

INTRODUCTION

As part of preparatory studies for a synoptic revision of *Lotononis* (DC.) Eckl. & Zeyh., several new species have been described in previous parts of this series. The section *Telina* (E. Mey.) Benth. and the *L. angolensis* group of the section *Polylobium* (Eckl. & Zeyh.) Benth. were treated in parts 2 and 3 respectively (Van Wyk 1988, 1989). Recent studies however, have shown the presence of another two new species of *Telina* and one new species of the *L. angolensis* group. These are described below.

Section *Telina* (E. Mey.) Benth.

Lotononis filiformis B-E. van Wyk, sp. nov., *L. azureae* Eckl. & Zeyh. valde affinis sed habitu longissimo gracili sparsim ramoso, foliolis gracilibus linearibus, lobis calycis oblongis (non triangularibus), fructu minore angustiori et praesertim pube minute strigillosa ramulorum foliorum calycis fructusque (sparsim pilosa in *L. azurea*) differt.

TYPE.—Cape, 3321 (Ladismith): northern slopes of Outeniqua Mountains, between Farms Bonnieedale and Woëska (—DD), 14.10.1988, *Vlok 2030* (PRE, holo.; JRAU, K, MO, NBG, SAAS, STE, iso.).

Very sparse perennial herb, up to 1 m wide. *Branches* long, slender, sparsely leafy, glabrescent, reddish-brown; twigs minutely strigillose. *Leaves* digitately trifoliate; petiole (4—)7—14(—22) mm long; leaflets linear, thick in texture, (4—)8—22(—26) × (0,5—)1—1,5(—2) mm, inconspicuously strigillose on both surfaces. *Stipules* consistently present, single or paired at each node, narrowly lanceolate, (2—)4—8(—10) mm long. *Inflorescences* leaf-opposed, slender, long-pedunculate, 25—120 mm long, invariably single-flowered; bracts small, up to 1,5 mm long; bracteoles absent. *Flowers* relatively large, 8—12 mm long, blue; pedicel 3—8 mm long. *Calyx* 8—10 mm long, subequally lobed, minutely strigillose; lobes narrowly oblong. *Standard* broadly ovate to suborbicular, 7—12 mm long, minutely pubescent on the middle part of the dorsal surface, deep blue with yellow at the base. *Wing petals* oblong, longer than the keel; apex rounded; sculpturing in 2—3 rows of mostly transcostal lunae and lamellae. *Keel petals* semicircular, obtuse, auriculate and pocketed near the base. *Anthers* dimorphic. *Pistil* 9—11 mm long; ovary linear, 6—9 mm long, pubescent; style erect. *Pods* narrowly oblong, 14—20 × 3—4 mm, laterally much inflated, ± 5—8-seeded, minutely strigillose, lower suture sunken, upper suture verrucose, dehiscent. *Seed* suborbicular, ± 2 mm in diameter; testa reddish brown, dark brown or almost black, densely tuberculate; funicles up to 1,2 mm long (Figure 11).

