

# *Paulownia tomentosa* (Thunb.) Sieb. & Zucc. ex Steud. Royal Paulownia

Scrophulariaceae      Figwort family

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Royal paulownia (*Paulownia tomentosa*) is an introduced ornamental that has become well established in this country. It is also known as princess-tree, empress-tree, or paulownia. Aside from its continuing ornamental use, the species has value for its small saw logs that are in demand for specialty products. Its capacity to "pioneer" disturbed exposed sites has made royal paulownia a favorite for strip-mine spoilbank reclamation.

## Habitat

### Native Range and Climate

Royal paulownia is a native of eastern Asia. It has been widely planted in North America from Montreal to Florida and west to Missouri and Texas. It has also been planted in some Pacific States. The tree is moderately cold hardy and has naturalized principally in the East and South. In China, the natural range is south of the 0° C (32° F) January isotherm in areas which receive an annual rainfall of at least 1020 mm (40 in) (5).

### Soils, Topography, and Associated Forest Cover

Naturally seeded or planted royal paulownia survives and grows best on moist, well-drained soils of steep slopes or open valleys (3,7), but it will germinate and grow on almost any moist, bare soil. A highly adaptable "escapee" such as royal paulownia is found in many site, soil, and forest type conditions, including soils commonly found in the order Alfisols.

## Life History

### Reproduction and Early Growth

**Flowering and Fruiting**-The perfect flowers of royal paulownia are borne in terminal panicles up to 25 cm (10 in) long in April and May. They are violet or blue, and their appearance before the leaves emerge is quite striking. The fruits are ovoid, pointed, woody capsules about 30 to 45 mm (1.25 to 1.75 in) long (fig. 1). They turn brown as they mature

in September or October and persist on the tree through the winter (1).

**Seed Production and Dissemination**-Royal paulownia trees start bearing seed after 8 to 10 years and are very prolific (2). Each capsule contains up to 2,000 seeds, and a large tree may produce as many as 20 million seeds a year. The tiny, flat, winged seeds weigh about 0.17 mg (170,000 seeds/oz). As the capsules break open on the trees throughout the winter and into spring, wind dissemination occurs easily (1).

**Seedling Development**-The seeds of this species germinate quickly and grow rapidly when conditions are favorable. The seeds are not dormant, but laboratory studies have found that light is required for germination (1). Cold storage reduces the light requirement, however (7). Germination is epigeal. Like most pioneer species, *P. tomentosa*

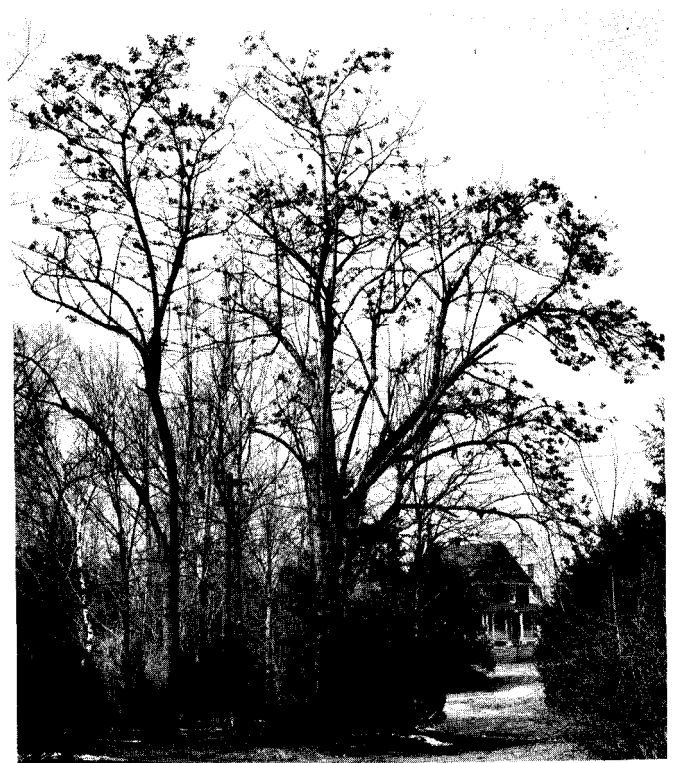


Figure 1-Planted paulownia trees with persistent woody seed capsules in winter.

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needs bare soil, sufficient moisture, and direct sunlight for good seedling establishment. Seedlings are very intolerant of shade.

**Vegetative Reproduction-Royal** paulownia roots sprout easily. In fact, lateral root cuttings of 1-year-old seedlings can be used for propagation directly in the field (7).

#### Sapling and Pole Stages to Maturity

**Growth and Yield-On** good sites royal paulownia grows rapidly. Plantation spacings of 1.2 by 1.2 or 1.8 by 1.3 m (4 by 4 or 6 by 6 ft) have been recommended; saw logs can be expected in 15 years. Heights at maturity range from 9 to 21 m (30 to 70 ft) (3,7). Heights of 13 m (43 ft) in 11 years have been reported in Russia. On poor sites, such as surface mine spoils, growth is considerably slower. The ability of royal paulownia to survive, grow, and reproduce on such harsh, exposed sites, however, has made it a favorite for revegetating surface mine areas. The tree thrives on dry southern aspects, even though it generally has a shallow root system (7).

**Rooting Habit-No** information available.

**Reaction to Competition-Since** royal paulownia is a naturalized exotic that is only now being planted, little is known about its silviculture. Like most pioneer species, however, it is classed as intolerant of shade and competing vegetation.

**Damaging Agents-No** major insect pests are known for royal paulownia in the United States. Minor damage from several foliage diseases has been reported on the species. The most common, *Phyllosticta paulowniae*, produces small brown spots on the leaves, and two powdery mildews, *Phyllactinia guttata* and *Uncinula clintonii*, have also been found (4). No major disease problems have appeared yet in the United States.

## Special Uses

Royal paulownia was introduced into this country as an ornamental, and it still retains some popularity for that purpose. Its use in reclamation of the disturbed soils of surface mines grows yearly. The wood is highly prized for the manufacture of specialty items in Asia, and there is a brisk export business of logs to Japan. The export market has led to establishment of commercial plantations in this country.

## Genetics

Some authorities list 15 species of paulownia, but only 6 species from China are generally recognized (7). This may indicate considerable natural variation to select from, but there are no published reports of genetic studies in the United States.

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