

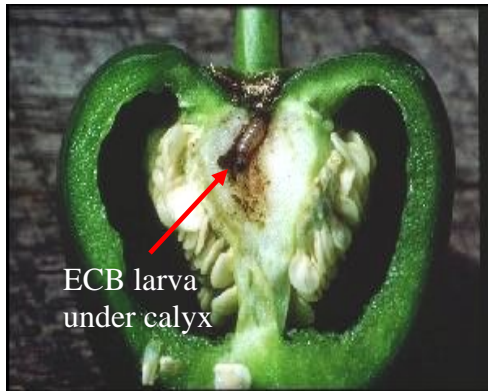
Insect Pest Management in Pepper

Pepper production in Maryland is mostly confined to the DELMARVA area, although bell and other types of peppers are grown over the entire state. Because of its value growers frequently apply pesticides regularly in order to protect their investment. This often leads to development of insect resistance, environmental contamination, worker and food safety issues and poor management of pests. The key to any successful pest management program is to develop a regular scouting plan to gain information on insect pest populations that may be used to determine if insecticide applications are needed. Monitoring can consist of sampling groups of 10 plants which are randomly selected at five to eight different locations in a field. Samples should be evenly distributed throughout the field so that plants near the edges and middle of the field are examined. It is critical to properly identify pests to be controlled and to determine their potential for damage. The only way to obtain this information is through routine scouting of fields. The purpose of this guide is to serve as a reference for insect pest identification and for general management guidelines. Specific information on insecticides is available from [EB-236](#) the pesticide recommendation guide for the mid-Atlantic region. Cultural controls, reduced risk pesticides as well as other pesticides are recommended for each pest.

European corn borer (ECB) (*Ostrinia nubilalis*) is the most important insect pest of peppers in Maryland. It is more of a problem in sweet peppers than in hot peppers. European corn borer eggs are laid in small flat masses, each with about 20 white eggs. Each egg mass is about 1/4 inch in diameter. Larvae are creamy white to light pinkish brown with several light brown spots on each segment and often with two faint white lines down the back. They have a small, dark brown head. Larvae start out about 1/16 inch long, and they reach a length of about 7/8 inch when fully grown. The European corn borer overwinters as fully grown larvae inside corn stalks or corn cobs. In the spring, they go through the pupal stage and emerge as adult moths. European corn borer moths begin emerging after about 450 degree-days starting from January 1st. Moths spend most of their time in moist grassy areas, where they rest during the day and mate at night. After sundown, female moths fly to nearby fields of young corn and lay eggs on the underside of corn leaves. After feeding for about 4 weeks larvae are fully grown and pupate for 2 weeks in corn stalks or



ears. The pupal stage takes about 2 weeks. New adults begin to emerge in July and these moths lay eggs on either corn or peppers. If there is corn in the fresh silk stage nearby, the moths are more likely to lay eggs on corn than on peppers. Egg masses are laid on leaves of the pepper plant. Eggs hatch in about 4 to 7 days. Larvae crawl immediately to fruit more than 1 inch in diameter, and bore in at the edge of or under the fruit cap (calyx). If attack occurs when fruit is small the infested fruit is usually rotten by harvest and marketable yield is reduced. If attack occurs when fruit is larger an infested fruit can appear normal on the outside but is rotted on the inside. Infested peppers usually have a small hole surrounded by frass (excrement)



at the edge of the cap.



Larvae feed in the central seed mass, in the ribs, and in the wall of the fruit. Infestation by European corn borer is of great concern to pepper growers as an entire load can be rejected, or accepted at a reduced price if more than 3% of bell peppers are infested. If nearby corn is past the fresh silk stage, then moths are likely to lay eggs on peppers. Second generation larvae feed inside

peppers throughout August and early September. There are usually 2, but sometimes 3 generations per year in Maryland. It all depends on how warm the season is. The third generation of ECB can cause severe economic damage to peppers because it is the only viable crop they can lay eggs.

