

INSECT CONTROL RECOMMENDATIONS FOR MINT PRODUCTION IN IDAHO

Craig R. Baird, Hugh W. Homan, Eric P. Eldredge

Insects and mites damage spearmint and peppermint plants and in many cases must be controlled for growers to obtain maximum oil yields. This publication describes the common pests that attack mint, their seasonal cycles, injury, and control methods.

When you find an infestation, identify the insects correctly to avoid needless insecticide applications. (For additional details on life cycles and control, consult PNW 182, *A Guide to Peppermint Insect and Mite Identification and Management*).

Cutworms and Loopers

Several cutworm species cause damage by feeding on emerging plants in early spring. Other species damage plants in mid- to late-season. The **army cutworm**, **redbacked cutworm**, **spotted cutworm**, or other species can cause early spring damage. These cutworms overwinter as partially grown larvae and begin feeding when the mint starts growing in the spring. The redbacked cutworm, however, overwinters as an egg and is active slightly later in the season. Cutworms are nocturnal feeders. They spend the day under dirt clods or beneath the soil surface.

The first sign of cutworm damage is when the mint is not growing, or only part of a mint field is growing in the spring. If you examine mint plants closely and find the underground rhizomes are cut off or seriously damaged, cutworms may be nearby in loose soil or plant debris.

To assess cutworm damage and estimate population levels, sample at least 10 1-square-foot plots to a depth of 2 inches throughout the field. In newly planted fields, use an insecticide if an average of at least one cutworm per square foot sample occurs. In well-established, healthy mint fields, apply an insecticide treatment only when the average number of cutworms exceeds five per square foot sample.

Mid- to late-season cutworm or looper damage is caused by foliar feeding caterpillars, such as the **variegated cutworm**, **spotted cutworm**, and **loopers**. By examining the growing mint plants, you may find foliar injury from these worms.

Assess the cutworm population by sampling with a 15-inch-diameter sweep net when the mint is at least 6 inches high. Take several sets of 5-sweep (90 degree sweep) samples in several areas of the infested field. Apply appro-

priate insecticide if you find an average of three cutworms per sweep.

Assess the looper population by sampling in the same way. If you find an average of 5 or more 1/2-inch or longer loopers per sweep, apply an appropriate insecticide. Since larger, more mature caterpillars are difficult to control, apply insecticide when the loopers are small for maximum kill.

Aphids

The **mint aphid** is an occasional pest of mint and the only aphid normally found in Idaho mint fields. Aphids weaken mint plants by sucking their plant fluids, causing wilting and water stress. Stressed plants are more susceptible to mite injury and invasion from other minor pests, such as **mint stem borer**.

The mint aphid spends the summer on mint leaves and stems, eventually moving to its alternate host, wild hawthorn to overwinter. Mint aphids frequently occupy mint fields during the growing season; however, you should not allow aphid populations to build to high levels that cause plant wilting and obvious water stress. When aphid populations increase to 15 to 20 per sweep, apply an appropriate insecticide.

Mint Flea Beetle

The **mint flea beetle** is another pest that causes greater concern than its damage warrants. This is a tiny, oval, brown beetle with large hind legs for jumping. Eggs overwinter in the soil and hatch in the spring. The slender white larvae bore into mint roots causing the most severe damage. This larval feeding is first noted in the spring when the mint stand does not "green-up." Close examination reveals 1/32-inch holes or tunnels in the roots. Heavy populations can cause large areas of dead or weak mint. The adult flea beetle emerges in early July and feeds on the leaf surface causing a shot-hole appearance as the mint matures.

Shot-hole damage by itself does not warrant insecticide treatments. You may have significant numbers of flea beetles in a field and be unable to find any evidence of shot-holes on the leaves and have no root damage the following spring.

If symptoms develop early in mint and you find larvae in the roots, apply a foliar insecticide to control adult beetles in mid-July before they lay more eggs. Insecticidal control of

the larval stage in the soil is ineffective; however applying BioVector nematode to the soil is very effective if moist soil conditions can be maintained.

Two-Spotted Spider Mite

The **two-spotted spider mite** is found in all commercial varieties of mint in Idaho but not always at pest levels. The mite causes much more damage in summers with early and prolonged hot periods. Water-stressed fields are more likely to suffer mite damage.

The adult spider mite overwinters in soil cracks beneath dead plant debris. Adults lay eggs on the undersides of leaves. Depending on temperature, eggs hatch in 4 to 5 days, and the life cycle is completed in another 14 to 16 days. This mite completes many generations in one season.

Spider mite injury appears as small silvery or dry spots on the upper leaf surface. Severely damaged leaves eventually turn brown and drop. Mite population buildup occurs in localized areas of the field; some portions may be severely damaged while others remain uninfested.

To evaluate the mite infestation, select areas of the field with a history of mite damage early in the season, paying particular attention to dry and dusty areas. In late June, begin weekly sampling to determine the need for miticide treatment.

