

ROOT RESTRICTION IN CHERRY TREES

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Root restriction, or bonsai in Japan, was developed over 1000 years ago in Japan. It enabled the enjoyment of the shape and form of trees in small spaces. Some examples of bonsai trees are over 800 years old. It was used for conifers, maples, chestnuts and acers, rather than fruit trees, as large fruit on small trees looked incongruous.

Now root restriction for smaller tree size is being applied to horticultural crops for some fundamental reasons:

Growers control the orchard rather than the other way round.

Higher sustainable returns per hectare, with the option of leasing land rather than owning.

Lower cost of protective structure against birds, wind and frost.

The option of moving the trees to a new location.

Fred Field is a horticultural consultant in Oamaru, with a nursery, who has been advising people on how to set up cherry orchards under cover on small land holdings.

He makes and sells bags from Polypropylene, called Growe bags. The most common size is 10 litres, which results in about 100 litres of tree canopy. Root restriction produces that 10 to one relationship, plus a correlation between the diameter of the bag and root ball, with the canopy diameter. Thus a long thin bag will result in a thin tree. Fred believes about 150 people have started orchards using Growe bags, which control the woodstock while encouraging fruit production. Fred claims fruitfulness is inversely proportional to the size of the bag, so that root restriction actually increases fruit yields.

Most bag orchards are above ground, requiring some sort of running wires to which the trunks of the trees are attached, to prevent blowing or falling over.

The small orchards are covered with shade cloth to protect from birds, hail and frost. The plants also become more compact, with the internodes shorter and the leaves smaller.

That means they stay at workable height, without the need for ladders or hoists.

Surprisingly, Fred does not recommend irrigation or fertilisation, because he says the plant will regulate its own development to the available nutrients and rainfall.

“Plants in the right environment will photosynthesise all their own nutrient needs,” he said. With minimum added fertiliser, the plant builds smaller structures, which is the whole point of the root restriction.

For the peace of mind of growers, Fred’s irrigation recommendation for plants/bags above the ground, is no more than one litre per tree per day. If growers intend to put the bags in the ground, then he warns against heavy, clay soil surrounds, which he says just creates a pot in the ground, resulting in water-logging.

Other advantages of Growe bags include reduced pruning of trees, possible manipulation of seasons, by moving trees into glasshouses for early production, or leaving in chillers for late production, higher yields per hectare, depreciation options, with capital investment in a tangible asset.

Among the disadvantages are slightly higher set-up costs for bags, wires and covers etc., all offset by reduced long-term management work required for smaller trees versus larger ones. The average cost of a Growe bag is \$3, made from cloth which will not rot.

Plants grown in a Growe bag can be transplanted into a larger bag or container at any time with the root system completely intact. That removes the need for shoot pruning and the original size and shape of the plant can be maintained after transplanting.

Because the root systems of plants grown in bags are contained, plants can be grown in close proximity without any one root system out-competing its neighbour.

Fred is also experimenting with cambium restriction, using pressure bands, which mimic some of the physical effects found in nature, when a branch folds over and hangs down, resulting in more fruit. This is notable on pears and plums.

Fred has about 1000 trees in bags or with cambium restriction, of many different types. Maudes Rd is an experimental site, as well as a Growe bag nursery. He founded Tunnelworld crop canopies, in which he was involved for 20 years, and then about 15 years ago began the work on root restriction. He has been closely involved with Lincoln University horticultural department, but no longer purchases any work there.

Work is being done overseas by researchers on big commercial crops where orchard space is limited, but there is little official research work in New Zealand at present. Field Horticulture is pretty much a one-stop shop for the theory, bags, plants and advice.

With cherries, the major crop being grown under root restriction, Fred predicts that one square metre tree canopy diameter will result in four to five kgs of fruit per season, which at the minimum price of \$10/kg returns \$40/sg m, which is high for any horticultural venture. Because of portability, plants in Growe bags have a capital value separate from the location in which they are planted. They can be traded at any stage of their growth or age and relocated. A fully productive orchard can be relocated without loss of growth or productivity.

Root restriction is currently being applied to cherries, apples, stonefruits, pears, plums, citrus, feijoa, avocados, roses, rhododendrons, potatoes and strawberries.

Ornamentals are also grown in Growe bags with root restrictions, which open up new options for landscape gardening. Virtually any species of plant can be used in conjunction with each other, for better utilization and contrast in garden design for small spaces. Plants can be rearranged in time, space and season because of easy portability.