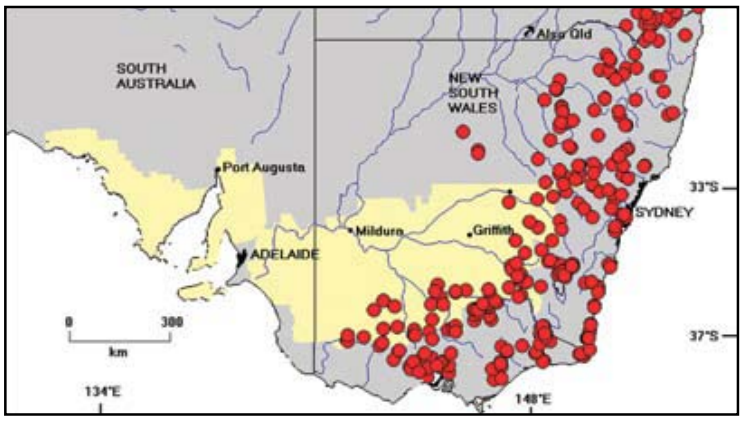
Acacia implexa Benth.

Common Names

Lightwood (Standard Trade Name), Hickory Wattle, and more (see Cunningham *et al.* 1981).



Map 29. Distribution of *A. implexa.*

Habit

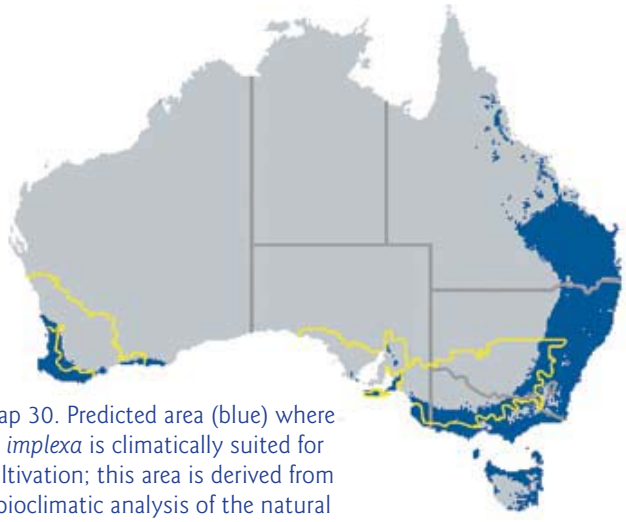
Erect trees 5–12(–15) m tall, single-stemmed or dividing near ground level into 2 or 3 main stems, sometimes bifurcating into two main branches at about 2 m above ground but more usually branching higher up, commonly with clean straight to sub-straight boles to about 15–30 cm dbh (but on good sites can reach 60 cm dbh on oldest plants), crowns bushy and terminal, often gregarious due to suckering from the roots; bipinnate leaves may persist on young plants. Bark rough and unevenly tessellated, becoming longitudinally fissured with age, grey.

Botanical descriptions and illustrations/photographs are provided by Maiden (1910a), Burbidge & Gray (1970), Lebler (1981), Cunningham *et al.* (1981), Costermans (1981), Simmons (1987), Fairley & Moore (1989), Tame (1992), Cowan (1996), Cowan & Maslin (2001 & 2001a) and Kodela (2002); see also description in Pedley (1978).

Taxonomy

Acacia implexa is referable to *Acacia* section *Plurinerves* a diverse, and probably artificial, group of about 212 species (Maslin 2001) which are characterized by having plurinerved phyllodes and flowers arranged in globular heads (see Maslin & Stirton 1998 and Maslin 2001 for discussion). Species of section *Plurinerves* are widespread in Australia with the main centres of richness located in the inland areas of the southwest and southeast of the continent (Hnatiuk & Maslin 1988, Maslin & Pedley 1988). Five species of section *Plurinerves* are detailed in this report, namely, *A. cyclops*, *A. implexa*, *A. melanoxylon*, *A. stenophylla* and *A.* aff. *redolens*.

Acacia implexa superficially resembles *A. melanoxylon* and is frequently confused with it but differs in its commonly pruinose branchlets, its drooping, sickle-shaped phyllodes that have a more elongated reticulum and its white (not red) funicle/aril which does encircle the seed.



Map 30. Predicted area (blue) where *A. implexa* is climatically suited for cultivation; this area is derived from a bioclimatic analysis of the natural distribution (red circles, Map 29), see also Table 5. Target area shown in yellow.

