

## ***Acacia* Miscellany 2. Species related to *A. deltoidea* (Leguminosae: Mimosoideae: Section *Plurinerves*) from Western Australia**

R.S. Cowan and B.R. Maslin

Western Australian Herbarium, Department of Conservation and Land Management,  
P.O. Box 104, Como, Western Australia 6152

### **Abstract**

Cowan, R.S. & B.R. Maslin. *Acacia* Miscellany — 2. Species related to *A. deltoidea* (Leguminosae: Mimosoideae: Section *Plurinerves*) from Western Australia. *Nuytsia* 7(2): 201-208 (1990). In addition to a key to distinguish the taxa, two of which are new (*A. vincentii* and *A. deltoidea* subsp. *ampla*), a new combination under *Acacia* of *Racosperma adenogonia* Pedley is effected.

### **Introduction**

This group of species was treated by Pedley (1987) in a well-illustrated and well-documented review, so a further publication on the alliance so soon after Pedley's might appear redundant. The purpose of this paper, however, is to provide names for two new taxa in the group and to make available one of Pedley's names under *Acacia*; he treated the group as taxa of *Racosperma*, a course we are not yet prepared to follow. Because full, detailed descriptions are available in his paper, it is principally the new taxa that are described below; *A. deltoidea* is described in full because we have extracted from typical *A. deltoidea* a new species and a new subspecies whose character states alter Pedley's circumscription to some extent. *Acacia adenogonia* is described fully in order to take into account several additional collections beyond those cited by Pedley.

The taxa of this group are a close-knit assemblage with the possible exception of *A. sublanata* which differs in several respects from the other taxa comprising the group. All are from the north tropical and subtropical zones in the Kimberley region of Western Australia and in the Northern Territory.

There is a superficial resemblance of this group of taxa to *A. adnata* F. Muell. and *A. comans* W. Fitzg. in the *A. latipes* alliance, which differs from the *A. deltoidea* group by the presence of basal peduncular bracts, separate lateral stipules, and by the lack of a bract on the peduncle above the base. In form of the phyllodes there is also a superficial similarity to the uninerved, triangular phyllodes of some *Phyllodineae*, such as those of Maslin's "*A. biflora* group" (1978). Pedley

(1978) included *A. pravifolia* F. Muell. and *A. amblygona* Cunn. ex Benth. with the *A. deltoidea* group as "the *Triangulares* group of *Acacia* section *Plurinerves*" and there is more than a passing resemblance between these species and the *A. deltoidea* group. Both species, however, have separate, lateral stipules, a bract subtending the base of the peduncles which are otherwise ebracteate, the heads are few-flowered and the bractcoles are of very different structure and texture than those of the present group.

The *A. deltoidea* group is characterized by (1) small, inequilateral, pungent, sessile or sub-sessile phyllodes; (2) upwardly curving pairs of often partly connate (except *A. sublanata* and *A. froggattii*), persistent, subulate or acicular stipules located on the abaxial side of the phyllode base (except *A. sublanata* and *A. froggattii*), rather than laterally as in most species of *Acacia*; (3) all but *A. sublanata* have at least some of the hairs gland-tipped; (4) the peduncles are solitary, lacking a bract at their base but occasionally bearing one above their middle; (5) sepals and/or petals are partly united among themselves; and (6), most strikingly, some of the species have the staminal filaments united, up to one-fifth their length in *A. stipulosa* and basally in irregular fascicles in *A. adengonia*. Such union of filaments is known in the *A. lycopodifolia* group of species, which Pedley (1987) suggested as possible relatives, e.g., *A. lycopodifolia* Cunn. ex Hook. and *A. hippuroides* Heward ex Benth., as well as in other unrelated tropical species

All measurements are from herbarium specimens unless otherwise indicated. The un-numbered taxa in the following key are not treated herein and are included only to indicate relationships.

