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Raspberries: Management of autumn fruiting cultivars

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Introduction

The raspberry plant possesses the potential to produce fruit on primocane tips in autumn, in addition to the main crop which is borne on floricanes in spring. This habit is usually described as primocane-fruiting (PF). PF cultivars are grown as a perennial crop with annual canes - that is, canes emerge in spring, grow through summer, fruit in autumn and are pruned to the ground in winter.

The cultivar Heritage was the first raspberry bred specifically to produce an autumn crop and to this end it is very successful. It fruits earlier than dual-crop cultivars (such as Willamette, Nootka and Chilcotin) and reliably crops from late February onwards, even in cool seasons when yields from dual-crop cultivars are late and sparse. It is easy to establish and has strong thorny canes which scarcely need trellising until fruit form. Its main criticism is its bland flavour and diminution in fruit size as the season progresses.

Since the introduction of Heritage, several breeding programs have produced autumn-fruiting selections, many with better flavour than Heritage.

Establishment

Plants are established as a hedgerow, following the guidelines set out in the Agriculture Note *Raspberries and Cultivated Blackberries: site selection and establishment*. Following soil preparation, plant either canes or root pieces at 300 mm intervals in the planting furrow. Row spacing should be as narrow as machinery will allow – as narrow as 2 m between row-centres (hand harvesting) or 3m (for mechanical harvesting).

In the establishment year, primocane growth will be confined to the area adjacent to the planting material and little sucker control will be needed. Sucker control should only be practised to confine growth to a 150 - 200 mm wide row. There is no point to establishing stools of PF cultivars as the advantages gained by managing main crop cultivars as stools do not apply, and considerable effort would be expended to no avail (see the Agriculture Note *Raspberries: cane management of maincrop cultivars*). Primocanes emerge over a period of months. Generally, those primocanes which emerge first will fruit first. The long harvest season associated with PF cultivars is more due to this fact than a prolonged ripening season down each individual cane.

Trellising

Most PF raspberry canes are short, stout and self-supporting until fruit enlarge, therefore training is minimal. Trellis details are discussed in the Agriculture Note cited above. An alternative offered commercially in the USA, is a proprietary self-supporting post of concrete reinforcing rod, with a base welded to it, which can be placed in the row as needed and easily removed prior to winter pruning. Under this system, only the end posts or end assemblies are permanent, and tractor-mounted equipment can easily be used to prune dormant canes. Trellising can vary according to cane density and severity of wind—under optimal conditions posts can be 10-15 m apart within rows.

Fertilising and watering

Preplanting fertiliser recommendations appear in the Agriculture Note *Raspberries: site selection and establishment*. PF cultivars have a very long cropping season, and unless adequate levels of nitrogen and water are maintained, fruit size will decline and fruit will become dry.

In spring, plants should be given the equivalent of 50 kg N (active ingredient) per hectare, as either blood-and-bone, pelletised fowl manure or N:P:K mix. The rate to use is calculated from the percentage of nitrogen in the product: for example an N:P:K mix of 8% nitrogen requires:

$$50 \times (100/8) \text{ kg product/ha} = 625 \text{ kg product / ha at 3.0 m row spacing, one hectare comprises 3 300 m of row}$$
$$3\ 300 \text{ m/ha divided by 625 kg/ha} = 5.28 \text{ m/kg}$$

So one 50 kg bag will cover $50 \times 5.28 = 264$ metres of row. The N:P:K mix to be used will depend on fertiliser history and soil type, and should be discussed with your local extension officer, fertiliser supplier or consultant, and should be based on annual leaf mineral analysis conducted in February.

It is common practice to add nitrogen fertiliser again in December at the rate of 25 kg N/ha, and a final application in February as fruit are enlarging. These applications should be of a soluble and readily available nitrogen form, such as ammonium sulphate (21% N, requires 120 kg product/ha) or ammonium nitrate (34% N, requires 74 kg product/ha).

Irrigation is crucial to success with PF raspberries because the soil has all summer to dry out before fruit ripens. Drip irrigation is most economical in terms of water.

Spring management

Most PF cultivars sucker very readily and row width must be controlled to avoid excess cane numbers. Excessively wide row-width or high cane numbers causes fruit size to diminish as the season progresses. In the first harvest, fruit size is unaffected by row width, but thereafter the greatest fruit size is achieved with no more than 15 canes/metre. Row width is controlled by lashing /mowing and brush cutting.

Winter pruning

Pruning simply consists of cutting all canes to the ground. The optimum time to prune is as soon as all leaves fall. It has been demonstrated (Frith, 1993) that pruning both earlier and later than full leaf fall results in diminished yields in the following autumn. Heritage has a shortcoming which becomes worse as plantings age, in that an increasing proportion of the fruit become crumbly in the latter half of the season. This problem rarely responds to minor

element supplements. To combat this problem some growers have experimented with either not pruning in the first winter at all, or high pruning of dormant canes to leave from 300 to 800 mm of cane. Both practices appear to improve berry coherence in the subsequent crop and both delay harvest of the subsequent crop.

Seasonal manipulation

Heritage produces approximately half its total yield in the first two weeks of fruiting. The remaining half of the crop ripens over a long period of up to ten weeks and at some time during the ripening period the cost of harvesting becomes uneconomic. Growers therefore face a short period at the start of harvest when harvesting is most profitable. Some growers have experimented with seasonal manipulation to provide a sequence of blocks of plants, each starting harvest one to two weeks apart. Delaying the start of harvest runs the risk that an early winter will prevent ripening before all fruit, or even an economic portion of the crop, can be harvested.

1. Delayed planting: in the first season after planting, the time of harvest can be delayed by late planting, as late as November. Yields will be reduced by planting so late, however the economics of this practice depend on late season prices more than yield alone.
2. Late winter pruning, or slashing of young primocanes in spring: either practice will effectively delay the emergence of the primocanes which will be allowed to flower and crop. Cane numbers are reduced by this practice, so yield can also be reduced. Harvest can be delayed by up to four weeks, by slashing up to 3 months after the first emergence of primocanes.
3. Dormant canes can be left standing, as discussed above under winter pruning.
4. Where the main crop fruit produced by floricanes is of adequate quality, PF cultivars can be managed as dual-cropping varieties; see the Agriculture Note *Raspberries: cane management*. This practice has been successfully demonstrated with Bogong; Heritage produces small, dark and unacceptable fruit from floricanes.
5. Varieties: full descriptions are included in the Agriculture Note *Raspberry cultivars*. Ripening commences in southern Australia with Malling Autumn Bliss, followed (at two to four days) by Dinkum. Heritage and Bogong commence two to three weeks later.

Reference

Frith, G.J.T. (1993) Influence of the time of cane removal on yield and harvest date of primocane fruiting raspberries. *Acta Hort* **345**, 105 - 109.

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