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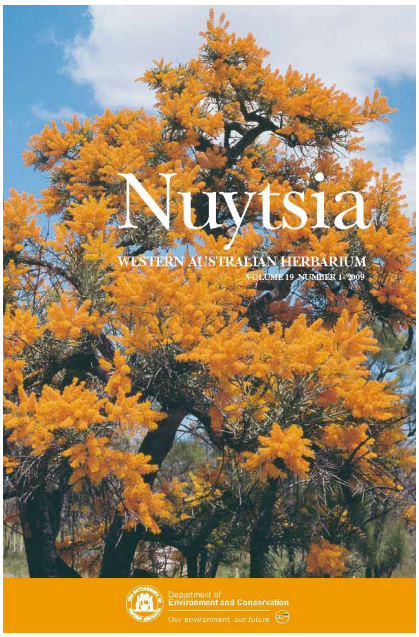

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Three new species of *Acacia* (Leguminosae: Mimosoideae) from the Kimberley Region, Western Australia

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Abstract

Lewington, M.A. & Maslin, B.R. Three new species of *Acacia* (Leguminosae: Mimosoideae) from the Kimberley Region, Western Australia. *Nuytsia* 19(1): 63–75 (2009). Three new species of *Acacia* Mill. endemic to the Kimberley region of northern Western Australia are described: *Acacia barrettiorum* Lewington & Maslin *sp. nov.*, *A. spectra* Lewington & Maslin *sp. nov.* and *A. willingii* Lewington & Maslin *sp. nov. Acacia willingii* is listed as Priority One and *A. barrettiorum* and *A. spectra* as Priority Two species under the Department of Environment and Conservation's Conservation Codes for Western Australian flora.

Introduction

The remote Kimberley region in far northern Western Australia comprises a diverse and often rugged topography. There are relatively few roads and access to many areas requires the use of boat or helicopter; collecting during the wet summer months (December to February) is particularly difficult and as a consequence there are relatively few gatherings from this time of the year. Restricted access to much of the north-west Kimberley has lead to a marked temporal and geographic sampling bias in existing collections, and it is therefore difficult to estimate the number of undiscovered short-range endemics, especially those associated with rugged sandstone and seasonally-wet habitats. Currently about 130 species of *Acacia* Mill. have been recorded for the Kimberley (Maslin 2001) but judging from the collections at the Western Australian Herbarium (PERTH) there are a number of undescribed wattles in the region, three of which are described below. Two of these species (*A. barrettiorum* and *A. spectra*) were discovered relatively recently (2003 and 1998 respectively), well after the period when several botanical surveys were conducted in the Kimberley (see George & Kenneally 1975 and 1977, Hnatiuk & Kenneally 1981, Kenneally 1983 and McKenzie & Kenneally 1983). Although the third species, *A. willingii*, was first collected in 1921 the species was not able to be properly characterized until collections made in 2006 came to hand.

New species descriptions

Acacia barrettiorum Lewington & Maslin, *sp. nov.*

Frutices glabri. *Phyllodia* congesta, patentia, parvissima (1.5–3 longa, 1–3 mm lata), triangularia ad oblongo-triangularia, indistincte 3–7-nervia; *basis* lata, sessilia; *apex* puncta conspicuosa setosa sursum inflexa 0.5–2 mm longa; *nervi longitudinales* 3–7 per superficiem, indistincti. *Inflorescentiae* simplices, solitariae in axillis phyllodiorum positae; *pedunculi* 4–7 mm longi, bractea basali pedunculari absentia; *capitula* globularia, 30–40-flora. *Bracteolae c.* 2 mm longae, laminis lineari-triangularibus acuminatis. *Flores* 5-meri; *sepala* ±libra. *Legumina* angusto-linearia, 30–60 mm longa, 2–3 mm lata, tenui-textura, resinosa, atro rubro-brunnea, tenuiter longitudinaliter nervosa. *Semina* in legumina longitudinales posita; *arillus* albus.

Typus: Kimberley region, Western Australia [precise locality withheld for conservation reasons], 20 January 2003, *R.L. & M.D. Barrett* 2611 (*holo*: PERTH 07271220; *iso*: CANB, DNA, K, MEL, NSW, NY, PERTH 07687567).

