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Studies in the genus *Lotononis* (Crotalarieae, Fabaceae). VI. Two new species of the *L. digitata* group from the north-western Cape Province

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Two new species of *Lotononis* (DC.) Eckl. & Zeyh. are described: *L. magnifica* B-E. van Wyk and *L. plicata* B-E. van Wyk. The new species are closely related to *L. digitata* Harv. and *L. benthamiana* Dümmer [section *Krebsia* (Eckl. & Zeyh.) Benth.], but also to *L. quinata* (Thunb.) Benth. and *L. longiflora* H. Bol. [section *Leptis* (Eckl. & Zeyh.) Benth.]. Within the genus *Lotononis*, these species together form an isolated group that should be recognized as a distinct section. The shape of the pods is a particularly useful character to distinguish between the species of the group.

Twee nuwe spesies van *Lotononis* (DC.) Eckl. & Zeyh. word beskryf: *L. magnifica* B-E. van Wyk en *L. plicata* B-E. van Wyk. Die nuwe spesies is naverwant aan *L. digitata* Harv. en *L. benthamiana* Dümmer [seksie *Krebsia* (Eckl. & Zeyh.) Benth.], maar ook aan *L. quinata* (Thunb.) Benth. en *L. longiflora* H. Bol. [seksie *Leptis* (Eckl. & Zeyh.) Benth.]. Hierdie spesies vorm gesamentlik 'n geïsoleerde groep binne die genus *Lotononis* wat as 'n afsonderlike seksie erken behoort te word. Die vorm van die peule is 'n besonder handige kenmerk om tussen die spesies van die groep te onderskei.

Keywords: Cape Province, Fabaceae, *Lotononis*, taxonomy

Introduction

Lotononis digitata Harv. and related species form a distinct group of short-lived perennials that are easily recognized by the 5-digitate leaves, slender petioles, uniform flower structure and stipitate pods. Except for *L. digitata*, which has also been recorded from the south-eastern Cape, the group is confined to the north-western Cape Province.

Dümmer (1913) placed *L. digitata* and *L. benthamiana* Dümmer in the section *Krebsia* (Eckl. & Zeyh,) Benth., but retained *L. quinata* (Thunb.) Benth. in the section *Leptis* (Eckl. & Zeyh.) Benth. *L. digitata* and *L. quinata* are very similar and indeed difficult to identify when pods are not available. It is suggested that *L. digitata* and related species should be formally recognized as a distinct section (van Wyk, in prep.). The new section would include *L. digitata, L. benthamiana, L. quinata, L. longiflora* H. Bol. and the two new species described below.

Descriptions

1. Lotononis magnifica *B-E. van Wyk* sp. nov.

L. quinatae (Thunb.) Benth. valde affinis, sed habitu maiore lignosiore, foliolis maioribus densius sericeis (in *L. quinata* glabrescentibus), floribus valde maioribus atque leguminibus parum longioribus differt. Similes est etiam *L. molli* (E. Mey.) Benth. et *L. mirabili* Dinter (sectionis *Lepti*), sed in his speciebus folia trifoliolata, vexillum, alae carinague sunt dense pubescentes.

TYPUS.— Cape Province: 3018 (Kamiesberg), top of Kamiesberg, 3 km south of radio tower (–AC), 16/10/1986, *B-E. van Wyk 2421* (PRE, holotypus; K, NBG, MO, isotypi).

Prostrate shrublet up to 0.3 m wide. Branches thick and woody below, upper parts sparsely leafy, densely and divaricately branched. All mature parts (except the corolla and pods) densely sericeous. *Leaves* slender, (10–)15–20(–25) mm long, digitate, invariably 5-foliolate, densely sericeous; petiole slender, (5–)10–16 (–20) mm long; leaflets relatively large, oblanceolate, 5–8 mm long, 1–3 mm wide, abaxially densely silky-sericeous, adaxially glabrous. *Stipules* single at each node, small, lanceolate to ovate, up to 4 mm long. *Inflorescences* leaf-opposed, 1–4(–6)-flowered; peduncle short, 2–6 mm long; bracts small, linear, up to 4 mm long; bracteoles absent. *Flowers* relatively large, (10–)15–20 mm long, yellow; pedicel short, 2–4 mm long. *Calyx* narrowly campanulate, sericeous; lobes long, narrowly acuminate, the upper and lateral lobes on either side fused much higher up in pairs, the lower lobe similar to the upper ones. *Standard* obovate, as long as the keel; claw 3–5 mm long; lamina 8–14 mm long, glabrous or with a few minute hairs dorsally along the middle. *Wing petals* oblong, slightly shorter than the keel, distinctly auriculate, glabrous; apex obtuse; sculpturing in 4 rows of intercostal lunae, fading into transcostal lamellae towards the auricle. *Keel petals* broadly oblong, glabrous; apex obtuse. *Pods* shortly stipitate, (stipe ± 1 mm long), linear, 14–18 mm long, 3–4 mm wide, flat, upper suture minutely and inconspicuously verrucose, ± 10-seeded, the seeds on long funicles. *Seeds* suborbicular, testa minutely and densely tuberculate (Figure 1).