Management. The best way to monitor ECB is to trap the adult moths. There are two trap types commonly used to monitor ECB activity. Blacklight traps catch male and female European corn borer moths as well as numerous other species. The Maryland Department of Agriculture (MDA) maintains a black light trapping network throughout Maryland and posts the information at their web site: http://www.mda.state.md.us/plantspests/plant_protection_weed_mgmt/plant_pest_survey_detection/interactive_map_links_daily_counts_at_individual_locations.php The other trap type is a pheromone trap that uses a synthetic sex attractant to trap male moths of the same species. The best trap style for this pest is a large cone-shaped trap such as the plastic-mesh Heliothis trap or the metal-mesh Hartstack trap. Two types of pheromone lures are available for European corn borer; the E-strain ('New York' type) is the best one to use in Maryland. The pheromone trap should be placed in a weedy area at the edge of the crop field as the trap is much less effective if placed over bare ground. The trap should be checked twice per week. Growing peppers as early as possible will avoid much of the ECB population that normally infests corn. If more than 7 moths/week are caught in pheromone traps or when the first ECB moth is caught in black-light traps and corn has dried silks in your area then weekly insecticide applications should begin and continue for the next 2-4 weeks. The organic pesticide Entrust or the reduced risk pesticides Confirm

or SpinTor can be used as well as Pyrethroids for control. If ECB pressure is high, and it has not been very great over the last 5-7 years in Maryland, then a greater volume of water (≥ 100 gal/a) at a greater pressure (100-150 psi) is needed to get the type of coverage that is required to stop ECB larvae from entering the fruit.

Tomato Fruitworm (*Helicoverpa zea*) is a moderate problem in peppers, usually after corn has dried down in the area. The larvae are variable in color, ranging from pale yellow, to red, to green, to brown with pale stripes running lengthwise. Young larvae have several rows of black bumps along their backs and two bristle-like hairs in each bump. Older larvae are densely covered with microscopic spines that make the larvae feel rough. Fruitworms overwinter as pupae in the top 2-6 inches of soil. Adults emerge from early May to early June and have 2-3 generations per year in Maryland. The moths lay eggs at night on leaves near green fruit. Eggs are white when first laid and develop a reddish brown band 24 hr before hatching. After the egg hatches, the larvae feed for a short period of time on the foliage before attacking the fruit. Damage consists of small holes in the stem of the fruit when larvae are small but the larvae are cannibalistic, so there is rarely more than one larva per fruit. The tomato fruitworm has a wide host range and the attractiveness of peppers for egg laying vary with the time of year. Early fruitworm generations attack corn, particularly when it is silking, but later season pepper plantings are often damaged more severely because fruitworm populations generally increase as the season progresses. The most severe fruitworm damage in peppers frequently occurs after dry-down or harvest of adjacent corn as peppers now become a site for egg laying. **Management** Calendar-based insecticide sprays are not recommended. Though it may appear that a calendar-based program is a preventative strategy this program is not cost-effective. A more effective strategy for managing fruitworm and armyworms is to monitor fields regularly for signs of insects or damage and to apply an insecticide only when necessary. Field trials in Maryland have demonstrated that use of the insect monitoring program will reduce pesticide applications and any damage by the pest. Reduced risk chemicals for fruitworm control include: Avaunt, Confirm, SpinTor, and Proclaim. Other chemicals include: Pyrethroids, Renounce, and Coragen.



