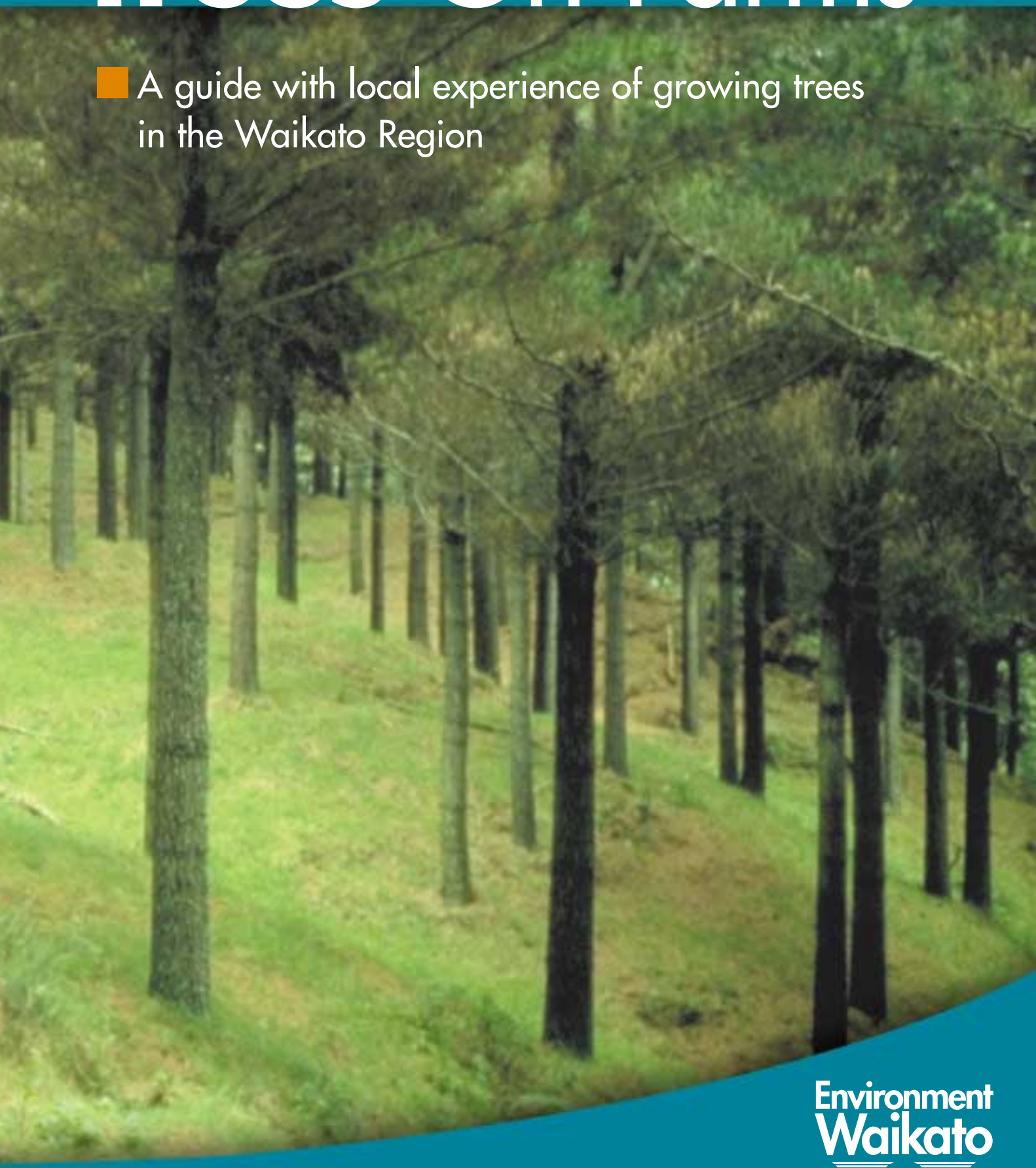
Trees On Farms

A guide with local experience of growing trees in the Waikato Region



Environment Waikato
REGIONAL COUNCIL

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Foreword

Trees fulfil many important functions in our environment and in our lives. Whether planted for timber or food production, shelter, shade, erosion prevention, protection of riparian margins, or to improve the aesthetic appeal of landscapes, trees improve and protect the environment in which we five and work, and the quality of our lives.

Well managed, trees can impart all these benefits, but errors in matching species with the site, insufficient care at establishment or inadequate protection from livestock can mean indifferent results. When pruning, timeliness is imperative. Preparation and planning can save significant effort and expense - we all have examples of choices we would make differently if only we could have that opportunity.

This publication provides a useful framework within which to consider all the necessary aspects of selection, establishment and care of trees on farms. Above all, it emphasises that each set of circumstances are different - there is no single formula for success. I encourage readers to see for yourselves what has (and what has not!) worked for others in similar conditions. Information and commentary from tree growers experienced with a number of species, uses, and soil and climatic conditions are presented; and the reader is encouraged to learn what has worked for others. I commend this publication to those who would grow trees on farms for any purpose, and encourage you to make use of the resources and local knowledge referred to within.

Chris Ingram
President
Waikato Branch
NZ Farm Forestry Association

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Contents

one Introduction

There has always been an interest in growing trees on farms, reflecting the many functions that trees can have. Whether it is for shelter, shade, firewood, timber, erosion control, stock feed, aesthetics or for wildlife, trees form an essential part of any farm. There are many excellent publications available to help in choosing a tree. However, there is not much available on the practical experience of others who have already planted trees and developed a local knowledge of what does and doesn't work. This publication attempts to fill some of these information gaps by collecting together some local experience, providing examples of planting case studies, supplying a list of contacts and an annotated bibliography.

This is not a detailed 'how to do it' planting guide, but a collection of comments from land owners who attended one of four 'Trees on Farms' workshops held in the Waikato Region. The topics of shade, shelter, timber, soil erosion and native habitat were covered, along with the characteristics of some tree species. No attempt has been made to vet these comments and although some may appear controversial or even contradictory, they record what was said and show the range of different experiences locally. Each comment is referenced to the particular workshop it came from as there may be local differences in plant response peculiar to each district. Workshops were held in Reporoa, Te Kuiti, Tirau and Morrinsville.

"There has always been an interest in growing trees on farms, reflecting the many functions that trees can have."

two

Why plant trees?

There are many reasons for planting trees, ranging from aesthetic to creating habitat to financial. Trees have so many uses that it is impossible to imagine anybody not wanting to plant them! The secret to successful results is to match the tree to the use and locality and manage it in the right way. Many people have achieved personal and financial satisfaction from planting the right tree for the right purpose.

The treed landscape of the Waikato is part of our lifestyle, contributing to the quality of life in this Region. The aesthetic appeal of a well-planted property contributes to property value and saleability.

Parts of the Region have a particular character based on the trees they contain - the oaks of Tirau and Matamata, pines in Tokoroa and Taupo, kahikatea in the Hauraki. There is also growing interest in planting more natives to restore wildlife habitat and create more of a uniquely New Zealand landscape.

Trees help improve water quality by shading and cooling the water, by stabilising eroding slopes and river banks, and as part of riparian buffer areas they contribute to filtering sediment and nutrients from runoff. Trees are valuable sources of shade for stock in summer, provide shelter from the wind, can be used as stock feed, timber or firewood. Financial returns from planting trees can be direct from timber, or indirect through improved stock health, or attracting bees to pollinate clover. The benefits also extend beyond our lifetime and add to the lives of those ahead of us, providing millable timber for the next generation, or helping combat the effects of global warming.

This picture shows various tree uses such as for shade, timber, shelter, amenity, riparian and habitat.

three Getting local information

To minimise the chances of mistakes it's important to plan, to have a look at what is growing well in your area, and to seek advice from either a professional or from farmers who have already successfully established trees. These sections cover some details of what is to be considered in planting a site. Some of the detail and planning required may appear too much, after all maybe you only want to plant a tree or two. The important thing is to do a little each year and remember that you are not alone. Many organisations and individuals are keen to help with free advice, time and even money. The planting of trees need not be difficult or overwhelming - just ask for help if you need it!

