ROBINIA, HONEY LOCUST AND PAGODA TREE

MAX VISCH
120 Hoon Hay Road, Christchurch 2. Phone 03 338 2273

Three introduced leguminous trees grown in Christchurch and the Canterbury region are robinia (also known as black locust), honey locust, and pagoda tree. The first two are very common, though usually seen as cultivars, whereas pagoda tree is much less frequent. This article describes their introduction into cultivation, their distinguishing features, and their uses.

ROBINIA PSEUDOACACIA – ROBINIA

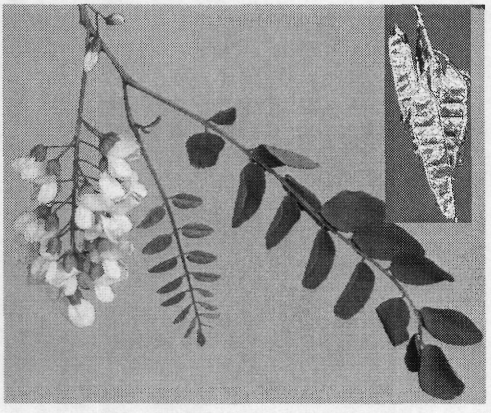

Fig. 1: *Robinia pseudoacacia* (pods inset: not to scale). Photo: P.E. Horn.

Robinia was brought to Europe early in the 17th Century, being one of the first North American forest trees to arrive there. It was given the generic name *Robinia* by Linnaeus in 1629 to honour Jean and Vespasian Robin – father and son – royal gardeners and herbalists to Henry IV and Louis XIII of France. They grew robinias in the Royal Gardens at the Louvre and did much to popularize the species in France.

When the species arrived in England is uncertain but the English journalist and politician William Cobbett made sure that his countrymen would not miss out on growing this remarkable tree. No doubt he also hoped to profit from the venture he had in mind. Of its timber he wrote "It is absolutely indestructible and the time will come, when black locust will be more common in England than oak, when a man would be thought mad if he used anything else but locust in the making of sills, posts, gates, poles or for anything where there is liability to rot." In response to his enthusiastic writings, many landowners planted robinia as a timber tree, often in large numbers.

Cobbett sent plants and seed from the nursery he had established on Long Island in the United States. Planters bought more than a million trees from him, but in England at least, the undertaking was no great success – growth of the trees was poor, and their fluted stems proved quite unsuitable for processing in sawmills. It seemed as though the British climate had insufficient sunshine to produce the rapid growth that the species was known for, whereas in eastern Europe and parts of Asia, its introduction was an immediate success.

Robinia is native to the uplands of the eastern USA, with the original centre thought to have been the Appalachian Mountains. Widespread planting and naturalization through seed and root suckers has ensured that robinia now grows on wasteland throughout much of North America, including southern Canada, and Europe.

Robinia is a vigorous grower, especially in its youth, and can achieve a height of 25-30 m. Old trees have a most picturesque appearance. In winter the most striking feature is the thick, rugged, deeply furrowed grayish bark. Often two or three trunks arise from a short bole and together support the rather open crown of gnarled and twisted branches. Like honey locust (*Gleditisia triacanthos*), robinia has sharp spines, which occur in pairs on the young branches and sucker shoots, and represent modified stipules.

In spring, the light green, pinnate leaves arrive late but are soon followed by long, pendulous racemes of white, sweetly scented pea-like flowers. The flat, brownish pods, which contain up to ten blackish seeds, remain on the tree throughout winter and in some years are produced in such huge numbers that they appreciably darken the tree's crown (Fig. 1).

The bark contains toxins which have killed sheep and horses in New Zealand and overseas. In the USA a group of young boy scouts was poisoned at a camp – though not fatally – from chewing the bark.

Apart from being a most attractive amenity tree suitable for parks and large gardens, robinia has also become of great economic importance in many countries. More than a million hectares have been planted worldwide, with the largest plantings being in Korea, Hungary, Yugoslavia, the former USSR and China. The tough and extensive root system, suckering habit, rapid growth and an ability to grow well in soils too dry and poor for most other trees, make robinia eminently suitable for soil stabilization. It is widely used

to counter erosion in China, Korea and Hungary and some 645 million trees were planted in the Tennessee Valley as shelter belts to control wind erosion. It was used in the USA and Germany to reclaim mine spoils, being a legume that fixes nitrogen in symbiosis with rhizobial bacteria, thereby enriching the soil.

Robinia flowers are a rich source of nectar and pollen, and are the primary resource for Hungary's bee-keeping industry. The heartwood is one of the most naturally durable timbers, so that chemical treatment is not needed. In France, it is much used for vine stakes, which need not be replaced for 50 years. The timber's great strength, toughness and durability has made it highly suitable for posts, poles, sleepers, sports gear and tool handles. In Europe, the attractive wood has been used for furniture, paneling, parquet flooring and veneers.