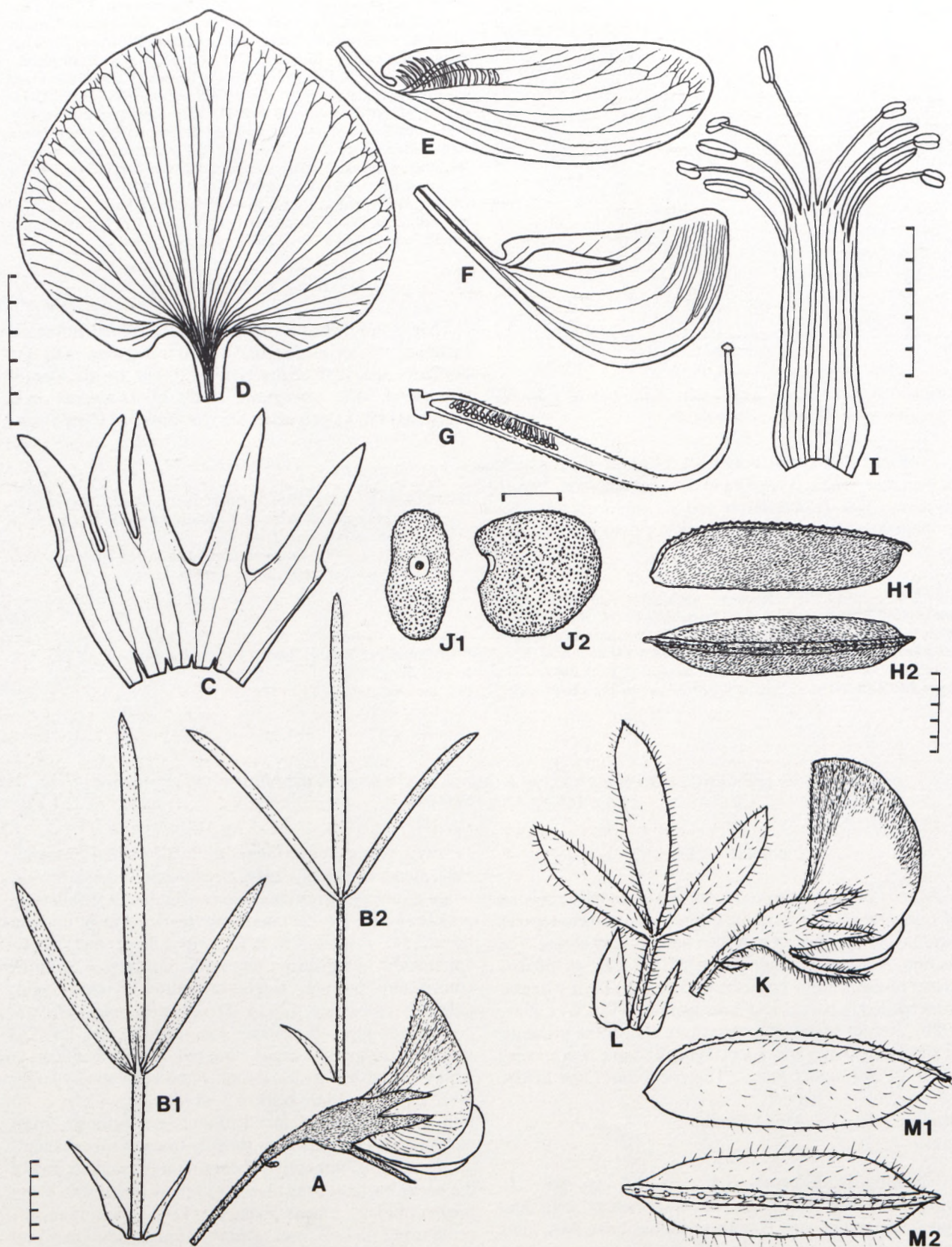


FIGURE 11.—*Lotoononis filiformis*. A, flower in lateral view. B1 & B2, leaves, showing the stipules and strigillose vestiture: B1, abaxial view; B2, adaxial view. C, calyx opened out, with the upper lobes to the left, vestiture not shown; D, standard petal; E, wing petal; F, keel petal; G, pistil. H1 & H2, fruit, showing the densely strigillose vestiture and verrucose upper suture: H1, lateral view; H2, top view. I, androecium. J1 & J2, seeds: J1, hilar view; J2, lateral view. *Lotoononis azurea* var. *lanceolata*. K, flower in lateral view; L, leaf in adaxial view; M1 & M2, fruit in lateral and top view. All from Van Wyk 2857 except H1, H2, J1 & J2 from Vlok 2030 and K, L, and M from Acocks 13713. Scales in mm.

