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REVISION OF THE CASSIINAE IN AUSTRALIA.
3. *SENNA* MILLER SECT. *SENNA* *

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Abstract

In Australia, sect. *Senna* comprises 7 species, 5 native and 2 introduced, all previously treated within *Cassia* L. These are divided between two series, ser. *Pictae* having erect spike-like racemes, and ser. *Floridae* here transferred from sect. *Chamaefistula*. New combinations are provided for the four endemic species, *S. venusta* (F. Muell.) Randell, *S. notabilis* (F. Muell.) Randell, *S. magnifolia* (F. Muell.) Randell, and *S. pleurocarpa* (F. Muell.) Randell, and its two varieties var. *angustifolia* (Symon) Randell and var. *longifolia* (Symon) Randell.

Introduction

This is the third in a series of papers which will revise all members of the Cassiinae in Australia. The earlier paper dealing with *Senna* sect. *Psilorhegma* (Randell 1989) presented the results of many years analysis of known problems in cytology, breeding systems, hybrid swarms, morphological variability and taxonomy. However, in the rest of the Cassiinae, few such problems have been obvious, studies have been more restricted in time and financial resources, and as a consequence, revisions are less exhaustive in character. This is very obvious in the current publication, where field observations have been restricted, cytological records are few, and no studies of breeding systems have been attempted. Thus the current study applies classical morphological species concepts, and supports decisions of earlier workers (eg. Symon 1966) while making the new nomenclatural combinations required, following the recognition of *Senna* Miller as a separate genus.

Senna* sect. *Senna

Senna Miller sect. *Senna*, *Gard. Dict. abr. edn 4*, vol. 3 (1754), by implication.

Type species: *S. alexandrina* Miller, syn. *Cassia senna* L., the only species cited by Miller.

Synonyms

1. *Cassia* L. sect. *Senna* (Miller) DC. ex Colladon, *Hist. nat. med. Casses* 92 (1816).

Type species: as above.

2. *Cassia* [subgen. *Senna* (Miller) Benth.] sect. *Chamaesenna* DC. ex Colladon, *Hist. nat. med. Casses* 92 (1816), Benth. in Benth. and Hook., *Gen. pl.* 1(2): 572 (1865); in Mart., *Fl. Bras.* 15(2): 120 (1870); *Trans. Linn. Soc. London* 27: 538 (1871), p.p.

Type species: *C. reticulata* Willd. fide Irwin and Barneby, l.c. p. 456.

Description

Foliar glands usually 0. Corolla zygomorphic along its vertical axis; often several of the upper whorl of androecium filaments elongate, 2 latero-abaxial usually much longer, usually elevated sideways into a plane almost perpendicular to that of corolla symmetry; anthers all truncate or sometimes some produced into beaks, three adaxial reduced to staminodes, four

*Other papers in this series will be found in *J. Adelaide Bot. Gard.* 11(1): 19-49; and 12(2): 165-272.

median fertile or sterile, two latero-abaxial fertile, central abaxial often sterile and reduced; pods cylindrical, flat or winged (in one species), with coriaceous valves.

Two series are represented in Australia.

Key to the Australian series of sect. *Senna*

- Stipules amplexicaul or cordate, subpersistent; inflorescence a long axillary spike-like raceme, often apparently terminal; floral bracts often large subpersistent, imbricate, forming a cone-like inflorescence 1. ser. *Pictae*
- Stipules linear to setiform, caducous; inflorescence thyriform-paniculate, axillary or (by fusion with the stem) displaced shortly above the axil; floral bracts not large, persistent or imbricate; inflorescence not cone-like 2. ser. *Floridae*

1. Ser. *Pictae*

***Senna* Miller [sect. *Senna*] ser. *Pictae* (Benth.) Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 456 (1982).**

Lectotype species: Cassia picta G. Don, *Gen. hist.* 2: 444 (1832), syn. *Senna pistaciifolia* (G. Don) Irwin and Barneby var. *picta* (G. Don) Irwin and Barneby, fide Irwin and Barneby l.c.

Synonyms:

1. *Cassia* L. sect. *Chamaesenna* DC. ex Colladon, *Hist. nat. med. Casses* 95 (1816) p.p.
Lectotype species: C. reticulata Willd., *Enum. pl.* 1: 443 (1809), syn. *Senna reticulata* (Willd.) Irwin and Barneby, fide Irwin and Barneby l.c.
2. *Cassia* L. [subgen. *Senna* (Miller) Benth. sect. *Chamaesenna* (DC. ex Colladon) Benth.] ser. *Pictae* Benth. in Mart., *Fl. Bras.* 15(2): 126 (1870).
Lectotype species: C. picta G. Don, fide Irwin and Barneby l.c., as above.
3. *Cassia* sect. *Herpetica* DC. ex Colladon, *Hist. nat. med. Casses* 91 (1816).
Lectotype species: Cassia alata L., *Sp. pl.* 378 (1753); syn. *Senna alata* (L.) Roxb., *Fl. ind. edn* 2: 349 (1824), fide Raf., *Sylva tellur.* 123 (1838).
4. *Herpetica* (DC. ex Colladon) Raf., *Sylva tellur.* 123 (1838).
Type species: Cassia alata L. syn. *Senna alata* (L.) Roxb., l.c. p. 349, fide Raf., l.c., as above.
5. *Chamaesenna* Pittier, *Arb. legum.* 130 (1928).
Lectotype species: Chamaesenna reticulata (Willd.) Pittier, fide Britton and Rose, *N. Amer. Fl.* (1930); syn. *Senna reticulata* (Willd.) Irwin and Barneby l.c. p. 456.
6. *Cassia* [subgen. *Senna* (Miller) Benth.] sect. *Chamaesenna* sensu Symon, *Trans. Roy. Soc. S. Australia* 90: 76 (1966), non DC. in Colladon. This concept used by Symon included ser. *Floridae* as recognised here. No type species was recognised.

Description

As for the section with the following additional characters (Irwin and Barneby 1982) — stipules amplexicaul or caudate; inflorescences racemose, sometimes spike-like, 10-70 flowered, the buds often subtended by enlarged, imbricate, coloured bracts; seeds oblong to obovate; seed testa smooth or rugulose.

Distribution

A group with 8 species in the Americas, 4 in Australia, and several in Africa. It thus contrasts with sect. *Psilorhegma*, which is restricted to Australia and the Pacific region, but parallels the distribution of species within sect. *Chamaecrista* (Irwin and Barneby 1982).

At least one African and one American species are now widely cultivated and/or weedy in both the Americas and Australia.

Key to the species of ser. *Pictae* in Australia

- 1. Floral bracts dark brown or black*5. *S.didymobotrya*
- 1. Floral bracts yellow or green:
 - 2. Pod 10-12 cm long, dark, with lateral wings*6. *S. alata*
 - 2. Pod 2.5-10 cm long, without lateral wings:
 - 3. Leaves obviously hairy:
 - 4. Floral bracts pubescent, acuminate, foliose, caducuous, green 2. *S. notabilis*
 - 4. Floral bracts glabrous, obtuse, stramineous, persistent, yellow 3. *S. venusta*
 - 3. Leaves not obviously hairy:
 - 5. Leaflets emarginate, broad-oblong, 2.5-5 cm wide 4. *S. magnifolia*
 - 5. Leaflets obtuse to emarginate, linear to elliptic, never more than 2 cm wide 1. *S. pleurocarpa*

1. *S. pleurocarpa* (F. Muell.) Randell, comb. nov.

