PAULOWNIA PRUNING

Paulownia adapt well to pruning as they have many dormant buds - even on quite old wood - which can sprout new growth when required. For ornamental use, they can be shaped into tall, stately trees or shorter bushy specimens. The removal of the tips of the branches and even the top portion of the trunk, will force regrowth lower on the stems to produce a dense, compact tree. Multi-trunked bushy trees can be continuously pruned for fodder throughout the growing season.

The following deals with the pruning of Paulownia for timber production. The aim of this activity is to increase the value of the timber by producing as much clear wood (free from knots) as practical and to keep any knots present in the timber small and tight.

NATURAL TRUNK FORMATION. The different Paulownia species have varied trunk growth habits. These can be divided into three categories:

1) Continuous Extension: P. fortunei, P. taiwaniana.
During winter, the buds on the top of the trunk from the 1st to 3rd nodes die. In spring, a pair of lateral buds develop from the top of the trunk. Of these, one is strong and grows upward to become the trunk while the weak one grows horizontally or obliquely. In warm climates, P. fortunei sometimes does not lose the tip of the trunk in winter. The trunk then continues straight upwards in the spring. The result is perfect straightness. [See fig. 1]

2) Intermittent Extension: P. elongata, P. fargesii, P. australis
During winter, the buds on the top of the trunk from the 1st to 3rd nodes die. In the first two or three years after the initial trunk extension, the tree mainly grows lateral branches. At three to four years of age, extension of the sapling trunk takes place by the production of a renewal shoot from near the base of a lateral branch. Sometimes several vertical renewal shoots sprout from near the bases of the lateral branches. If this occurs, a strong renewal shoot near the tip of the original pole should be selected and the others removed. This will become a trunk extension. [See fig. 2]

3) Unsatisfactory Natural Extension: P. tomentosa, P. kawakamii.
Again, during the winter, the buds on the top of the trunk from the first to third nodes die. After one or two years of good trunk growth these species tend to grow mostly lateral branches - at least during their third and fourth years. If renewal shoots are produced they are often badly positioned and of poor quality. Pruning is needed for good trunk extension. [See fig. 3]

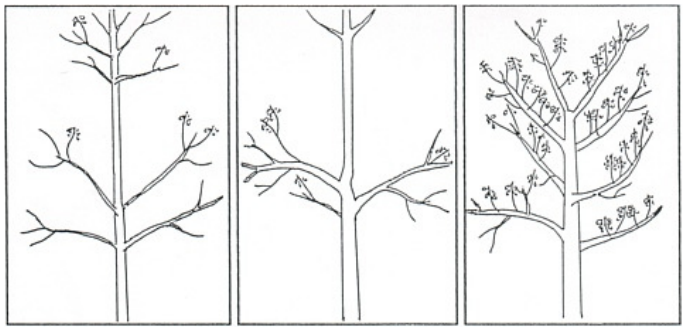
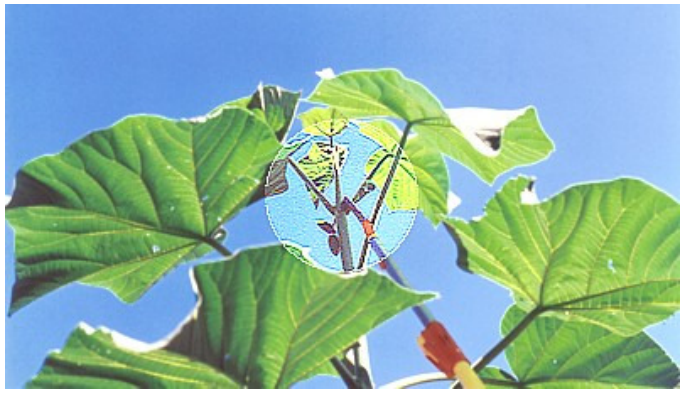


Fig. 1 P. fortunei **Fig. 2 P. elongata** **Fig. 3 P. tomentosa**
The natural trunk formation of young Paulownia as visible in winter.

