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CONTROL OF INSECTS IN DRY BEANS AND SOYBEANS

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A summary of how to check fields of dry beans and soybeans for insects is given in Table 1. Note that problems with some insects can be anticipated even before the field is planted. Small plants are especially susceptible to insect damage. Fields should be checked for insects especially frequently when the plants are small. The insects tend to be most abundant in wet, weedy areas of a field and in the borders of bean fields adjacent to weedy fields. These areas should be especially well checked for insects. Notes on how to recognize the insects are given below, and recommendations on the control of the pests are summarized in Table 2.

White Grubs and Wireworms

The adults of the white grub (May beetles or June bugs) and the adults of the wireworms (click beetles) usually lay their eggs in grassy fields, sod, old pasture and weeds. The larvae that hatch from these eggs feed on the roots of grasses and on the roots of beans that may be planted in these fields. The larvae can persist and cause damage for two years after the sod has been plowed down. The white grubs have white, thick, soft, cylindrical bodies and curl into a c-shape when disturbed. They have a definite head, six small legs just behind the head, and range up to 1 1/2 inches in length.

Wireworms have tan, hard, thin, cylindrical bodies. They also have a definite head and six small legs just behind the head. Neither white grubs nor wireworms have fleshy legs near their rear. Look for white grubs and wireworms in plow furrows while fitting the land, and apply an insecticide if they are easily found. Check the roots of wilting seedling plants for feeding and the soil around each plant for the grubs or worms. If there is still time, these affected areas and a margin around them may be disked, an insecticide applied, and the area replanted.

Apply the insecticide as a spray or granule to cover the soil surface. Work the insecticides into the upper layer of soil immediately after application. It is a good practice to apply the insecticide just before final disking.

Seedcorn Maggot

The seedcorn maggot is a whitish, spindle-shaped larva that lacks both a definite head and legs. The maggots tunnel into the seed and into the stems of the seedlings. Their damage appears as areas of poor stand or as weak, wilting seedlings. The adults of the maggots are small flies. They lay their eggs in soils that are high in organic matter (muck soils or fields that have had a lot of weeds, stubble or manure plowed down in them). The maggots hatch from these eggs and cause the damage to beans. Start looking for areas of poor stand as soon as the beans start to germinate. Check the seed and stems of the seedling for the maggots.

Seed treatment with an insecticide is the recommended control. It is best done by the seed dealer at the same time he treats the seed with fungicides. Seed treatment formulations of the insecticides are available for use in planting-box applications if ready-treated seed is not available. Follow instructions on the label of the seed treatment to be sure to obtain an even coating of the seed.

Cutworms

Cutworms cut the stems of small plants and eat the plant. They can be expected in fields that are weedy or poorly drained, but they can appear in any field. The cutworms are the larvae of the miller moths. They have a round, dark head; six small legs just behind the head, and ten fleshy legs at the back end of their bodies. Their bodies are dark-colored, soft and cylindrical. They curl their bodies tightly when disturbed and may try to bite when handled; their bite is painless and harmless.

Cutworms cut the plant at night and hide in the soil surface near the plants during the day. Check fields every few days following germination for plants that are cut at their bases. Search the soil around the cut plants for the cutworms and apply an insecticide if they are common in the field. If not controlled, the large cutworms can destroy a stand very quickly. Do not delay applying an insecticide if it is needed. Apply insecticides either as sprays or granules, in a band just wide enough to cover the plants.

Bean Thrips

Bean thrips are very small, oval-shaped insects that rasp the surface of the bean leaves and suck up the plant juices. Their damage appears as silvery areas on the underside of the leaves. Severely attacked plants will wilt quickly in dry weather. Bean thrips have been especially damaging during cool, dry spells early in the season. Young thrips (nymphs) are yellow to reddish and wingless. Adult thrips are dark grey to black and have two pair of feathery wings. Both nymphs and adults are active and, while small, can be seen running on the underside of the bean leaves.