Basionym: *Cassia pleurocarpa* F. Muell., *Fragm.* 1: 223 (1859); Benth., *Fl. Austral.* 2: 284 (1864); *Trans. Linn. Soc. London* 27: 552 (1871); Symon, *Trans. Roy. Soc. S. Australia* 90: 98 (1966).

Lectotype: In thickets towards the mouth of the River Murchison, Western Australia, *A. Oldfield s.n.*, s.d., MEL (photo)!, lectotype here designated; *isolecto:* K (photo), PERTH (not seen, cited Symon 1966).

Description

Spreading shrubs 50-75 cm tall; *leaves* 8-12 cm long; *leaflets* 5-12 pairs, linear to elliptic, 15-20 mm apart on the rachis, the largest 3-6 cm x 5-15 mm, all even in size, apex obtuse or emarginate, base acute and equal-sided, glabrous, veins impressed above and conspicuous below, dull olive; *stipules* acicular, glabrous, caducous; *petiole* 2-4 cm long; *inflorescence* 11-25 cm long, bearing 20-60 flowers in a cone-like head; *peduncle* 2-8 cm long; *pedicel* 10-25 mm long; *bracts* oval, 12-15 mm long, subpersistent; *sepals* lanceolate, c. 10 mm long; *petals* obovate, 15 mm long, venation conspicuous, yellow; *androecium* of 10 anthers, 3 adaxial reduced and sterile, 4 median fertile and 5 mm long, 2 latero-abaxial fertile and 10 mm long, 1 central abaxial fertile and 3 mm long; *filaments* subequal, c. 1 mm long; *ovary* glabrous; *fruiting pedicel* 10-25 mm long; *pod* 3.5-7 cm x 8-12 mm, flat, the valves with a median lateral ridge over the seeds; *seeds* oblong, c. 7 mm long, rugose, with very short areole, dark brown. Plate 1 a-h.

Notes

In this and all future descriptions, the character *peduncle* refers to the length of the axis below the lowest flower.

3 varieties are recognised.

Key to the varieties of *S. pleurocarpa*

- 1. Leaflets 5-9 pairs:
 - 2. Bracts oval, obtuse, to 12 mm long, caducous; leaflets 5-7 pairs 1. var. *pleurocarpa*
 - 2. Bracts oval to acute, acuminate, to 15 mm long, subpersistent; leaflets 8-9 pairs 2. var. *angustifolia*
- 1. Leaflets 11-12 pairs 3. var. *longifolia*

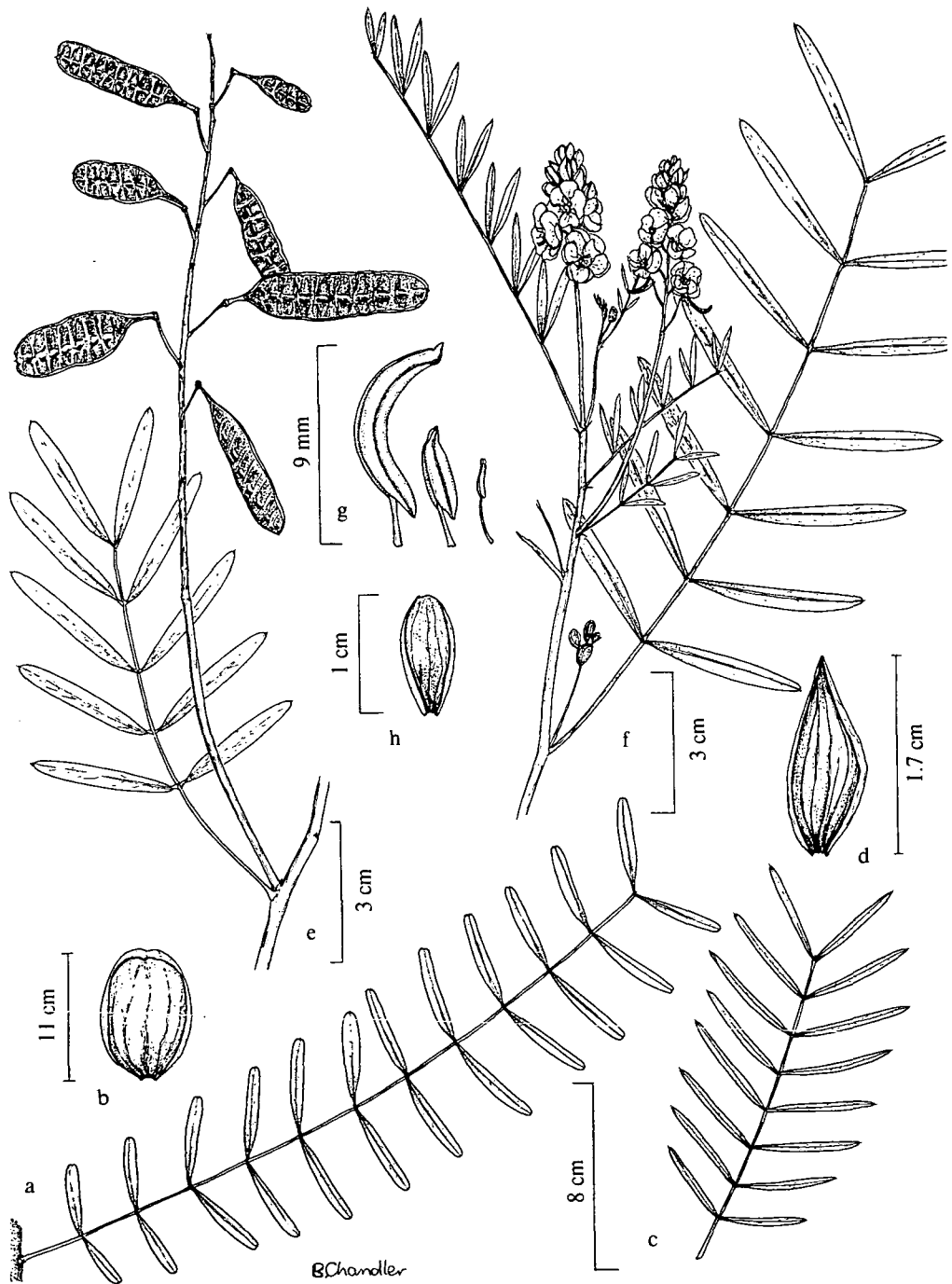


Plate 1. *S. pleurocarpa*. a-b, var. *longifolia*; a, leaf; b, bract, both from *Bumbiens s.n.* (AD); c-d, var. *angustifolia*; c, leaf; d, bract, both from *Phillips 012101* (AD); e-h, var. *pleurocarpa*; e, habit, *Symon 23497* (AD); f, habit, *Chippendale 1626*; g, anthers; h, bract, both from *Symon 2155* (AD).

1.1 var. **pleurocarpa**.

Basionym and lectotype: as for the species.

Description

Leaflets 5-7 pairs, the largest 3-6 cm x 5-12 mm; *bracts* oval, 12 mm long; *Pods* 3.5-7 cm x 8-12 mm wide. Plate 1e-h.