Sprawling to ascending, glabrous *shrubs* 1–2.5 m tall and to *c.* 3.5 m across. *Branchlets* terete, ± ribless, green at extremities aging light brown to reddish brown, sometimes slightly resinous, bearing elongated, narrow, yellow scars where phyllodes have fallen. Tips *of new shoots* echinulate due to numerous conspicuous erect tips of the crowded phyllodes. Stipules mostly caducous, very narrowly triangular, inconspicuous (0.2–0.3 mm long). *Phyllodes* crowded, patent, triangular to oblong-triangular with a broad, sessile, truncate base, 1.5–3 mm long, 1–3 mm wide, slightly longitudinally wrinkled when dry, green, slightly shiny (especially when fresh), stomata visible at x10 magnification; *longitudinal nerves* indistinct, 3–7 per face with the central one slightly more pronounced than the rest; *apices* terminated by a conspicuous, upwardly inflected, subulate, setose, light brown, brittle mucro 0.5–2 mm long. *Gland* absent or inconspicuous on upper margin of phyllode above the middle. *Inflorescences* simple, single within axil of phyllodes; *peduncles* 4–7 mm long, resinous, somewhat stout, often finely and sparingly longitudinally ribbed when dry; *basal peduncular bracts* absent; *heads* globular, 7–9 mm diam. when dry, light golden, 30–40-flowered. *Bracteoles c.* 2 mm long, slightly exserted beyond the flowers in buds; *claws* short (1/4–1/3 length of lamina); *laminae* shallowly inflexed, linear-triangular, acuminate and terminating in a slender, light brown point. *Flowers* 5-merous; *sepals c.* 1/3 length of petals, free or almost so, 0.8–1 mm long, narrowly linear; *petals* 1.7–2 mm long, 1-nerved, sometimes very obscurely striate; *stamens* free. *Pods* narrowly linear, slightly raised over the seeds and not or scarcely constricted between them, 30–60 mm long, 2–3 mm wide, firmly chartaceous to thinly coriaceous, shallowly curved (valves slightly irregularly twisted after dehiscence), resinous, slightly viscid, dark red-brown, longitudinally finely nerved with some sparingly anastomosing, marginal nerve slightly thickened. *Seeds* longitudinal in the pods, obloid, 3–4 mm long, 1.8–2 mm wide, compressed (*c.* 2 mm thick), ± shiny, black; *pleurogram* continuous, bordered by a narrow band of dull tissue; *areole* oblong, 1 mm long, 0.5 mm wide; funicle folded and expanded into a terminal, conical, white *aril*. (Figure 1)

Characteristic features. Sprawling to ascending, glabrous *shrubs.* Branchlets bearing scars where phyllodes have fallen. Stipules mostly caducous. *Phyllodes* crowded, patent, very small (1.5–3 mm long, 1–3 mm wide), triangular to oblong-triangular with a broad, sessile, truncate base and terminated by a conspicuous, upwardly inflected, setose mucro 0.5–2 mm long; *longitudinal nerves* indistinct, 3–7 per face. *Gland* absent or inconspicuous. *Inflorescences* simple; *peduncles* 4–7 mm long; *basal peduncular bracts* absent; *heads* globular, 30–40-flowered. *Bracteoles c.* 2 mm long, the laminae linear-triangular, acuminate and slightly exserted in buds. *Flowers* 5-merous; *sepals* ± free, narrowly

Figure 1. Holotype of *Acacia barrettiorum* Lewington & Maslin (PERTH 07271220), scale = 5 cm.

linear. *Pods* narrowly linear, 2–3 mm wide, thin-textured, resinous, dark red-brown, longitudinally finely nerved with some sparingly anastomosing. *Seeds* longitudinal in the pods, obloid; *aril* white.

Other specimens examined. WESTERN AUSTRALIA: Kimberley Region [precise locality withheld for conservation reasons] 25 Jan. 2007, *R.L. Barrett & M.D. Barrett* RLB 3892 (DNA, NSW, NT, PERTH 07692218, 07692226, 07692498, 07692528) and 25 Jan. 2007, RLB 3920 (K, MEL, PERTH 07692196, 07692501).

Distribution. *Acacia barrettiorum* appears to be have a very localized geographic range and is currently known from a remote, difficult to access area near the Prince Regent River in the northwest Kimberley region of Western Australia. It is known from two disjunct populations over an area of about 10 km. One population is relatively small, being restricted to the floor of a narrow valley beside a creek; the other is more extensive, covering an area about 1.5 km across. It is estimated that there exist 600+ plants in these two populations, both of which occur in the Prince Regent Nature Reserve.

Habitat. Occurs on shallow sand lenses over sandstone pavement often near small creeks in fire-protected areas. Associated species are *Borya subulata*, *Rhynchospora* sp., *Grevillea wickhamii* subsp. *pallida*, *Triodia bynoei*, *Gonocarpus implexus*, *Micraira* sp., *Sauropus* sp. A Kimberley Flora (T.E.H. Aplin *et al*. 929), *Ricinocarpos rosmarinifolius*, *Portulaca* sp., *Drosera subtilis*, *D. paradoxa* and *Utricularia georgei*.

Flowering and fruiting period. Because of the paucity of collections, it is not possible to determine the full range of flowering and fruiting. All specimens to hand were gathered in January and collectively they have buds, flowers at anthesis, immature pods, mature pods with seeds and dehisced valves present.

