9a]; 4508 (K, MO) [8c]; 4643 (K, MO) [?8c]; 5035 (K, MO) [8c]; *Germain* 3307 (BR, K) [9a]; 3958 (BR, K) [9a]; 3966 (BR, K) [9a]; 5928 (BR, K) [9a]; 6542 (BR, K) [9a]; 6967 (BR) [3c]; *Germishuizen* 574 [20032] (K, PRE) [8b]; *Gerrard* 19 (K) [1]; 596 (K) [8c]; *Giess* 9323 (K) [9a]; *Gilbert* 4145 (K) [8c]; 5058 (K, EA) [8a]; *Gilbert & Thulin* 1752 (K, UPS) [9a]; *Gillfillan* 6169 (BOL, K) [8b]; *Gillett, JB* 5157 (K) [8c]; 14460 (K, B) [8c]; 17609 (BR, EA, K) [3a]; *Gillett, UC* 4326 (K) [1]; *Gilliland* 265 (K) [8c]; Q.1757 (K) [8c]; *Gillman* 217 (K) [9a]; *Glover & Bally* 3531A (EA) [8a]; *Glover, Gwynne & Samuel* 1706 (K, EA) [9a]; 186 (K, EA) [9a]; 550 (K) [9a]; 647 (EA, K) [8c]; 988 (EA, K) [8c]; *Glover, Gwynne & Tucker* 2283 (EA, K) [8c]; *Glover, Gwynne, Samuel & Tucker* 2159A (BR, EA, K, PRE) [8a]; 2159B (EA, K) [8c]; *Glover, Gwynne, Samuel, Tucker & Napier* Bax 2624 (EA, K) [8c]; *Glover & Ledonet* 4324 (EA) [8a]; *Glover & Samuel* 2758 (K) [9a]; *Goetze* 918 (BM, BR, Z) [7]; 956 (BM, P) [3b]; *Gomes e Souza* 465 (K) [8c]; 1483 (COI) [3c]; *Gonan* s.n. (K) [1]; *Gonde* 208

(K, SRGH) [9a]; *Gossweiler* 360 (K) [9a]; 6413 (COI) [3c]; 6414 (BM) [3c]; 12329 (BM, LISC) [3c]; *Gould* s.n. (K) [9b]; *Goyder et al.* 3891 (C, K) [8c]; *Grabner* 332 (K, W) [9a]; *Grant* s.n. (K) [8c]; *Granvik* 32 (LD) [8c]; *Greenway* 2424 (K) [8c]; 3279 (K) [8c]; 4321 (K) [8c]; 5430 (K) [6]; 7691 (K) [8c]; *Greenway & Kanuri* 11879 (K) [9a]; 12560 (K) [8c]; 13589 (K) [8c]; 14229 (K) [9a]; *Greenway & Turner*, M 10636 (K) [9a]; *Greuter* 22075 (B) [8a]; *Grimshaw* 931258 (K) [8c]; *Grosvenor* 731 (S, SRGH) [8b].

Haaver, AE 19b (K) [8c]; *Haaver*, QE 325 (K) [9a]; *Hagemann* 3145 (B) [8c]; 3178 (B) [9a]; *Hagerup* 541 (C, K) [9b]; *Hagos* 181 (K) [8c]; *Halliwel* 5076 (K, PRE) [8c]; *Hammond* 69 (K) [9a]; *Hancock*, AD 192 (K) [8c]; *Hancock*, IR 11 (K) [9b]; *Hanekom* 2042 (K, PRE) [1]; 2266 (K, PRE) [8c]; *Hansen* 3492 (K, C, GAB, PRE, SRGH, WAG) [8b]; *Hansford* 2376 (K) [8c]; *Harder & Schmidt* 3017 (K, MO) [9a]; *Harder, Gereau, & Kayombo* 1443 (K, MO) [8c]; *Hardy* 2031 (K, PRE) [8c]; *Harley* s.n. (K) [9b]; *Harmsen* 6429 (BR, WAG) [8a]; *Harris & Fay* 2228 (K, MO) [9b]; *Harvey* 562 (K) [1]; s.n. (CBS) (K) [8a]; s.n. (Port Natal) (K) [8c]; *Harwood* 36 (K) [4]; *Hayton* s.n. (K) [8a]; *Hedberg* 6157 (UPS) [9a]; 6170 (UPS) [8a]; 6822 (C, UPS) [8c]; *Hedberg et al.* 271 (K, UPS) [8c]; *Hedren & Pettersson* 723 (UPS) [9a]; *Hellquist* 8 (UPS) [4]; 56 (UPS) [2]; *Henriques* 310 (K, LUAI) [8c]; 991 (K, LUAI) [8c]; *Hepper* 1069 (K) [9b]; *Hepper & Jaeger* 7089 (K) [9a]; *Herlocker* 37 (K, EA) [9a]; 78 (K) [8c]; *Heudelot* 188 (P) (9b); *Hiepho, A & P* 2553 (B) [9a]; *Hilliard* 8224 (K) [1]; *Hilliard & Burt* 9960 (K) [8c]; 10057 (K) [8c]; 18299 (K) [8c]; 18403 (K) [8c]; *Hindorf* 856 (K) [9a]; *Hislop* 56 (K) [8c]; *Hock* s.n. (BR) [3c]; *Hoffman* 930 (BR, K) [3c]; *Hohenacker* s.n. (B) [1]; *Holm* 5 (S) [8c]; *Holmes* 256 (K, FHO) [3c]; *Holmes* 1477 (K, NDO) [3c]; *Holst* 9075 (B, COI, K, M, P, W, Z) [8c]; *Hopkins* 11736 (BM) [8b]; *Hornby et al.* 907 (K) [9a]; *Hugh Scott* s.n. (K) [8c]; *Hull* 37 (C) [8a]; *Humbert* 9094 (P) [8a]; 16906 (P) [3a]; *Hutchinson* 3157 (K) [1]; 4523 (K) [8a]; *Hutchinson & Gillett* 3711 (BM, K) [6].