L. filiformis is very closely related to *L. azurea* Eckl. & Zeyh. but differs in the very long, slender and sparsely branched habit, the slender linear leaflets, the oblong (not triangular) calyx lobes, the smaller narrower fruit and particularly in the minutely strigillose vestiture of the twigs, leaves, calyx and fruit (not sparsely pilose as in *L. azurea*). It is also geographically isolated from the latter and has a more western distribution, known only from the northern slopes of the Outeniqua Mountains (Figure 12). The narrow calyx lobes are very similar to those of *L. azurea* var. *lanceolata* Harv. (based on *Ononis villosa* Thunb.), with which *L. filiformis* has previously been confused (Figure 11). I have examined the Thunberg type specimen of *Ononis villosa*, but the long, sparse and spreading hair covering of the latter is very different from the dense and minutely strigillose vestiture of *L. filiformis*.

I am much indebted to Mr J. H. J. Vlok of Saasveld, George for the opportunity to study the species *in situ*. The almost climbing habit is quite unlike that of any other species of *Lotononis*—the long, slender branches are supported by the surrounding vegetation and when not in flower, the plants are almost invisible.

CAPE.—3321 (Ladismith): Mossel Bay Division, Vryers Berg (—DC), Muir 2042 (BOL); northern slopes of Outeniqua Mountains, between Farms Bonnedale and Woeska (—DD), Vlok 2030 (PRE, holo.; JRAU, K, MO, NBG, SAAS, STE, iso.). 3322 (Oudtshoorn): Oudtshoorn District, Moeras River between Oudtshoorn and Robinson's Pass (—CC), Bolus 11767 (BOL, GRA); lower northern slopes of the Outeniqua Mountains, near Zebrafontein in Doornrivier Wilderness area (—CC), Van Wyk 2857 (JRAU, K, MO, NBG, PRE, STE); 4,2 miles [6,72 km] WNW of Camfer Station (—CD), Acocks 23250 (STE).

***Lotononis complanata* B-E. van Wyk, sp. nov., *L. varia* (E. Mey.) Benth. similis sed habitu foliisque minore, apicibus foliolorum recurvatis, stipulis singularibus (plerumque geminis in quoque nodo in *L. varia*), pube foliorum plus dense strigillose (foliis \pm glabris in *L. varia*), inflorescentiis semper unifloris (saepo 2- vel pluri-floris in *L. varia*), floribus minoris et praesertim fructu breve oblongo compresso indehiscenti (longiore valde inflato dehiscenti in *L. varia* et speciebus omniis aliis sectionis *Telinae*). Fructus etiam multiseminales ad 30 seminibus (\pm 6–12-seminales in speciebus aliis),**

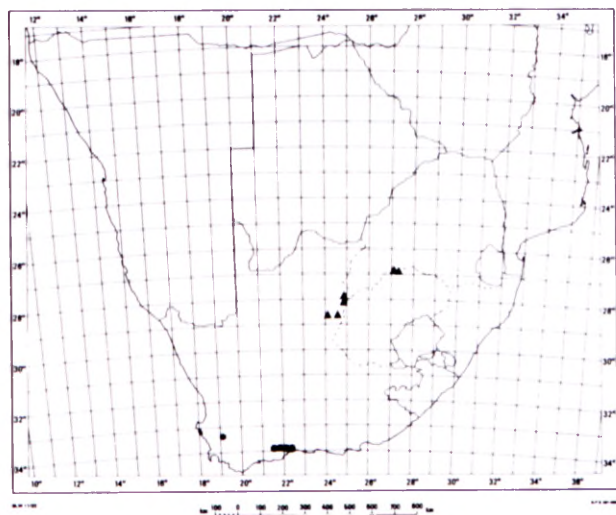


FIGURE 12.—The known geographical distribution of *Lotononis filiformis*, ●; *L. complanata*, ★; and *L. subulata*, ▲.

funiculis sunt usque ad 4 mm longis (usque ad 2 mm in speciebus aliis).

TYPE.—Cape, 3319 (Worcester): Riebeeck-Wes, in Elandsberg Nature Reserve (—AC), 15.06.1988, Vlok 1941 (PRE, holo.; K, NBG, iso.).

