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Flea beetle life cycle pdf

Print this fact sheet by W.S. Cranshaw1 (1/19) Fast facts ... Figure 1: Adult flea beetles chew small pits in the leaf surface. This produces a type of injury known as a bullet hole. Figure 3: A leafy spurge flea beetle. Three species of flea beetles occur in Colorado that feed on leafy spurge, a severely invasive weed. Figure 4: Larva of a Western black flea beetle. Most flea beetle larvae develop on the roots of the plant. Figure 5: Surface wounds of potato caused by feeding damage to the tuber bubble. Figure 6: Apple flea beetle larvae develop on the leaves and flowers of evening primrose. Figure 7: Adult apple flea logs feed on leaves of many garden flowers, shrubs and vines. Figure 8: Flea billeföring normally causes little effect for well-established plants. These injuries were produced by potato flea beetle, the usual flea bubble on potatoes and tomatoes. Flea beetles are small beetles that jump when disturbed. They damage plants by chewing small bullet holes in the foliage. Flea beetles are found on a wide variety of plants. However, most flea beetles attack only a few, closely related plant species. Flea beetle damage is most important when seedlings are established or in the production of green vegetables. Injuries are usually minor and easily outgrown to established plants. Flea beetles are small beetles that jump. The adult beetles feed on leaves, chewing small pits that produce gunshot wounds, similar to injuries that can be produced by fine buckshot. Young stages (larvae) of most flea beetles feed on the roots, but some develop chewing leaves. Young plants and seedlings are especially prone to flea beetle damage. The growth can be severely retarded and in severe attacks plants can be killed. The holes in the leaves also damage the plant appearance, which can be important when growing certain leafy vegetables and decorative flowers. Dozens of species of flea beetles are found in Colorado (Table 1). Although there is some overlap of flavors, each type of flea beetle has a specific preference for certain plants. For example, some flea beetles eat only on potatoes, tomatoes and other members of the nightshade family. Others have a taste for broccoli, cabbage and other crucifer crops. A group of flea beetles (*Aphthona* species) were purposefully introduced into the state to feed on and help deal with leafy spurge, an important invasive weed. Life history and habits Flea beetles spend the winter in the adult stage, hidden under leaves, dirt clover or in other protected places. They usually begin to become active in hot days in early spring and then seek out the types of plants they feed on. Flea beetles can fly well and can fly long distances in search of suitable plants. Adults of all flea beetles feed on the leaves of plants. However, immature stages (larvae) can have different habits. Most develop in the soil, feeding on plant roots. Earth-dwelling flea beetle larvae are very small, pale colors and Normally, they cause little, if any, significant damage to the plants. Exceptions include larvae of the knollopper bubble, which can cause scarring of potato tubers and larvae of flea beetles that feed on leafy spurge. Flea beetles that develop in the soil as larvae can often produce 2 or 3 generations a season, for example, cabbage beetles and potato flea beetles. A small number of flea beetles have larvae that develop on the leaves of the plant. Apple flea beetle, which has larvae that develop in evening primrose, is an example of a flea beetle with this habit. What types of flea beetles have larvae that are black or gray and have small legs. The larvae produce large and irregular holes in leaves instead of bullet holes. Flea beetles that develop on leaves include the larger types of flea beetles, with apple flea beetle as the most common species. Adults do not make bullet holes, but chew in a more generalized pattern. Flea beetles with larvae that develop on leaves often have only a single generation a year, but the adults can be present for several months. Flea Beetle Management Although flea beetles are common, injuries are often negligible for plant health. At established plants, 20-30 percent or more of the leaf area must be destroyed before there is any effect on the yield. The plants most likely to benefit from treatment are more sensitive seedlings, plants grown for decorative purposes or for edible greens, and potatoes that can be affected by tuber bubble larvae. Cultural controls Because seedlings are most at risk, use transplants or plant seeds in a well-prepared seed bed to speed up growth and let plants overcome damage. In home gardens, try high sowing rates to spread damage produced by adult feeding. Thin the plants when established and less prone to damage. Trap crops work in some situations. This involves the targeted planting of a highly favored crop to attract flea beetles away from the main crop. The best regional example of this practice involves the use of radish or daikon to protect seedlings of other crucifers (eg broccoli, cabbage, Brussels sprouts) that are prone to Western black flea beetle and crucifer flea beetle. The trap crop can then be harvested or destroyed after the main crop has established itself sufficiently to grow flea beetle damage. It may also be possible to avoid harm by planning plantings so that seedlings appear during periods of low flea beetle activity. Cabbage flea beetles are usually most harmful in June, when moving from winter annual mustard glow, for example, flixweed, on which the early spring generation develops. Most vegetable crops that are well established can tolerate a large amount of damage of flea beetles without affecting the yield. Mechanical and physical controls Floating row covers or other screening can exclude beetles during seedling establishment. In isolated plantings, thick mulches can also help reduce the number of flea beetles by with activity of root and soil stages. Flea beetles can be collected from foliage using sweeping nets or a portable vacuum. Caution must be done when using