Acacia angustissima

(Miller) Kuntze

Fabaceae - Mimosoideae

LOCAL NAMES
English (white ball acacia,Prairie acacia,fernleaf acacia,fern acacia); Spanish (timbre,palo de pulque timbe,guajillo,cantemo,barba de chivo)

BOTANIC DESCRIPTION
Acacia angustissima grows as a thornless shrub or small tree mostly 2-7 m tall with a single short trunk. It exhibits much variation in pubescence, size and venation of the leaflets and size of flowers and heads.

The leaves are mostly asymmetric with a displaced mid-vein, 10-25 cm long, with 10-20 pairs of pinnae and leaflets without secondary venation.

The inflorescences are ellipsoidal with whitish heads 1-1.5 cm in diameter, turning pinkish to dull orange when dried.

The pod is oblong, 3-6 cm long and 6-9 mm wide, with straight or sinuate margins. The pods are initially green, turning coffee-brown as they ripen.

A. angustissima has six varieties (var. angustissima; var. hirta; var. suffruticosa; var. chisosiana; var. leucothrix and var. oaxacana). The generic name ‘acacia’ comes from the Greek word ‘akis’, meaning point or barb.

BIOLOGY
The species flowers throughout the year in its natural range, and at the end of the dry season in trials in Zimbabwe. A. angustissima is a prolific seed producer.

Tree habit: Typical small branchy tree in full bloom, Chiquimula, Guatemala. (Colin Hughes)

Flowers: Lax flower heads, illustrating cream-white stamen filaments. (Colin Hughes)

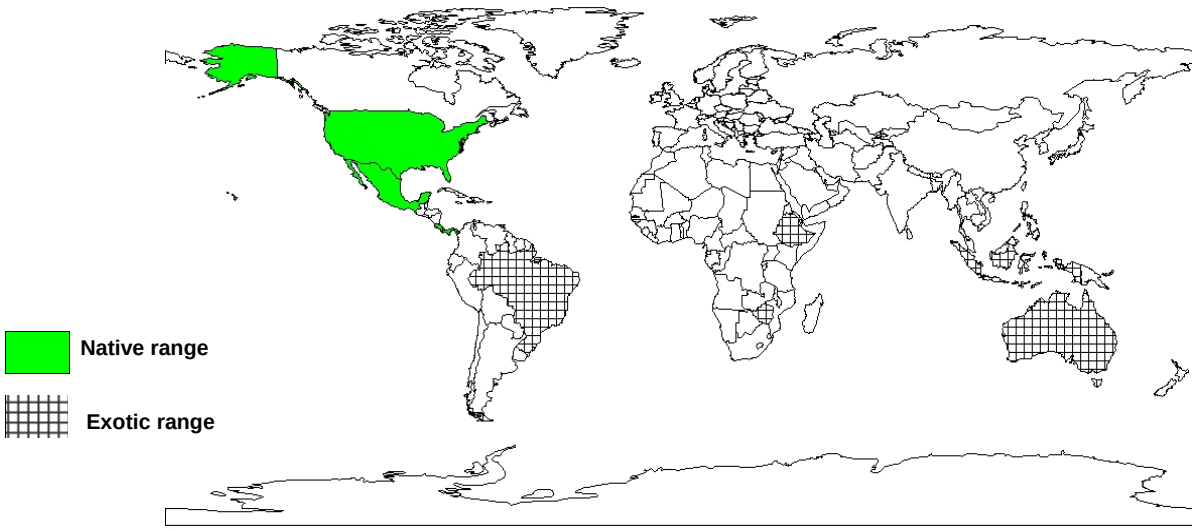
Seed pods: Unripe, flat, glossy maroon pods. Pods turn mid-orange when ripe. (Colin Hughes)

ECOLOGY
In its natural range A. angustissima is found on hillsides, rock slopes, summits, and in grassland with other shrubs. It is often found in tropical deciduous or semi-deciduous forest. It tolerates cold climates (occasional temperatures below freezing) and free-draining acid soils. It also withstands periods of drought, possibly due to its substantial taproot, retaining its green foliage in the long (sometimes 8 months as in Timor, Indonesia) dry season.

BIOPHYSICAL LIMITS
Altitude: 0-2600 m
Mean annual temperature: 5-30 deg C.
Mean annual rainfall: 895-2870 mm
Soil type: A. angustissima is well adapted to free draining acidic, infertile soils and shows an excellent drought tolerance.