Beet Armyworm (*Spodoptera exigua*, BAW) is an occasional pest usually later in the season (late August or September) in pepper. Like the fruitworm, BAW moths are active at night and eggs are deposited in masses covered by white, feathery scales from the female. Beet armyworm larvae are smooth, without hairs, and vary in color from dull green to black. Older larvae have a broad, light-colored stripe along the side of the body and usually have two large



dark spots just above the middle pair of true legs (red arrow). **Management** Beet armyworm egg masses are deposited randomly throughout a pepper plant, often on the underside of leaves. It is common to see many small armyworm larvae feeding on the underside of leaves before they disperse throughout the plant. Beet armyworm is primarily a foliage feeder, but they will also attack fruit, usually creating single or closely grouped round or irregularly shaped holes. Feeding damage is usually superficial, and larvae only occasionally develop inside the fruit. Unfortunately, decay organisms enter the feeding-damaged areas and can rot the fruit. Therefore, it is practical to check young plants regularly for beet armyworm egg masses or small larvae. The presence of beet armyworm larvae can also be detected by shaking foliage over a shake cloth. Reduced risk chemicals for BAW control include: Avaunt, Confirm, SpinTor, and Proclaim. Other chemicals include: Lannate, but pyrethroids are not recommended for control of this pest.

Yellowstriped Armyworm (YSA) (*Spodoptera ornithogalli*) and **Fall Armyworm (FAW)** (*Spodoptera frugiperda*) become pests later in the season in peppers. YSA larvae usually have a yellow or cream colored strip running along the length of their body which can be pale gray to black. On the first abdominal segment there are two large dark spots. FAW larvae vary in color from light tan or green to nearly black. Along the sides of its body is a longitudinal, tan or yellow stripe; while down the center of its back is a reddish-brown stripe. The head of the fall armyworm is usually marked with a pale-white inverted "Y." Eggs are laid in groups of 20-30 near fruit. Small larvae



feed on leaves for a short time and then attack fruit. Feeding damage to fruit consists of 1/8 – 1/4 inch wide holes. **Management** Leaves must be inspected in June so that these pests can be found when small and before they feed on fruit. Identification of the pests is necessary to understand when controls should be started. Growers should watch for each pest in their peppers each year, because their populations will fluctuate greatly from year to year and field to field. If damaging populations are found and larvae are small the organic pesticide Bt (XenTari) can be used effectively. If larvae are larger then reduced risk pesticides such as Confirm, Avaunt, and SpinTor can be used. Other pesticides that will work are bifenthrin, Warrior, and Lannate.



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Aphids There are many different species of aphids that could be found in a pepper field, but only the green peach aphid should be a problem. Aphids are small, soft-bodied insects that vary in color from pale yellow to red to black, depending on the species (with one species capable of having several colors), the host plant, and time of season. Direct-feeding damage by aphids is rarely severe enough to kill plants. They pierce plant tissue with needlelike mouthparts, which may result in blossom shed or curling or stunting of new growth. They also produce a sticky material called honeydew that supports growth of a black sooty mold fungus, if the honey dew gets on the fruit it is difficult to remove making the fruit unmarketable. Three species of aphids can be found on pepper in Maryland, the



melon, potato and green peach aphids. Only the green peach is economically important and it must be correctly identified. The



green peach aphid (*Myzus persicae*) is pear shaped and pale yellow to green with cornicles (tail-pipe appendages on the back end of its body) that are light in color and much shorter than the potato aphid's. Melon aphids (*Aphis gossypii*) also are pear-shaped and vary from yellow to dark green, but have dark colored cornicles (tail pipes, red arrow). Potato aphids (*Macrosiphum euphorbiae*) are soft-bodied, elongated tear-shaped insects that may be solid pink, green-pink mottle or light green with a dark stripe. Usually wingless, they are about $\frac{1}{8}$ inch long and have a pair of long, slender cornicles. Adult females give birth to live young, called nymphs. Although slightly smaller than adults, nymphs are similar in color and shape to the adults.

Management Aphids usually are not an important pest in peppers unless too many pesticide applications have been made. Pyrethroid and carbaryl insecticides if used too often can cause an outbreak of these pests in pepper. These pesticides are broad-spectrum and kill many beneficial insects. These beneficial insects or natural enemies, such as predators (lady beetles and their larvae, syrphid fly and lace wing larvae), and parasitic wasps keep aphid populations under control most of the time unless their populations are disrupted. If aphid populations do increase to damaging levels there are several reduced-risk pesticides available that will give excellent control: Actara, Assail, Fulfill, imidacloprid, Platinum and Movento. During periods of drought apply insecticides two to three days after irrigating crop. Coverage of the foliage (under-side of leaves) must be thorough in order for best control of green peach aphids.