L. magnifica is closely related to *L. quinata* (Thunb.) Benth. but differs in the larger and more woody habit, the larger and densely sericeous leaflets (glabrescent in *L. quinata*), the much larger flowers and the slightly longer pods. It is also similar to *L. mollis* (E. Mey.) Benth. and *L. mirabilis* (section *Leptis*) and may be mistaken for it, but in these species the leaves are trifoliolate and the standard, wing petals and keel are densely

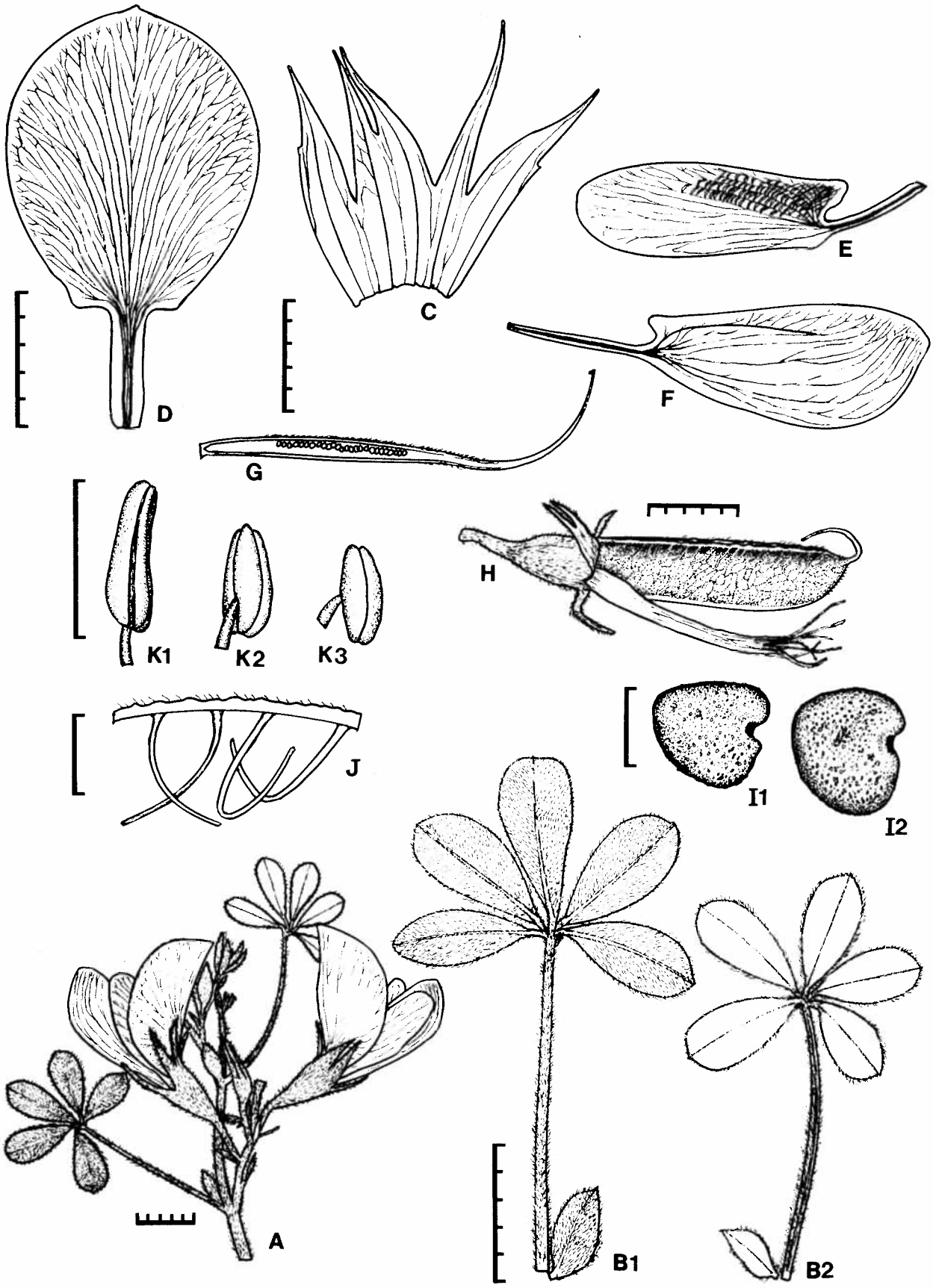

Figure 1 *Lotononis magnifica*. A, flowering twig, showing the short racemose inflorescence and the large flowers; B1 & B2, leaves and stipules: B1, abaxial view, B2, adaxial view; C, calyx opened out with the upper lobes to the left; D, standard petal; E, wing petal; F, keel petal; G, pistil, showing the short stipe; H, pod in lateral view; I1, I2, seeds, showing the tuberculate surface; J, part of pod after dehiscence as viewed from inside, showing the long funicles and slightly verrucose upper suture; K1, K2, K3, anthers: K1, long basifixed anther, K2, intermediate carinal anther, K3, short dorsifixed anther. All from *B-E. van Wyk 2421* except the pod and seeds from *B-E. van Wyk 2549*. Scales in mm.

pubescent. Both *L. mollis* and *L. magnifica* are known only from the Kamiesberg (Figure 4), where the new species was first collected in 1986. The specific epithet alludes to the striking appearance of the plant when in full flower (Figure 2).

Specimens examined

—**3018** (Kamiesberg): Kamieskroon to Kamiesberg road, *ca.* 1 km south from turn-off to Springbok (–AA), 16/10/1986, *B-E. van Wyk 2389* (JRAU); Top of Kamiesberg, 3 km south of radio tower (–AC), 16/10/1986, *B-E. van Wyk 2421* (PRE, holo.; K, NBG, MO, iso.), *2422* (BOL, JRAU, K, PRE), *2423* (STE), 20/01/1987, *B-E. van Wyk 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556* (JRAU).

2. L. plicata *B-E. van Wyk* sp. nov.

