

A synopsis of *Tephrosia* subgenus *Barbistyla* (Fabaceae) in southern Africa

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ABSTRACT

A synopsis of the southern African species of *Tephrosia* Pers. subgenus *Barbistyla* Brummitt is given. Twenty-one species are recognized. A new species, *T. brummittii* B. D. Schrire, is described and six new combinations are presented. The key is partly descriptive to provide diagnoses of the taxa and includes information on distributions. Vouchers are noted from at least three different herbaria to aid identification. Detailed notes are provided on atypical collections and taxa that require further investigation. Typification has been done as far as necessary to ensure that the names used are correct.

UITTREKSEL

'n Samevatting van die suider-Afrikaanse spesies van *Tephrosia* subgenus *Barbistyla* Brummitt word gegee. Een-entwintig spesies word erken. 'n Nuwe spesie, *T. brummittii* B. D. Schrire, word beskryf en ses nuwe kombinasies word voorgestel. Die sleutel is gedeeltelik beskrywend om diagnoses van die taksons te verskaf en bevat inligting oor verspreiding. Kontrole-eksemplare is van ten minste drie herbaria aangeteken om identifikasie te vergemaklik. Gedetailleerde notas word verskaf oor atipiese versamelings en oor taksons wat verdere ondersoek vereis. Tipifikasie is gedoen sover dit nodig was om seker te maak dat die name wat gebruik is, korrek is.

INTRODUCTION

Tephrosia is a pantropical genus in the tribe Millettieae (Papilionoideae) comprising over 400 species mostly from Africa. An overview of the nomenclatural history, systematic position, taxonomy and morphology of the genus is given by Bosman & De Haas (1983) and the most recent reviews of the tribe are by Geesink (1981, 1984).

In the Flora of southern Africa region it is estimated that there are 52 species eight subspecies and 10 varieties. There are at least three interspecific hybrids with the likelihood of more being found in the future.

My treatment of the genera closely allied to *Tephrosia* follows that by Brummitt (1980), i.e. *Requienia* and *Ptychobium* are retained as separate genera whereas *Lupinophyllum* is sunk in *Tephrosia*.

Despite recent criticism by Geesink (1984) there is good reason for retaining the two subgeneric divisions in *Tephrosia* (Brummitt 1980). Although precise characters such as arrangement and position of hairs either along the style or just below the stigma, or the degree of style twisting, are variable, the two subgenera are characterized by flowers with different pollination strategies.

The salient features of each subgenus are summarized in the key below.

In subgenus *Barbistyla*, 21 species are recognized; a number of H.M.L. Forbes's (1948) species are reduced to synonymy or to subspecific status. The subgenus has a high degree of endemism in southern Africa with the *T. natalensis*, *T. macropoda*, *T. albissima* and *T. grandiflora* complexes almost all radiating exclusively within the Flora of southern Africa area. The three latter groups appear to be closely related to one another. It is however only these species in the subgenus that are endemic to us. The *T. longipes* complex and some of the other isolated species are more tropical in origin and they represent southerly extensions into the FSA area. A number of other areas of diversity for the subgenus occur in tropical Africa.

Selection pressures for evolutionary divergence at the generic level appear to have been centred on the breeding system. The subgeneric categories have different flower structures and this is reflected in their different pollination strategies. Within the subgenus *Barbistyla*, inflorescence characters (bracts) and fruit characters (pod size and seed position) separate the *T. grandiflora* allies from those of *T. longipes*. Inflorescence specialization has been particularly marked in the *T. grandiflora* alliance.

- Flowers (4-) 6-13 (-18) mm long (from calyx across the keel), orange or pink; wings and keel distally curving upwards (the keel often appearing L-shaped); standard somewhat folded over the keel basally and curving upwards with the distal half reflexed; style glabrous, with or without a tuft of hairs just below the stigma subgenus *Tephrosia*
- Flowers (11-) 14-24 (-30) mm long (from calyx across the keel), pink or mauve; wings and keel forwardly directed, obtriangular; standard generally straight, either folded over the keel or fully reflexed away from it; style pubescent, with or without a tuft of hairs just below the stigma subgenus *Barbistyla*

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An interpretation of the above might be that in the early stages of the evolution of *Tephrosia* the floral characters were fairly labile, and only after the build up of various constraints, did two major alternative strategies become dominant. The multifunctional-structural flower had now become constrained by the accumulated adaptations and interactions (burden) that made it successful. This became a fixed feature around which the other parts of the breeding system could interact. Further selection could be channelled in either of two directions: specialization in the ovules and ovary and ultimately fruit and seed dispersal, or specialization in inflorescences acting on floral development, presentation and protection.

Further examination of these hypotheses could add to

our knowledge of the radiation and interrelationships within the genus *Tephrosia* as a whole.

This synopsis is a preliminary account of the subgenus *Barbistyla* aimed at providing names and a means of identification for a difficult and variable group of plants. Hybridization is so far only known from isolated cases in disturbed areas, between closely related species.

The genus appears to comprise a number of actively evolving complexes in which peripheral variation is difficult to assess, and much of the underlying genetic variation is not readily quantifiable in morphological terms. A full revision of the genus for the *Flora of southern Africa* is in preparation.

KEY TO SPECIES

(Note: l: b = length/breadth)

