

## **Analysis of a New Industry**

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Paulownias can be used for many purposes, such as some of the examples set out below:

### ***ORNAMENTAL***

Paulownias can be grown as an ornamental tree in most areas of Australia. They are spectacularly fast growing, have large attractive foliage, and are covered with brown velvety buds in the winter, and in the spring they have large foxglove like heads of sweetly scented flowers.

By planting a number of varieties, a gardener can enjoy several different colors of flowers throughout a flowering period of over 90 days. The Paulownia makes a lovely shade tree that is dormant in the winter; it's leaves decompose quickly and make nitrogen rich compost.

Perhaps one of the best attributes of the Paulownia is that shrubs, flowers, bulbs and lawn do well right up to the base of the tree. The Paulownia likes a full sun situation, sheltered from extreme winds in the growing season, with well drained soil. Gardeners in very dry areas should irrigate Paulownias in summer.

### ***URBAN FORESTRY***

Apart from being attractive, Paulownias have other characteristics that make them ideal for urban forestry. They are dormant through the late autumn, winter and well into the spring, and have no twigs, just branches that let the full sun through. Then in the summer they form a cool shady canopy. The leaves also can withstand amounts of dust, smoke and pollution. In fact, the fine hairs on their leaves can actually purify the air. In the city of Chendou in China, intensive planting of Paulownia decreased the air pollution by more than 80 percent.

Paulownia plantations could also utilize storm water and sewerage, turning them into valuable timber. This could be of particular interest in areas like the Gold Coast, where people are looking at alternatives to pumping sewerage into the sea.

### ***AGROFORESTRY***

Paulownias are compatible with many crops. Some of these include wheat, cotton, corn, soyabeans, lucerne, potatoes, vegetables and flowers. They are valuable, because they increase soil fertility, lift temperatures in winter and lower them in summer, plus they increase soil and air humidity. Where Paulownias are likely to prove the most valuable is in agroforestry. Used in this way they can benefit farmers in lots of ways:

1. They lower the water table and prevent salination;
2. They reduce wind damage to the crops;
3. Increase soil and air humidity. This decreases the need for irrigation;
4. Paulownias recycle nutrients by drawing them up from deep in the ground and depositing them back on the surface in the form of leaf drop;
5. Leaf drop can be harvested for livestock food in the autumn;

6. Paulownias flower heavily which can produce very large volumes of honey; and;
7. Paulownia can also produce large volumes of high value timber, on short rotations.

In China, rotations vary from two to 16 years, with the average being 10 years. Ten year old trees produce between 100-200 cubic metres of butt log per hectare, a rate of 400 stems per hectare, the butt log having a value of \$300-700(Aust.) per cubic hectare, in Japan. (Japan is the world's main importer of Paulownia timber).

## ***PAULOWNIA PRODUCTS***

### **ANIMAL FODDER**

Paulownias produce very large leaves, and in China these are harvested at leaf fall, dried and shredded, then stored in silos. The dried leaves are rich in sugar, fat, and proteins; their food value is similar to an equivalent weight of grain. In China the leaves are used to feed sheep, rabbits, pigs, goats and bullocks.

### **GREEN MANURE**

The leaves of the Paulownia are rich in nitrogen and decompose quickly when they are moist. Where the Paulownias are grown in the nursery, it has been noticed that the soil becomes richer and when it is ploughed the soil has large amounts of mycorrhizal fungus growing through it.

### **HONEY**

The Paulownia flowers in October, November and December (springtime in Australia) which is a time when there is not a lot of other high volume nectar producers about. The honey is light colored and although not distinctively flavored is produced in enormous volumes, and is ideal for blending in commercial blends

### **TIMBER**

The special properties of the Paulownia timber, give it many potential uses. There is a well established market for Paulownia timber in China, Taiwan, Korea and Japan. Brazil and North America produce a small amount of Paulownia for export.

There are two main grades of Paulownia timber, both with different applications. Slow growing Paulownia produced on rotations of 10 to 16 years is fine grained and colorful and highly prized for furniture, ornaments, vases and wood carvings. This grade produces a premium price up to \$700 (Aust.) per cubic metre.

The other type of timber is produced on fast growing trees with short rotations. This timber is less colorful and more coarsely grained and much lighter in weight. It also carries a much lower price. This is the type of timber grown in Brazil for the Japanese market. It is cut on a seven year rotation.

Both grades of timber have certain properties in common, and these are:

1. They are a very good temperature insulator; in fact, of the 40 species tested in China, they were the best;
2. The timber is one of the most stable of all timbers. Paulownia timber resists twisting, cracking and shrinkage;

3. It is easy to work with. We have employed one of Victoria's top wood-carvers and furniture makers to work on some Paulownia timber as part of our research project. He described it as being completely passive, with no vices and he was delighted with how it stained and finished;
4. It is easy to saw and dry. In China the boards are sawn by hand, back to back, then air dried for a few weeks. Then they are able to use it for woodcarvings and furniture. This is a major advantage, as it means that Paulownia does not need a lot of expensive high technology equipment in order to be processed;
5. Paulownia timber is rot resistant and it also resists insect attack. There are examples of buildings constructed entirely of Paulownia, that are up to 100 years of age, which are still sound;
6. Paulownia can be sliced and peeled, very finely. This makes it ideal for veneers and plywood;
7. The timber is the best in the world for printing on, and is used for business cards in Japan;
8. It is free of odor and taste, making it good to use in food and other packaging; and
9. Paulownia timber doesn't sag or distort. In China, two year old Paulownia poles are used in the round for roof purlins to support clay tiles and these are found to sag much less than conifer poles of a similar diameter.

