

***Acacia thomsonii* (Leguminosae: Mimosoideae: *Acacia* section *Juliflorae*), a new species from the tropical dry zone of Australia**

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### Abstract

*Acacia thomsonii* (Leguminosae: Mimosoideae: *Acacia* section *Juliflorae*), a new species from the tropical dry zone of Australia. Nuytsia 10 (3): 443-449 (1996). *Acacia thomsonii* Maslin & M.W. McDonald, a new species with seed that has potential as a human food resource, is described and illustrated. It is discontinuous within the tropical dry zone of Australia, extending from northeast Western Australia, through Northern Territory to northwest Queensland. In the past *A. thomsonii* was confused with *A. cowleana* Tate but is most closely allied to *A. colei* Maslin & L.A.J. Thomson.

### Introduction

The new species from northern Australia described here as *Acacia thomsonii* was first recognized, as *A. sp. aff. cowleana*, by Thomson (1992). Thomson's paper appeared as a contribution to the proceedings of a Workshop convened by the Australian Tree Seed Centre (CSIRO, Division of Forestry) to investigate the potential of *Acacia* seeds as a source of human food (House and Harwood 1992). As part of an overall research strategy the Workshop identified the need to clarify the taxonomy of species considered to have greatest food potential, namely, *A. colei* Maslin & L.A.J. Thomson (1992), *A. cowleana* Tate and *A. tumida* F. Muell. *Acacia sp. aff. cowleana* was noted by Thomson (1992) as having unique attributes for human food production due its high fecundity and occurrence on harsh, stony sites. Further information on the potential of Australian dry-zone acacias suitable for multipurpose use, including human food production, is given in Harwood (1994) and Thomson *et al.* (1994).

*Acacia thomsonii*, *A. colei* and *A. cowleana* belong to *Acacia* section *Juliflorae* (Benth.) Maiden & Betche and this group appears to be most closely related to *A. leptocarpa* A. Cunn. ex Benth. and *A. longispicata* Pedley. These species, together with a number of other relatives noted in Maslin & Thomson (1992) predominate in the tropical and subtropical arid zones of Australia and are characterized by having spicate inflorescences, phyllodes with numerous longitudinal nerves (often with anastomoses between the main nerves), and thinly textured pods containing seeds commonly with bright yellow arils. *Acacia cowleana* is currently under review by the authors and will be shown as comprising more than one species; in the present paper we use the name *A. cowleana* in its broad sense (which includes *A. oligophleba* Pedley).

## Description

**Acacia thomsonii** Maslin & M.W. McDonald, sp. nov. (Figure 1)

*Frutex* vel abor 2-6 m alta. *Ramuli* sericei. *Surculi* novi ab initio strato resinaceo pallido aeneo vel fuscenti (nec visco) incrustati qui indumento occulto. *Phyllodia* oblanceolata vel anguste oblongo-elliptica, rotundo-obtusa vel sub-acuta, 7.5-17 cm longa, 1-2 cm lata, plerumque ± recta vel leviter falcata, sparsim vel modice sericea; *nervi longitudinales* numerosi, tribus (vel interdum duobus) plus manifesti, *nervis minoribus* 2-4 per mm, sparsim anastomosantibus. *Inflorescentiae*: racemi binati maxime deminuti; axis racemo vestigialis, ad 0.5 mm longus. *Pedunculi* (2)3-7(8) mm longi. *Spicae* 15-30 mm longae, aureae; bracteolae inconspicuae. *Flores* 5-meri. *Calyx* longitudine 1/4-1/3 corollae partes aequans, gamosepalus. *Petala* glabra. *Legumina* linearia, recta vel leviter curvata, (35)45-80(100) mm longa, 3-4(4.5) mm lata, firme vel tenuiter chartacea, ± glabra. *Semina* longitudinalia, ± oblonga, (3)3.5-4(5) mm longa, 2-2.5 mm lata, atro fusca vel nigra; arillus plerumque laete flavus.

*Typus*: 19 km due NE of Halls Creek township, 4.5 km S of Great Northern Highway on minor road to Old Halls Creek, Western Australia, 4 July 1993, B.R. Maslin 7300 (*holo*: PERTH; *iso*: BRI, CANB, K, MEL, NY).

