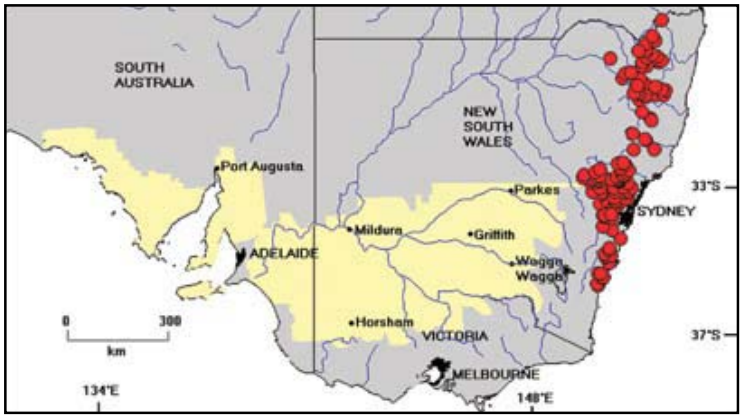
Acacia filicifolia Cheel & M.B.Welch

Common Name

Fern-leaved Wattle.



Map 25. Distribution of *A. filicifolia*

Habit

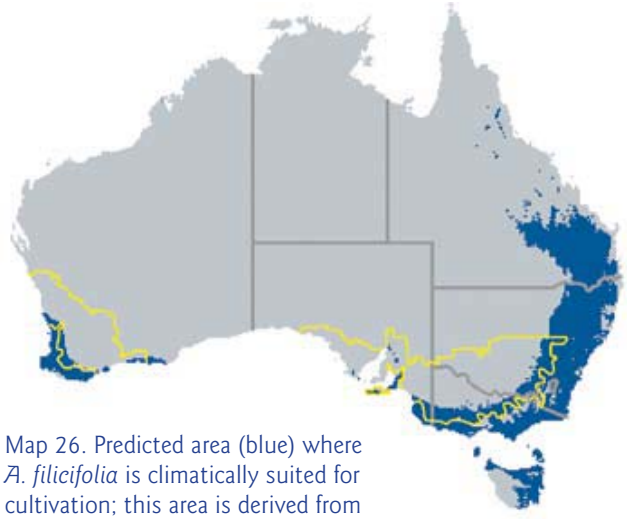
Erect shrubs or trees 3–14 m high, multi-stemmed at ground level (with up to 5 main stems) or single-stemmed to 0.5–1.5 m before branching, main stems straight to sub-straight (we measured stems 11–14 cm dbh but they undoubtedly get larger). Bark thin, smooth but with age becoming fissured near base of main stems, black or dark brown. Note: this description is based on very limited field knowledge of the species.

Botanical descriptions and illustrations are provided by Costermans (1981), Fairley & Moore (1989), Tindale & Kodela (2001) and Kodela (2002); a description is also provided by Pedley (1980).

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 filicifolia is closely related to *A. storyi* and *A. parvipinnula* (Tindale & Kodela 2001). 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*; this study placed *A. filicifolia* in a group with *A. irrorata* and *A. silvestris*.



Map 26. Predicted area (blue) where *A. filicifolia* is climatically suited for cultivation; this area is derived from a bioclimatic analysis of the natural distribution (red circles, Map 25), see also Table 5. Target area shown in yellow.

Distribution and habitat

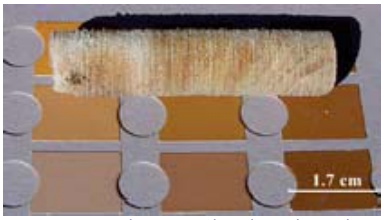
Occurs from Stanthorpe, southeast Queensland, to Bateman's Bay on the south coast of New South Wales (Tindale & Kodela 2001). In the latter State it occurs in the North and South Coast regions, as well as the Northern and

Figure 12. *Acacia filicifolia*

A – Young plant. (Photo: J. Simmons)

B – 3 years old plant in trial at Kowan, Australian Capital Territory. (Photo: S. Searle)

C – Base of stems showing variation in number of branches. (Photos: B.R. Maslin)



D – Stem core showing pale coloured wood. (Photo: P. Macdonnell)

E – Flowering branch showing heads in racemes & leaves bipinnate. (Photo: J. Simmons)

Central Tablelands, and the North and Central Western Slopes. It is common within its geographic range. Although the natural distribution of *A. filicifolia* is outside the target area it occurs close to the northeastern border in New South Wales. Grows in open forest, eucalypt scrub-woodland and savannah, on valley slopes or alluvial flats, often near streams, often on granite but also on various strata (Tindale & Kodela 2001). Soils range from sands to gravelly clays.

Flowering and fruiting

Flowers from late July to October and fruits chiefly from November to January (but sometimes in October).

Genetics

Chromosome number: $2n = 26$ (Tindale & Kodela 2001).

