Cultivated blackberries: Pruning and training

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This Agriculture Note deals with pruning and training of trailing, sub-erect and erect forms of hybrid berries of the genus Rubus, subgenus Eubatus, which includes Logan, Boysen, Young, Marion, Silvan, Lawton, Dirksen Thornless, Lockness, Karaka, Thornfree, Chester and Smoothstem blackberries.

General information on varieties, establishment and management of blackberries is given in the Agriculture Notes Raspberries and cultivated blackberries: establishment and management and Cultivated blackberries: varieties.

Pruning

Pruning involves removal of dead fruiting canes plus suckers growing beyond the well-defined crown of the plant. Removal of dead canes from the trellis is facilitated by allowing the dead canes to dry out. Some commercial growers cut the old fruited canes at ground level in late summer and allow them to dry until winter. This practice ensures that dead canes are brittle and easily broken from the trellis.

The fruited canes which produced last season's crop are cut and pulled from the trellis. Care must be exercised to avoid snapping new canes which may be tangled in the old canes. Old and new canes may be recognised by the different colours of the bark, plus the presence of dead fruiting laterals (on old canes) and the presence of dormant buds on new canes.

There are no diseases of Rubus associated exclusively with dead or decomposing canes. Prunings may be left in the alleyways and incorporated into the soil by disc harrows, rotary hoe, slasher or flail mower during spring management operations.

Training

Training is the practice of arranging new canes on a trellis. The choice of trellis structure involves consideration of initial capital costs, labour costs of each training technique, and the influence of training technique on potential yield - on whether the plant can achieve optimal potential, and whether pickers can find all the fruit. The methods used now include rope, weave, fan, and some more experimental compound trellises.

The rope method

The oldest method of trellising the more flexible varieties is the rope, in which all new canes are picked up as a bundle and wound around a single wire situated at 1.1 - 1.25 m above the ground level. Rope training is illustrated in figure 1. The bundle is wound in one direction only until it just passes the point where the next plant begins. The remaining cane is pruned off, and the next bundle of canes is wound over the last to prevent unwinding. A tie of baleror binder-twine may be useful to secure the canes, particularly with thornless varieties which can easily slip over each other.

Advantage of the method:

- low capital costs at establishment for one wire only plus posts;
- simple, relatively fast removal of old fruited canes;
- simple, fast handling of new canes.

Weaknesses:

- some buds are captured within the bundle. and fail to burst, thereby reducing potential yield.

Variations:

- two wires may be used. at 0.8 - 1 m and 1.2 - 1.4 m, and plants divided into two bundles
- two wires can be used on a Tee trellis, both at 1.2 - 1.5 m and 400-500 mm apart.

Both variations attempt to reduce bundle thickness and thereby reduce bud suppression. The Tee trellis results in some fruit ripening between the two wires, where pickers may have difficulty reaching if the trellis height is too tall for them.

Figure 1. Rope training

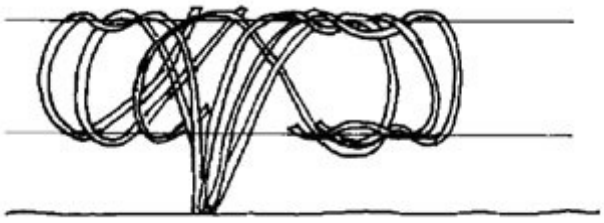

Figure 2. The standard weave method

The weave method

Canes are trained around two or 3 wires, by leading them over and under in a series of loops, as shown in figure 2. Canes may be handled singly or in bundles of two or three. Start by training a cane from the centre of the crown, pass it over the top wire, under the lower wire, up and over the top again until it is all restrained. The remaining canes are progressively woven to create an even distribution of canes along the wires. This will result in an even wall of foliage, and encourage fruiting laterals to grow outward away from the trellis, thereby making picking relatively

easy, particularly of thorny cultivars.

Advantage of method:

- full expression of yield potential by even spacing of fruiting laterals
- good presentation of fruit.

Weakness:

- slow to prune, and slow to train unless the techniques are learnt from an experienced grower.

Variation:

- the Newton trellis uses wooden laths of 10 mm x 20 mm thickness positioned vertically against the wires as canes are woven; canes stay on one side only of the trellis, and loop around the wooden laths. The laths are pulled out before pruning, and allow the dead fruited canes to fall free from the trellis. The advantage of this variation depends upon a supply of cheap laths.

