



hill country heroes

poplars & willows - securing new zealand's hill country

securing hill country with the right poplar and willow trees.

► Farming hill country can be harsh; the land's stability is at the whim of Mother Nature. Even mild storms cause erosion, harming pastoral productivity, producing flooding and polluting waterways. But there is a solution.

The Poplar and Willow Research Trust undertakes extensive research and breeding programmes to grow the most effective poplars and willows for preventing erosion. Working with Local Government and valued commercial partners, we then help farmers select and plant the right trees for their area. The securing properties of poplar and willow trees, we think, makes them NZ's humble, unsung, Hill Country Heroes.



Comparison of secured and unsecured hill country following the July 2015 Whanganui storm.

it's all about topsoil.

▶ Topsoil – the top six inches – holds the highest concentration of nutrients. Without it, little plant life is possible.

When pastoral topsoil erodes, it takes those vital nutrients with it, leaving the land less productive. And it takes more than a farmer's lifetime to build that productivity back up again.

When pastoral soil run-off enters our waterways it elevates the levels of nitrogen and phosphorus, harming the quality of the water and the life dependent on it.

But, through planting the right poplar and willow trees, we can stabilise our hill country and keep that valuable topsoil in place.



“Planting poplars and willows on erodible hill country is a no brainer – it’s my insurance for being able to carry on business when severe weather events occur, and they seem to be getting more frequent.”

PETER GAWITH
WAIRARAPA FARMER

“Planting poplars and willows is a key land management option for hill country farmers. Beef+Lamb New Zealand supports the work of the Trust in providing independent technical information to assist farmers in land management. Information from the Trust is delivered to farmers at Beef+Lamb New Zealand field days and workshops, alongside other farm sustainability tools like the LEP toolkit (Land & Environment Planning toolkit).”

BEEF+LAMB NEW ZEALAND

“Without the soil conservation plantings of poplars and willows giving protection in erosion-prone areas, this farm would be another green desert on the coast.”

JAMES HUNTER
RANGITOTO FARMER

“Ensuring we have the best genetic material available is vital for our regional erosion control programmes. This gives us and our farmer clients the confidence to invest in poplars and willows for erosion control.”

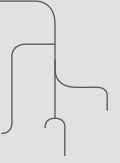
DAVID CAMERON, LAND MANAGER - GREATER
WELLINGTON REGIONAL COUNCIL

“The impact of climate change and concern about water quality means I’ll be planting more poplars and willows to protect my farm.”

TONY PEARSE
OTAGO FARMER

“The damage to Hawke’s Bay’s hill country after Cyclone Bola was extensive, with some farmers choosing to exit and sell to forestry. Here on ‘Trelinnoe’ we stepped up our planting programme to better protect our hills from future events like Bola. Today we have some 7,000 poplars and willows. Several weeks ago we had 420mls of rain over a few days with only a small handful of slips - a stunning display of the trees’ effectiveness in stabilising our vulnerable hillsides. When you add the additional benefits of shade, shelter, drought feed and amenity, I’m left wondering why more of these trees aren’t being planted.”

BRUCE WILLS
HAWKE’S BAY FARMER



our vision:
all 700,000ha
of new zealand's
at-risk pastoral
hill country
is secured.

our mission:
getting the right
tree in the ground
to retain highly
productive pasture
and clean waterways.

► To deter erosion and improve water quality through sediment reduction, a complementary relationship between trees and pasture is needed on 700,000ha of NZ's pastoral hill country. Our extensive poplar and willow research is focussed on realising our vision through providing effective and viable tree solutions for farmers.



our research

breeding programme

Our breeding programme, based in Palmerston North, creates tailored poplar and willow seedlings to test in field trials.

We maintain a national archive of poplar and willow species, providing the genetic material for developing new and improved cultivars. Controlled crosses are made and seedlings are raised in root trainers. After one season they're planted in open ground, and for the next two years, we evaluate their phenology, disease resistance, branch angle, stem form, brittleness and plant vigour. The best seedlings are then selected for field trials.

field trials

We monitor the field trial plantings for 15 years to evaluate survival, growth and compatibility with grazing stock and pests. We also examine water-use efficiency, rooting capability, ease of propagation, tolerance to wind and drought, and wood properties.

