

## Studies in the genus *Lotononis* (Crotalariaeae, 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 subspecies (*L. rostrata* Benth. subsp. *brachybotrys* B-E. van Wyk) word beskryf. *L. namaquensis* H. Bol. word beskou as 'n subspecies 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 southwestern 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  $\pm$  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

**Table 1** Summary of similarities and differences between *Lotononis* section *Oxydium* and *Crotalaria*

	<i>Lotononis</i> sect. <i>Oxydium</i>	<i>Crotalaria</i>
Bracteoles	absent	present
Anthers	4 long, 6 short	5 long, 5 short
Stipules	single at each node (paired in 3 spp.)	paired or absent, never single
Pod—upper suture	usually verrucose	smooth
—shape	usually inflated	usually inflated
Seed surface	tuberculate	smooth or rugose, rarely tuberculate
Standard petal		
—callosities	occasionally present	usually present
—claw	usually very long; dilated, at least at the base	short; not dilated
Keel	acute, often beaked but the beak never twisted	mostly beaked and the beak often twisted
Style	glabrous; not geniculate	hairy; mostly geniculate
Chromosome base number*	9	7, 8
Cyanogenesis**	mostly cyanogenic	acyanogenic
Alkaloids***	pyrrolizidine	pyrrolizidine

\*See van Wyk &amp; Schutte 1988

\*\*See van Wyk 1989

\*\*\*See van Wyk &amp; Verdoorn 1989

much narrower than the upper four, the sinuses of equal depth; lobes narrowly triangular, acute. *Standard* broadly ovate, as long as the keel; claw much dilated,  $\pm$  5 mm long, 2–3 mm wide; lamina 9–12 mm long, 7–12 mm wide, without lobes or callosities, glabrous but with a few minute hairs dorsally along the middle. *Wing petals* oblong,  $\pm$  as long as the keel, with a large and conspicuously lobed auricle, glabrous; apex obtuse; sculpturing in 4–5 rows of intercostal lunae, fading into transcostal lamellae towards the auricle. *Keel petals* broadly subtriangular, only slightly auriculate, glabrous; apex strongly beaked. *Androecium* conspicuously widened towards the base; anthers markedly dimorphic; basifixed anthers linear, several times longer than the small ovoid dorsifixed anthers; carinal anther similar to dorsifixed anthers. *Gynoecium* subsessile; pistil ovoid-oblong, pubescent; style long and slender. *Pods* subsessile, shortly oblong, 9–11 mm long, 4–5 mm wide, much inflated laterally, minutely strigillose, upper suture  $\pm$  smooth, 8–14-seeded, the seeds on 1.5–2 mm long funicles. *Seeds* suborbicular,  $\pm$  1.5 mm in diameter, testa densely tuberculate (Figure 1).

Unlike Baker (1914), who hesitantly retained *C. ecklonis* in *Crotalaria*, Verdoorn (1928) and Polhill (1968, 1982) correctly excluded this species and referred it to *Lotononis*, but the new combination still remained to be made. It is similar to *L. oxyptera* (E. Mey.) Benth. but is readily distinguished from this species by the strongly beaked keel, the relatively narrow leaflets and the ovate-oblong, markedly inflated pods (Figure 1). This rather poorly known but relatively common species is very closely related to *L. carnea* (q.v.) and is also

restricted to the north-western Cape Province (Figure 5).

#### Specimens examined

—**3017** (Hondeklipbaai): Grootvlei, W. of Kamieskroon (–BB), *Acocks 19589* (K, M, PRE), *Macguire 973* (NBG); Between Grootvlei and Kamieskroon (–BB), *Goldblatt 4251* (MO); Kamieskroon (–BB), *Salter 1495* (K).

—**3018** (Kamiesberg): Rietkloof (–DC), *Schlechter 11187* (GRA, K, PRE).

—**3118** (Vanrhynsdorp): Bitterfontein (–AB), *Schlechter 11046* (MO, PRE, S); N. of Vanrhynsdorp (–DA), *Leighton 1120* (BOL); Klaver (–DC), *Barker 3636* (NBG), *Lavis 20231* (BOL, K, NBG, PRE); Klaver turn-off on Vanrhynsdorp to Clanwilliam road (–DC), *B-E. van Wyk 2426, 2427, 2428* (JRAU).

—**3119** (Calvinia): Nieuwoudtville (–AC), *Leipoldt 729* (BOL, K, PRE); *Lokenburg (–CA), Acocks 17389* (PRE).

—**3218** (Clanwilliam): Between Citrusdal and Clanwilliam (–BB), *Barker 9624* (NBG); Nardouw Kloof (–BB), *Stokoe s.n. sub SAM 61434* (SAM); Olifants River (Clanwilliam) (–BB), *Ecklon & Zeyher 1261* (S, lecto.; S, SAM, isolecto.); Pakhuisberg (–BB), *MacOwan s.n. sub Herb. Aust. Afr. 1833* (GRA, K, SAM, UPS).