Conservation status. *Acacia barrettiorum* is listed as a Priority Two species under the Department of Environment and Conservation's (DEC) Conservation Codes for Western Australian Flora (Atkins 2008).

Etymology. The botanical name honours the brothers Russell and Matthew Barrett, botanists currently based at Kings Park and Botanic Garden, Perth. Russell and Matthew have made extensive collections of flora from remote areas of the Kimberley region since 1991 when they were living on Beverley Springs Station (now renamed Charnley River Station). Their recent collecting activity has focused on Kimberley sandstone pavement habitats, like the one where this new species was discovered in January 2003. Both Russell and Matthew have produced numerous publications on the taxonomy, ecology and conservation of Western Australian flora, with a particular focus on Kimberley plants (see http://www.bgpa.wa.gov.au/).

Common name. Barrett's Wattle

Affinities. *Acacia barrettiorum* is a very distinctive species on account of having very small, truncate, sessile, multi-nerved phyllodes that terminate in a long, upwardly inflexed, setose mucro (other distinguishing characteristics are noted under *Characteristic features* above). It has no apparent close relatives but may possibly be distantly related to members of the *A. deltoidea* Cunn. ex Don group (Cowan & Maslin 1990). *Acacia deltoidea* and its allies are readily distinguished from the new species in having generally larger, differently-shaped phyllodes that are not truncate at their base and which are normally terminated by a rigid, spiny tip; also, members of this group have hairy branchlets (hairs

commonly glandular), possess a pair of stipules on the abaxial side of the phyllode base, often have partially united stamens and broader pods (3 mm or more wide).

Notes. The species is killed by fire and regenerates from seed.

Acacia spectra Lewington & Maslin, *sp. nov.*

Frutices exigui penduli 4–6 m alti. *Ramuli* graciles, glabri, pruinosi. *Stipula* caduca. *Phyllodia* filiformia, in sectione transversali quadrangularia (saltem in statu sicco), 30–60 cm longa, 1.5–2 mm lata, glabra, viridia, nervis 4 longitudinalibus. *Inflorescentiae* racemorum axillarium vel terminalium vel simplices; *capitula* globularia, magna (12–13 mm diam. in statu sicca), citro-flavida. *Flores* 5-meri; *sepala* et *petala* hispidula. *Legumina* anguste oblonga, 11–15 cm longa, 8–10 mm lata, coriacea vel leviter lignosa, glabra, brunnea vel rubro-brunnea, nervo marginali non incrassato. *Semina* in leguminis obliqua, obloidea-ellipsoidea, compressa, ± sordida, pagina foveolata, brunnea; *areola* magna (5 mm longa, 2 mm lata).

Acacia sp. Mitchell River (M. King *s.n.* 15/2/2003), in Council of Heads of Australasian Herbaria, *Australian Plant Census*, http://www.chah.gov.au/apc/ index.html; Western Australian Herbarium, in *FloraBase*, http://florabase.dec.wa.gov.au [accessed 19 February 2008].

Typus: Kimberley region, Western Australia [precise locality withheld for conservation reasons], 6 May 2005, *T. Willing s.n.* (*holo*: PERTH 07190344; *iso*: CANB, DNA, K, MEL, NSW, NY, PERTH 07190328 & 07190336).

Photographs. WorldWideWattle [online at www.worldwidewattle.com].

Wispy, pendulous *shrubs* 4–6 m tall, single-stemmed for 1–2 m before branching, crowns open, stems slender. *Bark* smooth, green and pruinose when young, perhaps aging bronze-orange, grey and breaking with a rectangular fracture on oldest plants. *Branchlets* slender, terete, glabrous, pruinose. *Stipules* caducous, triangular, not spinose, 0.4 mm long. *Phyllodes* filiform, quadrangular in section at least when dry, 30–60 cm long, 1.5–2 mm wide, wide-spreading to pendulous, straight to shallowly incurved, not rigid, sometimes slightly longitudinally wrinkled or grooved between the nerves when dry, glabrous, green; with 4 yellowish *longitudinal nerves*, one at apex of each angle; *apices* attenuate (the points normally break off with age); *pulvinus* 3–4 mm long, wrinkled, pruinose. *Gland* situated on the upper surface of the phyllode at the distal end of the pulvinus, 0.5–1 mm long, 0.4–0.6 mm wide, sometimes with a second gland near the middle of the phyllode. *Inflorescences* axillary or terminal racemes, or simple; *raceme axes* 2–8 cm long, glabrous; *peduncles* 1–3 in phyllode axils or at nodes along raceme axes, 10–18 mm long, glabrous, base ebracteate; *heads* globular, 12–13 mm diam. when dry, densely 60–70-flowered, lemon-yellow. *Bracteoles* linear-peltate, equal in length to calyx claws, glabrous, the laminae hispidulous abaxially with yellow hairs aging silvery-white. *Flowers* 5-merous; *calyx* 1.8–2 mm long, 3/4 the length of the corolla, gamosepalous, very shortly dissected into hairy lobes which are hispidulous as on bracteoles; *calyx tube* nerveless and glabrous, sometimes brown (at least when dry); *petals* 2.5 mm long, 2/3 united, apices hispidulous as on bracteoles and sepals. *Pods* pendulous, narrowly oblong, slightly raised over the seeds and not constricted between them, 11–15 cm long, 8–10 mm wide, coriaceous to slightly woody, straight to shallowly curved, openly longitudinally reticulate, glabrous, brown or reddish-brown, marginal nerve not thickened. *Seeds* oblique in the pods, seated in shallow chambers separated by narrow partitions, obloid-ellipsoid, 7–8 mm long, 3–4 mm wide, compressed (*c.* 2 mm thick), ± dull, surface minutely pitted, brown,