*Shrub* or small *tree* 2-6 m tall and to 3 m across, often ± spindly, crowns rather open with phyllodes confined to the upper portion of the branches, normally sparingly divided at or near ground level with stems c. 2-4.5 cm dbh, occasionally single-boled with dbh to 10 cm, roadside plants may have up to 6 main stems from ground level and rather bushy crowns. *Bark* thin, smooth except slightly longitudinally fissured at the base of main stems, grey. *New shoots* at initiation encrusted with a layer of light bronze or brownish resin (not viscid) which obscures the underlying indumentum (at this stage the yellowish apical mucro of the phyllodes is clearly differentiated and is invested with a mixture of silvery white and minute, light reddish brown resin hairs), upon expansion of the phyllodes a sericeous indumentum of silvery hairs (interspersed with light reddish brown resin hairs) becomes evident on the lower half of the blades with the brownish resin coating confined to the upper half of the blades, subsequently the resin coating is lost and the indumentum becomes confined to the region between the nerves. *Branchlets* ± straight, terete but often angled towards extremities, finely ribbed (ribs yellow, obvious immediately below insertion of phyllodes, soon obscure), orange to orange-brown, moderately to densely sericeous with closely appressed, silvery white hairs (occasionally interspersed with sparse red-brown resin hairs). *Stipules* sub-persistent to caducous, scarious, triangular, rarely oblong-triangular, 1-1.5 mm long, resinous, sparsely to moderately hairy. *Phyllodes* mostly slightly but discernibly asymmetric with lower margin ± straight and upper margin shallowly convex, sometimes a few (especially young phyllodes) symmetric with both margins shallowly convex, oblanceolate to narrowly oblong-elliptic, 7.5-17 cm long, 1-2 cm wide, 5-11 times long as wide, coriaceous, ± straight to shallowly falcately recurved, occasionally shallowly recurved at apex only, patent to ascending, green to grey-green with a slight to obvious silvery sheen (due to the indumentum, most apparent in sunlight), sparsely to moderately sericeous with closely appressed, silvery white hairs; *longitudinal nerves* numerous with 3 (occasionally only 2) main nerves yellowish and more evident than the rest, the uppermost main nerve normally less pronounced than the lower two, remaining separate from them at the base and commonly very inconspicuous towards the apex, the lower two main nerves running together at the base but not confluent with the lower margin, secondary venation not prominent with nerves 2-4 per mm and anastomoses few but consistently present; *marginal nerves* discrete, yellow; *apices* rounded-obtuse to sub-acute, mucronate, the mucro a discrete, rounded or triangular, glabrous to sub-glabrous, callose point, yellow (aging brown); base

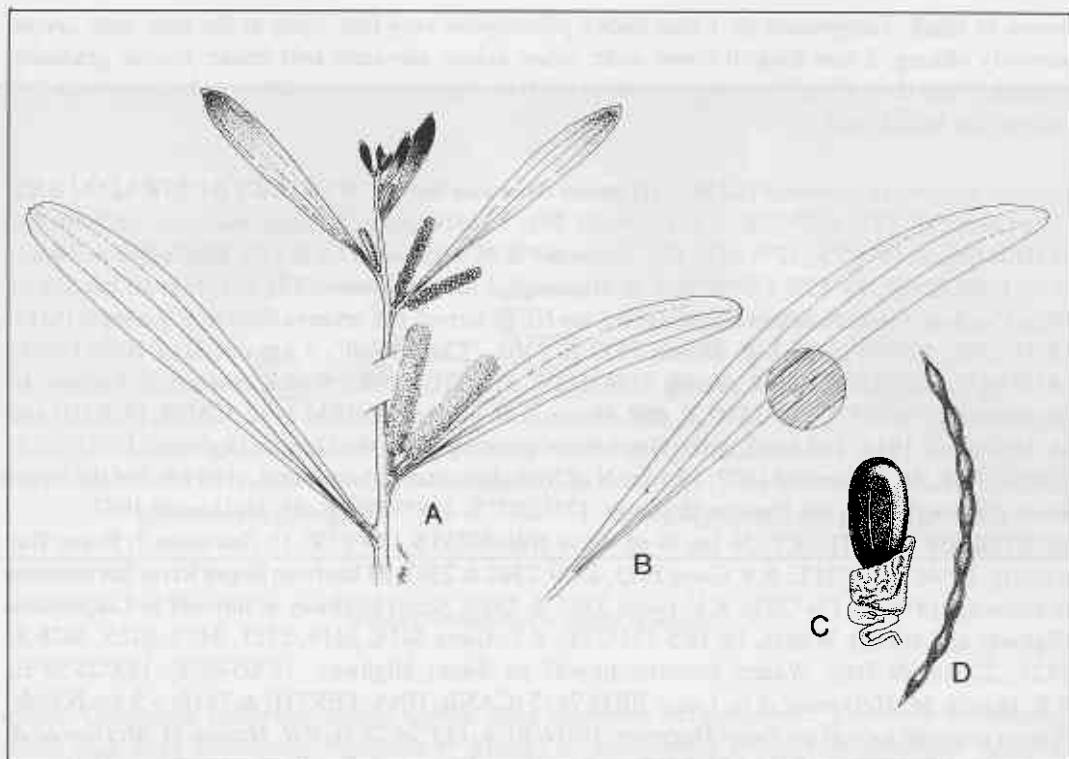


Figure 1. *Acacia thomsonii* A - portion of flowering branchlet, B - single phyllode showing detail of nervature, C - seed, D - pod. A from B.R. Maslin 7300 (CANB, *isotype*); B - D from L. Thomson LXT 1232B (PERTH)

