

Lets' not re-invent the wheel: simple tools for a tree nursery[©]

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INTRODUCTION

My talk is about some simple tools or solutions to everyday jobs that we use with our business. These are used in combination with other techniques to grow our crops and are in themselves not complicated. They are easy to make, and may save yourself a bit of time, or ease the task by making it a little easier on yourself and your body.

Marie and I operate our small nursery, The Tree Farm, here in the Waimea Plains in Nelson. We grow mainly deciduous trees and shrubs and a small amount of natives mainly in open ground seed beds. The total area we use is less than a hectare, and our production numbers are small. The range of items we grow is mainly 1- or 2-year-old trees or shrubs, through to topiary and budded or grafted lines.

The aspects that I will discuss are in the broad categories of:

- A tool frame for working over raised seedbeds.
- Transplanting equipment – a simple tool for transplanting plants into plugs.
- Weed control – soil solarization – a simple technique for weed control prior to planting.

Tool frame

We grow 95% our crops in the open ground, and the daily routine involves a lot of bending or kneeling to tend to our crops at ground level. The plants are grown in raised seed beds and we take a lot of care to not stand or compact the seed bed in any way during the process of growing any crop.

As an apprentice, Eric Appleton the founder of Appleton's Tree Nursery in Nelson, explained to me on my 1st week of work that "You need to treat a seedbed the same way as your wedding bed... You keep your boots off them!!" After being a little bemused at this statement, I really like the message behind it. First being, that we have an underlying respect for the soil that we grow our crops in. And secondly, we also have respect for the plants that we are growing. With this in mind, when we had the opportunity to develop our own business, I have been able to make a simple tool frame for ourselves that has made life easier.



Figure 1. Tool frame with height adjustable seat.

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The tool frame has made daily tasks such as transplanting, weeding, and thinning a breeze. In terms of transplanting seedlings or plug grown plants we are able to transplant 300 to 400 plants per hour, which for our scale of business is appropriate.



Figure 2. Thinning seedlings using the tool frame.

Now I realise this is at the low end of the technology scale, but still if you need to transplant, sow, thin, weed, and you need to physically get your body low to the ground – or in our case, just over the top of the seed bed, then this makes life a lot easier. If you have had a previous career shearing or crutching sheep then no problem – you can probably get around like a bent fish hook all day, no trouble at all. But if you are like me – 185 cm or 6 ft 1 in. in height, and you have a day or two or three transplanting, thinning or weeding in front of you, then this tool frame means getting dressed the following morning is a breeze. You don't need to lasso your socks on the next day!!

The tool frame is made from recycled 26-in. bicycle wheels and pipe steel. It is height adjustable from 150 mm above the seedbed to up to 400 mm above the seed bed. We can simply hook bins on it to hold transplants or weeds, and the frame is easily pushed up and down the seed row when sitting on the seat, which is a plank of timber.

TRANSPLANTING EQUIPMENT – BARE ROOTED PLANTS TO PLUGS

Open ground production means we broadcast seeds on a seed bed. After germination if thinning is needed, we have the potential to save thinned seedlings and transplant these into plug cells. These can be grown on and lined out for alternative uses for ourselves. Plug technology is well known and used in a range of ways in the industry; this simple template allows us to get the seedlings transplanted into a cell easily, without the hassle of other cells filling with potting mix.



Figure 3. Plug transplanter with BCC 81 Plug Tray.

The Plug transplanter is placed on the tray of cells. Each adjoining cell is presented as an empty cell by means of a sliding shutter. The seedling is placed inside the cell and potting mix is filled around the seedling, while the transplanter keeps the potting mix from filling the other surrounding cells. Once this is finished, slide the shutter to the next cell and repeat.



Figure 4. Planting cuttings.

As a row of cells is completed, pull the transplanter back on row of cells and repeat. The cells we use are BCC81s or Lannen 63s, but you could make this to fit any cell tray.



Figure 5. Side view of transplanter.

The plug transplanter is made out of light tin, 6-mm steel rod (which the sliding panel slides along) a pair of tin snips and a pair of pliers, drill, and a vice or clamps to bend tin with. It is easily made in ½ an hour or so and easily used by left or right handed people. With the use of this tool, we are able to transplant 1500 to 2000 seedlings to plug trays per person each day, which again for our level of production is acceptable.

SOIL SOLARIZATION – SOLAR POWERED WEED CONTROL

The land we lease is quite a weedy block of land, previously used to grow vegetables and pasture for livestock. We add 2 m³ of composted bark each season to each of the seed beds which are 50 m long by 1 m wide. The compost is in turn rotary hoed into the seedbed as it is formed prior to seed sowing and this application helps greatly with soil structure and makes for a more friable soil longer term. As a rule of thumb, when we are sowing our spring crops we generally have a period of 7 to 10 days after forming the seedbed to the first

germination of weed seeds. Weeds that we need to control include fathen, amaranthus, dock, mallow, clover, and dandelion. These in turn can match the germination of seed crops that we have planted. Crops such as *Robinia pseudoacacia* or *Pyrus calleryana* can easily germinate in conjunction with the weed seed crop, and then the dilemma is what course of action to take, to rescue the potential seedling tree crop. Mechanical weeding can be destructive to the seedlings, contact herbicides can be the same, and hand weeding although it can be thorough – does take time.

We have experimented with soil solarization for a couple of seasons, and it has proved to be a very good tool to have in our spring sowing tool box as the results have been impressive.

The seedbeds are formed as we would normally; they are then irrigated to field capacity. The seedbeds are covered with a light weight clear plastic and weighted down every few meters or so, to stop it blowing away.



Figure 6. Clear plastic on seedbeds.

The resulting temperature gain underneath the plastic rises very quickly to 50 to 60°C in our early summer days. With the plastic on the seedbed for 10 days or so, we remove, and sow our tree crops into the seed bed. The results to date have been very good, and although we still need to go and hand weed through our tree crop to take out the occasional weed, 90% of the weed crop is fried off by the heat generated underneath the plastic.



Figure 7. Left row: untreated seedbed; middle seedbed: germinating *Robinia pseudoacacia* with minor weed germination.

Now this is nothing new in terms of technique. The University of California has done a lot of research work in the past with this and my understanding is they are looking at it again with regard to strawberry production. The research recommends keeping the plastic cover on for 6 weeks. Our 10-day cycle would seem to be too short in theory, but the practice has given us good results to date. Fathen, amaranthus, dock, and mallow weeds were almost completely taken out by the 10-day roasting, Clover did still germinate in lesser amounts, and dandelion seed blew in from neighbouring fields during the summer, and germinated in the alleyways.



Figure 8. *Robinia pseudoacacia* at the end of growing season.

The resulting tree crops required only minimal amounts of hand weeding. It is a very simple and cheap technique to use and we can capture and utilise the sun's rays for the price of reusable plastic – that is money for jam!! We can roll out the plastic with a simple cloth unwinder, and wind the plastic up again with our cloth winder, that we use for our artificial crop covers.

SUMMARY

These tools haven't been expensive or complicated to make or use. As one of my previous employers used to say – "There is always a simple solution to all problems we face," and another former boss was fond of saying – "Let's not re-invent the wheel, somebody already has!!"

I hope some of these simple solutions that we use are able to solve some or your own production problems.

