



AGRONOMIC SPOTLIGHT



FLEA BEETLES ON BROCCOLI AND CAULIFLOWER

- » Flea beetle feeding can result in stunting, delayed development, seedling death, and head damage on broccoli and cauliflower.
- » Broccoli and cauliflower plants are most susceptible to flea beetle damage in the early seedling stage.
- » Growers can use cultural practices, such as controlling cruciferous weeds and planting trap crops, along with insecticide applications to manage flea beetles on broccoli and cauliflower.

FLEA BEETLE SPECIES ON BRASSICAS

Flea beetles are small (0.125-inch long), shiny, hard beetles that jump like fleas. Several species of flea beetles feed on crucifers, including the crucifer (Figure 1), striped (Figure 2), western black, western striped, and palestriped flea beetles (Figure 2b). Differences in body color and markings distinguish these species.



Figure 1. Crucifer flea beetle (*Phyllotreta cruciferae*) (A) adults, Roberto Cordero; (B) adults and feeding damage on broccoli, Whitney Cranshaw, Colorado State University, Bugwood.org.

The crucifer flea beetle and striped flea beetle are the species most commonly found on broccoli and cauliflower. Crucifer flea beetles are bluish or greenish to black. They feed primarily on crucifers, including wild mustard and other cruciferous weeds, but they also feed on sweet alyssum. Striped flea beetles are shiny black with crooked yellow stripes on their backs. The host range of striped flea beetles includes crucifers, cucumber, pumpkin, squash, potato, tomato, fall rye, and several ornamental flower species.^{1,2}

LIFE CYCLE AND BEHAVIOR

Flea beetles can be present on brassica crops at any time during the season, but they are most commonly found in the spring. The beetles overwinter as adults in protected

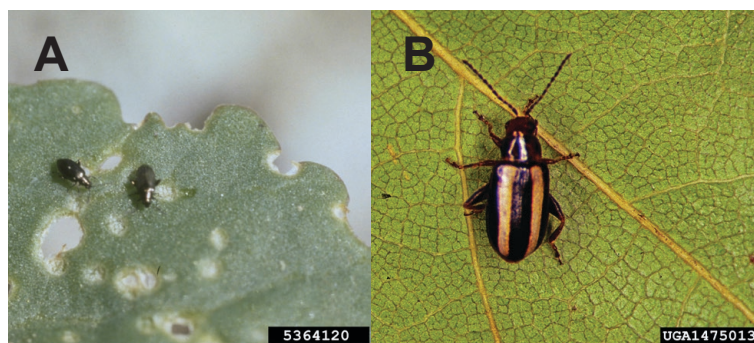


Figure 2. (A) western black flea beetle (*Phyllotreta pusilla*) adult and (B) palestriped flea beetle (*Systema blanda*) adult, Whitney Cranshaw, Colorado State University, Bugwood.org.

areas, such as fencerows, the edges of woods, and under leaf litter and plant debris. The adults usually become active as temperatures reach 50°F in the spring. Flea beetles are good fliers, and they can disperse over long distances. Adult flea beetles typically start feeding on weed species and then move into crop fields after seedlings emerge or are transplanted. The beetles are attracted to crucifer plants by compounds called glucosinolates (or mustard oil glycosides) that these types of plants produce.^{1,2} Female beetles lay eggs in the soil near host plants. The crucifer flea beetle also lays eggs in "gnawed-out areas of roots."¹ The larvae feed on plant roots, and they eventually pupate while underground. The second brood of adult beetles emerges in mid-June to mid-August. For most flea beetle species, it takes six to ten weeks for an adult to develop from an egg.^{1,3}

CROP DAMAGE

Flea beetle damage is caused mainly by feeding adults. Flea beetles feed primarily on the undersides of leaves. The beetles create pits and small, round to irregularly shaped holes in the leaves (Figure 1). When severe, feeding damage can stunt the growth of or kill seedlings. Damage is most severe on newly emerged, direct-seeded plants and young, transplanted seedlings (Figure 3). Once plants have reached the stage where they have produced more than five true leaves, they

(Continued on page 2)





FLEA BEETLES ON BROCCOLI AND CAULIFLOWER

(Continued from page 1)

are less susceptible to damage from flea beetles. As broccoli and cauliflower plants mature, feeding is usually restricted to areas near the leaf margins.³ However, damage to heads can reduce the market quality of the product. Feeding wounds can also provide an entryway for diseases such as black rot and *Alternaria* leaf spot, and flea beetles can serve as vectors of some plant pathogens.^{1,2,3} Flea beetle feeding and the associated amount of damage gradually decline in the fall.



