

# The *Indigofera filifolia* complex (Fabaceae) in southern Africa

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**Keywords:** Fabaceae, *Indigofera filifolia* complex, new species, southern Africa, taxonomy

## ABSTRACT

The *Indigofera filifolia* Thunb. complex, previously known as a widespread polymorphic species, is segregated into three species. *I. filifolia* is retained as a variable species and two allied species, *I. gifbergensis* C. H. Stirton & J. K. Jarvie and *I. ionii* J. K. Jarvie & C. H. Stirton are described as new.

## UITTREKSEL

Die *Indigofera filifolia* Thunb.-kompleks, voorheen bekend as 'n wydverspreide polimorfiese spesie, word in drie spesies verdeel. *I. filifolia* word as 'n veelvormige spesie behou en twee verwante spesies, *I. gifbergensis* C. H. Stirton & J. K. Jarvie en *I. ionii* J. K. Jarvie & C. H. Stirton word as nuut beskryf.

## INTRODUCTION

The pantropical genus *Indigofera* comprises some 800 species. It forms a large and distinctive part of the tribe Indigofereae which also contains two closely related genera *Cyamopsis* and *Rhynchotropis* along with an anomalous Madagascan genus *Phylloxyon* (Polhill 1981).

*Indigofera* was once the main source of indigo dye but its importance dwindled as cheaper synthetic analogues were developed to replace the plant source of the dye. There is, however, a renewed interest in the genus and it has begun to be of some value as a source of forage legume (De Kort & Thijsse 1984).

The last major revision of *Indigofera* in Africa was by Gillett (1958), who recognized 278 species. He divided the African representatives into 5 subgenera, 5 sections and 19 subsections. As this revision was a precursor to a revision of the genus for the *Flora of Tropical East Africa* he treated only 70 species in any detail. The work is essentially regional and ignores to a considerable extent areas such as southern Africa.

Our overall knowledge of southern African species of *Indigofera* is still dependent on the 1862 revision by William Harvey. This account was subsequently added

to and modified by the following workers: Baker (1905), Brown (1925, 1926), Dinter (1932), Fourcade (1932), Bremekamp (1932), Guthrie, Pillans & Salter (1939), Dyer (1944), Suessenguth & Merxmüller (1951), Merxmüller & Schreiber (1957), Schreiber (1970) and Stirton (1982).

The present investigation focuses on the widespread polymorphic species *I. filifolia* in South Africa. Gillett (1958) placed *I. filifolia* Thunb. as the sole member of his section *Juncifolieae*. His diagnosis is limited to the presence of petioles many times longer than the small terminal leaflet, persistent when the latter falls off; fruiting pedicels erect and spreading; and endocarp spotted with seeds  $\pm$  separated.

We are indebted to Mr Ion Williams for drawing our attention to a small aphyllous plant which did not appear to fit the description of *I. filifolia*. He felt certain that it represented a new species. We confirm this and name it *I. ionii* in his honour. As part of our study we also looked at all the available South African aphyllous specimens of *Indigofera* that seemed pertinent to the *I. filifolia* group. We conclude that what had been known as *I. filifolia* Thunb. in herbaria should be separated into three species: *I. filifolia* Thunb., *I. ionii* J. K. Jarvie & C. H. Stirton, and *I. gifbergensis* C. H. Stirton & J. K. Jarvie.

## KEY TO SPECIES

- 1a Leaflets 3-5, terminal leaflet present, narrowly obovate to obovate, base obtuse; petiole 14-25 mm long; stipules narrowly triangular; flowers 5-6(7) mm long:
- 2a Dense, erect shrub up to 1m tall; leaflets recurved mucronate, obovate, biramous hairs present on lower surface but restricted to the margin; inflorescence 15-30-flowered; flowers brick-red; calyx-teeth finger-like, sinus between vexillar teeth narrow; standard broadly elliptic; peg on outer surface of keel blade pointing downwards; scales absent from base of anthers; upper parts of filaments uniformly thickened; seeds dark chestnut or khaki and covered in black blotches and stripes, elliptic..... 1. *gifbergensis*
- 2b Small lax wiry herb, sparsely branched; leaflets with straight mucro, narrowly obovate, biramous hairs sparsely but evenly distributed over lower surface; inflorescence 6-10-flowered; flowers pink; calyx teeth triangular, sinus between vexillar teeth broad; standard very broadly ovate; peg on outer surface of keel blade pointing upwards; scales present at base of anthers; upper parts of filaments alternately thick and thin; seeds olive-green, oblong..... 2. *ionii*
- 1b Leaflets 6-8, upper leaflets absent or reduced to scales, elliptic, base cuneate; petiole 40-60 mm long; stipules filiform; flowers (7,5) 8,0-10,5 mm long..... 3. *filifolia*