IECA E-80 (EA, K) [8c]; *IECAMA* F-74 (K) [8c]; *Irvine* 8 (K) [9b]; 1418 (K) [9b]; *Issa* 69 (BR, EA, K) [2]; *Iuvsen et al.* 85035 (K) [8c]; 85679 (K) [8c]; 87692 (UPS) [4]; *Iwarsson* 200 (UPS) [9a]; 203 (UPS) [9a]; 205 (UPS) [9a]; 236 (UPS) [9a]; 255 (UPS) [9a]; 290 (UPS) [9a]; 329 (UPS) [9a]; *Iwarsson & Ryding* 700 (UPS) [8c]; 712 (UPS) [8c]; 736 (UPS) [8c]; 747 (UPS) [8c]; 757 (UPS) [9a]; 781 (UPS) [8c]; 805 (UPS) [8c]; 805 (UPS) [8c]; 806 (UPS) [8c]; 807 (K, MAL, UPS) [3a]; 830 (UPS) [8c]; 839 (UPS) [8c]; 840 (UPS) [8c]; 842 (K, MAL, UPS) [3a]; 868 (K, MAL, UPS) [3a]; 873 (UPS) [8c]; 874 (UPS) [8c]; 886 (K, MAL, UPS) [3a]; 892 (K, MAL, UPS) [8a]; 893 (UPS) [8c]; 898 (K, MAL, UPS) [8a]; 900 (K, MAL, UPS) [8a]; 901 (UPS) [8c]; 904 (K, MAL, UPS) [8a]; 911 (UPS) [8c]; 912 (UPS) [8c]; 913 (UPS) [8c]; 914 (UPS) [8c]; 923 (UPS) [8c]; 924 (UPS) [8c]; 930 (K, MAL, UPS) [8a]; 932 (UPS) [8c]; 933 (UPS) [8c]; 938 (K, MAL, UPS) [8a]; 942 (UPS) [9a]; 951 (UPS) [8c]; 959 (DSM, EA, K, MAL, P, UPS) [5]; 962 (UPS) [8c]; 970 (UPS) [8c]; 972 (DSM, EA, K, MAL, NHT, UPS) [2]; 974 (UPS) [9a]; 985 (K, MAL, UPS) [9b]; 986 (DSM, EA, K, MAL, P, UPS) [4]; 987 (UPS) [8c]; 988 (UPS) [8c]; 994 (UPS) [8c]; 995 (UPS) [8c]; 997 (UPS) [8c]; 999A (UPS) [8c]; 999B (UPS) [8c]; *Iwarsson, Abdallah, Macha & Magogo* 1050 (DSM, NHT, UPS) [2]; 1052 (DSM, NHT, UPS) [2]; 1053 (DSM, NHT, UPS) [2]; 1059 (UPS) [3a]; 1067 (DSM, EA, K, NHT, UPS) [4]; 1072 (DSM, NHT, UPS) [4]; 1084 (UPS) [3a]; 1085 (DSM, EA, K, NHT, UPS) [4]; 1086 (UPS) [8c]; 1095 (DSM, K, NHT, UPS) [4]; 1096 (UPS) [8c]; 1097 (UPS) [8c]; 1098 (UPS) [3a]; 1111 (DSM, K, NHT, UPS) [4]; 1112 (DSM, K, NHT, UPS) [8a]; 1145 (DSM, NHT, UPS) [4]; 1147 (DSM, NHT, UPS) [4]; 1148 (UPS) [8c]; 1154 (DSM, EA, K, NHT, UPS) [4]; 1156 (UPS) [8c]; 1157 (DSM, K, NHT, UPS) [3b]; 1160 (BR, DSM, EA, K, NHT, S, UPS) [3b]; 1192 (NHT, UPS) [4]; 1193 (DSM, K, NHT, UPS) [7]; 1194 (UPS) [3a]; 1197 (DSM, K, NHT, UPS) [7]; 1198 (UPS) [3a]; 1216 (UPS) [3a]; 1217 (DSM, NHT, UPS) [8a]; 1224 (UPS) [8c].

