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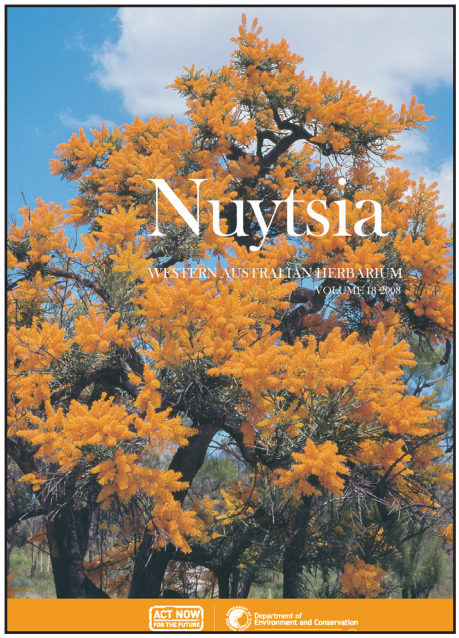


Maslin, B.R. & Buscumb, C. *Acacia diallaga* (Leguminosae: Mimosoideae), a new geographically restricted species with diallagous phyllodes from the Midwest Region of south-west Western Australia

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# *Acacia diallaga* (Leguminosae: Mimosoideae), a new geographically restricted species with diallagous phyllodes from the Midwest Region of south-west Western Australia

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## Abstract

Maslin, B.R. & Buscumb, C. *Acacia diallaga* (Leguminosae: Mimosoideae), a new geographically restricted species with diallagous phyllodes from the Midwest Region of south-west Western Australia. *Nuytsia* 18: 127–132 (2008). *Acacia diallaga* Maslin & Buscumb, a new species of *Acacia* sect. *Juliflorae* (Benth.) C.Moore & Betche restricted to a small area east of Morawa in the Midwest Region of Western Australia is described. A feature of the new species (and one from which the botanical name is derived) is that during times of drought the phyllodes turn a purplish colour, reverting to their normal glaucous to sub-glaucous colour when conditions improve. This process of foliage colour change related to weather conditions occurs also in *A. subsessilis* A.R.Chapman & Maslin which is the closest relative of *A. diallaga*. The new species is listed as a Priority Two species according to the Department of Environment and Conservation's Conservation Codes for Western Australian Flora.

## Introduction

The new species described here, *Acacia diallaga* Maslin & Buscumb, is referable to *Acacia* sect. *Juliflorae* (Benth.) C.Moore & Betche and is most closely related to *A. subsessilis* A.R.Chapman & Maslin. Both these species exhibit a change in colour of their foliage (to a light purple and reddish respectively) during periods of drought, reverting to normal foliage colour when conditions improve. As discussed below, the term diallagous is used to describe this phenomenon of foliage changing colour and reversing back according to certain weather conditions.

*Acacia diallaga* was discovered in 2006 and based on current evidence seems to be geographically restricted to a small area on Karara and Warriedar Stations, about 100 km east of Morawa. Because the species grows on and near areas covered by mining exploration leases it is deemed desirable to formalize its name and to assess its conservation status in anticipation of future mining development in the area.

## Taxonomy

**Acacia diallaga** Maslin & Buscumb, *sp. nov.*

*Frutex* effusus multiramosus 0.5–1.5(–3) m altus. *Phyllodia* asymmetrice anguste elliptica vel anguste oblongo-elliptica vel lanceolata, (3–)5–6(–7) mm lata, ± patentia, glabra, glauca vel sub-glauca, vel purpureo-rubra mutata in statu siccitate, nervis longitudinalis principalis 3, nervis minoribus anastomosans interpositis, apice pungenti; pulvinus multi-redactus. *Spicae* breves (5–10 mm in statu sicco); *pedunculus* brevis (2–4 mm), glaber vel sub-glaber; *bractea basalis* peduncularis saepe persistentia. *Bracteolae* peltatae, caducae. *Flores* 5-meri; *calyx* breviter dissectus; *petala* 1.3–1.5 mm longa. *Legumina* anguste oblonga, 4 mm lata, ad marginem recta vel inter-semina leviter constricta, tenuiter coriacea, glabra. *Semina* obloidea, 3 × 2 mm, nigra; *areola* minima (*c*. 0.2 mm longa); arillus in extremo seminis sub-lateraliter dispositus.

*Typus*. Karara Station, Western Australia [precise locality withheld for conservation reasons], 4 September 2007, *D. Coultas & C. Anderson* AS-03 (*holo*: PERTH 07577451; *iso*: K, MEL).