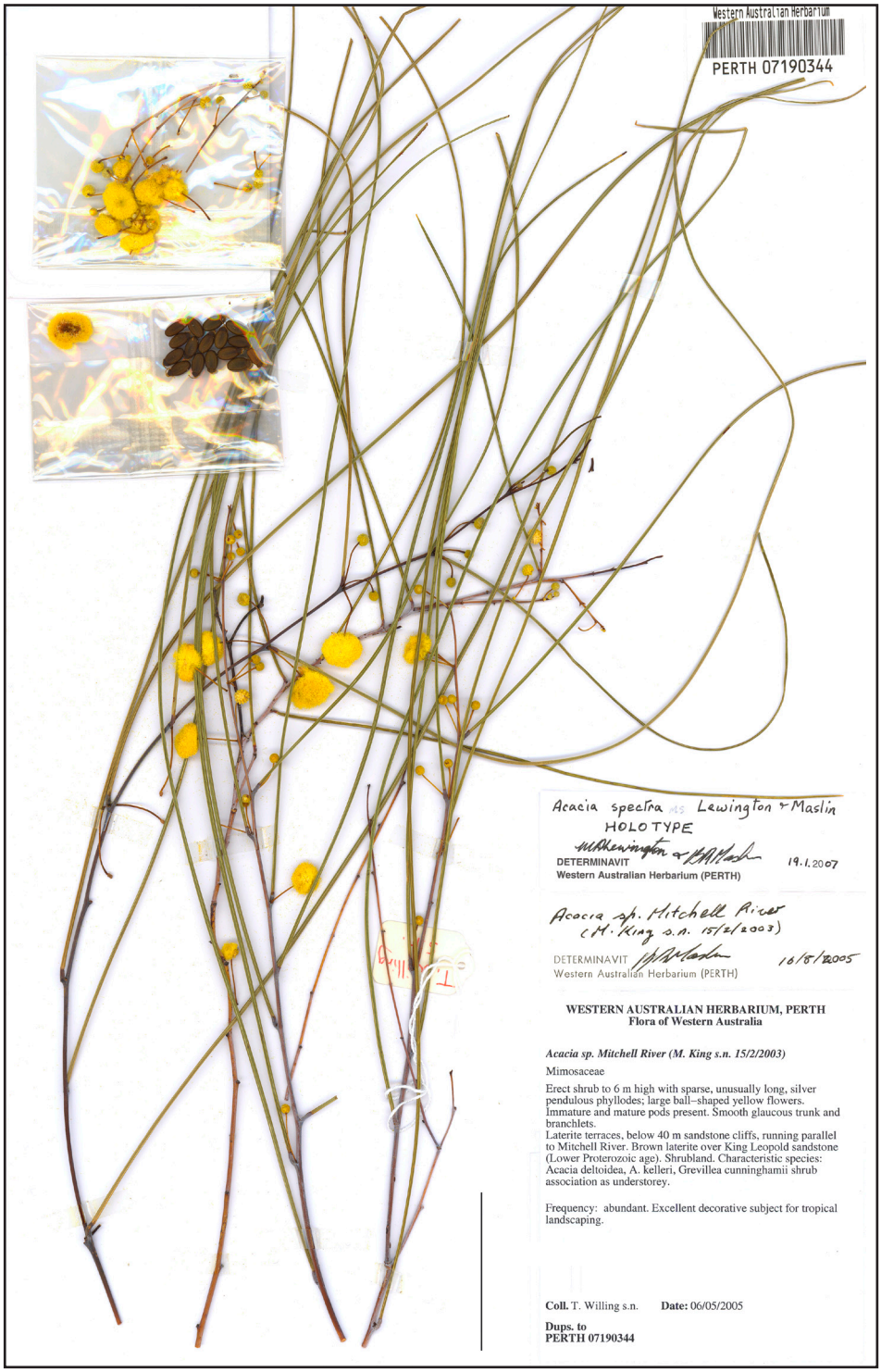

Figure 2. Holotype of *Acacia spectra* Lewington & Maslin (PERTH 07190344), scale = 5 cm.