Jackson 1964 (K) [8c]; *Jaeger* 1a (K) [9b]; *James* 110 (K) [9a]; *James* s.n. (K) [8c]; *Jarrett* 287 (EA, K) [9a]; *Jefford, Juniper & Newbould* 252 (B, K) [8c]; *Jessel* 27 (K) [8c]; *Johansson* 1074 (UPS) [8c]; 1076 (UPS) [9a]; *Johnson*, WP 85 (K) [9a]; *Johnson*, SM 1143 (K, PRE) [1]; *Johnston (Sudan)* 1441 (K) [8c]; *Johnston*, HH s.n. (BM, K) [8c]; *Jonsel* 2006 (UPS) [9a]; *Jordaan* 751 (K) [8c]; *Joseph* 4004 (EA, K) [9a]; *Junod* 403 (Z) [8c].

Kaessner 596 (K) [9a]; *Kassner* 2975a (K) [9a]; 3008 (BM, BR, K, P, Z) [3c]; *Kayombo* 473 (K, MO) [7]; *Kerfoot* 612A (EA, K) [8c]; 3585 (EA, K) [9a]; *Killick* 1415 (K, LD, PRE) [8c]; 3853 (K, PRE) [8c]; 3921 (K, PRE) [8c]; *Kinet* 105 (BR, K) [8c]; *Kirk* 46 (K) [8c]; s.n. (K) [9a]; *Kitching* s.n. (K) [1]; *Kotschy* 373 (K) [9b]; 396 (BM, FI-W, G-DC, LD, K, M, P, S, W) [9b]; 519 (B, BM, FI, I-W, K, M, P, W) [8c]; *Kuntze* 55 (K) [8a]; s.n. (Moori R. Station) (K) [1]; s.n. (Van Renas Pass) (K) [8c]; s.n. (Craddock) (K) [8a]; *Kutilek* 126 (EA, K) [9a]; *Kwatha & Balaka* 92 (K, MAL) [9a].

Lambrecht 85 (K, SRGH) [9a]; *Lamprey* 387 (K) [9a]; *Langdale-Brown* 2265 (K) [9a]; *Larsen* 6 (C) [8b]; *Latham* s.n. (K) [4]; *Latilo & Oguntayo* FHI 67696 (FHI, K) [9a]; *Laurent* s.n. (BR, K) [9a]; *Lawlor & Hall* 312 (K) [9b]; 421 (K) [9b]; *Lawrence* 166 (K) [9a]; 427 (K) [3a]; 443 (K) [9a]; *Le Testu* 352 (BR) [9a]; *Lea* 72 (K) [9b]; s.n. (MANCH) [1]; *Leach* 11665 (K, SRGH) [8c]; *Leach & Cannell* 14299 (K, SRGH) [8c]; *Leach & Noel* 104 (K, SRGH) [8b]; *Lebrun* 8085 (BR, K) [9a]; 8280 (BR, K) [9a]; 9137 (BR, K) [9a]; 9643 (BR, K) [8c]; *Leedal* 5561 (UPS) [3b]; 5561B (UPS) [8c]; 5591 (UPS) [8a]; 5650 (UPS) [8a]; 5794 (UPS) [7]; 6129 (UPS) [7]; *Leendertz* 770a (K) [8c]; 1035 (K) [8b]; *Leenderiz* 1954 (K) [9a]; *Leistner* 156 (B, K, PRE) [?8b]; *Leistner, Oliver, Steenkamp & Vorster* 242 (K, PRE) [8c]; *Lely* 588 (K) [9b]; 678 (K) [9b]; *Leonard* 4356 (BR) [3c]; *Letouzey* 6158 (K) [9b]; 6956 (K, P, WAG) [9b]; *Lewalle* 204 (BR, K) [9a]; 423 (BR, EA, K) [3c]; 676 (BR, K) [8c]; 802 (BR, K) [8c]; *Liebenberg* 4776 (B) [8c]; *Lindblom* s.n. (S) [9a]; *Linde* s.n. (K, PRE) [1]; *Lindsay* 11 (EA, K) [8c]; *Linley* 167 (SRGH) [3c]; *Linnaeus* 740.19 (LINN) [1]; 740.29 (LINN) [8a]; *Lisowski* 23579 (POZG) [8a]; *Long* 412 (K) [8a]; 725 (K) [8a]; 973 (K) [8c]; *Louis* 1722 (BR, K) [9b]; *Loveridge, JP* 702 (B, BR, K, LISC, PRE, SRGH) [3c]; *Loveridge, MV* 646 (K) [9a]; *Lovett* 1311 (K, MO) [sp.]; 1996 (K, MO, UPS) [8c]; *Lovett et al.* 2154 (K, MO, UPS) [9a]; 3332 (K, MO) [8c]; 3460 (K, MO) [8c]; *Lowe* 3152 (FHI, K) [9a]; *Lucas & Williams* 12352 (EA, FT, K, UPS, WAG) [8a]; *Lugard, Major EJ* 113 (K) [8c]; *Lugard, Mrs EJ* 222 (K) [9a]; *Lusaka Natural History Club* 255 (K) [8c]; *Luwika et al.* 162 (K, MO) [9b]; *Luxen* 141 (BM, BR, C, K) [3c]; *Lye* 52 (UPS) [9a] *Lykke, Jorgensen, Iboudo & Goudiaby* 605 (K) [9b]; *Lynes* V.43 (K) [8c].