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## QUICK-KEY CHARACTERS

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|--|--|
| 1. Flowers brick-red .....   | <i>I. gifbergensis</i>                       |
| Flowers pink .....   | <i>I. ionii</i> , <i>I. filifolia</i>        |
| 2. Leaflets with straight mucro .....                                | <i>I. ionii</i> , <i>I. filifolia</i>        |
| Leaflets recurved-mucronate .....                                    | <i>I. gifbergensis</i>                       |
| 3. Anthers tufted; short filaments thicker than long filaments ..... | <i>I. ionii</i> , <i>I. filifolia</i>        |
| Anthers without tufts, filaments uniformly thin ...                  | <i>I. gifbergensis</i>                       |
| 4. Peg on outer surface of keel blade pointing downwards ...         | <i>I. ionii</i>                              |
| Peg on outer surface of keel blades pointing upwards .....           | <i>I. gifbergensis</i> , <i>I. filifolia</i> |
| 5. Fruits compressed .....   | <i>I. ionii</i>                              |
| Fruits terete .....  | <i>I. gifbergensis</i> , <i>I. filifolia</i> |
| 6. Seeds dark chestnut or khaki, blotched .....                      | <i>I. gifbergensis</i>                       |
| Seeds olive-green .....  | <i>I. ionii</i>                              |
| Seeds chocolate-brown .....  | <i>I. filifolia</i>                          |

1. *Indigofera gifbergensis* C. H. Stirton & J. K. Jarvie, sp. nov. subsectioni *Juncifoliae* Gillettii proxima.

Frutex erectus lignosus ad 1 m altus, valde ramosus, caulibus veterioribus glabris, junioribus appresso-strigulosus glabrescentibus. *Stipulae* conferruminatae, basi petioli adnatae, ad 4 mm longae, anguste triangulares. *Folia* regularia, imparipinnata. *Foliola* obovata, 6–8 × 3,0–3,5 mm, basi obtusa, recurvato-mucronata. *Inflorescentiae* axillares, racemosae, laxae, 15–30-florae, sanguineae. *Flores* 5–6(7) mm longi, unoquoque bractea caduca anguste triangulari 2,0–2,3 mm longa subtenti. *Tubus calycis* 1,5 mm longus; lobi calycis omnes aequales triangulares. *Vexillum* late ellipticum, 5–6 × 4,0–4,5 mm. *Petala alarum* 5,5–6,0 × 2,0–2,5 mm. *Laminae carinae* 6 × 2–3 mm, manifeste saccatae. *Antherae* late apiculatae, ad 0,7–0,8 longae, squamis basilibus absentibus. *Pistillum* 5 mm longum, subtiliter fimbriatum. *Fructus* 25–30 × 2,5–3,0 mm, dehiscens; septa doliiformia, semina secedenta. *Semina* 2,5–2,7 × 1,7–1,8 mm, badia, maculis lineisque purpurascensibus.

TYPE.—Cape, Pilaarsberg, north of Pakhuis Pass, 9.1967, *Kerfoot* 5922 (NBG, holo.!).

Erect shrub up to 1 m tall, dense; woody below, half-herbaceous above; branches set close, stiff; appressed strigulose when young but glabrous when mature. *Sti-*

*pules* fused, adnate to base of petiole, up to 4 mm long, acute, glabrous. *Leaves* scarce, imparipinnate. *Leaflets* obovate, 3–5, 6–8 × 3,0–3,5 mm, base obtuse, apex recurved mucronate, glabrous above, covered in few flattened hairs around margin below. *Petiole* 14–15 mm long; petiolules 0,5 mm long. *Inflorescences* axillary, racemose, lax, 15–30-flowered; peduncle 60–140 mm long. *Flowers* 5–6 (7) mm long, red, each subtended by a 2,0–2,3 mm long, narrowly triangular, rapidly caducous bract; pedicel < 1 mm long. *Calyx* 2–3 mm long; tube 1,5 mm long; teeth equal, 1,5 mm long, triangular, sparsely fringed with flattened biramous hairs. *Standard* broadly elliptic, 5–6 × 4,0–4,5 mm; claw short; auricles absent; apex rounded; appendages absent. *Wing petals* 5,5–6,0 × 2,0–2,5 mm, upper part flattened near the margin, raised above but equal in length to the keel blades, few scattered hairs present. *Keel blades* 6 mm long, 2–3 mm wide at maximum, fringed along upper margin. *Androecium* 5 mm long; vexillar stamen free; anthers uniform, 0,7–0,8 mm long, broadly apiculate, anthers on long filaments basifixed, anthers on short filaments dorsifixed; scales absent. *Pistil* 5,0–5,5 mm long, glabrous, narrowly oblong, sessile, 7–8-ovuled; style upcurved, height of curvature 2 mm; stigma capitate. *Fruits* narrowly oblong, 25–30 × 2,5–3,0 mm, chestnut-brown, dehiscent; inner surface shiny white; septa up to 2 mm wide, barrel-shaped, separating the seeds, white with red flecks when in dry state. *Seeds* elliptic, 2,5–2,7 × 1,7–1,8 mm, dark chestnut or khaki, covered in large black blotches and stripes with small speckles in between; hilum exserted. Figure 1.

*Indigofera gifbergensis* is restricted to mountainous regions from Kobe Pass in the north to Cedarberg Sneeu-kop in the south (Figure 2).

This mountain fynbos endemic flowers from late August to November. It occurs between 600–1 650 m.

