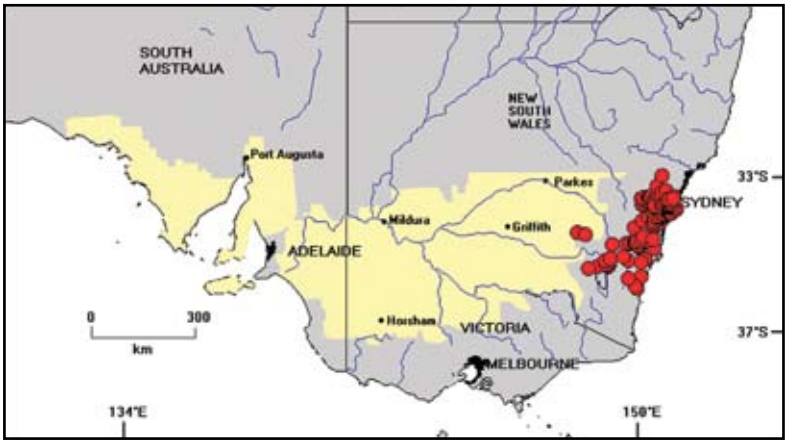
Acacia parramattensis Tindale

Common Names

Parramatta Wattle, Sydney Green Wattle, Parramatta Green Wattle.



Map 47. Distribution of *A. parramattensis*.

Habit

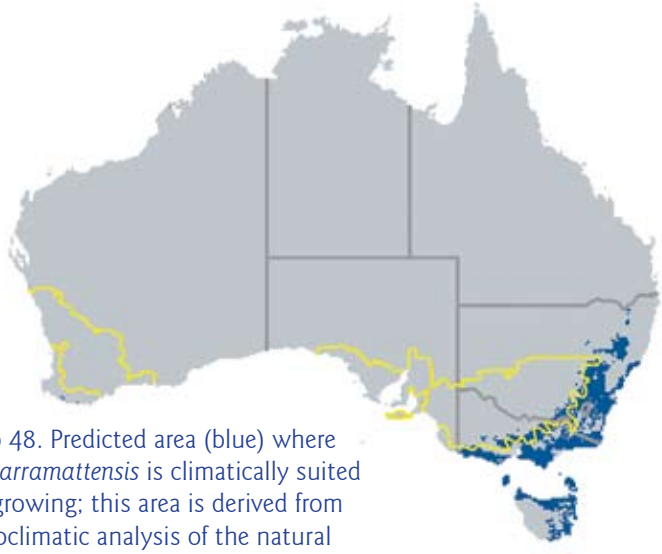
Erect shrubs or trees 2–7(–15) m tall, with a single-trunk commonly branching into 2–3 main stems at 0.3–0.5 m about the ground, trunks undivided (except for the lateral branches) for 1 m or more when plants growing close together, sometimes with 2 main trunks from ground level, the trunks straight, erect and to about 35 cm dbh, young plants have a conifer-type habit. Bark thin, smooth but becoming longitudinally fissured on old plants, black, brown or green.

Botanical descriptions and illustrations/photographs are provided in Burbidge & Gray (1970), Costermans (1981), Fairley & Moore (1989), Tame (1992), Tindale & Kodela (2001 & 2001a) and Kodela (2002); see also detailed description in Tindale (1962).

Taxonomy

This species belongs to *Acacia* section *Botrycephalae*, a group of 44 mostly arborescent species characterized by having bipinnate adult foliage and flower heads normally arranged in elongated racemes (Orchard & Wilson 2001). These species predominate in temperate areas of eastern and southeastern Australia (Hnatiuk & Maslin 1988, Maslin & Pedley 1988). There are seven species of *Botrycephalae* detailed in this report, namely, *A. baileyana*, *A. dealbata* subsp. *dealbata*, *A. decurrens*, *A. filicifolia*, *A. leucoclada* subsp. *leucoclada*, *A. mearnsii* and *A. parramattensis*. A number of recent studies have suggested that species of section *Botrycephalae* are most closely related to certain racemose species of section *Phyllodineae* (foliage phyllodinous) from eastern Australia, see Maslin & Stirton (1998) and Maslin *et al.* (2003) for reviews. Of the phyllodinous species included in this report those having presumed closest affinities to species of *Botrycephalae* include *A. linearifolia*, *A. neriifolia* and *A. pycnantha*; members of the '*Acacia microbotrya* group' are not far removed from these species.