Mabberley & McCall 118 (K) [8c]; *MacGillivray* 569 (K) [1]; *MacInnes* 465 (BM) [3c]; *Mackinder* 512 (HNC, K) [9a]; *MacNaughton* 2617 [55] (K) [9a]; *MacOwan* 233 (MANCH) [1]; 591 (K) [1]; 1264 (K) [8a]; s.n. (Boschberg) (K) [8c]; s.n. (Grahamstown (K, MANCH) [1]; *Magaji* MG 667 (K) [9b]; *Magogo* 62 (EA, K) [8c]; *Mainwaring* 1540 [10] (K) [8c]; 1541 [9] (K) [8c]; *Malaisse* 13923 (BR, K) [3c]; *Marais* 331 (K) [8c]; 351 (K, RE) [8c]; 407 (LD, PRE) [8a]; 407 (K, PRE) [8a]; *Marko* 64 (K) [3c]; *Martier* 1743 (BR) [?8c]; *Marques* 2745 (UPS, LM) [9a]; *Mason* 47 (K) [8c]; *Massey* 32 (K) [8c]; *Masson* s.n. (BM) [8a]; *Mathew* 6113 (EA, FT, K) [8a]; 6138 (K, BR) [8c]; *Maude* 81 (K) [1]; *Mazzocchi-Alemanni* 158 (FT, K) [3c]; *McClellan* 280 (K) [?8c]; 660 (K) [8c]; 923 (K) [8c]; *McGregor* 22 (EA, K) [7]; *Mechow* 498 (M, W, Z) [3c]; *Meese* 10208 (LD) [8c]; 10233 (LD, PRE) [8c]; *Meller* s.n. (Manganja Hills) (K) [8c]; s.n. (Chikawa) (K) [9a]; s.n. (E of Bangwe Pass) (K) [3a]; *Melville et al.* 141 (K) [9a]; 238 (K) [9a]; *Mendes dos Santos* 1512 (COI, LISC) [3c]; *Merxmüller* 115 (K) [8b]; *Merxmüller & Griess* 1246 (K) [8b]; *Mesfin* 2793 (C) [9b]; *Mesfin & Kagneu* 1665 (K) [8c]; 2268 (K) [9b]; *Meyer* 7493 (K) [8c]; 8140 (K) [8c]; *Meyers* 13488 (K) [8c]; *Mgaza* 358 (EA, K) [8c]; 380 (EA, K) [8c]; 500 (EA, K) [4]; 516 (EA, K) [3a]; *Mhoro et al.* 1963 (K, UPS) [9a]; 2160 (K, UPS) [9a]; *Mhoro & Bacheus* 2314 (K, UPS) [9a]; 2327 (UPS) [2]; 2328 (UPS) [8c]; 2329 (UPS) [8c]; *Michel & Hinceley* 947 (MAL) [3a]; *Milne* 133 (K) [1]; *Milne-Redhead & Taylor* 10297 (B, K) [8c]; 10929 (K) [9a]; *Mitchell* 2799 (K) [9a]; *MMIC/S. Africa* 44 (K) [8b]; *Mogg* 9377 (K) [8c]; 11658 (K, PRE) [8a]; 30423 (K) [8c]; *Mohle* 521 (K, PRE) [?8c]; *Moll* 863 (K, PRE) [1]; 888 (K) [8c]; 2274 (K, PRE) [1]; *Monro* 1063 (BM, SRGH) [8a]; *Mooney* 5398 (K) [8c]; 6168 (K) [8c]; 6399 (K) [8c]; 8692 (K) [8c]; *Moreau et al.* 202 (K) [9a]; *Moriarty* 136 (K, MAL) [3a]; *Morris* 788 (K, PRE) [8c]; *Morton* A4096 (K) [9b]; GC8500 (K) [9b]; SL1362 (FHI, IFAN, GC, K, SL, WAG) [9a]; *Moss* 14844 (BM) [8a]; *Mott* s.n. (MANCH) [8a]; *Mouva* 192 (UPS) [9a]; *Mshaha* 51 (K, SRGH) [9a]; *Muller & Giess* 408 (K) [9a]; *Muller & Scheepers* 127 (LD, PRE) [8c]; *Mund* (K) [?8a]; *Musa* FHI 24869 (K) [9b]; *Mwangani* 530 (EA, K) [9a]; *Mwangani & Msafiri* 1611 (EA, K) [9a]; *Mwasumbi* 16522 (K, MO) [8c]; *Mwasumbi et al.* 13192 (DSM, K) [3c]; 13414 (K, MO) [8c]; *Myembe* 40 (EA, K) [4].

Napier 371 (K) [9a]; 706 (K) [8c]; 1330 (K) [9a]; 2587 (K) [8c]; 2588 (EA, K) [8a]; 5399 (K) [8c]; *Nation* 209 (K) [8b]; *Nels* s.n. (Z) [8c]; *Newbould* 6048 (K, EA) [8a]; *Newbould & Jefford* 1213 (K) [8c]; *Newton* 106 (Z, COI) [8c]; *Ngoni* 490 (K, SRGH) [9a]; *Ngoundai* 347 (EA, K) [8c]; *Nicholas & Isaacs* 1291 (K) [1]; *Nicol* 34 (K) [8c]; *Noah* 185 (K, SRGH) [9a]; *Norlindh & Weimark* 4722 (LD) [8c]; *Nyasi* 203 (K, SRGH) [8a].