CAPE.—3118 (Vanrhynsdorp): Gifberg (–DC), 10.1953, *Esterhuysen* 22084 (BOL); 9.1948, *Acocks* 12891 (K); 8.1948, *Compton* 20838 (NBG, STE); just before bridge over Snorkfontein River (–DC), 2.1979, *Snijman* 101 (MO, NBG, PRE); summit of Kobe Pass (–DB), 10.1973, *Hall* 4158 (NBG, PRE, STE). 3119 (Calvinia): Lokenberg, WSW of Calvinia (–CA), 8.1953, *Acocks* 16882 (PRE). 3218 (Clanwilliam): Langberg (–BA), 12.1951, *Bond* 1393 (NBG); 12.1941, *Esterhuysen* 7335 (BOL); Pilaarsberg, north of Pakhuis Pass (–BB), 9.1967, *Kerfoot* 5922 (NBG). 3219 (Wuppertal): Heuningvlei Forest

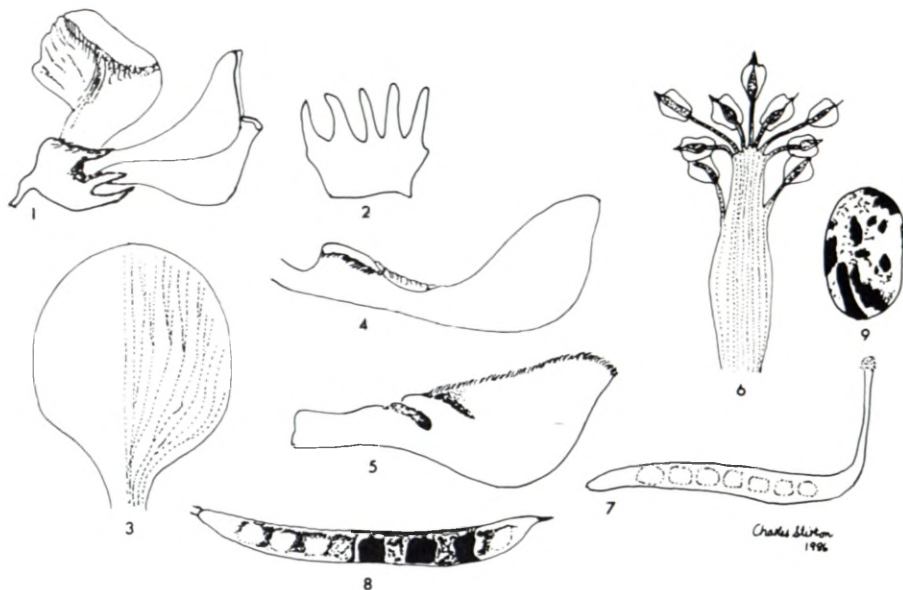


FIGURE 1.—*Indigofera gifbergensis* 1, flower, × 5,5; 2, calyx opened out, × 6,8; 3, standard opened out, × 8,2; 4, inner face of wing petal, × 8,2; 5, outer face of keel petal showing position and shape of the peg, × 8,2; 6, androecium flattened out, × 8,2; 7, pistil, × 8,2; 8, fruit with section cut away to show seeds and septa, × 2; 9, seed, × 6,8. 1–7: *Kerfoot* 5922. 8–9: *Leipoldt* 3366.