#### Key to taxa of *A. deltoidea* group

1. Most phyllodes broadest below the middle, ovate to ovate-elliptic
  2. Phyllodes mostly 5-10 mm long, inequilaterally ovate, acuminate, pungent, gland often extending beyond phyllode margin in tooth-like projection; seeds longitudinal in pods ..... 1. *A. adengonia*
  2. Phyllodes 15-16 mm long, inequilaterally elliptic to elliptic-ovate, acute, not pungent, gland not extending beyond phyllode margin; seeds transverse ..... 2b. *A. deltoidea* subsp. *ampla*
1. Most phyllodes broadest at or above the middle
  3. Branchlets villose, hairs crisped, none gland-tipped; phyllodes broadly obdeltate ..... *A. sublanata*
  3. Branchlets other than villose, gland-tipped hairs always present; phyllodes of other shapes
    4. Calyx and corolla regularly 5-merous
      5. Branchlets with long, gland-tipped hairs and shorter, antrorsely curved hairs ..... *A. froggattii*
      5. Branchlets glandular-puberulous, hairs very short and patent sometimes with longer hairs intermixed
    6. Phyllodes 4-6 mm wide, inequilaterally elliptic or obdeltate ..... 2a. *A. deltoidea* subsp. *deltoidea*
    6. Phyllodes 1.5-2 mm wide, inequilaterally oblong-oblanceolate, the margin between gland and apex strongly rounded ..... 3. *A. vincentii*
  4. Calyx with up to 11 acuminate lobes, corolla 7- or 8-lobed ..... *A. stipulosa*

1. *Acacia adenogonia* (Pedley) Cowan & Maslin, comb. nov. (Figure 1, O-S)

*Basionym*: *Racosperma adenogonium* Pedley, *Austrobaileya* 2(4): 316 (1987), based on the following.

*A. deltoidea* Cunn. ex Don var.? *pungens* Benth., *London J. Bot.* 1: 333 (1842). *Type*: Greville Island, Western Australia, *A. Cunningham* s.n. (holo: K; iso: BM (probably), PERTH — fragment ex K).

*Illustration*. L. Pedley, loc. cit., p. 317, Figure 1, E-I (1987).

Erect to sprawling *shrubs* 1-2 m tall, spreading to 3 m. *Bark* smooth, dark red-brown with many pale lenticels. *Branchlets* terete, canescent-villose, scattered shorter gland-tipped hairs sometimes intermixed. *Stipules* persistent, subulate, 2.5-6.5 mm long, united to 1/3 length, curving upwardly, rigid, ciliolate, small subulate lobes sometimes present between primary ones. *Phyllodes* inequilaterally ovate to lanceolate, acuminate-pungent, sessile to subsessile, (3-)5-10(-15) mm long, 1.5-4.5 mm wide, coriaceous, crowded-imbricate, patent to inclined, subglabrous to villose,