To sample for two-spotted spider mites, select 50 leaves, and examine the underside using a hand lens. When leaf counts exceed an average of five mites per leaf, populations can increase rapidly and damage the crop. If leaf counts in several areas of a field reveal five or more mites per leaf, apply an appropriate miticide. This decision should consider such factors as stage of growth, time to harvest, moisture conditions, and presence of mite predators.

Naturally occurring mite predators, such as predaceous mites, minute pirate bugs, lacewings, and small, black lady beetles, occupy mint fields, but there are usually too few to reduce spider mite populations significantly when plants are severely stressed. An average of one predator for every two leaves may control the mite population without requiring miticide treatments. Without the predators to control two-spotted mite populations, these harmful mites can multiply rapidly.

Excessive insecticide treatments can destroy predator populations. Kelthane, in particular, harms predator mites. Fields that are fall flamed usually have lower mite populations the following spring. Fall plowing or cultivation also reduces mite populations the following spring.

Mint Root Borer

The **mint root borer** is a serious pest of peppermint in Idaho. It is a minor concern in spearmint or citrata varieties.

Peak emergence of the light brown, 1/2-inch adult moths occurs in mid-July. Larvae hatch from eggs deposited on the undersides of leaves and then feed for a short time before moving to the soil to feed inside the rhizomes. Once inside, the larvae hollow out and eventually kill the plants. This

damage occurs from August through October.

Evaluate infested fields by carefully digging and screening several square-foot soil samples (3 to 4 inches deep) in suspect areas. To detect infestations, to compare infestations from year to year, or to compare pretreatment and posttreatment, count root borer larvae from soil samples. Direct control efforts toward developing larvae in the early fall. Apply insecticides postharvest between August 15 and October 1, irrigating or cultivating them into the soil. Treatment levels for mint root borer have not been established, but here are some guidelines:

- New fields (1 to 2 years old) should be treated if any root borer larvae are found. This will prevent the infestation from growing in subsequent years.
- Older fields (3 to 5 years old) should not be treated if the grower plans to remove the mint and not harvest another crop. The larvae will not develop on a nonpeppermint rotation crop.
- Intermediate-aged fields should be treated if in good vigor and if the grower plans to harvest the following year.
- Apply appropriate insecticide to any fields from which you sell root stock if you find any borer larvae in soil samples.

Several cultural control methods are useful in reducing root borer populations. Field trials show that cultivation, disking, or shallow plowing of mint fields after they have gone dormant reduces mint root borer populations by 80 to 90 percent. (See PNW 322, *Mint Root Borer in the Pacific Northwest*, for details on life cycle and control.)

Minor Pests

The **mint stem borer** is a small (1/8-inch), black weevil whose white larva can be found boring into mint plants at the soil line. The larvae bore up into the stem or down into the rhizome. Healthy, vigorous mint can withstand stem borer infestation, whereas plants stressed from other causes (disease, fertilizer, moisture, etc.) may suffer serious damage. No insecticides are registered specifically for stem borer control; however, insecticides applied for loopers and aphids during mid-June reduce stem borer populations. In most instances, the stem borer does not justify control. (See CIS 808, *The Mint Stem Borer in Idaho*, for more details.)

The **garden symphylan** is a tiny, white centipede-like pest that does not usually cause economic damage in Idaho mint. It overwinters in the soil as an adult or nymph, becoming active in the spring. Numbers increase from April through August as eggs hatch in the soil and the new nymphs develop and mature. There are one or two generations of garden symphylans each year. They feed on the plant root systems, including mint, and, at high numbers, reduce plant vigor and delay growth.

To estimate the symphylan population, sample 25 to 30 sites per field, counting the number of symphylans per shovel in the top 6 inches of moist soil. If samples show an av-