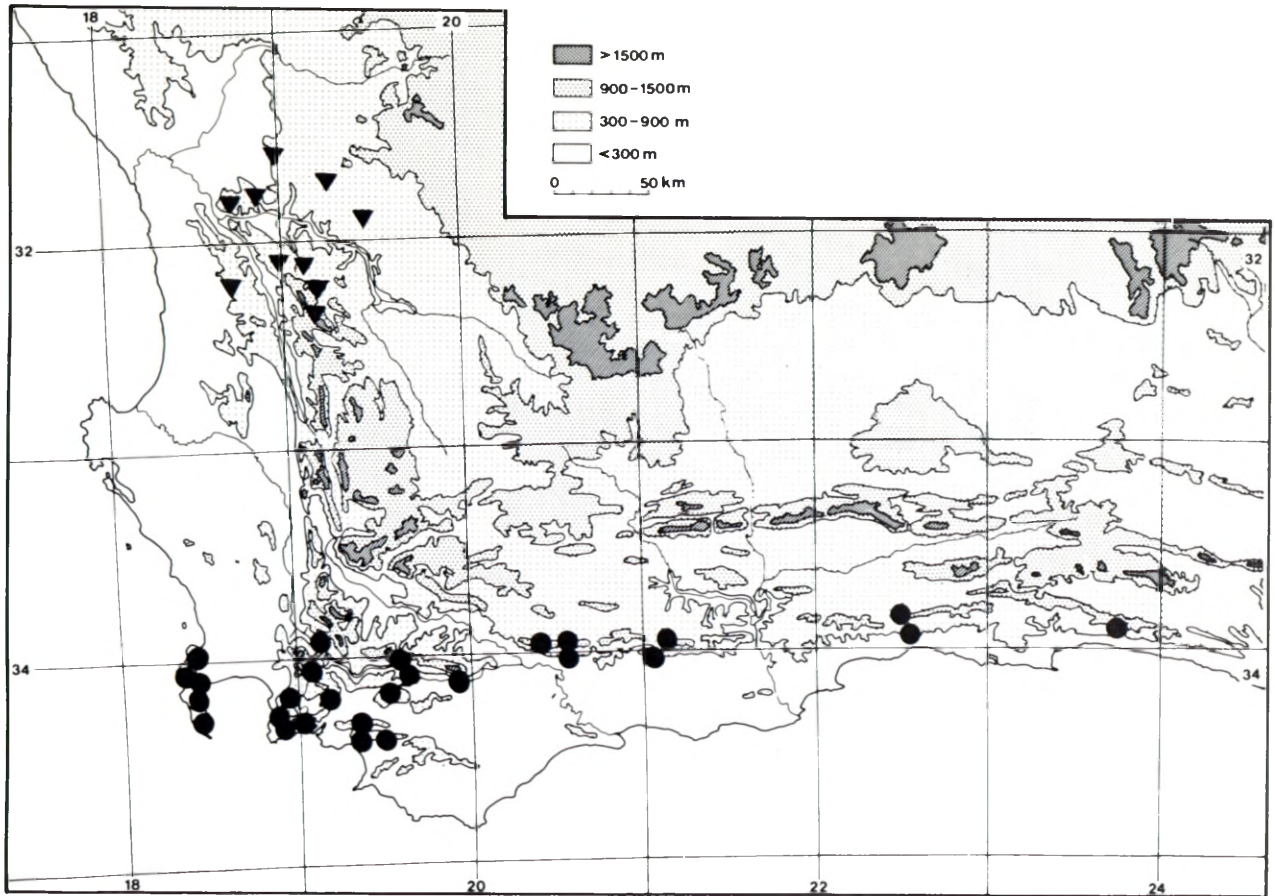


FIGURE 2.—Distribution of *Indigofera gibergensis*, ▼; *I. filifolia*, ● in southern Africa.

Station along road to Groenberg (–AA), 10.1967, *Emdon 143* (PRE, STE); Pakhuis Mountain (–AA), 12.1940, *Leipoldt 3366* (BOL); 11.1929, *Thode A2112* (PRE); 9.1940, *Compton 9598* (NBG); 9.1937, *Compton 6939* (NGB); 12.1981, *Stirton 10196* (STE); Sneeuokop, Cedarberg (–CD), 2.1936, *Compton 6207* (NBG). Without precise locality: 8.1936, *Thorne s.n* (SAM 52691).

This distinctive species is easily separated from *I. filifolia* and *I. ionii* by its stiff compact habit, small brick-red flowers, the absence of tufts on anthers and its blotched seeds.

2. *Indigofera ionii* J. K. Jarvie & C. H. Stirton, sp. nov. subsectioni *Juncifoliae* Gillettii proxima. *I. filifoliae* Thunb. et *I. gibergensis* C. H. Stirton & J. K. Jarvie affinis sed ab ambabus habitu humiliore, seminibus olivaceis, leguminibus compressis, sacco carinae deorsum curvato, differt.

Herba perennis decumbens usque 0,8 m alta. *Stipulae* liberae ad caulem appressae, glabrae. *Folia* juventute praesentia, imparipinnata, petiolata. *Foliola* anguste obovata, 3 (4 vel 5), 8–10 × 3–5 mm, lateralia minora, basi obtusa, apice mucronata, supra glabra, subtus sparse aequaliter pubescentia. *Petioles* 15–25 mm longi. *Inflorescentiae* axillares, 6–10-florae, racemosae, laxae, 40–70 (80) mm longae. *Flores* 5–6 (7) mm longi, unoquoque bractea caduca anguste triangulari 2,5–3,0 mm longa subtenti; pedicellus filiformis, 2–3,5 mm longus. *Calyx* 3,0–3,5 mm longus; tubus 1,5–1,6 mm longus, glaber, dentibus 1,5 mm longis, ± aequalibus, triangularibus. *Vexillum* 5–7,0 mm longum et latum, transverse late ovatum; auriculae et calli absentes. *Alae* 6,8–7,0 × 2,5 mm, margine inferiore involutae; extremitas infera laminae incisa. *Petala carinae* 6,5–7,0 × 2,0–2,5 mm, apice pubescentia. *Androecium* 6,0–6,5 mm longum;

stamine vexillari libero; antherae uniformes, <0,5 mm longae, ovatae, apiculatae, squamis basalibus praesentibus; filamenta antherarum basifixarum longa, tenuia; filamenta antherarum medifixarum, breviora, crassiora. *Pistillum* 5–6 mm longum, compressum, anguste oblongum, 8-ovulatum. *Fructus* 3,0–3,5 mm longus, compressus, dehiscentis; septa <1 mm longa. *Semina* oblonga, 2–3 × 2 mm, olivacea.

TYPE.—Cape, Vogelgat, near Hermanus, *I. Williams 3519* (K, holo.!, NBG, iso.!).

