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APR 05 1988

The Mint Stem Borer in Idaho

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The mint stem borer (*Pseudobaris nigri-na*) is a new pest in the mint-growing areas of Idaho and eastern Oregon. In the mid-1970's, this small weevil was found infesting commercial peppermint and spearmint fields in southwestern Idaho, mainly in Ada and Canyon counties. It has been found in Payette County and across the Snake River in Malheur County, Oregon.

Description and Life Cycle

The adult stem borer is a black weevil $\frac{1}{8}$ -inch long (Fig. 1) that begins flying in late May to early June. Mating begins soon afterward, and mating pairs may be found into late June. After mating, females chew a hole in the mint stem near the soil line and deposit a single egg in the wound, usually laying only one per stem. Each female is capable of laying up to 100 eggs during a season.

Eggs hatch by late June. The larvae begin feeding on the soft tissues around the egg deposition sites, then penetrate to the center of the stems and usually burrow down into the rhizomes. Some larvae may burrow upward into the stems (Fig. 2). The main feeding and larval development period lasts 3 to 4 weeks extending into late July, although some larvae may be found inside the plants as late as October. The earliest pupae are found inside the rhizomes or stems at the end of their feeding tunnels during late July. Adult weevils emerge from their pupal cases after 2 weeks. One generation per year occurs in most fields, but a partial second generation may occur in late fields. The late-season

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Fig. 1. Adult stage, mint stem borer.

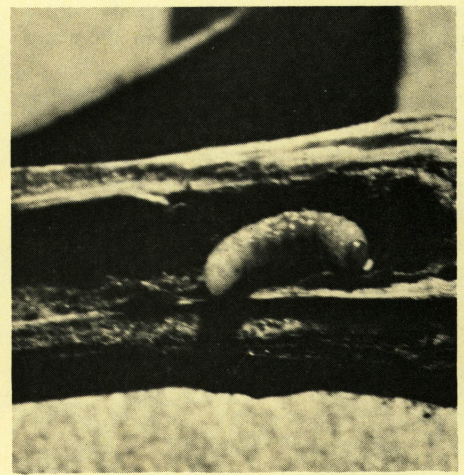


Fig. 2. Larvae inside stem. Note feeding damage.

immature stages do not survive the winter unless they complete development and overwinter as adults inside hollowed out mint plants. Some adult weevils overwinter outside the plant in soil debris. See life cycle summary on next page (Fig. 3).

Host Plants

In Idaho and eastern Oregon, the mint stem borer infests all species of commercially grown mint including peppermint, spearmint and citrata. In addition, several weeds such as wild mint, golden rod and *Kochia* are hosts of this insect. Other crops grown in the Idaho-Oregon area are not affected.

Damage and Symptoms

Stems of infested plants become weakened near the soil line where the eggs are laid and the resulting larvae have fed on the plant tissue. A general weakness of the infested plants occurs with the early visible symptoms of yellowing, wilting and lodging. Young mint plants are often killed back to the soil line, but new shoots emerge

from the rhizomes. In established stands where numerous shoots emerge from a complex of rhizomes, only stems directly associated with infested rhizomes show symptoms. Secondary bacterial decay is often associated with larval feeding areas.

Healthy, vigorously growing mint does not usually show symptoms or yield loss despite high numbers of adults present in the field. Mint fields that are 3 to 5 years old or mint that is under stress (water, fertilizer, root disease, etc.) are affected by stem borer infestation to a much greater extent. The weevil prefers spearmint, typically causing slightly greater damage in spearmint fields than in peppermint or citrata.

Spread

The weevils can move from field to field in several ways. Adults are strong fliers and during the late spring can readily move several hundred yards in short flights. The pests can also be spread when infested plant material or root stock is moved to new areas.

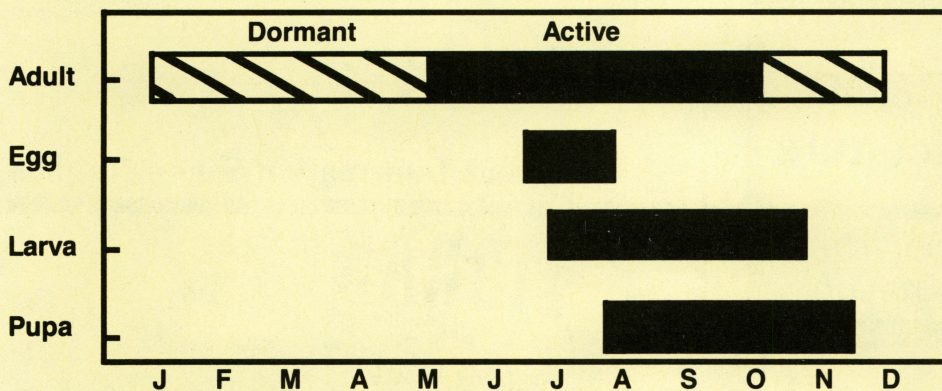


Fig. 3. Life cycle summary.