Local contacts

- Farm Forestry Association for advice on timber production on farms also shade trees and shelter
  PO Box 1122, Wellington
  Ph 04-472- 0432, **e-mail nzffa@clear.net.nz**

- NZ Tree Crops Association - For more information on useful tree crops - including nut and fruit trees, trees for shelter, timber, stock fodder and firewood
  FRANKLIN
  Secretary Monica Holmes, P 0 Box 356, Pukekohe
  Ph 09-238-7114, **email holmbrook@xtra.co.nz**
  WAIKATO & THAMES-COROMANDEL
  Sec/News Maurice Denton, Main Rd, RD 1, Tokoroa
  Ph/Fax 07-886-6687, **email mdenton@xtra.co.nz**

- Environment Waikato for advice on erosion control, pest control, contacting or forming a local Stream or Landcare Group.
  PO Box 4010
  Hamilton East
  Environment Waikato's Freephone 0800 800 4001, **e-mail info@ew.govt.nz**

- Local plant nurseries for advice on plants, planting and contacts.

Workshop Comments

- Local knowledge is often the best way of finding out what will grow and where. For instance, Douglas fir can get wiped out by spring frost - coastal species can be better. Become a member of NZ Farm Forestry Association (NZFFA). There is a branch in every region of New Zealand. The NZFFA has an interest in promoting alternative species such as hardwoods like acacia melanoxylon, eucalyptus, natives; and softwoods like Cupressus species, redwoods.

Joining a Landcare Group or organisation is a good way of getting ideas and meeting people with similar interests

four

Web sites

Other information on trees that may be relevant is available directly or can be downloaded from these sites:

NZ Farm Forestry Association - Local contacts, market information, useful links,
http://www.nzffa.org.nz

New Zealand Tree Crops Association Inc - local contacts, publications and articles
http://www.nzero.co.nz/tca

Environment Waikato - Information on animal and plant pests, landcare and streamcare groups, native plants and animals, soil conservation programs, planting tips
http://www.ew.govt.nz

Hawke's Bay Regional Council - Information on conservation trees, native plants, shelter, weeds and pests
http://www.hbrc.govt.nz/env_topics.asp

Northland Regional Council - Information on planting and managing stream sides
http://www.nrc.govt.nz/lakes.rivers.and.streams/streamside_management.shtml

Forest Industries Training - Extensive Information on plantation forestry and some on native forests
http://www.insights.co.nz

HortResearch - Information on poplars and willows, varieties and their characteristics, growing advice
http://www.hortresearch.co.nz/products/poplars

Taupo Native Plant Nursery - Extensive information on native plants including plant lists for various uses such as timber, shelter, wetlands, attracting birds and book list.
http://www.tauponativeplant.co.nz

New Zealand Ecological Restoration Network - some planting tips including a planter guide
http://www.bush.org.nz/home/index.html

five Planning

Having clear goals for what you want to achieve can result in a rewarding, efficient and cost-effective outcome. It is often too easy to rush in and plant trees, only to do the thinking later and find out after several years of growth that the site, species, spacing, or management was all wrong. At this late stage the goals for planting can become clear, not because you knew what you wanted but because you now see what you don't want.

Avoiding disappointing results is essential, given the time taken for trees to reach maturity. It is important to know exactly why the tree is being planted. Planting is really a small part of the planning programme. At the beginning is planning, then site preparation, then planting, followed by continued maintenance and management.

Draw up a planting plan for the farm and plant a bit each year. Planning also must consider the soil drainage, site and landscape conditions, plant and animal pests, the characteristics of the tree for its required function, along with costs and market information. Consideration also needs to be given to proximity to overhead power lines, continued access along drains, and whether the trees will increase accident risk by shading a road and making it prone to ice in winter. There may be single or multiple goals in mind for a particular planting. For example, to provide shade may be the primary goal but it is also possible to get timber and wildlife benefits from the same trees. Deciding where and what to plant is one part of the planning process. The other part is to consider when to plant, where to get your plants, quality of the plants, and quantity of supply. Local information and contacts can be a great help at this stage.

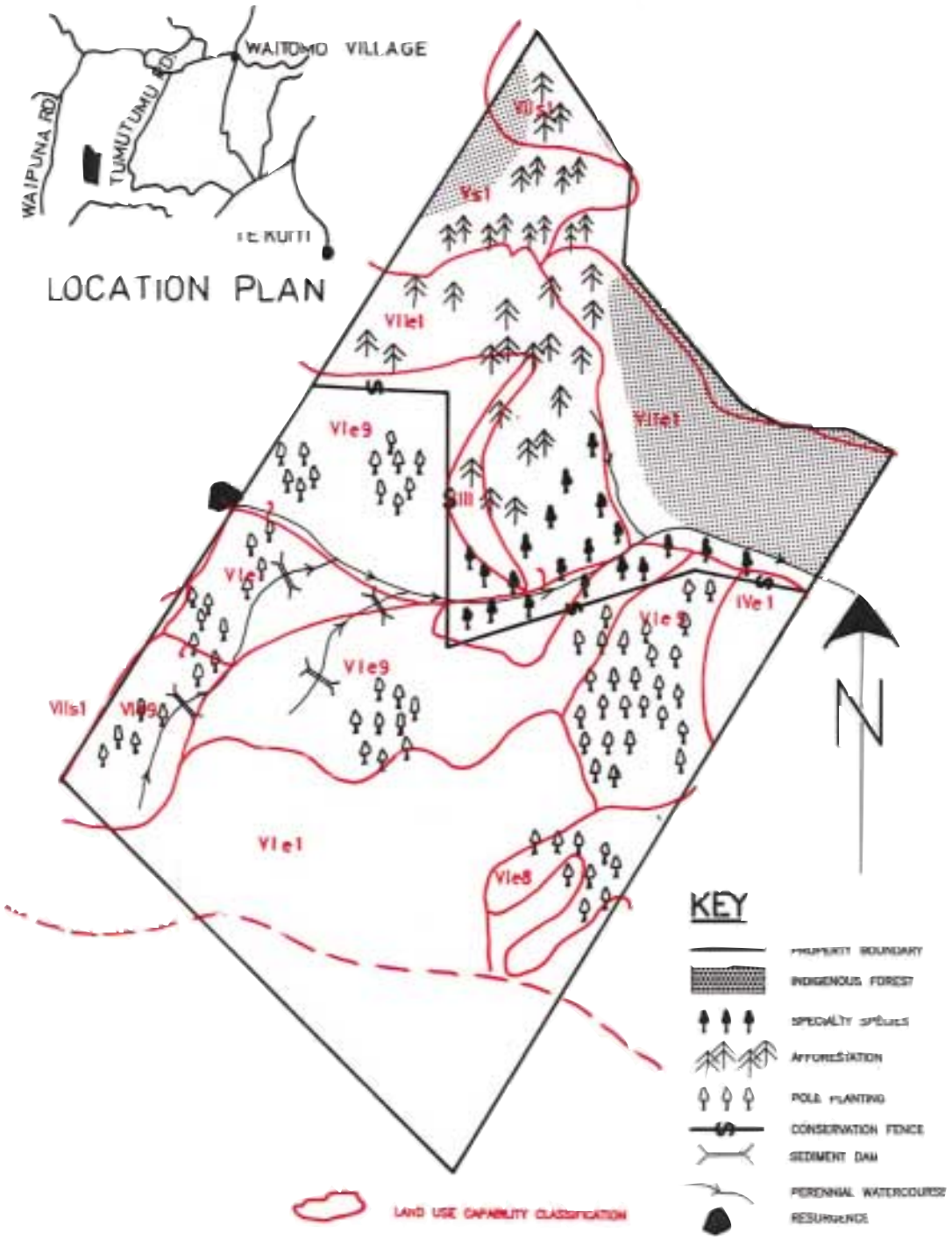
"What do you want the trees to achieve for you in the short and long term?"

Workshop Comments

Questions to ask:

(Te Kuiti)

- Work out what you want the tree for - Source/supply the best available for that purpose - maintain them accordingly
- How quickly will the trees achieve their potential use?
- Are they poisonous to stock
- Are they good for firewood or timber?
- Do they stand the wind?
- Do they sucker?
- Is it a weed?