slightly unequal, gradually narrowed toward the pulvinus, *pulvinus* 3-6 mm long, finely transversely wrinkled, sparsely to densely hairy, yellow, orange or brownish. *Gland* situated on upper margin of phyllode at distal end of pulvinus, somewhat prominent, oblong-elliptic, 0.7-1.0 mm long, c. 0.7 mm wide, pore distinct and  $\pm$  narrowly oblong, lip yellow and slightly raised. *Inflorescences* extremely reduced bipinnate racemes, the vestigial raceme axis to 0.5 mm long and commonly terminated by a vegetative bud. *Peduncles* (2)3-7(8) mm long, normally sparsely sericeous with silvery-white, appressed hairs (sometimes interspersed with scattered reddish resin hairs) which are commonly densest towards base of the peduncle, occasionally glabrous or densely sericeous,  $\pm$  finely longitudinally ridged when dry; *basal peduncular bracts* sub-persistent or caducous, scarious,  $\pm$  oblong and slightly narrowed towards the rounded apex, c. 2 mm long, brown, sericeous, abaxially sessile. *Spikes* 15-30 mm long, the flowers sub-densely arranged, light- to mid-golden, *receptacles* glabrous, longitudinally and irregularly ridged when dry. *Bracteoles* spatulate, inconspicuous, 0.7 mm long (equalling calyx), brown. *Flowers* 5-merous. *Calyx* 0.5 mm long, 1/4-1/3 length of corolla, very shallowly dissected with broad sinuses and broadly triangular, minutely ciliolate lobes; *calyx tube* nerveless and glabrous to sparsely,  $\pm$  appressed hairy, truncate base. *Petals* 1.5 mm long, erect or slightly spreading, acute, nerveless, glabrous. *Ovary* very densely hairy, sessile. *Pods* linear, straight to shallowly curved, (35)45-80(100) mm long, 3-4(4.5) mm wide, firmly chartaceous to thinly coriaceous, may persist on receptacle upon dehiscence, moderately to prominently raised over seeds and slightly to moderately constricted between (occasional deep constrictions occur on some pods), red-brown to rich dark brown, glabrous to sparsely hairy with straight, appressed minute hairs (not visible to unaided eye), normally finely and sparingly  $\pm$  longitudinally wrinkled or nerved when dry, acute, marginal nerves narrow and commonly yellowish, stipe 3-5 mm long. *Seeds* longitudinal in pod with the aril facing apex of pod,  $\pm$  oblong, (3)3.5-4(5) mm long, 2-2.5 mm wide, glossy, very dark

brown to black, compressed (c. 1 mm thick); *pleurogram* very fine, open at the hilar end; *areole* narrowly oblong, 2 mm long, 0.4 mm wide; *hilum* apical, elevated; *lens* linear; *funicle* gradually expanded into the aril; *aril* conspicuous, bright yellow (rarely white or yellow and white), with 2-3 folds at the funicle end.

*Selected specimens examined* (all PERTH unless otherwise stated). WESTERN AUSTRALIA: Rock Hole Creek, 18°17'S, 127°35'E, C.E. Harwood 295; 1 km N along Old Stone Hut road, 18.8 km NE of Halls Creek, 18°07'S, 127°48'E, C.E. Harwood & M. McDonald CEH 379; Moola Bulla Station, W of Halls Creek, 18°12'S 127°26'E, C.E. Harwood & M. McDonald CEH 382-384; 16 km SW of Halls Creek on Great Northern Highway (0.1 km NE of turnoff to Carranya Station at Koongie Park), 18°19'22"S, 127°33'20"E, B.R. Maslin 7157 & 7303; "China Wall", 7 km due E of Halls Creek, 18°15'01"S, 127°43'22"E, B.R. Maslin 7294 (NSW, PERTH); 15 km W of Kununurra on highway to Wyndham, 15°46'20"S, 128°38'05"E, B.R. Maslin & M. McDonald BRM 7492 (CANB, PERTH) and M. McDonald 1912; 117 km S of the Negri River crossing along the Duncan Highway, 17°51'32"S, 128°53'33"E, M. McDonald 1937; 19.1 km N of Nicholson Station homestead, (120 km S of the Negri River crossing) along the Duncan Highway, 17°52'55"S, 128°53'09"E, M. McDonald 1952.