L. quinatae (Thunb.) Benth. et *L. digitatae* Harv. valde similis, sed leguminibus tortis plicatis differt. A *L. digitata* foliolis oblongis vel anguste oblanceolatis (in *L. digitata* anguste linearibus), floribus paulum minoribus atque vexillo pilosiori etiam differt. A *L. quinata* etiam habitu maiore diffusiore, foliis paulum maioribus atque pedunculis longioribus differt. Legumines similes sunt eis *L. listii* Polhill, sed bracteolae absunt et habitus, folia, stipulae fabricaque florum omnino differunt.

TYPUS.— Cape Province: 3118 (Vanrhynsdorp), near Bitterfontein, between Vanrhynsdorp and Bitterfontein (–AB), 27/09/1931, *Salter 1601* (K, holotypus; BOL, isotypus).

Prostrate shrublet up to 0.4 m wide. Branches somewhat woody below, upper parts diffuse and slender, sparsely leafy. Mature parts inconspicuously and minutely pubescent. *Leaves* (8–)10–20(–28) mm long, digitate, invariably 5-foliolate, minutely pubescent; petiole slender, (4–)6–12(–24) mm long; leaflets narrowly oblanceolate to narrowly oblong, (4–)6–8(–13) mm long, 0.5–2 mm wide, abaxially sparsely and minutely pubescent, adaxially glabrous. *Stipules* single at each node, small, lanceolate to ovate, up to 3 mm long. *Inflorescences* leaf-opposed, 1–3(–4)-flowered; peduncle (2–)5–8(–12) mm long; bracts small, linear, ± 1 mm long; bracteoles absent. *Flowers* 9–10 mm long, yellow; pedicel short, 1–2 mm long. *Calyx* narrowly campanulate, minutely pubescent; lobes long, narrowly acuminate, the upper and lateral lobes on either side fused much higher up in pairs, the lower lobe similar to the upper ones. *Standard* obovate, as long as the keel; claw 2.5–3 mm long; lamina 6–8 mm long, minutely pubescent on part of the dorsal surface. *Wing petals* oblong, slightly shorter than the keel, distinctly auriculate, glabrous; apex obtuse; sculpturing in 3–4 rows of intercostal lunae, fading into transcostal lamellae towards the auricle. *Keel petals* broadly oblong, glabrous; apex obtuse. *Pods* shortly stipitate, (stipe ± 1 mm long), folded like a concertina, 7–15 mm long, 2–3 mm wide, upper suture ± smooth, 5–8-seeded, the seeds on long funicles. *Immature seeds* suborbicular, testa minutely and sparsely tuberculate (Figure 3).

