

Trees on farms

Planting for biodiversity

With good planning and design, trees will create a pleasant, diverse and interesting place in which to live and work. Trees and shrubs enrich the environment by providing habitat for many types of flora and fauna – birds, reptiles, invertebrates, plants, fungi, lichens and aquatic life.

Plantings for timber, livestock shelter, shade and fodder, riparian zone protection and soil conservation can all deliver significant biodiversity and amenity benefits. Each adds capital value to your farm as well as, character and visual diversity.

The New Zealand climate offers many tree choices, not just simply for biodiversity; native and exotic species, tree crops such as fruit and nuts and plantings purely for a show of blossom or autumn colour. There is no real limit to what you can achieve once you get started.



First check that your trees are not toxic to animals

Many trees available and for sale in New Zealand could be harmful to companion animals and livestock. Some of the tree species mentioned on the website below could, in some cases, cause issues in some animals. Before planting, make sure that you have selected the right trees. Check with your vet for advice or visit this site for a general list of toxic plants: taruavets.co.nz

Planning plantings for biodiversity

Trees for biodiversity can be planted on all farms. Think of your marginal lands like gullies or steep or wet areas. Existing areas of natural vegetation can also be fenced off to encourage regeneration, as can wetlands, creeks and dams in your dairy farm riparian plan. Visit dairynz.co.nz/riparianplanner for more information.

The key about biodiversity planting, is to think big. Improving biodiversity requires larger areas set-aside for self-sustaining plantings to establish over the long-term. Either as stands, alone or linked by narrower corridors of native plantings.

Along waterways, it has been estimated that a width of 10m or more is needed for self-sustaining bush to regenerate. With smaller margins, you can still improve biodiversity and water quality by filtering run-off, reducing erosion and providing shade and habitat. Thinking beyond biodiversity is crucial to reaching biodiversity goals. For instance, think about riparian planting between wetlands. All wetlands (springs, seeps or swamps) are biodiversity 'hot-spots' and linking them through riparian plantings, to and along waterways, meets a mix of biodiversity and water quality objectives.

Thinking big also means thinking ahead - how will the farm look in 10, 20 or 50 years. How will stock move and can paddocks be realigned to improve that and protect more marginal areas for biodiversity?

Encouraging birdlife

For many people, the most satisfying and visible aspect of biodiversity is birdlife. Remember other aspects of biodiversity like native fish and aquatic insects will already benefit from planting programmes for water quality goals.

First, you will need to provide a source of clean, cool, shaded water (riparian planted) nearby and then ensure pest control for rats, stoats and possums is started - pest control is as, if not more important, than the choice of plants for any biodiversity goals.

Both native and exotic trees provide habitat and food for birds. A carefully chosen mix will ensure the greatest number and diversity of birds visit your farm year-round.

Native birdlife is often insectivorous. So planting densely for shade, enabling thicker leaf-litter and woody debris to build up, will support more insect life and in turn, more birds. The cooler, more humid and rich an understorey, the better.

Many other native birds feed on nectar, like tui, bellbirds and silvereye. A mix of rata, puriri, pohutakawa, rewarewa, tree fuchsia and any of the native pittosporum species will support nectar feeders. Eucalypts are also beneficial to nectar feeders.

Others, like kereru, feed on the fruit of native trees, as well as the foliage of exotics including tree lucerne (tagasaste) and poplars. Fruiting trees, preferred by native birds, include fivefinger (pseudopanax), miro, titoki, tawa, fuchsia, kowhai, pigeonwood, taraire, puriri and wineberry.

What do some favourite birds eat?

	Bellbird, tui, wax/ silvereye	Fantail, grey warbler, skylark	Kereru	Kingfisher, ruru/ morepork
Fruit/seeds	X	X	X	
Foliage			X	
Nectar	X		X	
Insects	X	X		X
Other				Small rodents, birds, lizards, frogs

Have a plan

All planting on farm is better when it's planned.

All planting requires livestock exclusion and most requires access.

Think about integrating your trees on farm with your riparian management plans. Visit dairynz.co.nz/waterways for more information. If the main objective is to enhance the biodiversity around your farm, the mix of plants, as well as the pest and weed control undertaken year-after-year, are the big jobs to consider first.

Spend some time looking around you at what grows well locally and build on the experience of others. Wander through any native bush blocks on your or nearby farms and take a native plant guide. The Penguin *Miniguide to the Identification of New Zealand Native Trees* by Andrew Crowe is perfect and fits in your pocket.

Local community planting projects are often an excellent source of knowledge and experience on planting for biodiversity.

Time for action

- Identify your planting site(s) - look for wet areas or marginal land.
- Assess each site carefully – assess slope, soil moisture, aspect, exposure, existing vegetation, pest weeds and animals (each affects site maintenance and plant choices).
- Measure the area to be planted and calculate the number of plants you will need. Landscape plantings may need only a few, larger trees; for small scale plantings of native species, plan for around 4500 -1100 trees per hectare (one tree every 1.5m – 3m).
- Choose and order the trees well in advance (around September for the following year's spring). Learn from the bush around you, experienced planters or see below for choices. For most biodiversity and amenity objectives, the best results will be achieved with a mix of species.
- Exposed sites may need planting in more than one phase, with hardy shelter species established first before attempting to plant any large stature or less robust species. Another option is to use wind cloth or shelters to protect young trees.
- Fence out during the wait for plants, or protect individual trees from livestock with guards when planted. If recreating a native ecosystem, grazing animals must be excluded permanently. If possible, graze the site hard before excluding livestock and planting, as this will make planting easier.
- Woody weeds like gorse and blackberry can provide cover for native species in areas which are to be left to regenerate naturally, but clearing and planting a site will give quicker results.
- Plant the trees well; individual guards protect trees from hares, rabbits, exposure and chemical sprays and help with finding the trees again later. Guards may need to be hand-weeded if biodegradable mats aren't used at planting.
- Be prepared to maintain new plantings for several years. This may include irrigating in the first couple of summers, especially if larger trees are planted, and good weed control around new plantings.