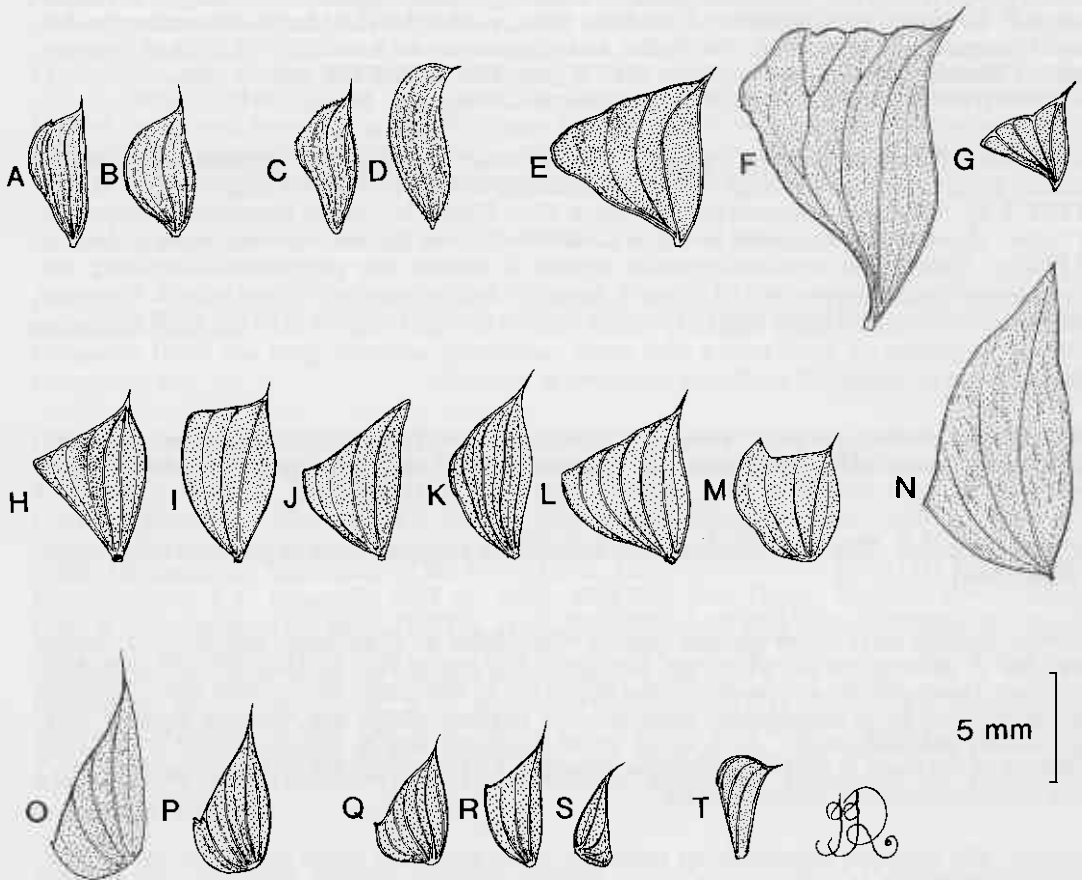


Figure 1. Some variation in phyllodes of taxa comprising the *A. deltoidea* alliance. A-B - *A. stipulosa*; C-D - *A. froggattii*; E-G - *A. sublanata*; H-M - *A. deltoidea* subsp. *deltoidea*; N - *A. deltoidea* subsp. *ampla*; O-P - Gibb River form of *A. adenogonia*; Q-S - coastal, typical form of *A. adenogonia*; T - *A. vincentii*. Phyllodes in most cases from several collections to illustrate intra- and inter-taxon variation in size and form; phyllode of *A. vincentii* from the type. All drawn at about 2x

scattered, short gland-tipped hairs sometimes present; nerves 3 or 4 on each phyllode face; gland 1, situated on upper margin of phyllodes, often projecting in short tube beyond phyllode-margin. *Peduncles* 7.5-14 mm long, solitary, villose, basally ebracteate, occasionally bracteate above middle; heads globular, 4-6 mm diam., 60-92-flowered; bracteoles exerted in bud, linear to narrowly lanceolate, acuminate, ciliate. *Flowers* 5-merous. *Sepals* less than 1/2 corolla-length, 1/2-united, ciliolate, lobes linear from ciliolate basal cup. *Petals* 3/4-united, lobes ovate, puberulous. *Filaments* united irregularly in fascicles at the base. *Legumes* linear, raised over and irregularly slightly constricted between seeds, 35-85 mm long, 5-6.5 mm wide, thin-coriaceous, curved, canescent-puberulous with intermixed longer, gland-tipped hairs. *Seeds* longitudinal, elliptic-oblong, 6-6.5 mm long, 3.5 mm wide, compressed, dull brown-black; pleurogram oblong, closed; aril apical.