Distribution and ecology

Widespread especially in disturbed habitats, over semi-arid areas of all mainland states except Victoria. Purgative to stock (Symon 1966). Map 1.

Selection of specimens examined (c. 100 seen)

WESTERN AUSTRALIA: Mt Squires, Barrow Ra., *Helms s.n.*, 27.viii.1891 (AD); 40 miles E Meekatharra, *Speck 782*, 10.ix.1957 (CANB); 10 miles S of W end Hopkins Lake, *Symon 2358*, 2.viii.1962 (AD); 38.4 miles E Meekatharra on Wiluna rd, *Ashby 4783*, 28.viii.1973 (PERTH).

NORTHERN TERRITORY: Andado Bore, 240 km SSE Alice Springs, *Crocker s.n.*, 6.vi.1939 (AD); summit, Ayres Rock, *Schodde 403*, 30.viii.1957 (AD); Chambers Pillar, c. 130 km S Alice Springs, *Lothian 4569*, 23.vii.1968 (AD); 16 km ESE Mulga Park Hstd, *Munir 5100*, 21.viii.1973 (AD).

QUEENSLAND: 20 km SE Arrabury Hstd, *Lothian 673*, 29.viii.1960 (AD); Tambar, SW Windorah, *Browning s.n.*, -ix.1966 (AD).

NEW SOUTH WALES: nr Fort Grey, *MacGillivray s.n.*, -viii.1921 (AD).

SOUTH AUSTRALIA: Cariewerloo Stn, 35 miles W Pt Augusta, *Higginson s.n.*, 3.ix.1955 (AD); 3 miles S Maralinga, *Forde 628*, 10.x.1956 (AD, CANB); 40 miles S Ernabella, *Turvey s.n.*, 5.vii.1964 (AD); Great Victoria Desert, c. 40 km W Vokes Hill, *Symon 12505A*, 23.viii.1980 (AD).

1.2 var. **angustifolia** (Symon) Randell, comb. nov.

Basionym: *Cassia pleurocarpa* var. *angustifolia* Symon, *Trans. Roy. Soc. S. Australia* 90: 99 (1966).

Holotype: Coolgardie, Western Australia, *E. Kelso s.n.*, Oct. 1900, PERTH (photo); *iso*: K not seen.

Description

Leaflets 8-10 pairs, the largest 5-7 cm x 5-8 mm wide; *bracts* 15 mm long, acuminate; *Pods* to 7 cm long x 15 mm wide. Plate 1c,d.

Distribution

Restricted to subtropical semi-arid areas of Western Australia. Map 2.

Selection of specimens examined (15 seen)

WESTERN AUSTRALIA: c. 72 km W from Knutsford, c. 120 km NW Southern Cross, *Helms s.n.*, 10.xii.1891 (AD); Hayden Rock, Dirk Hartog Is., *Eardley s.n.*, 7.x.1934 (AD); 74 miles N Norseman towards Coolgardie, *Phillips s.n.*, 11.ix.1962 (AD, CANB); Hammersley Ra. Natl Pk, *Jackson 2934*, 19.viii.1977 (AD); 50 km from Leonora towards Menzies, *Hos 48A/8*, 20.ix.1977 (PERTH).

1.3 var. **longifolia** (Symon) Randell, comb. nov.

Basionym: *Cassia pleurocarpa* var. *longifolia* Symon, *Trans. Roy. Soc. S. Australia* 90: 99 (1966).

Holotype: Mungalalla, Queensland, *C.E. Hubbard 6076* and *C.W. Winders*, 1.i.1931, BRI (photo); *iso*: K (not seen).

Description

Leaflets 10-12 pairs, the largest to 5 cm long x 8 mm wide; *bracts* oval, 15 mm long, obtuse to acute; *pod*s as for var. *angustifolia*. Plate 1a,b.

Distribution

Known only from the central west of Queensland. Map 2.

Specimens examined

QUEENSLAND: Charleville, *MacGillivray s.n.*, 26.viii.1923 (AD); Charleville, *Smith s.n.*, 17.iv.1932 (AD); cult., Adelaide (seed ex. *Smith s.n.*), *Bumbiens s.n.*, 8.x.1963; and *Symon s.n.*, 25.v.1965 (both AD).

2. *S. notabilis* (F. Muell.) Randell, comb. nov.

Basionym: *Cassia notabilis* F. Muell., *Fragm.* 3: 28 (1862); Benth., *Fl. Austral.* 2: 284 (1864); *Trans. Linn. Soc. London* 27: 551 (1871); Symon, *Trans. Roy. Soc. S. Australia* 90: 97 (1966).

Holotype: between the Bonney River and Mt Morphett, Northern Territory, *J. McD. Stuart s.n.*, March 1862, MEL (photo).

Description

Annual subshrub to tall shrub, 0.3-1.5 m tall, hairy in all parts; *leaves* 10-20 cm long, including petiole; *leaflets* 6-12 pairs, lanceolate, 10-15 mm apart on the rachis, the largest 15-30 x 8-12 mm, all even in size or the terminals slightly longer, apex acute to aristate, base obtuse unequal, hairs short and dense on both sides, only lower midveins conspicuous, concolourous; *stipules* ovate, long aristate, 2 mm wide, persistent, green; *petiole* 15-20 mm long; *inflorescence* 10-20 cm long, bearing 20-30 flowers in a cone-like head; *peduncle* 2.5-6 cm long; *pedicel* 5 mm long; *bracts* leafy, pubescent, acuminate to aristate, imbricate, caducous by anthesis, green; *sepals* subequal, c. 6 mm long, pubescent, yellow; *petals* obovate, subequal, c. 7 mm long, with distinct veins, yellow; *androecium* of 10 anthers, 3 adaxial sterile and reduced, 4 median fertile and c. 2 mm long, 2 latero-abaxial fertile larger and c. 3 mm long, 1 central abaxial fertile and reduced to 2 mm long; *filaments* subequal, c. 1 mm long; *ovary* glabrous; *fruiting pedicel* 8-10 mm long; *pod* 2.5-4.0 cm x 10-15 mm, golden brown, darker over seeds; *seeds* oblong, c. 4 mm long. Chromosome number n=14, (Randell 1970). Plate 2a-e.

Distribution and ecology

Grows in sand, clay or on rocky hillsides, often with *Triodia* species. Widespread in northern arid areas of Western Australia, Northern Territory, Queensland, New South Wales and South Australia. Map 3.