An example of a planting plan for a property.
The red lines delineate different slope classes of land.

Checking site conditions

Trees are one of the major ways of altering the rural landscape, and viewlines on the property can be important. You need to consider not just the location, but the larger landscape as well. For example there may be views to protect, buildings to screen or natural features of the landform to accentuate. Proximity to overhead and underground cables and pipelines needs to be considered. Consider slope, sunny or shady aspect, soil depth, texture and drainage, wind exposure, salt wind effects, erosion, frost, humidity and flood risk. On any property, site conditions vary and there are a variety of micro-climates that suite different trees. These site conditions can have a marked effect on tree growth and survival.

The sequence of figures above shows how trees can be used to alter the appearance of the landscape. The picture on the right shows that existing native trees have been fenced and natives used for erosion control, shade, shelter, timber, riparian planting and to create habitat and planted corridors for native birds.

"Site conditions can have a marked effect on tree growth and survival."

Workshop Comments

- Coastal species are different - special needs (Te Kuiti)
- **Specimens:** see what grows locally. Frosts have been giving trees a hard time especially out of season. It burns new growth. (Reporoa)
- **Natives:** in south Tokoroa, we have deep and severe frosts. It is important to make sure the plants are the right variety for the area. It comes down to trial and error because what will work in one place won't work elsewhere. (Tirau)

Where to plant

Where to plant will vary depending on the requirements of the tree and its purpose. Some trees are hardy and will grow in a variety of conditions, others are more sensitive and will only thrive in specific conditions. Use the best sites to produce the best trees. Sheltered locations with deep well-drained soil are desirable. Think of the final size of the tree, consider access around the site when fully grown, and shading effects on roads and drains. Ease of stock management, ease of fencing, environmental gains (e.g. from retiring wetlands, eroding sites), access for harvest, visual impact, neighbours' fencelines and views are some examples of the many aspects that need considering.

Workshop Comments

- **Questions:** How big do they grow - power lines? What does your local council allow you to do - planting restrictions on boundary lines? (Te Kuiti)
- The tree patch can be positioned in the middle of a paddock for maximum stock shade and it does not interfere with cultivation. Conifers - Where possible plant multi-rows. For aesthetic purposes mix species together. Plant small woodlots in corners of paddocks, slopes, gullies. Don't plant cypress in shelter belts if you have stock because the tree can cause abortions. (Reporoa)
- Plant specimen trees on fence lines rather than along the main farm race - some drop branches. Pines don't like to be too close to fences where stock can nibble them or they will thicken their branches. The top must be protected (so stock can't reach it) or the tree will be deformed. Plant so cattle can't reach it, especially when it is growing up as high as the fence. Plant say 1.5 - 2 m away. Pines didn't grow on loose sand when planted in September (there was a dry spring). They also got loosened by the wind (Tirau)
- **Blackwoods:** Plant in light wells in the bush. Light wells must be big enough, but tight enough, to drive the growth up (Te Kuiti). Companion plant with eucalyptus or manuka/kanuka. Most are sacrifice trees, leave some (maybe one in ten). Shading helps - shady slopes and overstorey trees. Pick the most favourable site (sheltered, moist) - South-facing preferable. The faster they grow, the less you have to prune them (Reporoa). Mix with kanuka - they don't like being solitary. Make sure you choose the right site - avoid wind, responds to a good fertile site. Moist gullies with a nurse crop. (Tirau)
- **Poplars:** appear to be affected by heavy soil. Plant where you can push them in. Not in the open/exposed dry faces (Te Kuiti). Should not be planted too close together as they lean out to get the sun (Reporoa).
- Must remember the range of eucalyptus available and site specific conditions they prefer (Reporoa). Eucalyptus nitens - don't plant where there is poor drainage, but they are okay in dry soils. (Tirau)
- **Tree lucerne:** Likes a hill - it's susceptible to frost so keep out of low areas. (Reporoa)
- **Natives:** Like to grow in a huddle. Flaxes are good shelter. To make a grove, plant a variety of species and the birds will come and add others (Reporoa). Do better as a mixed planting of different species (Te Kuiti)
- **Kauri:** frost is a problem when young - grow on a hill above the frost - likes slopes Rimu, matai, kahikatea - Okay in wetter areas (after 10-12 yrs they dried out wet areas). (Tirau). Plant totara with other trees e.g. hoheria (lacebark), wineberry - let them get up to 2 m high and then interplant (keep pruned for lightwells) and keep weeds down. Let the totara come up through everything else. Best growth and form occurs when they are planted into, or with, a nurse/scrub layer (especially natives). They will grow straighter if grown amongst scrub. (Tirau)

What to plant

For a particular purpose there may be a variety of trees to choose from. Compare the trees in terms of growth rates, final size, resistance to pests and diseases, hardiness, amounts of shade produced, timber quality and other spin-offs like bee nectar/pollen, attracting birds, flowers, foliage colour or just general good looks. Match plants to the site conditions, or alter the conditions e.g. use shelter. Choose trees that need less maintenance if you don't have time or money to do this. Use the best stock and choose multi-purpose varieties if possible.

Workshop Comments

- Most specimen trees are site-specific - e.g. some like water, some like dry - choose accordingly (Te Kuiti)
- **Pines:** very easy to grow. Avoid wet places. (Tirau). Fall over in wet and won't grow. Need intensive management (Reporoa)
- **Willows:** Problems with sawfly - don't plant near a river (Te Kuiti)
- **Poplars:** Possum damage in poplars with low balsam content - can be very highly damaged. Tasman seems prone to rust (Morrinsville)
- **Eucalyptus:** Some trees are good for soaking up wet areas, e.g. eucalyptus (Morrinsville). Saligna - problems with wind and possums and lately bugs (cardiospina) (Tirau). Botryoidies/saligna are particularly bug prone - take care with all types. Nitens has fungus problem. (Morrinsville). Sawfly not problem here because they are mainly saligna. (Reporoa). Particularly site specific for various species - most farmers wouldn't realise this and consider them all "gum trees". Most don't grow here: e.g. saligna. Ash group grow here most reliably and some blue gums e.g. nitens - but less reliable - provenance dependent. Fraxinoides slightly prone to frost damage, avoid frosty gullies. (Reporoa). No good - Insects - botryoidies, eugenioides (Tirau). E. nitens - self pruning (Tirau). Not so much maintenance work as pines (Morrinsville). Some seed provenances are more prone to early frost damage than others e.g. best stock from FRI Rangiora for E. delegatensis (Reporoa)
- **Macrocarpa:** is susceptible to canker. Lusitanica is fairly resistant to canker (Reporoa)
- **Cypress canker:** becoming more of a problem - lots of cypress are affected, wouldn't plant them again. Lusitanica - little canker. Macrocarpa - considerable canker. Conifers are easy to establish (Tirau)
- **Blackwoods:** Pruning techniques are very important. Brutes to prune - some people prune twice a year up to final lift (Tirau). Difficult to grow straight - grows like a cabbage (Morrinsville).

Specific planting goals

Shade

Animals and people benefit from shade in summer.

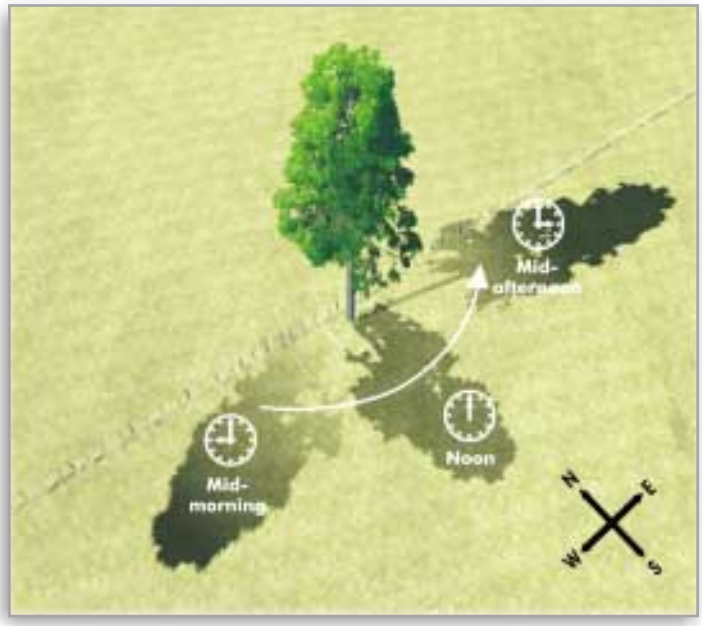
Areas that benefit from shade include buildings, stock yards, race ways and paddocks. Plant plenty of trees so stock in paddocks have a choice of shade and aren't all trying to huddle under one tree. High prune the tree stems to encourage height and to allow light under the tree for pasture growth.

