

Willows | No.1 | 2013

WILLOWS

**Willows for
the Farm**

Specially selected
for New Zealand
conditions

Plant & Food
RESEARCH
RANGAHAU AHUMĀRA KAI



Willows for the farm

Willow trees are useful on the farm for soil conservation of slopes, gullies and streambanks, for livestock shelter and shade, and for valuable livestock fodder during droughts.

Three main willow types are grown in New Zealand:

Tree willows (e.g. 'Tangoio') are grown for soil conservation, shade, shelter, fodder and stabilising river banks. They grow up to 20 m tall, mostly with a single trunk that can grow to 90 cm in diameter.

Osier willows (basket willows) grow as medium-sized shrubs (e.g. 'Booth', 'Irette', 'Kinuyanagi', *Salix viminalis* 'Gigantea'). They have multiple stems.

Sallow (shrub) willows are low shrubs or small trees with multiple stems and stout branches (e.g. pussy willow).

Osier and Sallow willows are used as windbreaks and for slope, roadside and stream bank stabilisation, and as pollen sources for bees.

Soil Conservation

Tree willows are particularly valuable for holding erodible hill soils, as they quickly develop roots from poles driven into the ground. Willows are useful for stabilising 'wet' soils and generally moist soils, where poplars are less suited to wet sites. Willows produce a large number of fine roots useful for binding the fine sediments found in watercourses and gullies. As a general rule, DO NOT plant female willow clones along waterways, to prevent seed dispersal downstream.

Shelter and Shade

Willows provide good shade and shelter for stock, both as soil conservation trees and as shelterbelts. They are particularly useful as east-west shelter because their deciduous nature minimises shading through winter. Tree willows in shelterbelts should be form pruned to a single leader by age 2 years, and are then easily maintained by side- and top-pruning every two or three years using a tractor-mounted trimmer.

Fodder

Willow fodder is nutritious for all stock types. Cattle strip leaves and bark and eat stems up to 10 mm diameter, while sheep can manage leaf and small stems up to 5 mm diameter. For this reason, stock are kept away from newly planted poles.

Pollarding

Willows grown for summer fodder are best managed with regular pruning (called pollarding for isolated trees) and quickly regenerate new stems. Pollarded willows harvested every 3-4 years maintain their vigour for years. Mature pollarded willows maintain root networks sufficient for soil conservation, and continue to offer shade for stock. Pollarding should not begin till the trunk diameter at chest height is close to 30 cm.

Wood

Willows burn as well as any other timber in an efficient wood burner. Use as timber is limited.

Choosing a willow cultivar

Exposed hill slopes and drier sites

'Tangoio', 'Hiwinui'

Tunnel gullies

'Tangoio', 'Moutere', 'Hiwinui'

Riverbank/stream bank planting

'Hiwinui', 'Glenmark', 'Moutere'

Eroding gullies, streambeds

'Tangoio', 'Moutere', 'Glenmark'

Gravel riverbeds and wet areas

Golden willow
(*S. alba* 'Vitellina')

Shelter and shade

'Aokautere', 'Makara', 'Moutere', 'Matsudana'

Fodder

'Kinuyanagi', 'Tangoio'

Consult your local Regional Council (website or land management staff) or commercial nursery for further advice on clone selection for particular sites or purposes.

The experiences of others can save you making bad choices!

Willows as amenity trees enhance the landscape



ESTABLISHING WILLOWS ON FARMS

Planting willow (and poplar) poles

Regional councils and private nurseries supply good quality 3.0-, 2.5- and 2.0-metre poles. Order poles early and arrange for delivery in good time for July-August planting. Soak the poles with their lower end in clean water for up to four days (trough or stream). Plant the poles as soon as possible after delivery and soaking.

For best planting results when planted in pasture with sleeve protector, use 3.0-metre poles. Exclude any cattle from the planted paddock for two years. It is important to select good planting sites, and for most 3.0-m poles an initial density of 80-100 poles/ha is needed for erosion control. At this density, spacing is ~ 10-12 metres between poles. Plantings can be progressively reduced to 30-40 trees per hectare as the trees mature (~30 cm diameter).

