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Acacia atrox subsp. *planiticola* (Fabaceae: Mimosoideae), a new threatened subspecies from the North Western Plains of New South Wales, Australia

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Abstract

Acacia atrox Kodela subsp. *planiticola* Kodela & L.M.Copel., a new, rare and threatened subspecies, is described and illustrated. Notes are also given on its distribution, habitat, etymology and conservation status. The subspecies is known only from a single population in Kirramingly Nature Reserve on the North Western Plains of New South Wales, Australia. With its unusual, sharply pungent-pointed, sessile, basally dilated phyllodes, subsp. *planiticola* appears to be closely related to typical *Acacia atrox* Kodela, and both taxa are thought to be clonal with plants spreading vegetatively beneath the ground via root suckers. Although all plants are in a conservation reserve, *Acacia atrox* subsp. *planiticola* is considered threatened due to its small population size and its vulnerability to stochastic events.

Introduction

During May 2010, the vegetation and floristics of Kirramingly Nature Reserve were surveyed under contract with the Parks & Wildlife Group of the NSW Office of Environment & Heritage (formerly Department of Environment, Climate Change & Water). Over 260 vascular plant species were recorded with a number of these being of some conservation significance or thought to be potentially undescribed taxa requiring further taxonomic investigation (Copeland 2010). One of these taxa, a tall shrub or small tree up to 6 m high, was a species of *Acacia* clearly similar to *Acacia atrox* Kodela, an endangered species from the Delungra district on the North Western Slopes of New South Wales. The distance between these two taxa is c. 100 km. Specimens of the putative new taxon were compared with all specimens of *A. atrox* held at the National Herbarium of New South Wales (NSW) to confirm its taxonomic distinctiveness. This paper describes the new subspecies, gives notes on its distribution, habitat, etymology, phenology and conservation status, and discusses the diagnostic features distinguishing typical *Acacia atrox* and the new subspecies.

Taxonomy

Acacia atrox Kodela subsp. *planiticola* Kodela & L.M.Copel., *subsp. nov.*

Diagnosis: *A. atroci* subsp. *atroci* similis sed phyllodiis minus rigidis venis longitudinalibus paucioribus atque minus prominentibus et eis basibus minus expansis, capitulis maioribus floribus numerosioribus praecipue differt.

Acacia sp. aff. *atrox* (Kirramingly N.R., L.M. Copeland 4422) NSW Herbarium (Kodela 2012)

Acacia sp. Kirramingly N.R. (L.M. Copeland 4422) Kodela (Centre for Australian National Biodiversity Research 2012).

Type: New South Wales: North Western Plains: Kirramingly Nature Reserve, c. 30 km SSW of Moree, [precise locality withheld for conservation purposes], L.M. Copeland 4422 & M. Kerr, 14 May 2010 (holo: NSW864862; iso: BRI, CANB, K, MEL, MO, NE, NSW864863, PERTH).