It seems strange that with its many virtues, robinia has been so little planted in New Zealand. Considerable quantities of seed were imported privately before 1900 and a number of strains now occur, but past efforts have mostly given trees with small, crooked trunks and much branched tops. Several attempts have been made by forestry scientists to improve the quality of New Zealand-grown robinia by importing and trialling reputedly high quality clones from the USA and Hungary but results so far have been disappointing.

Although ordinary robinia is perhaps too large for average suburban gardens, a number of cultivars are highly popular. The one most frequently planted in Christchurch gardens is golden robinia (*R. pseudoacacia* 'Frisia') which was developed in the Netherlands in 1935. It is much less vigorous than the parent species, bears no spines and is particularly showy in autumn when its butter gold foliage turns orange yellow. It is as tough as the species and is grafted on a standard.

One of the biggest robinias in New Zealand stands in a private garden on the corner of Helmore Lane and Rhodes Street in Fendalton. Its short bole supports four massive, grayish trunks. Last summer it must have produced huge amounts of flowers, as the tree is still loaded with pods this (2004) winter.

GLEDITSIA TRIACANTHOS – HONEY LOCUST

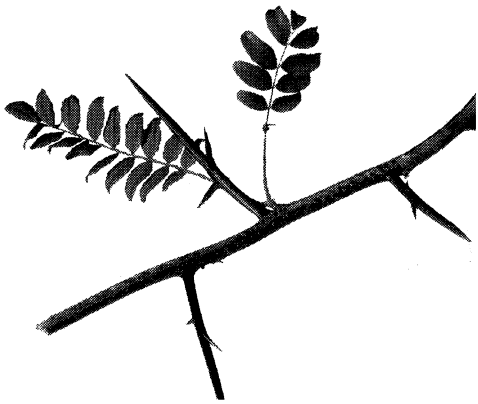

Fig. 2: *Gleditsia triacanthos* with large spines and young leaves. Photo: P.E. Horn

The genus *Gleditsia* was named to honour Johann Gleditsch, one time director of Berlin's Botanic Garden. Of the dozen or so species distributed across North and South America, tropical Africa and Asia, only honey locust (*G. triacanthos*) is commonly grown in New Zealand, usually as cultivars. It is a large, deciduous, legumeinous tree native to fertile, alluvial lowlands of the eastern United States, that under optimal conditions can achieve a height of 40 m or more. Tree shape is variable – usually a single trunk supports an open, flat-topped canopy that is widest at the top.

Honey locust is noted for its attractive, fine, almost fern-like foliage. The slightly zigzag brownish shoots bear alternate, pinnate and bipinnate leaves composed of numerous glossy, dark green leaflets, which can be sparsely toothed or entire.

The most distinctive feature of this tree, however, is its formidable armament of very sharp, rigid spines up to 30 cm long, variously described as vicious, wicked, fierce, ferocious and aggressive (Fig. 2). These occur singly on the shoots, and as dense, radiating bunches covering the trunk and larger branches. They are commonly branched – hence the specific epithet *triacanthos*, meaning 'three-thorned'. Degree of branching depends on age. The spines occasionally bear small leaves, indicating that they are really modified shoots.

Honey locust belongs to the Caesalpinioideae, a subfamily of Fabaceae, or legumes, in which many genera have flowers not at all like the colourful pea flowers of our gardens. Those of the honey locust are small, inconspicuous

and greenish - a bit disappointing when compared with the flowers of robinia and pagoda tree (Fig. 3). All petals are similar in size and shape. The flowers are usually either male or female and the two sexes occur on separate trees, occasionally on the same tree. A redeeming feature is that they produce much nectar and pollen and are very sweet scented, so at least bees find them appealing.

The large, flattened, brown pods that dangle from the female trees during winter months are far more prominent. They are 30-45 cm long, sickle shaped or twisted, and drop off throughout the winter without opening, the blackish seeds being scattered when the pods are blown about by the wind and break down.

The green immature pods contain, apart from developing seed, a sweet-tasting pulp rich in sugars and protein. They are eagerly eaten by all kinds of livestock and other herbivores. Pod production varies greatly between individual trees and from season to season. Where pods fall in large quantities on to footpaths and pavements they can be a nuisance to pedestrians. Male trees produce no pods, nor do some cultivars.

Honey locust is a very tough and hardy tree, with hard, ground-durable heartwood that can be used for posts and poles. It is increasingly being planted on North Island farms to stabilize eroding hillsides, because of its deep, extensive root system and tolerance to drought. The diffuse canopy allows light to filter through to the ground, thereby allowing grass growth and grazing right up to the trunk. The pods provide supplementary fodder for cattle, sheep and pigs, and the flowers are a nectar source for bees.