- 1a Stipules and flower bracts triangular to narrowly triangular or subulate, \pm of equal size, stipules never auriculate at the base or with reflexed margins:
- 2a Slender, procumbent to erect perennial herbs with many flexuous stems; leaflets 9–13, very narrowly elliptic to narrowly oblanceolate or oblong, 6–25 (28) mm long, often discolorous; pseudoracemes laxly flowered; pods linear, 35–55 mm long; seeds 6–9; from E Transvaal and Swaziland 1. *T. retusa*
- 2b Robust, decumbent to erect suffrutices, subshrubs or annuals:
- 3a Pseudoracemes compact and densely congested, on short peduncles 2–30 (–40) mm long, inflorescences often but not always more or less exceeded by the leaves; pods grey to brown villous:
- 4a Leaves (1–)3(–5)-foliolate, stipules narrowly triangular; leaflets abaxially grey sericeous; from SWA/Namibia and Botswana 2. *T. cephalantha* var. *decumbens*
- 4b Leaves (6–) 7–10 (–11)-foliolate, stipules triangular; leaflets abaxially appressed pubescent not sericeous; from NE Transvaal 3. *T. aequalata* subsp. *australis*
- 3b Pseudoracemes elongated and laxly flowered, up to 300 mm long excluding the peduncle or, if \pm congested, then at the ends of peduncles raised well above the leaves; pods glabrous to thinly pubescent:
- 5a Robust herbaceous-stemmed suffrutices or annuals; pods linear, l:b \pm 12:1; seeds orbicular or with longer dimension along the longitudinal axis of the pod:
- 6a Leaflets linear to linear-elliptic, l:b \pm 12:1 with acuminate apices; leaflets in 1–7 (8) pairs, (20–) 30–100 (–120) \times (1–) 2–7 (–14) mm; widespread in S Botswana, Transvaal, OFS, Natal and N Cape 4. *T. longipes*
- 6b Leaflet shape other than above, l:b \pm 6:1 or less with acute, rounded, truncate or emarginate apices:
- 7a Youngest foliage densely white or yellowish pubescent and conspicuously dark mucronate; from SWA/Namibia, N Botswana, N and NE Transvaal:
- 8a Leaflets narrowly to very narrowly elliptic with acute apices, (8–) 15–35 (–45) \times (2–) 3–7 (–12) mm; pods with 10–12 seeds; from N Transvaal 5. *T. euchroa*
- 8b Leaflets elliptic-oblong, oblanceolate or narrowly oblong with rounded, truncate or emarginate apices, (10–) 35–60 (–80) \times 7–12 (–15) mm; pods with 12–16 seeds; from SWA/Namibia, N Botswana and NE Transvaal:
- 9a Stems with conspicuous spreading brown to grey hairs up to 2,5 mm long:
- 10a Annual slender herb with a long thin taproot; stems not strongly decumbent; leaves few in number, restricted to the lower part of the plant; leaflets in 1–4 (5) pairs; from N Botswana 6. *T. euprepes*
- 10b Perennial with woody rootstock or, if annual then with robust, strongly decumbent stems; leaflets in 4–9 pairs:
- 11a Stems erect, conspicuously long brown pilose; petiole and rhachis together (90–) 120–180 (–200) mm long; calyx with long spreading hairs; from N Botswana 7a. *T. caerulea* subsp. *caerulea*
- 11b Stems usually decumbent, to 1 m or more long, rarely erect; moderately to densely yellowish or grey pilose; petiole and rhachis together 40–110 (–120) mm long; calyx shortly pubescent; from NE Transvaal 8. *T. reptans* var. *reptans*
- 9b Stems with appressed or ascending grey hairs; from SWA/Namibia, N Botswana 7b. *T. caerulea* subsp. *otaviensis*
- 7b Youngest foliage conspicuously dark brown in dried material and essentially glabrous or sparsely to moderately long pilose; from Natal midlands, N Natal, adjacent S Transvaal and Swaziland:
- 12a Pseudoracemes elongated with at least three distinct flowering nodes along the rhachis; calyx teeth lanceolate to linear, equal to or longer than the tube; from Howick and Pietermaritzburg Districts of Natal midlands, Utrecht to Paulpietersburg Districts of N Natal, adjacent S Transvaal and Swaziland 9a. *T. natalensis* subsp. *natalensis*
- 12b Pseudoracemes in pseudoheads at the ends of the peduncles, with only one or rarely two flowering nodes; calyx teeth triangular, shorter than the tube; from the Muden-Greytown-Kranskop Districts of Natal midlands 9b. *T. natalensis* subsp. *pseudocapitata*

