

1) HARVEST PREPARATION

Any operation runs better if you are well prepared. It remains for us to indicate some actions that based on our experience will make the harvest run more smoothly.

Enough equipment: Get out your harvest equipment in good time and check that you have enough of it. Over the next 10-years or so, most growers will be facing a larger harvest in each successive season as their trees come to maturity (at about year-10). This means that the harvest logistics will become more critical year by year and the pressure on equipment will rise.

Condition of equipment: Also, make sure that the equipment is not broken, and that it is clean, lubricated and in good working order. Much of it will not have seen service for about 11 months and mechanisms can seize up in that time especially if kept in the somewhat exposed environment of a workshop or implement shed (dust, damp, insects).

Spare parts: It is good to maintain a small stock of essential wearing, or easily broken parts. This is particularly true for those parts that the manual indicates are 'user serviceable' and especially for those that are peculiar just to that piece of equipment. Mostly, these parts are sourced from overseas and the New Zealand supplier can quickly run out of stock in a busy season – the lack of planning may be *theirs* but the consequential losses are all *yours*..! The more generic parts such as O-rings, gaskets and connectors are more easily obtainable in a hurry.

Contingency: Confirm your labour and press arrangements and try to build in a degree of time flexibility and contingency with each. What if the crop is larger or smaller than you earlier estimated? What if the weather is bad at the critical time and there are delays? What if mechanical breakdown strikes your harvest equipment? What if sickness or other misadventure strikes some of your staff at just the wrong moment?

Water: It is best *not* to irrigate for the last 4 weeks leading up to harvest, but if it is very dry and the fruit show severe enough signs of shrivel (wrinkling) to inhibit further ripening then apply a light irrigation a week or so before harvest. Oil extraction is as difficult from droughted fruit as it is from over-watered fruit.

Understorey: Make sure that the grass is very short. Cut it short well ahead of harvest to ensure that there is not a build up of dead grass that will get caught up in the harvest nets. Very short grass also reduces the risk of frost (more long-wave radiation beamed up from the ground) and of disease (quicker drying of the canopy). Also, remove suckers, twigs and other debris from around the trees where the harvest nets will be placed.

2) HARVEST CONDITIONS

Disease: Avoid harvesting when the canopy is wet with dew or rain. Wet fruit only encourages fungal disease in the bin during the postharvest period prior to pressing. There is also an increased probability of transmitting certain canopy diseases from tree to tree as harvesters and their equipment proceed along the row.

Mud: When the soil surface is wet and muddy, it is difficult to avoid getting mud in with the fruit. The nets soon become muddy (the harvesters must walk on them, pressing

them into the soil surface). It is a help if workers wear smooth-soled shoes as these pick up less mud than some work boots with deeply-embossed treads. It is good practice to ensure that the nets are used with the same surface uppermost (keeping the muddy surface to the bottom). Clean the nets thoroughly at the end of each day with a high-pressure hose. *Not all the mud can be removed from the fruit at the press and it will create off flavours in the oil.*

Fruit storage: The less the fruit are damaged, the shorter distance they are carted and the sooner they are pressed the better. If fruit *do* have to be stored the storage period should be minimised (no longer than 48 h for ripe fruit, no longer than 72 h for green fruit), the storage temperature should be low (about +1°C, but be sure not to freeze it), the fruit should be dry, and the containers should be well ventilated.

3) HARVEST METHODS

Some harvest images...



Nets: Catcher equipment is not commonly used in New Zealand, although several models are available, some suiting hillside capture. The common method of collecting fruit is to lay harvest nets (e.g. *FruitFed*, *HortMax*, 12x7 m, about \$150) along the row in advance of the harvesters, so as to overlap both cross and lengthways. After harvest these are gathered up by the ground crew in such a way that the fruit runs towards a point from which it can be poured into stackable plastic bins.

Bins: Suitable bins (about 600 x 400 x 200 mm deep) can either be purchased (e.g. *Fruitfed* ~\$25) or hired (e.g. [CHEP](#)). For larger quantities plastic ventilated bulk bins can be hired (e.g. *Weck-pak*) and filled from the smaller bins. Ensure that they are fully ventilated to avoid heat build up.