Dense, spreading, much-branched *shrubs* 0.5–1.5(–3) m tall, domed or ± obconic with rounded crowns. *Bark* grey, slightly rough on main stems (fibrous at their base on oldest plants), smoother on the upper branches. *Branchlets* terete, obscurely ribbed, lenticellate with scattered lenticels, glabrous, red-brown (but often covered with a light grey, translucent, exfoliating epidermis), aging grey, ± yellowish orange on young growth, the oldest branchlets marked with raised scars where phyllodes have fallen. *Stipules* early caducous, united. *Phyllodes* on raised stem projections, narrowly elliptic to narrowly oblong-elliptic or lanceolate, slightly asymmetric with lower margin straight to shallowly concave and upper margin shallowly convex, (11–)15–36 mm long, (3–)5–6(–7) mm wide, rigid, ± patent to slightly inclined or reclined, straight to shallowly recurved, glabrous, glaucous to sub-glaucous (green when young on new shoots), changing to purple-red when drought-stressed; *longitudinal nerves* 3 per face (central nerve the most pronounced), with widely spaced, openly longitudinally-anastomosing minor nerves between the main nerves; apices narrowed to a fine, subulate, straight, rigid, needle-like, dark brown, pungent tip; pulvinus much reduced, 0.3–0.6 mm long, represented by a narrow rim of yellowish tissue at base of lamina. *Gland* not prominent, 0.3–1.2 mm above pulvinus. *Inflorescences* simple, single within axils of phyllodes; *spikes* short (5–10 mm long when dry), light golden; *peduncles* 2–4 mm long, glabrous to sub-glabrous (hairs minute, straight, appressed and white); *receptacle* marked with short triangular projections (often appearing spiculate; most obvious when in flower), glabrous; *basal peduncular bract* single, often sub-persistent to anthesis, broadly ovate, *c*. 0.7 mm long, dark brown and glabrous except for minutely fimbriolate margin. *Bracteoles* peltate, early caducous, 0.7–0.8 mm long; claws narrowly linear; laminae broadly ovate, 0.7–0.8 mm across. *Flowers* 5-merous; *calyx* gamosepalous, 0.7–1 mm long (1/2–2/3 length of petals), sparsely puberulous, dissected for *c*. 1/4 its length, the lobes oblong, slightly inflexed and not thickened at apex; *petals* 1.3–1.5 mm long, ± nerveless, glabrous. *Pods* (few seen), narrowly oblong, 2.5–5.5 cm long, 4 mm wide, straight-edged or very shallowly constricted between seeds, very slightly raised over the seeds, thinly coriaceous, light brown (aging dark reddish brown following dehiscence), glabrous; marginal nerve not thickened. *Seeds* (few seen) longitudinal in the pods, obloid, 3 mm long, 2 mm wide, black with a satin lustre; *pleurogram* very obscure; *areole* extremely small (*c*. 0.2 mm long), open towards the hilum; *funicle* filiform, expanded into a non-convoluted, ± turbinate, thickened, creamy white *aril* that is sub-laterally positioned at end of seed. (Figure 1)


Figure 1. Holotype of *Acacia diallaga* (*D. Coultas & C. Anderson* AS-03), scale = 5cm.

*Characteristic features*. Dense, spreading, much-branched *shrubs* 0.5–1.5(–3) m tall. *Phyllodes* narrowly elliptic to narrowly oblong-elliptic or lanceolate, asymmetric with upper margin shallowly convex and lower margin straight to shallowly concave, (3–)5–6(–7) mm wide, ± patent, glabrous, glaucous to sub-glaucous (green when young on new shoots), changing to purple-red when drought-stressed, with 3 main longitudinal nerves and openly longitudinally-anastomosing minor nerves between them, apex narrowed to a straight, rigid, needle-like, pungent tip; pulvinus much reduced. *Spikes* short (5–10 mm when dry); *peduncles* short (2–4 mm), glabrous to sub-glabrous; *basal peduncular bract* often persistent. *Bracteoles* peltate, early caducous, claws narrowly linear, laminae broadly ovate 0.7–0.8 mm across. *Flowers* 5-merous; *calyx* shortly dissected; *petals* 1.3–1.5 mm long. *Pods* narrowly oblong, 4 mm wide, straight-edged or very shallowly constricted between seeds, thinly coriaceous, light brown, glabrous; marginal nerve not thickened. *Seeds* obloid, 3 × 2 mm, black; *areole* extremely small (*c*. 0.2 mm long); *aril* sub-laterally positioned at end of seed.

*Other specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 8 Aug. 2006, *D. Coultas* & *F. Obbens* GIND Opp 21 (PERTH); 13 Sep. 2006, *D. Coultas & K. Rodda* KR-3 (PERTH); 13 Sep. 2006*, C. Godden* GIND opp 29 (PERTH); 17 July 2007, *B.R. Maslin* 9126 (CANB, PERTH); 24 Apr. 2007, *Woodman Environmental Consulting s.n*. (PERTH 07534744).