- 5b Erect woody-stemmed subshrubs; pods narrowly oblong to lorate, l:b \pm 6:1; seeds transversely elongate with the longer dimension across the width of the pod:
- 13a Young stems canescent; stipules linear; pseudoracemes from short peduncles, elongate and laxly flowered; from E Swaziland 14. *T. gobensis*
- 13b Young stems sparsely to moderately pubescent; stipules narrowly triangular to lanceolate; pseudoracemes in pseudoheads at the ends of the peduncles; from E Transvaal, Natal to Transkei..... 21. *T. shiluwaniensis*
- 1b Stipules and flower bracts ovate to lanceolate, if stipules narrow then either auriculate at the base and with reflexed margins or somewhat narrower than the bracts:
- 14a Prostrate to ascending herbaceous plants with many slender stems arising from a woody rootstock; usually of open grassland and sandy places:
- 15a Peduncles less than 30 mm long; pseudoracemes elongated and laxly flowered; leaflets characteristically obtriangular to broadly obovate, up to 20 (-26) mm long; pods shortly oblong, (8-) 12-25 mm long with a rounded apex; seeds 2-4 (5), not transversely elongated; prostrate mat-forming herb; stems conspicuously spreading-pubescent; from N SWA/Namibia and N Transvaal 10. *T. radicans*
- 15b Peduncles longer than 30 mm; pseudoracemes with flowers often clustered at the ends of peduncles; leaflets variously shaped, up to 65 mm long; pods lorate, (20-) 25-60 mm long with acute apices; seeds more than 5, transversely elongated:
- 16a Buds completely enclosed by large, scarious navicular or trullate bracts 4-15 (-18) mm long (sometimes not quite masking the buds in *T. bachmannii*); pseudoracemes sparsely flowered with only 1-3 (4) flowers open at any one time:
- 17a Calyx densely white to yellow sericeous; leaflets abaxially canescent or sericeous; endemic to northern Pondoland/southern Natal sandstone region 15. *T. bachmannii*
- 17b Calyx shortly pubescent to spreading pilose; leaflets not as above:
- 18a Stipules maturing brown to dark brown, dying back and curling away from the stems; leaves 3-7-foliolate; leaflets obovate to narrowly obovate, 20-65 \times 6-30 mm; OR (which includes var. *diffusa*) 5-9-foliolate with leaflets narrower, elliptic, 8-20 \times 3-6 mm; widespread in the eastern half of the FSA area 11. *T. macropoda* sensu lato
- 18b Stipules maturing conspicuously red or brown, closely appressed to the stems; leaves 7-11 (-13)-foliolate; leaflets mostly narrowly oblong-elliptic or oblanceolate, (12-) 18-36 (-42) \times 3-7 (-12) mm; from N Zululand and Swaziland Lowveld 12. *T. brummittii*
- 16b Buds visible and only partially masked by trullate, ovate to narrowly lanceolate bracts (1) 2-5 (-8) mm long; pseudoracemes compactly 2-8 (-10)-flowered:
- 19a Leaves with petiole and leaf rhachis together longer than 25 mm (except occasionally in depauperate upland forms from the Kokstad-Harding region of E Griqualand); leaves never sessile; from Transkei to the Natal midlands 13a. *T. albissima* subsp. *albissima*
- 19b Leaves with petiole and leaf rhachis together shorter than 25 mm; leaves often sessile and with very reduced rhachides; from W Zululand and N Natal 13b. *T. albissima* subsp. *zuluensis*
- 14b Erect or bushy subshrubs 0,5-3,0 m high, with one to a few stems, woody at least at their bases; usually of scrub or forest margins, but where these vegetation types are evidently disturbed then plants untidy and scrambling:
- 20a Calyx shortly appressed white to yellowish sericeous; leaflets abaxially grey subsericeous to sericeous:
- 21a Leaflets very narrowly oblanceolate or, if broader than 40 mm then longer than 26 mm; bracts 1-10 (-12) mm long, about as long as wide, broadly ovate with rounded to acute apices, moderately to densely white sericeous; endemic from the sandstone outcrop region of N Pondoland/S Natal 15. *T. bachmannii*
- 21b Leaflets mostly shorter than 26 mm and wider than 40 mm; bracts (8-) 10-32 mm long, navicular or narrowly ovate, longer than wide with narrowly acute, more often acuminate apices; from the coastal belt of SW Cape to Natal south of Durban, inland to the Albany and Amatola regions of the E Cape 16. *T. grandiflora*
- 20b Calyx white to rufous pubescent, spreading pilose or villous; leaflets abaxially glabrous to canescent:
- 22a Bracts exceeding and completely enclosing young buds and also often the undeveloped apices of the pseudoracemes:
- 23a Stipules broadly ovate and conspicuously cordate at the base:
- 24a Compact, woody shrubs, largest stipules longer than 13 mm, characteristically chartaceous, maturing to purple or maroon, crowded and overlapping on new growth; from the Lydenburg and Barberton Districts of E Transvaal and Swaziland 19. *T. cordata*
- 24b Lax, short-lived perennials; largest stipules never longer than 13 mm, scarious, maturing reddish to brown; from the NE, E and SE Transvaal and N Natal, W Zululand to the Natal midlands..... 18b. *T. glomeruliflora* subsp. *meisneri*
- 23b Stipules ovate, not cordate at the base, or narrowly ovate to lanceolate and auriculate at the base, often with reflexed margins:
- 25a Bracts —(8-) 10-32 mm long, navicular or narrowly ovate, longer than wide with narrowly acute or more often, acuminate apices:
- 26a Stipules broadly ovate, closely appressed to the stems; bracts sparsely to moderately puberulent; from the coastal belt of SW Cape to Natal south of Durban, inland to the Albany and Amatola regions of E Cape 16. *T. grandiflora*
- 26b Stipules narrowly lanceolate to subulate, often with reflexed margins and spreading from the stem; bracts moderately to densely spreading pilose or villous; from the Eshowe to Inanda Districts of Natal..... 17. *T. inandensis*
- 25b Bracts 4-10 (-12) mm long, trullate, broadly ovate or orbicular, \pm as long as wide with rounded, broadly acute or apiculate apices:

- 27a Calyx teeth narrowly subulate, 4–7 mm long, significantly longer than the tube; from the Barberton, Nelspruit and Komatipoort Districts of E Transvaal and Weza in E Griqualand 20. *T. subulata*
- 27b Calyx teeth triangular, lanceolate or subulate, 1,0–3,5 mm long, shorter than to slightly exceeding the tube:
- *28a Young inflorescences in dense glomerules at the ends of the peduncles; bracts flesh-coloured, minutely puberulent with a ciliate margin or short and densely white pubescent; calyx teeth triangular or appearing shortly subulate when dry, shorter than the tube except for the lowest tooth:
- 29a Stems densely appressed pubescent, becoming glabrous only with age; bracts and calyces moderately to densely white pubescent; from the coastal belt of Natal from Umzinto to N Zululand and inland to the Boston District of the midlands in the south and to the Hlabisa District in the north 18a. *T. glomeruliflora* subsp. *glomeruliflora*
- 29b Stems glabrous or only sparsely pubescent when young; bracts flesh-coloured, minutely puberulent with a ciliate margin; calyces sparsely to densely white to rufous pubescent or pilose; from the NE, E and SE Transvaal and N Natal, W Zululand to the Natal midlands 18b. *T. glomeruliflora* subsp. *meisneri*
- †28b Young inflorescences in dense pseudoheads at the ends of the peduncles or pseudoracemes up to 100 mm long; if appearing glomerule-like then bracts white to yellowish spreading pilose; calyx teeth lanceolate-subulate, ± equal to the tube:
- 30a Youngest leaves densely spreading yellowish sericeous; bracts ovate-acuminate, (6) 7–12 mm long, densely white to yellowish pilose; from the Eshowe to Inanda Districts of Natal 17. *T. inandensis*
- 30b Youngest leaves densely appressed canescent; bracts ovate and apiculate, 4–7 mm long, sparsely to moderately white pilose; from the Shilovane, Pilgrims Rest and Lydenburg Districts of E Transvaal to N Natal, W Zululand and the Natal midlands from the Greytown through Pietermaritzburg to Harding Districts and the Transkei 21. *T. shiluwaniensis*
- 22b Bracts never completely exceeding or enclosing young buds and only partially obscuring them in the pseudoracemes:
- 31a Calyx teeth broadly triangular, with acute apices, much shorter than the tube; bracts 1–3 mm long, obovate or ovate with truncate or rounded to apiculate apices, shortly and densely white pubescent; from the Boston and Durban Districts of Natal 18a. *T. glomeruliflora* subsp. *glomeruliflora*
- 31b Calyx teeth narrowly triangular to lanceolate or subulate with attenuate apices, ± equal to or exceeding the tube:
- 32a Calyx teeth narrowly subulate, 4–7 mm long, significantly longer than the tube; from the Barberton, Nelspruit and Komatipoort Districts of E Transvaal and Weza in E Griqualand 20. *T. subulata*
- 32b Calyx teeth lanceolate or subulate, 1,0–3,5(–4,0) mm long, more or less equal to the tube:
- 33a Youngest leaves densely appressed canescent; bracts 1–6 mm long, minutely puberulent to sparsely pubescent; calyx lobes often maturing bristle-like and reflexed apically; from the Shilovane, Pilgrims Rest and Lydenburg Districts of the E Transvaal to N Natal, W Zululand and the Natal midlands from the Greytown through Pietermaritzburg to Harding Districts and the Transkei 21. *T. shiluwaniensis*
- 33b Youngest leaves densely spreading yellowish sericeous; bracts (6–) 7–12 mm long, densely white to yellowish pilose; calyx lobes not as above; from the Eshowe to Inanda Districts of Natal 17. *T. inandensis*