Dwarf suffrutescent perennial up to 0,1 m high and 0,2 m wide. Branches slender, procumbent from a thick central rootstock; young twigs densely strigillose. Leaves digitately trifoliate, relatively small, sparsely pubescent, variable in size, those on the main axis with long and slender petioles, those of lateral twigs with the petiole (4–)6–15(–22) mm long; leaflets narrowly to broadly oblanceolate, variable in length, (2–)4–10(–15) \times (1–)2–3(–3,5) mm, adaxial surface glabrous, abaxial surface minutely pubescent; apex acute, recurved. Stipules invariably single at each node, small, narrowly lanceolate, up to 3 mm long. Inflorescences subterminal or leaf-opposed on short lateral branches, invariably single-flowered; peduncle slender, variable in length, (16–45) mm long; bract small, oblong, up to 1 mm long; bracteoles absent. Flowers relatively small, 8–12 mm long, blue; pedicel short, 1–2 mm long. Calyx 5–7 mm long, subequally lobed, minutely pubescent; lobes narrowly triangular. Standard large, suborbicular, 7–11 mm long, with a line of minute hairs dorsally along the middle. Wing petals longer than the keel, oblanceolate; apex obliquely obtuse; sculpturing in 3–4 rows of mostly intercostal lunae and lamellae. Keel petals semicircular, somewhat acute, auriculate and pocketed near base. Anthers dimorphic. Pistil short; ovary oblong, \pm 7 mm long, minutely pubescent; style short, erect. Pods very broadly oblong, 10–21 \times 5–7(–8) mm, compressed, indehiscent, minutely pubescent, apex broad and rounded, 6–30-seeded, upper suture very conspicuously verrucose. Seed kidney-shaped, 1,5 mm in diameter, on very long funicles; funicles up to 4 mm long; testa brown, densely tuberculate (Figure 13).

This species is similar to *L. varia* (E. Mey.) Benth. but differs in the smaller habit and leaves, the recurved leaflet apices, the single stipules (usually paired at each node in *L. varia*), the more densely strigillose vestiture of the leaves (\pm glabrous in *L. varia*), the invariably single-flowered inflorescences (often 2- or more-flowered in *L. varia*), the smaller flowers and particularly in the shortly oblong, compressed and indehiscent fruit (longer, laterally much inflated and dehiscent in *L. varia* and in all other species of the section *Telina*). Differences between the two species are shown in Figure 13. The shape of the pods [*complanatus* = flattened out] is very unusual for the section *Telina* and the tooth-like projections along the upper suture are more strongly developed than in most if not all other species of *Lotononis*. The large number of seeds per pod and the very long funicles are also unique features not found in other species of the section *Telina*.

Only a single collection (without precise locality details) was known prior to the discovery of the species in the Elandsberg Nature Reserve (Figure 12). This discovery is another example of the valuable contributions Mr J. H. J. Vlok has made to the phytogeography of rare Cape

