

Designing and Planting for Trees for Bees

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Dr Angus McPherson
Trees for Bees Farm Planting Advisor

Designing and Planting for Trees for Bees

1. Why Plant Trees for Bees
2. Where to Plant
3. How to Plant

Why Plant Trees for Bees

- On-farm planting includes:-
 - Stock shade and shelter
 - Land stabilisation
 - Riparian and wetland protection
 - Tree crops (timber, fruit, nuts, honey)
 - Amenity
 - Native bush protection and enhancement

Why Plant Trees for Bees

- Bee nutrition
- On-farm pollination
- Sustainability, biodiversity, environmental services
- Focus on farmer/landowner perspective
- Challenge is to incorporate bee feed into on-farm planting

Why Plant Trees for Bees

“Providing bee forage as part of your on-farm planting just makes good farming sense.”

Where to Plant Trees for Bees

- Unproductive Land
 - e.g. gullies, bluffs, steep/shady slopes, wet & weedy land
- Paddock corners & fence lines
- Shelterbelts & hedgerows
- Stream/pond/wetland margins
- Stock lanes & avenues, farm entrances
- Individual specimens
 - e.g. paddocks, stock yards
- Road/rail verges
- Gardens
 - e.g. orchards, old homestead sites, flower & vegetable gardens
- Remnant native bush
- Ground cover where fencing off for planting

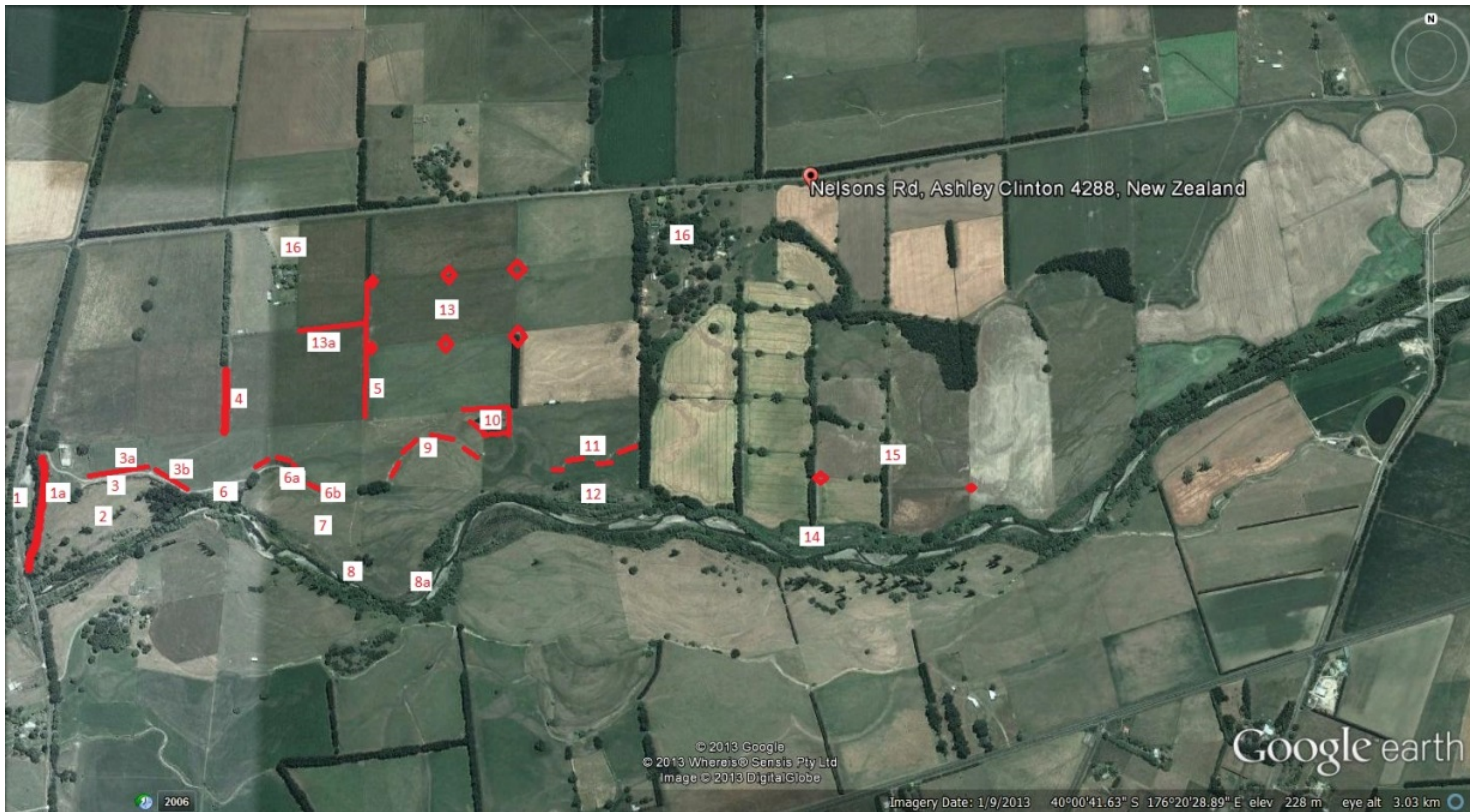
How to Plant for Trees for Bees – Critical Factors