Small wiry erect or sprawling herb up to 0,8 m tall; sparsely branched, mostly near the base. *Stipules* free, 2,5–3,0 mm long, appressed to stem, glabrous. *Leaves* present during early stages of growth, imparipinnate, petiolate. *Leaflets* 3, occasionally 4 or 5, narrowly obovate, 8–10 × 3–5 mm; terminal largest; base obtuse, apex mucronate, straight, glabrous above, sparsely and evenly scattered with biramous hairs beneath. *Petiole* 15–25 mm long; petiolule < 1 mm long. *Inflorescences* axillary, 6–10-flowered, racemose, lax, 40–70 (–80) mm long. *Flowers* 5–6 (7) mm long, each subtended by a 2,5–3,0 mm long, narrowly triangular caducous bract; pedicel filiform, 2,0–3,5 mm long, elongating and thickening during fruit formation. *Calyx* 3,0–3,5 mm long, glabrous; tube 1,5–1,6 mm long; teeth 1,5 mm long, more or less equal, triangular; sinus between vexillar teeth broad. *Standard* 5,0–7,0 mm long and wide, very broadly ovate, claw very short, venation fine, branched from three traces at base, apex slightly emarginate; auricles and appendages absent. *Wing petals* 6,8–7,0 × 2,5 mm, infolded along lower margin; auricle inflated and flattened; with scattered hairs along the margin to-



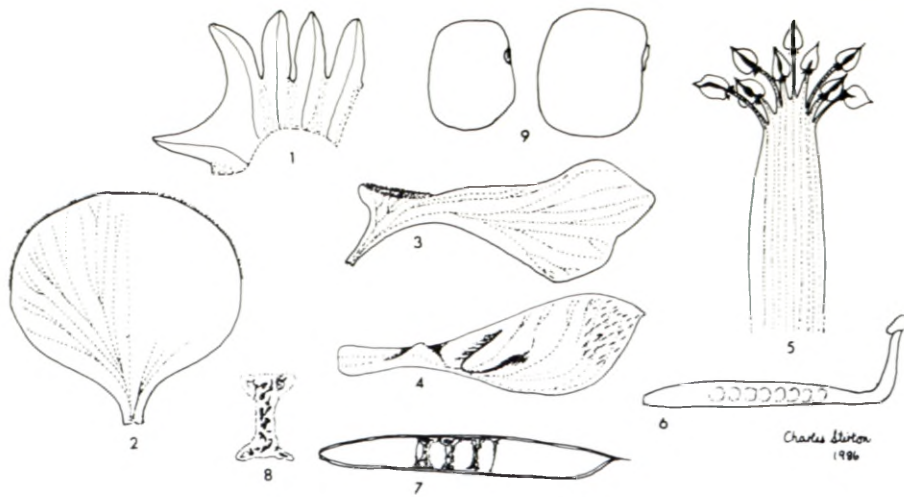


FIGURE 3.—*Indigofera ionii*. 1, calyx opened out,  $\times 6$ ; 2, standard opened out,  $\times 8$ ; 3, inner face of wing petal,  $\times 8$ ; 4, outer face of keel petal showing position and shape of the peg,  $\times 8$ ; 5, androecium flattened out,  $\times 8$ ; 6, pistil,  $\times 8$ ; 7, fruit with section cut away to show seeds and septa,  $\times 1,3$ ; 8, septum,  $\times 10$ ; 9, seeds, LHS seed from ends of the fruit and RHS seed from the centre of the fruit,  $\times 8,6$ . Voucher: *Williams 3519*.

wards the apex; lower end of blade notched. *Keel petals* 6,5–7,0  $\times$  2,0–2,5 mm, apex pubescent. *Androecium* 6,0–6,5 mm long; vexillar stamen free; anthers uniform,  $< 0,5$  mm long, ovate, apiculate, tufted at base; basifixed anthers on long thin filaments; medifixed anthers on short stout filaments. *Pistil* 5–6 mm long, compressed,  $< 0,5$  mm long, glabrous, straight, narrowly oblong, 8-ovuled; style upcurved, height of curvature 1,5 mm. *Fruit* 30–35 mm long, compressed, surface coarsely rippled, margins distinctly ribbed, dehiscent; septa  $< 1$  mm long, white with small orange flecks. *Seeds* oblong, 2–3  $\times$  2 mm, olive-green. Figure 3.

*Indigofera ionii* is restricted to the mountains of the south-western Cape (Figure 4). This fugitive fynbos species favours damp areas, usually on tussocks in river beds, vleis and marshes. It flowers sporadically from August to April, with peaks between September and January. It occurs from 500–700 m.

