Black vine weevil (*Otiorhynchus sulcatus*)

The black vine weevil *(Otiorhynchus sulcatus)* is a widespread agricultural pest which can cause significant impacts to berry crops, with growers of substrate Rubus and blueberry susceptible to the most damage.

Identification

Adult black vine weevils are approximately 7-10mm long, dull black in colour with orange-yellow tufts of hair along the abdomen and a distinctive snout

Adult weevils cannot fly but are capable of moving quickly between plants by walking

Larvae are milky white in colour with an orange-brown head and grow to around 10-12mm in length

Adult females lay eggs in spring, which hatch after 2-3 weeks and larvae burrow into the soil media in search of roots to feed on

Symptoms & damage

Adult black vine weevils emerge at night to feed in the canopy and damage can be observed through characteristic notching or feeding on leaf margins. While adults can cause substantial damage to vegetative plant growth, the most significant damage to berry crops is caused by larvae directly feeding on plant roots and girdling crowns. This impacts the plant's ability to uptake water and nutrients for growth and development.

Symptoms can vary between crops, damage in Rubus and blueberry is often exhibited as plant stunting or leaf yellowing due to the reduced root area lost to larvae feeding. Larvae can directly feed on blueberry plant crowns, girdling around the base to the cambium and damaging the important pathways the plant requires for water uptake. Serious damage will result in water stress or drought symptoms due to limited water uptake. This can result in plants presenting limited vegetative growth, chlorotic leaves and impacts to fruit quality and yield, with severe cases leading to plant death.

Monitoring

Small numbers of black vine weevil larvae can cause significant damage, and therefore monitoring for adult and larval presence is important. Adult weevils are rarely observed in the canopy as they emerge from around the plant base to feed at night, however presence of adults can be identified through characteristic notching on leaf margins.

Pest scouting should commence from early in the season to observe for leaf notching symptoms and adults may be found around the base of the plant, often under matting cover or around the media edges in substrate pots. Grooved boards can be used to monitor populations by providing a habitat for adults to congregate under and can be checked regularly.

Scouting for weevil larvae can be done by physically digging into the soil medium, particularly around the plant roots and crown where larvae reside. Larvae damage to crowns in blueberry plants can also result in the presence of fine frass around the base of the plant which indicates feeding damage. Early management is important as larvae can be difficult to find and by the time they are identified significant damage can occur.

Did you know?

All black vine weevils are female and reproduce parthenogenetically (egg development without fertilisation)

Black vine weevil adult.
Photo credit: Kent Loeffler, Cornell University

Black vine weevil larvae.
Photo credit: Ella Roper

Stunted plant growth due to black vine weevil feeding in raspberry. Photo credit: Kirsty Dickenson

1. Characteristic feeding or 'notching' from adult black vine weevil in raspberry. Photo credit: Kirsty Dickenson
2. Root break down due to larval feeding in substrate raspberry. Photo credit: Kirsty Dickenson
3. Stunted plant growth due to larval root and crown feeding in substrate blueberry. Photo credit: Ella Roper
4. Girdling from black vine weevil larvae in a blueberry crown. Photo credit: Ella Roper

Management

Biological control in the form of entomopathogenic nematodes is the most common and effective method of managing black vine weevil as chemical options are limited or non-existent, particularly in substrate production.

Biological

Entomopathogenic nematodes such as *Heterorhabditis bacteriophora* can parasitise black vine weevil and are an effective control if managed well. The nematodes can actively seek out weevil larvae in the substrate and invade the pests, before reproducing and releasing another generation for continued control. Infected larvae turn dark brown in colour and become slimy as they are broken down by bacteria released by the nematode activity.

Field scouting is important to determine when larvae are present in the soil or pot media. Applications should be done before pupation occurs as weevil pupae are more resistant to beneficial nematodes and they will not have the desired control. Nematodes are not active below 12°C and therefore applications should be done when temperatures are sufficient for nematode activity. Generally, nematode treatments are recommended in September and again in April before temperatures decline and nematode efficacy is limited, however the warmer conditions under protective tunnels likely increase the rate of reproduction and further treatments may be necessary. Nematodes can be applied either through the irrigation system or directly to plants as a liquid application. It is important to allow enough water to wash the nematodes into the rootzone. Nematodes are available through a number of stores in Australia via online order.

Cultural

While cultural controls for black vine weevil are limited, they are worth considering as part of the wider strategy. Aim to control weeds near the crop that can act as an alternate host for weevils, such as dandelion, dock, mallow, plantain and capeweed, as these will act as a habitat and food source for adult weevils. If planting into a location with previously high weevil populations, avoid planting immediately into soil as pest pressure will remain high. In field growing systems, tillage can disrupt the habitat of black vine weevil populations in the soil, and cover cropping with non-host plants can break the pest cycle, however this is not always practical between crops.

Chemical

Chemical control options for weevils more broadly are limited in berry crops and there are no products specifically registered or on permit for black vine weevil in berries. Therefore, it is important to monitor and control black vine weevil populations early with biological controls before populations and damage increases.

Summary

- Monitor crop for black vine weevil early in the season before damage occurs
- Observe canopy for characteristic weevil notching on leaves
- Entomopathogenic nematodes are the best option for controlling the pests currently
- Manage nearby weeds species that provide an alternate host for the insects

References

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