SYNOPSIS OF SPECIES

1. ***Tephrosia retusa* Burt Davy**, Flowering plants and ferns of the Transvaal 2: xxxi + 378 (1932). Type: Transvaal, Barberton, juxta Kaap River, *Bolus* 7724 (K!, BOL).

Distribution: E Transvaal and Swaziland.

Vouchers: *Bolus* 11821 (K, BOL); *Elan-Puttick* 254 (PRE); *Liebenberg* 3317 (K, PRE); *Pott* 5326 (PRE); *Rogers* 24827 (K, PRE).

2. ***Tephrosia cephalantha* Welw. ex Bak. var. *decumbens* Welw. ex Bak. emend. Brummitt** in Boletim da

Sociedade Broteriana, sér. 2, 41: 384 (1968). Type: Angola, Huíla, Ferrão da Sola, *Welwitsch* 2090 (K!).

Distribution: SWA/Namibia and Botswana.

Vouchers: *De Winter* 2801 (K, PRE); *De Winter & Marais* 4539 (K, PRE); *Holub s.n.* (K); *Merxmüller & Giess* 1864 (K); *Smith* 2311 (K).

3. ***Tephrosia aequalata* Bak. subsp. *australis* Brummitt** in Boletim da Sociedade Broteriana, sér. 2, 41: 358 (1968). Type: Zimbabwe, Melsetter Distr., *Williams* 146 (K, holo. !; PRE!, SRGH).

Distribution: NE Transvaal.

Vouchers: *Codd* 3040 (K, PRE); *Hanekom* 2283 (K, PRE); *Hemm* 182 (K, PRE); *Scheepers* 341 (K, PRE); *Taylor* 646 (K, PRE).

Note

This species was confused by H. M. L. Forbes: 990 (1948) with *T. zombensis* Bak.

* The term glomerule, used to describe certain juvenile inflorescences in the key, refers to the spherical or globose body located at the ends of peduncles which is formed by the compact arrangement of broadly ovate to orbicular bracts with rounded, apiculate or broadly acute apices.

† The term pseudoheads is used when inflorescences are congested at the ends of the peduncles but either the bracts are too small to completely enclose the young buds or the apices project out from the inflorescence because they are sharply acute to acuminate.

4. *Tephrosia longipes* Meisn. in Hooker's London Journal of Botany 2: 87 (1843). Type: Natal, in graminosis ad latera montium Tafelberge, Port Natal, *Krauss 20* (K, holo.!).

4a. subsp. *longipes*.

Brummitt in Boletim da Sociedade Broteriana, sér. 2, 41: 309 (1968).

Tephrosia lurida Sond.: 30 (1850). Type: Transvaal, Moorivier, Magaliesberg, Crocodile River, *Zeyher 456* (K, isosyn.!).

Tephrosia angustissima Engl.: 29 (1888). Type: Cape, pr. Kuruman, in summo montium 'Ga Mhana', *Marloth 1086* (B, BOL, GRA, PRE!, SAM).

Distribution: widespread in S Botswana, Transvaal, OFS, Natal and N Cape.

Vouchers: *Brenan & Vahrmeijer 14255* (K); *Codd 2661* (K, PRE); *Germishuizen 133* (K, PRE); *Rogers 18129* (K, PRE); *Wood 1202* (K).

Notes

(1) The typical subsp. is maintained because of the occurrence of subsp. *swynnertonii* (Bak. f.) Brummitt: 315 (1968) in eastern Zimbabwe.

(2) A great deal of confusion has arisen in the past concerning the *T. longipes*-*T. lurida* complex. Forbes (1948) and Brummitt (1968) treated the two as separate species while Gillett (1958) placed *T. lurida* as a variety of *T. longipes*. Present research has shown that traditional characters used to separate them are based on ecological variables which cannot be reliably upheld taxonomically.

(3) A number of varieties have been described in this complex, i.e. *T. longipes* var. *uncinata* Harv.: 209 (1862). Type: Transvaal, Pretoria Distr., in nemorosis ad Aapies R., *Zeyher 455* (BM, GRA, K!, SAM); *T. longipes* var. *icosisperma* Brummitt: 313 (1968), e.g. *Moss & Rogers 523* (K) from Komatipoort, Transvaal; *T. lurida* var. *lissocarpa* Brummitt: 320 (1968). Type: Transvaal, Soutpansberg, ± 9 miles E of Louis Trichardt, Farm Rustfontein, *Schlieben 7339* (K, holo.!) and *T. lurida* var. *drummondii* Brummitt: 321 (1968), e.g. *Liebenberg 3313* (PRE) from Farm Schagen, Nelspruit, Transvaal. More field work is necessary to establish the validity of these varieties in the Flora area and they are not considered in this preliminary treatment.

(4) This complex together with the following species, i.e. *T. reptans* Bak., *T. caerulea* Bak. f., *T. euprepes* Brummitt and *T. euchroa* Verdoorn forms a clearly recognizable assemblage that is widespread in tropical Africa, and with the exception of *T. longipes* Meisn. only occurs in the northern extremities of the Flora area.

5. *Tephrosia euchroa* Verdoorn in Bothalia 3: 239 (1937). Type: Transvaal, Soutpansberg Distr., rocky NW slopes of Soutpansberg, *Obermeyer, Schweickerdt & Verdoorn 73* (PRE, holo.!, K!).