Our field trials take place in a wide range of soil and climatic conditions, and planting on farms is wide-spaced to simulate erosion control plantings on pastoral hill country.

The occasion of severe rain events allows us to measure the stabilising effect of poplar and willow species, tree spacing, and size. Current research is investigating how tree root development on slopes varies with age, soil type and pollarding management.

pest management

Fortunately, poplars and willows are exposed to a low number of diseases and pests in NZ. Fungal rust diseases are the most significant, affecting tree vigour and health.

Poplar rust arrived in NZ in the 1970s, willow sawfly in the 1990s, and giant willow aphid in the 2010s. Other pests could be a threat in future. So our research also develops strategies for minimising the impact of pests and diseases through cultivar selection and management.

sharing results

Using results of our extensive research, we provide an advisory service to Regional Councils, and support users through our website (www.poplarandwillow.org.nz), publications, and speaking at field days and workshops.



other benefits of poplars & willows



- ▶ Provides shade for stock, which can improve growth rates and reduce losses.
- ▶ Improved farm aesthetics.
- ▶ Willow roots on the edges of streams provide valuable habitat for eels.
- ▶ Animal growth setbacks during droughts can be managed by feeding trimmings from poplar and willow trees.
- ▶ Contributes to bird corridors.
- ▶ Slowing run-off lessens river peak flows and flooding.
- ▶ Prevents costly damage to infrastructure from slips.
- ▶ Willow pollen is the dominant protein source for bee colonies in spring, which are key for agricultural and horticultural crop growth.

our partnerships

regional council sponsors

Regional Councils appoint the Chair and provide representatives from their Land Managers and River Managers groups. A council advisory group including council nursery managers also provides input into and reviews our research.



corporate sponsor

The role of the Poplar & Willow Research Trust is an important part of Beef+Lamb New Zealand's Land Environment Plans, which they're rolling out to support sheep and beef farmers around the country.



By farmers.
For farmers

research partners

We work with the following research partners on projects that promote knowledge and applications of poplars and willows: tree management; responses to environmental change; soil stabilisation effectiveness; willows for bees and stock fodder; education activities.



education partner

Our scientists work with Massey University on joint research projects. We also provide support and supervision for their post-graduate programmes.



1940s

Recognising soil erosion as a major concern for New Zealand, the Soil Conservation and Rivers Control Act was passed to reduce the extent and risk of soil erosion. Public Works Department and Ministry of Works and Development undertook applied research through demonstration farms.

1960s

National Plant Materials Centre (NPMC) established at Aokautere near Palmerston North to centralise national breeding programmes.

1980s

Native tree alternatives tested but none had similar growth rates or could grow in the presence of grazing animals. Poplars and willows still proved to be the most effective and versatile.

2000s

Ministry of Agriculture and Forestry (MAF) established the Hill Country Erosion Fund to support projects to decrease pastoral, hill country erosion. The continued development of poplars and willows was a key component, with \$175,000 per annum provided for four years on the condition that councils provide a similar amount and work to create a self-sustaining funding model.

1950s

International review identified poplars and willows as the best species for managing erosion in the presence of grazing animals. Superior clones were released in NZ. Improved nursery management techniques meant poles could be supplied to farmers in bulk.

1970s

NPMC incorporated into the Aokautere Science Centre, tasked with researching wider soil conservation management techniques. A significant portion of their budget was dedicated to poplar and willow breeding.

1990s

NPMC disestablished and breeding programmes were transferred to the newly established HortResearch Crown Research Institute (CRI) in Palmerston North. With funding under threat, 'survival' funding was provided by a group of Regional and Unitary Councils and the goodwill of the host CRI, who recognised the need for continued development of poplars and willows. Heavy storms continued to plague pastoral hill country, where 700,000 ha remained unprotected.

2012

Council committee established the Poplar and Willow Research Trust, based at Plant & Food Research at Massey University, Palmerston North. The key objective of the Trust is to secure funding for continued poplar and willow research and promotion, to protect NZ's 500,000ha of remaining at-risk pastoral hill country. To date, we've been funded through research grants, Regional Council subscription, pole levies, and our valued coporate partner, Beef+Lamb New Zealand.

the history
of poplars &
willows in nz



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