these methods as flea beetles will easily jump from plants and escape treatment. Sweeping mesh/vacuum treatments must be repeated often as the reinvasion of plants can be rapid. Biological controls There are many natural enemies of flea beetles – predators, parasitoids and disease that produce pathogens. Most of these attack larval stages, and these regularly help reduce general populations of flea beetles. Flea beetle adults, however, are very mobile, and no biological controls that can be used by a gardener are likely to reduce flea beetle damage in a planting. Chemical controls When high number of flea beetles are present on plants and threatens damage insecticides is usually the most effective way to deal with the problem (Table 2). Some flea beetle products act to reject flea billeföring (e.g. diatomaceous soil, kaolin clay), but most can kill flea beetles. But among these insecticides there is a significant selection in how long they can work to protect plants from flea beetles - from a few hours (pyrethrins) to several days (cypermethrin, cyhalothrin). Since the most serious problems with flea beetles involve species that are very mobile and easily invade plantings (cabbage flea beetles, apple flea beetle), insecticides with longer endurance will usually work best. Often, more than one program may be needed to protect seedling crops since leaf growth produced after application will be little protected. As with all pesticides, read carefully and follow all label directions. Pay special attention to the fact that any flea beetle insecticides considered are correctly registered for use on the crop. Figure 9: Leafy vegetables, especially brassicas such as arugala, mustard greens and Chinese cabbage are among the plants most damaged by flea beetles. Figure 10: Palestriped flea beetle has a wide host area and is found on many vegetable and flower crops. Figure 11: Spinach flea beetles are common on pigweeds and related weeds and only rarely damage garden vegetables. Table 1: Some common flea beetles found in Colorado. Common name Scientific name Host plants, comments Cabbage flea beetle (western black flea beetle, crucifer flea beetle) *Phyllotreta pusilla*, *P. cruciferae* Wide host range, mainly of cabbage family plants (*Cruciferae* family). Western black flea beetle is the most harmful flea beetle species in the state. Two and occasionally three generations are typical. Winter annual mustard, like flixweed, are important early season hosts for these insects. Palestriped flea beetle *Systema blanda* Has the widest host range of all flea beetles, including zucchini, beans, corn, sunflowers, lettuce, potatoes and many notches. Potato flea beetles *Epitrix cucumeris*, *E. subcrinita*, *E. parvula* Tomato, potato and other nightshade family plants. Sometimes they chew on and scars develop fruit. Tobacco flea beetle *Epitrix hirtipennis* Eggplant and some other nightshade family plants. Most common in warmer areas of the state. Tuber flea beetle *Epitrix tuberis* Potatoes. Larvae are associated with tuber damage. Horseradish flea beetles *Phyllotreta armoraciae*, *P. albionica* Horseradish, sometimes other mustard. Green spurge flea beetles *Aphthona flava*, *A. lacertosa*, *A. nigricutis* These three flea beetles were purposefully introduced in Colorado to help control the leafy spurge, an invasive weed. Younger larvae develop on roots and late stages dig into the crown of the plant. * Apple flea beetle *Halicta foliaceae* Larvae eat in the evening primrose (*Oenothera*); Grape, *Epilobium*, crabapple, *Zauschneria* and other plants are occasionally damaged by the adults. * Sumac flea beetle *Blepharida rhois* Skunkbush sumac. * Spinach flea beetles *Disonycha triangularis*, *D. xanthomelas*, *D. collata* Mostly pigweeds and other *Amaranthus* species. Beetroot, spinach and related plants are occasional hosts. * Larvae and adults feed on leaves. Larvae of other flea beetles develop on roots. Table 2: Some insecticides that can be used to deal with flea beetles. Common name Trade name** Comments acetamidiprid Ortho Flower, Fruit and Vegetable Insect Killer Use allowed on most vegetable crops. Quite long endurance of control (several days). permethrin Bonide eight insect control dust; Bonide eight insect control vegetables, fruits and flower; Hi-Yield Lawn, Garden, Pets and Pets Insect Control; Hi-Yield Garden, Pet and Livestock Dust Use allowed on most vegetable crops. Fair endurance of control (couple of days). gamma-cyhalothrin Triazicide Insect Killer at Lawns & Landscapes Use allowed on most vegetable crops. Quite long endurance of control (several days). Zeta-cypermethrin Sevin Insect Killer Use allowed on most vegetable crops. Quite long endurance of control (several days). spinosad Captain Jack's Dead Bug Brew; ferti-lome Driller, Bagworm, Tent Caterpillar & Leafminer Spray; Monterey Garden Insect Spray Use allowed on most vegetable crops. Fair endurance of control (couple of days). Most formulations allow use in certified organic production. Pyrethrins Many garden insecticides Use allowed on most vegetable crops. Very short endurance (hours). Many formulations allow use in certified organic production. Some formulations combined with horticultural oils. Diatomaceous soil Bonide Diatomaceous Earth Crawling Insect Killer Has some repellent effect on flea beetles. Most diatomaceous soil products do not allow use on growing plants; check labels to ensure that the product can be used on garden plants. Kaolin clay Surround Has some repellent effect on flea beetles. Currently only available by mail order. Use is allowed in certified organic production. * The item name used on this list is current as of January 1, 2017. Manufacturers sometimes active ingredients and label use directions without warning. Always check the product you purchase has label instructions that allow use as intended. * W.S. Cranshaw, Colorado State University Extension entomologist and professor. 1/99. Revised 1 / 19. Colorado State University, the U.S. Department of Agriculture and Colorado counties cooperate. 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