L. plicata is very closely related to *L. quinata* (Thunb.) Benth. and *L. digitata* Harv. but differs in the twisted and folded (plicate) pods. It also differs from *L. digitata* in the oblong to narrowly oblanceolate leaflets (narrowly linear in *L. digitata*), the slightly smaller flowers and the more hairy standard petal. It also differs from *L. quinata* in its larger and more diffuse habit, the slightly larger leaves and longer peduncles. The pods are similar to those of *L. listii* Polhill, but bracteoles are

Figure 2 *Lotononis magnifica* in full flower, showing the prostrate habit and large flowers. (Type locality, 16/10/1986, *van Wyk 2421*).

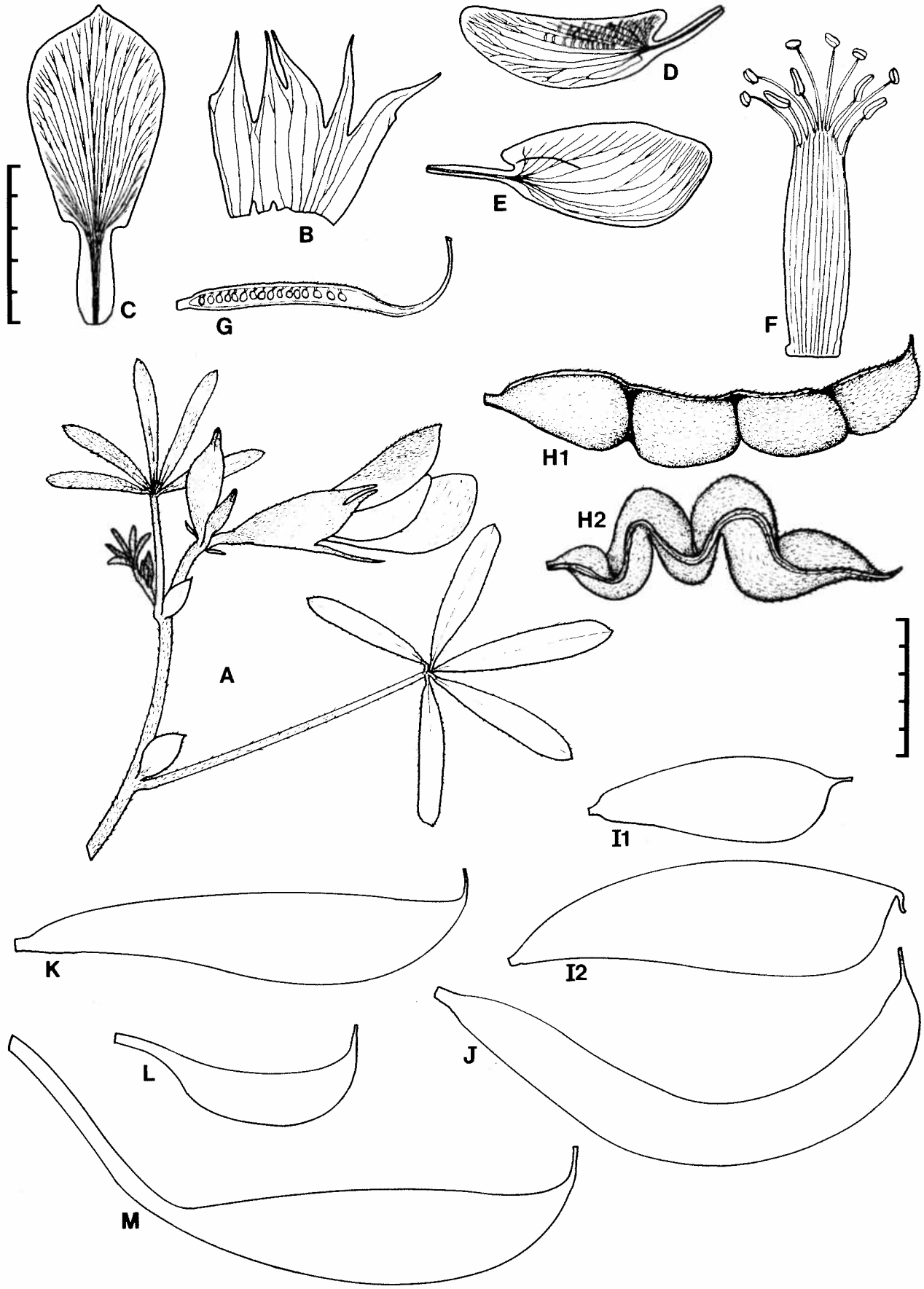

Figure 3 *Lotononis plicata*. A, flowering twig, showing the short racemose inflorescence, leaves and stipules (upper leaf in abaxial view, lower leaf in adaxial view); B, calyx opened out with the upper lobes to the left; C, standard petal; D, wing petal; E, keel petal; F, androecium; G, pistil, showing the short stipe; H1 & H2, mature pods: H1, lateral view, H2, top view. I to M, shape of the pod (lateral view) in *L. quinata* and related species: I1, I2, *L. quinata*; J, *L. digitata*; K, *L. magnifica*; L, *L. benthamiana*; M, *L. longiflora*. All except I to M from *Salter 1601*. Scales in mm.

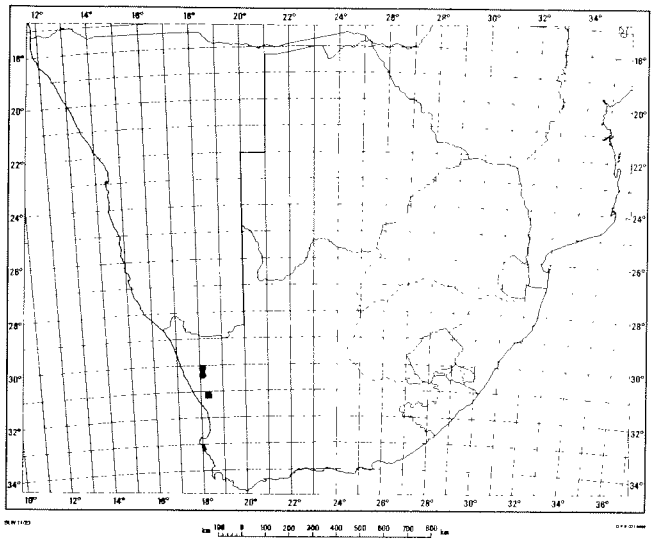

Figure 4 The known geographical distribution of *Lotononis magnifica* (●) and *L. plicata* (■).