pleurogram open towards the hilum; *areole* large (5 mm long, 2 mm wide); *funicle* abruptly expanded into a terminal conical *aril*. (Figure 2)

Characteristic features. Wispy, pendulous, *shrubs* with open crowns and slender stems. Branchlets slender, glabrous, pruinose. Stipules caducous. *Phyllodes* filiform, 30–60 cm long, 1.5–2 mm wide, wide-spreading to pendulous, not rigid, glabrous, green; with 4 yellowish *longitudinal nerves*. *Inflorescences* axillary or terminal racemes, or simple; *heads* globular, large (12–13 mm diam. when dry), densely 60–70-flowered, lemon-yellow. *Flowers* 5-merous; sepals, petals and bracteole laminae hispidulous (hairs yellow, aging silvery white). *Pods* narrowly oblong, large (11–15 cm long, 8–10 mm wide), glabrous, brown or reddish-brown, marginal nerve not thickened. *Seeds* oblique in the pods, seated in shallow chambers, minutely pitted, brown; *areole* large (5 mm long, 2 mm wide).

Other specimens examined. WESTERN AUSTRALIA: Kimberley region [precise locality withheld for conservation reasons], 10 May 2005, *C. Done* 1999 (PERTH 07190433 & 07190417). CULTIVATED: Seed from Kimberley region, grown in Darwin, *M. King s.n.*, 15 Feb. 2003 (PERTH 06231861 & 06231993) and Mar. 2003 (PERTH 07771835).

Distribution Known only from a very restricted area in the Kimberley region of northern Western Australia in the Mitchell River National Park. The area where it grows is remote and difficult to access. The new species occurs in two populations located within 1 km of one another and is quite common in the places where it grows. In some ways it is surprising that this species only came to light in 1998 because it occurs in an area which was extensively surveyed in the late 1970s (Western Australian Museum 1981). However, because of its wispy growth form *A. spectra* is easily overlooked, especially when not in flower.

Habitat. Grows on shallow sand in outwash areas formed by erosion of sandstone outcrops in association with *Acacia deltoidea*, *A. kelleri*, *Grevillea* spp., *Melaleuca* sp. and *Corymbia* sp. with *Triodia* sp. as a dense understorey.

Flowering and fruiting period. Because of the paucity of collections it is not possible to determine the full range of flowering and fruiting. All wild specimens to hand were gathered in May and bear buds, flowers at anthesis and pods with mature seeds. *Acacia spectra* has a long flowering period in cultivation (in Darwin), with mature buds seen in February and mature pods collected in March.

Conservation status. *Acacia spectra* is listed as a Priority Two species under DEC's Conservation Codes for Western Australian Flora (Atkins 2008).

Etymology. The botanical name is derived from the Latin *spectrum,* (image, apparition, spectre) in reference to the characteristic spindly, wispy growth form of this species. Similarly, the common name is in allusion to the same growth form.

Common name. Kimberley Ghost Wattle.

Affinities. Judging from its inflorescence and carpological features *A. spectra* is closely related to *A. kenneallyi* Cowan & Maslin which also has a similar growth form and ecological preference. *Acacia kenneallyi* is most readily distinguished from the new species by its flat, much broader phyllodes (6–14 mm wide) with a longer pulvinus and smaller flower heads (± 5mm diam. when dry); it occurs

in the vicinity of Prince Frederick Harbour and some islands of the Bonaparte Archipelago (Cowan & Maslin 1995: 65), about 50 km to the west of where *A. spectra* grows. These two species are referable to a group of north Australian acacias that includes *A. latescens* Benth., *A. mimula* Pedley and *A. rothii* F.M.Bailey; this group in turn is taxonomically not far removed from *A. platycarpa* F. Muell. and its allies (Cowan & Maslin 2001). In a recent molecular phylogeny study Ariati *et al*. (2006) showed that *A. platycarpa* was basal to the arid zone *A. victoriae* Benth. and *A. pyrifolia* groups (but with little bootstrap support). It is therefore of interest to note that *A. aphanoclada* Maslin, which is a member of the *A. victoriae* group of species (see Maslin 1992), is similar to *A. spectra* in having a wispy growth form, very long, narrow, 4-nerved phyllodes and globular heads which are arranged in racemes. *Acacia aphanoclada* has a very restricted distribution near Nullagine in the Pilbara region (about 1000 km south of where *A. spectra* grows) and is readily distinguished from the new species by its small, spinose stipules, smaller heads (7–9 mm diam. when dry), glabrous petals, shorter, narrower and more thinly textured pods (3–7 cm long, 6–8 mm wide, ± firmly chartaceous) and longitudinally orientated, shorter seeds (4–5 mm long) with a ± clavate aril. Although the two northern Australian species *A. jasperensis* Maconochie and *A. alleniana* Maiden have a wispy growth form, long, filiform, 4-nerved phyllodes and globular heads, they are not at all closely related to *A. spectra*, differing most obviously in having shorter and more slender phyllodes (12–24 cm long and less than 1mm wide), non-racemose inflorescences, a persistent bract at the base of their peduncles, free sepals, chartaceous pods and exarillate funicles.