Mexican Bean Beetle

The adult Mexican bean beetle is hard-shelled, about 1/4 inch long, round and cooper-tan with prominent black spots on its wings. Adults overwinter in sheltered places and move into the beans in early spring. Adults feed by eating irregular holes through the leaf from the lower surface of the leaf. Seedling beans should be checked for the adults and sprayed if the adults are common in the fields. Adults lay groups of orangish eggs in clusters of up to 50 on the underside of the leaves. The larvae that hatch from these eggs are oval, yellowish, have prominent spines on their back, and are up to 3/8 inch long. The larvae feed on the tissues between the veins of leaves. Their feeding gives the leaves a skeletonized appearance. Fields should be checked for the larvae and their damage, and a spray applied when damage is easily seen. The larvae are more damaging and harder to control than the adult. An early spray to control the adult may save extra sprays needed for larvae control.

Green Cloverworm

The green cloverworm is a cylindrical larva with a definite head, six small legs just behind the head and fleshy legs near the tail end of its body. The worm is light green, and has faint, narrow white lines running the length of its body. They range in size to nearly 1 1/2 inches long when fully grown and drop to the ground when disturbed. They feed by eating irregular holes through the leaf from the lower surface of the leaf. The worms are hard to spot on the leaves, but their damage is easily seen. Check fields for damage by looking for holes in the leaves, shaking the plant and counting the worms that are found. A spray is needed when 6 to 12 worms per foot of row are found.

Bean Aphid

Aphids are small, round, soft-bodied insects that are found in colonies on the stems and leaves. There are several species that damage beans. These range in color from pale green to almost black. The most common species is the bean aphid, which is black. Aphids suck

plant juices and inject a toxic saliva into the plant. This causes a general weakening of the plant and a curling of the leaves. Aphids excrete a sticky "honey dew" that often becomes covered with a sooty fungus. Check for aphids by looking for curled leaves and honey dew. Examine plants when these are seen, and apply an insecticide when nearly all plants have aphids on them.

Sprays are recommended for the control of aphids in beans. A row-crop sprayer or a weed-type sprayer that is carefully adjusted to completely cover the plant with spray are recommended.

Leafhoppers

Leafhoppers are small, spindle-shaped to oval, active insects. They range in color from pale green to dark grey. The potato leafhopper is the most common species and is pale green. Leafhoppers have the peculiar habit of running sideways when disturbed. They suck sap from the plant and generally weaken the plant when they are abundant. The potato leafhopper injects a toxic saliva into the beans that causes the leaves to curl and may destroy the plants. Check fields by looking at the underside of the leaves for sideways-running small insects. Apply a spray when about 5 or more leafhoppers are found per plant.

Plant Bugs

Plant bugs are active insects, oval to elongate in form and ranging from small to 3/8 inches in length. The most common species is the tarnished plant bug. This insect is oval, about 1/4 inches long, light grey to dark brown, and usually has a V-shaped mark in the center of its back. It sucks plant juices and injects a very toxic saliva into the plant. This saliva can blast flowers and young pods and leave stings ("dimple blemish"; hard, darkened spots) on the beans. Check the field at blossoming and again at the small pod stage. Apply an insecticide if the bugs can be easily seen in the field.

Twospotted Spider Mite

The twospotted spider mite, a relative of the spiders and only distantly related to insects, is a minute, rounded, eight-legged animal that feeds by sucking sap from the lower surface of the leaf. Affected leaves turn yellow to bronze and dry and fall off when severely attacked. A fine webbing with the small whitish to reddish mites under the leaves will identify the cause of the damage. Apply a spray as soon as the yellowing of leaves is noted. The mite is most abundant during dry spells, and several applications may be needed to obtain control of the mites during drought years.

Slugs

Slugs are not insects. They are mollusks related to the clam, snail and octopus. They feed at night by chewing irregular holes through the leaves of beans and hide

during the day in the soil near the bases of plants. The holes in the leaves and the slimy trails that they make on leaves are easily seen during the day.