Distribution: N Transvaal.

Vouchers: *Acocks 16762* (K, PRE); *Gertenbach 4914* (PRE); *Pienaar 287* (K, PRE); *Smuts & Gillett 4080* (K, PRE); *Van der Schijff 1824* (PRE).

6. *Tephrosia euprepes* Brummitt in Boletim da Sociedade Broteriana, sér. 2, 41: 292 (1968). Type:

Zimbabwe, western Div., Nyamandhlovu Distr., Bongolo, *West 2694* (SRGH, holo.!, K!).

Distribution: N Botswana.

Vouchers: *Allen 299BCD* (K); *Lugard 152, 175* (K); *Rand 19, 20* (BM).

7. *Tephrosia caerulea* Bak. f., Leguminosae of Tropical Africa 1: 197 (1926). Type: Zambia, Mazabuka, *Woods 51* (BM, holo.!).

7a. subsp. *caerulea*.

Distribution: N Botswana.

Vouchers: *De Winter 4406* (K, PRE); *Smith 2211* (K).

7b. subsp. *otaviensis* (Dinter) Schreiber & Brummitt in Boletim da Sociedade Broteriana, sér. 2, 41: 292 (1968).

Tephrosia otaviensis Dinter in Feddes Repertorium 30: 204 (1932). Type: SWA/Namibia, Hereroland, Klein Otavi, *Dinter 5747* (NH, iso.!, K, photo.!).

Tephrosia longipes sensu Schreiber: 298 (1957).

Distribution: SWA/Namibia and N Botswana.

Vouchers: *De Winter & Marais 4832* (K); *Dinter 7570* (K); *Müller & Biegel 2305* (K).

8. *Tephrosia reptans* Bak. in Oliver, Flora of Tropical Africa 2: 121 (1871). Types: Tanzania, Tabora Distr., nr Tabora, *Speke & Grant s.n.* (K, lecto.!) and Mozambique, Shupanga, *Kirk s.n.*

8a. var. *reptans*.

Brummitt: 284 (1968).

Distribution: NE Transvaal.

Vouchers: *Smalberger 29* (PRE); *Stephen 303* (PRE).

Note

Lectotypification by Brummitt: 283 (1968).

9. *Tephrosia natalensis* H. M. L. Forbes in Bothalia 4: 988 (1948). Type: Natal, Howick, *Wood 8341* (NH, holo.!, K!).

9a. subsp. *natalensis*.

Tephrosia apiculata H. M. L. Forbes: 989 (1948). Type: Natal, Paulpietersburg Distr. between Paulpietersburg and Sunkelsdrift, *Acocks 11749* (NH, holo.!, K, photo.!).

Distribution: S Transvaal, Swaziland, N Natal and Natal midlands.

Vouchers: *Arnold 252* (K, PRE); *Compton 29168* (K, PRE); *Devenish 1722* (K, PRE); *Schrire 1289, 2254* (NH).

9b. subsp. *pseudocapitata* (H. M. L. Forbes) B. D. Schrire, comb. et stat. nov. *Tephrosia pseudocapitata* H. M. L. Forbes in Bothalia 4: 988 (1948). Type: Natal, Greytown Distr., *Wylie s.n.* (NH21787) (NH, holo.!, K!).

Distribution: Natal midlands.

Vouchers: *Buthlezi 332* (NH); *Stirton 5203* (K, PRE); *Wilms 1940* (K); *Wylie s.n.* (NH27992) (K, NH).

Note

The *T. natalensis* group may be an isolated ally of the complex comprising species numbered four to eight.

10. ***Tephrosia radicans* Welw. ex Bak.** in Oliver, Flora of Tropical Africa 2: 121 (1871). Type: Angola, Huilla, in pratis humidis ad formicar monticul de Varzeas e Catumba, *Welwitsch 2082* (BM, holo.!; K!).

Distribution: SWA/Namibia and N Transvaal.

Vouchers: *De Winter & Marais 4992* (K, PRE); *Galpin 8959* (K, PRE); *Rehmann 5529* (K); *Schlechter 4679* (K); *Van Vuuren 1411* (K, PRE).

11. ***Tephrosia macropoda* (E. Mey.) Harv.** in Harv. & Sond., Flora Capensis 2: 210 (1862). Syntypes: E Cape, inter Kachu et Zandplaat, *Drège s.n.* (B); Transkei, inter Gekau et Basche, *Drège s.n.* (K!); inter Umtata et Umgazana, *Drège s.n.* (K!). See note (1) below.

Apodynomene macropoda E. Mey.: 112 (1836). *Apodynomene macropoda* E. Mey. var. *laifolia* E. Mey.: 112 (1836).

Apodynomene macropoda E. Mey. var. *angustifolia* E. Mey.: 112 (1836). Type: Transkei, in collibus graminosis prope Umsikaba, *Drège s.n.* (?).

Apodynomene aemula E. Mey.: 113 (1836). *Tephrosia aemula* (E. Mey.) Harv. & Sond.: 210 (1862), pro parte. Type: E Cape, in graminosis inter Zandplaat et Komba, *Drège s.n.* (B, holo.).

Tephrosia triphylla Harms in O. Kuntze: 57 (1898). Type: Natal, Krantzklouf, *Kuntze s.n.* (NY, holo.-K, photo!).

Tephrosia armitageana Chiov.: 421 (1908). Type: Natal, Port Natal, *Armitage 547* (? FI).

Tephrosia spathacea sensu H. M. L. Forbes: 995 (1948), non Hutch. & Burt Davy: xxxi (1932).

Distribution: widespread in the eastern half of the Flora area.

Vouchers: *Compton 27355* (K, PRE); *Huntley 472* (K, NU); *Liebenberg 7990* (K, PRE); *Mogg 5812* (K, PRE); *Rogers 18020* (K, PRE).

11a. var. ***diffusa* (E. Mey.) B. D. Schrire**, comb. et stat. nov.

Apodynomene diffusa E. Mey.: 113 (1836). *Tephrosia diffusa* (E. Mey.) Harv. in Harv. & Sond.: 210 (1862). Type: Transkei, in rupetris ad fluvium quendam minorem inter Umsamvubu et Umsikaba, *Drège s.n.* (K!).