Some of the well documented uses of Paulownia timber in China, Japan, Korea and Taiwan are: Furniture, ornaments, bowls, spoons, clogs, in house construction (doors, windows, frames, beams, roof purlins, lining), musical instruments (including pianos), plywood, business cards, paper, wood wool, tea chests, wine barrels, fishing boats, floats for fishing nets, surf boards, models for industrial molds, aircraft, lightweight packaging, bee hives, tables and chairs, charcoal crayons, model aeroplanes, toys, threshing tubs, aqueducts etc.

Many people have asked if Paulownia timber is likely to be able to find a market in Australia. In order to gauge its potential, Karl Lutz, a leading wood-carver and furniture maker, worked on some timber. His conclusion was that Paulownia trees have the potential to fill the gap between hardwoods and pine, which was left vacant when the Australian Red Cedar was logged out. He concluded that if he were to compare the properties of this tree with any other, it is most similar to the Australian Red Cedar.

### ***ENVIRONMENTAL BENEFITS***

One important aspect of developing the Paulownia, is the environmental benefits. In areas of Australia the natural forests are being locked up to preserve them.

Paulownia is a fast growing, high quality timber tree that can be produced in conjunction with other crops on the land that is now devoid of trees.

The growing of Paulownias are likely to reduce pressure on our native forests.

On farm land, Paulownia will protect the land from erosion and degradation. The fertilizing and irrigating of Paulownia is an environmentally sound way of disposing of sewerage.

Another benefit would be the use of Paulownia timber as a substitute for polystyrene, the manufacturing of which is a major source of the chlorofluorocarbons (CFC's) that are destroying the ozone layer. There are many other environmental benefits from tree planting that are not specific to the Paulownia, but are well known.

### ***ECONOMIC BENEFITS***

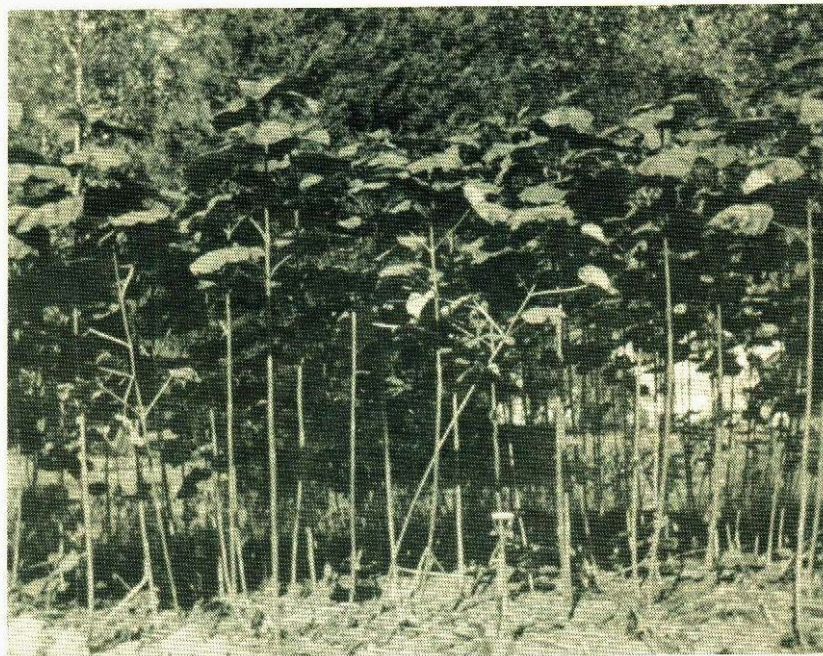
Australia is currently a net importer of timber and timber products; we have low levels of per capita timber reserves. The long term outlook for the world timber market is that environmental problems and the growing world conservation movement will reduce the supply of timber, as well as force up the price.

Timber is a vital part of the economy; the Paulownia will make a great contribution to our economy.

Paulownias are likely to be a great economic benefit to farmers, because they are an add-on-crop something you do in conjunction with the crop you are already growing. This reduces cost, outlays and financial risk. Plus the Paulownia can be harvested on short rotations two to 16 years. Even the longest is half the average rotation for pines. There are many more uses of the products that are a bonus to farmers.

Because Paulownia has many uses, most of which require low technology, and capital input. Paulownia growing won't be restricted to just near large processing mills. Many farmers may be able to benefit from involving themselves in the value added stage of processing the timber.

Correctly cultivated Paulownias elongate into a straight pole of between five to seven metres in the first season. They actually require less trimming and training to produce good timber than most other trees; thus the labor input is not high.



One year old Paulownia growing in a seedling bed. They are planted 20" apart. These can be dug and planted in fall or spring to their final location. They make excellent starters for your tree farm establishment. They are easily dug when the site is heavily amended with liberal amounts of horse manure and saw dust.