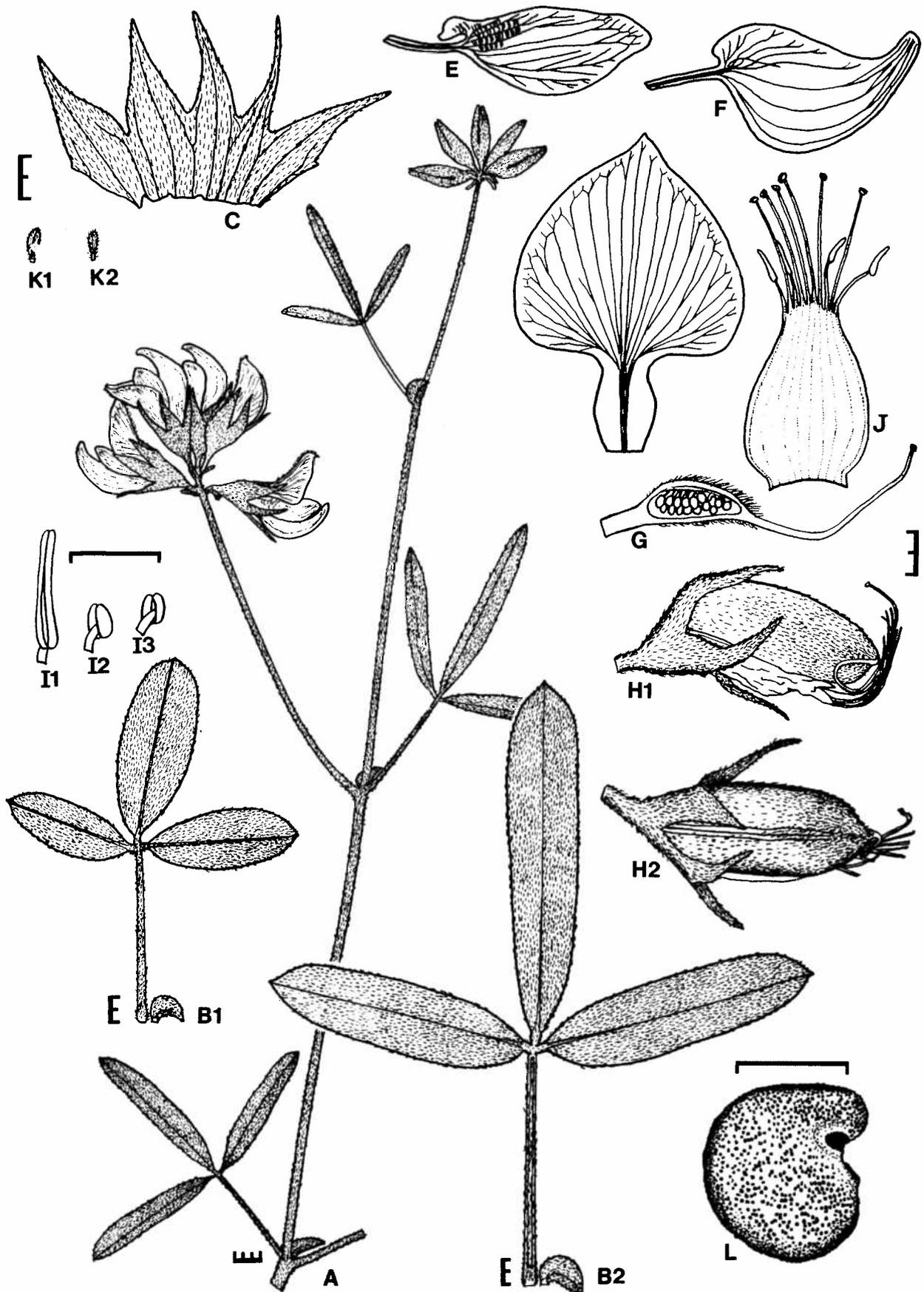
—**3219** (Wuppertal): Pakhuis Pass (–AA), *Sturton 6405* (PRE).

#### 2. *L. carnea* B-E. van Wyk sp. nov.

*L. stenophyllae* (Eckl. & Zeyh.) B-E. van Wyk valde affinis sed habitu minore, vestitura densiori sericeori, foliis latioribus obcordatis (in *L. stenophylla* ellipticis vel oblongis), pedunculis brevissimis atque lobis calycis latis imbricatis (in *L. stenophylla* angustis valvatis) differt.

TYPUS.— Cape Province, 3018 (Kamiesberg): Kamiesberg near Leliefontein, 16/10/1986, *B-E. van Wyk 2400* (PRE, holotypus; BOL, GRA, JRAU, K, MO, NBG, SAAB, STE, isotypi).

Prostrate annual, 0.2–0.6 m wide. Branches slender, sparsely leafy. All mature parts (except the corolla) minutely but densely strigillose. *Leaves* trifoliate, (5–)8–15(–30) mm long; petiole  $\pm$  as long as the terminal leaflet or sometimes longer; leaflets relatively small, obovate, (3–)5–10(–14) mm long, (2–)3–5(–6) mm wide, silky-strigillose on both surfaces; apex rounded or more often emarginate. *Stipules* single at each node, lanceolate to ovate, often slightly falcate, up to 5 mm long, the midrib slightly excentric. *Inflorescences* leaf-opposed, (1–)2–4(–5)-flowered; peduncle very short, (1–)2–4(–7) mm long; bracts small, oblanceolate to obovate, 1.5–2 mm long; bracteoles absent. *Flowers* relatively large, (8–)10–12(–14) mm long, yellow, turning orange with age; pedicel short, 1.5–3 mm long. *Calyx* subequally lobed but with the lower lobe much narrower than the upper four, the sinuses of equal depth; lobes narrowly triangular, widened above the point of fusion, somewhat imbricate, acute. *Standard* broadly ovate, as long as the keel; claw much dilated,  $\pm$  6 mm long, 2–3 mm wide; lamina 8–10 mm long, 7–9 mm wide, distinctly lobed at the base,



**Figure 1** *Lotononis stenophylla*. A, flowering twig, showing the slender peduncle and narrowly oblong leaflets; B1 & B2, leaves and stipules: B1, abaxial view, B2, adaxial view (note the strongly falcate stipules); C, calyx opened out with the upper lobes to the left; D, standard petal, showing the dilated claw; E, wing petal; F, keel petal; G, pistil; H1 & H2, pods: H1, in lateral view, H2, in top view; I1, I2 & I3, anthers: I1, long basifixed anther, I2, carinal anther, I3, dorsifixed anther; J, androecium; K1 & K2, bracts; L, seed, showing the tuberculate surface. All from *van Wyk 2426*. Scales in mm.

glabrous but with a few minute hairs dorsally along the middle. *Wing petals* oblong,  $\pm$  as long as the keel, with a large and conspicuously lobed auricle, glabrous; apex obtuse; sculpturing in 4–5 rows of intercostal lunae, fading into transcostal lamellae towards the auricle. *Keel petals* broadly subtriangular, only slightly auriculate, glabrous; apex strongly beaked. *Androecium* conspicuously widened towards the base; anthers markedly dimorphic; basifixed anthers linear, several times longer than the small ovoid dorsifixed anthers; carinal anther similar to dorsifixed anthers. *Gynoecium* sessile; pistil ovoid-oblong, pubescent; style long and slender. *Pods* and *seeds* unknown (Figure 2).