The shadow is also not always directly under the tree and moves around. This discourages stock camping because they follow the shadow. Pruning will also allow the tree to be used for any future timber production. Deciduous trees allow winter sun on pasture. Select fast growing trees for quick shade. Fence trees to protect them from browsing. Before planting consider sun angles for the time of year and time of day when shade is needed. Also think about where the shade is needed (e.g. buildings, yards, paddocks and raceways). Streams also benefit from being shaded. This helps suppress aquatic weed growth and improves the conditions for stream life by helping to cool the water.

Shade trees planted along paddocks and raceways provide shade for stock.

Workshop Comments

- Choose quick growing trees for shade. If the site is windy, select a small leafed tree With a low wide tree, the shade is in one place under the tree. With a tall tree, the shade extends further out and moves around the paddock (can high prune the tree to get this effect) (Te Kuiti).
- Any large spreading tree is good. Not just one tree - plant sufficient trees to spread cattle around the paddock (Tirau)
- Plant two or three trees in the corner or spread them evenly so cows spread out in the paddock. Make sure the trees are the sort that don't drop their branches. This is a problem for fences. Deciduous in winter or interplant deciduous and evergreen, avoid permanent shade. (Morrinsville)
- Need enough trees along a fence so animals aren't camped under only one. Also high prune so shade moves out in the paddock. Which is the best poplar variety? One that doesn't shed branches! Some specimen trees are being affected with borer (Reporoa).
- **Poplars:** avoid yunnanensis - grows too big, but retains leaves longer (Morrinsville). Flevo no good - branches fall off, but nice colour in spring. Yunnanensis is tricky to establish (10 percent failure) - the wood is brittle but it doesn't drop branches. Good shade - big crown, big leaves, farmers like them. (Reporoa). Great for clothing a landscape - even if removed after 20 to 30 yrs. Establish slower growing trees underneath (Tirau).



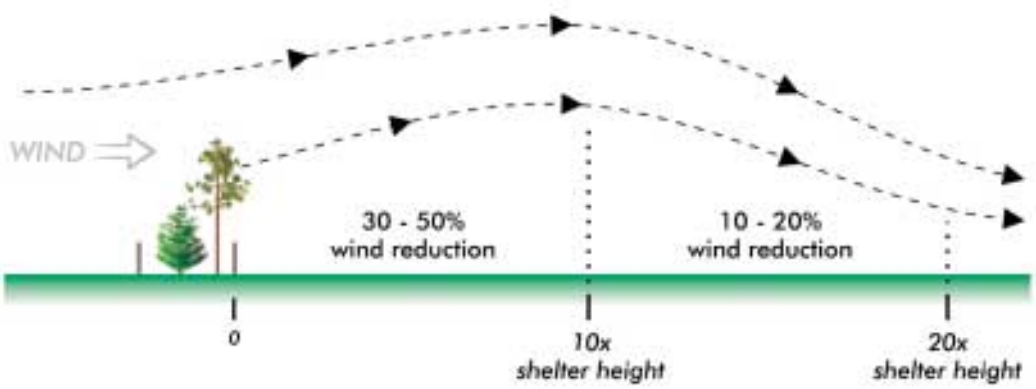
A tall tree with a pruned trunk keeps the shade further out into the paddock preventing stock camping and aiding grass growth under the tree.

Shelter

The best shelter filters the wind to slow it down, not stopping it. Dense shelter accelerates the wind and creates turbulence. The best sheltering effect is achieved when there is about 50 percent permeability through the shelter belt. A good shelter belt on the leeward side will give a 30 to 50 percent reduction in wind speed over a distance of up to 10 times the shelters height, and a 10 to 20 percent reduction up to a distance of 20 times the shelter height. Individual shelter belt lengths should be at least 12 times, and preferably 24 times, the height of the shelter trees.

Shelter should be maintained down to ground level to avoid wind funnelling. Trimming encourages foliage growth to ground level in some species. Alternatively grow lower growing species on the windward side of the taller species, particularly if the taller species is to be pruned. To prevent gaps any dead trees need to be replaced in the season after planting.

Plant shelter belts in a N-S orientation to reduce pasture shading effects, or in a direction to block the prevailing wind. Evergreen shelter running E-W will cause shading problems on the south side. In this case use less dense species such as eucalyptus or deciduous trees.



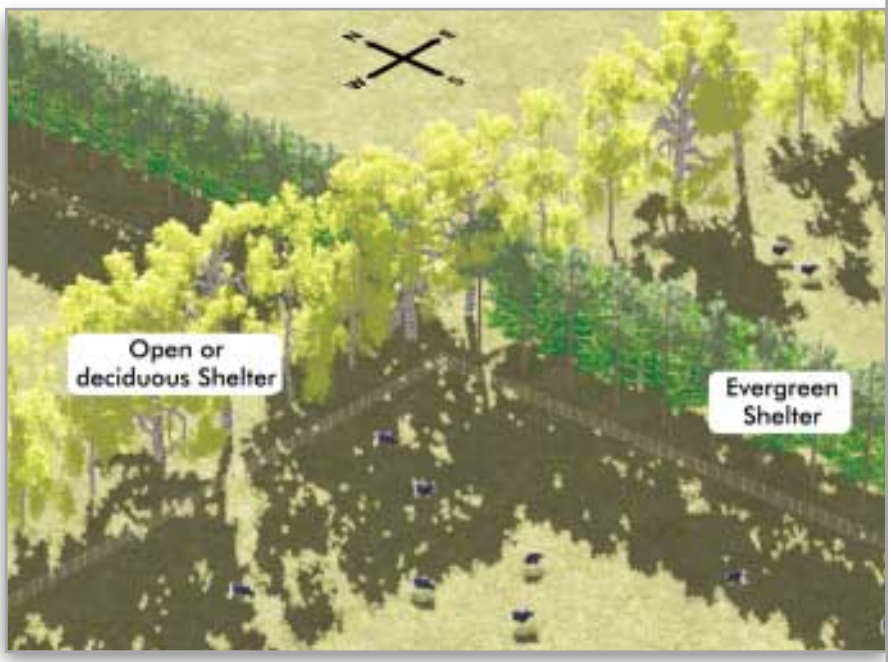
Shelter reduces the wind speed over a distance that is proportional to the shelters height.

Shelter belts must be protected from stock. The distance from tree to fence should be 1 m for sheep and 2 m for cattle and even greater for horses.

Shelter can be multipurpose and managed for timber, native habitat and stock fodder. There are several types of shelter belt design;

- Single row - closely spaced at 2 to 3 m to prevent gaps and draughts underneath;
- Double row - generally one species provides high shelter and a smaller species gives the dense lower shelter, rows are generally offset from each other. Spacing ranges from 2 to 3 m between and within rows
- Triple row - Often used in very exposed or coastal conditions. This consists of a single row of taller trees with a row of shrubs or small trees in a row on either side.
- Timberline - A row of trees in which alternate trees are pruned (fan pruned) to provide low shelter and the others are stem pruned (clear pruned) for timber. An alternative is a single row of unpruned timber trees

Native plants can be used as shelter. They have a range of growth rates and species can be selected to form the lower outside row of a shelter belt, or inter-planted to take over the role of exotic trees that may eventually be removed for some other purpose. Natives can act as forest corridors or "bird roads", linking together areas of native bush. They are also hardy and introduce some New Zealand character back into the landscape.



Open or deciduous trees can be used to help reduce the effects on pasture of permanent winter shade on the south side of shelter that runs in a east-west direction.