Distribution and habitat

Widespread and sometimes common in eastern Australia, mainly in higher rainfall zones, where it occurs in Queensland on the Atherton Tableland and then from Shoalwater Bay, Queensland, south along the coast and tablelands through eastern New South Wales and east to the Grampians in Victoria; also on King Island, Tasmania. The main area of occurrence of this species is to the south and east of the target area but it reaches

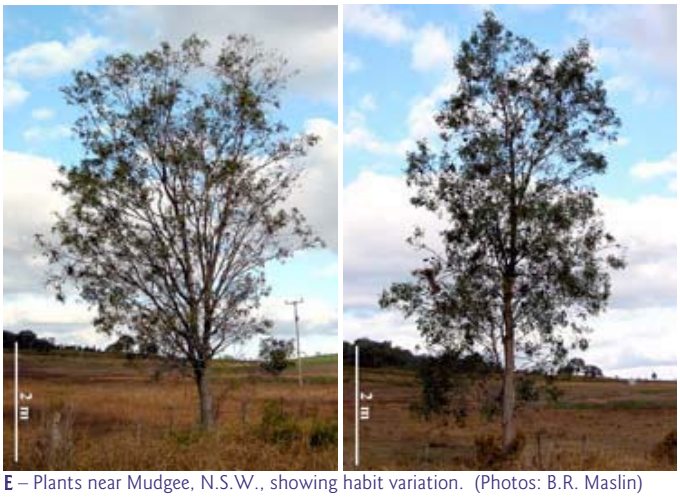
Figure 14. *Acacia implexa*

A – Old tree with insert showing bark.
(Photo: B.R. Maslin, tree; J. Simmons, bark)

B – Well-formed adolescent plant with 3 main stems.
(Photo: B.R. Maslin)

C – Roadside stand of young suckering plants. (Photo: B.R. Maslin)

D – Section of stem showing dark brown heartwood.
(Photo: B.R. Maslin)



E – Plants near Mudgee, N.S.W., showing habit variation. (Photos: B.R. Maslin)

F – Branch showing pale coloured-heads (in racemes) & multinerved phyllodes. (Photo: J. Simmons)

the temperate periphery of the region in New South Wales and Victoria. It is uncommon or absent in the drier inland areas of the target zone of New South Wales and Victoria. In its natural habitat *A. implexa* grows in a variety of situations but often in shallow, well-drained soil in hilly country in woodlands or open forest. In western New South Wales it occurs on shallow red earths or skeletal soils on rocky hillsides and also well-drained sites in river red gum communities (Cunningham *et al.* 1981).

Flowering and fruiting

Flowers occur usually between December and March/April but sometimes also at other times of the year. Seeds mature about 11 months following flowering (Stelling 1998).

Biological features

A vigorous, long-lived, fast to moderately fast growing species that coppices well. Root suckering is common, particularly if the main stems are cut back severely or if the roots are disturbed. Thirty two month old plants are reported by Searle *et al.* (1998) to have developed root suckers in trials near Canberra. In southern New South Wales the species is reported to tolerate fire, most droughts and strong wind (although its form may be affected) (Stelling 1998). It is frost resistant (Simmons 1987) although in trials near Canberra its growth and survival were seriously affected by frosts with minimum temperatures falling to -6^0 C (Searle *et al.* 1998).

Genetics

Cowan & Maslin (2001) report a putative hybrid between *A. implexa* and *A. trinervata* in New South Wales.

Toxicity

Webb (1948) notes that stock deaths are reported to have been caused by unripe pods. Bark contains much tannin (and saponin) which in the past was used by aboriginals to poison fish (Maiden 1910a).

Cultivation

Establishment

Can be grown from cuttings or from seeds (Simmons 1987) and lends itself well to direct seeding (Latarni McDonald, pers. comm.). Seed pretreatment techniques include scarfication (Stelling 1998 reports about 28 viable seeds per gram using this technique) and also pouring boiling water over the seed and soaking for several hours before drying and sowing.

Yield

Little is known regarding *A. implexa* in cultivation. Three provenances of the species 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. Variation among provenances was evident for survival and growth based on assessments at 2.6 and 5.2 years of age. Survival and growth was poorest for all provenances at the drier Kowen site. The Swansea provenance was clearly the poorest performer for growth at both sites. The most striking aspect of the overall performance of *A. implexa* in these trials was the relatively slight difference in growth at age 2.6 compared with age 5.2 years (best growth was for the Sofala provenance at Uriarra which attained 3.1 m in height and a dbh of 3.8 cm at 2.6 years, and 4.2 m tall with a dbh of 4.4 cm at 5.2 years). This same rapid early growth rate displayed by *A. implexa* was also observed in the results of Boxshall & Jenkyn (2001). In terms of mean stem volume, two provenances of *A. implexa* were amongst the worst performers in trials involving 16 temperate acacias at two sites in Victoria (Bird *et al.* 1998).