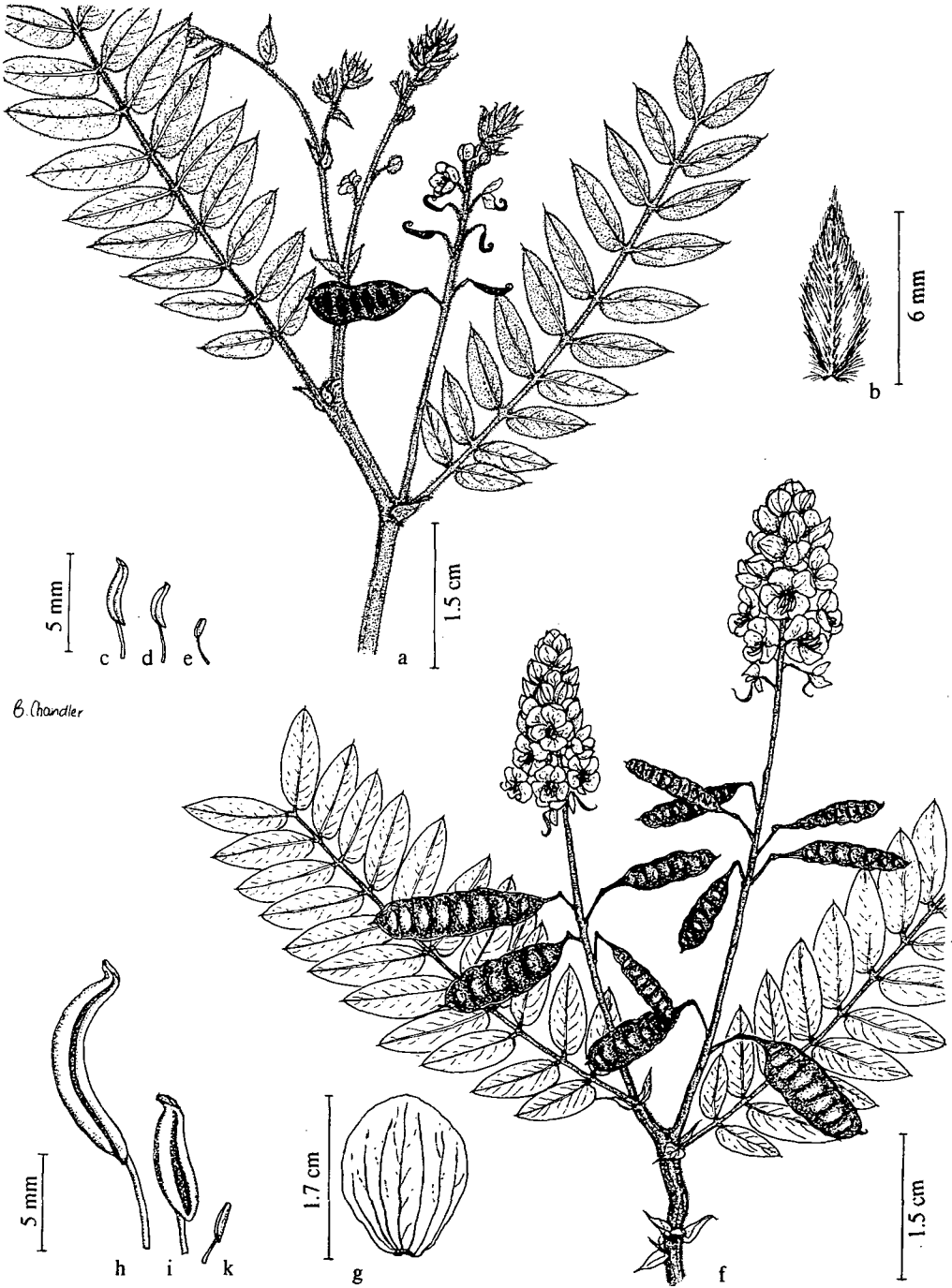
Notes

Shares with *S. venusta* the distinction of having small foliar glands.

Selection of specimens examined (c. 100 seen)

WESTERN AUSTRALIA: from Eva Downs to Ashburton Ra., *Diurich s.n.*, -ix.1886 (AD); 8 miles N Liveringa Stn, Kimberleys, *Lazarides 6465*, 1.viii.1959 (AD); 20 km SE Balfour Downs Hstd, *Wilson 10367*, 10.viii.1971 (PERTH); Peedamulla, *Pfeiffer 12*, 19.vii.1977 (PERTH); 146 km from Derby, *Conrick 1044*, 17.viii.1982 (AD).

NORTHERN TERRITORY: Fraser Ck near MacDonald Downs, *Cleland s.n.*, 30.viii.1930 (AD); between Barrow Ck and Wauchope, *Hill and Caulfield s.n.*, -vii.1953 (AD); 5.1 miles W Anitowa Hstd, *Chippendale s.n.*, 23.x.1956 (AD); 11 miles SE Yuendumu, *Barlow 1140/6*, 18.v.1967 (AD); 9 miles W Baines River East, *Symon 5233*, 18.vi.1967 (AD).



B. Chandler

Plate 2. a-e, *S. notabilis*. a, habit; b, bract; c, largest anther; d, median anther; e, staminode, all from *Ashby 2937* (AD), pod from *Jackson 2905* (AD); f-k, *S. venusta*; f, habit; g, bract; h, largest anther; i, median anther; k, staminode, all from *Jackson 3005* (AD).

QUEENSLAND: between Boulia and Dajarra, *MacGillivray s.n.*, -.viii.1928 (AD); 100 miles S Normanton, *Barlow 299*, 11.viii.1961 (AD); Tanbar, SW of Windorah, *Browning s.n.*, -.ix.1966 (AD); Mt Isa, *Coveny 471*, 14.viii.1968 (AD).

NEW SOUTH WALES: between 37 and 39 miles S Barradale, *Ashby 4679*, 16.ix.1972 (AD).

SOUTH AUSTRALIA: 55 km S Cordillo Downs Hstd, *Warnes 56*, 7.viii.1973 (AD); Innaminka, *Lewis s.n.*, 29.x.1976 (AD).

3. *S. venusta* (F. Muell.) Randell, comb. nov.

Basionym: *Cassia venusta* F. Muell., *Fragm.* 1: 165 (1859); Benth., *Fl. Austral.* 2: 284 (1864); *Trans. Linn. Soc. London* 27: 551 (1871); Symon, *Trans. Roy. Soc. S. Australia* 90: 97 (1966).

Lectotype: 'in terra Arnhem's Land et circum sinum Carpentariae ad ripas aridiores, rupes et scopulos', Northern Territory, *F. Mueller s.n.*, 22.vii.1856, K (photo), lectotype here designated; iso: MEL!

Description

Shrubs to 2 m tall; *leaves* 10-35 cm long, including petiole; *leaflets* 6-15 pairs, oblong to ovate, 15-30 mm apart on the rachis, the largest 3-8 cm x 10-35 mm, almost all equal in size but the central leaflets slightly larger, apex obtuse with a mucro 2 mm long, base slightly cordate, hairs moderately dense to absent on both surfaces, veins impressed above and conspicuous below, olive green; *stipules* cordate, glabrous, persistent; *petiole* 10-30 mm long, grooved above; *inflorescence* 15-40 cm long, bearing 15-40 flowers in a cone-like head; *peduncle* 4-8 cm long; *pedicel* 12-15 mm long; *bracts* obovate, obtuse, scarious, glabrous, persistent, yellow; *sepals* lanceolate, 12 mm long; *petals* obovate, 15 mm long, emarginate, yellow; *androecium* of 10 anthers, 3 adaxial reduced and sterile, 4 median fertile 5 mm long, 2 latero-abaxial fertile 12 mm long, 1 central abaxial fertile and reduced to 5 mm long; *filaments* 4 median 2 mm long, 2 latero-abaxials 3 mm long; *ovary* glabrous; *fruiting pedicel* 15-20 mm long; *pod* 4-8 cm x 9-14 mm, golden brown, with c. 8 seeds; *seeds* obovate, c. 6 mm long, rugose, areole small, dark brown. Plate 2f-k.

Distribution and ecology

Grows in sand on gravel or in lateritic soils, often with *Triodia* species. Widespread in arid areas of northern Western Australia and Northern Territory, few collections in north-western Queensland. Map 4.

