Purdue University
Department of Entomology
Undergraduate Capstone
Project Summary

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Project Title:

Home Gardener and Green Bean Pests – A Purdue Extension Entomology Factsheet

Project Summary:

PURDUE UNIVERSITY

PURDUE EXTENSION

Vegetable Insects

Department of Entomology

The Home Gardener and Green Bean Pests

Ruth Allhands

There are a number of common insect pests that infest green beans. The identification of these insect pests is the first step in curbing them.

Seedcorn Maggot

The adult looks like a small housefly that is dark grey in color with wings that overlap the body when the fly is at rest. The maggot is ¼ inch long, yellowish-white, legless, and has a wedge-shaped head-end.

Life Cycle and Damage

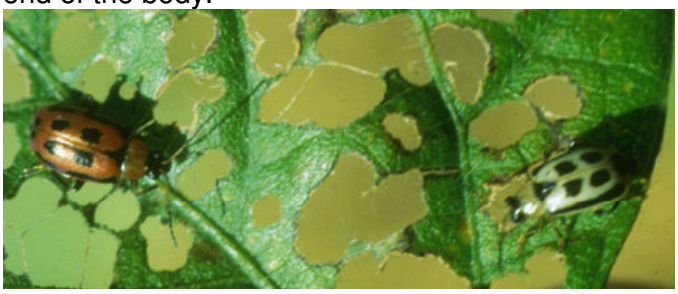
Seedcorn maggots overwinter as pupae in the ground. Adult flies come out in the spring sometimes in large swarms. Adults mate and lay eggs in organic matter or on seeds. The larvae tunnel into seeds and feed or eat the surfacing plant. This can cause the green beans to not come up or appear damaged upon arrival from the soil.

Control measures

Cultural controls	Row covers, shallow planting, no rotting organic matter incorporated into soil in the spring
Organic pesticides	Not recommended
Synthetic pesticides	Not recommended

Bean Leaf Beetle

The adult is ¼ inch long, yellow, tan, or red in color and has a distinctive black triangular mark on its wing covers directly behind the thorax. It often has 2 black spots on each wing cover and a black band that extends around the outer edges of the wing cover or can have no marking at all. The larval stage is white, with a segmented body, a brown head and a brown hardened area at the posterior end of the body.



Life Cycle and Damage

The bean leaf beetle (BLB) adult overwinters and emerges in the spring to begin feeding on emerging legumes including green beans. Overwintered adults mate and lay eggs after feeding. The larval and pupal stages cause minimal damage to legumes. Once the first generation bean leaf beetles become adults, they chew tiny round holes in the leaves of green beans. When the green beans begin producing pods the bean leaf beetles chew holes in them as well. The cycle continues with the second generation bean leaf beetles. Large infestations can cause severe damage to green bean plants.

Control measures

Cultural controls	Handpicking, row covers
Organic pesticides	Neem, pyrethrum, M-trak (larvae only)
Synthetic pesticides	Carbaryl, diazinon, cyfluthrin

Mexican Bean Beetle

The adult is 5/16 inch long and copper colored with 16 black spots on wing covers. The larva is yellow and covered with large spines.

Life Cycle and Damage

Adults overwinter and emerge in the spring to feed. Adults mate and lay eggs on the bottom of bean leaves. The eggs hatch into the larvae which cause much damage to green bean leaves. Both adults and larvae feed on the leaves of beans but adult feeding habits tend to eat the entire leaf tissue in between leaf veins whereas larvae eat away only the top of the leaf tissue. The Mexican bean beetle also feeds on bean stems and pods, though less damage is done to them than the leaves. The Mexican bean beetle can cause severe defoliation of green bean leaves.

Control measures

Cultural controls	Handpicking, row covers
Organic pesticides	Neem, pyrethrum, M-trak (larvae only)
Synthetic pesticides	Carbaryl, diazinon, cyfluthrin, M-trak (larvae only)

Potato Leafhopper

The adult is 1/8 inch long, lime green, and has six white dots behind its head. Also its head is wider than its body, which gives the insect a wedge-shaped appearance. The nymph looks much like the adult only it is smaller, wingless, and paler green in color.

Life Cycle and Damage

Potato leafhopper adults migrate into Indiana on winds from the warm southern climates where they overwinter. Arriving typically sometime in May, potato leafhopper females lay eggs in the stems of green beans. The eggs hatch in 7-10 days and nymphs molt five times before reaching the adult stage in about two weeks. Usually there are two generations in Indiana although there can be more.

Both nymphs and adults feed on the leaves on green beans, by sucking juices out of the plant and causing the leaves to curl and turn brown. Additionally, potato leafhoppers inject toxins from their saliva into the plant causing 'hopperburn.'