Stink bugs Several species of stink bugs are serious pests of peppers and various other vegetable crops. The two most common stink bug pests in Maryland are the brown (*Euschistus servus*) and green stink



Green stink bug

bugs (*Acrosternum hilare*). All adult stink bugs are shield-shaped. Green stink bugs are about 1/2 to 3/4 inch in length. They are bright green with a narrow orange-yellow line bordering the major body regions. Brown stink bugs are dull brown and 1/2 to 5/8 inch long. Stink bugs overwinter as adults in ditch banks, fence rows and in wooded areas. They become active in spring when temperatures rise above 70° F. Each female lays up to several hundred eggs in clusters with 20-30 eggs each.



Brown stink bug adult

Stink bugs usually reach high population levels in July through early October. Nymphs and adults pierce plants with their needlelike mouthparts and suck sap from pods, buds, blossoms and seeds. The degree of damage depends on the developmental stage of the plant when the stink bug pierces it. Immature fruits and pods punctured by bugs become deformed as they develop. Seeds can be damaged and shriveled with germination often times being reduced. In pepper their feeding causes a malady known as cloudy spot. This occurs when the stink bug removes the contents of cells below the outer-skin of the pepper which causes the empty cells to fill with air and appear as white areas. These white areas are soft and spongy and if spots are large or numerous make the peppers unmarketable. **Management** One of the challenges with managing stink bugs is that they feed on over 52 plants, including native and ornamental trees, shrubs, vines, weeds and many cultivated crops. The preferred hosts are nearly all wild plants. Stink bugs build up numbers on these alternative hosts and can move quickly to cultivated hosts as their preferred food sources become mature. Stink bugs usually move into fields from borders and this is the first place to look for their damage. It is difficult to see stink bugs on the plant and a better strategy is to look for any stink bug feeding on fruit. Early feeding looks like a small dimpled area on green fruit. If a few of these are found an insecticide should be applied especially if fruit trees are in the area of the pepper fields. Stink bugs are difficult to control with the chemicals available with brown stink bugs being more difficult to control than green. There are no reduced risk chemicals that are effective for stink bug control with the possible exception of Venom. Other pesticides that can be used are: pyrethroids, Danitol and Thionex.

Pepper maggot (*Zonosemata electa*) is a periodic pest of cherry peppers, bell peppers, and egg plant, but rarely of tomatoes. It is found in eastern North America and is thought to have moved from the weedy perennial weeds horse nettle and ground cherry to crops like pepper. Female pepper maggot flies are about the same size as a housefly, but males are slightly smaller. Adult flies are easy to spot as they



Pepper maggot adult

www.ohio.edu/veg/solanaceous/peppermaggot

have a yellow to reddish-brown head, body and legs, while there are three yellow or white lines on their “backs” with the center line being thickest. The wings are



clear with diagonal brown bands. Eggs of pepper maggot are $\frac{8}{100}$ of an inch long and bent in shape. Immatures are maggots and are white or yellow. Maggots pupate inside a brown pupal case. Pepper maggots overwinter in the pupal stage 2-5 inches below the soil surface. Adults emerge in early June, mate, and the females deposit eggs in oval punctures they create ($\frac{2}{100}$ inches in diameter) with their ovipositors in the skin of young peppers $\frac{1}{2}$ to $\frac{1}{4}$ inch in diameter. Females live for about 20-30

