

## Gleditsia triacanthos

honey locust

L.

Fabaceae - Caesalpinioideae

### LOCAL NAMES

English (honey locust, thorny locust, thorn tree, sweet locust, black locust, kirgis honey locust, honey shuck, three-horned acacia, common honeylocust); French (carouge miel, févier épineux); German (Dreidornige Gleditschie); Italian (gledischia, spino di Cristo, spino di Giuda); Spanish (espina de Cristo, acacias de tres espinas); Trade name (honey locust)

### BOTANIC DESCRIPTION

*Gleditsia triacanthos* attains a normal height of 15-25 (50) m and 0.5-1 (max. 1.8) m diameter. Trees have a short bole and open, narrow or spreading crown, bark reddish-brown to black, scaly, ridged, often covered in clusters of large, branched thorns. It has a strong taproot and a profusely branched root system.

Leaves deciduous, alternate, singly or doubly pinnately compound. Those singly compound form early on dwarf shoots or toward the base of the long shoots; bear 14-30 leaflets (no terminal leaflet) on a central stalk 15-20 cm long; preformed in buds. Those doubly compound bear 4-7 pairs of branches, each resembling a singly compound leaf; neofomed during the growing season. Leaflets 25-40 mm long, widest near the base; tip rounded, often with a small point; sometimes minutely toothed.

Flowers greenish-white, regular, small, about 5 mm across. The male and female flowers on the same tree, often on separate branches. Perfect flowers may also be present. Pollen flowers in many-flowered clusters (racemes) 5-7 cm long. Seed flowers in few-flowered clusters 7-9 cm long.

Fruit 15-40 cm long pods, flat, curved, twisted, brownish; husk leathery; falling in winter without opening. Seeds beanlike; with a hard, impermeable seed coat; 0.5-1.5 cm long, dark brown, smooth.

The generic name, sometimes spelt *Gleditschia*, commemorates the German botanist Johan Gottlieb Gleditsch (1714-1786), professor and director of the Berlin Botanic Garden. The specific name 'triacanthos' means 3-thorned; from the Greek 'treis' (three) and 'akantha' (a spine).

### BIOLOGY

Grafted seedlings begin to bear pods after 3 years and within 8 years will produce a dry weight of pods of 20-75 kg/tree. In the southern United States, the bee-pollinated flowers appear from early May and to late June in the north. Mature pods begin to drop by mid-September and continue throughout the winter. Seeds ripen from mid-September to late October in the United States.



Bark (Paul Wray, Iowa State University, [www.forestryimages.org](http://www.forestryimages.org))



Flowers (Paul Wray, Iowa State University, [www.forestryimages.org](http://www.forestryimages.org))



Foliage (Paul Wray, Iowa State University, [www.forestryimages.org](http://www.forestryimages.org))

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### ECOLOGY

Within the natural range, a large amount of variation exists in both climate and soil conditions. *G. triacanthos* occurs naturally in humid and subhumid climate regions; it grows naturally to 760 m but has been planted from sea level to 1500 m in temperate latitudes and will grow above 2500 m in subtropical highlands. It is shade intolerant and will only become established in open spaces. *G. triacanthos* is resistant to both drought and salinity.

### BIOPHYSICAL LIMITS

Altitude: 0-2500 m, Mean annual rainfall: 510-1520 mm, Mean annual temperature: 15-24 deg C.

Soil type: Best growth is found on deep soils (pH 6-8) in moist, alluvial floodplains although it also grows in saline soils. It generally grows poorly on gravelly or heavy clay soils and often fails on shallow soils.

### DOCUMENTED SPECIES DISTRIBUTION

Native: United States of America

Exotic: Australia, Canada, France, India, Lesotho, New Zealand, Russian Federation, South Africa, Tunisia, United Kingdom



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.

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**PRODUCTS**

**Food:** Seeds have been roasted and used as a coffee substitute.

**Fodder:** *G. triacanthos* leaves are an excellent source of fodder, contain 20% crude protein, low lignin and ensile well. Coppice regrowth retains high protein and low lignin levels. It has used as fodder in Australia and elsewhere.