Examples: plantings for landscape and biodiversity



A roadside amenity planting protected from rabbits and mowers by tyres. The tyres will need to be removed before the trees get much bigger. Species include akeake, cabbage trees, flax, pittosporum, coprosma and corokia.



A multi-species shelter and amenity planting. Both native species and eucalypts have been used, increasing the spread of flowering times. Species: pittosporum, corokia, coprosma, hebe, pseudopanax, plus flowering eucalypts.



Native species provide welcome shelter and screening to a milking shed, with older trees screening and sheltering the farmhouse behind.

Natural regeneration

If allowing areas to regenerate naturally, some light grazing may help create gaps in dense vegetation, but livestock will need to be fenced out permanently thereafter. Further weed control, if needed, should be done by hand.

Naturally regenerating areas can be enriched by planting beneficial species – planted trees will need protection from grazing livestock and good spot weed control in their first few years to get established.

Naturally regenerating areas often need far less in-fill plants than the rate of 4500-1100 plants/ha. Likewise, existing trees provide shelter, so secondary plant choices that require shelter can be selected (although think about the severity of frosts, wind and soil moisture).

Maximising biodiversity benefits - controlling animal pests

By creating habitat that encourages native plant and animal species, you are also creating a paradise for pests. The worst pests for native wildlife on farms are rats, possums, mustelids (ferrets, stoats and weasels) feral cats, and hedgehogs.

Magpies also deter native birds and are best controlled by shooting or trapping.

Rabbits, hares, pigs, goats and deer can also be highly destructive to new plantings and native vegetation. Control these pests before planting, and keep trapping them afterwards to keep pest numbers low.

Monitoring pest species

If possible, monitor pest populations before starting control operations. 'Before and after' monitoring helps confirm how effective pest control has been, but also which traps to use based on the pest present.

Monitoring methods for small animals include tracking tunnels (where animals leave footprints); baited 'chewtrack' cards, and live catch traps.

Pest control

Pest control is best if carried out year-round.

Less effective, but still good, is pest control in seasons of high-impact. For example, a concentrated September-November rat and possum control blitz when birds are nesting, should increase the chances of chicks fledging successfully.

Removing one pest species can create an opportunity for another different pest. For example, control of feral cats could increase rat populations unless they are also controlled. If mustelids are controlled, you may find you have more rabbits. Be alert to any possible knock-on effects when a predator species is controlled.

Target pest	Prey /damage to native species	Control methods
Possums	Eggs and nestlings Reptiles Large invertebrates e.g. weta Vegetation stripped	Bait stations Timms trap Goodnature trap Killtraps Shooting
Rats	Eggs and nestlings Insects and small reptiles	Bait stations DoC 150 or 200 trap Goodnature trap Fenn Mark 4 trap
Mustelids – ferrets, stoats, weasel	Eggs and nestlings Invertebrates Reptiles – frogs, geckos, skinks	DoC 200 or 250 trap Goodnature trap Fenn Mark 4 trap
Feral cats	Birds Reptiles Large invertebrates Reptiles	Timms trap Live trap Shooting
Hedgehogs	Invertebrates Eggs and nestlings of ground-nesting birds Reptiles	Timms trap



Timms trap (yellow) plus Fenn Mk 4 trap in tunnel



Sentry bait station (targeting possums and rats)



Ferret killed by a Mk 4 Fenn trap



DoC 200 trap

Indicative establishment costs

Cost item	How much	Other considerations
Fencing	Permanent fencing \$13-\$17/m Electric fencing \$5-\$8/m	Allow at least one metre between fences/tree guards and trees to prevent browsing damage by cattle.
Plants 1100-4500 plants/ha (3m x 3m spacing to 1.5m x 1.5m spacing).	Exotic species \$1-\$4/plant Native species \$2-\$7/plant	Species choice depends on site, planting design, and any desired co-benefits of the planting. Plant quality is more important than size.
Planting	Bare-rooted trees (small) \$0.75-\$1 per tree depending on scale of planting (contractor rates).	Planting costs increase with bigger plants. Bigger plants provide quicker results, are more expensive, but need less maintenance.
Weed control	25-30c/tree (contractor rates including herbicide) for 1m spots.	May need several repeat applications. 1.4m ² recommended. Mats or mulch are other options.
Shelters e.g. combiguards for small trees	\$1-\$3 each Some designs include a mat (to prevent weeds growing within the shelter).	Protect from rabbits, hares, and spray damage.
Pest control	A comprehensive professional on-farm pest control programme may cost \$1,000-\$3,000/yr including supply of all materials.	DIY pest control involves significant investment in traps, bait stations and bait. Take advice on the best strategy for your farm and target pests.

More information

Species choice for different biodiversity and amenity objectives

Trees for the New Zealand Countryside: A planter's guide. John and Bunny Mortimer (1999) Taitua Books, Rotorua, New Zealand

Good nursery catalogues are also invaluable.

Attracting native wildlife

The Department of Conservation e.g. *Attract birds to your garden and what to plant*, visit doc.govt.nz

Pest control

Landcare Research: landcareresearch.co.nz

The Montfort Trimble Foundation: e.g. trimblefoundation.org.nz

Regional council biosecurity teams provide advice on pest monitoring and control.

Refer to dairynz Farmfact 5-6 Controlling Weeds and Pests