- Planning
 - Objectives, flowering calendar, soils/climate, site selection, plant selection (species, grade), layout/spacing
- Site preparation
 - Fencing, weed control, pest control, cultivation, irrigation
- Plant protection
 - Pests & stock – pest control, tree guards, fencing
 - Weeds – pre-plant, spot spray, mulch, ground cover
- Watering
 - Existing irrigation, water courses, K-line, sprinkler, drench container
- Maintenance
 - Pest control, weed control, watering

Some Aspects to Consider

- Space available for planting
- How planting fits in with existing land use
- Time, money and labour available
- Stage phases of planting over time – only plant what you can manage, including ongoing maintenance
- How quickly you want the plants to start flowering
- Don't overcrowd – let the plants grow into the space for their mature size

Kintail Farm, Hawkes Bay



Apiarists & honey producers

Queen raising

Farm leased to sheep & beef farmer

Existing shade, shelter and specimen trees

Potential loss of feed along river margin (gorse & willows)

Planting plan identifies a range of sites for different purposes:-

Replacement shelterbelts to incorporate bee feed species

Paddock shade and shelter

Queen raising site bee feed, shade and shelter

Protect trees from stock

Strong westerly winds

Summer drought

The following slides illustrate some of these sites

Queen raising site with specimen trees



Existing shade and shelter from pines and poplars.

Cattle graze site so heavy duty tree guard required.

Selection of deciduous large-grade bee feed trees to give further shade and shelter for both bees and stock.

Avenue



Adjacent to Queen raising site & track forms part of farm ring road.

Area fenced off to provide for an attractive avenue which doubles as bee feed.

Large grade Manna ash (*Fraxinus ornus*) planted as avenue species, which will be underplanted with lavender.

Because Manna ash were large grade trees, they are supported by standards for stability.

Stumps in background from old macrocarpa shelterbelt, replanted in totara and will have underplanting of bee feed shrubs.

Tree Guard



Example of tree guard and standards/waratahs used for stability.

Because the area is fenced off from stock there is no need for additional protection.

Note black pipe protruding from ground adjacent to the trees. This is 50mm diameter Novaflow™ which is cut to about 30-40cm length and placed in either side of the planting hole so that if watering is required, it is delivered deeper into the roots. This minimises wastage and encourages roots to go deeper. It is placed both sides of the tree so that you can alternate sides when watering to encourage even root development. Alternatively 50-60mm diameter polythene pipe with holes drilled through it can be used.

Diagram also enclosed which explains this.

Tree Guards



Further examples of tree guards.

LHS makes use of concrete reinforcing steel to exclude stock (diagram also attached). The end pieces of steel can be folded out to keep stock back. If wired to waratahs, the height off the ground can be raised so that stock can graze the grass around the tree without damaging the tree itself.