*Other specimens examined.* WESTERN AUSTRALIA: Gibb River Road, 1.5 km W of Lennard River Gorge turn-off, *G.W. Carr* 4115 & *A.C. Beaglehole* 47893 (BRI, CANB, K, MEL, PERTH); Napier Broome Bay, 7 km S of West Bay, *E.A. Chesterfield* 313 with *S.J. Forbes & J.H. Willis* (PERTH); Pim Hill, *E.A. Chesterfield* 385 (PERTH); [Prince] Regent River, Voyage of Bathurst in 1821-2, *A. Cunningham* 323 (PERTH, photograph of Herb. BM specimen); "Naturalist Island" in Prince Frederick Harbour at mouth of Hunter River, *M. Evans* 9 (PERTH); 0.5 km N of Pim Hill between Napier Broome Bay and Vansittart Bay, 17 km NNW of Kalumburu Mission, *S.J. Forbes* 2176 with *J.H. Willis* (PERTH); Plain Creek near Beverley Springs Homestead, NE of Derby, *K.F. Kenneally* 1988 (PERTH); "Naturalist Island" in Prince Frederick Harbour, W of entrance to Hunter River, *K.F. Kenneally* 9926 (PERTH); Gibb River Road, c. 17 miles [27.4 km] N from turnoff to Mt House Homestead, 24 July 1974, *J.H. Willis & A.C. Beaglehole* s.n. NSW, PERTH 00709255); Augustus Island, Bonaparte Archipelago, *P.G. Wilson* 10702 (PERTH) and 18 May 1972, *P.G. Wilson* s.n. (PERTH 00709263); Uwins Island, Brunswick Bay, *P.G. Wilson* 11445 (PERTH).

*Distribution.* Northern Western Australia in north-west and southern extremity of Gardner Botanical District and north central Fitzgerald Botanical District (1:250,000 maps D51-16, D52-9 and E51-4, 8). Occurs in scattered populations in West Kimberley in the Bonaparte Archipelago and Napier Broome Bay areas and inland at Kimberley Downs Station, Beverley Springs Station and Phillips Range. The available material appears to indicate two populations comprising the species, one along the north coast of Western Australia and the nearby offshore islands, the other along the Gibb River road in the area of Beverley Springs Homestead, about 150 km southward.

*Habitat.* Grows on sandy soil usually on sandstone in woodland.

*Flowering and fruiting periods.* Flowering specimens have been collected between May and August, and legumes with mature seeds have been collected in July and August from plants still in flower.

*Conservation status.* The wide distribution of this species suggests that it is probably neither rare nor endangered.

*Affinities.* Superficially, *A. adenogonia* appears very similar to *A. deltoidea* and they are clearly related but *A. adenogonia* has phyllodes that are widest below their middle, different branchlet pubescence (hairs shorter and mostly gland-tipped in *A. deltoidea*; villose with only scattered gland-tipped hairs in *A. adenogonia*), often exerted phyllode glands and narrower legumes with longitudinally oriented seeds. It is closer to *A. froggattii* and *A. sublanata* with respect to orientation of the seeds in the pods. Bentham described it as a variety of *A. deltoidea* questionably, saying it might represent a distinct species.

*Variation.* The southern population has somewhat larger phyllodes which are villose, rather than obscurely puberulous as in the coastal form. We have not recognized infraspecific taxa largely because collections from the region between the two populations are infrequent and we expect future collecting to show that these are extremes in a north to south cline, unworthy of formal recognition.

## 2. *Acacia deltoidea* Cunn. ex Don, Gen. Hist. 2: 401 (1832).

*Type*: Montague Sound, Western Australia, 1820, *A. Cunningham* 293 (lecto: BM, fide L. Pedley, *Austrobaileya* 2(4): 315 (1987); iso: K, US).

*Racosperma deltoideum* (Cunn. ex Don) Pedley, *Austrobaileya* 2(4): 315 (1987).

*Illustrations*. F. Mueller, Iconogr. Austral. *Acacia*, dec. 7, pl. [1] (1887), as *A. stipulosa*; J.H. Maiden, J. & Proc. Roy. Soc. New South Wales 53, pl. 13, figs. 7-17 (1920); L. Pedley, loc. cit., p. 319, Figure 2, J-N (1987).