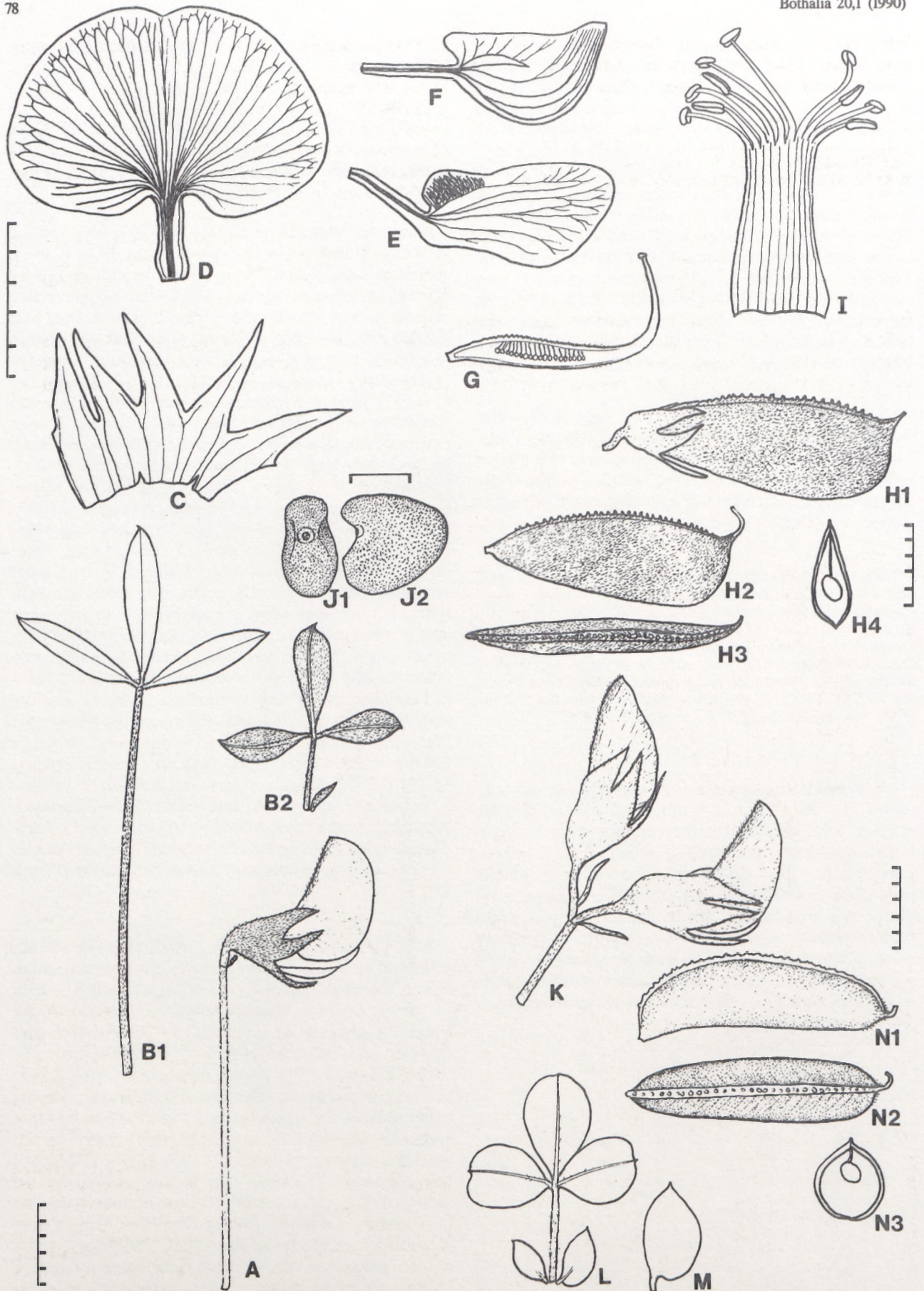


FIGURE 13.—*Lotononis complanata*. A, flower in lateral view. B1 & B2, leaves, showing the slightly recurved leaflet apices and strigillose vestiture: B1, leaf from central branch in adaxial view; B2, leaf from lateral branch in abaxial view. C, calyx opened out, with the upper lobes to the left, vestiture not shown; D, standard petal; E, wing petal; F, keel petal; G, pistil. H1–H4, fruit, showing the distinctive shape, densely strigillose vestiture and verrucose upper suture: H1 & H2, lateral view; H3, top view; H4, transverse section. I, androecium. J1 & J2, seeds: J1, hilar view; J2, lateral view. *Lotononis varia*. K, flowers in lateral view; L, leaf in abaxial view; M, stipule. N1–N3, fruit: N1, lateral view; N2, top view; N3, transverse section. All from Vlok 1941 except H1–H4, J1 & J2 from Van Wyk 2879, K from Esterhuysen 35558, L, M, N1–N3 from Barker 7164. Scales in mm.

legumes. *L. complanata* is known only from one population and it may be worthwhile to assess the population structure from time to time.

