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Research and Extension

Colorado Potato Beetle
Insect Pest of Vegetable Crops

Colorado potato beetle, *Leptinotarsa decemlineata*, a native of the U.S., is a destructive insect pest of certain plants in the Solanaceae (nightshade) family including potato, eggplant, and tomato. The larvae and adult can cause extensive plant damage if not managed. This publication provides information on biology and damage, and discusses the management strategies that can mitigate plant damage caused by Colorado potato beetle larvae and adults.

Biology

Colorado potato beetle adults are approximately ⅜ inches (9.5 mm) long, yellow-cream to orange, and oval-shaped with 10 black stripes extending lengthwise on the wing covers (Figures 1 and 2). The Colorado potato beetle adult overwinters in the soil. Adults emerge and become active in May or when early-planted potatoes are present. Adults feed for five to 10 days before females mate with males (Figure 3). Females lay clusters of 10 to 40 bright yellow-orange eggs on the undersides of potato leaves (Figure 4), which protect the eggs from direct sunlight. Females can lay up to 500 eggs over a four- to five-week period.

Figures 1 and 2. Adult Colorado potato beetles. (Photos: Raymond Cloyd)

Figures 3 and 4. Colorado potato beetle adults (male and female) mating (left) and egg cluster located on leaf underside (right). (Photos: Raymond Cloyd)

Larvae emerge (eclose) from eggs in three to 10 days, depending on air temperature, and begin feeding on potato leaves (Figure 5). There are four larval instars. The first- and second-instar larvae are less than ½ inch (12.7 mm) long, dark-red with black heads, humpbacked, and have two rows of black spots on both sides of the body (Figure 6). Third- and fourth-instar larvae are approximately ½ inch (12.7 mm) long and pink to salmon in color with black heads. The larvae have two rows of black spots on both sides of the body (Figure 7).

After two to three weeks, fourth-instar larvae fall from plants onto the soil surface and tunnel 3 to 12 inches (15.4 to 30.5 cm) into the soil where they pupate. After two to three weeks, depending on soil temperature, new adults emerge and start another generation. The life cycle (egg to adult) can be completed in approximately 21 days. Adults start feeding and can cause extensive plant damage. Females mate with males and then lay eggs. Larvae emerge (eclose) from eggs and feed on plants for four to six weeks. In late summer, adults tunnel six to 12 inches (15.2 to 30.5 cm) into the soil to overwinter. There can be up to three generations per year.

Damage

Larvae and adults of Colorado potato beetle feed on potato leaves, resulting in the removal of leaf tissue and plant stunting (Figures 8 and 9). Extensive feeding can result in complete defoliation. The third- and fourth-instar larvae cause the most damage (75%) to plants because they consume more leaf tissue than the first- and second-instar larvae. Effects on potato yield may differ depending on the

Figures 5, 6, and 7. Early-instar larvae of Colorado potato beetle feeding on potato leaf (left and center) and mature Colorado potato beetle larva (right). (Photos: Raymond Cloyd)

timing and amount of feeding by Colorado potato beetle larvae or adults. In fact, potatoes can tolerate 30% defoliation without a reduction in yield; however, this depends on timing of feeding and cultivar planted.

Management

Scouting

Early in the growing season check plants at least once a week for the presence of larvae and adults. Examine the undersides of leaves for the yellow-orange egg clusters.

Cultural Controls

Remove weeds in and around the vegetable garden to eliminate alternative food sources for Colorado potato beetle adults. Crop rotation to avoid planting solanaceous crops in succession and destroying plant debris may reduce future Colorado potato beetle populations. Substantial feeding damage can be avoided by selecting early-maturing potato cultivars or planting later in the growing season. Mulching around potato plants (Figure 10) helps decrease the population of adults by interfering with their ability to find plants and increasing the number of beneficial insects.

Figures 8 and 9. Potato leaves fed upon by Colorado potato beetle (left) and damage and stunting of potato plant (right). (Photo: Raymond Cloyd)

Figure 10. Placing straw mulch around plants helps reduce populations of Colorado potato beetle adults. (Photo: Raymond Cloyd)

Trap Plants

Plants that attract Colorado potato beetle adults (trap plants) or early-planted potatoes can be placed around the border of the vegetable garden to lure overwintering adults away from the main crop. Trap plants should be discarded when they are no longer effective in diverting attention away from the main crop (e.g., potato).

Physical Removal and Damage

Hand removal of larvae and adults reduces Colorado potato beetle populations, thus minimizing plant damage. Larvae and adults should be placed in a container of soapy water. In addition, the clusters of yellow-orange eggs on leaf undersides can be physically removed and destroyed.

Insecticides

Spray applications of insecticides will kill Colorado potato beetle larvae and adults. However, Colorado potato beetle can develop resistance to insecticides, which may occur faster when the same insecticide is applied repeatedly. Consequently, it is important to rotate insecticides with different modes of action to delay or mitigate resistance.

Insecticides should be applied when adults and early-instar larvae are present and before fourth instars enter the soil to pupate. The first- and second-instar larvae are more susceptible to insecticides than the third- and fourth-instar larvae. Thorough coverage of the upper and lower surfaces of plant leaves is essential. Eggs on the underside of plant leaves and pupae in the soil are not susceptible to insecticide applications because they are not affected or escape exposure from spray residues. Read the product label to ensure that the insecticide is labeled for use against Colorado potato beetle.

Beneficial Insects

A number of beneficial insects will attack Colorado potato beetle larvae and/or adults. These include green lacewings, ladybird beetles, predatory stink bugs, spined soldier beetles, and tachinid flies. However, beneficial insects may not be effective in regulating Colorado potato beetle larvae and adult populations below damaging levels.

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