absent and the habit, leaves, stipules and flower structure are totally different. *L. plicata* is known only from two collections and appears to be restricted to southern Namaqualand (Figure 4).

The mature pods provide the only reliable character to distinguish *L. plicata* from its close relatives. Figure 3 shows that the shape of the pod and the length of the stipe are indeed useful diagnostic characters in the group as a whole.

Specimens examined

—3118 (Vanrhynsdorp): Near Bitterfontein, between Vanrhynsdorp and Bitterfontein (–AB), 27/09/1931, *Salter 1601* (K, holo.; BOL, iso.); 8 miles [12.8 km] SE of Bitterfontein (–AB), 14/09/1948, *Acocks 14782* (K).

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Studies in the genus *Lotononis* (Crotalarieae, Fabaceae). VII. New taxa and new combinations in the section *Oxydium*

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The taxonomy and nomenclature of some species of the section *Oxydium* Benth. of *Lotononis* (DC.) Eckl. & Zeyh. have been revised. Diagnostic characters to distinguish between this section and the genus *Crotalaria* L. are briefly discussed. *Crotalaria stenophylla* Eckl. & Zeyh. and *C. sparsiflora* E. Mey. are transferred to the genus *Lotononis*. A new species (*L. carnea* B-E. van Wyk) and a new subspecies (*L. rostrata* Benth. subsp. *brachybotrys* B-E. van Wyk) are described. *L. namaquensis* H. Bol. is treated as a subspecies of *L. rostrata*. The known geographical distribution of the above-mentioned species is given.

