

The NZ Farm Pole Nursery Guide

Part 1 – Planning

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THE NEW ZEALAND
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Introduction

Pole planting is a quick and effective way of establishing trees in the presence of livestock, especially cattle. Poplars and willows are fast growing species with the essential trait of being able to root from semi-mature wood, but poles need to be straight and of sufficient size for planting amongst livestock - see *Figure 1*.

With the current nation-wide shortage of poplar and willow pole material, many landowners are showing interest in growing poles on farm for erosion control plantings. Developing and running a stool (coppicing stump) nursery, even at limited scale, requires resourcing, management and above all, time.

A well-managed farm nursery will require input, but will produce the quantity and quality of poles required for an annual planting programme. This guide outlines the actions and resources involved in developing and operating farm pole nurseries, to assist landowners wanting to produce a regular supply of suitable poles. The NZ Farm Pole Nursery Guide is in four parts: Part 1 of the Guide focuses on the planning and site selection required for establishing an on-farm nursery. Part 2 details management required for producing 3 m A grade poles and should be read in conjunction with Part 3, the Annual Calendar of nursery management activity. Part 4 is a reference section for the identification and control of pest and disease issues which can affect pole nursery production.



Figure 1. 3m poles of 'Tangoio' willow, showing difference between fully managed A grade stem on left and unmanaged material on right

1. Planning

1.1 Pole requirements, numbers and grade

How many poles do you need each year?

This will depend on areas of the farm that are at risk of erosion and annual capacity for pole planting. Unless cattle are fully excluded from planting sites, 3 m 'A' grade poles will be required, with a 55-70mm butt end 2 NZ Farm Pole Nursery Guide Part 1 – Planning diameter and a straight stem to assist pole driving. Lighter 'B' grade poles with a 40-50mm butt diameter can be used where cattle are temporarily excluded for 1 – 2 years.

For erosion control, trees are best planted in anticipation of erosion, rather than heavily planting recent slip sites. This is a natural reaction but does little to address future erosion on adjacent slopes, while high planting densities (5 -7m spacings) use up a lot of poles and contribute to regional shortages. Instead,

plan ahead and work with your experienced local Regional Council staff to identify erosion susceptible terrain and aim for best utilisation of poles: 50-70 per ha or around 12m - 15m spacing on average for potential slip erosion, 10m - 12m spacings for gully control or 8m - 10m spacing for pair planting along eroding watercourses in deep V-shaped gullies.

Avoid planting on ridgelines and spurs, and identify appropriate sites for poles in swales or along local surface drainage patterns for optimum summer soil moisture. Upper slopes with shallow soils, especially if north-west facing, are poor sites for unrooted planting material and can be addressed with other planting options. Choice of poplar and willow varieties is addressed in Section 1 of Part 2 NZ Farm Pole Nursery Guide.



Figure 2. Gully pole planting 10 m - 12m



Figure 3. Slope planting 12 m - 15m

After assessing pole numbers based on planting areas and priority, annual pole numbers can then be determined in accordance with resources required for planting. Excluding pointing (if necessary) and transport from holding area to planting site, pole planting rates will generally vary from 10-12 per person per hour, including layout for correct siting and spacing. Planters should be experienced with the chosen planting method and equipment, and be coordinated so

that layout out of poles, distribution of protector sleeves and planting are continuous. The ideal planting crew size is 4-5 people, and the minimum recommended number is two, although productivity tends to drop with fewer people and the planting rate may be more like 8-10 per hour. For most properties an annual planting of 100-200 3m A grade poles is readily achievable, while 300-500 is feasible for larger properties with sufficient labour resources.

1.2 Pole Nursery Establishment Checklist

While site selection, layout and size are dealt with in more detail in Sections 2 - 4 below, the following checklist outlines activities that will need to be considered in the planning stage, with resources and budget allocated as required.

- **Earthworks** - as required to form or upgrade track access, or for drainage purposes, and also trenching if applicable for irrigation lines. Where excavation may take place remember to plan for cable location checks in road-side paddocks or other likely sites.
- **Fencing** - upgrade or construction of new fences to ensure the nursery site will be fully stockproof at all times. All-electric fencing is not recommended.
- **Site preparation** - this would include clearing vegetation and tree stumps, or other obstructions such as soil stockpiles. If the site has a cultivation pan, deep ripping will be required, to a depth below the compaction layer.
- **Cutting supply** - cutting material will be available when pole nurseries are harvesting poles from June to August each year. Identify your nearest supplier to arrange for ready-made cuttings, or wand material to make your own cuttings. Cuttings can be held in fresh water, and should be planted within three weeks.
- **Planting & Establishment** - planting of cuttings should be completed by mid-August and is relatively quick if sites have been prepared and more than one labour unit is available. Weed control will be required late September/ early October, and will need to be repeated 2-3 times throughout the growing season. Poplar rust spraying may be required at three-weekly intervals through summer to early autumn. Rabbits and hares will need to be controlled to prevent browsing on new cuttings.

1.3 Annual work plan

Planting and establishment, and annual crop management call for specific timing of a range of activities. A calendar of annual nursery works can be found Part 3 of the NZ Farm Pole Nursery Guide. This provides a 12-month schedule indicating seasonal labour and equipment requirements, and annual labour hours will depend on scale of operation.

How many poles will I need per year?

Is there a suitable site available?

Have I got the time to do a good job?