*L. carnea* is closely related to *L. stenophylla*, but differs in the smaller habit, the more dense and silky vestiture, the broader, obovate to obcordate leaflets, the very short peduncles and in the broad and imbricate calyx-lobes (narrow and valvate in *L. stenophylla*). Diagnostic characters of the new species are shown in Figure 2. The yellow flowers turn to an almost flesh-coloured orange with age, hence the specific epithet. *L. carnea* has been recorded from a few localities in the north-western Cape (Figure 5).

#### Specimens examined

—**3018** (Kamiesberg): Kamiesberg, near Leliefontein (–AA), *B-E. van Wyk 2400* (PRE, holo.; BOL, GRA, JRAU, K, MO, NBG, SAAS, STE, iso.); Kamiesberg, De Kom (now farm Karas), 3 miles [4,8 km] from Leliefontein (–AC), *Leipoldt 3157* (BOL).

—**3119** (Calvinia): Between Oorlogskloof and Papkuilsfontein (–CA), *Leipoldt 3126* (BOL); Papkuilsfontein SE of Nieuwoudtville (–CA), *Snijman 894* (MO, S).

**3. *L. rostrata* Benth** in Hooker's London Journal of Botany 2: 604 (1843), as a new name for *O. micrantha* Thunb. non *L. micrantha* Eckl. & Zeyh. Type: South Africa, 'e Cap. b. Spei', *Thunberg s.n. sub THUNB-UPS 16620* (UPS!, lecto., designated here).

*Ononis micranthus* Thunb.: 130 (1800); Thunb.: 587 (1823); DC.: 167 (1825), as *O. micrantha*. Type as above.

*Crotalaria micrantha* (Thunb.) E. Mey.: 27 (1836); Dümmer: 330 (1913). Type as above.

*Lotononis micrantha* (Thunb.) Harv.: 58 (1862) non *Lotononis micrantha* Eckl. & Zeyh.: 178 (1836). Type as above.

*Crotalaria tenuiflora* Steud.: 445 (1841), as a new name. Type as above.

*L. rostrata* is relatively well known by the illegitimate name *L. micrantha* (Thunb.) Harv. but is still filed under *Crotalaria* in some southern African herbaria. The species is here subdivided into 3 subspecies:

#### 3a. subsp. *rostrata*

Diffuse annual of up to 0.4 m high. Branches slender, sparsely leafy. All mature parts (except the corolla) sparsely and minutely strigillose. *Leaves* trifoliate, (10–)15–30(–45) mm long; petiole  $\pm$  as long as the

terminal leaflet or slightly longer; leaflets oblong to narrowly oblong, rarely oblanceolate to obovate, (5–)12–22(–30) mm long, (1–)2–5(–8) mm wide, minutely strigillose on both surfaces; apex obtuse to emarginate. *Stipules* single at each node, lanceolate to ovate, usually strongly falcate, variable in size, up to 12 mm long, the midrib excentric. *Inflorescences* leaf-opposed, densely umbellate, (3–)5–7(–9)-flowered; peduncle long and slender, (10–)25–50(–70) mm long; bracts very small, oblanceolate to linear, up to 1 mm long; bracteoles absent. *Flowers* very small, 6–8 mm long, yellow; pedicel short, 1–2 mm long. *Calyx* subequally lobed but with the lower lobe much narrower than the upper four, the sinuses of equal depth; lobes narrowly triangular, acute. *Standard* ovate-oblong, as long as the keel; claw much dilated, 2–3 mm long, 1–1.5 mm wide; lamina 3–4 mm long, 3–4 mm wide, without lobes or callosities, glabrous but with a few minute hairs dorsally along the middle. *Wing petals* oblong, slightly shorter than the keel, auriculate, glabrous; apex obtuse; sculpturing in 4–5 rows of intercostal lunae, fading into transcostal lamellae towards the auricle. *Keel petals* narrowly subtriangular, only slightly auriculate, glabrous; apex acute, beaked. *Androecium* conspicuously widened towards the base; anthers very strongly dimorphic; basifixed anthers linear, several times longer than the small, ovoid dorsifixed anthers; carinal anther similar to dorsifixed anthers. *Gynoecium* sessile; pistil ovoid-oblong, pubescent; style long and slender. *Pods* sessile, obovoid, scarcely longer than the calyx, 3–5 mm long, 2–3 mm wide, much inflated laterally, minutely strigillose, upper suture  $\pm$  smooth, 3–5-seeded, the seeds on  $\pm$  1.2 mm long funicles. *Seeds* suborbicular,  $\pm$  1.5 mm in diameter, testa densely tuberculate.

