

Corn Flea Beetle on Sweet Corn

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Damage

The corn flea beetle is a vector of a disease called Stewart's bacterial wilt. Many varieties of sweet corn, especially early maturing, yellowkerneled varieties, are susceptible to this disease. The disease causes reduced yields, and an entire planting can be stunted or killed (see OSU Extension fact sheet AC-37, *Stewart's Bacterial Wilt and Leaf Blight of Corn*, for more information on this disease). This disease was discovered in 1895 but it was not until 1923 that insects were determined to be the vector of the disease. The disease is transmitted primarily by the corn flea beetle and to a lesser extent by other beetles.

In addition to transmitting disease, the corn flea beetle damages corn leaves by feeding. The beetle feeds on the upper layer of leaf cells; it does not usually chew all the way through the leaf. Feeding damage appears as thin brown stripes on the leaves. When seedlings are growing rapidly, this feeding damage is not usually harmful. During a prolonged cool period when seedlings are growing slowly, feeding can be serious enough that damaged leaves will die.

Appearance

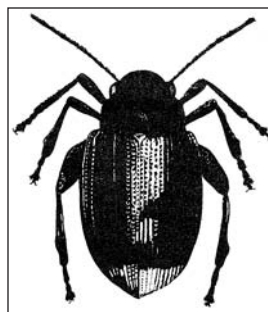
The corn flea beetle (*Chaetocnema pulicaria*) is a small, shiny black beetle,

1.6 mm (1/16 inch) long. Its fat hind legs contain muscles that make it a strong jumper. The larval stage of the beetle is in the soil; the larva has a white body with a brown head and is 4.5 mm (3/16 inch) long when fully grown.

Life Cycle and Behavior

Corn flea beetle adults become active in the spring when soil temperatures reach 65°F. Adults are most active on sunny, warm, windless days. They hide in cracks in the soil during windy, cool, or cloudy periods. After feeding and mating, adult females lay eggs at the base of host plants. Larvae feed on corn roots and are full grown in about two weeks. There are at least two generations per year in Ohio. The beetle overwinters as an adult in the soil with a preference for bluegrass sod. It overwinters near corn fields, in fencerows, roadsides, and woods.

The corn flea beetle harbors the Stewart's wilt bacterium during the winter and spreads the disease during the growing season. The bacterium overwinters in the digestive tract of the beetle. Only 10 to 20 percent of the beetles that emerge in the spring carry the bacterium. An uninfested beetle that feeds on an infected plant can then spread the bacterium to other plants. As the season progresses, an increasing



Corn Flea Beetle

percentage of the beetle population carries the bacterium.

Cultural Control

An important management option for managing Stewart's wilt is to use resistant hybrid varieties, although there is a shortage of early yellow varieties that are both resistant and horticulturally desirable. Although problems are usually most severe in early plantings, some Ohio growers have experienced a serious problem with Stewart's wilt when early varieties were used for late-summer plantings.

Although most of the early yellow sugary (*su*) varieties are susceptible to Stewart's wilt, there are susceptible varieties among the other types of sweet corn, including bicolor and white varieties, and sugar-enhanced (*se*) and supersweet (*sh2*) varieties. The susceptibility of some varieties is listed in Table 1. For susceptibility ratings for several hundred sweet corn varieties under study by J. K. Pataky at the University of Illinois, see the web site www.sweetcorn.illinois.edu or yearly editions of the *Midwest Vegetable Variety Trial Report*.

Monitoring and Action Thresholds

Fields should be scouted several times per week during the spike-emergence and seedling stages. Plants are most susceptible to Stewart's wilt when inoculated at early growth stages; they are less susceptible once they are past the 7-leaf stage. Scout 20 adjacent plants in 5 different sections of each planting, count the number of beetles on those plants, and calculate the average number of beetles per plant.

The suggested action threshold for wilt-susceptible varieties is low: treatment is suggested if there is an average of 6 flea beetles per 100 plants.

The suggested action threshold for wilt-tolerant varieties is much higher: treatment is suggested if there is an average of 2 beetles per plant and 25 percent of the stand is damaged by heavy leaf-feeding.

An alternative method of monitoring corn flea beetle is to use yellow sticky traps. Studies in Connecticut found that traps were most effective if 6 by 8 inches in size, mounted 2 feet above ground on posts,

and located 9 feet inside corn fields; the suggested action threshold is 8.5 beetles per trap per week.

Chemical Control

Chemicals can be used to control corn flea beetle in a preventive way with systemic insecticides. These are available as commercial seed treatments (Gaucho, Poncho, Cruiser) or as products applied to the soil at planting time. Two soil insecticides labeled for sweet corn are systemic: terbufos (Counter) and phorate (Thimet). Note that some of the soil insecticides used for corn rootworm control are not systemic and thus will not control corn flea beetle; these include diazinon, chlorpyrifos (Lorsban), permethrin (Pounce), and ethoprop (Mocap).