NORTHERN TERRITORY: 50 km W of Wave Hill, 17°33'S 130°25'E, D. Davidson 4; Roper Bar Airstrip, 14°44'S 134°31'E; B.V. Gunn 2375, 2379, 2382 & 2383; 37 km from Roper River Bar towards Borroloola, 14°47'S, 134°39'E, B.V. Gunn 2387 & 2389; Stuart Highway at turn-off to Carpentaria Highway and at Daly Waters, 16°18'S 133°23'E, B.V. Gunn 2414, 2419, 2421, 2423, 2425, 2426 & 2427; 22 km N Daly Waters townsite turnoff on Stuart Highway, 16°05'42"S, 133°25'59"E, B.R. Maslin, M. McDonald & G. Leach BRM 7415 (CANB, DNA, PERTH) & 7416; 4.5 km N Daly Waters townsite turnoff on Stuart Highway, 16°14'30"S, 133°24'28"E, B.R. Maslin, M. McDonald & G. Leach BRM 7420 (DNA, PERTH); 6 km N of Dunmarra Roadhouse on Stuart Highway, 16°38'19"S, 133°22'44"E, B.R. Maslin, M. McDonald & G. Leach BRM 7426 (DNA, PERTH) & 7430 (DNA, PERTH); 19 km S of Dunmarra Roadhouse, Stuart Highway, 16°50'48"S, 133°25'32"E, B.R. Maslin, M. McDonald & G. Leach BRM 7468 (DNA, PERTH); 118.6 km NE along the Buchanan Highway from turnoff at Duncan Highway, 17°45'39"S, 129°54'16"E, M. McDonald 1959-1962; 67 km N of Newcastle Waters turnoff on Stuart Highway, 16°46'S, 133°26'E, L. Thomson LXT 1231A & 1231B (BRI, DNA, PERTH); 2.4 km N of Dunmarra Roadhouse on Stuart Highway, 16°40'S, 133°24'E, L. Thomson LXT 1232A-J, K, L & M (BRI, DNA, PERTH).

QUEENSLAND: 35 km E of Camooweal, 19°58'S, 138°25'E, B.V. Gunn 2469; 6.2 km E of Camooweal, M. McDonald 1928; 44.6 km E of Camooweal, 19°29'48"S, 138°31'48"E, M. McDonald 1929; 13 miles SSE of Kajibbi township, 20°08'S, 140°12'E, M. Lazarides 4008.

*Distribution* (Figure 2). *Acacia thomsonii* has a somewhat discontinuous but wide-ranging distribution in the dry tropical region of Australia (between latitudes 15°-20°S) from Western Australia through Northern Territory to Queensland. The most western known occurrence is on Moola Bulla Station, c. 40 km west of Halls Creek, W.A., where it occurs in relatively small, scattered populations. In Northern Territory it occurs in relatively large populations between Daly Waters and Newcastle Waters, with populations in the Roper Bar and Wave Hill Station areas. In Queensland it is known from relatively large populations in the Mt Isa region. *Acacia thomsonii* is adventive on disturbed sites throughout its natural range, particularly those receiving run-on watershed, such as roadsides. The occurrence of a small population of *A. thomsonii* near Kununurra, Western Australia may represent a recent adventive range extension.

*Habitat*. *Acacia thomsonii* grows on dissected plateaux along diffuse drainage lines (often actively eroded) on low, rocky hills and on stony or sandy plains. The soils are usually skeletal, slightly acidic (pH 5.0-6.0) and include ferruginous, sandy clay loams, reddish or brown sands or reddish brown stony



Figure 2. Distribution of *Acacia thomsonii*.

loams. Geological substrates include laterite, meta-sediments and sandstone. Low open woodlands, which may have *Eucalyptus brevifolia* F. Muell., *E. leucophloia* Brooker, *E. pruinosa* Schauer, *E. terminalis* F. Muell. or *Lysiphyllum cunninghamii* (Benth.) de Wit and a groundcover of grasses such as *Triodia* spp. or *Aristida* spp. predominate.