Discovery and cultivation. Acacia spectra was originally found in May 1998 by Marjorie King of Top End Seeds, Darwin, Northern Territory, while walking with a group in the Kimberley region, when her attention was attracted by "large yellow ball-shaped flowers". The plant was photographed and a seed taken back to Darwin, where a plant was grown. The original cultivated plant has since died (in 2006 at 8 years old). Self-sown juveniles have now reached 5–6 m. *Acacia spectra* is an attractive plant, growing to 4 m in 4 years, with apparently a prolonged flowering period during the wet season and has definite horticultural potential. A brief account of the species, as the Kimberley Ghost Wattle, appeared in *Australian Plants* (King 2004). *Acacia spectra* has recently been included in landscape plantings around Broome in Western Australia.

Notes. Collectors observed that plants in populations sampled tended to be even-aged, suggesting the species is a pioneer fire regrowth colonizer, most likely regenerating from seed.

Acacia willingii Lewington & Maslin, *sp. nov*.

Frutices diffuso-ramosi 3–7 m alti; *rami* longi virgati vel subpenduli. *Ramuli* teretes, dense tomentosi, pilis albis. *Stipula* persistentia, 3–4 mm longa. *Phyllodia* agregata, plerumque 0.8–2.7 cm longa, 1.3–2.3 mm lata, plana, erecta, anguste oblonga, mucronata vel sub-setosa, nervis longitudinalibus obscuris. *Inflorescentiae* simplices et axillares; *pedunculi* dense albo-tomentosi; *spicae* floribus dense ordinatis. *Flores* 5-meri, *sepalis* et *petalis* albo-tomentosis. *Legumina* anguste oblonga, plana sed super semina manifeste rotundata et inter semina non constricta, ±dense pilosa. *Semina* in leguminis obliqua, obloidea, sub-nitida; *areola* tristis.

Acacia affin. *kelleri*: Maslin 1983: 369–370.

Acacia sp. Wade Creek (C.A. Gardner 1534), in Council of Heads of Australasian Herbaria, *Australian Plant Census*, http://www.chah.gov.au/apc/ index.html; Western Australian Herbarium, in *FloraBase,* http://florabase.dec.wa.gov.au [accessed 19 February 2008].

Typus: Wade Creek area, Kimberley region, Western Australia [precise locality withheld for conservation reasons.], 18 September 2006, *T. Willing s.n.* (*holo*: PERTH 07418205, *iso*: CANB, DNA, K, MEL, NSW, NY, PERTH 07418191).

Wispy, single-stemmed *shrubs* 3–7 m tall, with an open, ±sparse canopy, the branches virgate to sub-pendulous and marked with scars where phyllodes have fallen. *Bark* light brown and fairly rough on younger branches, maturing brownish grey and longitudinally fissured. *Branchlets* terete, densely tomentose, the hairs white, patent and rather crisped. *Stipules* persistent, setaceous, 3–4 mm long, reddish brown, ciliate. *Phyllodes* crowded towards the ends of the long slender branches, narrowly oblong, (0.6–)0.8–2.7(–3) cm long, 1.3–2.3 mm wide, flat, ascending to erect, straight or sometimes very shallowly incurved, bright green, sparsely to moderately appressed-hairy; *longitudinal nerves* numerous and obscure (nerves the same colour as the inter-nerve spaces), rarely anastomosing, the central nerve slightly off-centre and normally slightly more pronounced than the rest; *apices* mucronate to sub-setose by a delicate, short mucro 0.5 mm long. *Gland* situated on upper margin of phyllode 2–4 mm above pulvinus. *Inflorescences* simple, single within axil of phyllode; *peduncles* (3–)4–7 mm long, densely white-tomentose; *spikes* 15–35 mm long, bright light golden, flowers densely arranged. *Bracteoles* linear-spathulate, 1–1.5 mm long, reddish brown, short-tomentose. *Flowers* 5-merous; *sepals c.* 0.7 mm long, united for *c.* 1/5 their length, short-tomentose abaxially; *petals c.* 1.5 mm long, united for 1/2 their length, short-tomentose abaxially, seemingly nerveless. *Pods* narrowly oblong, flat but prominently rounded over the seeds, not constricted between seeds, 3.5–8 cm long, (5–)6–7.5 mm wide, firmly chartaceous to thinly coriaceous, straight to shallowly curved, slightly resinous but not viscid, very obscurely obliquely nerved, densely puberulous to short-tomentose (the hairs 0.5–0.7 mm long, patent and slightly crisped), mid-brown, attenuate at base and apex, margins slightly thickened. *Seeds* oblique in the pod, obloid, 4–4.5 mm long, 2.8–3.3 mm wide, compressed (*c.* 2 mm thick), depressed at centre (associated with areole), sub-shiny, black to very dark brown; *areole* dull, dark brownish; *aril* cap-like, small; *funicle* folded. (Figure 3)