*Shrubs* 1.5-3 m tall. *Bark* grey to dark brown, fissured. *Branchlets* glandular puberulous with intermixed longer hairs, sometimes  $\pm$  resinous. *Stipules* persistent, subulate, partly united, 1.5-4 mm long, upwardly curving, ciliolate or glandular ciliolate. *Phyllodes* sessile, inequilaterally cuneate, elliptic, ovate or broadly obdeltate, with a gland-bearing angle on the upper margin,  $\pm$  mucronate-pungent, 6-16 mm long, 4-7 mm wide, thinly coriaceous to coriaceous, congested, imbricate, patent to ascending, glabrous or  $\pm$  glandular puberulous on faces, and generally on margins, bright green; 3 or 4 longitudinal main nerves on each phyllode face inconspicuous to prominent; gland 1, situated on upper margin of phyllode, rarely projecting beyond margin. *Peduncles* (6-)10-25 mm long, solitary, glandular puberulous, basally ebracteate, rarely with a median peduncular bract; heads globular, dark golden, 5-6 mm diam., (30-)56-73-flowered, compact; bracteoles  $\pm$  exerted in bud, spatulate with blade lanceolate and long-acuminate. *Flowers* 5-merous. *Sepals* 1/2-2/3 corolla length, 1/3-1/2-united, lobes linear, glandular-puberulous apically. *Petals* 2/3-3/4-united, lobes ovate. *Stamens* free. *Legumes* oblong, slightly raised over but not restricted between seeds, 28-42 mm long, 9-12 mm wide, thinly coriaceous, straight, obliquely reticulate-nerved, base rounded, apex rostriform. *Seeds* obliquely oriented, 5 mm long, 2.5 mm wide, compressed, dull dark-brown; pleurogram closed; aril apical.

### 2a. *Acacia deltoidea* Cunn. ex Don subsp. *deltoidea*. (Figure 1, H-M).

*Phyllodes* coriaceous, inequilaterally cuneate, elliptic or triangular, excentrically mucronate-pungent, 6-8.5 mm long, 4-6 mm wide, glandular-puberulous, often obscurely. *Peduncles* 10-12 mm long, glandular-puberulous, rarely with a bract about the middle; bracteoles  $\pm$  exerted in bud.

*Other specimens examined*. WESTERN AUSTRALIA: 3.7 km NW of Mt Daghish, *J.J. Alford* 558 (PERTH); near Manning Gorge, Mt Barnett Station, *I. Cowie* 330 (PERTH); Fitzroy River, 1879, *A. Forrest* s.n. (NSW, PERTH 00698172); creek entering inlet of Talbot Bay, 23 km SE of Cockatoo Island, *P.A. Fryxell & L.A. Craven* 3893 (CANB, PERTH); Plain Creek, c. 10 km W of Beverley Springs Homestead, *A.S. George* 12228 (PERTH); Manning Gorge, *A.S. George* 15176 (PERTH); above the headwaters of the Helby River, *T.G. Hartley* 14819 (PERTH); Prince Regent River Reserve, *K.F. Kenneally* 2081 (K, MEL, PERTH); Euro Gorge, Drysdale River National Park, *K.F. Kenneally* 4363 (BRI, PERTH, TLF); Steep Island off Raft Point at entrance to Doubtful Bay, *K.F. Kenneally* 9681 (BRI, K, PERTH); 5.7 km NW of Gibb River-Kalumburu Road intersection, travelling along old Mitchell River Station Road, *B.L. Koch* 568 (CANB, K, PERTH); Boomerang Bay, Bigge Island, *N.G. Marchant* 72/116 (PERTH); High Clifty Islands, E of Montgomery Island, 24 May 1987, *L.M. Marsh* s. n. (PERTH 00870021); Galvans Gorge, 14.8 km S of Barnett River on Gibb River - Derby road, *J.G. & M.H. Simmons* 1901 (PERTH); Stewart River valley, c. 82 km NNE of Derby, 13 km NNW of "Kimbolton" Homestead, *I.R. Telford* 6310 & *G. Butler* (PERTH).