Control measures

Cultural controls	Row covers
Organic pesticides	Neem, pyrethrum
Synthetic pesticides	Diazinon, malathion, endosulfan, dimethoate, cyfluthrin

European Corn Borer

The adult is a small yellowish-buff to light tan moth with several dark zigzag markings across its wings and a wingspan of ¾-1 inch. The larva is a dirty white caterpillar often with pinkish tinge and numerous dark spots on the body.

Life Cycle and Damage

Larvae overwinter in host plants, including green beans; pupate; then emerge as adults who mate and lay eggs in host plants. Larvae hatch from the eggs and feed on leaves, leaving small round holes as evidence. The larvae pupate in plant matter and become adults. The second generation is typically the one to overwinter.

Control measures

Cultural controls	Row covers, handpicking, early planting
Organic pesticides	*Bacillus thuringiensis* products, pyrethrum
Synthetic pesticides	*Bacillus thuringiensis* products, endosulfan, cyfluthrin

Corn Earworm

The adult is a yellowish moth with dark spots or lines on wings and a wingspan of 1.5 inches. The larva grow nearly 1 ¾ inches in length and vary from yellowish-white to greenish-yellow, reddish, or brown with light longitudinal stripes, black spots, and brown to orange heads.

Life Cycle and Damage

In southern Indiana, corn earworm pupae can overwinter in the soil, although the insect cannot survive the winter in most of the state. The corn earworm reaches the northern portion of Indiana on winds from the south. The arriving adults feed on beans causing holes in the leaves and the pods. The adults mate and the females lay eggs on the leaves of green beans, which hatch into larvae. The larvae also feed on both the leaves and the pods and can tunnel into pods in order to feed on seeds.

Control measures

Cultural controls	Row covers, handpicking, early planting
Organic pesticides	*Bacillus thuringiensis* products, pyrethrum
Synthetic pesticides	*Bacillus thuringiensis* products, endosulfan, cyfluthrin

Control Measures

Cultural

Handpicking is an effective means of removing individual pests from green beans when the insects are large, slow-moving, and in small numbers. However if pest populations reach intolerable levels other methods may have to be pursued.

Early planting is an effective method against foliage feeding insects because it allows the plants to gain an advantage over the insects.

Row covers are an option to keep insect pests from injuring green beans. There are two main types of row covers: supported and floating. Supported row covers are held up above growing plants by wire hoops. Floating row covers lie directly on top of the plants and the edges are sealed by weighing them down. The floating row covers come in perforated plastic, spunbonded

polyester, and spunbonded polypropylene. The perforated plastic is not recommended as the ventilation holes allow insects inside the row cover. Row covers do have several disadvantages such as weeds growing along with the green beans, and insects emerging from the soil under the row cover. Floating row covers require less assembly than supported ones but are more susceptible to high winds. Both types of row covers are relatively expensive and fairly short-lived.

Organic

Bacillus thuringiensis (Bt) is an organic method because it is a naturally occurring bacterial disease of insects. Bt stops insect pests from feeding, causing death by starvation in a matter of days. Bt is non-toxic to humans and animals and is safe for use on food crops. However, Bt degrades quickly and has little residual activity.

Pyrethrum is the extract of chrysanthemum flowers from which pyrethrins are made. Pyrethrins affect the central nervous center of insects by generating excessive electrical impulses. Pyrethrins are low in toxicity to mammals and are rapidly degraded in sunlight.

Neem is an extract from the seed of the neem tree (*Azadirachta indica*). The active ingredient is Azadirachin, which disrupts the insect molting process. Neem also reduces insect feeding and mating and can act as an insect repellent. Neem is considered low toxicity to mammals and degrades quickly with ultraviolet light and rainfall.

M-trak is a type of Bt that is placed into dead bacteria cells and is only effective against specific larval instars. M-trak is susceptible to washing off in the rain.

Synthetic

Carbaryl is a carbamate insecticide that disrupts the insect nervous system by impeding nerve signals. It is moderately toxic to humans and extremely deadly to honey bees.

Diazinon also interrupts the insect nervous system. It is highly toxic to honey bees and also is toxic to fish, birds, and aquatic invertebrates.

Cyfluthrin is a pyrethroid insecticide that attacks the insect nervous system. It is extremely toxic to aquatic organisms including fish, and also honey bees. It is relatively non-toxic to mammals.

Malathion is an organophosphate insecticide that hinders the insect nervous system. It has a large range of toxicity which is dependent on the dosage and method of exposure.

Endosulfan is a chlorinated hydrocarbon insecticide that is considered highly toxic.

Dimethoate is an organophosphate insecticide that is considered moderately toxic.

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