Tall shrub to small tree to 6 m high; branching from near base with spreading canopy; spreading by suckering. Bark grey-brown, rough, firm-flakey, vertically fissured. *Branchlets* terete, pale light green to yellowish green, becoming darker and brownish in colour with age, with inconspicuous low rounded longitudinal ridges, glabrous. *Phyllodes* sessile, perpendicular to slightly upwards-inclined on branches (often more inclined distally along branches), ± straight to slightly curved, ± terete to somewhat quadrangular in section, the venation indistinct with at least 4 inconspicuous veins (the obscure or unclear venation can be further confused when dry phyllodes are longitudinally wrinkled/ridged), possibly other minor veins present (which are not detectable on surface), (15–) 20–50 mm long, (0.7–) 0.8–1.5 mm wide, ± rigid, light green, glabrous (except immature phyllodes have scattered, appressed, white-hyaline hairs); apex gradually to somewhat abruptly tapered towards a straight, pungent, fine, orange-brown tip (0.7–) 1–1.5 (–2.2) mm long; base abruptly broadened (longitudinally splayed) leaving a (1–) 1.5–2 (–2.2) mm long, ± obovate scar on branch when lost; gland inconspicuous, light green (same colour as phyllode) to yellowish or orange-brown, ± circular to oval, 0.4–0.8 mm long, situated on the upper margin or vein at or near (to 1.5 (–2.5) mm above) phyllode base, sometimes a second similar minute gland c. ¼–⅔ from base (this gland sometimes slightly raised by an outgrowth of the phyllode margin where the gland occurs); galls narrowly ovoid and distally tapering (similar in shape to *Hakea* species with narrow tapering follicles) commonly formed within some phyllodes. *Inflorescences* paired (often one missing) or sometimes single on a rudimentary raceme axis to 1 mm long (therefore often appearing simple); peduncles (5–) 12–32 mm long, slender, reddish/purplish brown, glabrous; bracts at base of peduncles markedly concave, ± broadly ovate, to 1.5 (–2) mm long, ciliolate, often splitting and caducous; heads globular, c. 33–41-flowered, 7–11 mm diam. (dry specimen), cream-coloured to pale yellow. *Bracteoles* ± spatulate to obovate (often concave-convex and gradually broadening towards apex), 0.6–0.9 mm long, ciliolate, minute hairs also on the outer surface of the claw especially along midline. *Flowers* 5-merous; calyx cupular, 0.7–1 (–1.2) mm long, dissected for c. ½–⅓ (–⅔), with appressed to spreading, minute, hyaline-white hairs at base, often scattered on tube and concentrated along the ribs and lobes, ciliolate along the broadly acute to obtuse lobes; corolla 1.8–2.2 mm long, dissected for c. ½ or more its length, probably splitting towards base with age, the petals 1-veined, mostly glabrous, with minute hairs or granules (appearing papillose) towards apex mainly along the margin (sometimes forming a white tuft at tip), acute and often purplish in upper half; ovary densely white-puberulous. *Pods* and seeds not seen. (Figs. 1–4).

Additional specimens examined: New South Wales: North Western Plains: Kirramingly Nature Reserve, c. 30 km SSW of Moree, L.M. Copeland 4421, 6 May 2010 (BRI, CANB, MEL, NE, NSW); *ibid.*, P.J. Clarke s.n. & R.D.B. Whalley (NE97712), 8 April 2011 (BRI, CANB, MEL, NE, NSW).

Etymology: the specific epithet ‘*planiticola*’ refers to the habitat where this subspecies grows (dwelling on the plains). *Acacia atrox* subsp. *atrox*, in contrast, grows in sloping terrain further east.

Phenology: flowers have only been recorded in April and May although the presence of old, wilted flowers and numerous unopened buds at this time suggests that this subspecies would also flower in March and June. No fruits have been observed despite an extensive search of all the known stems during April and May 2010.

Distribution: currently known only from a single population in Kirramingly Nature Reserve, 30 km SSW of Moree on the North Western Plains of New South Wales. Within the reserve, stems of *Acacia atrox* subsp. *planiticola* occur in five distinct clumps over an area of approximately five hectares. Each of these clumps range from 50–200 m from each other.

Habitat: the vegetation within Kirramingly Nature Reserve consists of a mosaic of natural grasslands and grassy woodlands with small trees up to 10 m high (Clarke *et al.* 1998; Copeland 2005, 2010). The topography is extremely flat with a rise of only a few metres across the entire reserve, while the soil is a basalt-derived



Fig. 1. Growth habit of type individual of *Acacia atrox* subsp. *planiticola*.



Fig. 2. Trunk and bark of *Acacia atrox* subsp. *planiticola*.



Fig. 3. Flowering branchlet and phyllodes of *Acacia atrox* subsp. *planiticola*.