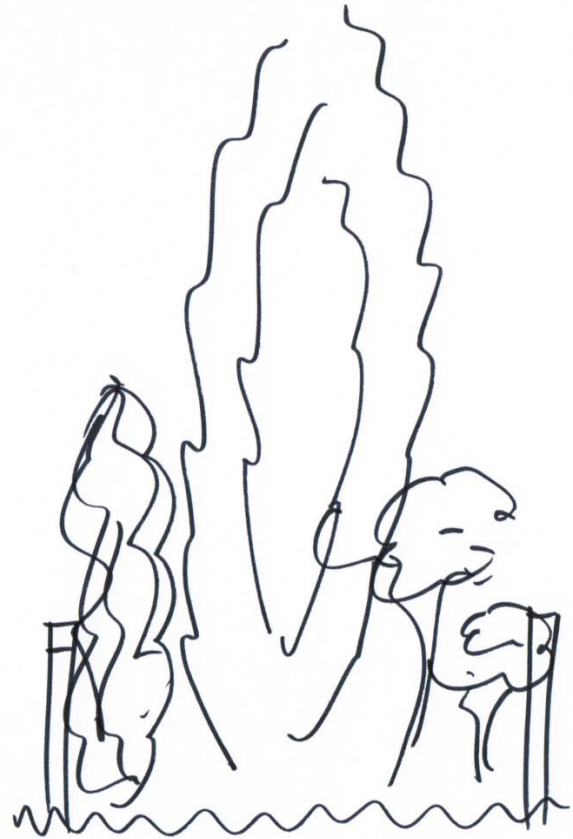
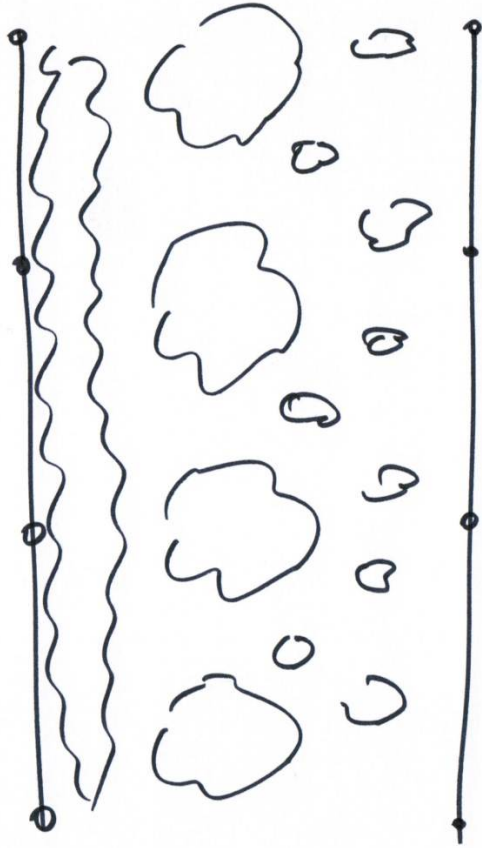
RHS is chicken mesh to keep rabbits/hares away from trees.

River Margin



Example of river margin issues – loss of weed species and erosion of river banks. Requires innovative use of non-invasive flowering bee feed species.

Shelterbelt



Example of 3-tier shelterbelt to replace conventional pine/macrocarpa shelter.

Requires double fencing 5-8m apart, depending on density of shelter and size of trees used.

Uses evergreen hedge species for windward side, taller deciduous shelter in the middle to break the wind flow over the hedging, and heavy flowering shrub species on the leeward side. All species can be bee feed.

Escarpment



Track through escarpment – unproductive land for grazing.

Both sides of track and escarpment fenced, and bee feed species planted.

Queen raising site in background left.

Hoheria flowering in first year



Adjacent to escarpment.

Another queen raising area that requires shade and shelter, in this case using native species. Shown is the substantial tree guard required to keep cattle at bay.

The tree is a large grade *Hoheria populnea*. Planted in September 2013, it was flowering in March 2014.

The decision as to what grade of tree to plant will depend on a number of factors, & in this case the use of a large grade tree is worthwhile.

Callaghan Farm, Mid Canterbury Shelterbelt



Sheep and Beef farm

Hive wintering

Queen raising

Existing on-farm planting

Hard climate – snow, early & late frosts, summer drought, strong winds.

Site shown is a variation of the 3-tier shelterbelt. Existing shelter is on the farm side of the watercourse with poplars and some gorse.

This side of the watercourse will be planted in a mix of large tree species (e.g. oaks, maples, ash), with an understory of medium size trees and shrub species – all bee feed. Ground cover will also be planted to compete with the grasses.

Trees are spaced widely enough to allow them to grow full canopies to maximise flowering area.

Callaghan Farm - Native riparian planting



Riparian strip planted in native species.