Die taksonomie en nomenklatuur van enkele spesies van die seksie *Oxydium* Benth. van *Lotononis* (DC.) Eckl. & Zeyh. is hersien. Diagnostiese kenmerke om hierdie seksie van die genus *Crotalaria* L. te onderskei, word kortliks bespreek. *Crotalaria stenophylla* Eckl. & Zeyh. en *C. sparsiflora* E. Mey. word oorgeplaas na die genus *Lotononis*. 'n Nuwe spesie (*L. carnea* B-E. van Wyk) en 'n nuwe subspesie (*L. rostrata* Benth. subsp. *brachybotrys* B-E. van Wyk) word beskryf. *L. namaquensis* H. Bol. word beskou as 'n subspesie van *L. rostrata*. Die bekende geografiese verspreiding van bogenoemde spesies word aangegee.

Keywords: *Crotalaria*, Fabaceae, *Lotononis* section *Oxydium*, new combinations, new taxa

Introduction

The section *Oxydium* Benth. of *Lotononis* (DC.) Eckl. & Zeyh. includes species that are remarkably similar to species of the genus *Crotalaria* L. For this reason, Dümmer (1913) referred a large part of the section to *Crotalaria*. Some of the nomenclatural difficulties that have resulted from this treatment are resolved in this paper.

The distinction between *Lotononis* section *Oxydium* and *Crotalaria* have been discussed by Baker (1914), Verdoorn (1928) and Polhill (1968, 1976). Most of the previously used diagnostic characters have resulted in different opinions about the placement of some species. Too much weight has been given to the shape of the keel, the presence of lobes and callosities on the standard petal and the shape of the pods for example, characters which are now known to be variable within both groups. Polhill (1968, 1976, 1982) has shown that the size of the carinal anther is a useful character. *Crotalaria* has 5 long and 5 short anthers (carinal anther similar to the basifixed ones) while *Lotononis* has 4 long and 6 short anthers (carinal anther similar to the dorsifixed ones).

I consider the total absence of bracteoles in *Oxydium* to be the most reliable diagnostic character, but the number of stipules is also very useful. Stipules are single at each node in *Oxydium*, while they are paired (or absent) in *Crotalaria*. The only species of *Oxydium* with paired stipules are *L. delicata* (Bak. f.) Polhill and *L. pseudodelicata* (Torre) Polhill (both known only from Angola) and *L. pallens* Eckl. & Zeyh. (known only from the type collection made near Citrusdal in the south-western Cape). The standard petal provides another useful character. In *Oxydium*, the claw is usually very long and it is distinctly dilated (at least at the base) in all the species, while it is short and narrow in *Crotalaria*. A summary of similarities and differences between *Crotalaria* and *Lotononis* section *Oxydium* is given in Table 1.

The species treated in this paper are all rather poorly known, so that full descriptions are given also for the species that are here transferred from *Crotalaria*.

Descriptions and new combinations

1. Lotononis stenophylla *(Eckl. & Zeyh.) B-E. van Wyk* comb. nov.

Crotalaria stenophylla Ecklon & Zeyher, Enumeratio plantarum: 174 (1836); Benth.: 574 (1843), as a doubtful synonym of *C. humilis* Eckl. & Zeyh. Type: South Africa, Cape Province, Olifants River (Clanwilliam), *Ecklon & Zeyher 1261* (S!, specimen annotated by Harvey, lecto., designated here; S!, fragment, SAM!, isolecto.).

Crotalaria ecklonis Harv.: 42 (1862), as a new name for *C. stenophylla* Eckl. & Zeyh. non Vog.; Bak.f.: 395 (1914). Type as above.

Prostrate annual up to 0.7 m wide. Branches slender, sparsely leafy. All mature parts (except the corolla) sparsely and minutely strigillose. *Leaves* trifoliolate, (12–)20–35(–50) mm long; petiole ± as long as the terminal leaflet or slightly longer; leaflets relatively large, oblong to narrowly oblong, (5–)10–25(–32) mm long, (2–)3–5(–7) mm wide, minutely strigillose on both surfaces. *Stipules* single at each node, lanceolate to ovate, usually strongly falcate, 3–6 mm long, the midrib excentric. *Inflorescences* leaf-opposed, (1–)3–6(–8)-flowered; peduncle long and slender, (12–)24–65 (–135) mm long, usually thick and rigid in the fruiting stage; bracts small, oblanceolate to obovate, up to 2.5 mm long; bracteoles absent. *Flowers* relatively large, (10–)12–14(–16) mm long, yellow; pedicel short, 1–3 mm long. *Calyx* subequally lobed but with the lower lobe