

Tobacco (Geranium) Budworm

Fact Sheet No. 5.581

Insect Series | Home and Garden



by W.S. Cranshaw*

In many parts of Colorado, the tobacco budworm (*Helicoverpa virescens*) is a serious pest of many garden flowers. Geranium is a particularly common host, leading to the name geranium budworm. Petunia and nicotiana are other common hosts, while rose and many other flowers are occasionally damaged.

Caterpillars of the tobacco budworm usually attack the flower buds and ovaries of developing flowers. The damaged buds fail to open and a failure of flowering (“loss of color”) is often the first injury observed. Petals of emerged

flowers are also chewed, giving the flowers a ragged appearance. The amount of damage the insects cause progresses through the growing season, becoming most noticeable in late summer. Damage by this insect is so severe that in some parts of the country people have discontinued use of geraniums and petunia.

In Colorado, problems are most common in the Denver Metro area and Grand Junction. Nationwide, this insect is one of the most devastating insect pests of agriculture, particularly in cotton and tobacco. In the United States, millions of dollars are spent annually to control this insect on these crops. It is closely related to the corn earworm (*Heliothis zea*), a common pest of corn and tomatoes in Colorado.

Life History

The adult stage is a moth with a wingspan of about 1 1/2 inches. The wings are light green with brown overtones and a few wavy, cream-colored bands. In the early evening, females lay single eggs on buds or leaves. The larvae have striping but can be quite variable in overall color. Dark forms are common but

red, green or light brown larvae also occur. Color differences are related, in part, to the color of the flowers on which the insects are feeding.

The caterpillars become full-grown in about a month, drop to the soil and pupate. Adults emerge to repeat the cycle, with two generations normally produced each year. At the end of the season, determined by declining day length and temperatures, the insects go into a state of suspended development (diapause), that they maintain through winter.

In Colorado, the tobacco budworm spends the winter as a pupa. The pupal stage occurs below ground, usually 2 to 6 inches deep, and is formed within a packed earthen cell that the full-grown caterpillar produces. Overwintering pupae generally are killed if exposed to temperatures below 20 degrees F. The insect is therefore poorly adapted to the harsh winters of Colorado. However, warm soil microclimates, such as those found around the foundations of heated buildings, can allow many to survive. As a general rule, the number of overwintering tobacco budworms and the likelihood of problems are related to the severity of the previous winter.



Figure 1: Young tobacco budworm larva tunneling into geranium bud.

Quick Facts

- Tobacco budworm feeds on the buds and petals of many commonly grown flowers, including geranium, petunia and nicotiana.
- The insect survives winter as a pupa in the soil. Where soil freezes deeply, most overwintering insects are killed.
- Tobacco budworm is resistant to most garden insecticides.

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Control

To monitor for budworm and detect early stages of an infestation, check buds and flowers for small holes. In small plantings, the most practical control is hand picking the caterpillars. Tobacco budworm larvae are most active during dusk and best discovered at this time. During daylight hours, they often hide around the base of the plant.

The tobacco budworm is a difficult insect to control with insecticides. Synthetic



Figure 2: Tobacco budworm injury.



Figure 3: Adult tobacco budworm.

pyrethrins, also known as pyrethroid insecticides, can provide the best control of tobacco budworm. These recently have become much more commonly available at garden centers and nurseries. They go under a wide variety of trade names but include as the active ingredient permethrin, esfenvalerate, cyfluthrin, bifenthrin or related compounds. Natural pyrethrins, also a commonly sold garden insecticide, have not been effective against tobacco budworm in Colorado State University trials, possibly due to its very short persistence. Spinosad-containing products should also be effective.

Insecticides containing *Bacillus thuringiensis*/Bt (Thuricide, Dipel, etc.) are effective biological controls when used on some plants. (See fact sheet 5.556, *Bacillus thuringiensis*.) However, the insect must eat the Bt in order for it to be effective. On plants such as geranium, where the caterpillars drill into the buds and eat little of the outside surface, Bt is not effective. On petunia, where caterpillars eat a great deal of the blossom, Bt can provide a marginal amount of control.

Developing varieties of bedding plants resistant to tobacco budworm may provide a long-term means of managing tobacco budworm. For example, some variation in susceptibility to this insect has been observed among petunia cultivars. Also, ivy geraniums (*Pelargonium peltatum*) are much less frequently damaged than standard types (*Pelargonium x hortorum*).

Maintaining potted plants in protected areas, such as garages, between seasons can allow tobacco budworm pupae to survive in the soil. If potted geraniums or other tender perennial host plants are kept between seasons, remove the soil to eliminate pupae and repot the plants before overwintering.