*Distribution. Acacia diallaga* is known from a restricted area on Karara and Warriedar Stations in the Midwest Region of Western Australia, about 100 km east of Morawa, where it occurs in the vicinity of Blue Hill Range and Mt Mulgine. It has a patchy (discontinuous) distribution over a distance of about 30 km in an east-west direction and is locally common in the places where it grows. The general region in which the new species is found is relatively poorly collected, therefore it is possible that additional populations will be discovered. However, judging from current knowledge it is not expected that *A. diallaga* will be shown to have a very extensive geographic range.

*Habitat. Acacia diallaga* occurs in a semi-arid area with an annual rainfall of 250–300 mm, most of which falls between late autumn and early winter (May to July). It grows in skeletal, red, silty loam on the slopes, or occasionally crests, of low rocky (basalt) hills in open mixed *Allocasuarina* and *Acacia* thicket that includes *Acacia karina*, *Allocasuarina acutivalis* and *Grevillea* species (*G. scabrida* and *G. subtiliflora*).

*Flowering and fruiting period.* Because of the paucity of collections it is difficult to accurately determine the flowering and fruiting period for this new species; furthermore, it is likely that as with many other arid zone species of *Acacia* this one responds opportunistically to rainfall. Based on the material to hand plants were at full anthesis in early September and pods with mature seeds occurred in early to mid-December; it is estimated that flowering probably commenced around the middle of August. Field observations in 2007 showed that only few of the plants in the populations produced flowers or pods during that rather dry year.

*Discovery*. This new species was discovered by David Coultas and Frank Obbens in August 2006 while undertaking botanical surveys on Karara Station.

*Conservation status*. *Acacia diallaga* is recently listed as a Priority Two taxon according to the Department of Environment and Conservation's Conservation Codes for Western Australian Flora. Present knowledge shows the species as having a restricted and discontinuous distribution which is confined to Unallocated Crown Land on two former pastoral stations, Karara and Warriedar. These stations are now owned and managed by the Department of Environment and Conservation and are

currently proposed conservation reserves. Some populations of *A. diallaga* may be under threat as they occur on areas covered by mining leases.

*Etymology*. The species name is based on the word diallagous which is derived from the Greek *diallage* (interchange). See discussion under *Notes* below .

*Affinities. Acacia diallaga* is most closely related to *A. subsessilis* on account of its basic phyllode nervature (eight longitudinal nerves in all, three on each face and one along each margin), short, spicate, simple inflorescences on short peduncles subtended by a single basal bract, peltate bracteoles with relatively large laminae, gamosepalous calyx and similar carpological characters (Chapman & Maslin 1999). Both species also have the ability to change their phyllode colour when stressed due to drought conditions (see under *Notes* below). These two species grow in close proximity to one another (the closest occurrences are about 20 km apart) but they are not know to be sympatric; both have restricted geographic ranges and share similar habitat preferences. The most obvious differences between *A. subsessilis* and *A. diallaga* are found in their phyllodes and pods as summarized in the key below. Although it could be argued that *A. diallaga* could be treated as a subspecies of *A. subsessilis*, its phyllode shape, size and colour differences are so striking that it is deemed appropriate to treat it as a distinct species; there are also differences in carpological features and distribution.

**Key to *A. subsessilis* and *A. diallaga***

**1.** Phyllodes (3–)5–6(–7) mm wide, narrowly elliptic to narrowly oblong-elliptic or lanceolate, asymmetric with upper margin shallowly convex and lower margin straight to shallowly concave, glaucous to sub-glaucous (green on new shoots), anastomosing minor nerves present between the 3 main longitudinal nerves; pods 4 mm wide, not or scarcely constricted between the seeds; seeds 3 × 2 mm..... **A. diallaga**

**1:** Phyllodes 0.7–1.2(–2) mm wide, acicular and narrowly linear to linear-triangular (widest phyllodes with a slight tendency towards narrowly elliptic), symmetrical, straight-edged, dull green (tinged bluish), anastomosing minor nerves absent or rare; pods 5–7 mm wide, shallowly to moderately constricted between the seeds; seeds 4–5 × 3–3.5 mm.....**A. subsessilis**

*Notes*. This species exhibits a change in colour of its phyllodes (from glaucous/sub-glaucous to purple-red) when water becomes limiting during periods of drought. Unless the phyllodes die they revert to their normal glaucous/sub-glaucous colour when conditions improve with the advent of rainfall. *Acacia subsessilis* does the same thing with the phyllodes changing from green to pale reddish, then reverting to green. Diallagy (adj. diallagous) is a new term coined by George (2002) to describe the ability of some plants to change the colour of their foliage and then reverse it according to weather conditions. Many examples of south-west Western Australian diallagous flora are beautifully illustrated in George (2002a).

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