

Acacia linearifolia Maiden and Blakely

Common Names

Stringybark Wattle, Narrow-leaved Wattle.

Habit

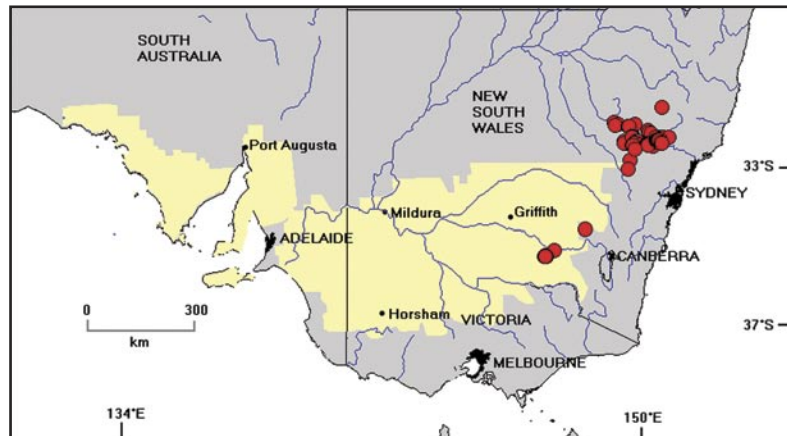
Tall shrubs or trees commonly 5–10 m tall with boles 15–45 cm dbh but may reach 14 m with boles 40 cm diam. in favourable sites, often with a single, straight to sub-straight, erect, sparingly branched trunk and a dense, terminal, somewhat narrow crown, however, in open sites plants may become widely branched from reasonably low down, may divide into two main trunks near the ground and their crowns may become quite spreading; strong, shallow lateral roots are developed; juvenile bipinnate foliage may persist on lower branches. Bark thin, smooth on young stems but aging longitudinally fissured, grey-brown.

Botanical descriptions and illustrations/photographs are provided by Tame (1992), Maslin (2001 & 2001a) and Kodela (2002).

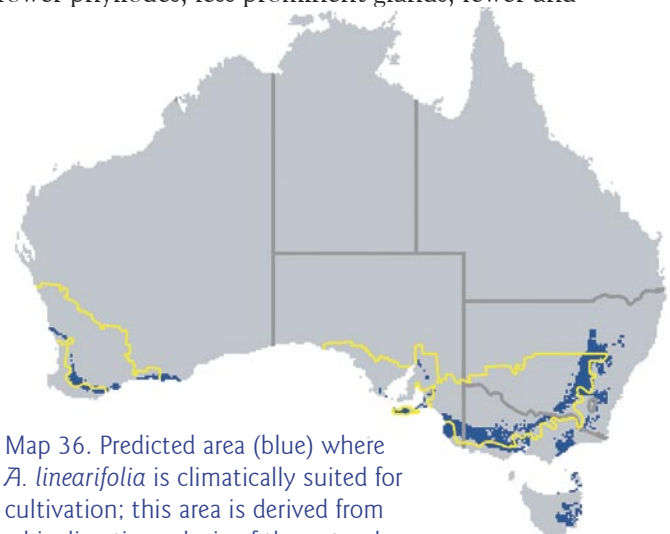
Taxonomy

Acacia linearifolia is referable to *Acacia* section *Phyllodineae*, a diverse, and probably artificial, group of about 408 species (Maslin 2001) which are characterized by having '1-nerved' phyllodes and flowers arranged in globular heads (see Maslin & Stirton 1998 and Maslin 2001 for discussion). Species of section *Phyllodineae* are widespread in Australia with the main centres of richness located in temperate and adjacent semiarid areas of eastern, southeastern and southwestern Australia; species number greatly decline in the arid zone and in northern tropical/subtropical areas (Hnatiuk & Maslin 1988 and Maslin & Pedley 1988).

As noted by Maslin (2001) *A. linearifolia* appears to be very closely related to *A. pustula* and further study is needed to determine the degree of difference between these two taxa. *Acacia linearifolia* is distinguished from *A. pustula* by its commonly narrower phyllodes, less prominent glands, fewer and less densely congested flowers in the heads and broader pods which are not or scarcely constricted between the seeds. *Acacia pustula* occurs in south eastern Queensland, well north of the target area. Species detailed in this report which are not far removed taxonomically from *A. linearifolia* include *A. hakeoides*, *A. nerifolia* and *A. pycnantha*; members of the '*Acacia microbotrya* group' are related to these taxa. In the past *A. linearifolia* was often confused with *A. adunca*, its phyllodes may also resemble those of *A. macnuttiana* and *A. forsythii*. However, none of these relatives occur within the target area and none develop significant woody biomass.

