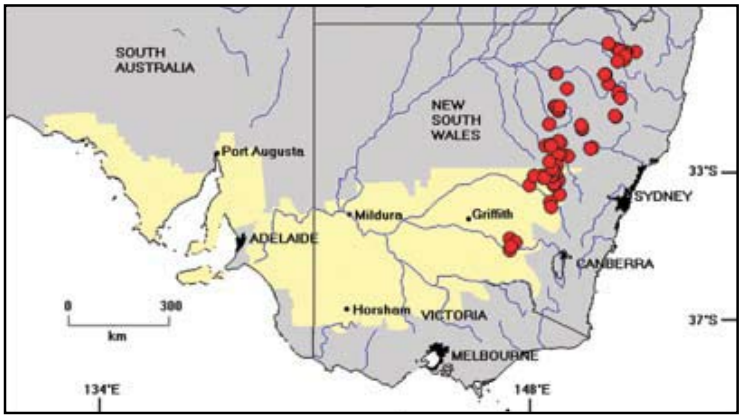
Acacia leucoclada Tindale subsp. *leucoclada*

Common Name

Northern Silver Wattle.



Map 33. Distribution of *A. leucoclada* subsp. *leucoclada*.

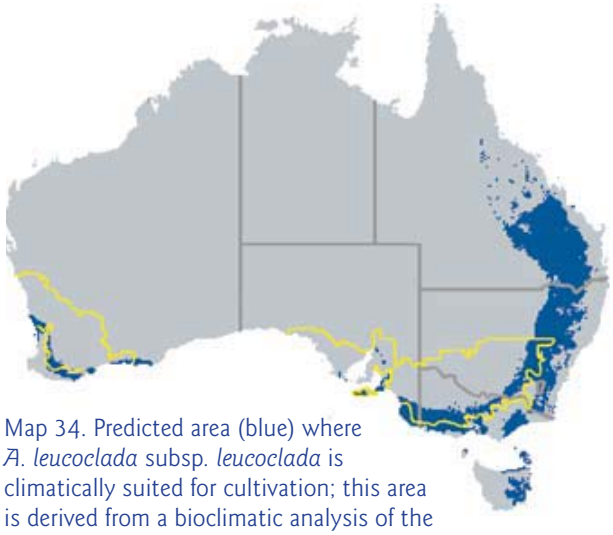
Habit

Trees or sometimes shrubs 4–9 (–15) m high, the single trunk bifurcating into 2 main branches at about 2–7 m above the ground, boles straight to sub-straight, 15–45 cm dbh and with relatively few short lateral branches, infrequently with 2–3 trunks from ground level, in dense regrowth stands or in shady situations the plants develop a rather spindly growth habit (with stems straight and erect), often freely suckering and forming pure stands; crowns not overly spreading (to about 6 m), sub-dense terminal (occupying about 1/3 of the total plant height). Bark smooth and grey on upper branches, rough, corrugated, grey or brown to black on lower trunk.

Botanical illustrations/photographs are provided by Costermans (1981), Tame (1992), Doran & Turnbull (1997) Tindale & Kodela (2001 and 2001a) and Kodela (2002).

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.



Map 34. Predicted area (blue) where *A. leucoclada* subsp. *leucoclada* is climatically suited for cultivation; this area is derived from a bioclimatic analysis of the natural distribution (red circles, Map 33), see also Table 5. Target area shown in yellow.

Acacia leucoclada has in the past been confused with *A. dealbata*, but differs in its more open growth habit, often inconspicuous glands and the presence of interjugary glands on the rachises between at least some pairs of pinnae. A study by Tindale & Roux (1969) of flavonoid and condensed-tannin contents of the heartwood and bark of *Acacia* recognized four groups within section *Botrycephalae*;

Figure 16. *Acacia leucoclada* subsp. *leucoclada*

A – Adult plant in open site with young sucker regrowth. (Photo: B.R. Maslin)

B – Mature roadside stand. (Photo: B.R. Maslin)

C – Stem base showing variation in branching. (Photo: B.R. Maslin)

D – Old plant in open site. (Photo: B.R. Maslin)

E – Section of stem showing pale-coloured wood. (Photo: B.R. Maslin)

F – Branch showing pale-coloured bipinnate leaves. (Photo: B.R. Maslin)

this study placed *A. leucoclada* (subsp. *argentifolia*) in a group *containing A. cardiophylla*, *A. chrysotricha* and *A. oshanesii*.