Fig. 4. Insect galls commonly occurring on *Acacia atrox* subsp. *planiticola*.

cracking clay loam (of the ‘black soil plain’) of high fertility (NSW National Parks & Wildlife 2003). The five clumps of *Acacia atrox* subsp. *planiticola* all have patches of small trees nearby such as Belah (*Casuarina cristata*), River Cooba (*Acacia stenophylla*) and Western Rosewood (*Alectryon oleifolius*). Several chenopod species such as *Sclerolaena muricata* var. *villosa*, *Atriplex semibaccata*, *Einadia nutans* subsp. *linifolia*, *Rhagodia spinescens* and *Maireana aphylla* occur within, or very close to, the clumps. Commonly associated grasses and forbs include *Aristida leptopoda*, *Astrebla lappacea*, *Astrebla elymoides*, *Panicum decompositum*, *Thellungia advena*, *Sida trichopoda* and *Boerhavia dominii*.

Population size and reproductive notes: the total number of large stems (>10 cm diam.) across all five clumps of *Acacia atrox* subsp. *planiticola* has been estimated at approximately 65 (Copeland 2010). In addition, several hundred smaller stems occur amongst the larger, older stems. It is currently unknown if each of the five clumps represents a single suckering individual (i.e. a total population of five individuals), or if all clumps are genetically identical. If the latter is true then each stem is a ramet and the species would consist of just a single individual. This scenario is suspected to be the case with the closely related type subspecies of *Acacia atrox* (Hawes *et al.* 2000; Kodela 2001; Hunter & Bell 2006), although further work is required to test this hypothesis.

Conservation status: *Acacia atrox* subsp. *planiticola* is known only from a very restricted area at the type locality. Although all plants are conserved in a Nature Reserve, the species remains highly vulnerable to stochastic events such as wildfire or a fungal disease. Browsing by feral goats may be an additional threat. A ROTAP code of 2VCit is suggested following the criteria of Briggs & Leigh (1996), while *Acacia atrox* subsp. *planiticola* would meet the requirements to be considered either “Critically Endangered” or “Endangered” on the IUCN redlist (IUCN 2001). The most appropriate category would depend on the total number of mature individuals which remains poorly known. Listing on both the NSW *Threatened Species Conservation Act 1995* and the federal *Environment Protection and Biodiversity Conservation Act 1999* is warranted.

Notes: *Acacia atrox* subsp. *planiticola* is very similar to the type subspecies of *Acacia atrox* in appearance, particularly the growth habit, bark, foliage (sessile, sharply pungent phyllodes with dilated bases, which are very unusual in *Acacia*), floral features and *Hakea* fruit-like galls. The subspecies differ mainly in several features of the phyllodes. In subsp. *planiticola* the phyllodes appear to be less rigid with the longitudinal veins being less pronounced and fewer in number (\pm 8-veined in subsp. *atrox* in which 4 veins are more pronounced than the intervening inconspicuous or incomplete veins). In subsp. *planiticola* the sessile phyllode base is less longitudinally splayed at the point of attachment to the branchlet (being 1–2.2 mm long compared with 2–6 mm in subsp. *atrox*) and the apex is generally less gradually tapered to a shorter fine orange-brown tip 0.7–2.2 mm long (1.5–3.5 mm long in subsp. *atrox*). The flower-heads appear to be smaller (5–7 mm diam.) with fewer flowers (17–25-flowered) in subsp. *atrox*, though there is limited material to be conclusive with respect to inflorescence characters. Further studies should be undertaken on the clonal nature and reproductive strategies of both taxa, as well as fertility, possible hybrid origins and molecular studies (phylogenetics and genetic variation). Genetic information would be useful in better understanding the taxonomic status of the entities treated here as subspecies, and relationships with other taxa. Molecular studies by Drs Joe Miller and Dan Murphy (pers. comm.) found a close relationship between subsp. *atrox* and *Acacia carneorum*, supporting the morphological assessment of these taxa discussed by Kodela (2001).

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