

Growing poplars and willows

This brochure gives information on planting poles and their aftercare. Don't forget to talk to your local Horizons Regional Council land management officer (LMO) for free, expert advice.

Why plant poplar or willow poles?

A poplar or willow pole is a young tree stem between 1 and 3.5m long, which roots and sprouts when planted in the ground. Poles have a 'head start' over seedlings and are less likely to be damaged by browsing animals. Some varieties can grow up to 40 metres high.

There are many benefits of planting poplar or willow poles. Erodible hillsides can be stabilised and sustained as farmland, because the extensive root systems of these trees bind and hold the soil in place.

Poles can protect farm assets like fences and tracks, which are prone to slip damage. They work as shelter belts, reduce damage to watercourses, provide shade and shelter for stock, and timber. Poplars and willows produce useful stock feed, which can be an extra feed reserve during droughts. For example, about 1.4 kg of fresh poplar leaves maintains a ewe for a day.

Getting started

The best months to plant poplar and willow poles are in the winter months - June, July and August. You need to plan which paddocks to plant, and how many poles they'll take.

Horizons Regional Council can help you by:

- providing free advice to help you plan, including how to choose a suitable species of poplar or willow, how many you need and how far apart the poles should be planted
- giving advice on how to plant poles
- arranging nursery supplies
- in some cases contributing funds towards the cost of erosion control plantings through our environmental grants – contact your LMO for more information.

Selecting poles

Selecting the best tree for the situation is critical for success. Poplars and willows are generally not suitable for planting on very exposed or dry sites, however, some varieties will handle these conditions better than others. Sites that are very wet should be planted with willows.

Poplars

The most common poplar varieties planted are Veronese, Kawa and Toa. These reach 20-25m in height and have a narrow to open crown. They require reasonable moisture throughout the year but can survive one off extreme droughts once established. The Veronese poplar is a narrow crowned tree suitable for dry, windy sites. Kawa and Toa varieties are best suited to sheltered areas where possum numbers are high, as possums find their leaves unpalatable. Kawa also has good timber potential with a slightly lower density than radiata pine, and a white, odourless timber which is lightweight, but relatively strong. Uses include veneers and plywood, furniture, truck decking, stockyards and pulp and paper.

Willows

Willows are ideal for gully, stream and river erosion control. Where debris dams and other gully structures or riverbank works have been carried out, willows can reinforce protection. They can also be planted to protect bridges, crossings and tracks.

The Tangoio willow is highly adaptable to most sites. Its high wind tolerance and good retention of lower branches make it suitable for planting as a windbreak. It does better on drier sites than other willow species but is palatable to possums. The Matsudana willow is similar to the Tangoio willow but is less suited to dry sites and more suitable for coastal situations.

Osier willows, also known as shrub willows are low growing at 6 - 8m tall. They have good rooting systems and are used in stream and riverbank works. The booth willow clone is unpalatable to possums and has flexible branches which are resistant to breakage.

Examples of which varieties are suitable for particular situations are as follows;

Drier sites: Crowsnest and Veronese poplar

Lower slopes: Veronese and Shinsei poplar, Tangoio willow

Moist areas: Kawa, Shinsei and Toa poplar, Tangoio willow

Possium resistance: Kawa, Shinsei and Toa poplar

Windy exposed sites: Crowsnest, Shinsei and Veronese poplar, Tangoio willow

Wet, sheltered valley systems: Kawa, Toa, Trichocarpa and Yunnanensis poplar

Eroding gullies and streams: Tangoio willow (situation specific advice needed), booth willows

Timber: Kawa poplar

Shelter: Veronese, Crowsnest and Tasman poplar (planted as rooted cuttings only)

Stock feed: All varieties

Pole length

As well as many varieties, poles come in lengths from 3.5m to 1m stakes. Generally, 3m poles are planted where there is stock, but should be protected with a sleeve to stop ring-barking. Shorter, 2.5m poles are used where there are sheep only, and 2m poles can be used on sites which have been fenced from stock. The 1m stake is suitable for areas where stock will be excluded for several years. Your LMO can recommend the best varieties and pole length for your planting sites.

