Tyfu Cymru: Technical Advice Sheet
Strawberry & Raspberry May 2020

General Comments

Early strawberry varieties like Christine and Vibrant growing under tunnels are now being picked, as are everbearer plantings of varieties such as Murano which were carried through from last year and have been growing under protection since March. In contrast with the exception of Christine & plantings of other cultivars such as Symphony that have been fleeced for some weeks to advance their harvest & to provide frost protection it will be 7-10 days before harvest begins. The earliest plantings (early March) of long cane plants of early summer fruiting raspberry cultivars such as Tulameen and long cane and carried through established primocane fruiting raspberries protected by tunnels will in most cases commence within a couple of weeks.

Long cane plantings made in late March/early April outside are now in flower with harvest approximately 3-4 weeks away. In most cases the final planting of long cane summer & primocane fruiting raspberry plants have now been made. The latest plantings of Glen Ample being used to provide fruit in August.

A few growers plant long cane summer fruiting varieties Glen Ample, Glen Dee or Octavia in early June, but these can be very difficult to establish (even if planted outdoors), unless reliable overhead misting of plants is available from planting until the plants are fully established especially if the weather is bright & hot, so as to avoid dehydration of the canes, newly broken buds or emerging flower laterals. Bare rooted & container produced long cane that are potted up are more susceptible to this problem as it takes some time for their root systems to establish within the new or increased volume of compost & to be able to provide the canes & foliage with sufficient water.

COVID-19

There is strong interest in farm gate sales, and you should think about how to manage contact with customers on your site. Some growers are operating a drive-in system where customers don't need to leave their cars when on site. If you are growing for pick your own you might want to consider selling picked punnets until social distancing is relaxed. Online contact to keep your customers informed about what you are selling – and how customers can buy it – will be essential in letting customers know that your produce is still available. You may consider a book-in-advance system, or by invitation only, to manage the flow of customers onto your site. You may wish to consider card payment systems to avoid dealing with cash on hand - see the Tyfu Cymru factsheet on contactless payment systems for more information on how these can be integrated into your business.

Pest Management Programs

You should by now have a robust pest control program in place to mitigate the risk to your crops. Given below are a range of likely pests – Tyfu Cymru has produced several factsheets to help you identify pests in your crop, you should consult these alongside the notes below. Several but not all of the major pests of strawberries & raspberries can be effectively controlled using bio controls. Make sure you follow the suppliers' recommendations when you apply them. In particular aim to apply them to crops on the day they arrive to ensure peak effectiveness. Except for nematodes further applications are usually required every 10-14 days so set up a rolling order with your supplier to help you schedule applications. It is vital that you ensure that you are aware of any adverse effects that conventional pesticides you are proposing to use on your crops may have on the bio-control agents

you are proposing to use. – The website of bio-control suppliers can often provide information on the compatibility of pesticides with the predatory mites, insects & nematodes with a wide range of pesticides..

Two Spotted Spider Mites

TSSM will be seen in two distinct phases: adults that start to emerge in the early-mid spring from the sites in crops & surrounding cracks in support posts, leaf trash etc where they have overwintered. These have two distinct black spots on their back but otherwise are brick red in colour these will quickly lay eggs on the underside of overwintered foliage that is still green or the first emerged but most mature foliage & then die.

These eggs hatch & produce the first (summer) generation of juvenile & in turn egg laying adult mites unlike the overwintered mites these adults are pale yellow in colour but still have the two dark black spots on their backs. Generally the summer generation mites are found feeding & lay the eggs on the underside of leaves (typically older leaves lower down in the canopy).

The symptoms of their presence is often first seen as some scattered yellowing of the under surface of infested leaves, as mite numbers increase scarring and bronzing of leaves and the calices of fruits can be seen.,

TSSM can be particularly damaging to young plants that have been recently planted and mite feeding on the leaves can weaken the plant and reduce yields. At high levels you will see webbing appearing on leaves, and plants will redden under stress. TSSM can be more of a problem where crops are grown under the protection of tunnels, because of the higher temperatures that the protection can provide the length of time that it takes to complete the mites life cycle (egg, juvenile, adult mite egg laying then dying) can be substantially reduced especially during June, July & August In field crops of strawberries that are fleeced can also be more susceptible to TSSM damage than on fleeced crops.

However the use of tunnel protection & fleecing can also benefit the use of predators especially when introduced in the mid-late spring as they also require to establish & breed frost free nights & daytime temperatures in excess of 10^{o} C.

TSSM can be controlled providing that the temperature is adequate using introductions of the predatory mite *Phytoseiulus persimilis* this predates on juvenile, young adult mites and their eggs.

Phytoseiulus is supplied in bottles of bran that can be shaken onto the foliage of crops. The rate of use varies according the level of TSSM infestation. For strawberry where mite levels are low 1/plant can be used, if moderate increase to 2-3/plant & for heavy infestations 4-5/plant. In raspberry 10-15/m 2, for light 20/m^{2}, for moderate & 25-50/m^{2} is used. The highest numbers can also be used to treat hot spots in crops which otherwise have low to moderate TSSM populations. Most growers for rasp berries use 10 – 20 mites/m^{2}, if you know the tunnel area you can roughly work out what proportion of the bottle should be shaken within each section of your tunnel. A bottle of 2,000 *Phytoseiulus* mites will be about £15, if the introduction is successful you should easily see *Phytoseiulus* in the crop, preying on TSSM in infested sections of leaves in around two weeks – these are bright orange red , and very active on the leaf surface. Phytoseiulus works best when the temperatures as 18-21^{0}C above 30^{0}C they can become inactive & cease breeding, with adults moving down lower in the foliar canopy of raspberries to where its cooler & there is more shade as spider mites move upwards to damage the leaves of the upper fruiting laterals of floricane. In protected but not outdoor strawberries the acaricide bifenazate (Floramite 240 SC) can effectively control adult & nymphal stages of TSSM without harming introduced predators. There are two other acaricides that

can be used in strawberries for TSSM control both act primarily on eggs & the juvenile stages. Spirodiclofen (Envidor) (EAMU) & clofentezine (Apollo 50SC) EAMUs), abamectin (Dynamec) can also be used but only in permanently protected crops (this does not include Spanish tunnel protection).