Boxshall & Jenkyn (2001) regarded the drought tolerance and the potential of *A. implexa* to grow to medium-sized trees on shallow impoverished soils favourable attributes. Its strong apical dominance and tendency to produce a central leading stem were also considered important characters based on observations of natural stands. Harvest rotation estimates were not given by Boxshall and Jenkyn but they suggested a stocking rate of 830 trees per hectare (at 4 x 3 m spacings) at a cost estimate of $1230 per hectare. They estimated that larger diameter logs may be worth $1000–1200 per tonne.

Pests and diseases

Susceptible to borer attack (Tame 1992). Wasps cause galls on flower buds in some areas, conspicuous woody galls are also caused by a fungus and young plants are susceptible to snails (Stelling 1998).

Weed potential

Not recorded as a major weed in Australia but, as discussed in Henderson (2001) it is a Declared Weed species in South Africa. Its strong root suckering propensity may render it problematic to eradicate if introduced into an area.

Wood

Hard, close-grained, dark brown with pale stripes and resembling *A. melanoxylon* to some extent (Anderson 1968), but of inferior quality to that species according to Maiden (1905). We observed the wood to be rather light relative to its volume (but not as light as either *A. leucoclada* or *A. retinodes* 'swamp variant') and it split due to shrinkage upon drying; the sapwood was pale brown and the heartwood dark brown. The basic density is given as 583–640 kg/m^3 by Ilic *et al.* (2000)*. A few aspects of wood anatomy are described in Shirley & Lambert (1922).

Utilisation

Wood

Wood can be used for turnery work and other purposes where tenacity and strength is required, furniture-making [e.g. plants from Candelo, SE coastal areas of N.S.W.] and for fuel (Anderson 1968). Boxshall & Jenkyn (2001) considered *A. implexa* to have potential as a plantation species for producing high value timber mainly for furniture and parquetry.

Tannin

Bark contains much tannin. Maiden (1910) reports on two bark analyses, one giving 7.82% of tannic acid and 20.54% of extract and the other 14.16% of tannic acid and 33.51% of extract.

Land use and environmental

Moderately useful for shelter purposes (Anderson 1968) and is occasionally planted in windbreaks and for shade on slopes and tablelands in temperate areas (Simmons 1987). This species is resistant to debarking by stock (Stelling 1998). In southern New South Wales it is reported to provide excellent recharge control on rocky hills and erosion control through its spreading root system (Stelling 1998).

Fodder

Phyllodes are eaten by cattle to some extent (Anderson 1968) but, as already noted, the unripe pods are reported to be toxic.

Other uses

Plants of this species provide a good wildlife habitat (Stelling 1998). An attractive summer flowering ornamental and shade for gardens and rockeries (Stelling 1998). Leaves produce a yellow dye with alum, and brown dye when copper is used as mordant (Stelling 1998).

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* The density range cited here represents a compilation of the Basic Density and the Estimated Basic Density from Air-dry (12%) MC values that are cited in Ilic *et al.* (2000).

Potential for crop development

Acacia implexa is regarded as having only moderate prospects as a crop plant for high volume wood production. This long-lived species is ranked as a categroy 3 species and would appear to have its best potential as a long cycle crop (Table 6). Despite having an ability to display rapid early growth rates, this species is unlikely to develop sufficient woody biomass within the short timeframe necessary for phase crops, particularly when cultivated in lower rainfall zones of the target areas. *Acacia implexa* is reported to coppice well but it is not known if this growth is sufficiently vigorous to sustain the species as a coppice crop. The propensity for *A. implexa* to vigorously root-sucker in nature may or may not be advantageous in cultivation, it depends whether or not this attribute is required (or expressed) for the system in which it is placed. *Acacia implexa* typically develops a good growth form (boles well-defined, rather straight and sparingly branched) that would be amenable to mechanical harvesting. It produces a good volume of moderately low density wood that is within the range of being attractive for reconstituted wood products, it could also be used for fuel and in high value solid wood products such as furniture and parquetry. *Acacia implexa* is susceptible to attack by borers and gall rust and these organisms are likely to cause problems in cultivation.

The area predicted to be climatically suitable for the cultivation of *A.implexa*, based on its natural climatic parameters, is shown in Map 30. This analysis indicates that *A. implexa* is not particularly well-suited to climatic conditions beyond its natural distribution, apart from the higher rainfall zones (greater than 500 mm isohyet) of South Australia and Western Australia. The critical climatic parameter limiting its wider cultivation in the target areas appears to be the mean annual rainfall range of its natural distribution. In the eastern target area *A. implexa* appears best suited for cultivation on upland areas that receive greater than 500 mm annual rainfall. Within this region the species could be cultivated on a range of relatively poor soil types but it is not suited to waterlogged soil conditions.

Although *A. implexa* is fairly common in eastern parts of the southeastern target area other species such as *A. leucoclada* and *A. linearifolia* offer better prospects.