CAPE.—3418 (Simonstown): plateau between Constantiaberg and Noordhoek (–AB), *Levyns 6848* (BOL); west of Grootkop (–AB), 1.1940, *Salter 8305* (BOL); Noordhoek Mountain (–AB), 11.1942, *Barker 2091* (NBG); marsh west of Klaasjagersberg (–AB); 1.1936, *Salter 5751* (BOL, BM, NBG); 8.1938, *Salter 7606* (BM); Constantiaberg (–AB), 3.1940, *Bond 192* (NBG); 9.1922, *Schlechter 1469* (BOL); 12.1943, *Compton 15463* (NBG); Redhill (–AB), 1.1940, *Lewis 709* (NBG); source of Prinskasteel River (–AB), 1.1948, *Salter 8302* (BOL); stream south of Constantiaberg (–AB), 11.1896, *Wolley-Dod 1914* (K); Cape Point (–AD), 8.1944, *Compton 15833* (NBG); near Smitswinkel (–AD), *Levyns 6850* (BOL); *Compton s.n.* (BOL); Booskraal near Brightwater, Cape of Good Hope Nature Reserve (–AD), 12.1981, *Grobbelaar 2647* (PRE); beacon near Smith's farm (–AD), 11.1939, *Salter 8279* (BOL); Modderdam (–BA), 12.1938, *Salter 7874* (BM, BOL, PRE); 12.1938, *Salter 7875* (BOL); Muizenberg Mountain (–BB), 12.1948, *Compton 21210* (NBG); Rooi Els Flats (–BD), 11.1945, *Leighton 1448* (BOL); flats south west of Klein Hangklip (–BD), 9.1969, *Boucher 566* (STE); near Somersfontein (–BD), 9.1969, *Boucher 711* (STE). 3419 (Caledon): flats near Kleinmond (–AC), *De Vos 855* (STE); Palmiet Valley near Albertyn's house (–AC), 10.1948, *De Vos 1045* (STE); Vogelpool, Vogelgat, near Hermanus (–AD), 3.1984, *Williams 3543* (K, NBG); *Williams 3519* (K, NBG); 9.1984, *Stirton 10762* (K); marshy slopes at head of Boskloof between Steenbras and Kogelberg (–BD), 2.1975. *Esterhuysen s.n.* (BOL). Without precise locality: *Forbes s.n.* (K).

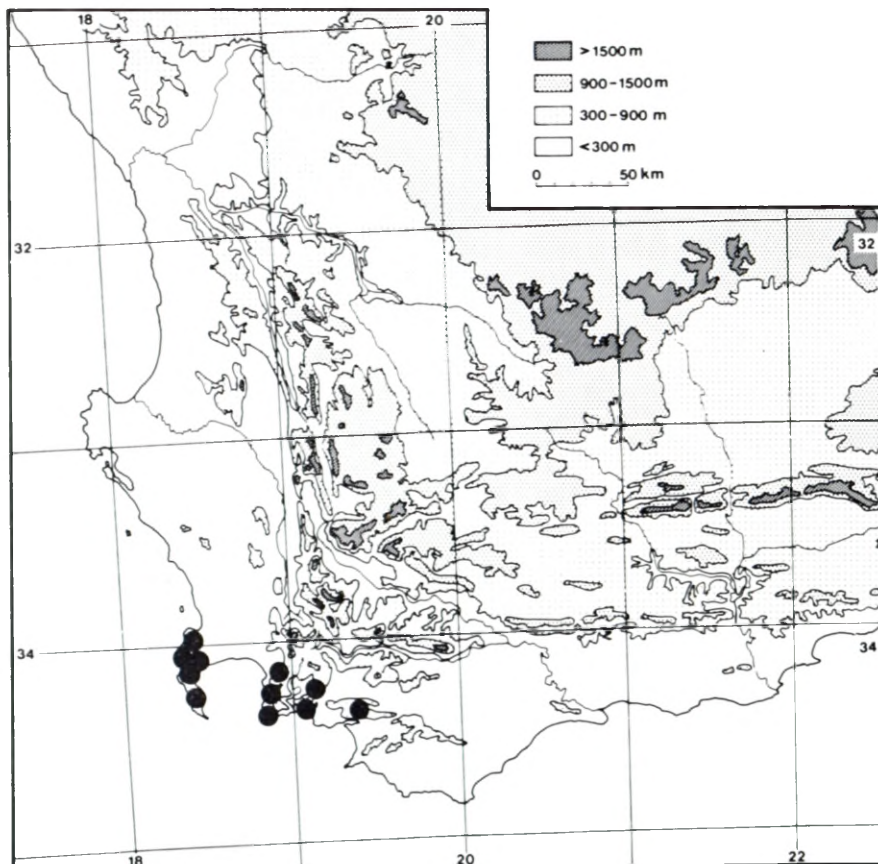


FIGURE 4.—Distribution of *Indigofera ionii* in southern Africa.



3. *Indigofera filifolia* Thunb., Prodr. plantarum capensium: 132 (1800); Thunb.: 595 (1823). Type: Cape, 'in collibus infra Tafelberg latere orientali', Thunberg s.n. (UPS-Thunb. 17338, holo., seen on microfiche).

*Lebeckia contaminata* Ker: 104 (1816) non Thunb. (1800). *L. contaminata* Ait.f.: 261 (1812) non Willd. (1803). *Indigofera filifolia* Ker: notes 2 (1817). *Spartium contaminatum* Ait.: 10 (1789) non L. (1771). Type: Cape of Good Hope, Masson s.n. (BM!, holo.!).

*Lebeckia nuda* Sims: t. 2214 (1821). *Indigofera nuda* (Sims) G. Don: 301 (1850); G. Don: 209 (1832). Type: *Anonymous* s.n. Raised from Cape seeds in 1814 by Messrs. Whitley, Brame & Milne at the Fulham Nursery and then sent to Sims in October 1819 as *Lebeckia contaminata* (BM, holo.!).

*Indigofera aphylla* Breit. ex Link: 251 (1822); Breit.: 209 (1817). Type: 'Kap der guten Hoffnung (Cape of Good Hope), cultivated in the Breiter Gardens in Leipzig and later by Link in Berlin, collector unknown (B, holo., destroyed).