Insecticide Recommendations for Mint Insect Control

Pest	Active ingredient (lb/per acre)	Time between last application and harvest; guidelines
Cutworms	Lorsban - 1 to 2	90 days. Treat during May and June when field counts indicate damaging populations are developing or present. When larvae are less than 3/4-inch long, use 1 lb. When larvae are 3/4-inch or more in length, use a higher rate. Apply at least 10 gallons of spray per acre. Apply only once during the growing season.
	Orthene – 1	14 days. Use 20 to 100 gallons of spray mix per acre by ground or in 5 to 10 gallon spray mix per acre by air. Begin applications when eggs or larvae first appear. Do not apply more than twice per season.
	Methomyl – .9	14 days. Variegated cutworm only.
Loopers	Malathion – .9	7 days.
	Orthene – 1	14 days. Use 20 to 100 gallons of spray mix per acre by ground or 5 to 10 gallons of spray mix per acre by air. Begin applications when eggs or larvae first appear. Do not apply more than twice per season.
	Methomyl – 0.9	14 days.
<i>Bacillus thuringiensis</i>		0 days. Treat when larvae are young before the crop is heavily damaged. Follow manufacturer's label directions.
Aphids	Orthene – 1	14 days. Use 20 to 100 gallons of spray mix per acre by ground or in 5 to 10 gallons of spray mix per acre by air. Begin applications when you find 15 to 20 aphids per sweep. Do not apply more than twice per season.
	Metasystox-R – 0.75	14 days.
Mint flea beetle	Malathion – 1	7 days. Apply foliar spray after adults emerge in early July.
	Methomyl – 0.7 to 0.9	14 days. Apply foliar spray after adults emerge in early July.
	BioVector	0 days. Apply 3 billion nematodes per acre between April and June when larvae are present. Note the application and irrigation requirements listed on the label.
Spider mites	Kelthane EC – 1.2	30 days. Do not apply more than once per crop season. Do not feed treated hay or spent hay to livestock.
	Omite – 1.5 to 2.25	14 days. Apply in at least 10 gallons of water by air. Do not apply more than twice per year. Do not feed treated mint to livestock.
	Comite – 1.6 to 2	14 days. Apply in at least 10 gallons of water. Do not apply more than twice per year. Do not feed treated mint to livestock.
	Metasystox-R – 0.75	14 days. Mite suppression only. For established infestations, apply twice, 10 to 14 days apart.
Mint root borer	Lorsban – 2	90 days. Apply postharvest only for mint root borer when field counts indicate damaging populations are present. Apply between Aug. 15 and Oct. 1 when larvae are visible in rhizomes and surrounding soil. Follow treatment with approximately 1 acre-inch of sprinkler irrigation to incorporate insecticide into soil. Make only one postharvest application per season. Do not apply preharvest for this pest.
	BioVector	0 days. Preharvest application: Apply 2 billion nematodes per acre. Postharvest application: Apply 1.5 to 2 billion nematodes per acre. Note the application and irrigation requirements listed on label.
Garden symphylans	Dyfonate – 2	Apply broadcast and incorporate into the soil by disking before planting or on established plantings before spring growth. Do not apply terbacil (Sinbar) for at least 3 weeks before or after Dyfonate application.
Strawberry root weevil	BioVector	0 days. Apply 3 billion nematodes per acre during the spring and fall when larvae are present. Note application and irrigation requirements on the label. Application conditions are critical when using BioVector. Follow instructions carefully or you may get unsatisfactory results.

- **If the cleaner is accidentally ingested or splashed in the eye, what is the appropriate treatment to minimize injury?**

erage of 10 or more, plants can suffer damage. Symphylans tend to occupy localized areas of a field, and control may not require insecticide on the entire field.

The caterpillar of the **painted lady butterfly** is frequently found on Canada thistle and related weeds. In rare outbreak years, these caterpillars invade mint and damage foliage.

The **false celery leaftier** caterpillar is found in many mint fields but seldom at levels requiring control. This tiny caterpillar feeds in mint terminals, eventually webbing the terminal leaves together forming a cocoon.

The **strawberry root weevil** and **black vine weevil** are 1/2-inch long black or brown weevils, and are occasional mint

pests in Idaho. The legless white larvae feed on mint rhizomes causing girdling and eventually killing the root system. The adults emerge from early to mid-June. Apply insecticides to control adults before they lay eggs (approximately June 20 in southwestern Idaho). Insecticides are the most effective in controlling adult weevils if applied late evening or after dark. Effective control of the larval stages is not possible with traditional insecticides currently registered for mint; however, BioVector nematode sprays applied as a soil treatment in the spring or fall are very effective if moist soil conditions can be maintained.

Insect Control Precautions and Recommendations

1. Do not use the mint hay or spent hay for food or animal feed unless stated on the labels of all spray products used.
2. Always protect pollinators. Wait until the pollinators have left the field before applying insecticides. Choose insecticides that are least toxic to pollinators.
3. Thorough coverage is necessary for insect and mite control.
4. Do not allow spray to drift to neighboring crops.
5. Buffering increases effectiveness of certain insecticides.
6. For more information, contact the Extension agricultural agent in your area.

The authors — Craig R. Baird, Extension entomology specialist, Parma Research and Extension Center; Hugh W. Homan, Extension entomologist, Moscow; Eric P. Eldredge, postdoctoral researcher, Caldwell Research and Extension Center. All are in the UI Department of Plant, Soil, and Entomological Sciences

Methomyl, Dyfonate, and Metasystox are especially hazardous to applicators. Follow label instructions precisely when storing, handling, and applying these poisonous materials. Post fields as required to prevent others from entering. Dispose of containers as label directs.

Pesticide residues —These guidelines are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow label for dosage levels, number of applications, and minimum interval between application and reentry or harvest.

To simplify information, trade names have been used. No endorsement of named products is intended nor criticism implied of similar products not mentioned.

Groundwater —To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.