*Distribution*. Northern Western Australia through most of the Gardner Botanical District and adjoining north-west part of the Fitzgerald Botanical District (1:250,000 maps D51-12, 15, 16; D52-10, 13; and E51-3, 4, 8). Occurs in scattered populations in the Kimberley in Buccaneer and Bonaparte Archipelago areas and near Cambridge Gulf extending inland to Mt Barnett and Drysdale River National Park. The *A. Forrest* collection cited above extends the range southward;

the precise locality is not known but from his journal we deduce the collection was made in grid-cell E51-8, not actually on the Fitzroy River but in its general area.

*Habitat.* Grows in sandy soil usually on sandstone in open scrub and, where the soil is deeper, in woodland.

*Flowering and fruiting periods.* Flowering specimens have been collected in March and between May and August; legumes with mature seeds have been collected in May, June and August from plants still in flower.

*Conservation status.* Not considered rare or endangered.

2b. *Acacia deltoidea* Cunn. ex Don subsp. **ampla** Cowan & Maslin, subsp. nov. (Figure 1, N).

*Phyllodia* firme chartacea, inaequilateraliter elliptica ad elliptico-ovata, contracto-acuta, mucronata, 15-16 mm longa, 5.5-7 mm lata. *Pedunculi* 18-25 mm longi, glandulari-puberuli, plerumque supra medium bracteam ferenti, bracteolis non exsertis in alabastro maturo.

*Typus:* Lawley R. gorge, Western Australia, 29 July 1921, C.A. Gardner 996 (holo: PERTH; iso: NSW, PERTH - C.A. Gardner "1496").

Phyllodes thinly coriaceous, inequilaterally elliptic to elliptic-ovate, acute, mucronate, 15-16 mm long, 5.5-7 mm wide. *Peduncles* 18-25 mm long, glandular-puberulous, usually with a narrowly lanceolate bract above its middle; bracteoles not exerted in bud.

*Other specimens examined.* WESTERN AUSTRALIA: base of Bougainville Peninsula on E shore of Admiralty Gulf, P.A. Fryxell, L.A. Craven & J. McD. Stewart 4782 (CANB, PERTH).

*Distribution.* Northern Western Australia in northern part of the Gardner Botanical District (1:250,00 maps D51-12 and D52-9). Known only from two localities separated by 60 km in the Admiralty Gulf area.

*Habitat.* Grows in woodland on sandstone.

*Flowering and fruiting periods.* Flowering specimens have been collected in June (with legumes with sub-mature seeds) and in July.

*Conservation status.* 2K, following the criteria of Briggs & Leigh (1988). This is a poorly known taxon that may be rare, but the area is very poorly collected and difficult of access.

*Discussion.* The differences separating subsp. *ampla* from the typical subspecies are mostly quantitative but they combine to produce quite a different appearing plant. Pedley (1987) considered it to be only a large-phyllode form of this species but it is so different, especially in phyllode form and size, that we prefer recognizing it as a subspecies, thereby calling it to the attention of future monographers.

*Note.* Gardner's collection numbers 1496 and 996 do refer to the same collection, as Pedley (1987) presumed; the first is the Western Australian Forest Department number, the second Gardner's own herbarium number.

*Etymology.* The subspecies name refers to the size of the phyllodes which are much larger than those of the typical subspecies.

### 3. *Acacia vincentii* Cowan & Maslin, sp. nov. (Figure 1, T).

*Frutex* 3 m altus, ramis longis, arcuatis. *Stipulae* persistentes, setaceae, connatae basaliter, 2-2.5 mm longae, glandulari-puberuli sursum. *Phyllodia* inaequilateraliter oblongo-oblancoolata, apice mucronato-pungenti, circa lateralibus ad axem longum, 4.5-5 mm longa, 1.5-2 mm lata, ascendencia ad erecta, parce puberula. *Pedunculi* 9-9.5 mm longi, solitarii; capitulae oblongoideae, circa 5.5 mm diametro, 41-floribus, bracteolis longo-exsertis in alabastris maturis. *Flores* pentameri, sepalis petalis 3/4 longioribus quam 1/2-connata corolla, connatis, lobis linearibus, ciliolatis. *Legumen* anguste oblongum, marginibus crenatis, 25-55 mm longum, 5-10 mm latum, arcuatum, dense glandulo-puberulum.