Apodynomene aemula E. Mey.: 113 (1836). *Tephrosia aemula* (E. Mey.) Harv. in Harv. & Sond.: 210 (1862) pro parte. Type: E Cape, in graminosis inter Zandplaat et Komga, *Drège s.n.* (B, holo.).

Distribution: ecotypes within the range of the species.

Vouchers: *Acocks 21940* (PRE); *Ross 1886* (K, NH); *Strey 6620* (K, PRE); *Venter 7708* (PRE); *Wood 886* (K).

Notes

(1) H. M. L. Forbes examined material in B before the Second World War for her revision (1948). She designated a specimen, *Drège (Herb. Meyer 5471)* as a type thus choosing one of the syntypes in Meyer's protologue as the lectotype. Since this material was destroyed and it is not clear which syntype she chose, a new lectotype can be designated from any of the original syntypes.

(2) The *T. macropoda* complex is a widespread group of trailing to prostrate open grassland herbs and over the

major part of its range, i.e. Transvaal and much of Natal, Transkei and the eastern Cape, it is easily recognizable as one species, *T. macropoda*. On the periphery of this range, however, there is considerable divergence from the typical form:

(a) Along the eastern coastal strip plants are particularly robust but are clearly recognizable as *T. macropoda*.

(b) In the following regions plants may be much reduced in size:

(i) the higher altitude foothills and slopes of the Drakensberg in Natal to Transkei;

(ii) the southerly end of the species range in the E Cape;

(iii) the coastal hinterland of Transkei and Natal;

(iv) parts of the E Transvaal and Swaziland.

(3) One distinct form (referred to here as var. *diffusa*) occurs in these areas, and is associated with edaphically dry granite or sandstone outcrops. Plants are procumbent, diffusely branching and often form dense mats. Typical *T. macropoda* may be found in the surrounding grassland and the two may appear to be quite separate taxa.

(4) *T. macropoda* is, however, a variable species and smaller-leaved forms do occur and will intergrade with the typical form, particularly at the extremes of its range and with increasing altitude. These are sometimes difficult to distinguish from the diffuse plant in the herbarium. The latter is clearly an ecotype and the name is retained as a variety of *T. macropoda* but doubtful plants should be retained in *T. macropoda* sensu lato.

12. ***Tephrosia brummittii* B. D. Schrire**, sp. nov. *T. macropodae* affinis, sed stipulis late ovatis, maturitate conspicue rubris vel brunneis, arcte appressis ad caules, foliis 7–11(–13)-foliolatis, foliolis anguste oblongo-ellipticis ad oblanceolatis differt.

TYPE.—Natal, 2832 (Mtubatuba): Hlabisa Distr., St Lucia Estuary Game Park, W of Vidal Rd (–AD), *Pooley 1918e* (NU, holo.; K, PRE, iso.).

Perennial spreading suffrutex up to 600 mm high, arising from a woody rootstock. *Stems* one to many, herbaceous except at the base, prostrate to ascending, glabrous or sparsely pubescent to ascending pilose, branching near the base. *Leaves* 7–11(–13)-foliolate, (30–) 70–120(–140) mm long; stipules (6–)7–17 × 3–11 mm, broadly ovate, base often cordate, apex acuminate, maturing conspicuously red or brown, closely appressed to the stems; petiole (15–)25–55(–70) mm long, canalliculate adaxially; leaflets (12–)18–35(–42) × 3–7(–12) mm, narrowly oblong-elliptic or oblanceolate, base cuneate to rounded, apex emarginate, obtuse or acute, mucronate, upper surface green, glabrous or minutely puberulent, lower surface moderately appressed to spreading greyish pubescent. *Pseudoracemes* terminal and leaf-opposed, with 1–2(–3) flowers open at any one time. *Bracts* 5–15 × 4–10 mm, broadly ovate-acuminate, navicular, completely enclosing young buds, scariosus, chestnut-brown, minutely bifid at the apex. *Flowers* 11–21 mm long. *Calyx* tube to 4 mm and teeth to 6 mm long, teeth lanceolate at the base narrowing to a long

attenuate apex, longer than the tube, sparsely to moderately pubescent with long spreading hairs on the teeth. *Standard* 11–21 mm long, to 20 mm wide, broadly obovate to orbicular, narrowing to a claw 2–3 mm long at the base, apex rounded or emarginate, dorsally densely pubescent, ventrally glabrous, scattered punctate-glandular as are all the petals. *Wings* 10–18 × 7 mm including a claw 2–3 mm long, cultrate with an auricle at the base of the lamina above the claw, sculpturing present, upper basal, up to 20 transcostal lamellae. *Keel petals* up to 18 × 7 mm including a claw 2–3 mm long. *Staminal sheath* 10–14 mm long, the stamens then free and alternating in length, 5 and 4 filaments to 4 and 3 mm long respectively, vexillary stamen to 17 mm long, free. *Ovary* to 16 mm long. *Style* to 8 mm long, curving erect from the ovary, flattened dorsiventrally and densely pubescent on both surfaces. *Stigma* capitate. *Fruits* immature, glabrous. *Seeds* 10–16, transversely arranged.

SWAZILAND.—2631 (Mbabane): Umbuluzi Falls near stream (–AD), *Compton 25094* (NBG, PRE).

NATAL.—2732 (Ubombo): Lebombo Mountains, Gwalaweni Forest (–AC), *Brenan 14272* (K, PRE); Umpangazi Lake (–DA), *Strey 5097* (NH, PRE). 2831 (Nkandla): Mtunzini Distr., 15 miles NW of Port Durnford (–DD), *Codd & Dyer 2826* (K, PRE). 2832 (Mtubatuba): Hlabisa Distr., St Lucia Estuary Game Park, W of Vidal Rd (–AD), *Pooley 1918e* (K, NU, PRE).

This species has often been confused with *T. macropoda* var. *macropoda*, from which it differs by having stipules maturing conspicuously red or brown and remaining closely appressed to the stems, and leaves 7–11 (–13)-foliolate with leaflets narrowly oblong-elliptic to oblanceolate. *T. macropoda* var. *macropoda* is distinguished by having stipules maturing dark brown and curling away from the stems, and leaves 3–7-foliolate with leaflets obovate to narrowly obovate or elliptic.