Olorunfemi FHI 30592 (K) [9a]; *Oxtoby* s.n. (K) [9a].

Pappi 4499 (EA, FI, S, W) [9b]; *Parkyn* s.n. (K) [9b]; *Patel IH et al.* 635 (BM) [5]; 2378 (MAL, S) [8c]; 5032 (K) [4]; *Patel, MP & El Kheir* 3 (K) [9b]; *Paulo* 979 (K) [8c]; *Pawek* 1420 (MAL, SRGH) [3a]; 2059 (K) [3a]; 2523 (K) [8c]; 3660 (K) [8c]; 3712 (K, MAL) [3c]; 4928 (K, MAL) [9a]; 4955 (K, MAL) [8c]; 5630 (K) [8c]; 5928 (CAH, K, MO, UC) [8c]; 7256 (K, MO, MA) [8c]; 7270 (WAG) [3c]; 9716 (K, MO,

MA) [8c]; 9880 (K, MO, A) [8c]; 10041 (K, Ma, MO) [8c]; 10121 (K, Ma, MO) [8c]; 11607 (K, MO, MA) [8c]; 11622 (K, MO) [3a]; 11638 (K, MO, A) [8c]; *Pearson* 1709 (K) [8b]; 9087 (K) [8b]; *Peddie* s.n. (K) [8c]; *Pegler* 355 (K) [8c]; 368 (K) [1]; 1514 (K) [8c]; *Perdue* 6472 (K) [8c]; *Perdue & Kibwaa* 8147 (K) [9a]; 9029 (EA, K) [8c]; 11131 (K) [3a]; *Peter* 30582 (B) [8c]; 37619 (B) [9a]; 37703 (B) [9a]; 41709 (B) [9a]; 42591 (B) [8c]; 42657 (B) [8c]; 42812 (B) [9a]; 42914 (B) [8c]; 42935 (B) [8c]; 43116 (B) [8c]; 44890 (B) [9a]; 47391 (B) [78b/c]; 54852 (B) [8c]; 54901 (B) [9a]; 54950 (B) [8c]; 55031 (B) [8c]; 55032 (B) [8c]; 55039 (B) [8c]; 55063 (B) [9a]; 55064 (B) [9a]; 55073 (B) [9a]; 55154 (B) [8c]; 55159 (B) [8c]; 55163 (B) [8c]; 55168 (B) [8c]; 55178 (B) [8c]; 55214 (B) [8c]; 55215 (B) [8c]; 55216 (B) [8c]; 55244 (B) [8c]; 55267 (B) [8c]; 55268 (B) [8c]; *Pettersson* 2015 (UPS) [8c]; 3044 (LISJ,C, UPS) [9b]; s.n. (UPS) [9a]; *Peyton* 1 (K, PRE) [8a]; *Phillips* 762 (K, MO) [4]; 1270 (C, K, MO) [8c]; 1398 (K, MO) [4]; 3395 (K, MO) [4]; 3408 (K, MO) [8c]; 3419 (K, MO) [3c]; 3445 (K, MO) [8a]; 3588 (K, MO) [8c]; *Phillipson* 310 (K) [1]; 321 (K) [8c]; 1041 (K) [8c]; 1214 (K, UFH) [8a]; *Phiri* 202 (K) [9a]; *Pichi-Sermolli* 1386 (K) [8c]; *Pierce* 1658 (K) [8c]; *Pirozynski* P602 (EA, K) [9a]; *Plant* 32 (K) [1]; *Plowes* 1868 (K, SRGH) [8a]; 1947 (K, SRGH) [9a]; 3454 (K, SRGH) [8b]; 3466 (K, SRGH) [1]; *Pole-Evans* 634 (K, PRE) [8c]; *Pole-Evans & Erens* 2884 [41] (K, SRGH) [6]; *Polhill & Paulo* 1514 (B, K) [8c]; *Pooley* 2129 (K) [8c]; *Prins-Lampert* 288 (WAG) [2]; *Prior*, A s.n. (ii.1848) (K) [8c]; s.n. (x.1846) (K) [1]; s.n. (4.xi.1847) (K) [8a]; s.n. (xi.1847) (K) [8a]; s.n. (24.xii.1847) (K) [8a]; *Prior*, J 148 (K) [8a]; *Prosser* P1194 (K) [8b]; *Purdy* 97 (K) [9b]; *Puseglove* 2891 (K) [9a]; *Purves* 2 (K) [8c]; 178 (K) [8c].

Quarre 457 (S) [3c]; 575 (BR, K, PRE, S) [3c]; 1242 (BR) [3c]; 1666 (BR) [3c]; 2549 (B, BR) [8c]; 2587 (BR, K) [3c]; 3025 (BMBR, K) [8c]; 3243 (BR, K) [9a]; 4602 (B) [9a]; *Quartin-Dillon & Petit* 17 (K) [9b]; 14460 (K) [8c].