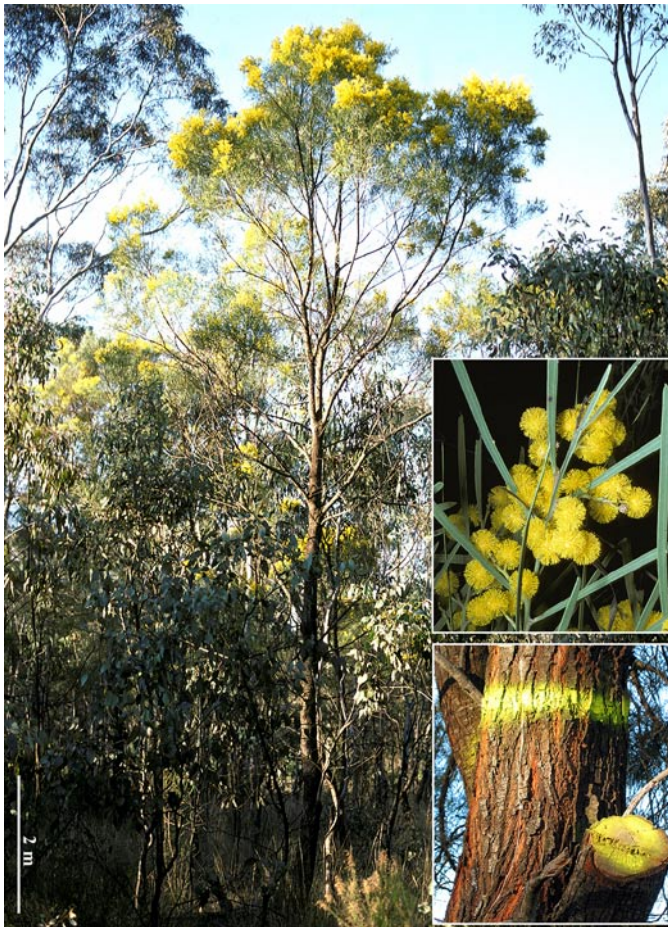


Map 35. Distribution of *A. linearifolia*.



Map 36. Predicted area (blue) where *A. linearifolia* is climatically suited for cultivation; this area is derived from a bioclimatic analysis of the natural distribution (red circles, Map 35), see also Table 5. Target area shown in yellow.

Figure 17. *Acacia linearifolia*



A – Tall, trees with erect, sparingly branched stems in forest, with inserts showing flowers/phyllodes & bark. (Photos: B.R. Maslin)



B – Mature plant in open site showing wide-spreading crown. (Photo: B.R. Maslin)



C – Stem base showing strong root development. (Photo: B.R. Maslin)



D – Mature stand showing good growth performance in cultivation at Burrendong Arboretum, N.S.W. (Photo: B.R. Maslin)



E – Cut stem showing vigorous young coppice regrowth (leaves bipinnate on coppice growth). (Photo: B.R. Maslin)



F – Stem core showing wood. (Photo: P. Macdonnell)

Distribution and habitat

Restricted to New South Wales where it occurs principally in the Scone–Denman district west to Gulgong–Dunedoo, there are outliers about 300–400 km to the south (from Binalong near Yass and The Rock near Wagga Wagga). According to Tame (1992) *A. linearifolia* mostly has a scattered distribution on the southern and central western slopes, but sometimes extends onto the tablelands. *Acacia linearifolia* is not especially common in the target area, its main area of occurrence lies just outside the region. In its natural habitat *A. linearifolia* grows in colluvial sands on the lower slopes and at the base of sandstone hills, or in shallow sand or sandy loam over sandstone or conglomerate on steep rocky slopes.

Flowering and fruiting

Flowers from August to October and seed is present in November and December.

Biological features

Apparently does not sucker. It coppices readily when stems are cut (coppice regrowth commencing with juvenile bipinnate foliage, maturing into phyllodes). *Acacia linearifolia* appears to have a fast growth rate (see below under **Cultivation**). Frost may damage young plants but they generally recover quickly (Stelling 1998). Its longevity is unknown but perhaps 20–30 years.