T. brummitti occurs sympatrically with *T. macropoda* and, although a few problem plants occur in overlapping areas, e.g. *Huntley 194* (PRE) from Mtunzini, Natal, they are not readily identifiable as intermediates.

Two specimens from southern Mozambique, cited by Brummitt: 372 (1968) as *T. incarnata*, also belong to this species. These are: 1, Sabie, Lebombo Mountains, Meponduine, *Pedro & Pedrogao 735* (LMJ); 2, Namaacha, near the Canada Dry factory, *Barbosa & Lemos 7534* (COI, LISC, LMJ). Both localities are near the border with Swaziland in the Lebombo Mountains.

The plants grow at altitudes from 0–450 m in the coastal and lowveld vegetation types of N Zululand, S Mozambique and E Swaziland. These prostrate herbs occur in open grassland from coastal dunes to stream-banks and forest margins along the Lebombo Mountains.

This species is named in honour of Dr R. K. Brummitt of the Royal Botanic Gardens, Kew, who has contributed much to the knowledge of the genus *Tephrosia* from the *Flora Zambesiaca* area.

13. *Tephrosia albissima* H.M.L. Forbes in *Bothalia* 4: 995 (1948). Type: Natal, Greytown, *Wylie s.n. (NH21590)* (NH, holo.!, K!, PRE!).

13a. subsp. *albissima*.

Tephrosia galpinii H. M. L. Forbes: 996 (1948). Type: Natal, Greytown, on railway bank on town commonage, *Galpin 14755* (PRE, holo.!, NH!).

Distribution: Natal midlands to Transkei.

Vouchers: *Schrire 298, 312, 831* (NH); *Stirton 5598* (K, PRE); *Wylie s.n. (NH37157)* (NH).

13b. subsp. *zuluensis* (H. M. L. Forbes) B. D. Schrire, comb. et stat. nov. *Tephrosia zuluensis* H. M. L. Forbes in *Bothalia* 4: 997 (1948). Type: Natal, Nkandhla, *Wylie s.n. (NH9399)* (NH, holo.!).

Tephrosia unifolia H. M. L. Forbes in *Bothalia* 4: 996 (1948). Type: Natal, W Zululand, *Baker s.n. (NH19781)* (NH, holo.!).

Distribution: W Zululand and N Natal.

Vouchers: *Codd 6987* (K, NH); *Grobbelaar 801* (PRE); *Ngwenya 31* (NH); *Schrire 2216* (NH); *Turner 1* (NH).

Notes

(1) *T. albissima* is another variable complex including a number of names published simultaneously by H. M. L. Forbes (1948). A geographically distinct segregate, *T. zuluensis* is given subspecific status and this includes those forms from western Zululand and northern Natal which have almost sessile leaves and very reduced densely pilose leaf rachides. This creates problems in the choice of key characters because the typical subspecies becomes very much reduced in size at the opposite end of its range in the higher altitude areas of Kokstad and Harding in eastern Griqualand (following a similar trend to *T. macropoda* sensu lato.).

(2) Another entity, *T. unifolia* H. M. L. Forbes is placed in synonymy under subsp. *zuluensis* but further field study is needed to be certain of its position. The best example is *J. Turner 1* (NH) from the Babanango Distr. in western Zululand. The leaves are distinctly petiolate with leaflets narrowly oblong-elliptic to oblanceolate, both longer and narrower than typical subsp. *zuluensis*. The collections *Brown & Shapiro 73* (K) from Itala Nature Reserve and *Ross 1741* (PRE) from near Goedegun in the Louwsberg, need further investigation as they appear to be somewhat intermediate between *T. albissima* and *T. macropoda* sensu lato.

14. *Tephrosia gobensis* Brummitt in *Boletim da Sociedade Broteriana*, sér. 2, 41: 368 (1968). Type: Mozambique, Goba Distr., *De Sousa 132* (LISC, holo.; PRE!).

Distribution: E Swaziland.

Vouchers: *Compton 31915* (PRE) *Culverwell 463* (K, PRE).

15. *Tephrosia bachmannii* Harms in *Botanische Jahrbücher* 26: 286 (1899). Type: Transkei, Pondoland, *Bachmann 616* (B, holo.).

Distribution: N Transkei and S Natal.

Vouchers: *Crawford 390* (K, PRE); *Strey 9591* (K, NH); *Wood 3021, 3101* (K).

Notes

This species is very variable, with three distinct forms:

(a) procumbent grassland suffrutices e.g. *Shackleton 367* (KEI);

(b) low woody bushes with linear-oblanceolate leaflets, from exposed rocky areas e.g. *Acocks 13375* (PRE);

(c) woody subshrubs up to 2 m high with broader, obovate leaflets conspicuously white sericeous abaxially, e.g. *Sidey 4185* (PRE).

Further investigation is needed to assess this variation.

16. ***Tephrosia grandiflora*** (Ait.) Pers., Synopsis Plantarum 2: 329 (1807). Types: Cape, Hort. Kew 1777, seed from C. B. S., *Masson s.n.* (BM, syn.); Africa australis, *Masson s.n.* (BM, syn.).

Galega grandiflora Ait.: 70 (1789).

Distribution: SW Cape to S Natal.

Vouchers: *Bruce 453* (K, PRE); *Marais 1195* (K, PRE); *Stirton 6297; 6320* (K, PRE); *Strey 6897* (K, NH, PRE).

Notes

The largest and most difficult complex, which is allied to both *T. albissima* and *T. macropoda* sensu lato, comprises those erect or bushy subshrubs related to *T. grandiflora* (species 14 to 21). *T. grandiflora* has traditionally been confused with many of the species in this group but presents no problems itself. The isolated *T. gobensis* from the Lebombo region seems most closely allied to it as does the endemic *T. bachmannii* from the sandstone outcrop areas of northern Pondoland/southern Natal.

17. ***Tephrosia inandensis*** H. M. L. Forbes in Bothalia 4: 276 (1948). Type: Natal, Inanda Distr., *Wood 289* (NH, holo.!: K!).

Distribution: Eshowe to Inanda Districts of Natal.