Poles should only be rammed into soft soil when they can penetrate to full depth. Otherwise augur a hole for planting. Planting depth depends on pole length, so plant:

- 3.0-m poles to 80-90cm
- 2.5-m poles to 60-70cm
- 2.0-m poles to 50cm

After planting, keep the pasture grazed to prevent long grass competing with the pole for soil moisture. Gently ram soil around the poles in early summer, before the dry weather begins, to ensure the new roots do not dry out.

Protecting poles

Protect newly planted poles in grazed pasture by either Dynex™ sleeves or netting protector (stapled at the top and bottom). Dynex™ sleeves split gradually as the growing tree exerts pressure, giving the bark time to harden before exposure to stock.

Netting protectors stretch and break as the tree trunk thickens. The bark under netting protectors hardens because it is more exposed to weather.

Cattle are especially damaging to the bark, and can kill young trees. Keep them away! Ideally graze only with sheep the year that Dynex™ sleeves are removed.

Pole survival improves with regular watering - either natural low-lying drainage area, reliable rainfall or, if necessary for survival in specific locations, watering by drip irrigation or other means.

Planting stakes and wands

Smaller material such as stakes (40-60 cm) or wands (100-150 cm) can be planting where the site is fenced off from stock, e.g. shelterbelts, stream banks, wet areas. These are also available from Regional Councils and private nurseries. The material does not need protection if stock are kept out. Stakes and wands should be planted to 20-50 cm depth.

Managing willow trees

Pruning prevents willow trees becoming too big and potentially dangerous. Windy and more exposed sites will increase breakage. Summer pruning is best for willows, as the wounds dry off and heal more quickly then. The main pruning method for willows is pollarding. Pollarding should be done at around 2 m, just above cattle grazing height. It promotes small stems and leafy growth, ideal for fodder supply. Pollard on a 3- to 4-year cycle. Alternatively, staged planting and removal of older trees (for summer fodder) can achieve ongoing site protection with mixed age classes. Older trees can be removed before they become too large, followed by replacement planting in gaps with new poles.

Operate safely

It is much safer and easier to prune poplars and willows while standing on the ground. Don't take risks. Consider having initial pollarding and pruning done by a contractor if it is necessary to climb the tree.

Farmers carrying out tree pruning should take a proper training course with forestry specialists before tackling the job themselves.



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Tree willows



Golden willow
S. alba 'Vitellina'

This has bright yellow branchlets that are more conspicuous with regular pruning. The tree grows to 15 m high, is semi-weeping in form, and is a great shade tree.



Matsudana
Salix matsudana

This species has been widely planted since 1960 for soil conservation, for shelter and as an ornamental tree. This clone is female. The *S. matsudana* x *alba* hybrids are far better for most roles than 'Matsudana' because of their better root system.



'Moutere'

Has blue-green foliage and the crown is quite dense and reasonably narrow. Its stem form is usually straight. Foliage is retained until early June. It is suitable for shelter and for general soil conservation planting. This clone has proved to be superior on windy sites. 'Moutere' is male. It is fast growing, good for wetter sites and riparian planting.



'Hiwinui'

More suitable for general soil conservation planting than for shelterbelts. It is male, with bluish green leaves, a rather spreading crown, and is vigorous. The lower branches tend to hang down.

'Aokautere'

A male clone for general soil conservation planting, river protection planting, and for windbreaks. It grows rapidly and develops as a narrow-crowned tree with a slightly wavy trunk and blue-green foliage. It needs good moisture to grow satisfactorily.

'Makara'

A very vigorous clone only for shelter planting. It has a light, reasonably narrow crown, and straight stems. Because it is female and has quite brittle side branches, 'Makara' is not recommended for general soil conservation and river control planting. 'Makara' trees remain in full leaf until early June, 2-3 weeks later than the other willows (except 'Moutere').



'Tangoio'

Selected specifically for farm soil conservation and horticultural shelter. It has high wind tolerance and very good lower branch retention. It has a wider crown than 'Moutere' and light green leaves. It is a female clone, so should not be planted where seedling establishment could be a problem. 'Tangoio' has an excellent root to shoot ratio and is ideal for slope and gully erosion control. It is relatively dry-tolerant. 'Tangoio' is ideal for pollarding since it produces many stems and foliage.

[Background image of 'Tangoio' planted on a hillside]



Osier willows

These are medium-sized shrubs with slender branches and long narrow leaves.