It is important to note that while the above is a general guide to the trunk form of these species it does not necessarily hold true for all of their cultivars (clones).

PRUNING TO INCREASE TIMBER QUANTITY AND QUALITY. Assuming you establish your plantation using the method described in Technical Bulletin #1, where the trees are cut down to ground level at the end of the first growing season to regenerate a stronger trunk the following spring, the most critical period with regard to pruning is the second season. There is no advantage in pruning during the first season as this initial trunk will be removed. (The exception to this is if you have ideal conditions and can feed them heavily to get 4 m tall trunks in the first season.)



Pruning on a first season trunk is the delicate removal of the branch shoots which grow in the 'V' between the large leaf stalk and the trunk, with care not to cut off the large leaves.

Promotion of a Lateral Branch.
At the start of the second season of the trunk, a few weeks after resumption of growth, it is important to check each tree to make sure the top has a straight growing tip. It is often necessary to encourage promotion of a lateral branch. When the upper-most lateral branches reach 10 to 20 cm long, the strongest and most upright shoot (generally out of the first three pairs) is selected to extend the trunk. The shoot opposite the one selected and the next closest two or three pairs are removed to prevent competition. Sometimes the best shoot is not from the highest pair - in this case ensure you remove any shoots above it. The dead portion of the top of the trunk will gradually wither and is best left to be safely removed some months later once the new trunk shoot is strong (so as to avoid breaking it off).

Lift Pruning.
From the second year of the trunk onwards unwanted branches on the butt log should be gradually removed by lift pruning while always leaving at least one third of the height of the trunk covered with leaved branches. Excessive pruning can expose the trunk to sunscald and will inhibit the normal formation of a canopy thereby preventing the natural establishment of the tree, resulting in slow diameter growth of the trunk.

DON'T OVER PRUNE: the "leave one third leaved" rule

Sapling Paulownia can cope without many branches as the large leaves are very efficient at photosynthesis. However once the trunk is into its second season the leaves are smaller and a canopy of leafy branches is important both for catching sunlight and trunk stability. If further pruning is required from this age in order to reach the target length of clear wood make sure you lift prune gradually, always leaving at least one third of the height of the trunk covered with leaved branches. It is usually a simple matter of removing the lower branches (generally from late summer to early winter) when they reach 2 to 3 cm diameter. This should prevent large knots in the timber.

Correction of a Crooked or Damaged Trunk.
In most cases of crooked or damaged trunks on Paulownias it is most appropriate to simply cut the trunk right off at ground level and allow the tree to regenerate a better trunk. However if the butt log is largely intact and is at a size close to being harvestable, the following methods may be used. If the trunk is badly forked or broken off, in the winter the whole crown is removed with an angle cut directly above the nearest node. When the lateral branches sprout, the "promotion of a lateral branch" is used to extend the trunk. (see Fig 4) If only the top of the trunk is damaged or broken off, it may not be necessary to remove the whole crown. In this case, cut the trunk off neatly and on an angle approximately one cm above a dormant bud (just below the damage). The next two to four pairs of lateral branches down should be removed. More than one bud may sprout. The strongest from the first two pairs should be retained and the others removed. If a shoot from the second is selected, the unwanted portion of the top of the trunk should later be cut off on an angle sloping away from the shoot.