Notes

Shares with *S. notabilis* the distinction of having foliar glands.

Selection of specimens examined (c. 40 seen)

WESTERN AUSTRALIA: Kimberley Research Stn, *Langfield 196*, 14.ii.1950 (PERTH); 82 miles SE Pt Hedland towards Marble Bar, *Beaglehole s.n.*, 11.viii.1965 (AD); New York Jump-ups, c. 90 km SW Wyndham, *Jackson 885*, 20.v.1967 (AD); head of Breadon valley, Southesk Tablelands, *George 15501*, 29.iv.1979 (PERTH).

NORTHERN TERRITORY: 3.5 miles S Elliot, *Chippendale s.n.*, 11.ix.1957 (AD); 56 km N Tennant Ck, *Orchard 890*, 19.vii.1968 (AD); 41.2 km from Hermansburg Mission, *Williams 12120*, 6.x.1981 (AD); Wauchope, c. 340 km N Alice Springs, *Caulfield and Hill s.n.*, -.vii.1983 (AD).

QUEENSLAND: 1 mile E Wernadinga Stn, *Symon 4994*, 31.v.1967 (AD).

4. *S. magnifolia* (F. Muell.) Randell, comb. nov.

Basionym: *Cassia magnifolia* F. Muell., *Fragm.* 1: 166 (1859); Benth., *Fl. Austral.* 2: 283 (1864); *Trans. Linn. Soc. London* 27: 551 (1871); Symon, *Trans. Roy. Soc. S. Australia* 90: 96 (1966).

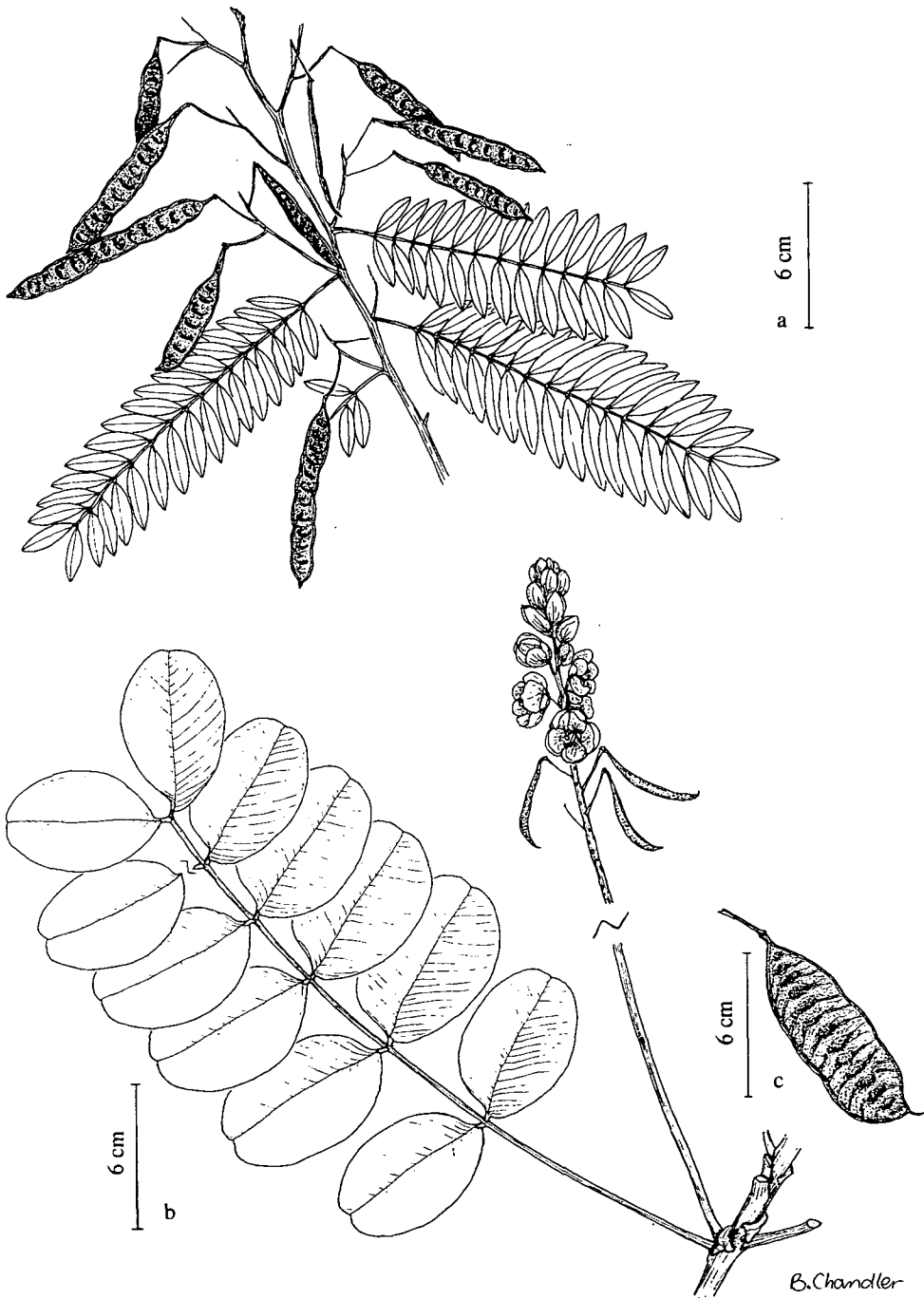


Plate 3. a. *S. timoriensis*, habit, Dunlop 4262 (AD); b-c, *S. magnifolia*; b, habit; c, pod, both from Symon 12115 (AD).

Lectotype: 'rocky ridges, upper Gilbert River, northern Queensland, altitude 1000 ft.', *F. Mueller s.n.*, s.d. There are in K, 2 sheets (both seen in photos), one of a single leaf with 3 dissociated pods, the other of a leafy terminal shoot and a dissociated flowering stalk bearing one pod. The leafy terminal shoot is here designated as the lectotype, with the single leaf as an isotype.

Description

Low shrubs 1-1.5 m tall; *leaves* to 30 cm long including the petiole; *leaflets* 4-6 pairs, broad-oblong to orbicular, 25-45 mm apart on the rachis, the largest 5-8 x 3-5 cm, slightly increasing in size from the base of the rachis, apex emarginate, base unequal and slightly attenuate, glabrous on both sides, veins impressed above and conspicuous below, olive green; *stipules* cordate, acute to acuminate, subpersistent; petiole 8-10 cm long; *inflorescence* 30-60 cm long, bearing 20-60 flowers in a cone-like head; *peduncle* 10-15 cm long; *pedicel* 12-15 mm long; *bracts* oblong, obtuse but apiculate, yellow-brown; *sepals* narrow to broad lanceolate, unequal, 10-12 mm long; *petals* obovate, emarginate, unequal, 10-17 mm long, yellow; *androecium* of 10 stamens, 3 adaxial sterile and reduced, 4 median fertile 3-4 mm long, 2 latero-abaxial fertile 8-10 mm long, 1 central abaxial fertile 3-4 mm long; *filaments* 1-2 mm long; *ovary* glabrous; *fruiting pedicel* 20 mm long, robust; *pod* 8-10 cm x 3-4 cm, flat, dark, with 8-10 seeds; *seeds* obovate, c. 8 mm long, rugose, with small areole, dark brown. Plate 3b,c.