Workshop Comments

- Plant evergreens N-S. Deciduous trees can be planted E-W for less pugging on the south side (Te Kuiti)
- Be aware of shade effects from the shelter belt. It's not the species that counts, but how you grow them. Open top, dense bottom. e.g. pines and Olearia, flax for the bottom. Plant to shelter stock from prevailing wind/southerly wind (Tirau)
- Plant pines in a North-South direction. Avoid solid shelter - you get too much turbulence. Spread trees, and open the bottoms of the trees up so you get less stock health problems. Natives give fast shelter. Pines - high (8 m) pruned trees still give shelter in the paddock. Pruning costs $7/tree over its life. (Morrinsville)
- **Japanese cedar:** looks ugly in open belt, needs management, good in woodlot but can lose to frost. Seed burs get in sheep wool but non-toxic to cattle. There are too many farmers planting single row pines expecting to make money in time. Better off to block plant an area. Pines were the only thing that was cheap and would grow on an exposed ridge. Fast growing. Stacking prunings parallel behind the fence creates additional shelter. (Reporoa)
- Problems with a single row of trees: Wind can loosen the stem in the ground (speed wobbles), magpies can break leaders off, getting rid of rubbish after pruning, it lies in the paddock fencing off, tops blow out

Soil erosion

Erosion can be localised or widespread, along waterways, on hill slopes or cultivated land. Using trees to prevent erosion is generally the most economic and effective method long term. The risk of erosion can be minimised in as little as five to six years. The soil binding properties of the roots (for hill and stream bank erosion), interception of rain and ground water (preventing slips by protecting soil and by drying out the ground) or reduction of wind speed (for wind erosion) all help prevent erosion.

The best time to plant is before erosion has occurred. If erosion is widespread, consider conversion to full scale forestry. If harvesting is difficult, reversion to indigenous vegetation may be a better option. Open spaced planting can be used if erosion (active or potential) is localised on otherwise stable, pastoral land. Density of planting can be increased if erosion is severe and stability needs to be achieved quickly. Thinning and pruning can be done later when stability has been achieved. This will increase pasture growth and optimise timber potential.

Some tree species have specific qualities which makes them suitable for particular erosion types. Generally the fast growing species such as poplars, willows and pines provide stability quickly, but require more maintenance and have a shorter life span, needing regular replanting or follow up planting with other species. Acacia, Cypress and natives have longer rotation, although these may require considerable maintenance earlier on.

Poplars and Willows (Salix matsudana hybrids) are extensively used to tackle active erosion on hill slopes and in gullies. Willows are also recommended as a first step in controlling severe stream bank erosion, but once fully grown may fall over and obstruct the stream creating stream bank erosion. Once stream bank stability has been achieved topping of the taller trees or introduction of other longer term species such as natives is necessary.

Poplars planted to stabilise a stream bank

The most common species used for protection forestry is Pinus radiata which has a proven record and an established timber processing industry. As area and harvest of other species such as Acacia, Cupressus, redwood, and Eucalyptus increases, the development of an appropriate infrastructure is likely to follow, giving more certainty to those landowners wanting to try species other than Pinus radiata.

Plants need to be protected from stock. This may require fencing or excluding larger stock from the planted area until the trees are large enough to withstand stock. Sheep may be introduced first at low stocking rates, young cattle at a later stage. Different stock behave differently, so vigilance is always required, otherwise exclude stock altogether.

Poplars and willows can be planted as cuttings or poles and are commonly protected from stock with Netlon (plastic netting) or Dynex (smooth, solid plastic) sleeves It is however recommended to exclude cattle from grazing around the poles for the first two years.

Cupressus lusitanica planted on a steeper slope

Plastic sleeves protect newly planted willow poles.

Workshop Comments

- **Natives:** make sure they establish properly. Choose species like manuka, coprosma and pittosporum, to get good cover. Tackle stock management and appropriate land use issues (Tirau)
- **Blackwoods:** have a dense mat of root which holds steep inclines (Morrinsville). Good for erosion control because after cutting down they coppice, the roots don't die (Tirau)
- **Chilean flame tree:** is good for soil conservation (but can be invasive), frost tender. Poplars - Pruning is vital - keeps shade moving, provides good access for machinery, stock can't duck around hiding in the branches, looks nicer. Prune in late summer to (minimise) avoid epicormic shooting. An advantage is that the timber rots away quickly in the paddock. (Morrinsville)

Enhancing native habitat

Native habitat makes New Zealand unique, as most of our plants and animals are found no-where else in the world. Preserving remaining native patches, and planting species that formed the original landscape will help preserve our biodiversity and leave a legacy for future generations. Planted native trees and/or shrubs can also be used as long-rotation woodlots, shelter belts, stock shade, screens between bull paddocks, protection for soil and water, or as sources of cottage-industry products such as honey, essential oils, or craft material.

Small patches of native bush or even scattered native specimen trees can attract native birds, insects and reptiles. Even if they are too small to support resident birds, they may be used by birds as a seasonal food supply or as stepping stones to move around the landscape.

Many areas of Waikato farmland are devoid of native vegetation. Planting native vegetation wherever practical is one way of reintroducing New Zealand's unique trees and animals back into our landscape.

Improve native habitat by fencing forest patches and controlling pests including possums, rodents, stoats, and weeds. Plant a range of native plants (ideally locally sourced) to provide year-round food supply (five-fingers, coprosmas and miro produce winter fruit, and in warmer areas puriri has fruit or flowers year round). Leave dead logs or trunks for nesting holes and to increase insect life. Ponds or streams near native habitat will also increase the diversity of insects for native bats and insect-eating birds like fantails and moreporks.

Native habitats can be protected in perpetuity with a QEII covenant or a private covenant on your title. Some landowners have been granted extra consent rights in exchange for legally protecting areas of native habitat. Protected native habitats may also be eligible for rate relief, assistance with pest control or other financial incentives.

Fencing existing native trees or bush from stock, and controlling pests, allows it to flourish and regenerate.

Workshop Comments

- Preserve what is already there, fill in gaps, do pest control. More tender plants can be planted after the initial hardier plants have established (year 6). Plant natives around streams and swamps, or any unproductive area. (Tirau)
- **Pittosporums:** are good for smaller birds - waxeyes eat the seeds, Tree fuchsia is good for birds - flower and fruit, Lemonwood/flax - quick growing. Protect existing trees as a seed source. Natives give good shelter - top and bottom. Native plantings can function as bird corridors. Puriri is good for birds, it can survive frost after the first year (Morrinsville)
- **Kahikatea:** provide fruit. Can appear to be dead for a couple of years then they grow rapidly. Grow well in well and poorly drained soils (Tirau)
- **Tree lucerne:** great for sheltering plants in regenerating areas (Morrinsville). Flowers all winter - bellbirds and tuis love it and so do bees. Plant as a ring around a native fragment to bring birds. Watch for weed potential, be prepared to manage it or grow it as a belt. It is a legume so provides nutrient to the soil. An excellent nurse crop for natives. Provides deep leaf litter. Very fast growing and short lived 10 - 15 years (Reporoa). Can be used to fill the winter feed gap for birds until large trees like puriri establish (Morrinsville)
- **Blackwoods:** can act as a pioneer for natives helping them to get established. Aesthetics - they look good with natives (present in pollen record so once grew in NZ). (Reporoa)

Timber

For the smaller grower it may be better to grow fewer trees but manage them well to obtain a greater proportion of high value timber. Timber trees can be registered against the title of the property. This means that even if the land is sold the felling rights to the trees remains with the person or party that registered them. The same applies to native trees planted for timber.

The best returns are for pruned, well-maintained trees. You need to consider such things as how much time is needed to tend the trees, site stability and access for extraction, distance from roads, the number and spacing of trees. Do not plant steep faces where soil erosion can occur after harvesting. Protect waterways by leaving vegetated strips alongside the watercourses.

