

## Acacia koa

koa

### LOCAL NAMES

English (koa acacia,koa,Hawaiian mahogany); Hawaiian (koa); Trade name (koa)

### BOTANIC DESCRIPTION

Acacia koa is a large, evergreen tree to 25 m tall, stem diameter to 150 cm at breast height. Trees occurring in dense, wet native forest stands typically retain a straight, narrow form. In the open, trees develop more spreading, branching crowns and shorter, broader trunks. A. koa has one main tap root and an otherwise shallow, spreading root system. Bark gray, rough, scaly and thick.

A. koa belongs to the thorn-less, phyllodinous group of the Acacia subgenus *Heterophyllum*. Young seedlings have bipinnate compound true leaves with 12-15 pairs of leaflets. Where forest light is sufficient, seedlings stop producing true leaves while they are less than 2 m tall. True leaves are retained longer by trees growing in dense shade. Phyllodes are sickle-shaped and often more than 2.5 cm wide in the middle and blunt pointed on each end.

Inflorescence is a pale yellow ball, 8.5 mm in diameter, 1-3 on a common stalk. Each inflorescence is composed of many bisexual flowers. Each flower has an indefinite number of stamens and a single elongated style.

Pods are slow to dehisce, 15 cm long and 2.5-4 cm wide. They contain 6-12 seeds that vary from dark brown to black.

The generic name 'acacia' comes from the Greek word 'akis', meaning point or barb.

### BIOLOGY

Observations suggest A. koa can flower almost any time of year, depending upon local weather conditions. One known pollinator of A. koa is the honeybee (*Apis mellifera*). A. koa appears to be self-fertilizing. Pods reach maturity at 4-6 months, depending on location and weather conditions.

Gray

Fabaceae - Mimosoideae



Exclosure at Pohakuokala Gulch, Maui, Hawaii (Forest and Kim Starr)



Habit at Makawao forest reserve, Maui, Hawaii (Forest and Kim Starr)



Wood at Makawao forest reserve, Maui, Hawaii (Forest and Kim Starr)

ECOLOGY

Occurring in both pure and mixed forest stands, A. koa is most commonly associated with the native ohia (Metrosideros polymorpha). It is also a co-dominant in several other major forest types including Koa/Mamane(Sophora chrysophylla) Montane Dry Forest and Koa/Ohia/A'e (Sapindus saponaria) Forest.