Raimundo & Guerra 419 (K) [9b]; *Rand* 148 (BM) [8b]; 165 (BM) [8b]; *Raynal* 19370 (K, P) [8a]; 20349 (K, P) [9a]; 20362 (K, P) [8c]; 20745 (K, P) [8c]; *Reekmans* 9290 (K, MO) [3c]; 11128 (K, MO) [9a]; *Rehmann* 7057 (Z) [8c]; 7374 (Z) [8c]; *Reid* 9 (K) [8c]; 10 (K) [8c]; *Renoize* 2733 (K) [9a]; *Renoize & Abdallah* 2009 (K) [8c]; *Relief* 1664 (K, PRE) [8c]; *Richards* 1561 (K) [8c]; 1781 (K) [9a]; 5032 (K) [9a]; 7730 (K) [8a]; 9415 (K) [8c]; 9727 (BR, K) [3b]; 9759 (K) [8c]; 10116 (K) [9a]; 10182 (K) [8c]; 12954 (EA, K) [3c]; 13007 (K) [8c]; 15275 (K, SRGH) [3c]; 16678 (K) [8c]; 16810 (EA, K) [3c]; 16835 (K) [8c]; 21805 (K) [8c]; 22539 (K, SRGH) [3a]; 23311 (K) [9a]; 24550 (K) [9a]; 24887 (K) [8c]; 25563 (K) [9a]; 25672 (K) [9a]; 25805 (K, M) [2]; *Richards & Arasululu* 26908 (K) [9a]; *Richardson & Livingston* 129 (EA, K) [9a]; *Robertson* 276 (EA, K) [4]; *Robinson* 189 (K) [9a]; 794 (K) [8c]; *Robson & Angus* 203 (BM, K, LISC, SRGH) [4]; 260 (BM, K, LISC, SRGH) [3a]; *Robyns* 1999 (BR, K) [9a]; *Rodin* 1003 (K) [1]; 1004 (K) [8a]; 2581 (K) [8c]; 4419 (K) [78a]; *Rogers, C. Gilbert* 255 (K) [8c]; *Rogers, FA* 1804 (K) [8b]; 8054 (K) [8c]; 8509 (K) [8c]; 10007 (K, Z) [3c]; 10192 (K, SRGH) [3c]; 10930 (BOL) [3c]; 26303 (BOL, PRE) [3c]; 26304 (BM, K, PRE, Z) [3c]; *Rosevear* 87/37 (K); [9a]; *Ross, FJ* 165 (K) [8c]; *Ross, R.* 1364 (BM, BR) [8c]; *Rowland* s.n. (K) [9b]; *Rudatis* 628 (LD) [8c]; 629 (K) [8c]; 1393 (K) [8c]; 1411 (K) [1]; *Ruffo* 1365 (K) [9a]; 1370 (K) [9a]; *Rushworth* 1055 (K, SRGH) [8c]; *Ryding* 308 (UPS) [9a]; 1503 (K) [8c]; *Ryding et al.* 1564 (K) [9b]; 1619 (C) [8c].

Sabaya, Mbano & Field Course DSM 476 (K) [8c]; *Salésiens* 632 (BR) 3c; *Salter* 1118 (K) [8a]; *Salubeni* 1064 (K, MAL, SRGH) [3c]; *Salubeni & Balaka* 4410 (K, MAL) [9a]; *Sanane* 122 (BR, K) [8c]; 910 (K) [3c]; *Sandwith* s.n. (K) [1]; *Sankey* 232 (K) [8c]; *Saunders* 1 (K) [1]; *Savile* 56 (K) [9a]; *Saxer* 386 (K) [9b]; *Scheepers* 280 (K, PRE) [8c]; 1563 (K, PRE) [8c]; *Scheffler* 263 (K, S) [8c]; *Schimper* 37 (K) [8c]; 178 (BM, FI-W, G-DC, K, M, P, S, W) [9b]; 371 (B, BM, FI-W, G-DC, K, M, P, S, UPS, W, Z) [8c]; 1793 (B, K) [9b]; *Schlechter* 509 (MANCH) [1]; 2624 (K) [1]; 6839 (BOL, Z) [8c]; 9689 (K) [8a]; 12655 (K) [9a]; *Schlieben & Strey* 8399 (K, PRE) [8a]; 8400 (K, PRE) [9a]; 8418 (K, PRE) [8c]; *Schlieben* 2536 (B, S) [9a]; 4127 (B) [8c]; 4333 (B, S) [8c]; 7044 (B) [8a]; 7806 (K) [8b]; 7806 (B) [8b]; *Schinz* 40 (Z) [8b]; *Schmitz* 526 (BR) [3c]; 7285 (BR) [3c]; *Schultze & Bader* 1 (B) [8c]; *Schwabe* s.n. (8.x.1963) (B) [8c]; s.n. (xi.1956) (B) [9a]; s.n. (3.ix.1972) (B) [9a]; *Schweinfurth & Riva* 2071 (FT, K, Z) [8c]; *Schweinfurth* 54 [Ser. III] (K) [9b]; 139 (K) [9b]; 3199 (K) [8c]; *Scott Kk1149* (MANCH) [1]; *Scott Elliot* 4000 (K) [9a]; 6503 (K) [9a]; 6950 (BM, K) [8c]; *Scudder* 66 (K, SRGH) [9a]; *Semsei et al.* 51 [FH 2483] (K) [8c]; 2567 (K) [9a]; *Sequeira* 35 (K) [9a]; *Seyani & Tawakali* 1170 (K, MAL) [8c]; *Seydel* 1709 (B, C, K, LD) [8b]; 2708 (B, K, LD) [8b]; 3456 (B, K) [8b]; 3958 (B, K, LD) [8b]; *Shabani* 1016 (EA, K) [8c]; 1055 (BR, EA, K) [8c]; *Shantz* 867 (K) [8c]; *Sharland* 763 (K) [9b]; 953 (K) [9b]; *Sharpe* 174 (K) [3a]; *Shaw* 1992 (K) [1]; *Sherif* A 2854 (K) [9b]; A 3995 (K) [9b]; *Shillito* 51 (K) [9a]; *Skold* s.n. (LD) [8a]; *Sladen* 5373 (K) [1]; *Smith, CA* 2664 (K, PRE) [1];