Insecticides may be applied as foliar sprays if scouting indicates that the action threshold has been exceeded; labeled materials include carbaryl (Sevin), pyrethroids (Asana, Baythroid, Brigade, Mustang, Pounce, Warrior), methomyl (Lannate), chlorpyrifos (Lorsban), diazinon, and methyl parathion (PennCap-M). Several sprays may be needed during the seedling and early whorl stages if a field continues to be invaded by newly emerged beetles after the initial treatment.

Predicting Flea Beetle Activity

Winter temperatures can be used to predict the severity of Stewart's wilt because the corn flea beetle survives better in mild winters than in cold winters. A "flea beetle index," sometimes called the "winter temperature index," has been used for many years to predict the severity of Stewart's wilt. The index is the sum of the average temperatures (in degrees Fahrenheit) of December, January, and February. Stewart's bacterial wilt disease on sweet corn is expected to be *negligible* in locations where the index is below 90, *light to moderate* if the index is between 90 and 95, *moderate to severe* if the index is between 95 and 100, and *severe* if the index is above 100. The index is not foolproof; it is possible that even in cold winters the beetles may survive well in areas insulated by continuous snow cover. Representative index values are shown in Table 2.

Table 1. Susceptibility of sweet corn hybrid varieties to Stewart's Wilt, by gene type (*su* = normal; *se* = sugary enhanced, *sh2* = supersweets) and kernel color.

| Type | Resistant (rating 1, 2, or 3) | Intermediate (rating 4, 5, or 6) | Susceptible (rating 7, 8, or 9) |
|--------------------|--|--|--|
| <i>su</i> yellow | | Golden Queen (4) | Earlivee (8) Jubilee (9) |
| <i>su</i> bicolor | | | Honey & Cream (7) |
| <i>su</i> white | Silver Queen (3) | | |
| <i>se</i> yellow | Incredible (3) Merlin (2) Miracle (1) Tuxedo (3) | Bodacious (5) Kandy King (5) Kandy Korn (4) Ogunquit (5) | Sweet Cheeks (7) |
| <i>se</i> bicolor | Accord (3) Ambrosia (2) Encore (2) Lancelot (3) Mystique (3) Precious Gem (3) Yankee Gem (3) | BC0808 (5) Cameo (4) Luscious TSW (5) Montauk (6) Providence (6) Renaissance (5) Seneca Arrowhead (6) Sensor (5) Temptation (6) Trinity (6) | Attribute BC0805 (7) HMX 0351 BES (8) Navajo (7) Revelation (7) |
| <i>se</i> white | Argent (2) Cinderella (3) Imaculata (3) Sugar Queen (3) | Silver King (5) Silver Princess (5) Sugar Pearl (5) Sweet Ice (5) Whiteout (5) WH0807 (6) | Chantilly (8) |
| <i>sh2</i> yellow | Prime Plus (3) | Bandit (6) Fortune (4) Mirai 131Y (6) Passion (4) Sweet Sunrise (5) | |
| <i>sh2</i> bicolor | Candy Store (3) Holiday (3) Mirai 301BC (3) Obsession (3) Tango (3) | Fantastic (5) Fortune BC (6) Mirai 308BC (6) Optimum (6) Triumph (4) 272A (5) 277A (4) | Amazingly Sweet (8) BSS 3495 (7) Double Up (7) Mirai 327 (7) |
| <i>sh2</i> white | Attribute WSS 0987 (3) Xtra Tender 382A (3) | Devotion (5) Ice Queen (4) Mirai 421W (4) Xtra Tender 372A (4) | |

Table 2. Corn Flea Beetle Index values for Ohio locations over a five-year period.

| Site | Long Term Avg. | Year | | | | |
|------------------------|----------------|------|------|------|------|------|
| | | 2005 | 2006 | 2007 | 2008 | 2009 |
| Corn flea beetle index | | | | | | |
| Piketon | 100 | 107 | 108 | – | 100 | 95 |
| Jackson | 96 | 106 | 106 | 98 | 100 | 94 |
| Columbus | 92 | 95 | 103 | 91 | 93 | 85 |
| S. Charleston | 90 | 93 | 96 | 90 | 90 | 84 |
| Kingsville | 85 | 87 | 94 | 88 | 87 | 80 |
| Wooster | 84 | 91 | 96 | 89 | 88 | 80 |
| Hoytville | 81 | 84 | 91 | 84 | 84 | 80 |
| Fremont | 80 | 78 | 85 | 79 | 87 | 79 |

This publication contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author, The Ohio State University, and Ohio State University Extension assume no liability resulting from the use of these recommendations.

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