BIOPHYSICAL LIMITS

Altitude: 180-6 000 m

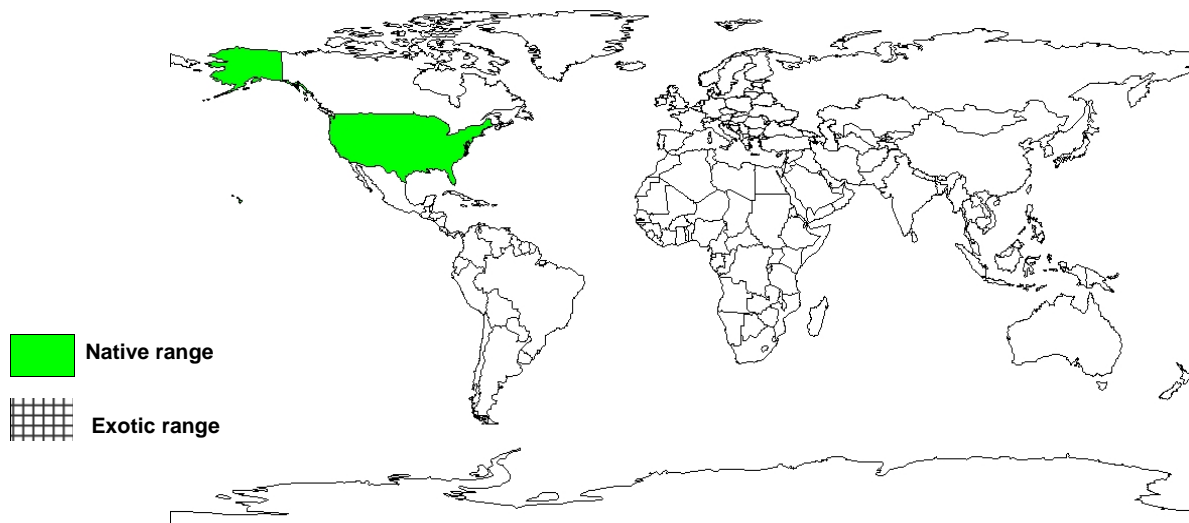
Mean annual rainfall: 1 900-5 100 mm

Soil type: A. koa prefers moderately to well drained, medium to very strongly acid soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: US

Exotic: Rwanda



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: Cattle, sheep and pigs browse *A. koa* foliage aggressively, especially its juvenile leaves.

Apiculture: The tree is visited by the honey bee and may be a source of nectar.

Timber: *A. koa* heartwood is highly valued for its unique grain, varied color and workability. It seasons well without serious warping or splitting. Curly-grained wood, the result of both stress and genetics, is preferred over straight-grained wood. Wood color ranges from a subtle yellow to a striking dark red-purple. The specific gravity of wood averages 0.40, but with curly-grained wood can be as high as 0.65. It is the premier Hawaiian timber for furniture, cabinetry, interior work and woodcrafts.

**SERVICES**

Reclamation: Most *A. koa* plantations in Hawaii have been established to provide vegetative cover on sites degraded by decades of intense grazing.

Nitrogen fixing: *A. koa* is nodulated by the slow-growing *Bradyrhizobium* spp. common in tropical soils. It nodulates heavily in a variety of soils, suggesting it is effective with a wide variety of *Bradyrhizobia* strains.

**TREE MANAGEMENT**

On favorable sites, planted seedlings grow to 9 m in 5 years. Its wide branching form is the result of open growth. Dense stocking of seedlings, which mimics the competitive environment where superior trees grow, encourages straight and rapid height growth. Initial spacing of 1.2 x 1.2 m is currently recommended. Observation indicates that effective self-thinning results in an adequate number of potential crop trees by age 25.

Plantation establishment is most easily and successfully accomplished through the stimulation of natural regeneration where scattered *A. koa* cover is adequate. Pasture soils are scarified and competition from grasses reduced by the application of a contact herbicide. Gaps in the regeneration are filled with planted seedlings. Fertilizers are applied to give seedlings an initial boost. Plantation thinning prescriptions should be based on desired products and management capabilities. The most important factors to consider in picking *A. koa* crop trees is stem form and height. Seed production begins when trees are 5 years old. *A. koa* bears seed often and abundantly.

**GERMPLASM MANAGEMENT**

The seeds are durable and easy to store. They germinate after many years of storage if kept in a cool, dry place. The most effective method for improving seed germination is mechanical scarification. However, hot water soaking works well and is a more practical method, seed should be soaked in boiled water for 24 hours. Seeds are seldom dispersed far from the tree and remain viable in the soil for up to 25 years.

**PESTS AND DISEASES**

Banana poka (*Passiflora mollissima*) is a fast growing vine that commonly outgrows and smothers young trees. Kikuyu grass (*Pennisetum clandestinum*), a dominant and extremely aggressive highland grass in Hawaii, is a major deterrent to the emergence of seedlings on cleared or formerly grazed lands. Successful plantation monoculture has historically been difficult to achieve due to associated insect and disease problems such as the defoliating koa moth (*Scotorythra paludicola*). A rust fungus (*Atelocauda koae*) and a lethal blight were first observed in 1988 on the island of Oahu. Insect larvae of many species destroy a large proportion of the mature seeds before they dehisce. *Calonectria crotalariae*, a soil-borne pathogen causes a collar rot, *C. theae* is the cause of a shoot blight.

**FURTHER READNG**

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**SUGGESTED CITATION**

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