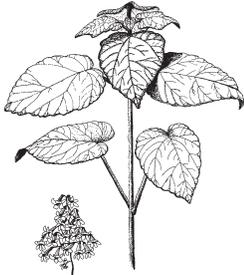




Paulownia

Yvonne Barkley



Paulownia (*Paulownia tomentosa*), also known as royal paulownia or Chinese empress tree, has been prized by Asian cultures for centuries. It is native to Asia and was introduced to the eastern part of the United States in 1834 as an ornamental. It is known for its extremely fast

growth, showy fragrant flowers, large leaves, and high-priced wood. The major commercial market is Japan, where paulownia's attractive, strong, lightweight wood makes it desirable for furniture, gift boxes, bowls, toys, clogs, and handicrafts. The wood also has good resonance qualities, creating a high demand for use in the crafting of musical instruments. Because of paulownia's great demand, Japan imports large quantities of logs from all over the world. The most desirable, and hence valuable, trees are those that have grown slowly in the wild, mostly because of their large size and close growth rings.

Biological and Silvics

As many as 20 species of *Paulownia* are reported, but only six species from China are generally recognized: *P. tomentosa*, *P. elongata*, *P. glabrata*, *P. fortunei*, *P. fargesii*, and *P. taiwaniana*. Provenance trials are currently underway in the United States, Australia, and South America to investigate growth and yield differences.

In China, paulownia grows best in areas similar to USDA Hardiness Zones 5 to 9. The climate in many areas of Idaho is marginal for the culture of this species, though large, mature paulownia have been found in several areas of the state. Areas in Idaho suitable for growing paulownia will be found at lower elevations with protection from arctic winter blasts and hot, dry summer conditions.

A striking tree with showy violet bell-shaped flowers, paulownia reaches 30 to 70 feet in height and three to

five feet in diameter at maturity. Its heart-shaped leaves are very large (six to 16 inches long and four to eight inches wide) and resemble catalpa. Considered to be a fast grower, it is intolerant of shade, flooding, and saturated soils.

Establishment

Site selection. Paulownia grows best in deep, well-drained soils with pH levels between 5.5 to 7.5. Paulownia requires full sun and is very intolerant of windy conditions. It usually grows best on gentle, lower slopes with southeast- to southwest-facing aspects. Areas with poorly drained, heavy clay, or compacted soils, frost pockets, and cold air drainages should be avoided.

Planting densities. Planting densities should be high enough so that a forest-like stand develops quickly. Competition from neighboring trees will limit rapid growth and in doing so, improve log quality. Tree spacing of 10 by 10 foot is often recommended, but spacings from seven to seven foot to 12 by 12 foot are common.

Culture and Management

General tree plantation management and cultural activities will be familiar: pruning; protection; fertilization; weeding; irrigating; mulching; and thinning. But one technique that is very different for paulownia culture is coppicing.

Coppicing. A realistic management objective for paulownia is to grow each tree so it produces a single eight foot log that is high-quality, meaning straight-grained with no knots. Paulownia always forms a double-forking terminal bud and consequently, a clear log must result from a single year's growth. To accomplish this you will need to coppice your trees. Coppicing is the practice of cutting young trees off near the soil line and allowing them to resprout from the root collar. This practice enables the tree to develop a root system large enough to produce a shoot of sufficient log length

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in a single year's growth. Coppicing takes place one to three years after you have planted your trees, while they are dormant. Before coppicing, your trees should be strong and vigorous, free from insects, disease, and sun-scald, and have no competition from surrounding vegetation.

Each time you coppice, you will cut your dormant trees off at the soil line (really). The following spring, each tree will send up new sprouts that will grow two to six feet tall, depending on your site. Choose the tallest, stoutest sprout from each tree and remove the rest. Remove any subsequent new sprouts as they appear throughout the growing season. In each succeeding year, the root system increases in size, enabling the tree to send up succeeding larger sprouts each time it is coppiced. For example, if an individual tree produced a two foot sprout after the first coppicing, a second coppicing will probably produce a sprout that is double (or more) in size. You may have to repeat the coppicing process a third year if all of your trees have not produced a nine foot plus sprout. Managing for sprouts at least nine feet tall will provide you with an eight foot clear log with provision for the stump and the swell at the top where the tree has its first fork.

Debudding/Pruning. As each tree completes the coppicing phase of its culture it moves into the debudding phase. Buds are removed before they grow into branches. The idea is to leave enough leaf surface to provide sufficient photosynthetic area for tree growth, but minimize knots. To begin debudding, leave the buds at the upper three node positions and remove the rest. Repeated removal of buds should continue throughout the growing season. This process is repeated for three to five years until the tree has a completely clear nine foot stem. Branches above this point are then allowed to develop naturally

Paulownia has a hollow pith with a thin circular tissue plate across the pith (like bamboo) at each node. Do not rip or puncture this tissue when pruning or debudding. This tissue plate prevents water from entering the stem where it could contribute to the development of rot. If damaged, go down to the next node and try again.

Protection. Sunscald is one of the most restrictive factors to growing paulownia and can seriously restrict growth, decrease log quality, and cause mortality. Wrapping the trunk with two layers of paper tree wrap

is one solution, as is painting the trunks with full strength, white latex paint. Paint alone will protect against some desiccation and spring sun-scald. Wrap alone will protect against winter freezes and desiccation. In Idaho, it is recommend you use both methods to provide the best protection. Paint the trunks first and then wrap with two layers of paper, with the tar side in the middle. Tree wrap must be removed in the spring at bud break and reapplied each fall. Paint will also need to be reapplied annually when coppicing begins.

Due to paulownia's large leaves and special cultural requirements (coppicing and debudding), tree shelters are not recommended for use with this species.

Royal paulownia has very special physical and cultural needs. But with the right site and cultural practices, paulownia could be a successful alternative tree crop for Idaho private landowners.

For more information on paulownia, contact:

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www.paulowniatrees.org

At a glance...

Species: *Paulownia tomentosa*

Common names: Royal paulownia, Chinese Empress tree.

Native range: Asia.

Hardiness: USDA Zone 5-9.

Soil type: moist, deep, well-drained soils.

Shade tolerance: intolerant.

Form: 30-70' tall with a rounded, dense crown.

Region insect and disease problems: few.

Objectionable characteristics: very susceptible to sunscald.

Other: popular ornamental.

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