Acacia leucoclada comprises two subspecies, subsp. *leucoclada* and subsp. *argentifolia*. The latter grows to a tree 20 m tall and occurs in south-eastern Queensland on the north coast of New South Wales, it has fewer and less conspicuous glands on the leaves than in subsp. *leucoclada*; intermediates between the two subspecies occur (see Tindale & Kodela 2001 for further discussion).

Distribution and habitat

Occurs in New South Wales on the western slopes from Warialda south to Wagga Wagga, common in the Pilliga Scrub, also rarely on the Northern and Southern Tablelands, in the Hunter River valley and at Howes Mountain. Subspecies *leucoclada* is not uncommon in some of the drier north eastern region of the target area in New South Wales. It grows in open forest or woodland, usually in association with eucalypts and *Callitris* spp., in poor sandy or gravelly clay soils, red loams or acid granite sands (Doran & Turnbull 1997, Anderson 1968). Subspecies *leucoclada* has wide ecological tolerance and is suitable for growing on drier sites (Lex Thomson, pers. comm.). It is common in the places where it occurs and often forms pure stands (which appear to be produced from both seedling regeneration and from sucker regrowth). Further details of the ecological preferences of this subspecies are given in Doran & Turnbull (1997).

Flowering and fruiting

Flowers from late July to September/October with seeds present approximately 5 months after flowering (November to January). The seed is dropped soon after maturity (Stelling 1998).

Biological features

Very little information is available but based on our field observations this subspecies appears to have a fast growth rate (under good growing conditions it would probably attain trunks 10–15 cm dbh in about 10 years), it freely suckers but is unlikely to coppice (or has weak coppicing ability). Its life-span is unknown but is probably several decades and similar to *A. dealbata*.

Genetics

Chromosome number: $2n = 26$ (Briggs in Tindale 1966).

Occasionally hybridizes with *A. baileyana* (Tindale & Kodela 2001).

Cultivation

Acacia leucoclada is an adaptable, fast-growing species that prefers well-drained soils; little is known regarding its cultivation. According to Doran & Turnbull (1997) it should be possible to select seed sources for both drought and frost tolerance.

Yield

There have been favourable reports in terms of survival, biomass production and form for the cultivation of *A. leucoclada* at a number of trial sites in China and Vietnam (Fanggiu *et al.* 1998; Thinh *et al.* 1998). In these trials it was ranked amongst the best species, out-performing a range of other temmperate *Acacia* species.

The performance of *A. leucoclada* was most impressive in a trial at Calliope, Queensland (John Doran, pers. comm.). In this trial, in the 600 mm rainfall zone, *A. leucoclada* showed good form, attained 5.6 m in height and 7.2 cm in diameter, at age 30 months.

Establishment

There are 51 600 viable seeds/kg and immersion in boiling water for 1 minute is required to break seedcoat dormancy. Nursery and silvicultural techniques used for *A. dealbata* are likely to be applicable to this subspecies.

Weed potential

Acacia leucoclada is not normally recorded as having weed potential, however, according to Doran & Turnbull (1997) subsp. *argentifolia* frequently invades cleared farmland within its distribution. It is reasonable to assume that subsp. *leucoclada* could behave in a similar way.

Wood

Our field observations show the wood to be of low density, the sapwood is white with a small core of pale brown heartwood. According to Clark *et al.* (1994) *A. leucoclada* (subspecies not indicated) wood has a basic density of 626 kg/m^3. They reported that the species had a good pulp yield, excellent pulpwood productivity, moderate tear index and good tensile index when tested in a laboratory scale using a simulated Kraft process. However the level of brightness achieved in the test conditions was below standard. This species produces an exceptionally lightweight hardwood relative to its volume.

