Best practice strawberry plant establishment in Western Australia

Aileen Reid, Berry Industry Development Officer, Agricultural Produce Commission

- Rates of plant establishment can be variable. Some growers are losing almost half their runners on some parts of their properties. Differences between varieties and runner growers occur, but growers who pay attention to detail can keep losses down to 5%.
- Good establishment is important because it costs the same to prepare, fertilise and irrigate empty spaces as it does to grow plants. Sprays are still applied over the whole area and pickers cover the same amount of ground.
- Risks are higher with earlier plantings of immature runners and management is more critical in warmer weather.

Reasons for poor establishment

Surveys of the rate of strawberry plant establishment in Western Australia show wide variation. **Some growers can keep losses down to about 5% while others lose almost half of the plants in some areas of their property.**

New crops are established annually from runners provided from interstate because there is no local runner industry.

Several factors can lead to poor establishment:

- runner immaturity (which affects disease susceptibility)
- warm weather after planting
- uneven and insufficient watering
- poor fumigation practices
- over-application of base dressings.

Early supply of runners

Some growers are keen to plant as early as possible so the high prices associated with early season fruit can be captured. Runners that are dug early may not have the required amount of chilling, making them fragile and more prone to failure after planting.

Temperatures may still be high in March so proper management of runners during and after transport, while planting, and in the first few weeks after planting, is critical to prevent high losses.

Uneven soil moisture

Perth's sandy soils can be difficult to wet up thoroughly. When wetting up the soil prior to fumigation, it may take four to five cultivations to ensure the soil is completely and evenly moist.

Do not assume because the surface looks moist, it is evenly wet to a depth of 15–30cm.

If the soil is not evenly moist (and reasonably compact) throughout the bed, the soil fumigant will not move evenly through the soil and there will be patches that are not fumigated. Those areas may contain disease left over from the previous crop and may infect new plants. At planting time this uneven wetting persists. Plants will be stressed and set back until their roots are able to access soil moisture. In the long-run, stressed plants often never fully recover and yield much less, if at all. Often, they will die.

Residual fumigant

High levels of residual fumigant can damage runners if planting occurs too soon after fumigation. If applying fumigant through the irrigation water, make sure the irrigation is even across the bed. There have been instances where three rows of dripline per bed have resulted in excessive levels of fumigant in the centre of the bed causing deaths after planting.

Poor irrigation practices at planting

Growers are continually seeking to plant earlier to achieve the higher prices associated with early cropping. As the weather is often quite warm in March and April, irrigation management in the first two to three weeks after planting is critical. The sooner plants establish a root system, the better they will be able to withstand changes in temperature and access nutrients for early growth.

When runners first arrive, they are virtually non-functioning. They have no active roots and need to draw on carbohydrate reserves to produce new roots. The shorter the time frame for this, the better the outcome is for the growth of the plant.

Runners need to be treated like cuttings and prevented from wilting as much as possible until they can grow new roots. Runners need to be kept as cool as possible. Do not leave bags of runners on the tops of beds in full sun.

For best establishment, runners should be kept fully hydrated and not allowed to wilt. As soon as they are planted, they should be overhead-watered little and often – say 5 to 10 minutes every daylight hour – especially when it is warm.

The purpose of overhead watering is to keep the plants cool and prevent wilting. Trickle irrigation is still required to keep the roots moist and allow new roots to form. Until a good root system develops, the plants will be fragile and prone to drying out. Do not rely on overhead irrigation to keep the soil moist. While some growers make large holes in the plastic for the plants, the bed surface is seldom perfectly even and there is no way to guarantee water will penetrate every planting hole.

Other growers make small slits only and much of the overhead irrigation runs off. Planting will be easier with a larger hole but weed growth may be worse.

Irrigation monitoring by the Department of Agriculture in WA shows that water falling on pathways between beds does not usually benefit the plants in coarse Western Australian sands. With large falls of rain we occasionally see water entering the soil under the beds at a depth of 45cm but that is below the vast majority of plant roots so the influx of water only serves to leach nutrients that may have accumulated below the root zone. **There is a strong correlation between sprinkler irrigation, plant survival and strong early growth.**

Several aspects of sprinkler irrigation should be considered:

Sprinkler system design

Many growers have sprinklers at spacings that are too wide to get good even coverage. The effects of this are seen in early plant growth and establishment which often matches the watering pattern of the sprinklers.

Where watering is good, plants survive and are green, but where less water falls, plants either die or are slow to take off. It is important to have your sprinklers at the recommended spacing for the pressure you run.

Most growers have had their system designed for drip irrigation. Since sprinklers require more pressure to operate effectively, the number in each shift will need to be much less, and the number of valves, greater.

Do not remove filters to increase pressure, the risk of dripper blocking is high. Many growers have twin-nozzle sprinklers that use up to 1500 litres per hour whereas some newer low-flow sprinklers may only need 500L to achieve the desired result.

Since many growers are licensed and have a water allocation that is monitored, it can be helpful to change nozzles to reduce this early water use.

Frequency of overhead irrigation

The purpose of overhead irrigation is more to cool the plants than to irrigate, so sprinklers should be run for 5 to 10 minutes every hour when it is warm for leaf-off plants. If the weather is cool and/or showery, every two to three hours may be enough.

For leaf-on plants, ideally leaves should be wet at all times. As a rough guide, check if any water droplets remain on the black plastic mulch. Once the plastic dries off, the humidity around the plants will drop and it is time to water again.

Ideally the leaves should stay green. If they start to brown off it is a sign that more frequent overhead irrigation is required.

Figure 1. Visible differences in plant establishment due to poor overhead sprinkler design
Photo credit: Aileen Reid DAFWA, 2014

Base dressings

Heavy application of base dressings such as composted manures can result in high levels of soil salinity which damage young plant roots. That damage may help pathogens to enter the roots and cause disease.

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The accurate identification of fruit flies is a key component of Australia's biosecurity system that underpins the domestic movement of fruit and vegetables, maintains international market access for Australian producers and protects Australia's borders from exotic pest incursions.

A revised version of **The Australian Handbook for the Identification of Fruit Flies** has been compiled by diagnosticians for diagnosticians using some of the latest research outcomes and resources available.

The handbook is a compilation of diagnostic information for 65 fruit fly species, most of which are exotic to Australia, including the non-tephritid fruit infesting *Drosophila suzukii* (spotted wing Drosophila). It is intended to facilitate rapid diagnosis of fruit fly species and be a comprehensive guide for Australian diagnosticians and field officers involved in maintaining, supporting and enhancing Australia's biosecurity system.

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