DOCUMENTED SPECIES DISTRIBUTION

Native: Costa Rica, Mexico, Panama, US
Exotic: Australia, Brazil, Ethiopia, Haiti, Indonesia, Papua New Guinea, Zimbabwe



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS
Fodder: A. angustissima produces large amounts of foliage with fodder potential. The crown architecture enables the tree to withstand frequent cuttings or defoliation with a high recovery and growth rate. A. angustissima has also been shown to respond well to coppicing. Biomass production has been shown to range from 10.3 t DM ha-1 to 11.4 t DM ha-1, at 2-m spacing. At 3-m spacing the biomass increases to a range from 11.5 t DM ha-1 to 12.4 t DM ha-1. These figures are based on cutting the trees back to 50 cm above ground level and on yearly cuttings taken during, and/or at the end of the wet season. Research shows that A. angustissima cuttings contain high levels of N, P and K, but due to a high tannin content (6% DM), the protein is less accessible to the livestock. Tests have shown that A. angustissima leaves degrade poorly in the rumen of cows (48% after 48 hours of incubation. A. angustissima has been found to produce significantly more leaves than other shrub legumes, notably Leucaena spp., Calliandra calothyrsus, Gliricidia sepium, Cajanus cajan, and Sesbania spp. However, the high tannin content and low palatability means it is of limited nutritional value to livestock.

In feeding trials at the International Livestock Research Institute (ILRI) in Ethiopia, sheep fed 300 g of A. angustissima supplement per head per day died between 9 days and 21 days after consuming only 75-100 g per head per day at any time. This shows that the feed may contain toxins, and that the sheep did not particularly like it. In some areas of Indonesia A. angustissima leaf is reported to be eaten well and is regarded as an important source of forage.

Alcohol: The bitter astringent bark is used in Mexico for precipitating mucilaginous matter and inducing fermentation in the making of alcoholic drinks.

Medicine: Although A. angustissima is not commonly used for agroforestry in its native range, it is an important medicinal species for the Tzotzil and Tzeltal Maya Indians in Mexico. They rank it the 4th most important species in the cure of bloody diarrhea and 7th in the treatment of mucoid diarrhea. It is also used as a cure for toothache, rheumatism and skin lesions, and is reported to inhibit growth in malignant tumors. Tests also show that A. angustissima possesses a mild antimicrobial effect on Escherichia coli and Staphylococcus aureus.

SERVICES
Reclamation: Although A. angustissima may not grow into a large tree, it can be extremely valuable for use as pioneer species for rejuvenating degraded lands, and as a nurse crop for more-valuable tree species.

Nitrogen fixing: A. angustissima forms an association with soil Rhizobium to fix atmospheric nitrogen.

Soil improver: Its potential as a mulch producer has come into question, because of the presence of secondary compounds that bind the Nitrogen and result in low-quality (slowly decomposing) prunings. This may mean that the mulch is a poor Nitrogen source for the present crop, but it may have greater residual effects that could benefit the subsequent crop, or be a good Nitrogen source to help build up organic matter in the soil. These long-term benefits could outweigh the initial low nutrient return to the soil over a number of years. Slowly decomposing prunings may have value for suppressing weed growth in associated crops.

Intercropping: No information has been found about A. angustissima being used within farming systems in its native habitat. In Papua New Guinea, trials have been carried out using A. angustissima in an alley cropping system intercropped with sweet potato. A. angustissima provided enough N, P and K for the crop, but due to the rapid growth shaded the crop and inhibited the tuber yield.

TREE MANAGEMENT
A. angustissima is a relatively fast growing tree, sometimes achieving a 5 m height and about 6 cm diameter after 2 .5 years. When introducing A. angustissima into a new area it may be necessary to inoculate with an appropriate Rhizobium before planting. Weeds can suppress early growth and the establishment of the seedlings; it is therefore necessary to maintain a weed free zone around the seed or seedling.

The application of fertilizer to A. angustissima has been shown to have different effects depending on when added. Fertilizer added to seeds had a negative effect on emergence and did not improve the competitive ability of the seedling against weeds once it started to grow. Once A. angustissima is established the application of fertilizer has a positive effect on the growth of the tree.

A. angustissima grows rapidly and responds well to regular cutting. However, it produces weak branches that break off in moderate winds. This ability to grow quickly has resulted in A. angustissima becoming weedy and forming thickets, especially along roadsides and in sandy soil in pastures in its native range. This weed potential has created concern among some researchers about the advisability of its use in agroforestry or agricultural systems.

GERMPLASM MANAGEMENT
The seeds are very small, 90 000-100 000 seeds/kg.

PESTS AND DISEASES
In its native habitat A. angustissima is eaten by the Acacia skipper butterfly, Cogia hippalus, and by the moth larva of Sphingicampa blanchardi and S. raspa. Two local birds also eat the seeds, the masked bobwhite and the Arizona scaled quail. In trials in Hawaii the tree has been shown to be naturally resistant to attack from the Chinese rose beetle (Adoretus sinicus Burmeister).

FURTHER READNG

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SUGGESTED CITATION

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