Getting your poles

Horizons Regional Council has nurseries producing poplar and willow poles. Order your poles and tree protectors by April to ensure supply.

Transporting your poles

When transporting poles, check that the bark is not bruised or damaged. Damaged bark makes it easier for the pole to become diseased and dry out. When securing your load of poles, use straps or ropes and protective pads rather than chains. When unloading them, remember to avoid damaging the bark.

Post-delivery and soaking

Poles left in the sun or exposed to winds for several days before planting have little chance of survival when planted.

Poles should be soaked for 1 or 2 weeks as soon as they are delivered. This lets the pole build up a reservoir of water, which it uses to continue growing roots in the following months. Plant the poles before root growth occurs.

Place poles in about half a metre of clean, running water or dam water, or keep them moist under a sprinkler. If it's not possible to soak your poles, put them in a cool shady place away from stock.

Be careful not to over-soak poles, as small roots can grow, which break easily during planting and reduce the chance of survival. Willow poles can be soaked for longer periods. Some poplar and willow varieties are prone to over-soaking, so ask your LMO about the soaking times for your poles to give them the best start.

Using tree protectors

There are two common types of pole protectors, Dynex sleeves and Netlon sleeves. These can be ordered from your LMO. Dynex sleeves are easy to use and less likely to be rubbed by stock.



Dynex sleeves are commonly used pole protectors

Dynex sleeves

Using a Dynex sleeve improves the survival rate of poplars and willows, and makes it difficult for possums to climb them. Made of heavy plastic, they also protect poles from stock damage, and reduce moisture loss from the drying effect of winds. Dynex sleeves also allow poles to develop thicker bark.

Put the Dynex sleeve on the pole before it's planted. The sleeves don't need stapling, and by moving freely on the pole, they deter stock from rubbing them. They are more effective where cattle have access to the poles, as the smooth sleeves actually deter stock from rubbing. On the other hand, farmers are urged to keep cattle out of planted areas for at least 18 months after planting. The standard length of the Dynex sleeve for poles is 1.7m.

Netlon sleeves

The Netlon sleeve is a plastic mesh, used where sheep are the only stock with access to the poles for the first two years. The sleeve should be put on the poles before planting. To do this:

- pull the sleeve onto the base of the pole so the bottom of the sleeve is 70cm from the butt of the pole – this will indicate when the correct planting depth is achieved
- secure the sleeve with two small staples, one 15cm from either end, fixed vertically, rather than crosswise – this helps prevent poles from splitting and weakening when planted.

The Netlon sleeve is designed to breakdown and pop-off as the tree grows. The standard length used for poles is 1.6m.

Planting

When to plant

The best time to plant poplar and willow poles is from late June to early August.

Tools for planting

Planting poles can be made easier using a borrowed Horizons Regional Council pole bar. The bar is a combination of a standard rammer and a pointed bar and allows the pole to be planted tightly at the right depth. Poles planted this way are less likely to loosen over the summer. The pole bar can be used for most soil conditions. To avoid injury, take care when using the planting bar. Keep one hand at the top and use short, sharp lifts.

Alternatively, use a purpose built pole rammer or a post hole borer. Ram the pole as tightly as possible, with the base of the pole anchored into undisturbed soil. Another option is to prepare the hole using a spade. Using a borer increases chances of the pole becoming loose over summer, damaging new roots. This problem can worsen when planting in very wet ground. See the section on post planting care for information on re-ramming poles.



You can borrow a pole bar to plant poles from us

How many poles can be planted in a day?

An average planter can plant 50-80 poles a day. Just take the poles you need out to the site, leaving the rest in water.

Planting depth

The key to healthy trees is planting deeply and firmly into moist soil. Plant 3m poles 0.8-1.0m deep, while 2.5m poles need to be planted at a minimum 0.7m deep. Make sure the pole is the right way up!