Acacia parramattensis is most closely allied to *A. mearnsii* but is distinguished by its velvety-pubescent branchlets (glabrous or sparsely appressed-hairy in *A. parramattensis*) and leaflets which are densely hairy on the lower surface (glabrous in *A. parramattensis*) (Tindale & Kodela 2001; see Tindale 1962 for further details). *Acacia parramattensis* is probably often mistakenly grown as *A. decurrens* according to Tame (1992).



Map 48. Predicted area (blue) where *A. parramattensis* is climatically suited for growing; this area is derived from a bioclimatic analysis of the natural distribution (red circles, Map 47), see also Table 5. Target area shown in yellow.

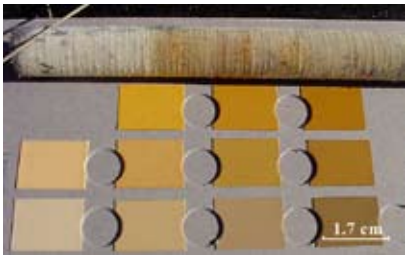
A study by Tindale and Roux (1969) of flavonoid and condensed-tannin contents of the heartwood and bark of *Acacia* recognized

Figure 23. *Acacia parramattensis*

A – Adolescent plant (note straight erect main stem). (Photo: B.R. Maslin)

B – Stem base. (Photo: B.R. Maslin)

C – Portion of bipinnate leaf. (Photo: J. Plaza)



D – Stem core. (Photo: P. Macdonell)

E – 8 year old plant in trial at Uriarra, Australian Capital Territory. (Photo: S. Searle)

four groups within section *Botrycephalae*; this study placed *A. parramattensis* in a group *containing A. constablei, A. decurrens, A. irrorata* subsp. *velutinella, A. mearnsii* and *A. trachyphloia*.

Distribution and habitat

Occurs in New South Wales where it is found chiefly from Yengo south to Tumut and west to Grenfell; it is common in around Sydney and Canberra and is possibly naturalized in Tasmania and areas of New South Wales (Tindale & Kodela 2001).). The main area of occurrence of this species is to the east of the target area but it reaches the temperate periphery of the region in New South Wales where it is not common. Grows in open forest or woodland, chiefly on sandy loams or clays derived from shale (Tindale & Kodela 2001). It often grows on heavier soils according to Tame (1992).

Flowering and fruiting

The main flowering period is from late November to early February, although in rare cases it may continue until April; it takes 12 months for the seeds to ripen and mature pods are present between November and February (Tindale 1962).

Biological features

Limited information is available for this species. Tame (1992) reports it to be short lived but fast growing (however, see below under **Yield** for note on growth rate). Field observations could not confirm that the species is likely to sucker or coppice. Searle *et al.* (1998) however reported root suckering in 32 month old plants under trial near Canberra, while, Barbour (2000) found no evidence of root suckers or coppicing in 62 month old plants under trial in Western Australia. *Acacia parramattensis* was ranked as one of the most frost tolerant species In two trials near Canberra (Searle 1998). An analysis of its gum characteristics is given in Anderson *et al.* (1971).

Genetics

Chromosome number: $n = 13$ (B. Briggs in Tindale 1962)

A hybrid with *A. mearnsii* is known according to CAB International (2000). The species is suspected of hybridizing with *A. dealbata* (Maslin, unpublished information) and specimen label information at the NSW Herbarium suggests that *A. parramattensis* hybridises with *A. baileyana*.

Toxicity

An unidentified cyanogenic glycoside has been reported to occur in the leaves of this species by Secor *et al.* (1976) but it apparently does not occur in all plants of this taxon (Conn *et al.* 1985). As noted by Maslin *et al.* (1987) the glycoside occurs at very low concentrations and the endogenous enzyme necessary to hydrolyse this into toxic HCN is absent. The species is therefore not considered a risk to stock from cyanogenic poisoning.

Cultivation

Although *A. parramattensis* is often grown for ornamental purposes in Australia there is little information available concerning its propagation. Searle *et al.* (1998) document succesful silvicultural protocols for the species based on two trials near Canberra.