However, limited studies indicate very low biomass yield response when planted from seed and harvested with a forage harvester during the 1st year's growth, or when 1-year-old seedlings were coppiced after a full year for establishment and growth. Sheep are able to digest the majority of seeds within the pods. However, for complete utilization by sheep, cattle, horses or swine, pods and seeds must be machine processed.

**Apiculture:** Flowers are very attractive to bees, which make honey from the nectar.

**Fuel:** The specific gravity of the wood is 0.60 green, 0.67 oven-dry, and it is considered an excellent source of fuelwood.

**Medicine:** In Lesotho, fruit pulp is used for lung diseases. Powdered seed is used as snuff for head colds. Reported to be anodyne, mydriatic, narcotic, and experimentally oxytocic, *G. triacanthos* pods are a folk remedy for dyspepsia and measles, colds and fevers among the Indians of the USA; Delaware Indians used the bark for blood disorders and coughs. The bark tea treats whooping cough.

**Timber:** The wood is strong, hard and durable, resistant to shock, and reddish-brown with attractive figuring; it is used locally for fence posts, pallets, crating, general construction, railroad ties and by woodworkers for making guitars.

**Gum or resin:** The gum from the seeds has been suggested as an emulsifying substitute for acacia gum and tragacanth.

**Alcohol:** A potable or energy alcohol can be made by fermenting the pulp.

**Poison:** Triacanthine from the leaves is highly toxic (LD50 about 35 mg/kg) and of questionable oncostatic activity.

**SERVICES**

**Erosion control:** Because it can be applied in erosion control, *G. triacanthos* is being tested in many temperate, Mediterranean and highland tropic regions of the world.

**Shade or shelter:** *G. triacanthos* is hardy and drought tolerant; it can be grown in windbreaks with the added benefit of pod production.

**Ornamental:** Its readiness to grow from seed, rapid growth, easy culture and extreme hardiness are among the commendable characters that make this tree popular for planting in gardens, parks or along highways. It has been widely planted as a replacement for American elm in North America and Canada with over 50 recognized cultivars. Budding can produce thornless trees with scionwood taken from the upper branches of selected cultivars. Thornless seedlings can be selected at a very early age (within 10 weeks of germination) for use as ornamental cultivars.

**Intercropping:** Widely spaced overstorey fodder trees (fodder orchard) can be planted for on-farm silvopastoral systems and should be compatible with a variety of forage, grain, vegetable, woody perennials or animals in the understorey.

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### **TREE MANAGEMENT**

Male trees (about 10%) must be included in or adjacent to fodder orchards to ensure pollination of female trees. When established in working pastures, young trees need protection with plastic tree shelters or electric fencing. Appropriately managed, average annual pod production of 40 kg/tree appears feasible. Planting 75 trees/ha (excluding male trees) would yield 3000 kg/ha, sufficient to provide 100 sheep a 1.5-kg ration of pods for 20 days. The tree coppices vigorously when cut. Typical of many caesalpinoid genera, *G. triacanthos* does not nodulate and lacks the ability for symbiotic fixation of atmospheric nitrogen.

### **GERMPLASM MANAGEMENT**

After harvest, pods should be stored at 0 deg. C to prevent fermentation. If bruchid seed weevils (*Amblycerus robiniae*) are present in the pods, it will prevent them from spreading within the pods.

Seed storage behaviour is orthodox. A few seeds germinated after 50 years in storage at 4% mc and ambient temperature; viability was maintained for several years in hermetic air-dry storage at 0-8 deg. C. Seed yield averages 5200 seeds/kg (3300-14 300, depending on the seed source) with high purity and soundness.

### **PESTS AND DISEASES**

Grazing animals may damage young plants, while other animals and birds may eat the pods. The mimosa webworm, *Homadula anisocentra*, is a serious defoliant and heavy infestations of spider mites (*Eotetranychus multidigituli*) occur during dry weather and can also defoliate a tree. Bruchid weevils (*Amblycerus robiniae*) are sometimes found in the seeds.

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### **FURTHER READING**

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### **SUGGESTED CITATION**

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