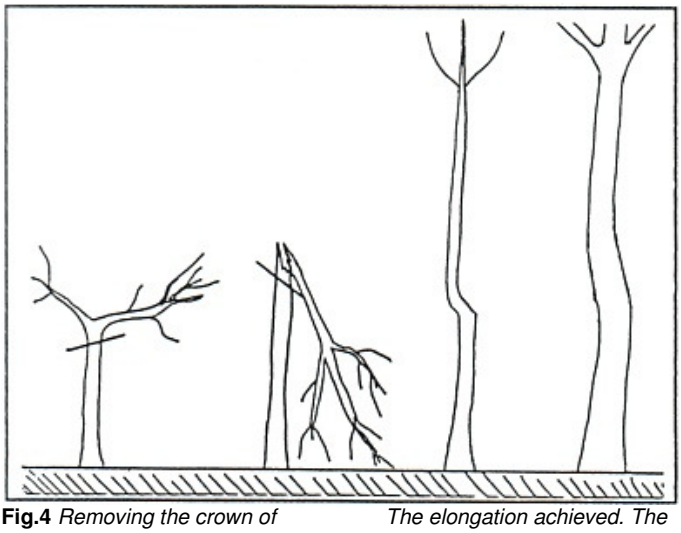


Fig.4 *Removing the crown of a crooked or damaged trunk. The elongation achieved. The trunk straightens over time.*

Crown Pruning.
Crown pruning involves the thinning of unnecessary lateral branches and unwanted upright shoots. This reduces the competition for the trunk and improves light penetration and nutrition for the remaining branches. After or during each trunk extension, a new crown is formed higher up and the lower branches can usually be removed when they are two or three years old. However, be sure to leave enough branches to support sufficient leaves for adequate photosynthesis.

Once the desired height of clear trunk is achieved crown pruning is generally not necessary and if overdone will only be counter-productive. It can, however, be a means of getting useful fodder for animals, particularly during dry times, and may also help prevent excessive shade if crops are being grown beneath the Paulownia.

CUT PLACEMENT. The illustration below shows the correct placement of the cut when removing a branch. Cutting too close to the trunk will slow healing and create a larger flaw in the timber.

The line indicates the cut

WRONG: *This cut is much too close to the trunk and will create a large wound slow to heal.*

CORRECT: *This shows proper placement of the cut leaving the 'shoulder' which will heal quickly.*

TOOLS. Pruning tools must be well maintained to ensure clean cuts. Tools can range from small secateurs to heavy duty loppers and saws, depending on the job. For high pruning I prefer to use a pruning saw on an extension arm rather than a lopper, as I find accurate placement and cleanness of cut is easier and as Paulownia cuts easily it is fast and involves little effort. Depending on the length of pruned trunk desired and the height of the operator, pruning can usually be done without the use of a ladder or cherry picker if extension handle loppers or saws are used. If you wish to prune higher than can be reached from the ground be sure to use a safe method designed for the purpose.

HOW HIGH TO PRUNE?

Generally, a commercially viable length of wood is 2.4 m or more in length. What this means for a timber grower is you need a MINIMUM butt log length of 2.5 metres. This is very easily achieved with Paulownia, even with very minimal pruning. Clearly, if you have a longer log they will be able to cut longer lengths of timber, which may or may not be an advantage depending on the use. If the log is longer than the boards required then they can always cut them shorter, but ideally it's best to know what length the customer wants so that the log can be grown to an equally divisible length. Generally a 5 metre long butt log is a reasonable length to aim for as it should produce 2 lengths of 2.4 m or 1 of 4.8 m. Some growers make the mistake of thinking they will get more timber if they prune the trunks very high. Well, this may be true in the longer term, but long clear stems can expose the trees to sunscald, wind damage, and the higher you prune the longer it will take for the trunk to thicken to a size suitable for harvest. Paulownia need to develop a large canopy before the trunk will thicken well. I would rather have a plantation of short thick trunks ready to harvest, than a field of flagpoles.

PROBLEMS, QUERIES, COMMENTS, SUGGESTIONS. Telephone (03) 5983 5688 [international +61 3 5983 5688] preferably between 8:30am and 5:30pm Australian Eastern Standard Time, Monday to Friday, or any time any day send facsimile (03) 5983 1999 [international +61 3 5983 1999] or email help@toadgully.com.au Visit http://toadgully.com.au or http://paulownia.com.au