A stand of eucalyptus

Pine is a common timber tree used on farms

Paulownia planted along a raceway to provide timber and shade

Workshop Comments

- Ask yourself "do you need to harvest in your lifetime? Is this type of timber immediately in commercial demand or is its future unknown?" Try to grow high value timber - radiata or anything else. See what the neighbours are growing. Cypresses - Seed source is important - clone selection - grow your own from cuttings. Redwoods grow too quickly - timber no good. (Tirau)
- For planting on high fertility farms choose species that can be easily managed, that have good form i.e. fastigate habit, small branches, and are non-toxic to livestock e.g. Abies (firs) and Picea (spruces) are non-toxic. For any trees planted where an economic return is desired then silviculture is a must. Poles - larch.(Reporoa)
- In a block of trees choose the ones to be used for timber and work on them, leave the rest as a wind shelter. Some conifers are very branchy and difficult to prune. Macrocarpa has fluting, and canker problems. For redwoods, pruning is not an issue. (Te Kuiti)
- **Planted lusitanica:** this was influenced by the fact that in years to come it may be environmentally unfriendly to maintain chemical processing of pine timber (Morrinsville)
- **Redwoods:** are fast growing - produce softer timber here than in cold climates. Should be grown close together to slow down growth rates. Crops best in 50 to 60 yrs, but can be harvested after 22 years. Pines - influenced by value of the NZ$, and market access. Stock toxicity - Macrocarpa, Taxus baccata (English yew) - are all very poisonous. (Te Kuiti)
- **Poplar:** tanalises, hardwood not recognised by end users in New Zealand. Open-sited trees may have twisting, warping, compressing wood problems. Auckland market for housing- lining finishing. Italian has a black heart - undesirable (Reporoa). For timber you need rooted plants with a good leader (and watch the possum damage of the leader).
- **Natives:** slow growing in most cases, black beech may be an exception to this. Need a very long-term rotation approach (next generation will benefit. (Te Kuiti). Can be used for timber - Seed sourcing needs to be considered- if not from here, issue for conservation Kauri need shelter and staking. They can grow faster than expected if given heat and shelter. Totara, mangeao, rimu, matai and kauri all do well here. Totara can be pruned like pines. Best grown among other trees to "pull them up". Pruning totara after three to four years will encourage apical dominance. Beech can produce some excellent timber. Black beech is very fast growing when kept weed free (Tirau).
- **Eucalyptus:** make excellent firewood (leave limbs on after felling to absorb moisture from leaves and branches). Fast growing - two growing seasons and they are 10 m+ high (Morrinsville). A specialist sawmill is required (Te Kuiti). Plenty of portable mills out there but there is a variable $ return. Nothing grows as fast as E. nitens - ideal shelter and firewood but no good for timber "growing trees for pulp is like growing sheep for dags". E. delegatensis - genetic variation affects timber values (Reporoa). Have to prune - as high as you can (Tirau). Neil Barr's book - Ten to twelve easy to grow, millable species. Ask about the origin of the seed, especially frost tolerance for nitens (Reporoa). Need slow drying so that it doesn't warp (Morrinsville)
- **Blackwoods:** produce a good pruned log (Tirau). Need competition from another species to improve form. Standard of pruning is essential, expensive to prune for timber, need lots of pruning (Te Kuiti). Rogue tree! Unpredictable for forestry - wouldn't recommend (Reporoa). Need best possible conditions. If growth gets checked, then they branch out. Good seed stock is important. Thinking 40 or 50 years to harvest (Reporoa) Seed freely and can cause a weed problem in some areas (Morrinsville). Quality wood can get $2000/$m^3$ (Reporoa).

Riparian planting

Planting alongside watercourses such as streams, lakes and wetlands (riparian planting) can be anything from a row of trees to a wide bush strip. Riparian planting helps stabilise stream banks, shades out water weeds, shades and cools the water for aquatic life, provides a variety of habitats for birds, fish and animal life, and can filter sediment and nutrients from runoff before it enters the water. Riparian planting may also link remnants of native bush together, providing a corridor for the movement of native birds, insects, reptiles and land snails.

Access along streams can be maintained by planting alternate sides of the bank. Keep weeds and pests under control. Choose trees that don't spread and sucker or that don't collapse and block the channel. Plant grassy plants like rushes, sedges and water tolerant shrubs at the stream edge to protect the bank from scouring. Next is a layer of shrubs and small trees. Furthermost from the stream plant larger and production trees. It is important to maintain a grassy filter strip on the tree side of the fence that separates the riparian planting from the paddock. This grass filter helps remove sediment and nutrient from runoff entering the riparian zone. Avoid planting large trees within 5 m (and preferably 10 m) of the stream bank. Trees over 15 m high are likely to become unstable and blow over, causing channel obstruction and flooding.

Trees shading drains have some benefits in suppressing weeds, but some sun is still needed because grass in drains act as a filter removing sediment and nutrients, and helping stabilise banks.

Planting natives along riparian areas can help stabilise some stream banks, shades the water for stream life and provides habitat for native animals.

Workshop Comments

- Riparian area (Karapiro) planted with E. nitens - high quality pulp and timber value (need to overcome drying problems and bugs, but less problems now). Oaks provide food for ducks. Use "Vigilant" stump gel to prevent stump regrowth when clearing willows/poplars. Trees can fall over and rip up the banks- poplars may be a problem especially if high pruned (Morrinsville)
- Don't plant willows unless they are managed (Reporoa)
- **Drains:** (all from Morrinsville)
- Fence drains to stabilise banks
- Planting will control erosion
- Use low growing/small shrubs
- **Environment Waikato comment:** Cleaning alternate sides of boundary drains is a problem when trees are in the way. The policy is to have a 7m clearway beside the drain to provide access. Some drains don't need cleaning - trees are no problem here, nor are they a problem where diggers can go up the stream channel. But debris from trees can block culverts - so trees can still an issue with internal drains.

Stock feed

In summer droughts it may be useful to have trees that can be used as stock food. Different parts of the tree may be used. Branches can be cut off for the stock to eat (e.g. poplar, willow. Poplar leaf has the same nutrient value as lucerne hay) . A block of low growing trees can be opened up for stock to browse on. Trees can be planted that provide edible fruit or seeds that drop to the ground to be eaten by stock (e.g. tree lucerne, sweet chestnut, mulberry, honey locust).

Workshop Comments

- Edible leaves can be an advantage (Te Kuiti)
- Fodder is useful for Hawke's Bay maybe, but the feed pressure is in winter here. Be careful stock don't knock the ladder over when you are cutting the branches! (Reporoa)
- Poplar provides stock food in a drought - prune in Autumn for stock to eat - brings up minerals from subsoils (zinc). (Morrinsville)

Some different ways of fencing individual trees

A four wire fence protects plantings on a steeper slope

Planting SIX

When to plant

Plan to plant when you'll have enough time. Plant only as much as you can maintain, given the time and resources available. The best time is from May to August when the ground is moist. Any other time is risky. In some areas frost is a consideration and trees are planted in spring. Very wet areas can be planted in summer providing the soil is still moist. Plant erosion prone areas before they slip. Some plants require shelter or a nursery crop to grow amongst and planting cannot occur until these are established. When to plant can also depend on the availability of plants from the nursery.

Preparing the site

Fencing is nearly always essential to prevent trees being eaten by stock or to allow natives to regenerate. It is important to fence before planting or the plant may be eaten before the fences are up. Plantings should be far enough away from the fence (say 2 to 3 m for cattle) to prevent animals from reaching over and eating the tree before it is large enough to be out of harm's way.

Tree guards or sleeves can also be used. Pest and weed control before planting are also essential. Hares and possums can be a particular problem for young plants. Shelter may need to be provided before planting can take place and the soil may need to be drained, ripped or fertilised. Access to the site and a water supply may also need to be installed. Before planting, heavy grazing can be used to suppress competition from grass.