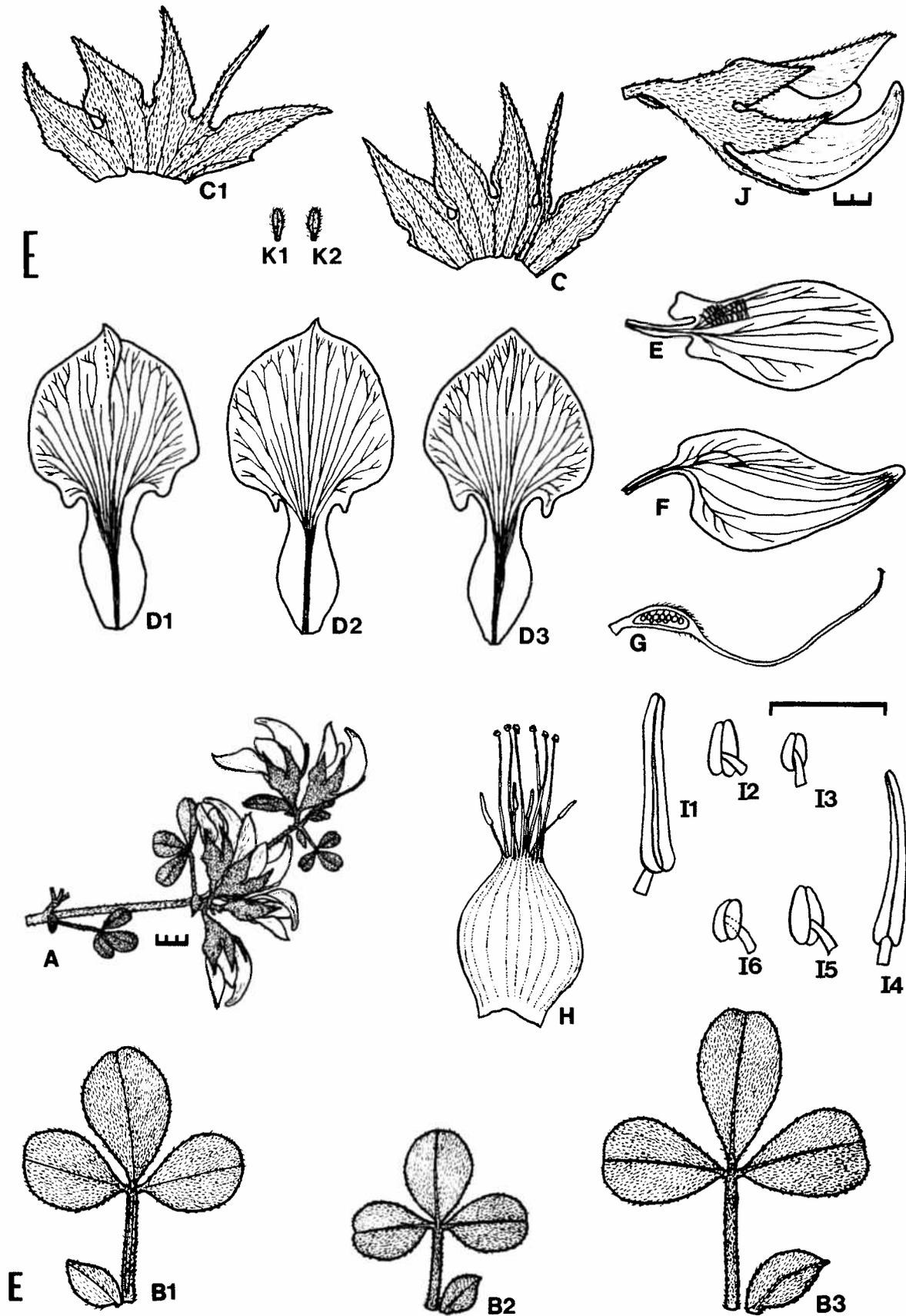
The typical subspecies is easily recognized by the small and narrow flowers, slender peduncles and obovoid, much inflated pods (Figure 3). It is widely distributed in the south-western parts of the Cape Province (Figure 6).

#### Specimens examined

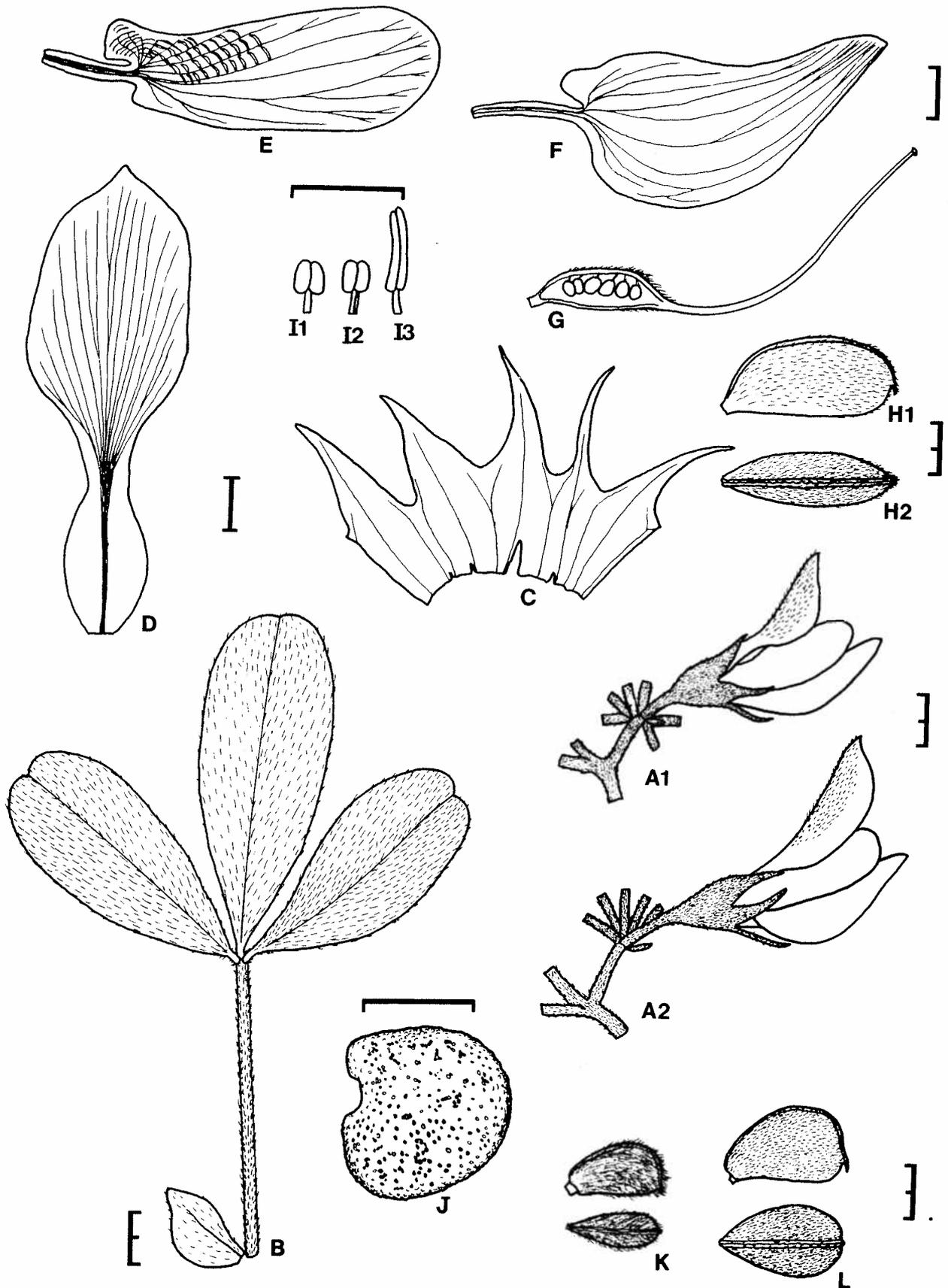
—**3218** (Clanwilliam): Olifants River Valley, Hex River (–BD), *Esterhuysen 12040* (BOL, K); Between Citrusdal and Clanwilliam (BD), *Barker 9623* (NBG); 21.4 km from Citrusdal on old road to Clanwilliam (BD), *B-E. van Wyk 2321, 2322, 2323, 2324* (JRAU); Piquetberg (–DD), *Bolus 7518* (BOL, PRE, SAM), *Bolus 11922* (PRE), *Guthrie 2581* (NBG); Near Pools Station (–DD), *van Breda 4361* (PRE).