Figure 3. Crucifer flea beetle feeding damage on a broccoli seedling. Whitney Cranshaw, Colorado State University, Bugwood.org.

SCOUTING

When plants are young, scout fields two to three times per week. Flea beetles are most active and easiest to observe on calm, sunny days. However, they tend to hop when disturbed, so they can be difficult to count. Sample plants randomly, but monitor field borders most closely. Flea beetle feeding damage and yellow sticky cards can also be used to help determine flea beetle population sizes. If plants have fewer than six true leaves, treat for flea beetles when one or more beetles are found per plant or if beetle feeding is stunting plant growth.^{1,3}

MANAGEMENT

Cultural practices can be used to reduce flea beetle damage on broccoli and cauliflower. Managing weed hosts of the flea beetles in and around fields and removing volunteer host plants can lower flea beetle populations and delay entry of the insects into the crop. Delaying planting or transplanting can help avoid exposure of the crop to early-season flushes of flea beetles. Transplants are less susceptible to flea beetle damage than newly emerged seedlings in direct-seeded fields, so transplants should be used in fields at high risk for flea beetle injury. Row covers and trap crops can be used to help keep flea beetles off broccoli and cauliflower plants. Crucifers that have glossy, non-hairy leaves and those that produce higher

levels of mustard oils are the most attractive to the flea beetles that feed on broccoli and cauliflower. Trap crops can be used for early detection of flea beetles and to help manage flea beetles before they move to the cash crop. Flea beetles also can be drowned with sprinkler irrigation, and it is best to apply irrigation for this purpose when the insects are most active. Crop debris should be disked in to the soil promptly after harvest to reduce flea beetle overwintering sites.^{1,2,4}

There are several natural enemies of flea beetles, including predators such as lacewing larvae, big eyed bugs, damsel bugs, and callops beetles, the parasitoid wasp *Microctonus vittata*, and the fungal pathogen *Beauveria bassiana*. However, these predators and parasites may not have much of an effect on flea beetle populations.^{1,4}

Insecticides can be used to manage flea beetles on broccoli and cauliflower. Foliar applications are usually made just before thinning if the number of flea beetles per plant has reached the action threshold. However, growers should always follow the application directions on the product label. It is best to treat when the insects are most active (warm, sunny, calm days). Some insecticides can be applied to the soil at planting. Partial control can be obtained by using insecticidal soaps applied at the cotyledon stage.^{1,2,3,5,6}

Sources:

¹Hoffmann, M., Hoebeke, R., and Dillard, H. 1999. Flea beetle pests of vegetables. Vegetable crop fact sheet. Cornell University Integrated Pest Management.

<https://ecommons.cornell.edu/handle/1813/43272>.

²How to manage pests: cole crops. UC IPM Pest Management Guidelines.

<http://ipm.ucanr.edu/PMG/selectnewpest.cole-crops.html>.

³2021. Flea beetle, Brassica. University of Massachusetts, Center for Agriculture Food, and the Environment. <https://ag.umass.edu/vegetable/fact-sheets/flea-beetle-brassica>.

⁴Parker, J. and Snyder, W. Managing cruciferous and solanaceous flea beetles in organic farming systems. eOrganic.org. <https://eorganic.org/node/12461>.

⁵Phillips, B., Maynard, E., Egel, D., Ingwell, L., and Meyers, S. 2019. Midwest vegetable production guide for commercial growers 2021.

⁶Dittmar, P., Freeman, J., Paret, M., and Smith, H. 2020. Vegetable Production Handbook of Florida 2020-2021. UF-IFSA.

Websites verified 3/26/2021.

For additional agronomic information, please contact your local seed representative.

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about broccoli production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with this specific crop.

BAYER GROUP DOES NOT WARRANT THE ACCURACY OF ANY INFORMATION OR TECHNICAL ADVICE PROVIDED HEREIN AND DISCLAIMS ALL LIABILITY FOR ANY CLAIM INVOLVING SUCH INFORMATION OR ADVICE.

9053_SE_S3 Published 04-14-2021

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.

Bayer, Bayer Cross Design, and Seminis® are registered trademarks of Bayer Group. All other trademarks are property of their respective owners. © 2021 Bayer Group. All rights reserved.