CAPE.—3319 (Worcester): Riebeeck-Wes, in Elandsberg Nature Reserve (—AC), 15.06.1988, *Vlok 1941* (PRE, holo.; K, NBG, SAAS, iso.), 07.10.1988, *van Wyk 2879* (BOL, GRA, JRAU, K, MO, NBG, PRE, S, SAAS, STE). Without precise locality, *Bowie s.n.* (BM, K).

Section *Polylobium* (Eckl. & Zeyh.) Benth. (*L. angolensis* group)

Lotononis subulata B-E. van Wyk, sp. nov., *L. bainesii* Bak. f., *L. listii* Polhill et *L. marlothii* Engl. valde affinis. A *L. bainesii* lobis calycis longis angustis (non late triangularibus), racemis sparsim paucifloris (non subumbellate multifloris) et fructu semper plicato (rare tantum

plicato in *L. bainesii*) differt. A *L. listii* lobis calycis longis angustis (late triangularibus in *L. listii*), inflorescentiis usque ad 4-floris (rare minus quam 6-floris in *L. listii*) et ramulis foliis calyce fructuque distincte pubescentibus (ramulis foliis calyce fructuque \pm glabris in *L. listii*) differt. A *L. marlothii* habitu floresque valde maiore, et fructu valde maiore plicato pubescente (fructu parvo recto glabrescenti in *L. marlothii*) differt.

TYPE.—Transvaal, 2627 (Potchefstroom): Parys, near bridge over Vaal River on Potchefstroom Road (—CD), 01.05.1989, B-E. van Wyk 2884 (PRE, holo.; JRAU, K, MO, S, iso.).

Prostrate herbaceous perennial, up to 1 m in diameter. Branches slender, prostrate, spreading from a woody caudex, often rooting at the nodes to form dense mats,