—**3319** (Worcester): Gouda, Tulbagh Kloof (–AC), *Strey 367* (M); Rhoddesand (–AC), *Drège s.n.* (K, MO); Nieuwekloof (–CD), *Drège s.n.* (PRE, S); Between Rooihogte and Worcester (–CD), *L. Bolus s.n. sub BOL 37210* (BOL); 22 km from Worcester on Villiersdorp road (–CD), *Grobbelaar 2849* (PRE).

—**3420** (Bredasdorp): Swellendam district, Storms Vlei (–AA), *Fries, Norlindh & Weimarck 1514* (K, PRE, S). Without precise locality: *Thunberg s.n. sub THUNB-UPS 16620* (UPS, lecto.).



**Figure 2** *Lotononis carnea*. A, flowering twig, showing the very short peduncles and obovate leaflets; B1, B2 & B3, leaves and stipules: B1, adaxial view, B2 & B3, abaxial; C1 & C2, calyx opened out with the upper lobes to the left, showing the slightly imbricate lobes; D1, D2 & D3, standard petals, showing the dilated claw and auriculate lamina; E, wing petal; F, keel petal; G, pistil; H, androecium; I1 to I6, anthers: I1 & I4, long basifixed anthers, I2 & I5, carinal anthers, I3 & I6, dorsifixed anthers; J, flower in lateral view; K1 & K2, bracts. All from *van Wyk 2401* except B3, C2, D3, K4, K5 & K6 from *Snijman 894*; B1 from *van Wyk 2405*; B2 from *van Wyk 2404*. Scales in mm.



**Figure 3** *Lotononis rostrata* subsp. *brachybotrys*. A1 & A2, flowers in lateral view showing the inflorescence structure; B, leaf in adaxial view; C, calyx opened out with the upper lobes to the left; D, standard petal; E, wing petal; F, keel petal; G, pistil; H1 & H2, pods: H1, lateral view, H2, top view; I1, I2 & I3, anthers: I1, dorsifixed anther, I2, carinal anther, I3, basifixed anther; J, seed, showing the sparsely tuberculate surface. K & L, pods of the other subspecies of *L. rostrata* (note the differences in size and shape: K, pods of subsp. *namaquensis* in lateral and top view; L, pods of subsp. *rostrata* in lateral and top view). All from van Wyk 2429 except A1 from Compton 20860, K from Bolus 6569, L from Bolus s.n. Scales in mm.

**3b. subsp. brachybotrys** *B-E. van Wyk* subsp. nov.

Typo similis sed habitu prostratori, foliolis maioribus obovatis, pedunculis brevioribus, floribus maioribus, vexillo valde maius pubescenti, leguminibus maioribus oblongis compressis (parvis obovoideis valde inflatis in typo) differt. A subsp. *namaquensis* (H. Bol.) B-E. van Wyk foliis maioribus sparsius pubescentibus leguminibusque valde maioribus differt.

TYPUS.— Cape Province, 3118 (Vanhynsdorp): 800 m from Klawer turn-off on Vanhynsdorp to Clanwilliam road, 17/10/1986, *B-E. van Wyk* 2429 (PRE, holotypus; K, MO, NBG, isotypi).

Prostrate annual of up to 0.8 m wide. All mature parts (except the corolla) sparsely and minutely strigillose. *Leaves* trifoliolate, (10–)15–35(–52) mm long; petiole ± as long as the terminal leaflet or longer; leaflets relatively large, obovate to oblong, (6–)10–18(–27) mm long, (2–)4–7(–10) mm wide, minutely strigillose on both surfaces; apex rounded to emarginate. *Stipules* single at each node, lanceolate to ovate, usually strongly falcate, variable in size, up to 8 mm long, the midrib excentric. *Inflorescences* leaf-opposed, densely umbellate, (3–)6–8(–15)-flowered; peduncle very short, (1–)3–5(–24) mm long; bracts very small, oblanceolate to linear, up to 1 mm long; bracteoles absent. *Flowers* small, 6–9 mm long, yellow. *Calyx, corolla, androecium* and *gynoecium* as in the type, but the petals larger and the standard petal dorsally pubescent. *Pods* subsessile, shortly oblong, more than twice as long as the calyx, 5–8 mm long, 2.5–4 mm wide, only slightly inflated laterally, upper suture ± smooth, 3–5-seeded, the seeds on ± 1.8 mm long funicles. *Seeds* suborbicular, ± 1.8 mm in diameter, testa unevenly tuberculate (Figure 3).

This subspecies is similar to the type but differs in the more prostrate habit, the larger and obovate leaves, the shorter peduncles, the larger flowers, the much more pubescent standard petal and the larger, oblong (not obovoid), less turgid pods (Figure 3). It is also similar to subsp. *namaquensis* (H. Bol.) B-E. van Wyk, but differs from the latter in the larger and more sparsely pubescent leaves, and in the much larger pods.

The new subspecies has a somewhat more northerly distribution than subsp. *rostrata* (Figure 6).