TSSM damage in raspberry can be high, and are seen in most years, spreading from April onwards in overwintered primocane and floricane nodes (especially where the pest was a problem in the last season). You should plan for biocontrol use and monitoring throughout the season. *Phytoseiulus* will spread rapidly once introduced, so early applications can be effective in reducing early risks. The specific acaricide clofentezine (Apollo 50SC) (has an EAMU) & can be used in outdoor raspberries prior to introduction of *Phytoseiulus* to reduce the numbers of eggs laid by overwintered mites.

Thrips

Thrips remain a significant problem for strawberry growers. You should inspect for thrips by tapping flowers over a sheet of paper and look for golden hyphen-shaped western flower thrips or black rose thrips with a hand lens. Western flower thrips are more of an everbearer crops in recent years rose & rubus thrips have become a problem in early-mid-summer mainly but not exclusively in everbearer strawberries. Unfortunately the flowers of some June bearers have proved to be very attractive & the fruit easily damaged by these thrips species, notably affected is Jive & Malling Centenary, but all later planted 60 day crops can be affected to the extent that many growers now automatically introduce the predatory insect *Orius laevigatus* as soon as the first thrips are spotted in strawberry flowers. . *Ambyseiulus* (*Neoseiulus*) cucumeris which are usually used to control WFT are ineffective against these two thrips species as they are usually enter crops as adults, the Ambyseiulus (Neoseiulus) being only able to predate on fist stage larvae stage thrips. WFT can reproduce very quickly (especially under protection) and will start to fly around the crop at temperatures of 26°C. Thrips will graze the fruit as a developing embryo, leaving bronzing of the fruit once mature. There is no effective pesticide for thrips control, but they can be controlled very effectively with biological control. *Neoseiulus cucumeris* mites should be applied at a rate of 25 per plant every two weeks, although this should be doubled if you see thrips in your crop. These will cost around £20 for 200, but given that thrips can render almost 100% of the crop unmarketable they are very good value. These are supplied as a sachet which can be hung out in the crop. Thrips will overwinter are larvae in the bags, so if you can avoid reusing bags it will help to keep levels low.

Tarsonemid Mite

Tarsonemid mite is very effectively controlled by *Neoseiulus cucumeris* introduced for thrips control, and so you are unlikely to see any significant tarsonemid mite infestation unless these are brought in from the propagator. In field crops these are likely to be seen at the end of the season.

Aphids

A mild winter in 2019/20 has resulted in good overwintering of aphids, and populations are growing quickly from overwintered populations. You should plan a spray soon after planting when the canopy is small – Batavia can be useful when the plants are actively growing, but it can only be applied 14 days before flowering. Aphids can be controlled with parasitoid wasps (e.g. *Aphidius*) which directly target aphids for egg laying. Wasps can control a low level aphid population, but if populations get too large wasps will become ineffective and you may need to consider a spray (e.g. thiacloprid e.g. Calypso or fatty acids e.g. Flipper), although the application of lacewings or hoverflies may help with heavier infestations (you may see these moving in naturally from outside). A vial of 240 will be about £18. Dosing around 0.6/m^2 can be effective for control.

Vine Weevil

Vine weevil are likely to be emerging from second year slabs, and you may start to notice symptoms in the crop. Notched leaves are typical of wine weevil damage, although symptoms will be noticeable as poor growth as temperatures rise and badly infested crops die. Vine weevils are unlikely to be a problem in field grown crops due a good range of natural predators (unless broad spectrum pesticides have been used), but can be significant in tunnels. These can be effectively managed with nematode products (e.g. Nemasys L) which applied through the feed line, preventing larval damage in the crop.

Blossom Weevil

You are unlikely to see blossom weevil in the crop, but you may see dead flowers as a result of adult weevils biting through the stalks. Blossom weevil will appear later, particularly in outdoor crops as the move in after hawthorn finishes flowering. Blossom weevil can be effectively controlled with thiacloprid e.g. Calypso (EAMUs), lambda cyhalothrin e.g. Hallmark (EAMU) can be useful for outdoor crops but is broad acting so may risk negative impacts of on natural vine weevil predators. Keep a keen eye out for damage, especially in 60 day crops and treat early although you're likely to see only a single generation in a season.

Slugs

Slug damage may be a concern, especially in field crops in the early season. Ferric phosphate pellets can provide effective control (and are permissible under some organic schemes) but you need to be careful to ensure none are carried over to punnets and may be unsuitable for PYO sites. Nemaslug drenches can be applied for effective control, but are best applied in high volumes of water on damp nights.

Spotted Wing Drosophila

SWD is a relatively new pest, of greater concern for raspberry and cherry growers. It is difficult to monitor free-flying adults, but you should have regular traps for monitoring of adult numbers. Regular applications of Tracer and Hallmark can be used for control.

Other Resources

Tyfu Cymu has prepared a number of resources on soft fruit pests and biological controsl to help you identify problems in your crops. One-to-one advice is still available for free through the project, please contact us if you'd like to access this.

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