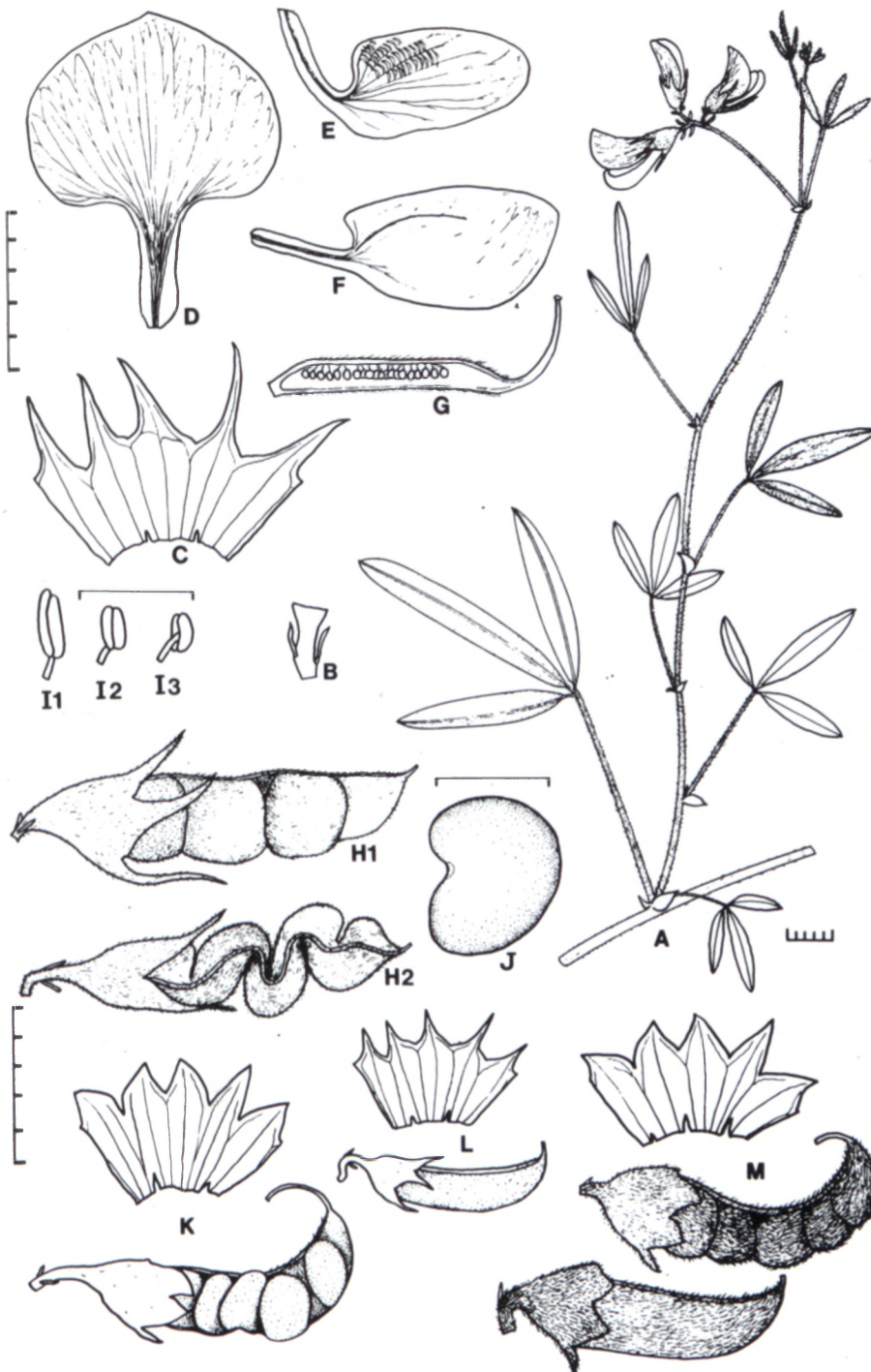


FIGURE 14.—*Lotononis subulata*.

A, flowering branch, showing the inflorescence structure, leaves and paired stipules; B, pedicel with bracteoles; C, calyx opened out, with the upper lobes to the left, vestiture not shown; D, standard petal; E, wing petal; F, keel petal; G, pistil. H1 & H2, fruit, showing the distinctive shape and vestiture: H1, lateral view; H2, top view. I1–I3, anthers: I1, basifixed anther; I2, carinal anther; I3, dorsifixed anther. J, seed in lateral view (slightly immature). K, L & M, calyces and fruit of related species (note differences in the shape of the calyx lobes and fruit): K, *Lotononis listii*; L, *Lotononis marlothii*; M, *Lotononis bainesii*. A–G, I1–I3 from Krynauw 61; H1, H2 & J from Louw 1691. Scales in mm.

thinly and minutely pubescent. *Leaves* digitately trifoliate, very variable in size and shape, adaxially glabrous, abaxially thinly and minutely pubescent, at length glabrescent, somewhat fleshy; petiole slender, (5–)7–24(–60) mm long; leaflets variable in size and shape, linear, narrowly elliptic to oblanceolate, the terminal one (4–)10–28(–36) × (1–)2–5(–7) mm, the lateral ones similar but smaller. *Stipules* up to 5 × 3 mm, dimorphic (the one large and foliaceous, the other similar or more often much smaller), ovate to narrowly lanceolate; base cordate; apex acute; minutely pubescent. *Inflorescences* leaf-opposed or subterminal on lateral branches, slender, 20–120 mm long, sparsely 1–4-flowered; bract linear to narrowly oblanceolate, 2–3 mm long; bracteoles linear, ± 1 mm long. *Flowers* 8–10 mm long, yellow. *Calyx* 4–6 mm long, with the upper and lateral lobe on either side fused higher up in pairs, minutely but distinctly pubescent; lobes very long and narrow, the free part up to 3 mm long. *Standard* orbicular, ± as long as the keel. *Wing petals* oblong, only slightly shorter than the keel. *Keel petals* elliptic; apex obtuse. *Anthers* dimorphic. *Pistil* 12–14 mm long; ovary oblong-linear, 8–10 mm long, pubescent; style short. *Pods* 10–15 × 2–4 mm, invariably folded like a concertina, ± 12-seeded, upper suture ± smooth, indehiscent, distinctly pubescent at maturity. *Seeds* small, ± 1 mm in diameter, testa nearly smooth (Figure 14).