**Specimens examined**

—**3118** (Vanhynsdorp): 7 miles [11.2 km] N. of Vanhynsdorp (–DA), *Acocks* 19497 (K, M); N. of Vanhynsdorp (–DA?), *Leighton* 1118 (BOL); Vanhynsdorp (–DA), *Compton* 20860 (NBG); Between Driefontein and Heerelogram (–DC), *Pearson* 6735 (BOL, K); Clanwilliam District, Wind Hoek (–DC), *Schlechter* 8346 (BOL); 800 m from Klawer turn-off on Vanhynsdorp to Clanwilliam road (–DC), *B-E. van Wyk* 2429 (PRE, holo.; K, MO, NBG, iso.).

—**3218** (Clanwilliam): Near Clanwilliam (–BB), *Bolus* 8970 (BOL, K), *Galpin* 11215 (PRE), *Leipoldt* 268 (GRA, SAM); Piquetberg (–DD), *Schlechter* 3368 (PRE); Foot of Piquetberg mountain (–DD?), *Schlechter* 5188 (BOL, GRA, NH).

**3c. subsp. namaquensis** (H. Bol.) *B-E. van Wyk* stat. nov.

*L. namaquensis* H. Bolus in J. Linn. Soc. 25: 159 (1889). Type: South Africa, Cape Province, Little Namaqualand, near Klipfontein, *H. Bolus* 6569 (BOL!, lecto., designated here; K!, isolecto.).

*Crotalaria namaquensis* (H. Bol.) Dümmer: 330 (1913). Type as above.

*Lotononis chrysophylla* Schltr. in sched. (*Schlechter* 11185, BM!).

Prostrate annual, 0.3–0.5 m wide. All mature parts (except the corolla) minutely but conspicuously silky-strigillose. *Leaves* small, trifoliolate, (6–)10–15(–24) mm long; petiole as long as the terminal leaflet or longer; leaflets usually very small, obovate to broadly obovate, (3–)5–9(–11) mm long, (1–)2–4(–6) mm wide, silky-strigillose on both surfaces; apex invariably emarginate. *Stipules* single at each node, lanceolate to broadly ovate, usually strongly falcate, up to 4 mm long, the midrib excentric. *Inflorescences* leaf-opposed, umbellate, (1–)2–8(–12)-flowered; peduncle very short, 1–3(–7) mm long; bracts inconspicuous, < 1 mm long; bracteoles absent. *Flowers* small, variable in size, 5–10 mm long, yellow or white, fading to pink. *Calyx, corolla, androecium* and *gynoecium* as in the type, but the petals usually larger and the standard petal dorsally pubescent. *Pods* subsessile, shortly oblong to obovoid, scarcely longer than the calyx, up to 4 mm long and 2 mm wide, only slightly inflated laterally, upper suture smooth or inconspicuously verrucose, 3–4-seeded. *Mature seeds* not seen.

Subsp. *namaquensis* differs from subsp. *rostrata* in the smaller and more densely pubescent leaves, the short peduncles and the smaller, less turgid pods (Figure 3). This subspecies may be mistaken for *L. arenicola* Schltr. but the latter has subsessile, invariably single-flowered inflorescences and a much more densely silky vestiture. The wing and keel petals are hairy in *L. arenicola*, totally glabrous in subsp. *namaquensis*.

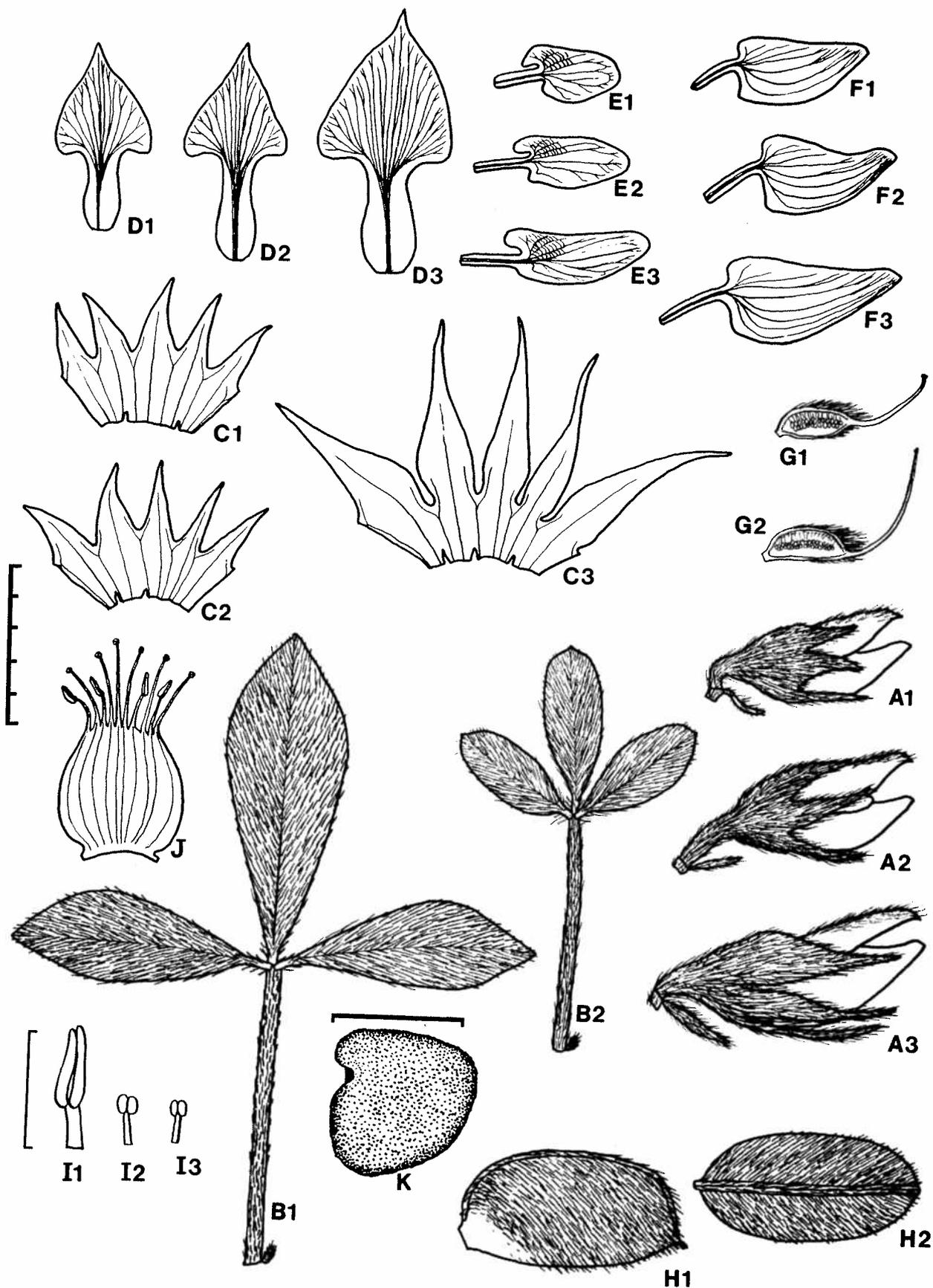
This subspecies appears to be geographically isolated from the other two subspecies and is known only from northern Namaqualand (Figure 6).