Salix purpurea clones:



'Gigantea'

S. viminalis

The most widespread of the osier willows, 'Gigantea' is a male clone, with an upright habit and several stems of even thickness. It grows quickly and is useful for fodder and low shelter.



'Glenmark'

A multi-stemmed vigorous and spreading tree that grows well on most sites, including hill country. 'Glenmark' grows up to 8 m high. It tolerates acidic soils but is moderately palatable to possums.



'Booth'

A sterile female clone with spreading habit, 7-8 m tall. It is used more extensively, has bigger leaves and more greyish green shoots than other *S. purpurea* clones. Its flexible stems resist breakage in the first few years and then can be vulnerable to breakage at the base.



'Holland'

Best in gullies and along stream banks. It is male, grows up to 7 m tall and looks similar to 'Booth'.



'Kinuyanagi'

(S. schwerinii)

Also known as the Japanese fodder willow. It grows as a large shrub or small spreading tree up to 6 m high. 'Kinuyanagi' grows very vigorously on moist fertile soils. It is a useful alternative to tree willows for shade, shelter and fodder. It is very palatable to stock. 'Kinuyanagi' is not affected by sawfly. It is not suitable along stream banks.



'Irette'

A male shrub willow with an upright habit, 7-8 m tall, with some value as shelter. Despite its low drought tolerance, it grows well at altitude. It is used for stream bank stabilisation because of its dense fibrous root mass.



'Pohangina'

A moderately spreading, very vigorous male clone, 7-8 m tall, with slender flexible stems. It is unpalatable to possums and withstands burial well.

Osier willows



Salix triandra

'Semperflorens' – flowers from October to April. It is known as 'bee willow'. It is an important source of pollen. This clone is male.

Pests and diseases



Possums continue to be major pests of willows and need to be managed. Rust diseases are common among willows and seriously reduce growth in a nursery. They appear to have little impact on growth when trees are widely spaced. Willow sawfly has been a major pest insect, defoliating and killing tree willows in the past. Any evidence of serious defoliation should be notified to your Regional Council. Leaf galls on willow leaves have little impact on willow health.

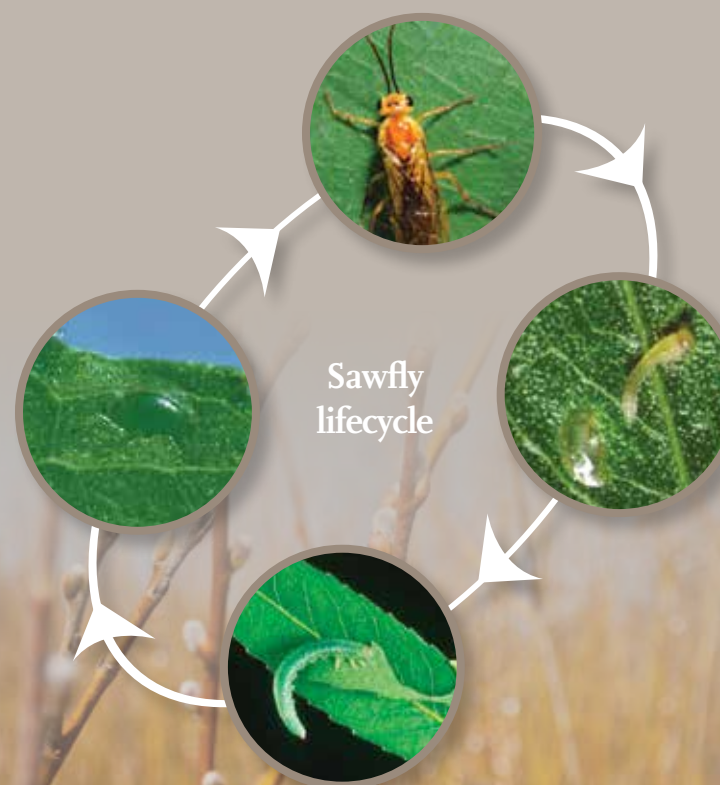


Willows and pollinators



Willows are probably the most important source of pollen and nectar for bees during early spring. This is the period when hive bee numbers need to increase in preparation for summer pollination. Many other pollinators contributing to pollination of crops use willow pollen and nectar as well.

A continual supply of pollen and nectar can be provided from mid-August to November by the careful selection and planting of appropriate willow clones.



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