**Phenology.** Flowers from June to mid August and mature pods develop from late September through October.

**Variation.** *Acacia thomsonii* is generally quite invariable over its wide geographic range. There is, however, a tendency for Western Australian specimens to have phyllodes at the lower end of the size range (normally <12 cm long and <17 mm wide), short peduncles (mostly 3-4 mm long) and long spikes (mostly 2-3 cm). On specimens from Queensland and from around Dunmurra, N.T., the phyllode shape is sometimes similar to that of *A. coleii* in being shallowly recurved at the apices, whereas elsewhere the phyllodes are straight or uniformly shallowly recurved over their entire length. The arils are typically bright yellow, however, in one population from north of Daly Waters, N.T. (cf. Maslin 7415 & 7416), a low percentage of the pods contained seeds with white arils or a mixture of white, yellow and piebald arils.

**Affinities and hybridity.** In the past *A. thomsonii* was sometimes confused with *A. cowleana* sens. lat.<sup>1</sup> and indeed Thomson (1992) suggested that it may have arisen as a hybrid involving *A. cowleana* and *A. gonoclada*. However, the new species appears to be most closely related to *A. coleii*, with which it is sometimes sympatric. *Acacia coleii* is most readily distinguished from *A. thomsonii* in the following ways: new shoots normally pale yellow sericeous and although sometimes light bronze due to sparse resin hairs, the surface is not encrusted with an obvious dark brown resin coating; phyllodes

<sup>1</sup>We are currently reviewing the taxonomy of the "Acacia cowleana group" (McDonald & Maslin, in prep.). *Acacia cowleana* sens. lat. comprises at least two species, *A. cowleana* (syn. *A. oligophleba* Pedley) and *A. elachantha* sp. nov.

wider (mostly 2-4 cm), normally more obviously tapered towards their apices, densely sericeous and more obviously reticulate; spikes 3-6.5(8) cm long; pods strongly curved. In the field *A. colei* is further distinguished from *A. thomsonii* by its denser crowns with broader, inclined to ascending, darker coloured phyllodes with a more obvious silvery sheen.

*Acacia elachantha* (ms) is commonly sympatric with *A. thomsonii* and the two could be confused on account of their often superficially similar habits and phyllodes, spicate inflorescences and very similar carpological features. *Acacia elachantha* (ms) is most readily distinguished from *A. thomsonii* by its falcate phyllodes and its new shoots which are normally golden- or silvery-sericeous (not resin-encrusted).

A putative hybrid, *A. gonoclada* x *thomsonii*, has been recorded from just north of Dunmarra Roadhouse in Northern Territory. It occurred as a single plant within a population of *A. thomsonii* (Maslin 7426, DNA & PERTH) and *A. gonoclada* (Maslin 7427, PERTH) and was morphologically intermediate for phyllode shape, phyllode nervation, branchlet angularity and new shoot resinosity. Its relatively robust habit (bushy tree to 6 m tall) and its very low fecundity (several pods containing single seeds were present) support a hybrid origin for this plant (Maslin 7428, PERTH). What is assumed to be the same hybrid occurred c. 5 km north of Daly Waters (e.g. Maslin 7422, PERTH). Another putative hybrid, *A. elachantha* x *gonoclada* (Maslin 7429 PERTH), occurred in the same population and had a facies very similar to *A. thomsonii*. However, it may be recognized by its glabrous or sub-glabrous branchlets, phyllodes to 25 mm wide and some seeds with white arils.

**Biology.** *Acacia thomsonii* is a relatively short-lived species with a life-span of less than 10 years (Thomson 1992). It regenerates prolifically from seed following fires and favourable rainfall to form small, patchy colonies of closely-spaced seedlings. It usually produces seed precociously and in large quantities; young plants (probably no more than one year old) have been observed with relatively heavy pod crops.

The phyllode glands are active during the period of pod initiation to seed dehiscence. They exude relatively large quantities of a slightly sweet, viscid nectar which is attractive to ants. Seed predation by Galahs (*Cacatua roseicapilla*) during the pod maturation stage has been observed.

**Utilization.** *Acacia thomsonii* is currently under evaluation for multipurpose use in dry areas of sub-Saharan Africa (Rinaudo *et al.* 1995). The potential of its seeds as a source of human food is also being assessed. Early results indicate that it is capable of successful establishment, rapid growth and good seed production, comparing favourably with *A. cowleana*, *A. colei* and *A. tumida* (Rinaudo *loc.cit.*). There are no definite records of Australian Aboriginal people having consumed its seeds and nutritional evaluation of the seeds as a food source has yet to be undertaken.

**Conservation status.** Not considered rare or endangered.

**Etymology.** Named after Dr Lex A.J. Thomson in recognition of his research on the utilization of Australian dry-zone acacias and who originally recognized *A. thomsonii* as a distinct entity.

**Common name.** Thomson's Wattle.

### Acknowledgements

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