A search of the soil and debris near the plants will reveal a soft, dark, slimy, rounded to elongate animal that ranges from 1/2 to 1 1/4 inches long. Slugs are most

abundant during cool, moist springs and are often damaging only in the wetter areas of the field. They can severely damage small plants when the slugs are abundant. Apply a spray to the affected area if their damage is seen on most plants in the area.

Table 1. Checking dry beans and soybeans for insect pests.

WHEN	WHERE	WHAT	WHY
BEFORE PLANTING	Field	Sod, old pasture, weeds High organic matter	Expect wireworm and white grubs. Expect seedcorn maggot.
GERMINATION	Areas of poor stand or wilting seedlings	Thick-bodied grubs in soil Slender, hard bodied worms in the soil Spindle-shaped maggots in seed or stem of seedling	White grubs Wireworms Seedcorn maggot
	Areas of cut plants	Cylindrical, dark worms near bases of plants	Cutworms
SMALL PLANTS	Areas of silvery plants	Very small yellowish to black active insects under leaves	Bean thrips
	Leaves	Irregular holes through leaves; brownish beetles under leaves Dark, slimy animals near bases of plants	Mexican bean beetle adults Slugs
LARGER PLANTS	Leaves	Irregular holes; cylindrical green worms under leaves Leaves skeletonized, yellow spiny grubs under leaves Leaves curled; small, sideways-running insects under leaves Leaves bronzed; fine webbing under leaves Leaves curled; small colonies of insects on stems and leaves	Green cloverworm Mexican bean beetle larvae Leafhopper Twospotted spider mite Aphids
	Leaves, flowers and green pods	Oval-shaped, active running insects, 1/4 to 3/4 inches long	Plant bugs

Table 2. Insecticides recommended for control of insects in dry beans and soybeans.

PEST	INSECTICIDE	AMOUNT OF ACTIVE INSECTICIDE	LIMITS ^a
SEEDCORN MAGGOT	diazinon dieldrin	2 oz/bu seed 1/2 oz/100 lb seed	Do not use seed for food or feed Do not use seed for food or feed.
WHITE GRUBS AND WIREWORMS	parathion ^b diazinon ^b chlordane ^b	4 lb/A 4 lb/A 4 lb/A	Apply prior to planting; do not contaminate ponds or streams. Apply prior to planting. Non-dairy farms only. Apply prior to planting.
WIREWORMS	Dyfonate ^b	4 lb/A	Dry beans only; apply prior to planting.
GREEN CLOVERWORM	malathion Guthion Sevin	1 1/2 lb/A 1/2 lb/A 1 lb/A	1 day dry beans; 7 days soybeans. 30 days dry beans; 45 days soybeans. 0 days.
CUTWORMS	Sevin Dylox	1 1/2 lb/A 1 lb/A	0 days. Dry beans only; 14 days.
MEXICAN BEAN BEETLE, BEAN THRIPS, LEAFHOPPERS, AND PLANT BUGS	Sevin malathion Guthion	1 lb/A 1 1/4 lb/A 1/2 lb/A	0 days. 1 day dry beans; 7 days soybeans. 30 days dry beans. 45 days soybeans.
APHIDS	malathion Trithion Cygon Systox Dibrom	1 1/4 lb/A 1/2 lb/A 1/2 lb/A 1/2 lb/A 1 lb/A	1 day dry beans; 7 days soybeans. Dry beans—2 applications per season; 21 days; soybeans; 7 days; do not use forage. Dry beans only; 1 day; do not use forage. Dry beans only; 21 days. 4 days.
MITES	Kelthane Dibrom Trithion Cygon Systox	1/2 lb/A 1 lb/A 1/2 lb/A 1/2 lb/A 1/2 lb/A	Dry beans only; do not use forage; 45 days. 4 days. Do not use forage; 2 applications per season; dry beans 21 days; soybeans 7 days. Dry beans only; 0 days. Dry beans only; 21 days.
SLUGS	Sevin	1 lb/A	0 days.

^aDays refers to the number of days between application and harvest.

^bApply prior to planting as spray or granules to cover entire surface of soil and cover with soil immediately after application.