Workshop Comments

- **Planting times are important:** plant in Winter before calving (Morrinsville)
- **Specimen trees:** winter planting.Pines - planting late in a dry spring resulted in 15 percent loss of seedlings. Fencing is the biggest cost. (Tirau)

Workshop Comments

- **Tree guards:** these are reinforced mesh that you roll up and lock together around the tree - fix with (long) tent pegs, 3 pegs per 1.5 m high guard (sheep and cattle sizes are available) - $40-$50
  (still cheaper than post and wire) commercial - Alburn industries, Pukekohe. (Te Kuiti)
- **Natives:** Tree protectors work well, brown corrugated plastic sleeves from Treetools - they come in varying heights. Tree protectors can lead to weak stems however, a problem in windy areas. Plant straight into grazed pasture, use trees 1m high - good specimens (Tirau). A shelter crop is important. Need a shrubby nursery cover first. If no shelter, the tree hardly grows. How tall does the nursery crop need to be before planting? (Te Kuiti). Plant coprosmas then get slower growing species going underneath (Morrinsville). Establish natives in a crack willow swamp: Go in with a digger and make 50 percent water and 50 percent land. Plant natives on land. Use willows to shade/shelter natives. Poison them as you go with a drill.
- **Specimens:** Pre-planting weed spray, protective fencing. (Tirau). Shelter them at planting (Te Kuiti).
- Use two electric wires, if near fence line, with 2 extra posts - sheep reach under (Te Kuiti)
- **Poplars:** must be fenced from dairy heifers. Eucalyptus - Pre-spray area with Treepel. Blackberry (in gully) - spray when trees are young (Tirau)
- **Lusitanica:** Shelter from wind - Can be planted with pines as a nurse crop. Use Treepel (deters rabbits, hares) - spray before planting (Morrinsville). Pines - hares eat young trees
- **Blackwoods:** Hares eat them after planting - use repellent immediately (1 egg + acrylic paint) but don't despair, can get a good shoot on regrowth (Tirau)
- Hares can be a problem. (Reporoa)
- Stems up to one finger thickness prone to hare damage
- Problem with bare stem species
- Thiram fungicide in bags before planting gives about 3 months protection
- Spot spray, but leave 2-3 months grass growth around the spots (good for the trees to leave spots a while)
- Eggs/paint + water or Treepel gives six months protection

Obtaining plants

Order a realistic number of plants, given your time and resources. Choose good specimens. For natives try to obtain plants grown from local seed sources (eco-sourcing). This helps to maintain locally adapted genetic strains and ensures that the plants are well suited to the local conditions.

Check plant quality before they leave the nursery, making sure the roots are moist, that there are plenty of fine fibrous roots and several thicker anchoring roots. Bare rooted trees need planting within 48 hours. Never order more bare rooted plants than you can comfortably plant within two days. Plants in pots can be kept until they grow out of their containers, making planting more flexible. Consider where you will store the plants. They will need watering and protecting from sun, wind and pests, but getting them acclimatised to your site before planting can increase survival rates. There may be a discount for bulk orders. Sometimes free plants are available from a hobbyist. There are also grants available from Environment Waikato for specific types of planting. Some people grow their own plants from cuttings or seed.

A plant nursery set up by the school at Walton

Workshop Comments

- **Start a nursery:** cuts costs but takes time. Pay more for a bigger tree (eucs.,) so you get less rabbit problems. Specimens - Important to buy good-sized trees (Morrinsville)
- The cost is important. Shop around, go to forest nurseries where bulk prices prevail. All seed is difficult to get - buy growing on lines. (Reporoa)
- **Specimen trees:** Buy smaller trees that aren't root bound, or open ground grown trees. Natives
- **Natives:** Buy growing on lines and grow on in the home nursery - will save money. Sometimes you can get natives for free by word of mouth. Free from our local school as part of the "Trees for Survival" unit (Tirau). Can be quite expensive - how to get cheaper stock? What is the maximum spacing to get costs down? How do you practically plant a large area? (Te Kuiti). Buy the biggest you can - worth the extra cost (Morrinsville). Get plants that have been hardened off, eco-sourced plants, buy in the locality. Want 1.5 m centres and let the best plants win (Morrinsville). Grow your own - time needed, collect seedlings. Costs reduced over time by recycling planter bags and use of 'Deeweed' bag tops (a kind of weedmat for planter bags) (Tirau). Totara - Plant no smaller than 40 cm high, PB2 or 3 grade. Plant only well hardened seedlings (Tirau). Totara is one of the few natives that does well from bare rooted stock (Tirau). Plant five good paces apart. If all planted at the same time they grow up together. Six paces for kauri. Kahikatea - 1m apart like wild ones - they'll select themselves (Tirau)
- **Poplars:** For low cost, plant poles. But you don't get good trees out of poles or cuttings. (Morrinsville)
- **Blackwoods:** Buy small and cheap - grow in planter bag 1 year, then they wont be eaten by hares. Buy biggest, select seed source. The runts never catch up. Source is important. Need to be careful with seed source for Lusitanica - can be variable with canker problem. (Tirau)
- **Pines:** Used to plant GF17s, now have gone to cuttings which are meant to be a superior strain i.e. plant good genetic material (but environmental factors may override the benefit of better genetic stock e.g. wet conditions have more of an effect than the genetic strain). Cypress - Plant in a block, dense spacing (3 x 4m). Walnut is a big spreading tree - plant 22 paces apart - branches touching after 2 years (Tirau)
- **Eucalyptus:** Plant close so they self-prune (Morrinsville). Spacing is important, 3m x 3m (900-1000 stems/ha). Close space - reduced branching but if not spaced when older they get narrow trunks and get stress cracks when felled, so the final crop needs to be well spaced - 300 stems/ha or 5-6 m apart (Tirau). For pulp plant 1000 stems/ha and pulp at 10 years (Fletcher Forests have a 50:50 deal with farmers in the Bay of Plenty) (Morrinsville).

Planting tips

To get the most growth, they will need to be well cared for before planting, and put into the ground with the least amount of stress. Always be conscious of protecting the roots from the sun. Don't take plants out of the containers until immediately before putting into the ground. When planting make sure the roots point downwards, are not bent or crooked and have no air pockets around them. The roots may need trimming to achieve this.

Prepare a decent hole for the tree (loosen the soil, breaking any pans) big enough (twice the size of the container) for the plant to get established in. Plant the tree straight and no deeper in the ground than it was in the container. Stake the tree if necessary. When compacting the soil around the tree, use the heel of your boot, making sure not to get closer than 5 cm from the stem. Slow release fertiliser can be added to the hole to help growth on low fertility sites. Most natives will do well without fertiliser.

It is a good idea to put a stake (60 to 70 cm tall) with the top dipped in white paint beside each tree to aid locating it in case weeds get out of control. Planting natives at 1.5 m centres, and planting larger plants, allows them to quickly shade out weeds. At some sites watering may be needed during a dry summer for the next two or three years.

Planting can be a community event.

Workshop Comments

- **Specimen Trees:** tease out root-bound roots, wash grit off roots so roots spread out and trim the long ones. Blackwoods - Plant small branches in the ground to confuse the hares - they'll eat those, then leave the others alone (Te Kuiti)
- Fertiliser when planting gives natives a good start e.g. Nitrophoska;
- No need for fertiliser at planting unless it's a very bare hill top. Can be too much fertiliser - causes fast growth and splitting. Natives for timber - Use a bamboo stake to help find it again. (Tirau)
- Eucalyptus with N fertiliser (40 grams in spade spit) grow fast.
- **Staking is important:** for conifers/totara - use bamboo to stake and flax to tie, will rot down over time. Need to stake (for ornamental conifers) and fence (3 hot wires); Sheep will even jump up to grab leaves off Robinia. Plant kanuka in clumps - they grow well and won't blow over. (Morrinsville)
- Use dead possum to fertilise. If using fertiliser eggs, place on top of the hole.Tree lucerne - Grow them in a controlled environment (i.e. veggie garden) until over 1-2m. Prune back and then plant out. Found this works much better than planting out small trees/saplings. (Reporoa)

Maintenance

Planting trees is one thing, caring for them after is another. Newly planted trees will grow a lot more quickly if competition from weeds is reduced in the first two to three years. Keep up the pest control and protect the trees from diseases and nutritional deficiencies. Other tasks are pruning, thinning and planting replacements.

Newly planted trees in a well fenced area that had been sprayed to control competition from grass and weeds.