*Indigofera juncea* DC.: 225 (1825); Mordant de Launay: 227, t. 227 (1820); Drapez: 452, t. 452 (1834). Type: cultivated from seed sent from England, 24 Jul. 1818, Cels s.n. (G, holo.!). Figure 5.



FIGURE 5.—Painting of *Indigofera juncea* DC. (*Cels* s.n.) = *I. filifolia*.

Tree-like shrub up to 2 m tall, open habit, woody; branches sparsely appressed strigulose when young but glabrous when mature. *Stipules* free, filiform, strigulose, up to 2 mm long, parallel to axis of branch. *Leaves* common on younger plants, petiolate, basal pair largest, upper pairs being reduced to scales. *Basal leaflets* 6–8, elliptic, rarely narrowly obovate, 15–20 × 8–10 mm; base cuneate; apex mucronate, straight; glabrous above, sparsely and evenly scattered with appressed biramous hairs beneath. *Petiole* 40–60 mm long; petiolules up to 2

mm long. *Inflorescences* axillary, clustered at ends of branches forming a pseudocompound structure, racemose, lax, up to 50-flowered. *Flowers* (7,5) 8,0–10,5 mm long, each subtended by a short 1–2 mm long, narrowly triangular, rapidly caducous bract; pedicel 4,0–4,3 mm long. *Calyx* 4,0–4,5 mm long; tube 1,7–3,4 mm long; teeth unequal, 1,1–3,0 mm long; triangular sinus between vexillar pair very broad, hairs few, scattered in the sinuses of the teeth. *Standard* (6,1) 8,4–9,2 (10,2) × (5) 6,3–7,6 mm, orbicular; claw very short; venation fine, branching from three traces at the base; apex slightly hooded, auricles and appendages absent. *Wing petals* 9–10 × 2,5–3,0 mm, constricted in the middle; auricle inflated and flattened. *Keel petals* 9 × 3,0–3,5 mm; apex pubescent. *Androecium* 9–10 mm long; vexillar stamen free; anthers uniform, 1 mm long, apiculate and tufted, anthers on long filaments basifixed, those on short filaments dorsifixed; scales present. *Pistil* 6,6–9,0 (9,9) mm long, terete, < 0,5 mm wide, glabrous, arched, narrowly oblong, 8–14-ovuled; style upcurved, height of curvature 2 mm. *Fruit* 40–55 × 4 mm, dark brown, dehiscent. *Seeds* 2,6–2,7 mm long and wide, chocolate-brown, hilum protruding, transversely oblong. Figure 6.

*Indigofera filifolia* is a widespread fynbos endemic occurring from the Cape Peninsula eastwards to Heidelberg (Figure 2). It favours damp sites and is especially common along watercourses. The plants flower throughout the year but with a peak from February to March. This species coppices strongly after burns.