Vouchers: *Forbes 108* (NH); *J. P. Forbes s.n.* (NH); *Lawn 537* (NH) *Rogers 24018* (PRE); *Stirton 5341* (NH).

Note

T. inandensis is closely allied to *T. glomeruliflora* (no. 18), and *Schrire 330* (NH) from the Natal coastal area adjacent to Eshowe is a hybrid between them.

18. ***Tephrosia glomeruliflora*** Meisn. in Hooker's London Journal of Botany 2: 86 (1843). Type: Natal, Port Natal, *Gueinzus s.n.* (K, holo.!).

18a. subsp. ***glomeruliflora***.

Distribution: Natal coastal belt and adjacent midlands.

Vouchers: *Baijnath 145* (K, NU); *Grobbelaar 1814* (K, PRE); *Nichols 840* (NH); *Pole Evans 3647* (K, PRE); *Wood 11400* (NH).

18b. subsp. ***meisneri*** (Hutch. & Burt Davy) B. D. Schrire, comb. et stat. nov. *Tephrosia meisneri* Hutch. & Burt Davy: xxxi & 377 (1932). Type: Transvaal, *Sanderson s.n.* (K, holo.!).

Tephrosia incarnata Brummitt: 370 (1968). Type: Zimbabwe, Umtali Distr., Himalayas, Engwa, *Wild 4450* (SRGH, holo.!: K!, PRE!).

Distribution: E half of Transvaal, N Natal to Natal midlands. It also extends northwards into Zimbabwe.

Vouchers: *Brenan 14116* (K, PRE); *Germishuizen 2852* (PRE); *Killian 14* (PRE); *Nichols 508* (NH); *Pole Evans s.n.* (PRE); *Strey 7968* (NH).

Notes

(1) The glomerulose inflorescences and geographical distribution of the two taxa *T. glomeruliflora* and *T. meisneri* suggest one species with two distinct subspecies, and *Strey 8371* (K, NH) from Ismont near Pietermaritzburg and *Coleman 973* (NH) from Byrne in the Natal midlands indicate a possible transition from one to the other.

(2) The typical subspecies shows considerable variation in bract size. Some individuals have minute bracts not at all obscuring the young buds in the inflorescence (as in the type of the species). The bulk, though, have bracts enclosing the young buds completely. There is little evidence of intermediates between them and on further investigation the latter may warrant varietal status.

(3) A few plants of subsp. *meisneri* are depauperate e.g. *Meeuse 9797* (K) from the Soutpansberg and *Galpin 14451* (K) from Pilgrim's Rest. These require further investigation as mentioned under the next species.

19. ***Tephrosia cordata*** Hutch. & Burt Davy in Burt Davy, Flowering plants and ferns of the Transvaal 2: xxxi (1932). Type: Swaziland, Mbabane, *Burt Davy 2886* (K, holo.!: BM!, PRE!).

Distribution: E Transvaal and Swaziland.

Vouchers: *Codd 8198* (K, PRE); *Compton 23302, 29985* (K); *Elan-Puttick 320* (K, PRE); *Stirton 1768* (K, PRE).

Note

T. cordata requires further study in the field, particularly as regards variation in stipule size and possible links with *T. glomeruliflora* subsp. *meisneri*, e.g. *Galpin 13134* (K) from Dullstroom and *Pole Evans 4245* (K) from Hendriksdal (both in the E Transvaal).

20. ***Tephrosia subulata*** Hutch. & Burt Davy in Burt Davy, Flowering plants and ferns of the Transvaal 2: xxxi & 377 (1932). Type: Transvaal, Barberton Distr., Highland Creek, *Galpin 843* (K, holo.!: NH!, PRE!, SAM).

Distribution: E Transvaal and Weza District in E Griqualand.

Vouchers: *Balsinhas 3153* (K, PRE); *Stirton 10388* (NH); *Thorncroft 36* (PRE); *Van der Merwe 247* (K, PRE); *Viljoen 133* (K, PRE).

Note

T. subulata occurs sympatrically with *T. cordata* in the E Transvaal, and *Kluge 2347* (PRE) from Kaapschehoop is an aberrant specimen that may represent a hybrid between them.

21. ***Tephrosia shilwanensis*** Schinz in Vierteljahresschrift der Naturforschenden Gesellschaft in Zürich 52: 423 (1907). Type: Transvaal, Soutpansberg Distr., Shiluwane, *Junod 2355* (Z, holo.).

Tephrosia spathacea Hutch. & Burt Davy in Burt Davy: xxxi (1932). Type: Transvaal, Lydenburg Distr., *Wilms 341* (K, holo.!).

Tephrosia medleyi H. M. L. Forbes: 968 (1948). Type: Natal, Kranskop Distr., nr Greytown, *Wood 5984* (NH, holo.!).

Tephrosia wyliei H. M. L. Forbes: 991 (1948). Type: Natal, Elandskop Distr., Sevenfontein nr Boston, *Wylie s.n.* (NH7996) (NH, holo.!).

Distribution: E Transvaal, Natal to Transkei.

Vouchers: *Codd 6961* (PRE); *Collins 3266* (PRE); *Germishuizen 95* (K, PRE); *Junod 1106* (K, PRE); *Kluge 2253* (K, PRE); *Tyson 1434* (K).

Notes

(1) *T. shiluwaniensis* is a variable species. At the western end of its range, i.e. from the Pietermaritzburg to Harding Districts, plants tend to be less robust with bracts generally more conspicuous and ovate-apiculate. This group matches the type of *T. wyliei* but for the most part they cannot reliably be separated from *T. shiluwaniensis*.

(2) *Fakude 68* (PRE) is a hybrid with *T. glomeruliflora* subsp. *glomeruliflora* from the Hlabisa District of Natal.

(3) An aberrant specimen, *Evans 345* (NH) from the Umlaas District between Pietermaritzburg and Durban may be a hybrid with *T. inandensis* and requires further investigation.

(4) Two additional species have been recorded as introductions to southern Africa but there is no evidence that they have become naturalized:

(a) *T. candida* (Roxb.) DC.; *Roxburgh s.n.*, Cape of Good Hope ex Botanic Garden, Calcutta (K);

(b) *T. vogelii* Hook. f.; *Strey 9009*, Ntsubane, Transkei (NH, PRE).

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