**Specimens examined**

—**2917** (Springbok): 1 mile [1.6 km] SE of Steinkopf (–BD), *Merxmüller & Giess* 3723 (M); Near O'okiep (–DB), *L. Bolus s.n. sub BOL* 37211, 37212 (BOL); O'okiep Copper Co., 'golflinks' at Nababeep (–DB), *Rösch & Le Roux* 97 (STE); Springbok, Hester Malan Wild Flower Reserve (–DB), *Rösch & Le Roux* 1351 (PRE); Vogelklip (–DB), *Schlechter* 11306 (GRA, PRE).

—**3017** (Hondeklipbaai): Dessiesfontein near Kamieskroon (–BB), *van Breda* 4206 (PRE); Grootvlei, W. of Kamieskroon (–BB), *Acocks* 19588 (K, M, PRE); Near Klipfontein (–BD?), *Bolus* 6569 (BOL, lecto., K, isolecto.).

—**3018** (Kamiesberg): Bovlei, c. 6 miles [9.6 km] NE of Kamieskroon (–AA), *van der Westhuizen* 310 (PRE); Leliefontein (–AC), *Esterhuysen* 23651 (BOL).



**Figure 4** *Lotononis sparsiflora*. A1, A2 & A3, flowers in lateral view, showing the very short peduncles; B1 & B2, leaves in adaxial view, showing the small (caducous) stipules; C1, C2 & C3, calyces opened out with the upper lobes to the left; D1, D2 & D3, standard petals, showing the dilated claws; E1, E2 & E3, wing petals; F1, F2 & F3, keel petals; G1 & G2, pistils; H1 & H2, pods: H1, in lateral view, H2, in top view; I1, I2 & I3, anthers: I1, long basifixed anther, I2, carinal anther, I3, dorsifixed anther; J, androecium; K, seed, showing the tuberculate surface. A1, B2, C1, D1, E1, F1 & G1 from *Geiss 14497*; A2, C2, D2, E2, F2, I1, I2, I3 & J from *Geiss & Müller 12308*; A3, B1, C3, D3, E3, F3, G2, H1, H2 & K from *van Wyk 2056*. Scales in mm.

**4. *L. sparsiflora* (E. Mey.) B-E. van Wyk comb. nov.**

*Crotalaria sparsiflora* E. Meyer, Commentariorum plantarum: 27 (1836); Benth. 573 (1843); Harv.: 41 (1862); Bak.f.: 400 (1914), non *Polylobium sparsiflorum* Eckl. & Zeyh. Type: South Africa, Cape Province, at the Garip near Verleptpram [2817 AA Vioolsdrif], *Drège s.n.* (K!, lecto., designated here; MO!, S!, isolecto.).

*Lotononis lenticula* (E. Mey.) Benth. var. *brachycarpa* Harv.: 62 (1862). Type: South Africa, Cape Province, Springbokkeel [3019 CA Loeriesfontein], *Zeyher 411* (K!, Herb. Benth. specimen, lecto., designated here; K!, Herb. Hook. partly, specimen on right, SAM!, minor part, isolecto.).

*L. oocarpa* Dinter in sched. (*Dinter 4851*, BOL!, K!, PRE!).

*L. oocarpa* Dinter ex Wilman: 52 (1946); Schreiber: 84 (1970), nom. nud.

Prostrate annual, up to 0.4 m wide. Branches rigid, divaricately much-branched, very brittle, sparsely leafy. All mature parts (except the corolla) densely silky-strigillose. *Leaves* trifoliolate, variable in size and shape, (5-)8-18(-25) mm long; petiole usually much longer than the terminal leaflet; leaflets small, elliptic, oblanceolate or obovate, (3-)5-12(-15) mm long, (1-)2-4 (-8) mm wide, strigillose on both surfaces. *Stipules* single at each node, lanceolate to ovate, strongly caducous, inconspicuous, up to 1 mm long. *Inflorescences* leaf-opposed, single-flowered, rarely with some 2-flowered; peduncle ± absent; bracts small, lanceolate to linear, up to 3 mm long; bracteoles absent. *Flowers* small, variable in size, often cleistogamous, (4-)5-8(-9) mm long, yellow and white; pedicel short, ± 1 mm long. *Calyx* subequally lobed but with the lower lobe sometimes slightly narrower than the upper four, the sinuses of equal depth; lobes narrowly triangular, rarely somewhat lobed, acute. *Standard* broadly ovate, as long as the keel; claw much dilated, 2-4 mm long, 1.2-2 mm wide; lamina 4-6 mm long, 3-5 mm wide, without lobes or callosities, pubescent dorsally along the

midrib; apex acuminate. *Wing petals* oblong, shorter than the keel, conspicuously auriculate, glabrous; apex obtuse; sculpturing in 3-4 rows of intercostal lunae, fading into a few transcostal lamellae towards the auricle. *Keel petals* broadly subtriangular, only slightly auriculate, glabrous; base more or less truncate; apex acute, beaked. *Androecium* exceptionally broad, conspicuously widened towards the base; anthers very strongly dimorphic; basifixed anthers linear, several times longer than the small, ovoid dorsifixed anthers; carnal anther similar to dorsifixed anthers. *Gynoecium* subsessile; pistil ovoid-oblong, pubescent; style long and slender. *Pods* subsessile, shortly oblong, 5-8 mm long, 2.5-3.5 mm wide, much inflated laterally, densely covered with long thick hairs, the hairs conspicuously parallel in orientation; upper suture ± smooth, 20-25-seeded, the seeds on very long funicles; funicles 2-3 mm long. *Seeds* suborbicular, ± 1.2 mm in diameter, testa minutely but densely tuberculate (Figure 4).