The fan method

The fan is often illustrated in gardening text-books, and is the preferred commercial trellising method in highly vigorous plantations in New Zealand. Fan training is illustrated in figure 3. The trellis is identical to the wire weave trellis, and each cane is led over the top wire, past the lower wire, and trimmed. The last cane to be trained can be used to lace the trimmed canes to the bottom wire.

Advantages:

- quicker to train than the weave method, as excess cane is pruned
- even fruiting lateral distribution, as for weave
- ease of harvest

Weakness:

- only applicable in very vigorous plantations.

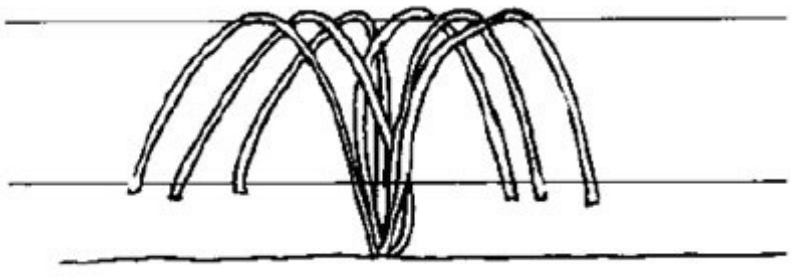

Figure 3. Fan training

Upright training - Lawtonberries

Lawton canes grow straight upright more like raspberry canes. Trellising is essentially the same as for raspberries. One pair of wires may be used at 1.2 m to capture new canes using ties or clips every 2 m. Pruning is easy in principle, except that canes bear sharp thorns.

Unconventional training methods

Growers have experimented for years to find easy methods to deal with the two separate growth phases of Rubus plants. The problems attendant to this growth pattern are seen particularly in the blackberries:

- new canes intermingle through old canes, and separation at pruning time is difficult
- pickers and machinery have to avoid crushing new canes.

The principle behind all experimentation is to physically separate the primocanes from the floricanes and to direct the growth of primocanes out of harm's way and into a useful position for next year's crop. The most radical approach to growth phase separation is Alternate Year cropping, in which primocanes are removed entirely during fruiting to produce a "fruit only" year, and in the following season, the "off" year, primocanes only are grown. This method has not been publicly trialed in Australia, but is practised by some growers in Oregon, USA. More detailed notes relevant to blackberries are included in the Agriculture Note Raspberries: Alternate Year management.

The single post method

Plants are established next to posts of 100 mm diam, 1.7 m height spaced 900 mm apart along rows. As new canes grow they are wound up the poles, and down again if they reach the top. Training occurs in summer, as canes grow. Winter pruning requires unwinding of new canes, removal of old canes, and re-winding of new canes. Ties may be needed to hold canes to posts (Figure 4).

Advantages:

- high planting density is possible
- winter labor is quick, despite "double handling" of new canes.

Weakness:
labor input in summer to wind new canes once per fortnight. The total labour input per annum is higher than with conventional systems.

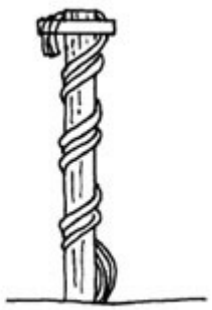

Figure 4. Single post method

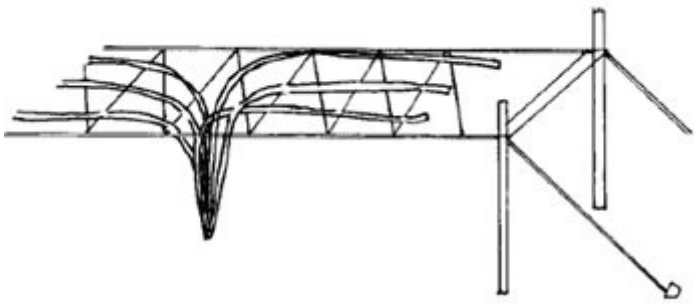

Figure 5. Table Top Training

Table top trellis

A pair of wires are erected 1.0 m apart, 1.0 m above ground level. Canes are held between the wires with a criss-cross lattice of binder-twine (Figure 5). If plants are widely spaced, new canes can be progressively trained as they grow, in an opposite direction to fruiting canes. The trellis end assemblies need to be stronger than normal to retain adequate wire tension.

Advantages:

- winter pruning is very quick if the alternate direction variation is used
- fruit grow above the trellis and are easily seen and easily reached.

Weakness:

- trellis cost
- wide spacing reduces yield per hectare.

