

Weevil Identification & Management In Blueberry

December, 2015

Intro

Most of the root weevil species that are pests in berry fields are invaders to North America from Europe, suspected to have been brought in on potted plants. *Otiorhynchus* species were first recorded in eastern North America in the early 1900s, and spread across continent. In blueberry field surveys in 2007 and 2012, 5 and 7 species were recovered in fields. All are implicated in plant damage. The main species are described below.

Damage

Weevil larvae feed on and girdle the roots, causing plants to decline, reduce yields, and can kill young plants. Weevil Adults feed on new growth, which can kill new buds and branches. Small plants can be heavily compromised or killed by weevils after only a year of feeding. Mature plants can decline and under-produce, or be killed after years of larval feeding. It is difficult to find larvae in root systems, but damage is relatively easy to find particularly if populations are increasing. Overall, blueberry plant decline appears to be a result of various factors including weevils, disease organisms, sub-optimal soil type, pH, and deep planting.



Fig. 1. Larval feeding damage to roots; callused margins



Fig. 2. Larval feeding damage to smaller roots, "tracking"



Fig. 3. Damage to new wood; twigs



Fig. 4. Adult feeding damage on foliage "notching"

Basic weevil life cycle:

Weevils have 4 life stages; adults, eggs, larvae and pupae. Weevils are primarily nocturnal, feeding in the evening and night and seek cover during the warmer days in the soil, or in shady plant foliage. There are 6-7 larval instars. Weevils spend about 10 months in the soil as larvae and pupae, where they are well protected. There is one generation a year. Adults can live for more than one year.

Most root weevil species that affect blueberries do not fly, but are strong walkers. Some species are all female, and lay viable eggs without mating, while some species have both males and females.



Larvae: in soil, 3-10 mm long.
No legs, brown head.



Pupae: in soil, 8-10 mm long

Main weevil species in berry crops:

Seven weevil species have been recovered in blueberry fields in surveys 2007-2012 and associated with plant damage. Regardless of species, significant root damage occurs in winter and early spring from over-wintering larvae. Six are shown here.



Clay coloured weevil
Otiorhynchus singularis

New adults emerge from the soil in March and feed on new buds and bark on 1-year old wood. Adults are inactive in the summer; there is limited evidence of feeding activity.



Black vine weevil
Otiorhynchus sulcatus

Biggest (1 cm) and most common. Larvae and some adults over-winter in soil. Pupates in May, new adults emerge mid-June, feed on foliage ('notching') for up to 4 weeks, then lay 100+ eggs from mid-July through August.



Obscure root weevil
Sciopithes obscurus

Life cycle timing is similar to Black Vine Weevil: adults are present in June. Adults are smaller with distinct wavy tan patterns.



Strawberry root weevil
Otiorhynchus ovatus

Smaller than Black vine weevil, ~ 5 mm long, black to plum-colored, with a rough surface and no spots; appears 'shiny'. Adults may appear later than Black vine weevil.



Rough strawberry weevil
Otiorhynchus rugosostriatus

Medium size, deep brown colour. Life cycle similar to Clay coloured weevil. Adults are inactive during July to mid-August. Rarely observed feeding on foliage; can find adults in soil & at base of plants.



Green immigrant leaf weevil
Polydrusus (sericeus) formosus

Shiny green, can fly, both males and females, up to 7 mm long. Adults are day feeders and can be found up high on the plant during May-June.

Monitoring

Adults: Look for ‘notching’ on leaves. Adults can be difficult to find on blueberries. Use a drop sheet or beating tray to collect adults from foliage. Do after dusk for best results for most species. Count the weevils that drop onto the sheet or tray.

Larvae: Look around plant roots for white larvae, and ‘tracking’ on roots from larvae feeding. Either pull up weak plants or excavate around roots. It is difficult to see damage on unwashed roots. Rate the damage as either low, medium, high, and old or current feeding damage.

Sample many locations within a field: Weevil distribution in a field is uneven, and the worst areas tend to be near field edges. Record the number found, and the species. If you are unsure, take the insects found or the entire plant (with roots) to the Plant Health Lab (B.C. Ministry of Agriculture) for verification.

Numbers of weevils collected cannot predict amount of damage. Knowing change over time is useful, i.e. is weevil presence increasing or changing in a field? What species is here? Pay particular attention to poor areas, borders, and new fields.

Management

If you find weevils, or recent damage to roots when monitoring, take action. If a weevil problem is occurring in an established field, it will take a few years of diligent management to clean it up. A multi-year, ongoing approach to weevil management is necessary.

Prevent weevil establishment: Weevils usually move in from wild areas along the field edges or can be introduced in containers (particularly if those containers have been sitting by hedgerows or wild treed areas for some time before planting out). Ensure planting stock is free of weevils.

Foliar insecticides for control of adult weevils are registered for use in Canada. For best results, it needs to be warm enough so that the adults are up and actively feeding, which can be a challenge if evenings are still cool or rainy in spring and early summer. Coverage is important; depending on the species, they can stay down low on plants in sucker growth (i.e. rough strawberry weevil), or be up high during day time (i.e. green weevil). Registered insecticides for weevils in B.C. are: Exirel (cyantraniliprole), Actara 25WG (25% thiamethoxam), and Malathion 85 E (85% malathion). Admire (imidacloprid) as applied for aphid control will also help to suppress weevils if adults are present at time of spraying. Some spotted wing drosophila sprays may help control weevils. ([see Berry Production Guide for details](#))

Beneficial nematodes: Some species have shown adequate suppression of weevil larvae. Plan to use nematodes when larvae are young and close to the soil surface (Aug-Sept). *Remember:* nematodes need moisture to move and survive; water soil before and after application, apply in a band application of nematode solution along the base of plants.

Met 52 (*Metarhizium anisopliae*) mixed in media nursery stock will protect plants for two years. Met 52 drenched in established in-field blueberry plants does not work well (trials in Oregon). Met 52 is currently registered for use in Canada in some crops including nursery stock (non-food plants) and strawberries.

Where to get more information:

B.C. Berry Production Guide
B.C. Ministry of Agriculture Plant Health Lab
Washington State University
Oregon State University