

## KCRC Pilot farms project one - Establishing low-cost forest grade native seedlings

March 2022

Currently native tree establishment costs are around \$20,000 per hectare, this is massively prohibitive especially recognising the current incentivisation for planting pines to generate significant (and rapidly escalating) income from carbon credits/offsets. KCRC are interested in options to facilitate the more cost-effective establishment of natives.

KCRC have purchased \$10,000 worth of mixed forest grade plants to be distributed throughout the SCGs to interested farmers. Whilst this approach has been utilised in BOP (John Burke et al) KCRC are not aware of it having been trialled/practiced in the King Country.

MPI Pilot farm project funding will be utilised for the support, monitoring, analysis and communication/extension. Farmers will be supported through the process. Annual Field days will be held for local groups to attend and discuss the success and learnings. Success will be measured by plant survival, increased biodiversity and over time, where appropriate, the value or income derived from the land when it was grazed versus when it was retired and planted.

Plants will be supplied for a requested area to be planted at a recommended rate of up to 2500 stems per hectare. Farmers will determine the area they wish to plant however it is likely they will need to do at least a minimum of 500 plants (0.2 hectare).

Farms are responsible for the completion (and costs) of site preparation/spraying, releasing, follow-up, and weed and pest control.

The delivered plants will be pre-mixed, as listed in table below, and supplied in cardboard boxes (100 plants per box), the same as those for pine trees to be planted by forestry workers. See photos on Page 2.

KCRC will work with landowners to time delivery with commencement of planting. When they arrive, plants need to be stored in a shady cool spot where they should be fine for at least a week before planting. For larger areas it is recommended you should engage a forestry planting gang; these teams of say 10 can plant 8-10000 stems (3-4ha) per day. KCRC will work with Mark Barrowcliffe (Barrowcliffe Shearing) to upskill a planting gang if landowners indicate an interest this.

Name	flowering time	% of total
Kanuka	Sep-Feb	10
Manuka	Oct-Dec	40
Kohuhu	Oct-Nov	4
Tarata (Lemonwood)	Oct-Dec	4
Harakeke (Flax)	Nov-Dec	4
Ti kouka (cabbage tree)	Oct-Dec	4
Whauwhaupaku (Five finger)	Jun-Aug	4
Makomako	Oct-Nov	10
Karamu	July-Nov	10
Mahoe	Nov-Dec	10
	<b>Total &gt;&gt;&gt;&gt;&gt;</b>	<b>100</b>



Key requirements for pre and post planting management are:

1. Weed Control: Get all invasive weeds under control prior to planting. In a very weedy site this may take 1-2yrs/2 to 3 passes. To ensure good plant establishment make sure planting does not occur inside chemical withholding periods.
2. Pest Control: Get all animal pests (deer, goats, hares, rabbits) down to low numbers prior to planting.
3. Pre-plant Spot spay: Pre-spray the spots where the plants are to be placed using round-up. A residual herbicide could be added to the mix but there is a risk of over application which will affect plant establishment. The roundup spot spray should be applied 6 weeks prior to planting i.e if planting in mid-August spray at the end of June
4. Planting: Plant at 2,500 stems per ha which equates at 2m spacings. Planting times can span from July to September on regular rainfall sites. Planting too early (say June) does not appear to provide any advantage as plant growth is minimal due to low soil temperatures.
5. Release: An option is to do a chemical release around November if the plants are being smothered by grass/weeds. In most cases this should not be necessary if the correct preparation has been taken in 1 & 3 above. With a chemical release there is also the risk of plant/soil biome damage which will retard plant growth. Consider a hand release in summer if there are specific areas of concern.
6. Follow-up Weed control: Stay on top of weed reinvasion during the first 3 years after which there should not be too much of a problem as the plants gain closure

Example and information provided by John & Rick Burke of Pukekauri Farm. Kati Kati:

We have been progressively retiring land since 1998.

Some of our earlier riparian plantings, although subsidised by BOPRC, cost well over \$20,000 per ha. This was due to both the cost of more expensive PB2 to PB5 plants and excessive plant density (8,000 to 10,000 stems per ha).

The end result 10-12 years later is not ideal with overplanting causing competition and shading which has progressively led to plant dieback with poor birdlife and little natural regeneration.

Worst of all we have bare soil exposed under the plants which is causing erosion into the stream.

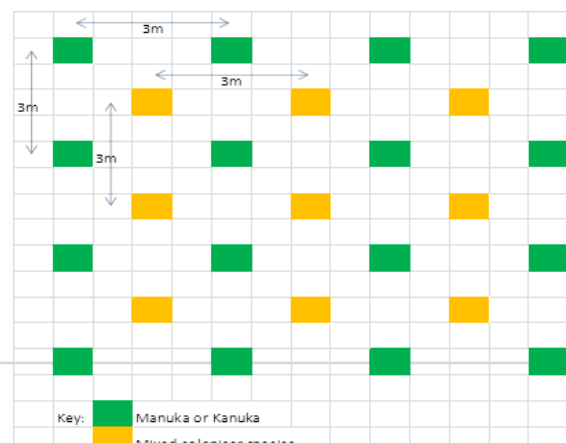
In the last 5 years we have focussed on critical source areas and have created 8 wetlands. On the apron areas we have used 100% Manuka as a coloniser species planted at 3\*3m (1,100 stems per ha) layering in other coloniser plants such as Karamu, Mahoe and Makomako after 3 years and then 2<sup>nd</sup> and 3<sup>rd</sup> tier species (e.g. Rewarewa, Kamahi, Puriri, Kahikatea, Pukatea, Rimu, Kauri) when the colonisers reach above 2m in height.

This approach has achieved a significant reduction in cost and we believe a much better long-term outcome.

This year we have retired a further 14ha of class 7 land (300m asl). In order to reduce costs further we are trialling the planting of both forestry grade Manuka/Kanuka as well as the coloniser species mix KCRC are accessing.

This concept is simply an extension to what was identified as Manuka plantation best practice establishment under a Manuka Research Partnership PGP project. The project included successful planting trials undertaken on various sites around NZ applying low-cost forestry establishment methods overseen by experienced forestry consultants Barry Poole and Stef Kincheff.

The process has been to firstly plant the 50% Manuka/Kanuka at as per the 3\*3m grid then plant





*guilty of encouraging land owners to plant at higher densities to suppress weed regrowth – over-planting exponentially increases cost and results in a poor long-term outcome.*

*4. For larger retirement areas, consider using “forestry grade” plants which are about the size of a pine seedling and can be efficiently planted by forestry workers at low cost. This grade of plant is only available from specific nurseries.*

*5. Avoid doing a release spray. Plants are better off protected during the summer from grass/annual weed regrowth. If concerned - do a hand release*

*6. Introduce groves of suitably placed 2<sup>nd</sup> and 3<sup>rd</sup> tier tree species in 3-5 years when coloniser canopy is well established. This will provide perfect habitat for the bigger trees to grow through. More importantly, allowing time for the coloniser species to establish will have a beneficial effect on the soil biome (note pasture-based soils tend to be bacterial dominant whereas forest/ngahere based soils are fungal dominant).*

*Rick & John have invited those interested to travel over to BOP and meet with them and visit the sites in person. KCRC will look to organise a trip in March/April 2022 if there is interest.*