Distribution and ecology

Grows on stony hillsides. Disjunct distribution in Victoria River area of Western Australia/Northern Territory and highlands on north Queensland. Map 5.

Specimens examined

WESTERN AUSTRALIA: 4 miles NNE Margaret R. Stn, *Lazarides 6335*, 14.vii.1959 (AD, MEL); 40 km NW Louisa Downs Stn, *Shaw 839*, 30.v.1967 (AD); c. 110 km E Halls Ck on Wave Hill rd, *Beaglehole 51250*, 23.v.76 (AD, MEL).

NORTHERN TERRITORY: Newcastle Ra., *Armit 271*, 1876 (MEL).

QUEENSLAND: Tait R., *Weld Birch s.n.*, 1892 (MEL); 19 miles E Georgetown, *Symon 4903*, 27.v.1967 (AD).

*5. *S. didymobotrya* (Fresen.) Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 467 (1982).

Basionym: *Cassia didymobotrya* Fresen., *Flora* 22: 53 (1839); Oliver, *Fl. Trop. Africa* 2: 276 (1871); Benth., *Trans. Linn. Soc. London* 27: 551 (1871); De Wit, *Webbia* 11: 241 (1955); Symon, *Trans. Roy. Soc. S. Australia* 90: 95 (1966); Brenan, *Fl. Trop. East Africa* 66 (1967); Isley, *Mem. New York Bot. Gard.* 25: 80 (1975).

Type: The type collection was made by Ruppel in Abyssinia. No material survives in the herbarium FR (Irwin and Barneby, l.c.) but apparently there has been no attempt to designate a lectotype or neotype. A neotype is definitely needed, preferably chosen from material annotated by Oliver or Bentham. The concept described in detail by Oliver (1871) has been used by all later workers, and is followed here.

Description

In cultivation a tall vigorous shrub to 2.5 m tall, with stems and petioles densely pale hairy; *leaves* 10-25 cm long, including petiole; *leaflets* 8-10 pairs, oblong, 10-20 mm apart on the rachis, the largest 2-6 cm x 10-20 mm, subequal in size but the terminals slightly larger, apex acute to obtuse and mucronate, base acute to obtuse, hairs sparse on the lower surface but denser over the veins, veins obscure or impressed above and prominent below, olive green;

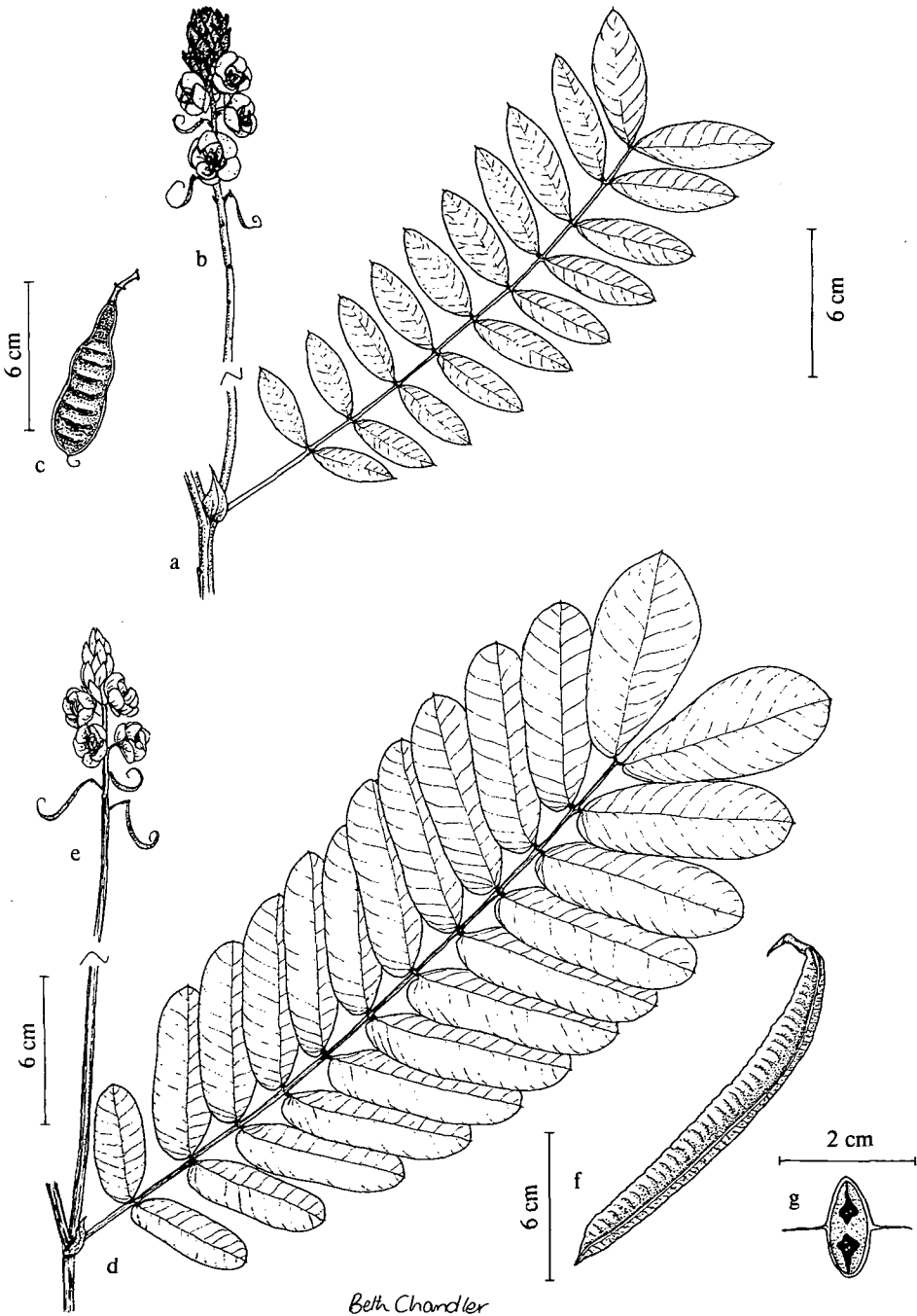


Plate 4. a-c, *S. didymobotrya*; a, leaf from Symon 21872 (AD); b, inflorescence; c, pod, both from Wright 5782 (AD); d-g, *S. alata*; d, leaf from Cilento s.n. (AD); e, inflorescence; f, pod; g, transverse section of pod, all from Symon 5151 (AD).

stipules cordate, stem-clasping, long acuminate, ciliolate, subpersistent; *petiole* 15-40 mm long; *inflorescence* 20-40 cm long, bearing 15-30 flowers in a cone-like head; *peduncle* 5-7 cm long; *pedicel* 6-8 mm long; *bracts* obtuse, pointed, imbricate caducous, dark-brown or black; *sepals* subequal, oblong, 10-12 mm long; *petals* obovate, to 20 mm long, clawed, with conspicuous veins, yellow; *androecium* of 10 anthers, 7 adaxial reduced and sterile, only the 2 latero-abaxial fertile and c. 10 mm long, central abaxial sterile; *filaments* subequal 1-2 mm long; *ovary* densely golden pubescent; *fruiting pedicel* 6-8 mm long, robust; *pod* to 7 cm long, to 18 mm wide, with about 15 ovules; *seeds* not seen, described by Brenan (1967) as oblong, c. 8 mm long, and by De Wit (1955) and Irwin and Barneby (1982) as smooth or obscurely pitted. Plate 4a-b.