2694 (K, PRE) [1]; 3057 (K, PRE) [8a]; *Smith, FG* 851 (EA, K, PRE) [9a]; 1198 (K) [3c]; *Smith, PP* 581 (K) [9a]; *Smuts* 2275 (PRE) [3c]; *Somona* 96 (BR) [3c]; *Spjut & Ensor* 2792 (K) [9a]; *St. Clair-Thompson* 442 (K, S) [9a]; *Stauffer* 3 (K) [9a]; *Stenström* s.n. (LD) [9a]; *Stuedner* 1388 (K) [8c]; 1389 (K, S [ex B]) [9b]; *Stewart, Dr* s.n. (K) [9a]; *Stewart, MIM* 103 (K) [8c]; *Stolz* 834 (B, K, C, S, UPS) [8c]; 835 (B, K, S, UPS) [8c]; 2115 (B, BM, C, PRE, S, UPS, Z) [4]; *Stone* 93 (K) [9b]; *Streel* 233 (BR, K) [3c]; *Strey & Schlieben* 8600 (K) [8a]; *Strey* 5414 (K, PRE) [8c]; 5883 (K, PRE) [8c]; 6612 (K, PRE) [1]; 7527 (K, PRE) [1]; 8419 (K) [8c]; 8516 (K) [8c]; 8731 (K, PRE) [8c]; 8941 (K) [1]; 10697 (K) [8a]; 10794 (K) [8a]; 11269 (K, PRE) [1]; 14454 (K) [8c]; *Strid* 2620 B (UPS) [9a]; 3690 (S) [8c]; 4654 (S) [9a]; *Swenson* 175 (UPS) [8c]; *Swynnerton* 235 (K) [8c]; 1296 (K) [9a]; 2013 (BM) [8c]; *Symoens* 7664 (K) [9a]; 8825 (BR, K, LISC) [3c]; 13592 (BR, K) [3c].

Talbot 2064 (BM, K) [9b]; *Tanner* 1589 (K) [9a]; 1813 (BR, K) [8a]; 1927 (K) [9a]; 2818 (K) [9a]; 4096 (K) [9a]; 4196 (K, B) [8c]; 4655 (K) [9a]; 4818 (K) [8c]; 5087 (K) [9a]; 5509 (K) [9a]; 5916 (K) [9a]; 5919 (K) [8c]; 6017 (K) [9a]; *Taylor* 3192 (BM, BR) [9a]; *Teague* 87 (K) [8c]; 170 (BOL, K) [8a]; 243 (K) [8c]; 268 (K) [8c]; *Templer* H8 (EA, K) [9a]; *Teixeira & Andrade* 6531 (COL, LISC) [3c]; *Theron* 2187 (K, PRE) [8c]; *Thode* A982 (K) [1]; *Thom* 273 (K) [8a]; 493 (K) [8a]; *Thomas, AS* 667 (K) [8c]; 1620 (BM, K) [8c]; 3274 (K) [8c]; 4354 (K) [9b]; *Thomas, D & Lovett* 13414 (K, MO) [8c]; *Thomas, NW* 107 (K) [9b]; 1996 (K) [9b]; 8104 (K) [9]; *Thomson* s.n. (K) [9a]; *Thonning* 1 (C) [9b]; *Thornicroft* 2144 (K) [8c]; 19188 (K) [1]; *Thulin & Mhoro* 529 (K, UPS) [9a]; 2718 (K, UPS) [8c]; *Thulin, Hunde & Tadesse* 3704 (K) [8c]; *Tiege* 121.71 (C) [8a]; *Toms* 166 (K) [9a]; *Tothill* 2337 (K) [8c]; *Townsend* 2375 (K) [8c]; *Trapnell* 2139 (EA, K) [9a]; *Troll* 5543 (B) [8c]; *Troupin* 1282 (BR) [9b]; 2594 (K) [9]; *Tuley* 1787 (K) [9b]; *Turton* 71 (K) [9b]; *Tweedie* 1095 (K) [8c]; 4276 (K) [9a]; *Tyrer* 618 (BM, BR, SRGH) [5]; *Tyson* 1300 (K, UPS) [8c]; 1508 (K, UPS) [8c]; 2729 (K) [8c]; 2766 (BM, BOL, GRA, K, SAM, UPS, W, Z); 2796 (K) [1].