Yield

Three provenances of *A. parramattensis* were represented at two sites in fuelwood trials near Canberra, A.C.T. (CSIRO 2001). The sites at Kowen and Uriarra had a mean annual rainfall of 630 mm and 824 mm respectively. Based on assessments at 2.6 and 5.2 years of age, variation among provenances for survival and growth was not great. Interestingly, the performance of all three provenances was similar at both sites despite differences in rainfall between sites. In these trials the early growth of

A. parramattensis was better than later growth. For example, at age 2.6 years plants from all three provenances had a mean height range of 3.8–4.0 m and a dbh range of 4–4.3 cm; while at age 5.2 years the mean height range was 4.8–5.5 m and the dbh range 5.5–6.1 cm. At trials involving 12 bipinnate acacias in Western Australia Barbour (2000) the performance of *A. parramattensis* was not particularly notable. On a volume per hectare yield basis this species was amongst the worst performers. Mean stem volumes for these provenances of *A. parramattensis* were less than half for those obtained for *A. mearnsii* in trials involving 16 acacias at two sites in Victoria (Bird *et al.* 1998). These data suggest limited prospects for short rotation cropping for biomass from *A. parramattensis*.

Pests and diseases

African black beetle can cause severe damage in cultivation trials in Western Australia (Barbour 1995).

Weed potential

Not widely reported as being a problem weed, however, it is possibly naturalized in Tasmania and areas of New South Wales according to Tindale & Kodela (2001). This species spreads by seeds which occur in great abundance.

Wood

Basic density 606 kg/m^3 (Clark *et al.* 1994).

Utilisation

Wood

Acacia parramattensis was one of several temperate species reported by Clark *et al.* (1994) as having kraft pulp yields within the range of commercial pulpwoods. The species pulped to relatively high yields (50–56%) and its pulps bleached readily to high brightness, but not within the range required for some high grade papers.

Potential for crop development

Because of a paucity of information it is difficult to accurately assess the wood crop potential of this species. Based on available evidence it is provisionally ranked as a category 3 species and its growth characteristics show that it would be most suited to development as a phase crop (Table 6). However, it remains to be seen whether or not this species is capable of achieving acceptable growth rates and biomass production within the target area. Despite *A. parramattensis* having some desirable growth characteristics the species is rare in the target area and is likely to have only limited application (see below). We suspect that it would be out-performed by other members of section *Botrycephalae* such as *A. decurrens* and *A. mearnsii*. It develops a good growth form that would be amenable to mechanical harvesting. It also produces reasonable quantities of pale coloured, low density wood (basic density 606 kg/m^3) within the range considered desirable for reconstituted wood products. It is to be expected that this species, like other members of section Botrycephalae, will produce large quantities of seed from an early age. If this is the case then it could possibly constrain its development as a phase crop because such phenological precocity would result in the creation of a soil seed bank that could lead to weed problems in adjacent or subsequent annual crops. Alternatively this seedling regeneration could possibly be treated as a form of green manure. The absence of root suckering is an attractive feature in the management of this species as a phase crop plant.

The area predicted to be climatically suitable for the cultivation of *A. parramattensis,* based on its natural climatic parameters, is shown in Map 48. This analysis indicates that *A. parramattensis* has the potential to be cultivated well to the south and south east of its natural distribution. However, within the eastern target area suitable climatic conditions are predicted to be relatively limited. Based on the bioclimatic prediction *A. parramattensis* is not suited for cultivation in the western target area. This

is probably due the long dry season experienced in that region of Western Australia compared its area of natural occurrence. We tentatively suggest cultivation on valley soils of the 550–650 mm rainfall zone of the eastern target area. Areas subject to heavy frosts should be targeted. Based on limited trial results, provenance variation may not be great for this species. Relatively rapid early growth suggests that if site selection is favourable short rotations could be achieved for this species but this remains to be verified. Although natural populations of *A. parramattensis* in the west of its range are characterised by rather spindly trees of low stature, they usually have straight stems and fine lateral branching. This attribute suggests that the potential for controlled hybrid combinations of *A. parramattensis* with related targeted species could warrant investigation.