Workshop Comments

- **Pruning shade trees:** Up to 4 m so the sun gets to the grass underneath and stops weeds - shade moves with the sun. Poplars - Prune up when using for shade (shade moves around, prevents camping under the tree). Annual prune for the first 3 yrs. Leave branches on the bottom 2 m of the tree to protect trunk from stock (Te Kuiti)
- Schedule a Farm Forestry Association field day at your place - you'll get your pruning done. Specimens - Lower limbs trimmed. Some leader selection and training e.g. oaks. Remove badly grown branches e.g. double leader. (Tirau)
- **Pines:** prune on time (Te Kuiti). Leave for three years to allow energy reserves to build up, then form prune (Reporoa). It is disastrous to get behind with pruning (may need to get a professional in). Have to start pruning in less than four years time. A light pruning at two years, then every year from then on. (Tirau). tTe advice is usually not to prune for the first four years (many say this is too long), but on the farm situation it must be two years or you get a big knotty core and big limbs.,It's hard work. In this climate the trees grow too fast so you can't leave the pruning too long. Also recommend pruning every year or branches get too big. May need to thin first so there is no unnecessary pruning. (Tirau).
  Cut out any double leaders to ensure a single stem for best results (Tirau)
- **Redwoods and other conifers:** Very little maintenance needed if planted close enough (Te Kuiti)
- **Cypresses:** Prune early up 1 m, but prune outside row as a windbreak - prune tips. Prune all trees up 2 m. Then select final crop trees. Prune up high. Remove the rest for use as firewood, poles etc (Tirau). Important to prune from an early stage to maintain shape. First lot 17 years old dead loss - 2nd go has been better (Tirau)
- **Blackwoods:** Form pruning is needed, not a lift as with pines. Needs a visit every year. Cut off no-hopers and start again. Prune regularly. Pruning and careful tree forming is needed (Tirau). Need lots of pruning. (Morrinsville).
  Ideally prune (corrective) every year (Reporoa).
- **Natives for timber:** Keep the growing tip - if frosts in autumn then can lose the tip and get double/triple leader. Prune for as long as you can reach - get good big barrel trunks even on totara. Nip ends off the sideways-growing branches, but leave leaves on, and talk to it - they grow straight (Tirau)

Weeds and other care

A working bee to remove creeping and climbing weeds from a planted area

The cream flowers of chinese privet identify this pest plant that can take quickly take over an area

Workshop Comments

- Must spray around trees to kill grass etc on a regular basis (3-4 times/yr) - $80/yr + time (3 days/yr). Grass weeds are the worst. Care is needed with Roundup. Mulch, inverted sods and weed mat give safe, effective, early weed control (Tirau)
- Use mulch (e.g. calf house sawdust) to keep weeds down.
- **Natives:** Small shrub trees can be smothered by weeds. Largest ones can survive better - must do follow-up weed control. (Te Kuiti). Totara must be released regularly for 2-4 yrs after planting. Need enough time/$ to release from weeds for three years (Tirau). Keep water on natives until well established Controlling grass around natives - use old carpet, plant bigger trees, use calf sawdust, weedeater, shears to cut grass, plant densely for a canopy, fill in gaps, use a mix of species that spread including Coprosma and five finger. Natives are sensitive to weed killers. (Morrinsville)
- **Eucalyptus:** Weed control essential (Morrinsville). Water the area in summer for three years (Reporoa)
- **Pines:** Sprayed weeds after planting (used Gardoprim) which worked well. Easier to control weeds when planted in a block rather than a row e.g. along a river. must protect from stock. Ensure stock can't reach over or under fence - use an additional temporary electric fence (Tirau).
- **Conifers:** Best to keep the protective fencing wires up, even if the tree is big, because animals rub and chew bark. Can cost a lot to have hedge cutting but benefits out-weigh costs (Morrinsville).
- **Cypresses:** Keeps goats out. Cattle love the bark. Kaka strip the bark. Paulownia - Grow up for two to three years then cut down (coppice). Good new shoots. Specimens - Water / mulching very important in first two years. (Tirau)
- Poplar trees 10-12 yr - resist stock damage. Encourage people to keep records of suppliers, planting dates and maintenance (Te Kuiti)
- How can I be sure the next guy won't cut them down? Blackwoods sucker everywhere and then grow fast. Also coppices, but probably faster to use the suckers. How to stop the stumps forming a mass of stems is a problem. Tree lucerne - Will seed down and grow quickly once the environment is right. Pull out unwanted seedlings and feed to stock. Cut for firewood before it needs splitting. (Reporoa)

seven

What's being planted where?

Below is a table of those trees that workshop participants were growing and doing well on their property. The numbers in the Table indicate how many participants at each workshop were growing the tree.

Scientific name	Common name	Morrinsville	Reporoa	Te Kuiti	Tirau
Acacia				1	
A. dealbata	Silver wattle			1	
A. melanoxylon	Blackwood	3	5	7	6
Eucalyptus			1		
E. botryoides	Southern mahogany			1	
E. delegatensis	White topped stringy bark		1	1	
E. dendromorpha	Budawang ash			1	
E. fastigata	Brown barrel			2	2
E. fraxinoides	White mountain ash		2		
E. globoidea (E. eugenioides)	White stringy bark				1
E. gunnii	Cider gum		1		
E. johnstonii	Yellow gum			1	
E. muellerana	Yellow stringy bark			2	
E. nitens	Shining gum	1	3	8	4
E. pilularis	Blackbutt			1	
E. regnans	Mountain ash	1		6	2
E. saligna	Sydney blue gum	1			
Natives		6		10	
Dacrycarpus dacrydioides	Kahikatea				10
Agathis australis	Kauri				9
Olearia sp.	Olearia				3
Pittosporum sp.	Pittosporum				9
Nothofagus fusca	Red Beech				5
Dacrydium cupressinum	Rimu				9
Podocarpus totara	Totara				9
Pinus	**Pines**				
P. coulteri	Coulter pine	4			
P. radiata	Radiata pine		6	12	8
P. pinea	Umbrella pine		1		
Picea	Spruce		1		
Pseudotsuga menziesii	Douglas fir		4	4	
Populus	**Poplars**	1		3	
P. alba x glandulosa	Yeogi 1		1		
P. yunnanensis	Chinese poplar	1	4	7	2
P.deltoides x yunnanensis	Kawa	1	4	8	3
P. deltoides x nigra	Tasman	1			
P. x euramericana x yunnanensisToa			2		
P. deltoides x nigra	Veronese			1	1

Scientific name	Common name	Morrinsville	Reporoa	Te Kuiti	Tirau
Cupressus					
C. lusitanica	Mexican cypress		2	6	6
C. macrocarpa	Macrocarpa		2	5	5
C. torulosa	Butan cypress		1		
C. leylandii	Leyland cypress			5	2
Taxodium distichum	swamp cypress		1	7	6
Other Conifers					
Cryptomeria japonica	Japanese cedar		1		2
Larix kaempferi	Japanese larch			4	
Abies	Fir		1		
Larix	larch		3		3
Sequoia sempervirens	Redwood		3	6	6
Calocedrus decurrens	Incense cedar	2	1		
Cedrus atlantica	Atlas cedar				
Cedrus deodara	Himalayan cedar				
Thuja plicata	Western red cedar			5	
Exotic Specimen trees					
Alnus	Alders	2		8	8
A. cordata	Italian alder	3			
A. glutinosa	Black alder	3			
Betula	Birch		5		
Juglans nigra	Black Wallnut	1		5	
Prunus cerasus	Cherry		3	2	2
Castanea sativa	Chestnut				5
Gleditsia triacanthos	Honey locust	1		4	1
Liquidambar styraciflua	sweetgum		4	4	
Acer	Maples		3	4	
Quercus robur	English oak	4	5	9	8
Paulownia tomentosa	Princess tree			10	1
Platanus acerifolia	London plane tree		5	5	7
Robinia pseudoacacia	Black locust				2
Acer pseudoplatanus	Sycamore		3		
Juglans regia	Wallnut	2			8
Other					
Chamaecytisus palmensis	Tree Lucerne		2	1	
Salix	Willow	1	4	6	
Chamaecyparis lawsoniana	Lawson Cypress			3	
Cryptomeria japonica	Japanese cedar	1			