van der Scheff 127 (K, PRE) [8c]; *van der Schyff* 2626 (K, PRE) [8c]; *Van der Veken* 10682 (BR) [9a]; *van Hoepen* 1758 (K, PRE) [1]; *van Meer* 134 (K, WAG) [9a]; *van Rensburg, HJ* 1602 (K) [9a]; 1867 (K) [9a]; *van Someren* 1637 (EA, K) [8a]; *van Uuwen* 998 (K) [8b]; *van Wyk* EVW0086 (K) [8a]; *Vanden Berghen, C* 6105 (C, BM) [9b]; *Vaughan* 356 (BM) [9a]; *Venter & Vorster* 171 (K, PRE) [1]; *Verdcourt* 2362 (K) [8a]; 3671 (K, EA) [8a]; 3813 (BR, EA, K) [8a]; *Verdoorn* 92 (K, PRE) [8b]; *Vogel* 36 (K) [9b]; 94 (K) [9a]; *Volkens* 235a (BM, K) [8c]; 1688 (BM) [8c]; *von Nolde* 163 (BM) [3c]; *von Wolff* s.n. (PRE) [6]; *Vos* 268 (K) [8b]; 556 (K, NH, PRE) [8a].

Wall 25/206 [53] (S) [9a]; *Wallace* 1085 (K) [9a]; *Wallich* s.n. (K) [1]; *Walter, EG* 13 (K) [9a]; *Walter, HuE* 611 (B) [8c]; *Wanntorp, H & HE* 214 (K) [8b]; 852 (K) [8b]; *Ward* 2372 (K, PRE) [8c]; 3389 (K, PRE) [8c]; 7027 (K, PRE) [8c]; 9581 (K) [8c]; *Warnecke* 288 (BM, BR, EA, K, P) [9b]; *Wasserfall* 894 (LD, PRE) [8b]; *Wechuysen* 392 (BR) [3c]; 393 (BR) [3c]; *Welch* 168 (K) [9a]; *Wells, MJ* 2619 (B, K, PRE) [8a]; *Welman* 586 (C, PRE) [8b]; *Welwitsch* 5500 (K) [8c]; 5562 (K) [9a]; 5577 (K) [9a]; *Werdemann & Oberdieck* 1007 (B, K) [8a]; *West, E* 75 (K) [8c]; *West, O* 66 (K, PRE) [8c]; 105 (K, PRE) [8c]; 1092 (K, PRE) [8c]; 2613 [GH 26464] (K, SRGH) [8b]; 5842 (K, PRE) [8c]; *Westphal & Westphal-Stevels* 2323 (K, WAG) [8c]; 2417 (BR, C, K, WAG) [8c]; *Whellan* 1962 (SRGH) [3c]; *White* 2738 (BR, FHO, K) [4]; 2873 (K, FHO) [8a]; *Whyte* 320 (K) [4]; s.n. (Nyika Mtns) (K) [8c]; s.n. (Busogo Distr.) (K) [9a]; s.n. (Mt. Chiradzulu) (K) [8c]; s.n. (Nairobi) (K) [9a]; s.n. (from Nandi) (K) [8c]; s.n. (from Eldoma Ravine) (K) [8c]; s.n. (Liberia) (K) [9a]; *Wickens* 335 (K) [9b]; 624 (K) [9b]; 1812 (K) [9b]; *Wilberforce* 121 (K) [3c]; *Wilburt* 2111 (K) [8c]; *Wild* 3001 [GH 25198] (K, SRGH) [8a]; 4042 [41681] (K, SRGH) [9a]; 5403 (K, SRGH) [9a]; 7987 (K, SRGH) [8a]; *Wiley* s.n. (EA, K) [8c]; *Willan* 41 (MAL, SRGH) [4]; *Williams* 30 (MAL) [4]; 291 (EA, K) [9a]; 294 (EA, K) [8c]; *Williamson, C* 56 (K) [8c]; *Williamson, DJ* 86 (K, SRGH) [9a]; *Wilms* 1146 (K) [8c]; 1146a (K) [8c]; *Wilson, J* 258 (EA, K) [9a]; *Wilson, Rev. CT* 57 (K) [9a]; *Wolley Dod* 662 (K) [1]; *Wood* 164 (K, MANCH) [1]; 1303 (K) [8c]; 1837 (K) [8c]; 5267 (MANCH) [8a]; s.n. (MANCH) [1] (both sheets); *Worsdell* s.n. (K) [1]; *Wrigley & Melville* 141 (K) [9a]; *Wylie* s.n. (K) [8a].

Zeyher 14 (K) [1]; 206 (BM, K) [8a]; 686 (K) [8a]; 1349 (K) [8a]; 1349B (K) [8a]; *Zimba et al.* 988 (K, MO) [9a].