CAPE.—3318 (Cape Town): valley behind Table Mountain (–CD), February, Smuts 1083 (PRE); 3.1920, *Andrae* 296 (STE); north of Window stream (–CD), 4.1956, *Esterhuysen* 25652 (BOL, MO); St James, Cape Peninsula (–CD), 4.1914, *Sr. Clair Capron* s.n. (PRE); summit of Table Mountain (–CD), 3.1899, *Schoenberg* 4867 (PRE); 3.1922, *Wilson* 130 (STE); 3.1917, *Page* s.n. (PRE); 4.1907, *Kensit* 68 (PRE); 2.1929, *Gillett* 3527 (STE); *Kensit* 68 (PRE); *Prior* s.n. (K); 4.1881, *Bolus* 4778 (K, BM, BOL); 3.1947, *Barker* 4445 (NBG); 3.1952, *Salter* s.n. (STE); 3.1910, *Worsdell* s.n. (K); 4.1929, *Hutchinson* & *Smuts* 3190 (BM, K); Rondebosch (–CD), July, *Drège* s.n. (K). 3319 (Worcester): Franschhoek Pass (–CC), 3.1934, *Smuts* & *Gillett* s.n. (STE). 3320 (Montagu): Swellendam Forest Reserve (–CD), 1.1969, *Marsh* 1110 (STE); below 12 o'clock Peak (–CD), 5.1963, *Taylor* 4752 (PRE, STE); Barrydale Pass (–DC), *Van Breda* 1518 (K, PRE); Tradouw Pass (–DC), 3.1954, *Balfour Browne* 18 (BM). 3321 (Ladismith): Garcias Pass (–CC), 4.1935, *Esterhuysen* 32484 (BOL); *Van Breda* 1101 (K); 11.1814, *Burchell* 6974 (K). 3322 (Oudtshoorn): Montagu Pass (–CD), 2.1944, *Fourcade* 6367 (STE); 12.1949, *Martin* 76 (NBG); 6.1927, *Fourcade* 3245 (STE, PRE); 1.1897, *Guthrie* s.n. (NBG); lower Montagu Pass, between Toll House and bridge, 6.1943, *Fourcade* 6020 (STE); on Postberg near George (–CD), 8.1814, *Burchell* 5952 (K, BOL, PRE); 7.1912, *Rogers* 4321 (BOL); *Prior* s.n. (K); 3.1928, *Maude* s.n. (K). 3323 (Willowmore): Coldstream (–DC), *Galpin* 9565 (K). 3418 (Simonstown): Orange Kloof River (–AB), 2.1896, *Wolley-Dod* 820 (BOL); 5.1953; *Salter* 9558 (BM, MO); above Kalk Bay (–AB), 3.1896, *Wolley-Dod* 1007 (BM, BOL); 4.1974, *Goldblatt* 1399 (MO, PRE); Constantia Valley (–AB), 4.1886, *Thode* 9 (PRE); 11.1938, *Salter* 7852 (BOL); 3.1939, *Salter* 8032 (BOL); Silvermine Plateau (–AB), 4.1974, *Goldblatt* 1585 (MO, NBG, PRE); 3.1932, *Salter* 2059 (BM, BOL); 3.1936, *Salter* 5947 (BM); Simonstown (–AB), 5.1884, *Marloth* 94 (PRE); 3.1935, *Minicki* s.n. (NBG); 3.1918, *Pillans* 3488 (PRE); 8.1865, *Wright* s.n. (K); Hout Bay (–AB), *Prior* s.n. (K); 4.1955, *Baker* 657 (BM, NBG); Blaauberg (–AB), *Drège* s.n. (K); Schusters Kraal (–AB), 3.1941, *Perifold* s.n. (NBG); flats at Smitswinkel vlei (–AD), 2.1961, *Thomas* s.n. (STE); Boys Kraal Rivier Vlei (–AD), 3.1946, *Compton* 17940 (NBG); Bettys Bay (–BD), 3.1972, *Vogts* s.n. (STE); Palmiet Kloof, east of bridge (–BD), 3.1948, *De Vos* 1299 (STE); 7.1950, *Parker* 4491 (BOL, K, NBG); 7.1975, *Stirton* 5013 (PRE); *Ebersohn* 243 (NBG); Palmiet River Mountains (–BD), 1.1947, *Stokoe* s.n. (NBG); Rooi Els (–BD), 3.1948, *Parker* 4319 (BOL, K, NBG); Elephant Rock Mountain (–BD), 3.1971, *Boucher* 1464 (K, PRE, STE); Platbos Pass (–BD), March, *Boucher* 1176 (K, PRE, SRGH, STE). 3419 (Caledon): Elgin (–AA), 4.1946, *Stokoe* s.n. (SAM 59572); Nuwekloof, Houwhoek Mountains (–AA), 3.1815, *Burchell* 8052, 8134 (K); on the sides of the Bot River, near Houwhoek (–AA), *Bowes* s.n. (BM); Swartberg Mountain near Caledon (–AB), 9.1904, *Bolus* s.n. (BOL); Palmietberg (–AC), 3.1983, *Van Wyk* 1142 (PRE); *Hermanus* (–AC), 4.1949, *De*



FIGURE 6.—*Indigofera filifolia*. 1, calyx opened out,  $\times 6,8$ ; 2, standard opened out,  $\times 8,2$ ; 3, inner face of wing petal,  $\times 8,2$ ; 4, outer face of keel petal showing position and shape of the peg,  $\times 8,2$ ; 5, androecium flattened out,  $\times 8,2$ ; 6, pistil,  $\times 8,2$ ; 7, fruit with section cut away to show seeds and septa,  $\times 1,7$ ; 8, septum,  $\times 6,8$ ; 9, seed,  $\times 6,8$ . Voucher: Williams 3542.

Waal s.n. (BOL, NBG); 4.1946, *Compton 17963* (BOL, NBG); 4.1980, *Orchard 545* (K, MO, PRE, STE); Cascade Pool, Vogelgat (–AD), 4.1984, *Williams 3542* (K); Sues Pool, Vogelgat (–AD), 4.1979, *Williams 2739* (MO, NBG, PRE); Vogelkloof, 4.1950, *Martin 322* (STE); Maanschijkop (–AD), 4.1978, *Williams 2465* (MO, NBG); Babylon's Tower (–AD), 2.1941, *Esterhuysen 4974* (BOL); near Stanford, foot of Kleinrivier Mountains (–AD), 4.1952, *Stokoe s.n.* (NGB, STE); Boesmanskloof (–BA), 4.1983, *Forsyth 24* (PRE); Genadendal, Baviaanskloof (–BA), 3.1933, *Gillett 840* (BOL, STE); Riviersonderend (–BB), 4.1950, *Middlemost 1534* (NBG); Wynand Louw's Bos (–BD), 3.1963, *Van der Merwe 1357* (PRE, STE); Koudebergkloof near Nuwepos (–DA), 4.1975, *Oliver 5845* (PRE, STE). 3420 (Bredasdorp); Swellendam Mountain (–AB), 2.1941, *Compton 10600* (NBG); 4.1926, *Smith 2720* (PRE); 3.1930, *Thode 2318* (K); 1.1815, *Burchell 7401* (K); Hermitage Kloof (–AD), 12.1958, *Stokoe s.n.* (NBG). 3421 (Riversdale); Lemoenshoek Mountain near Heidelberg (–AA), 3.1948, *Stokoe s.n.* (SAM 61559). Without precise locality: Cape, *Harvey, s.n.* (BM, K); Cape Flats, February, *Ecklon & Zeyher s.n.* (SAM 32330); *Bowie s.n.* (BM); Langeberg Mountains, 4.1923, *Muir 2528* (PRE).

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