Sampling Mint for Stem Borer

A standard sweep net is useful for detecting the presence of adult weevils in a field and for determining when they are active. This species tends to stay low on the plant, however, so they are not readily picked up in a net. Thus, the sweep net is inefficient, but it is the only tool for adult sampling at this time. In addition to sweep-net sampling for adult weevils, growers may wish to assess the actual infestation of larvae in mint plants. To do this, cut random samples of 10 mint plants and examine the center of stems and rhizomes for feeding damage or larvae. Sample several areas in each field and total the results to get an accurate estimate of the percentage of plants infested. The best time for sampling is from late June through July.

Economic Value

In most instances the mint stem borer is not an economically important pest. That is, it does not cause sufficient damage to justify insecticide treatments. Without question, the insect causes damage, but damage to date has been minimal to mint stands as a whole. In Idaho studies, only a few fields have had significant stem borer damage, with up to 25 percent of the stems showing apparent borer symptoms of serious wilting, yellowing or death. These fields were also under severe fertilizer or disease stress, but many plants died without evidence of stem borer damage. Stem borer larvae seem to cause greater damage among stressed plants. Conversely, young, healthy mint stands tend to incur only light infestations in spite of heavy adult breeding populations in the mint canopy. Older mint fields nearing the end of production may be "finished off" by a severe stem borer infestation if stressed by other fac-

tors. The worst infestations with the greatest damage have occurred in 4- to 5-year-old fields that should have been rotated out of mint production the previous year.

Control

Avoiding stress to the mint plants is the best way to control the stem borer. Irrigation and fertilization must be properly managed to avoid excesses or deficiencies, regardless of the age of the stand. Crop rotation is another key tool to maintaining healthy, vigorous mint and preventing stem borer damage. While we cannot recommend a specific crop sequence, we suggest growers plow out the mint when it becomes mediocre in production, and replant to a non-mint crop for 1 to 2 years.

Weed control during mint producing years is important since wild mint, golden rod and *Kochia* are plants in which the stem borer larvae can develop. Ditch banks, roadways and waste areas must also be kept free of these hosts if stem borer populations are to be reduced or eliminated during years of non-mint production. When fields are being planted or replanted to mint, the grower should make every effort to select root stock from fields that are free of the stem borer.

Insecticide control of the stem borer is difficult because the larvae are concealed and the adults are exposed for only a short period before they begin laying eggs. The adult is active from late May into mid-June. Insecticide sprays applied for aphids or loopers during this time period (June 7 to 21) are moderately effective in killing the adult stem borer as well. No insecticides are registered specifically for the stem borer. No insecticides, systemic or otherwise, are effective in controlling developing stem borer larvae inside the stems or rhizomes. Extensive small plot tests with

soil- and foliar-applied systemic and residual insecticides, even at 10 times the recommended rate on other crops, failed to reduce the stem borer population. Therefore, we do not recommend insecticidal control once the larva is inside the stem.

Situations that justify insecticide use if plants were infested with stem borer larvae the previous year are:

1. In fields used for root stock increase.
2. In fields where mint roots will be dug and used for replanting in new fields, especially if the mint is to be sold and replanted out of state.
3. In newly planted mint (baby mint) if the field was formerly in infested mint and the field has not been rotated to a non-mint crop.

Summary of control recommendations:

1. Positively identify the pest. Stem borer larvae can be confused with mint root borer larvae, although the seasonal occurrence of the two pests is quite different.
2. Rotate the field out of mint when production declines. Don't try for an extra year when the stand has declined due to disease and insect damage.
3. Avoid stressing the mint plants. Maintain optimum fertilizer and moisture conditions.
4. Maintain proper weed control, especially *Kochia*, golden rod and wild mint, which serve as alternative hosts for stem borer larvae. This includes waste areas, ditch banks and roadways.
5. Eliminate golden rod, *Kochia* and volunteer mint plants during years of non-mint production.
6. Before planting fields to mint, select root stock from noninfested fields.
7. If applying foliar sprays for control of aphids or loopers in fields also infested with adult stem borers between June 7 and 21, spray during the warmer periods of the day. Sprays applied between June 7 and 10 are most effective. Apply sprays at high pressure and high gallonage and with drop nozzles to get the spray down around the base of the plants.
8. Do not attempt to use foliar sprays, soil insecticides or granular systemics to control stem borer larvae already in the stem. No insecticides are registered for this use, nor have any been found to be effective.
9. Do not apply foliar sprays to blooming mint adjacent to honey bee, leafcutting bee or alkali bee areas.