Mix of canopy, sub-canopy and understory species planted at 650-700 sph, with ground cover provided by sedges and tussock grass.

Small grade plants used to reduce cost, and although planted late (November 2013) and with a dry summer, by March 2014 there was over 90% survival and most plants had more than doubled in size.

Use of combi-guards important here to (1) protect new plants from hares and rabbits, & (2) protect plants from spray drift for weed control.

Road margin



Drain adjacent to road to be planted with low growing bee feed shrubs.

On road side of fence a hedge of manuka to be planted, to provide some shelter and reduce the need for road margin mowing.

Gisborne Hill Country – Shelter



Issue of high country shelter and lack of pollinators for clover due to loss of feral hives to varroa & apiarist interest elsewhere.

Opportunity to use shelter that provides bee feed.

Much of the hill country has significant native remnants that can be built into the framework.

Focus here on diversifying summer feed to keep honey bees healthy, but also year-round feed sources for native bees and bumble bees.

Existing shelter



Example of old shelter.

At some point this requires removal and replacement.

Unless you are on easy ground near to a log market, this will be an expensive exercise.

What to replace it with? Do you want to create a similar liability for farmers in 40-60+ years?

Alternative is to use mixed native bee feed species.

Gullies



Wet gully bottoms are dangerous to stock.

Fence off, plant with bee feed and turn a liability into an asset.

Steep faces



Unproductive.

Fence off and plant in bee feed – again a liability becomes an asset.

River margin



Lower in farm near potential hive wintering sites.

River margin already fenced off to exclude stock and currently growing rank grass.

Native species in adjacent area winter flowering, so replicate.

Fence lines & corners



Dead fence corners offer an easy solution for fencing off to create stock proof bee feed areas.

Remnant bush



Remnant bush does not always require enrichment planting.

In this case, the use of bait stations to control possums and rats, along with baits for wasps, will significantly improve plant growth and flowering, which will benefit both bees and birds.

SI High Country – yards



Holding paddock adjacent to woolshed has existing mature shade and shelter.

Wet paddock drained, with drains fenced off – planted with shade/shelter/bee feed species one side of the drain while enabling digger access to maintain drains on the other side.

Paddock corners & orchard



End of drain creates unusable corner. Plant in orchard, using some of quarantine paddock behind if required.

Unproductive corner lower RHS planted in specimen trees which will also provide bee feed.

Avenue & pond



RHS show wetland at end of avenue planted in bee feed specimens.

Slash pile in centre is old willows and poplars – replaced by pond to drain wet area and plant margin in amenity and bee feed species.

Farm entrance



Previous farm entrance adjacent main road unproductive and unsightly.

Area cleared and planted with specimen trees that provide bee feed, and entrance avenue to farm.

Irrigation



Use of drench containers for watering trees.

Arable Shelter



From first demonstration farms.

Focus on fast initial growth, high survival and early flowering.

Used higher initial stocking and cuttings, which are physiologically older and flower earlier.

High survival rates and early flowering. Plants becoming crowded in some cases and will need some removed.

Higher cost option, but choice of option depends on requirements.

Dairy shelterbelt



Clover-based pasture system.

Former double-row shelterbelt of pines and fir/cedar.

Pines removed and fir/cedar topped at 3m for pivot.

Area of pines to be replanted in bee feed shrub species that will require minimal topping under pivots.

Unproductive land – hive wintering site



Stream margin, not included in productive paddock area.

Fenced 3 sides with good access.

Plant mix of shelter species, and late summer through to late spring feed for hive wintering site.

Unproductive land – wet & weedy



Fenced off as too wet to develop.

Near to wintering site.

Existing native shrub species.

Interplant with native bee feed species.

Paddock corner & pond



Dangerous to stock.

Minimal fencing required.

Plant with amenity/bee feed species.

Unproductive land – bee feed for wintering



Boundary of farm difficult to fence due to moving ground.

Shifted effective boundary fence to stable ground on top of escarpment.

Slope planted with mix of native and exotic winter to spring bee feed species.

Wet gullies and lower ground planted in willows for stabilisation and bee feed.

Remnant native bush



Adjacent to farm entrance and QEII bush.

Wet and unattractive area cleared and planted with mixed native species endemic to area, including bee feed species.

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