*Typus*: 6 miles NE of F. B./33 [c. 10 km WSW of Mt Blythe], Edkins Range, West Kimberley Region, Western Australia, Aug. 1905, *W.V. Fitzgerald* 1421 (holo: NSW 104428; iso: NSW, PERTH).

*Illustration*: L. Pedley, *Austrobaileya* 2(4): 317, Figure 1, J, K (1987).

*Shrubs* 3 m tall with long, arching branches. *Branchlets* terete, glandular-puberulous, slender. *Stipules* persistent, setaceous, united basally, often a setaceous lobe on each stipule between primary lobes, 2-2.5 mm long, curved upwardly, not rigid, sparingly glandular-puberulous to glabrous. *Phyllodes* inequilaterally oblong-oblancoolate, upper margin conspicuously rounded between apex and gland, apex mucronate-pungent and  $\pm$  perpendicular to long axis of phyllode, pulvinus 0.3-0.4 mm long, blades 4.5-5 mm long, 1.5-2 mm wide, coriaceous, ascending to erect, sparingly puberulous; 2 or 3 nerves on each phyllode face prominulous; gland 1, minute, situated on upper margin above middle of phyllode. *Peduncles* 9-9.5 mm long, solitary, ebracteate throughout, puberulous with many hairs gland-tipped; heads oblongoid, c. 5.5 mm diam., 41-flowered; bracteoles long-exserted in bud, spatulate with blade lanceolate, acuminate, puberulous and ciliolate. *Flowers* 5-merous. *Sepals* 3/4 length of petals, 1/2-united, linear lobes and margin of basal cup ciliolate. *Petals* 1/2-united, lobes puberulous. *Stamen filaments* free. *Legumes* narrowly oblong, not constricted between seeds, one or both margins crenate, 25-55 mm long, 5-10 mm wide, curved, obliquely reticulate transversely, densely glandular puberulous. *Seeds* (immature) oblique, black, shiny; pleurogram U-shaped, 1/2 as long as seed; aril small, apical.

*Distribution*. Northern Western Australia in the south-west of the Gardner Botanical District (1:250,000 map E51-4). Known only by the type collection from the Edkins Range, West Kimberley.

*Habitat*. Collected from a sandstone plateau. No other data available.

*Flowering and fruiting periods*. Flowering specimens were collected in August along with immature legumes.

*Conservation status*. IX, using the criteria of Briggs & Leigh (1988) but its status cannot be reliably determined until more information is available.

*Affinities*. The type collection of *A. vincentii* has been variously treated: Fitzgerald himself called it *A. stipulosa* on his labels; then Maiden (1920) treated it as *A. deltoidea* (incorrectly and inexplicably, citing April 1905 as the collecting date, although Fitzgerald gave August as the date in his field diary), at least partly because he considered *A. stipulosa* to be conspecific with *A. deltoidea*; finally, Pedley (1987) viewed the material of the new species as an "aberrant individual" of *A. deltoidea*. While related to *A. deltoidea*, *A. adenogonia* and *A. froggattii*, the new species is really quite distinct. Its obliquely transverse seeds and glandular-puberulous vegetative parts relate it most closely to *A. deltoidea* subsp. *deltoidea*. From all elements of the "*A. deltoidea* group", *A. vincentii* differs in its setose stipules, the shape and size of the phyllodes, its

long-exserted bracteoles in bud, oblongoid flower heads and in its legume having one or both margins crenate.

The new species is described, admittedly on less than the sort of complete data one hopes to have at hand when describing new taxa, because it is very distinct and a name is needed for it in the account of the Kimberley flora being prepared at PERTH, as well as for the Flora of Australia.

*Note.* The type locality data have been augmented beyond those on the label itself, by notes from Fitzgerald's diary/field book of the Kimberley Trigonometric Expedition of 1905.

*Etymology.* This species is named for the collector of the only known material, William Vincent Fitzgerald, to perpetuate the memory of a keen field observer and one of Western Australia's most respected early taxonomists.

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