

You are here: [Home](#) > [Agriculture](#) > [Horticulture](#) > [Fruit and nuts](#) > [Berries](#) > Raspberries: Cane management of main crop cultivars

Raspberries: Cane management of main crop cultivars

Note Number: AG 0537

Published: July 1996

Updated: December 2011

Reviewed: July 2013

The raspberry plant produces new canes, which emerge from the ground in early spring. These new canes, referred to as primocanes, grow throughout spring and early summer and become dormant in winter. The varieties Willamette, Nootka and Chilcotin normally produce an autumn crop on the tips of the primocanes before becoming dormant. Dormant canes are trained to or between wires during winter, and produce fruit during spring; at this stage they are termed floricanes. Old floricanes die after fruiting in summer, and are cut out during the winter.

Sucker control

Summer pruning is more commonly known as sucker control. A sucker is an unwanted primocane, outside the row or the stool. Sucker control is very important in achieving satisfactory yields. Because the normal tendency of the plant is to spread through suckers, growers must combat this behaviour and force the plant to produce large thick canes only where they are wanted.

At present suckers are controlled by one of the following methods:

- chemical spraying of new canes as they emerge
- driving a slasher as close as possible to the floricanes;
- cultivating with a rotary hoe or disc harrows;
- ploughing a furrow beside the row; or
- cutting suckers off with a brushcutter (large, with autofeeding head).

All the foregoing techniques are aimed at maintaining a row base of roughly 100 mm. Sucker control is central to the sustained management of a plantation. Regularity of optimal yields depends on producing a regular supply of replacement canes, year after year. The number of canes which can consistently grow to a satisfactory size depends on site and variety. As a guide, density ranges from around 15 canes/metre of Willamette, to 12 canes/metre of Chilliwack. In very fertile soils, Willamette can sustain 20 canes/metre.

Pruning

Winter pruning involves the removal of:

- dead floricanes that have already fruited;
- small, thin or broken primocanes; and
- primocanes that have grown outside the area where they are wanted.

If sucker control has resulted in higher than desired cane numbers, do not cut out good primocanes simply to achieve a certain number of canes to be trained. Rather, closer attention should be given to sucker control in the following springsummer to correct any tendency to excessive row width.

Winter pruning involves the laborious use of secateurs. Some growers have built selfpropelled carts with seats, mulchers and pneumatic secateurs that enable two rows to be pruned at once by workers sitting almost at ground level.

A planting of more than 4 hectares justifies, even necessitates, the time and money spent building or purchasing such a device. Dead fruited and unwanted canes are cut off as close to ground level as possible and pulled out of the row.

Winter pruning is usually left as late as possible prior to bud burst, to allow last season's dead canes to dry and become brittle.

Tipping

The final pruning activity each winter involves tipping—cutting off dormant canes at shoulder height. This brings all fruiting laterals to within easy reach of pickers and also removes thin tips of cane, which produce smaller and more crumbly fruit. Although bud numbers (and therefore fruit numbers), are reduced by tipping, the raspberry plant has the ability to compensate for smaller fruit numbers by producing larger fruit on the remaining cane. Optimum fruit size and yield is achieved by removing roughly 30% of each cane. Earlier literature referred to hooping untipped canes over to the top wire, without tipping. Such practices were used to maximise production from cultivars which either lacked vigour, or suffered significant lack of bud break "blind bud". The practice is still used to some extent in areas of North America where cane growth is so vigorous that tipping to shoulder height would remove more than 50% of the cane.

Claims have been advanced that tipping stimulates bud burst below tipping height, but observations under controlled conditions have failed to substantiate these claims. Where fruit is grown solely for mechanical harvesting (and processing), the cost of tipping may not be justified.

Hedgerows or stools?

A hedgerow of canes looks like a picket fence, with canes evenly spaced along the row both at ground level and at the training wires.

This is achieved by planting single canes or bundles of roots at 200350 mm intervals, and confining the canes that emerge to a 100150 mm row width.

Some varieties form hedgerows more readily than others—Chilcotin, Meeker, Nootka, Chilliwack and Willamette will fill in the spaces between plants as a natural tendency.