Distribution and ecology

Native to northern Africa, widely cultivated in tropical areas around the world. In Australia, I have seen it sparsely naturalised in Queensland and New South Wales in disturbed areas such as roadsides.

Notes

The distinctive dark colour of the bracts noted by Symon (1966), Isley (1975), and Irwin and Barneby (1982), was not described by earlier workers, and may be a feature which has become obvious since the plant was taken into cultivation.

Specimens examined

QUEENSLAND: Childers, *Durrington 138*, 16.vii.1970 (MEL).

SOUTH AUSTRALIA: cult. Waite Institute Arboretum, *Wright s.n.*, 19.iv.1940 (AD).

*6. *S. alata* (L.) Roxb., *Fl. ind. edn 2*: 349 (1824).

Type: Herbarium Cliffortensis 158, Cassia no. 33, BM. This plant was considered as a syntype by Brenan (1967), and as the holotype by Irwin and Barneby (1982), but its status is now being reassessed (Reveal, pers. comm.).

Selected synonyms and references [for full listing see Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 460 (1982)].

Cassia alata L., *Sp. pl.* 378 (1753); Benth., *Trans. Linn. Soc. London* 27: 550 (1871); De Wit, *Webbia* 11: 231 (1955); Symon, *Trans. Roy. Soc. S. Australia* 90: 95 (1966); Brenan, *Fl. Trop. East Africa* 64 (1967); Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 460 (1982).

Description

Low spreading shrub, usually less than 1 m tall, stem hairy; *leaves* 15-40 cm long including *petiole*; *leaflets* 8-12 pairs, oblong, 10-20 mm apart on the rachis, the largest 8-11 x 3-5.5 cm, increasing in size from the base of the rachis but the subterminal the longest, apex obtuse to emarginate and mucronate, base unequal and larger on rachis side, hairs sparse on the lower midrib, veins impressed above and prominent below, olive green; *stipules* cordate, stem-clasping, subpersistent; *petiole* 20-40 mm long; *inflorescence* 30-60 cm long, bearing 20-40 flowers in a cone-like head; *peduncle* 15-30 cm long; *pedicel* 5-8 mm long; *bracts* boatshaped, acute, imbricate, caducous, orange; *sepals* subequal, glabrous; *petals* to 20 mm long, clawed, with conspicuous veins, yellow; *androecium* of 10 anthers, 7 adaxial reduced and sterile, only 2 latero-abaxial fertile and 4 mm long, central abaxial sterile; *filaments* unequal, 4 median 2 mm long, 3 abaxial 4 mm long; *ovary* sparsely hairy; *fruiting pedicel* 15 mm long, robust; *pod* 12-16 cm x 10-15 mm, each valve with a median wing c. 6 mm wide and projecting horizontally, seeds in 2 rows; *seeds* trapzoid, c. 6 mm long. Plate 4c-e.

Distribution and ecology

Native to the Orinoco and Amazon basins of South America, but now widely naturalised throughout the world tropics (Irwin and Barneby, l.c.). In Australia, restricted to far north of Queensland and Northern Territory. Map 5.

Specimens examined

NORTHERN TERRITORY: Darwin, *Cilento s.n.*, -ix.1923 (AD); 10 miles SW Jim Jim crossing, *Symon 5151*, 11.vi.1967 (AD).

QUEENSLAND: Buchan Pt, *Morris 6427*, 4.xi.1939 (AD); Quintel Ck Beach, Lloyd Bay, *Robertson s.n.*, 19.viii.1986 (AD).

2. Ser. *Floridae*

Senna Miller [sect. **Senna**] ser. **Floridae** (Benth.) Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 97 (1982).

Lectotype species: *Cassia siamea* Lam., *Encycl.* 1(2): 648 (1785); syn. *C. floridae* Vahl, *Symb. bot.* 3: 57 (1794); syn. *Senna siamea* (Lam.) Irwin and Barneby, fide Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 97 (1982).

Synonyms

1. *Cassia* L. [sect. *Chamaesenna* DC. ex Colladon] ser. *Floridae* Benth. in Mart., *Fl. Bras.* 15(2): 124 (1870); *Trans. Linn. Soc. London* 27: 547 (1871).

Lectotype species: as above.

2. *Sciacassia* Britton ex Britton and Rose, *N. Amer. Fl.* 23(4): 252 (1930).

Lectotype species: *Sciacassia siamea* (Lam.) Britton and Rose, syn. *Senna siamea* (Lam.) Irwin and Barneby.

3. *Senna* Miller [sect. *Chamaefistula* DC. ex Colladon] ser. *Floridae* (Benth.) Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 97 (1982). [Reasons for this transfer are given in Randell 1988].

Description

As for the section with additional characters (Irwin and Barneby 1982) — stipules linear setiform and subulate, caducous; inflorescences thyriform-paniculate, 10-100 flowered; bracts elliptic; seeds subdiscoïd; seed testa smooth and lustrous.

Distribution

A series of only three species, the type species *S. siamea* reportedly native to Burma and Thailand, *S. garrettiana* in Indochina (Irwin and Barneby 1982), and *S. timoriensis* occurring in SE Asia generally, Malesia and Australia (de Wit 1955). The distribution of the series is thus similar to that of sect. *Psilorhegma* (Randell 1989).

7. *S. timoriensis* (DC.) Irwin and Barneby, *Mem. New York Bot. Gard.* 35: 98 (1982).

Holotype: Timor, *s. coll.*, Musee de Paris 1821, seen in microfiche (exposure 33459, Prodromi Herbarium, IDC microedition).

Synonyms (partly after de Wit 1955):

1. *Cassia timoriensis* DC., *Prodr.* 2: 499 (1825); Benth., *Trans. Linn. Soc. London* 27: 550 (1871); De Wit, *Webbia* 11: 273 (1955); Symon, *Trans. Roy. Soc. Australia* 90: 94 (1966).

Holotype: as above.

2. *Cassia exaltata* Reinw. ex Blume, *Catalogus* 68 (1823); Spanoghe, *Linnaea* 15: 201 (1841); *nomen nudum*.

3. *Senna glauca* Roxb., *Fl. ind. edn* 2: 351 (1832) equated with *S. timoriensis* by Irwin and Barneby l.c. 78; non *Cassia glauca* Lam. *Encycl.* 1: 647 (1785).

Type: not located.

4. *Cassia arayatensis* Llanos, *Fragm. pl. Filip.* 71 (1851); F. -Vill. & Naves in Blanco, *Fl. Filip.* edn 3(4): 55 (1880); Merrill, *Sp. blancoan.* 173 (1918).

Type: not designated.

5. *Cassia laxiflora* Benth., *Fl. Austral.* 283 (1864); *Trans. Linn. Soc. London* 27: 550 (1871).

Lectotype: Arnhem North Bay [Melville Bay, N.T.], R. Brown 4255, 14.ii.1803, BM (photo), (bearing a Type label, but not clear by whom identified as such), lectotype here designated; syntypes BRI!, K (2 sheets, photos), MEL (2 sheets!, photos), E, NSW, P, (cited by Symon 1966) not seen.