A distinct species easily recognized by the neatly orientated strigillose hairs on the pods, a character which it shares only with *L. rabenaviana* Dinter & Harms. The latter differs in the much larger flowers and pods and in the lobed, imbricate calyx-lobes but may eventually prove to be only subspecifically distinct. *L. sparsiflora* is widely distributed in southern Namibia and the dry interior of the Cape Province (Figure 5).

**Specimens examined**

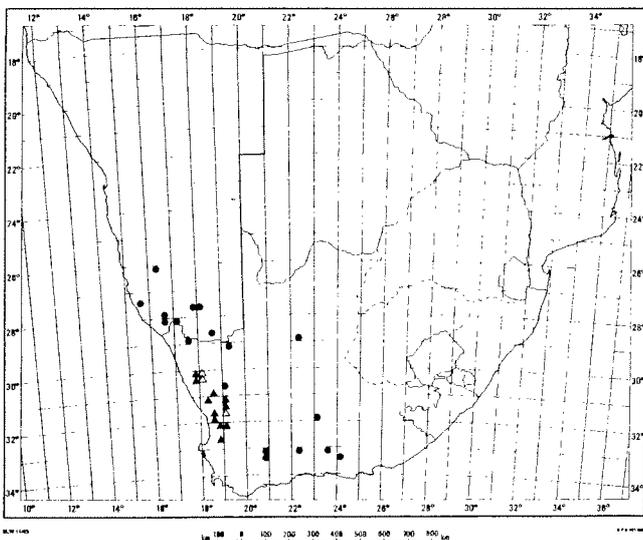
—2616 (Aus): Lüderitz district, Farm Weissenborn (-AB), *Kinges 2432* (PRE).

—2715 (Bogenfels): Central Klinghardt Mts, on top of mountain (-BC), *Müller 711* (PRE, WIND).

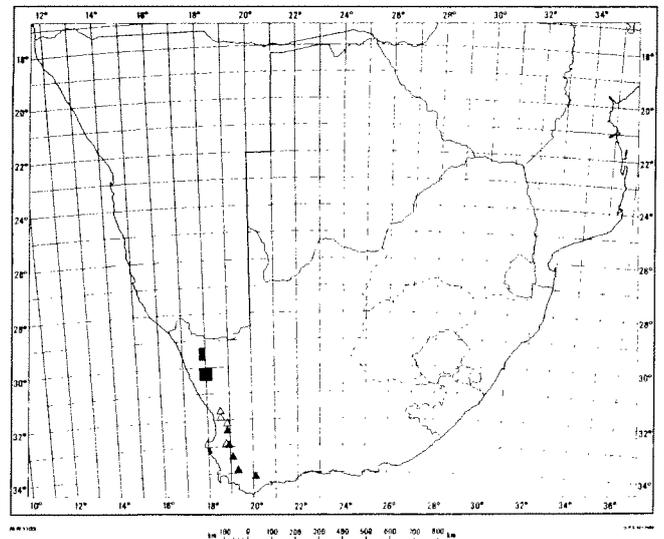
—2716 (Witputz): 8 km N. of Rosh Pinah (-DC), *Mërxmüller & Giess 28514* (M).

—2717 (Chamaite): Farm Hologberg (-DB), *Giess & Müller 12308* (M, PRE, WIND).

—2718 (Grünau): Klein Karas (-CA), *Dinter 4851* (BOL, K,



**Figure 5** The known geographical distribution of *Lotononis stenophylla* (▲), *L. carneae* (△) and *L. sparsiflora* (●).



**Figure 6** The known geographical distribution of the three subspecies of *Lotononis rostrata*: subsp. *rostrata* (▲), subsp. *brachybotrys* (△) and subsp. *namaquensis* (■).

KMG, NH, SAM).

- 2816** (Oranjemund): Obibberge (–BA), *Merxmüller & Giess 28605* (M).  
 —**2817** (Vioolsdrif): At the Garip [Gariap, Orange River] near Verleptpram (–AA), *Drège s.n.* (K, lecto.; MO, S, isolecto.); 9 miles [14.4 km] south of Vioolsdrif (–DC), *Merxmüller & Giess 3689* (M).  
 —**2818** (Warmbad): Farm Aluriesfontein (–DA), *Giess 14497* (M, WIND).  
**2822** (Glen Lyon): Hay 0.303 [see Acocks map in Wilman 1946] (–CD), *Acocks 505* (KMG).  
 —**2919** (Pofadder): Pofadder (–AB), *Conradie 9* (STE).  
 —**3019** (Loeriesfontein): Springbokkeel (–CA), *Zeyher 411* (K, SAM).  
 —**3123** (Victoria West): 66 km N. of Beaufort West, near Drie Susters (–CC), *B-E. van Wyk 2139, 2140* (JRAU).  
 —**3320** (Montagu): Laingsburg (–BB), *Bond 834* (NBG); 16.6 km SSE of Laingsburg (–BD), *B-E. van Wyk 2139, 2140* (JRAU).  
 —**3322** (Oudtshoorn): Near Boterkraal in the district of Prince Albert (–AB), *Bolus s.n. sub BOL 12448* (BOL).  
 —**3323** (Willowmore): Little Karroo, 19 miles [30.4 km] N. of Willowmore (–BA), *Acocks 18403* (PRE).  
 —**3324** (Steytlerville): Hills at Gerts Kraal near Uitenhage Karroo (–AC), *Prior s.n.* (K).

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Thanks are due to Dr H.F. Glen (Botanical Research Institute, Pretoria) for the Latin translations and the Directors and staff of the cited herbaria for the loan of specimens. The taxonomic study of *Lotononis* is a registered Ph.D. project at the University of Cape Town.

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