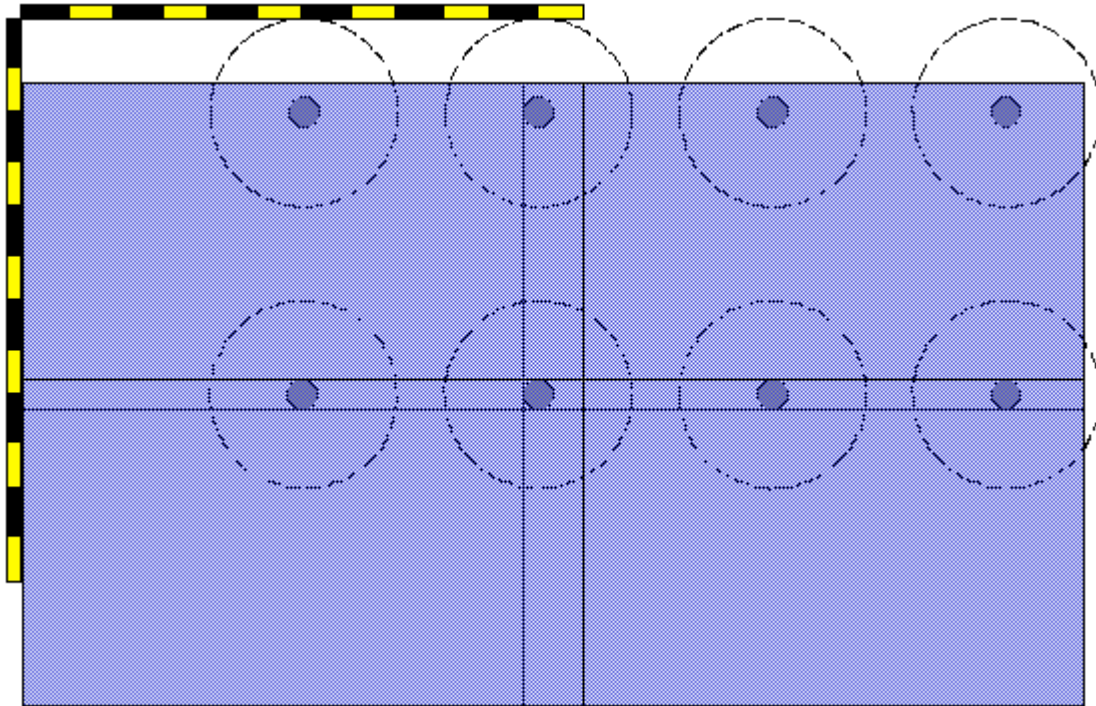


Figure 1. Harvest nets are spread along the row in advance of the harvesters and in such a way as to overlap. After harvest they are gather up by the ground crew so that the fruit roll towards a central point from which they can be poured into stackable plastic bins.

Rakes and clappers At this stage, most New Zealand olives are harvested using a combination of hand rakes and pneumatic 'clappers'. The latter offer a very significant cost efficiency advantage over the former (see below) but without the need for huge capital outlay.

Tree shakers: At this stage of the industry in New Zealand there are very few fully mechanical harvesters available. It is likely that the number will increase providing their cost-efficiency is comparable or better than hand methods. They have the potential to be very time and labour efficient in large groves and here, they are the obvious route to pursue. See [TREE SHAKERS](#)

Harvesters: Avoid spreading fruit off the mats and reject any fruit that has been on the ground as some of it may have lain there for several days and be badly fungal or contaminated. Try not to trample on the harvested fruit (minimise stepping). *Damaged fruit soon oxidises to create rancidity in the expressed oil.*

Harvest costs: It is estimated that hand harvesting with rakes costs between \$1 and \$2 /kg of fruit. With pneumatic 'clappers' the cost reduces to between \$0.20 and \$0.50 /kg, and with a tree shaker the cost is between \$0.40 and \$0.60 /kg. Note that the *higher* cost in each case relates to lightly bearing trees and the *lower* cost to heavily laden trees.

These costs are acknowledged to be somewhat crude estimates that are based on limited experience in terms of different cultivars, different tree ages and different canopies etc. It is also noted that the harvest cost will depend on all sorts of factors *other* than the harvest equipment and trees. These will certainly include the efficiency with which the harvest work is performed - staff training and experience and, not least their physical fitness!

Harvest team: A harvest team commonly comprises four persons. Two members (usually male)¹ operate the clappers and two members (usually female)² lay and recover the nets, also placing the fruit in the bins. A brief respite occurs from time to time as one of the team repositions the tractor/trailer unit carrying the compressor and accumulating the full bins. Experience shows that such a team can operate successive 8-hour days without too much difficulty. We would comment that harvesting olives is not for the physically unfit!

^{1,2}At risk of accusations of gender bias etc, we remark that clappers seem to become quite significantly heavier after a couple of hours of working with them. Males usually possess greater upper-body strength and therefore cope better over a full working day than females in performing this task. Conversely, the endless bending associated with net laying and recovery requires a fair degree of agility. Females usually retain greater suppleness of back and knee into middle age, and so cope rather better all day with this task. With younger persons the gender preferences are probably somewhat less marked!

A good team will harvest perhaps 400 to 1,500 kg fruit /day, depending again on crop load - more fruit from heavy-laden trees.

Pneumatic clapper: One person operating a clapper can perform (roughly) the work of three persons using hand rakes. We note that their use is much more pleasant (noise, fumes) if the petrol driven compressor (20 cfm minimum capacity is required to adequately serve 2 clappers) serving them is mounted some way away from the workers, while the clappers are connected up using long (50 m) hoses.

OSH: You will be concentrating on the task at hand. Protect yourself from eye injury by wearing safety or sunglasses and protect your hands using work gloves. A pair of knitted polypropylene harvesting gloves from *FruitFed* will cost you only a couple of dollars, are comfortable to wear and they will protect your hands from dirt and the odd scrapes and scratches.