Characteristic features. Wispy *shrubs* with open canopy and long virgate to sub-pendulous branches. *Branchlets* densely white-tomentose, 4–7 mm long. *Stipules* persistent, 3–4 mm long. *Phyllodes* crowded, erect, narrowly oblong, mostly 0.8–2.7 cm long, 1.3–2.3 mm wide, obscurely longitudinally multi-nerved, mucronate to sub-setose by a delicate, short mucro. *Inflorescences* simple, peduncles short (mostly 4–7 mm long), densely white-tomentose, *spikes* densely flowered. *Flowers* 5-merous, sepals and petals white-tomentose. *Pods* linear, flat but obviously rounded over seeds and not constricted between them, thin-textured, ± densely puberulous to shortly tomentose. *Seeds* oblique in the pod, obloid, depressed at centre, sub-shiny; *areole* dull.

Other specimens examined. WESTERN AUSTRALIA: Wade Creek area [precise locality withheld for conservation reasons] 19 Aug. 1921, *C.A. Gardner* 1534/1034 (PERTH, see under *Notes* below re dual collecting numbers) and 6 Aug. 2006, *T. Willing s.n.* (PERTH 07788762).

Distribution. Known only from a very restricted area in the vicinity of Wade Creek in the Kimberley region of northern Western Australia. *Acacia willingii* is known with certainty from only this one area where less than 100 plants occurred (T. Willing, pers. comm.). However, the area is remote and difficult to access, therefore difficult to survey; its geographic range therefore remains uncertain at present.

Habitat. The new species occurs on horizontal sandstone terraces which adjoin a creek and are subject to monsoonal flooding. The plants usually grow in crevices in the pavement on skeletal sandy soil in Hummock Grassland of *Triodia* spp.; associated species include *Solanum vansittartense* and

Figure 3. Holotype of *Acacia willingii*, Lewington & Maslin (PERTH 07418205), scale = 5 cm

Acacia translucens. The Wade Creek catchment is principally vegetated by savanna woodland, dominated by a Stringybark (*Eucalyptus tetrodonta*) sub-alliance, which was mapped and detailed in a 1984 survey undertaken by Forbes *et al.* (1988).

Flowering and fruiting period. Because of the paucity of collections, it is not possible to determine the full range of flowering and fruiting. Specimens collected in August and September bear buds, flowers at anthesis and pods with mature seeds.

Conservation status. *Acacia willingii* is listed as a Priority One species under DEC's Conservation Codes for Western Australian Flora (Atkins 2008).

Etymology. The botanical name honours Tim Willing, whose principal area of expertise is the Kimberley environment, particularly its flora and the environmental values of the coast and islands. Tim has lived and worked in Broome continuously for 27 years. From 1980–1995 he was a horticulturist with Parks and Gardens, Shire of Broome, and developed his abiding interest in identifying and cultivating the Kimberley flora. In 1996, he co-authored (with Kevin Kenneally and Daphne Edinger) *Broome and beyond*: *plants and people of the Dampier Peninsula* – a flora of the area north from Broome, for which the authors were awarded a CSIRO External Medal for Research Achievement. From 1996–2003 Tim was Conservation Officer (West Kimberley) with the Department of Conservation and Land Management (now Department of Environment and Conservation), based in Broome. During 2004 he was Acting Regional Leader (Nature Conservation) for CALM Kimberley. Since 2005 he has been Expedition Guide for Pearl Sea Coastal Cruises on board their charter vessels *Kimberley Quest 1 & 2,* operating between Broome and Wyndham. He has been the only person to recollect this new species since its original discovery in 1921 (see below).

Common name. Willing's Wattle.