Vee trellis

The principal behind Vee trellising is to separate fruiting canes from new canes on either side of a Vee trellis. The difficulties relate to the problem of fruit ripening within the Vee and being hidden or inaccessible.

Virginia Vee trellis

Although the Virginia Vee trellis has not been demonstrated in Australia, it has been proven sufficiently well in the USA (USDA Appalachian Research Station, West Virginia) to warrant inclusion. It is based on a "flip-flop" trellis of steel frames which can be rocked from one position to another, as illustrated below. It relies on the principle that developing laterals display phototropism - that is, they orient themselves towards light until fruit set, after which they lose their phototropism and remain "locked" in position. It was developed specifically for the late-season thornless blackberries such as Thornfree, Chester etc. (Figure 6 – 10)

Figure 6. Virginia Vee: New primocanes are led to fixed trellis frame, but not secured.

Figure 7. Virginia Vee: New primocanes are tipped at 2m length to encourage secondary branches.

Figure 8. Virgina Vee: The flip-flop wall is laid over the fixed side and dormant canes are attached to the movable trellis.

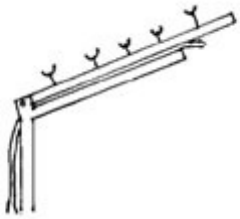

Figure 9. Virgina Vee: In summer, flowering laterals all orient themselves upwards and fruit set in this position.

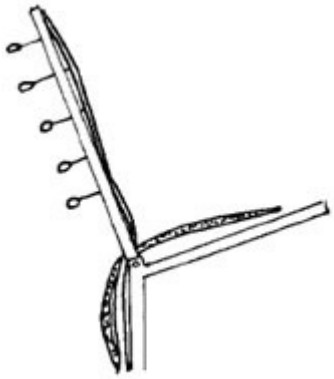

Figure 10. Virgina Vee: In late summer, the flip-flop side is raised to allow fruit to ripen in one plane. New primocanes are trained as in Fig 6.

Primocane management

The new canes of all cultivars except Lawtonberries are pruned to two nodes either just prior to harvest, or, in the case of late-ripening cultivars, by mid-December. The two remaining nodes will produce new canes. In this way, plants are encouraged to produce larger numbers of thinner canes than would otherwise emerge, and the risk of breaking canes during training is thereby reduced. The shortening of primocanes also removes some competition for water and nutrients from fruiting canes, as the major growth phase of the new canes is delayed. There is also less new cane to interfere with pickers or to be damaged by them.

Late-ripening erect blackberries may also be variously pruned at the level of the top-wire or first wire, depending on vigour (e.g. Loch Ness at top, Chester at lower level), or, not tipped at all but tucked in or tied off along the trellis. The advantage of this approach is that there will be no branching to interfere with picker access. The disadvantage is a very long unbranched cane to be woven along the trellis after harvest.

Left to themselves, new canes will grow in any direction, and either risk damage by tractors and machinery, or prevent vehicular access to alleyways. The conventional training techniques all leave canes on the ground until late winter. They can be periodically trained to run under the trellis, and some growers have tried hanging primocanes in "S" hooks looped to the lower trellis wire or irrigation wire. The conventional techniques allow summer training of

primocanes and thereby avoid risk of damage.

Overseas research and local observation, all indicate that training should be done either during active growth, or alternatively, as late as can be gauged before bud burst. Training during active growth is not a practical proposition except when the post training system is employed.

Lawtons tend to sucker more than other cultivars and stray suckers emerging beyond the row base should be slashed during the growing season.

Varietal considerations

Boysen, Silvan and Young are most commonly trained by the weave method. Fan training could be considered, where vigour allows.

Marion is usually very vigorous and may be fan-trained under normal circumstances.

Logan does not always show the vigour of other cultivars and is not normally suited to fan training.

The late-ripening, semi-erect thornless cultivars Loch Ness, Chester, Dirksen Thornless, Thornfree and Smoothstem produce stiffer canes than the others mentioned and do not lend themselves to being treated like string. They are usually arched over the top wire of a two or three wire trellis in a variant of fan training.

Marketing considerations

Pick your own customers are not averse to harvesting thorny cultivars provided they do not have to climb into the plants to locate hidden fruit. The table top trellis was developed for PYO enterprises. The weave trellis is adequate for PYO, but care must be taken not to position the lower wire so low that pickers must crawl to see under the lower foliage, as this is the activity most commonly associated with minor injury, mainly from dry pieces of pruned cane which have not been properly buried or removed

Acknowledgements

This Agriculture note was developed by Graeme McGregor, FFSR in January 2000.

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