The advantages of hedgerows are:

- plants are quicker to establish high cane numbers;

- no summer pruning of suckers within rows, therefore sucker control is more straightforward and can be achieved with a slasher or tractor drawn cultivator.

The disadvantages are:

- lack of air movement between plants may predispose towards fruit rots;
- it is harder for new growers or workers to accurately gauge the plants' vigour and desirable cane numbers. In the early years, this makes them more predisposed to management mistakes, usually with rows being left too wide, resulting in excessive numbers of poor, thin canes.

Stools of raspberries look like clumps of canes, each of 150-200 mm basal diameter planted 600-800 mm centre to centre. Each clump is called a stool.

The advantages of stools are:

- better air movement between plants, which helps to avoid fungal problems and to dry fruit after rain;
- easier to gauge primocane numbers during summer sucker control.

The disadvantages are:

- lower cane numbers in early years;
- suckers emerging between stools cannot be managed by using any tractor drawn machinery, and this necessitates the use of a handhoe or brushcutter.

Training

Training refers to those practices used to arrange and contain raspberry canes to facilitate picking and prevent damage to canes and fruit. Trellis construction is discussed in the Agriculture Note [Raspberries and blackberries: Establishment and management](#). In the following descriptions, only those trellis details specific to training method are discussed.

The traditional stool system

Canes are held upright. This is done by bundling all dormant canes together with a tie of baler twine around all canes and a single wire, tied at about 1.2 m above ground, as in figure 1.

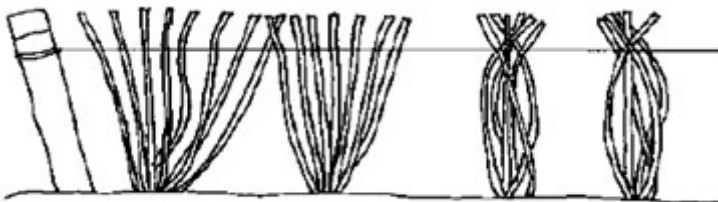


Figure 1. The traditional stool system

The timing of pruning and training is sometimes modified to accommodate dual crop cultivars such as Willamette. Old floricanes are cut out as soon as harvest ceases in January, and new primocanes are bundled and tied up immediately. The advantages are:

- quick and easy to train to the wire. The disadvantages are:
- bundling canes together suppresses bud burst in the centre of the bundle;

- picking is slower because of high lateral density;
- primocanes of floppy cultivars fall outside the bundle, creating a jungle by midharvest.

The standard hedgerow system

Canes are held upright between two wires, 1.4 m above the ground. Dormant canes are positioned between the wires by unclipping the wires from posts along the rows and pushing canes under the outstretched wire. This operation is performed along each side of the row. The wires are finally tied or clipped together at 12 m intervals, depending on cane numbers and wind. Trellis outline is shown in figure 2.

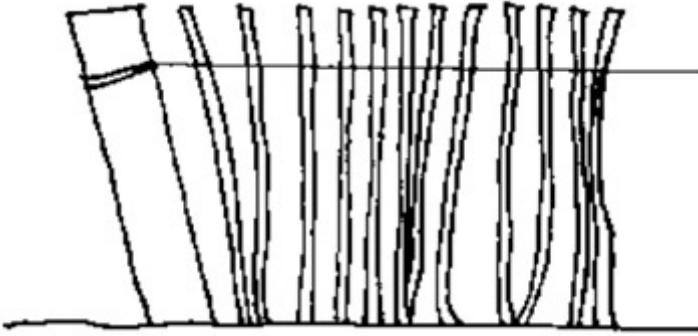


Figure 2. The standard hedgerow system

A pair of training wires are sometimes added to this trellis to capture and lift new primocanes. These wires are dropped to the ground in late winter and lifted as new primocanes grow, preferably twice during the season. When new canes are 600 mm high, the training wires are lifted and clipped to posts at the height of 300 mm. They are lifted a further 300 mm, to 600 mm, when new canes are over 1 m high. There is a danger in holding primocanes too closely to the fruiting canopy, because the mass of foliage can become too dense, and predispose fruit to rots.