Affinities. *Acacia willingii* belongs to a small group of species that includes *A. chrysochaeta* Maslin, *A. dacrydioides* Tindale and *A. kelleri* F. Muell. A key to these species, including *A. willingii* (that was then called *A.* aff. *kelleri*) is given in Maslin (1983: 370). The new species is most closely related to *A. kelleri* which is readily recognized when in fruit by its pods which are sub-moniliform, 3–5 mm wide, dark red-brown, glabrous or rarely sparsely hairy and longitudinally striate, and by its longitudinal seeds (oblique in *A. willingii* but incorrectly given as longitudinal in Maslin *l.c.*). In the absence of pods the two species are more difficult to separate as their phyllodes are similar in shape and size but there are differences in the apical mucro (distinctly setose and about 1mm long in *A. kelleri*, mucronate to sub-setose and about 0.5mm long in *A. willingii*) and phyllode nervature (the nerves are more distinct and yellowish, contrasting with the green inter-nerve tissue in *A. kelleri*, whereas in *A. willingii* the nerves are fewer and green and therefore not well demarcated from the green inter-nerve spaces). The inflorescences and flowers of the two species are very similar. *Acacia willingii* and *A. kelleri* seem not to co-occur; *A. willingii* is known from only one locality, which is at least 40 km from the nearest known occurrence of *A. kelleri*. The differences between the two species were recognised by Tim Willing (pers. comm., 23 January 2007) who commented that '[the images] show the differences between Ac Wade Creek [*A. willingii*] and *A. kelleri* pretty clearly!! At Wade Creek there is no *kelleri* at all in that catchment to my knowledge, so the taxa appear to be allopatric. The Wade Creek taxon also appears to be confined to the flood-affected horizontal rock terraces and banks of Wade Creek itself (*kelleri* is invariably above the flood level on high sandstone bluffs and terraces, above the creeks where it grows). I have not observed the Wade Creek taxon [*A. willingii*] anywhere, except at Wade Creek. In comparison to *kelleri*, the Wade Creek taxon, when mature, is much more gracile and wispy-looking. When juvenile, it is particularly ornamental and clearly has landscaping potential.

The phyllodes are also much brighter green in appearance and less obviously hairy … [The bark of *A. kelleri*] seems to be rougher, darker and more fibrous in comparison to the smoother-barked Wade Creek taxon.' Although we concur with most of the differences noted by Willing, it is evident from examination of a wide range of herbarium material that there are no significant differences between the phyllode indumentum of the two species. *Acacia willingii* is further distinguished from *A. kelleri* in the following ways: there is a general tendency for the peduncles of *A. kelleri* to be longer [(4–)7–12 (–20) mm] than those of *A. willingii* [(3–)4–7 mm], the pods of *A. kelleri* lack the slightly thickened margins of *A. willingii*, also the seeds in *A. kelleri* are separated by a narrow band of oblique tissue in the pods (this tissue is absent in *A. willingii*) and have a dull yellow areole, in contrast to the dark brownish areole of *A. willingii*.

It is of historical interest to note that C.A. Gardner, who was the first to collect *A. willingii*, did not regard this species as distinct from *A. kelleri*. Gardner collected both species in 1921 when he was a member of the W.R. Easton Kimberley Exploration Expedition (see Forbes *et al.* 1988). *Acacia kelleri* was gathered from the Moran River on 30 June 1921 (*C.A. Gardner* 949/1449, PERTH: see under *Notes* below re dual collecting numbers) and *A. willingii* from Wade Creek on 19 August 1921 (*C.A. Gardner* 1534/1034, PERTH). Gardner determined his specimens of *A. willingii* as *A. kelleri*.

Acacia chrysochaeta shows similarities to *A. willingii* but is distinguished by its usually longer phyllodes (25–40 mm) with setose mucros, longer peduncles (6–12 mm) and particularly by the golden indumentum on its buds and wider pods (7–10 mm). *Acacia dacrydioides* is readily distinguished by its sub-terete phyllodes.

Discovery. As already noted, *A. willingii* was first collected (from Wade Creek) by C.A. Gardner in August 1921; it was not collected again until August and September 2006, by Tim Willing. This additional material, together with the comprehensive notes provided by Willing, has enabled this species to now be properly characterized.

Notes. In the Maslin key to species referred to above *A. willingii* (as *A.* aff. *kelleri*) was based on the C.A. Gardner 1921 collection and there are three herbarium sheets of this collection at the Western Australian Herbarium (PERTH). Sheets 00339385 and 00339377, which have always been part of the PERTH collection, bear the collecting number 1534, while sheet 00339393 originally formed part of C.A. Gardner's personal herbarium (it is labelled: 'Herbarium Gardnerianum made available to the Western Australian Herbarium by the Lord Abbott and Members of the Benedictine Community of New Norcia, June 1970.') and has the collecting number 1034, but is part of the same gathering. For many of the specimens which Gardner contributed to the Forests Department Herbarium (which later became the Western Australian Herbarium) between 1921 and 1924, Gardner incorporated duplicates into his own private herbarium. These were given Gardner Herbarium numbers which ran 500 below those of the corresponding specimens in the state collection. Gardner (1923) made 325 collections in the Kimberley in 1921, covering the Western Australian numbers 1321–1645 and corresponding to the Gardner numbers 821–1145 (Wilson 1988).

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