2. Site Selection

Size of site will be determined by numbers of poles required and layout – see Section 3 below. Sites with good cropping soils are preferred. Sandy loam to silt loam soil textures are suitable, while sandy or stony soils are likely to require irrigation, especially for cutting establishment. Heavy silt or clay soils are likely to have management issues such as cultivation limits, poor winter access and constrained crop performance because of lack of soil aeration and drainage. The effective root depth for a pole crop is around 800mm, so dig soil pits to assess the soil texture profile and check for limitations such as a pan or a river gravel layer, which may require additional management.

During the winter harvest season, loading and transport of poles will require access for medium to heavy vehicles, so nursery sites are best located near existing tracks or on suitably stable terrain. Low terraces adjacent streams subject to flooding are not preferred because of damage from flood debris and seasonal access issues.

In addition to the crop area, headland areas 5 – 7m wide are recommended for the grading and trimming of pole material as it is extracted for rows. Piles of slash will accumulate so sufficient space, or regular removal, will be required to allow continuous access. A holding area for poles will also be required. This could be within the nursery footprint, or an adjacent site such as a stream bank with vehicle access. Until planting, poles can be held with butts in fresh water or in bundles under sprinklers. Bundled poles can be handled with frontend loader forks, so a set down area for this purpose should have sufficient manoeuvring space and a stable, heavy traffic surface, with bundles piled on bearers to allow fork access underneath.

Sites that are vulnerable to strong winds in spring /early summer will need shelter on the windward aspect to prevent damage to first season growth on stools after each harvest. Horticultural shelter species like Casuarina and Italian Alder are suitable, and benefit from periodic trimming. Pruning 0.5m – 1.0m at the base of shelter trees wind will encourage air flow under the pole crop and help to control potential disease issues like poplar rust, depending on variety being grown.



Figure 4. Stony sites will require irrigation for new cuttings



Figure 5. Allow gaps for access/handling areas in block layouts (see below)

What are my soils like?

Will I need irrigation?

Have I got a large enough area for headland areas for grading, slash and vehicles?

Can I access the area in all weather?

3. Layout

For farm pole nursery production, two basic layouts for stool beds are described below. Layouts are per rotation (see below) , and can be configured to suit site dimensions. Consider the options below and consult with experienced Land Management staff from your local Regional Council to assist with planning a layout.

3.1 Block Layout

Where landowners are growing for their own on-farm use this option provides a small-scale layout with potential to produce 150-250 3m A grade poles. To achieve around 300 stools will be required, representing a planted area approximately 16m x 20m, at 1.0 m x 1.0 m centres. Allowance should also be made for access and handling at harvest. At an 8m interval across the block a gap can be left for a 3 - 4m wide access lane, and along the block at a 10m interval and 4m - 5m gap can be left as a handling area – see Figure 5 above.

With this type of layout all crop management is manual e.g. knapsack weed & grass spraying. Vehicle access is limited, and headland space around the margins of the block provides working areas where harvested stems are manually hauled out to be trimmed and cut to length.

3.2 Row Layout

Where landowners have high demand for on-farm use (c. 500 poles) and may be interested in producing some extra poles for sale, this option allows for scaled up production and use of mechanisation. With potential to produce 700-800 3m A grade poles, up to 1000 stools can be established in an area 25 m x 85 m, as rows 3.0 m apart and stools at 0.7 m spacing within rows. The 3.0 m spacing between rows allows work to be mechanised, such as boom spraying for weed control, mowing grass and use of small trailers to extract poles at harvest. Slash can be left in rows and mulched if suitable equipment is available, otherwise cut stems can be moved in bulk to headlands or separate working areas outside of the stool bed area. Where possible, orientate rows on a north-south axis as much as possible for more even distribution of sunlight.

Another option is to use a double row layout with twin rows 1.0 m apart and a 4.0 m spacing between each set of double rows. This allows for 20% more stools on a per ha basis, but is not recommended for farm nurseries because inter-stool competition tends to induce more variation in crop performance and give a lower percentage yield of 3 m A grade poles. Generally there is more site preparation involved, more selective management of thinning and pruning is required , and there are extra labour demands for activities such as weed control.



Figure 6. Block layout at harvest.
Note slash in working area in foreground



Figure 7. Row layout: rows are boom sprayed for weed control and grassed alleyways are mown

Based on the poles needed annually, what layout system works best for my resources and location and size of area?

When planning nursery areas, don't forget to allow for headlands, vehicle manoeuvring and winter access.

4. Rotation

In an intensively managed pole nursery it is possible to produce 3 m A grade poles on a two-year rotation. However this requires carefully selection of variety and a good site with a high level of crop management (including irrigation), so for most farm nurseries a three-year rotation is more realistic. On some sites, or where limited crop management is applied, a four-year rotation may be necessary to produce 3 m A grade poles.

For a continuous annual harvest of poles on a three-year rotation, three separate stool beds will be required, planted in succession over three years. Selective harvest in stool beds, leaving material to grown-on for another season, is not recommended. This results in a mixed-age crop which causes suppression of new growth and leads to declining yields of 3 m A grade poles over time.

More Information:

NZ Farm Pole Nursery Guide

Part 2 – Management

NZ Farm Pole Nursery Guide

Part 3 – Annual Work Plan

NZ Farm Pole Nursery Guide

Part 4 – Disease and Pests

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