Variations to standard systems

- The stool system of bundles of cane can be managed by the twowire retaining system described for hedgerows. This will overcome two of the disadvantages stated—canes are more evenly spread, which encourages bud burst and facilitates picking.
- The training wire system described for primocane management in hedgerows can be used on stool bed rows to capture and control new primocanes.
- For cultivars with stout erect canes (such as Tulameen, Chilliwack) training wires are not necessary as primocanes of these cultivars stand up straight without extra support.
- In windy areas, canes will be blown into bundles and damaged, particularly when fruit are formed and canes are "topheavy". The first thing to do is to avoid such areas until windbreaks are established, but if you are faced with this problem, canes can be laced to a single wire at 1.4 m above ground. Another approach is to clip the two wires together at one metre intervals with maspro clips.

Lacing

Use cotton or heavy jute string. Tie string to an end post and tie each cane individually to the top wire. The knot is illustrated in figure 3 and 4. Note that lacing will save laterals and canes from visible wind damage only it cannot ameliorate the insidious effect of wind stress, which reduces vigour and consequent yields without causing obvious symptoms. The disadvantage of this approach is its higher costs.

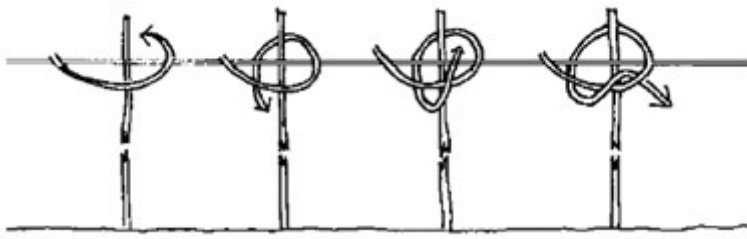


Figure 3. The principle is a simple knot around each individual cane.

The practice: lay the left wrist on the string (left diagram), flick the wrist to produce a loop right around the wrist (centre diagram), pass the string around the wire and cane back to the left wrist. Slip the loop over the ball of string and the knot is complete. Experienced workers can lace at a slow walking pace.

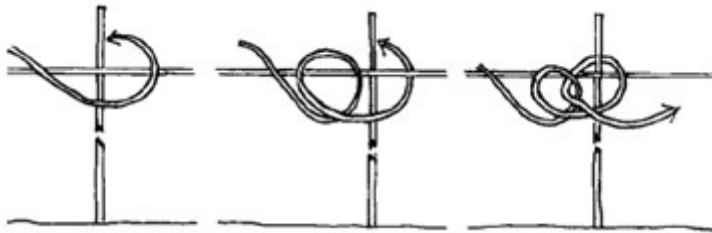


Figure 4. Lacing canes to top wire

An alternative the V trellis.

The vee trellis allows dormant canes to be bent over to wires spaced 1 m apart and 11.2 m above ground, as shown in figure 5.

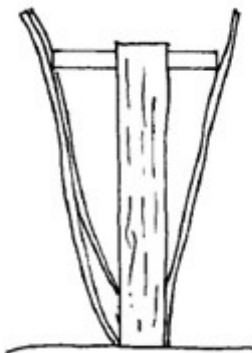


Figure 5. The Vee trellis, end view

Canes are held in position by a pair of wires, as described for hedgerow trellising or by lacing. This trellis is difficult to apply to stoutcaned cultivars; it better suits cultivars such as Willamette, Nootka, etc.

The advantages of this system are:

- fruit are presented well because primocanes grow up the centre of the structure, leaving fruit only at the outside;
- primocanes are not damaged by pickers;
- primocanes have shorter internodes as they do not have to compete for light with the floricane canopy.

The disadvantages are:

- higher establishment costs because of extra wire, wooden spacers;

- end assemblies must be stronger than conventional trellis; fruit cannot be machine harvested, unless the vee is made very narrow (less than 300 mm at 1.2 m high). Narrow vee trellises were previously used in the northwest of the USA in conjunction with beatertype mechanical harvesters, however the recent move towards rotary drum harvesters is not well served by vee trellising. Further considerations of mechanical harvesting requirements are discussed in the Agriculture Note [Raspberries and cultivated blackberries: harvesting](#).

Acknowledgements

This Agriculture note was developed by Greame McGregor of FFSR in July 1996.

It was reviewed by Mark Hincksman and Neville Fernando of Farm Services Victoria in December 2011 and in July 2013.

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