Cultivation

There is no trial information available for this species. However, we observed *A. linearifolia* under cultivation at the Burrendong Arboretum where it performed exceptionally well in the absence of supplementary watering (see Fig. 17D). Here plants estimated to be about 10 years old attained a height of 10–12 m with stems 20–26 cm dbh. They were grown close together (about 1 m apart) without any ill effect to their form. Burrendong Arboretum is located about 20 km due southeast of Wellington, just outside the target area near its north eastern corner (Wellington has a mean annual rainfall of 620 mm).

Weed potential

There are no records of weediness involving this species.

Wood

Detailed wood characters unknown but they are likely to be similar to those of *A. neriifolia* or *A. microbotrya*.

Utilisation

Ornamental

Well suited as an ornamental on account of its attractive growth form and its prolific flowering; it is commonly planted in places in New South Wales for this purpose (P. Kodela, pers. comm.).

Potential for crop development

Acacia linearifolia is regarded as having good prospects as a crop plant for high volume wood production. However, this species is presently not known in cultivation, other than as an ornamental, and therefore there is very little relevant information available for it. *Acacia linearifolia* is ranked as a category 1–2 species and would seem best suited for development as phase crop, although possibilities for it as a coppice and/or long cycle crop should not be discounted at this stage (see Table 6). The apparent absence of root suckering is regarded as a significant advantage for the management of this

species as a phase crop. Plants of *A. linearifolia* develop an excellent growth form and commonly have strong, relatively unbranched, rather straight main stems. In cultivation it is expected that the plants could be spaced reasonably close without detrimental effect to their growth form or wood biomass production, despite the fact that they develop strong lateral roots. Indeed, limited field observations suggest that closely spaced plants have narrower crowns, develop straighter main stems and have fewer lateral branches compared with those in more open sites. *Acacia linearifolia* produces large volumes of woody biomass; the wood is pale-coloured and although its density is unknown it will possibly be similar to that of *A. microbotrya* (which averages about 830 kg/m³) and if so it lowers its attraction for use in reconstituted wood products. The species appears to have a reasonably fast growth rate judging from its performance at Burrendong Arboretum. We would expect that if cultivated in appropriate sites plants of this species would reach harvestable size in about 5 years.

Field observations show that *A. linearifolia* resprouts well when stems are cut at about 0.5 m above the ground. However, it is not known if this growth has sufficient vigour to maintain the species as a viable coppice crop. Furthermore, it is not known what factors (such as cutting distance above ground or time of year to cut) promote best growth. Study of these important matters warrants investigation.

It is likely that *A. linearifolia* would produce appreciable quantities of seed and if so it would result in the creation of a soil seed bank that may lead to weed problems in adjacent or subsequent annual crops. (Alternatively the young seedlings may possibly be treated as a form of green manure.) One way of avoiding soil seed build up is to harvest plants before pods are produced; however, plants would need to have developed sufficient wood biomass by that time for such a technique to be viable.

The area predicted to be climatically suitable for the cultivation of *A. linearifolia*, based on its natural climatic parameters, is shown in Map 36. This analysis indicates that *A. linearifolia* is climatically suitable for cultivation in the greater than 500 mm rainfall zones of the eastern and western target areas. These areas are well to the south and west of its natural distribution. Although its best performance is indicated for areas that receive greater than 500 mm mean annual rainfall it remains to be seen how much climatic and ecological plasticity will be evident in this species. Trials are warranted to assess if it has the potential to be cultivated for biomass production over a range of sites and soil types throughout many parts of the target area.

In view of the above it is recommended that intensive silvicultural assessment of this species be undertaken. There is much fundamental data needed to assess its crop potential. For example, the extent of provenance variation for growth rate and form, drought and frost tolerance, optimal plantation stocking rates and coppicing response. Comprehensive range-wide seed collections are recommended so that assessment trials can be conducted. To assess the extent of within provenance variation (which is likely to be substantial) individual family seedlots should be maintained wherever possible.

Any serious agroforestry investigation of *A. linearifolia* should include an assessment of its very close relative, *A. pustula*. Because *A. pustula* occurs in Queensland, well north of the target area, it was not assessed for this project.