There are 'well-armed' honey locust trees at Chatwood Place off Breens Road, Bishopdale. On some, the lower branches have been pruned back, making them impossible to climb – but who would want to! Most honey locusts used as street trees in Christchurch belong to the cultivar 'Inermis' which is usually without thorns –no doubt to protect the public from being impaled. One of the most common garden forms is 'Sunburst', which has become immensely popular in recent years on account of its slow growth, absence of thorns, and foliage that is golden yellow in spring and golden in autumn. It is easily confused with the equally popular *Robinia pseudoacacia* 'Frisia' or golden robinia, but 'Sunburst' has finer, more shiny foliage.

SOPHORA JAPONICA – PAGODA TREE

Sophora comes from the Arab word *sophira* which relates to a tree with pea-shaped flowers and pods. The pagoda tree is native to China and Korea, not Japan, but as it has been cultivated in Japan for centuries and became first known to botanists as a Japanese tree. Linnaeus, not knowing any better, named it *Sophora japonica*. In 1747 the French Jesuit missionary Pierre d'Incarville sent seed from China to the famous Jardin des Plantes in Paris. Kew Gardens received one specimen in 1761.

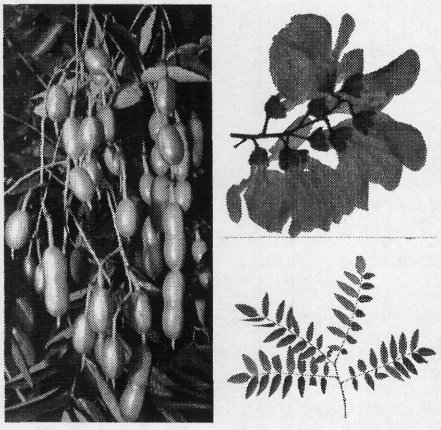

Fig. 3: Pods, flowers and leaves of *Sophora japonica* (not to scale).

The pagoda tree is vigorously growing, producing an irreg-ular, rather open crown of massive contorted branches, glaucous shoots and pinnate leaves. It resembles the much more common black locust *Robinia pseudoacacia* but differs in that it has no spines, does not sucker, and flowers much later in the season. The creamy white, pea-like flowers are arranged in terminal clusters and are followed by the 5-8 cm long, wingless pods which, like those of the New Zealand kowhais, are conspicuously constricted between the seeds, giving the appearance of beads on a string (Fig. 3).

According to ancient Chinese literature, the pagoda tree was in cultivation before the start of the Christian era. In old China there was a strict hierarchy of trees that were allowed to be planted at the graves of notable citizens and rulers of various ranks. Pines were for emperors, a princess was worth a *Paulownia*, and a scholar, teacher or priest – citizens still fairly high in the ranking order – could have a *Sophora* at their burial places. Hence the alternative name 'scholar tree'.

Among the many botanical curiosities at Kew Gardens, there is a pagoda tree with a strongly reclining trunk propped up by three stout metal supports. It was planted in 1762 by Lord Bute, who had been given the task of

establishing a small arboretum and physic garden on behalf of Augusta the dowager princess of Wales. This later became the nucleus of Kew Gardens. Nearby that same year a ten-storey pagoda was completed under the supervision of the architect Sir William Chambers. Perhaps the close proximity of the young Chinese tree to the pagoda is the reason why the species is known as the 'pagoda tree'.

Many consider that the pagoda tree in full flower is one of the most beautiful deciduous trees brought to New Zealand, but it does not flower until at least 30 years old. It is not very common in Christchurch, but can flower here though not as profusely as in the North Island as production of flowers and pods appears to be favoured by warmer summers. Two mature trees overhang the Iris Bog Garden in the Botanic Gardens. The largest specimens I have seen are in the grounds of the former Sunnyside Hospital, opposite 11 Annex Road. Both have a diameter of about one metre. I do not know when and by whom they were planted, but hope that they survive the development and possible sale of the grounds in the near future.

Note by Bill Sykes and editor: *Sophora japonica* has recently been transferred to a resurrected genus, as *Styphnolobium japonicum.* In similar vein, American sophoras like the blue-flowered *Sophora secundiflora* of Texas have been transferred to *Calia*, hence *Calia secundiflora.* The type species of *Sophora* is the shrub *S. tomentosa*, which grows on tropical beaches. The section *Edwardsia* that comprises the kowhais extends from New Zealand to Chile, with outliers on Lord Howe Island and Tristan da Cunha; one species, *S. chrysophylla,* ascends to over 3000 m in Hawaii. Fortunately for us, this section remains in *Sophora* as, so far, does the spiny, blue-flowered shrub *S. moorcroftiana* that grows on dry mountainsides in Tibet and the northern Himalaya.

ACKNOWLEDGEMENTS

The illustrations of pods of *Sophora japonica* is copied from Salmon, Pamela N. 2003. Reed Field Guide to exotic trees in New Zealand: Broadleaves and conifers. Reed, Auckland. 207p. with permission from the publisher.

The flowers were photographed by Sue Gibb; from material in the Landcare Research Herbarium (CHR).