L. subulata is closely related to *L. bainesii* Bak. f., *L. listii* Polhill and *L. marlothii* Engl. and may be confused with these species, particularly when mature fruit are not available. As shown in Figure 14, however, it can easily be distinguished from these species by the shape and size of the calyx alone. The long and narrow calyx lobes have suggested the specific epithet. The inflorescence structure and the shape and vestiture of the fruit are also useful diagnostic characters. *L. subulata* differs from *L. bainesii* in the shape of the calyx lobes (not broadly triangular), the sparsely few-flowered racemes (not subumbellately many-flowered) and in the consistently plicate fruit (only rarely plicate in *L. bainesii*). It can be distinguished from *L. listii* also by the shape of the calyx lobes, the fewer (up to 4) flowers per inflorescence (rarely less than 6-flowered in *L. listii*) and in the distinctly pubescent twigs, leaves, calyx and fruit (twigs, leaves, calyx and fruit ± glabrous in *L. listii*). From *L. marlothii* it differs in the much larger habit and flowers and in the much larger, plicate and pubescent fruit (fruit small, straight and glabrescent in *L. marlothii*).

Compared to its close relatives, *L. subulata* has a much more restricted distribution and has been recorded only from the banks of the Vaal River (south-western Transvaal, eastern Orange Free State and the northern Cape Province, Figure 12). The robust habit and obvious similarities with *L. bainesii* suggest that it may be worthwhile to investigate the agronomic potential of the new species. Despite the similarity between *L. subulata* and *L. listii* and the occurrence of both species at some localities, Wilman (1946: 52) recognized *L. subulata* as a distinct species.

TRANSVAAL. — 2627 (Potchefstroom): Potchefstroom District, Scandinavia Drift, bank of Vaal River (–CC), 06.03.1948, *Louw 1691* (PRE), 25.04.1979, *Krynauw 61* (PRE); Schoemansdrift road, near turn-off to Venterskroon (–CD), 20.02.1979, *Ubbink 865* (PRE); Parys (–CD), 04.1907, *Potts 553* (BLFU); Parys, near bridge over Vaal River on Potchefstroom Road (–CD), 01.05.1989, *B-E. van Wyk 2884* (PRE, holo.; JRAU, K, MO, S, iso.). 2724 (Taung): Internierungslager Andalusia (–DD), 28.12.1941, *Giess 103* (M), 05.1942, *Volk 228* (WIND).

CAPE. — 2824 (Kimberley): bank of Vaal River at Warrenton (–BB), 13.10.1936, *Acocks & Hafstrom 1279* (KMG, PRE); Schmidt's Drift, bank of Vaal River (–CA), 03.1935, *Wilman s.n. sub KMG 3294* (BOL, KMG); Riverton (–DA), 10.1917, *Wilman s.n. sub BOL 15660* (BOL).

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REFERENCES

- VAN WYK, B-E. 1988. Studies in the genus *Lotononis* (Crotalariaeae, Fabaceae). III. A new species of the *L. angolensis* group (section *Polylobium*) from the northern Cape Province. *South African Journal of Botany* 54: 628–630.
- VAN WYK, B-E. 1989. Studies in the genus *Lotononis* (Crotalariaeae, Fabaceae). 2. Three new species of the section *Telina* from the Cape Province. *Bothalia* 19: 1–5.
- WILMAN, A. 1946. *Preliminary checklist of the flowering plants and ferns of Griqualand West*: 52. Deighton Bell, Cambridge.

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