Biological features

Our field observations at one site near Glen Innes suggest that the species may have some suckering potential (but this is not likely to be vigorous). Under trial conditions near Canberra plants of *A. filicifolia* did not develop root suckers (Searle *et al*. 1998). In these same trials this species was shown not to be especially frost sensitive. It is unlikely to coppice. Five year old plants under trial in Western Australia showed no evidence of coppicing (or root suckering) 12 months after harvest (Barbour 2000). An analysis of gum characteristics is given in Anderson *et al.* (1971).

Cultivation

Yield

Acacia filicifolia was 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. Differences in performance between the Yadboro Flat and Singleton provenances at each trial site were not great. At age 2.6 years mean heights ranged from 4.7–5.2 m tall and dbh ranged from 4.7–5.1 cm. The mean height and dbh incremental increase was around 2 m and 2 cm per year respectively. At 5.2 years some differences in growth between provenances had become evident. At Kowen the mean height of the Singleton provenance was 6.8 m and mean dbh of 8 cm, while the Yadboro Flat provenance attained 5.3 m in height with a 6.3 cm mean dbh.

Acacia filicifolia was included by Barbour (2000) in trials involving 12 bipinnate acacias at three sites in Western Australia (Busselton, Darkan and Mt Barker). The species was ranked among the top five for growth, form and volume yield per hectare at age 5 years. Of the two provenances represented, Yadboro Flat out-performed the Singleton provenance. Survival and ranking of *A. filicifolia* was best at the cooler Mt Barker site. At the Busselton and Mt Barker trial sites *A. filicifolia* produced around twice the biomass compared to the Darkan site. In these trials the performance of plants at the Mt Barker and Darkan sites are of most interest to the present study because these areas both receive 650 mm mean annual rainfall. Barbour's report highlighted the fact that high evaporation and high summer temperatures at the Darkan site were too severe for the successful establishment of bipinnate acacias. These trial results suggest provenance variation will be a significant factor in the domestication of *A. filicifolia.* They also demonstrate that this species has some potential for successful cultivation in areas receiving at least 650 mm rainfall in the target area.

Acacia filicifolia was represented by two provenances in trials involving 16 temperate acacias at two sites in Victoria (Bird *et al.* 1998). The Yadbora Flat provenance performed well attaining 4.7 m in mean height with a 6.5 cm mean diameter at age 34 months.

Pests and diseases

African Black Beetle can cause severe damage in cultivation trials in W.A. (Barbour 1995). Birds are reported to have caused damage to plants under trial near Canberra (Searle *et al*. 1998).

Weed potential

There are no reported serious weed problems involving this species. However, in its natural area of occurrence it frequently colonises disturbed sites and hence, probably has some weed potential, especially in areas outside its natural range (Terry Tame, pers. comm.).

Wood

No specific information known except wood is pale coloured (it is likely to be of low density).

Utilisation

The timber of this species, according to Anderson (1968), has been used for fuel and minor purposes; the bark is inferior to that of *A. meansii* for tanning purposes, yielding about 25–32% tannin.

Potential for crop development

This poorly known species is provisionally ranked as category 3 (Table 6). Current evidence suggests that *A. filicifolia* is moderately fast growing and does not root sucker (or suckers only weakly) and therefore would be most suited for development as a phase crop. However, like many other species included in this report *A. filicifolia* has the capacity to produce large quantities of seed and this would lead to the creation of a soil seed bank that may lead to weed problems in adjacent or subsequent annual crops (on the other hand seedling regeneration may possibly be treated as a form of green manure). Harvesting plants prior to them reaching biological maturity is one way of avoiding soil seed build up, however, it is not known at what age *A. filicifolia* first sets appreciable pod crops. This species is capable of producing good quantities of woody biomass, at least in the wetter parts of its range (which occur outside the target area). Although nothing is known of its wood characters they are likely to be similar to those found in other Botrycephalae species, namely, pale coloured and of low density (thus attractive for use in reconstituted wood products).

The area predicted to be climatically suitable for the cultivation of *A. filicifolia*, based on its natural climatical parameters, is shown in Map 26. This analysis indicates that *A. filicifolia* is well suited to climatic conditions beyond its natural range into Victoria, Tasmania and the higher rainfall zones of South Australia and Western Australia. Within the eastern target area best growth is predicted to be mainly along the south-eastern fringes but site selection will be critical to achieving best results for biomass production. Wherever it is cultivated in the target areas *A. filicifolia* can be expected to perform best in the 550–650 mm rainfall zone and in valley soils on upland sites. Areas where frosts are a problem could be targeted as this species does not appear to be especially frost sensitive. Provenance variation is also likely to be substantial, particularly for desirable attributes such as form and biomass production. Comprehensive trials are therefore warranted to investigate this effect.

Depending on site conditions data from the few existing trials suggest that *A. filicifolia* may be out-performed by two other species of *Botrycephalae* that are detailed in the present report, namely, *A. decurrens* and *A. mearnsii*.