Where to plant

Pick the best site for each pole, preferably a small depression or low lying spot where moisture will run during rain. On hillsides, follow small channels and watercourses where summer rain run-off is likely to occur. When planting for erosion control, the erosion is often initiated by water concentration. Planting in these spots is where poles are more likely to thrive.

Planting stakes

Stakes are 1m long young wood. They are planted for soil conservation or shelter purposes where there is no stock pressure, for example behind retirement fences. Spacing varies due to site requirements and the purpose of planting.

Shelterbelts can be established using stakes or rooted cuttings. Plant at 1.5 to 2m spacing and under-plant with natives if needed. This is not suitable for exposed sites.

How to plant stakes:

1. Use a bar to make a suitable hole, 500mm deep.
2. Plant the stake vertically with the butt end buried.
3. Ram the stake around the collar until it's firm. Back filling should also be firmed well, when it is returned to ground level.
4. Where grass and weed cover is present, the best strike and growth rates will be achieved when the areas to be planted are pre-spot sprayed with a knockdown spray like glyphosate.
5. If spraying after planting, use a shield to protect the bark from damage.

Space planting for erosion control

To control slight to moderate erosion on hill country plant poles at 10 to 12m spacing. On more erosion prone sites poles may need to be planted at a closer spacing and thinned later.

Plant across the lower half of exposed windy slopes, and plant only the sheltered, moist sites on the upper part of slopes. Avoid any ridge tops exposed to prevailing winds. When planting on very steep slopes, locate the poles away from banks and angled out from the vertical. This prevents stock from eating growing tips from the upslope side. Try to plant poles away from stock access tracks. This will minimise any rubbing that causes root damage or snapping of the poles.

Pair planting to control gully and streambank erosion

Larger gullies, with moderate to severe erosion, should be pair planted. Plant willows opposite each other, at regular spacing along the streambank. Smaller watercourses, where slight erosion is occurring, can be planted at intervals on alternate sides. Spacing between the willows depends on the severity of the erosion, and grade of the stream. The more severe the erosion and steeper the grade, the

closer the spacing should be.

Space planting for shade and shelter

Planting for erosion control can also provide shade and shelter. Shade reduces stress on stock, and also the evapotranspiration rate of soil and grass. Tree planting can lower the ground watertable and enhance recycling of nutrients.

Plant poles at 15 to 20m spacing or between 25 - 50 trees per hectare. Planting 80 trees per hectare or more is likely to result in reduced pasture quality compared with unplanted stable ground, because of the shading effect.

Post planting care

After winter planting of poplar and willow poles, follow-up work is important so the trees have the best chance of surviving.

Grazing control

For the first 18 months restrict grazing around poles to sheep. This helps the root systems develop. Cattle can damage the fragile new roots by rubbing on the pole, even when it's protected with a Dynex sleeve. Stock rubbing on the poles causes substantial movement at the base. Damage to the roots is hard to detect, and may not show until the pole eventually dries out and dies. This is most commonly seen in the second spring, when the pole fails to leaf up.

If stock grazing can't be avoided, try isolating the planted poles from the balance of the paddock with a temporary electric fence. You can also try removing individual cattle or sheep worrying the poles, and treating stock for lice.

Re-ramming

When the ground dries in spring and summer, the soil can draw away from the pole, causing the roots to dry out. Poles may then loosen and become prone to wind damage and root breakage. It may be necessary to re-ram poles once to ensure they remain firm in the ground.

You can re-ram using a regular fencing rammer. Extreme care is needed because roots are still establishing. Try ramming the ground in towards the pole, rather than compacting the soil down around the pole. Fill any soil cracks with sand or fine soil to

reduce the risk of root damage during re-ramming.

Form Pruning

In the second or third summer, form pruning of poplar and willow poles will encourage one dominant leader. Pruning is done in late summer to help the wounds dry quickly and reduce new growth from the pruning cut.