Utilisation

Wood

According to Doran & Turnbull (1997) *A. leucoclada* is a potential source of small round timbers for use as posts, poles or rails, and its wood characteristics indicate that it may be a useful source of firewood or charcoal, and possibly of pulpwood. Although this species produces pulp yields within the range of commercial pulpwoods its level of brightness (upon bleaching) is below standard. Doran & Turnbull (1997) note that further tests are required to see whether different wood samples give different properties and whether different bleaching sequences and higher chemical charges can overcome the brightness problem.

Land use and environmental

A useful windbreak species and provides excellent gully erosion control on account of its fast growth rate, vigorous suckering habit and proopensity to form thickets (Stelling 1998). Stelling also reports that *A. leucoclada* is an ideal 'nurse crop' for use with slow growing eucalypts or other long-lived species in mixed woodlots.

Stelling (1998) regards *A. leucoclada* as providing an excellent habitat for wildlife.

Potential for crop development

Acacia leucoclada subsp. *leucoclada* is regarded as having good prospects as a crop plant for high volume wood production. It is ranked as category 1–2 and would seem best suited for development as a phase crop but it may also have some prospects as a long cycle crop (Table 6). However, this species is currently not known in cultivation and there is very little relevant information available for it. Subspecies *leucoclada* is seemingly a fast-growing adaptable taxon and is common in northeastern parts of the target area in New South Wales. It has an excellent growth form and develops good quantities of woody biomass (we estimate that under good growing conditions this subspecies would probably attain trunks 10–15 cm dbh in about 10 years). The wood is pale coloured and has a low basic density (626 kg/m^3), thus within the range of being suitable for reconstituted wood products, and may possibly have potential as a pulpwood. Because of its apparent shade intolerance subsp. *leucoclada* is likely to do best if cultivated plants are widely spaced and grown in open sites. According to Doran & Turnbull (1997) it should be possible to select seed sources for both drought and frost tolerance.

The propensity for subsp. *leucoclada* 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. However, successful development of this species as a phase crop may depend upon locating non-suckering provenances, if they exist. As with other species of section Botrycephalae subsp. *leucoclada* would be expected to set prolific quantities of seed and this may possibly be produced from a relatively early age. Such phenological precocity will lead to the creation of a soil seed bank that may cause weed problems in adjacent or subsequent annual crops (on the other hand seedling regeneration may possibly be treated as a form of green manure). One way of avoiding soil seed build up is to harvest prior to pods being produced, but this would also require that sufficient woody biomass had been produced by that time. Perhaps the successful crop development of this subspecies will depend upon locating non- (or low-propensity) suckering or late-fruiting provenances, if they exist. These are important areas for future study if this subspecies is to be progressed as a crop plant.

The area predicted to be climatically suitable for the cultivation of *A. leucoclada*, based on its natural climatic parameters, is shown in Map 34. This analysis indicates that subsp. *leucoclada* has the potential to be cultivated well to the south and west of its natural distribution, including some parts of South Australia and Western Australia, mainly in areas that receive greater than 500 mm mean annual rainfall. As it is a poorly known taxon, many fundamental aspects of its successful cultivation need to be ascertained. For example, extent of variation among and within provenance for growth rate and form, drought and frost tolerance, optimal plantation stocking rates and pollarding response. As indicated by its excellent wood and growth characteristics this species warrants intensive silvicultural assessment over a range of sites and soil types throughout much of the target area.

Comprehensive range-wide seed collections are recommended for *A. leucoclada* so that representative 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.

The weed potential of subsp. *leucoclada* is likely to be low; however, if it behaves like subsp. *argentifolia* it may cause some problems by regenerating in agricultural lands. It is advisable therefore that any wide-scale use of subsp. *leucoclada* be accompanied by a weed risk assessment.