6. *Cassia montana* Naves in Blanco, *Fl. Filip.* edn 3: t. 452 (1880); Merrill, *Sp. Blanc.* 173 (1918); non Heyne.

Type: not designated.

Description

Shrub to 2 m tall, stems with short appressed hairs, and longer erect hairs; *leaves* 15-17 cm long, including petioles; *leaflets* 15-18 pairs, lanceolate, 5-7 mm apart on the rachis, the largest 3.5-4.5 cm x 6-8 mm wide, largest in the centre of the rachis and decreasing towards both base and apex of rachis, apex obtuse mucronate, base obtuse, hairs pale on lower midrib and margins, veins obscure above and conspicuous below, olive green above and paler below; *petiole* 10-15 mm long; *stipules* acicular, caducous; *peduncle* 10-20 mm long, bearing 8-10 flowers; *pedicel* 15-20 mm long; *bracts* elliptic, pubescent, subpersistent; *sepals* elliptic, 4-5 mm long, pubescent, green; *petals* to 8 mm long, yellow; *androecium* of 10 stamens, 3 adaxial very reduced and sterile, 4 median fertile and c. 4 mm long, 2 latero-abaxials fertile and c. 6 mm long, one central abaxial fertile and 4 mm long; *filaments* all short; *ovary* short, pubescent, with 15-20 ovules; *fruiting pedicel* 15-20 mm long; *pod* 7-9 cm x 7-10 mm, apiculate, with 12-15 seeds, rich brown; *seeds* squarish, c. 5 mm long, smooth, with linear areole, dark olive green. Plate 3a.

Distribution and ecology

Scattered in sclerophyll woodland of northern Western Australia, Northern Territory and Queensland. Rarely recorded as flowering in the first year after germination. Map 6.

Specimens examined

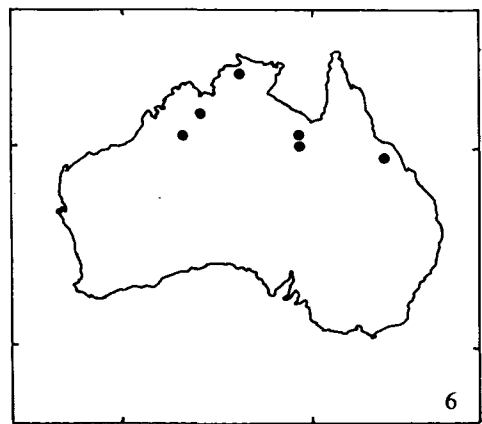
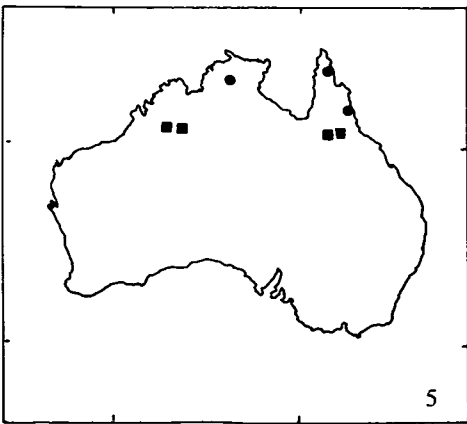
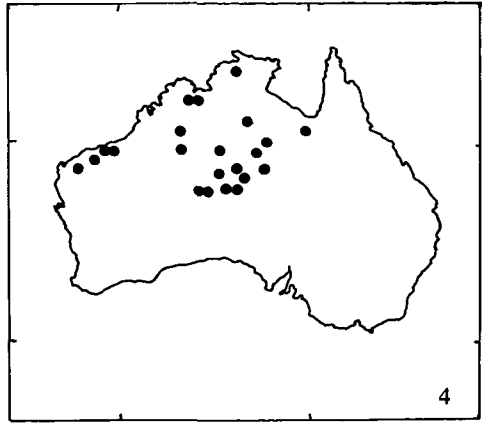
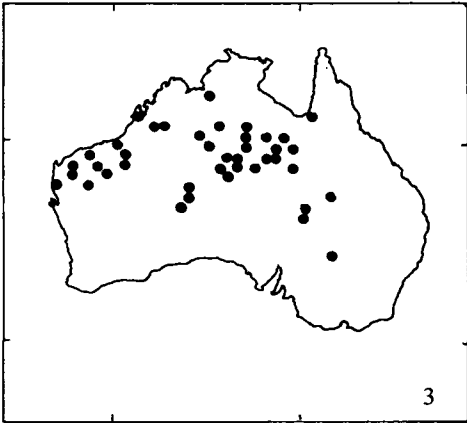
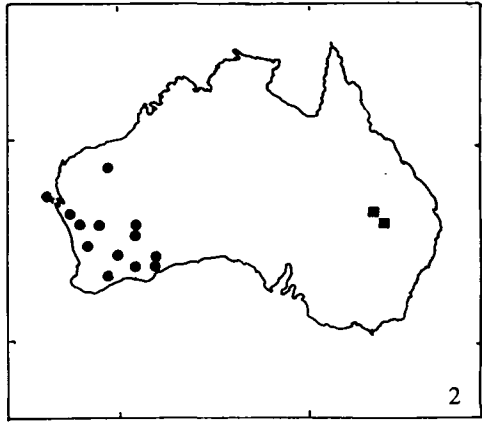
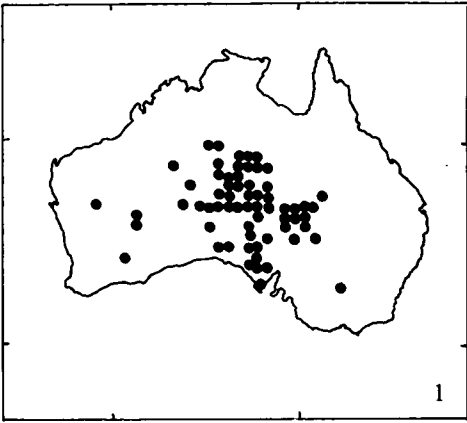
WESTERN AUSTRALIA: 14 miles SW Argyle Downs Stn, *Perry* 2668, 2.viii.1949 (CANB); Old Lake Argyle Rd, c. 7.9 km SE Kununurra, *Beaglehole* 54331, 6.vi.1976 (MEL); Emerian Pt, Dampierland Peninsula, *Martin* 63, 9.iii.1986 (PERTH); 6 km E Mt Talbot, *Keighery* 10621, 4.iii.1989 (PERTH).

NORTHERN TERRITORY: Mt Bunday, *Dunlop* 4262, 19.v.1976 (AD).

QUEENSLAND: Camooweal, *DeLestang s.n.*, -xii.1938 (BRI); 30 miles SE Riversleigh Stn, *Perry* 1435, 11.vi.1948 (CANB); Collinsville, *Smith* 4563, 14.ix.1950 (BRI); Riversleigh Holding, *Gillins* 801, -vi.1963 (BRI); Lawn Hill Hstd, *Webb & Tracey* 10647, -v.1979 (CANB).

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Map 1. *S. pleurocarpa* var. *pleurocarpa*. Map 2. ● *S. pleurocarpa* var. *angustifolia*; ■ var. *longifolia*. Map 3. *S. notabilis*. Map 4. *S. venusta*. Map 5. ■ *S. magnifolia*; ● *S. alata*. Map 6. *S. timoriensis*.

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