Identify the best leader, which is usually the tallest, and nearest the top of the pole. Ideally, the main leader's diameter needs to be 10-20mm on poplars, but can be as small as 5mm on willows. Carefully remove the remaining branches close to the trunk.



Before pruning with multi-leader branches

After pruning with dominant leader

Two years later tall and healthy

In windy areas or where growth is poor, leave one or two other branches on. This allows for secondary leaders if the primary leader is damaged. Try achieving a balanced tree with branches on opposite sides, with at least 100-150cm between each branch whorl (where the branch joins the trunk). Extra branches are removed in following years.

Form pruning has many advantages, it:

- reduces the shading of pasture at the base of the tree
- lifts the tree's foliage, which increases directional shading (shade will move with the sun), resulting in less stock camping
- creates tall narrow trees that are more wind tolerant
- avoids the tree splitting when branches grow against each other (a problem common in willows).

If wanted, use methods similar to pruning pine trees for follow-up poplar pruning (for example, leave 3-4m of green crown). Or, you can delay pruning and feed leaves to stock during a feed shortage. Willows can be pruned or coppiced (cut down above grazing height) at any time and will re-shoot. However it's important not to over-prune poplars as this can have a detrimental effect on tree health. All normal safety

equipment and practises should be used to avoid injury.

Removing tree protectors

The Dynex sleeves are designed to split along a perforated strip as the tree grows. You generally don't have to remove Netlon sleeves. They breakdown in the sunlight as the tree grows out, but keep an eye-out for the ones that don't.

Check your poles regularly, and when about 20% of the sleeves are tight or begin splitting, it's time to remove all the sleeves in that paddock (except on poles that are clearly too small). In most cases this is between years three and five.

To avoid damaging the bark, remove protectors on a paddock by paddock basis. Once the sleeves are removed, spell the paddock from cattle and intensive sheep grazing. This protects the bark while it hardens, and takes one or two months depending on the time of year.



A poplar shelterbelt

Rotational felling and planting

As the trees and their root systems mature, fewer may be needed to achieve soil protection. Where this is the case, the stand can be selectively thinned to the required density. A rotational felling and replanting system, at say 10 year intervals, will ensure that the trees don't reach maturity all at once.

Keep up pest control

Try to control possums and goats. Both these animals find some poplars and willows very tasty. Possums cause damage by climbing poles and breaking branches, leading to poor tree form. Other benefits of possum control are maintaining and enhancing areas

of 'native bush', and reducing the risk of Tb spreading to cattle and deer.

There are a number of ways to control possums, and the method used depends on farm location and possum numbers. To protect conservation plantings, it generally requires an initial knockdown operation, with an ongoing maintenance programme.

Contact Horizons Regional Council pest management staff for free advice and general information on possum and goat control.



Possums cause damage by climbing poles and breaking branches leading to poor tree form.

Early signs of possum damage include:

- broken branches and/or leaves stripped off
- closer inspection will show bark being stripped,

scratch marks on sleeves, possum droppings around the base of the pole, and possum runs along the ground.

To help reduce possum damage you can:

- watch out for early signs of possum damage
- survey the wider area for likely possum habitat, including bush gorges and plantations
- carry out a pre-planting control programme
- use Dynex sleeves on all 2.5 and 3m poles
- fit a possum plate around the top of the protective sleeve (like those on power poles)
- avoid planting next to banks, fence post other places where possums can jump from
- where possible plant varieties that are unpalatable to possums.
- possum damage is most likely to occur in the late winter early summer period, depending on the varieties planted and the seasonal temperatures.

More information

More information about poplars and willows and demonstrations of specific techniques are available free from your local Horizons Regional Council LMO.

The publication "Growing Poplar and Willow Trees on Farms" is available online by going to <http://www.maf.govt.nz>, and typing "growing poplar and willow trees" into the 'search MAF' box.