days and can lay 50-75 eggs. Eggs hatch in 8–10 days, when peppers are about $\frac{2}{3}$ fully grown. Maggots feed on the developing seeds and soft tissue of the pepper core for 15-20 days after which they tunnel out of the fruit leaving a large exit hole. Maggots drop to the soil where they burrow into the soil to pupate. In Maryland, there is one pepper maggot generation per year. Damage is greatest to round or blocky fruit such as cherry-, apple- or sweet bell peppers. Damage is negligible on slender, thin-walled cultivars such as banana, long-hot, cayenne, jalapeno and Serrano peppers. Peppers damaged by the pepper maggot are susceptible to rotting because of pathogens that cause soft rot entering through feeding wounds. Growers sometimes confuse pepper maggot with maggots of other fly species that commonly feed on decaying plant or fecal material found in peppers that have been damaged by disease or other pests (like ECB). These maggots should not be confused with the pepper maggot since they feed only on decaying material and do not injure healthy peppers.

Management There are several cultural practices that can be utilized to reduce pepper maggot damage. The two most important are field sanitation and rotation. The adult flies are attracted to rotting peppers; so removing rotting fruit from fields helps reduce their attractiveness as egg-laying sites. Destroying infested fruit and cull piles helps minimize potential infestations. Peppers should not be planted in or near fields with a history of pepper maggot infestations. Alternate hosts such as horse nettle should be eradicated from the field and field margins. To monitor pepper maggot flies the most successful trap/bait combination uses a rectangular, yellow, sticky-trap baited with a vial of 30% liquid ammonia. These traps should be placed 20 ft high in sugar maple trees along the margins of pepper fields. Though this methodology seems unusual, research from Connecticut has shown that pepper maggot flies can be monitored most effectively using this technique. Flies also can be monitored by using hot-cherry pepper as indicator plants spaced 25-100 meters apart around the perimeter (within the outer rows) of the field. The cherry-peppers are a preferred host to bell peppers and should be checked every 3-4 days for egg laying stings or scars. Stings are easy to recognize on the smooth surface of the cherry pepper and appear as shallow indentations of the fruit surface with tiny scars. By timing insecticide applications with the first observation of stings on the indicator

fruit, damage to the main crop can be avoided with a minimum of spraying. Sprays, therefore, should be targeted at the adult fly as soon as it is detected in traps or by indicator plants. During warm temperatures ($\geq 90^{\circ}$ F) flies emerge over a short period of time, usually within 10-14 days, and can be controlled with 1-2 well timed sprays. In cooler seasons three applications may be necessary to control the fly. Unfortunately there are few pesticides registered in Maryland for pepper maggot control. Mustang (pyrethroid), dimethoate and Thionex are pesticides that can be used for adult pepper maggot control.

Thrips (most being flower thrips *Frankliniella* spp) may infest peppers, including western (WFT) (*Frankliniella occidentalis*) and eastern (*Frankliniella tritici*) flower thrips, and tobacco thrips (*Frankliniella fusca*). Thrips are tiny ($1/16$ inch), slender insects that vary in color from yellow or orange (most common color) to dark brown or black. Thrips overwinter in plant debris or on weeds such as winter annuals found in or around



fields. In the spring they fly to plants producing flowers where they feed on pollen and nectar. They prefer to feed in flowers but also occur in flower and leaf buds and, occasionally, on leaves. They are more likely to be found on leaves of vegetables early in the season when these leaves have pine pollen on them. Pine pollen, as well as other tree pollens is quite commonly found on plants in the field. Thrips then feed on this pollen. These early season thrips populations rarely result in any problems later in the season unless several weekly applications of pyrethroids are made early in the season. There are two larval stages and a pupal stage. Immature thrips are sometimes transparent and take on the appearance of whatever plant part they are on, which can make them almost impossible to see even with a 10x hand lens. Thrips have only the left mandible and use this mouthpart to punch a hole or scrape the leaf or fruit



surface of the plant disrupting cells and feeding on the cell contents. This feeding method damages peppers in several ways. Feeding in blossoms may cause blossom drop, or fruit may not develop properly and become scarred. Feeding on foliage may cause a bronzing or silvering of foliage. Eggs inserted (oviposited) in fruit causes dimpling. Some thrips species (western flower thrips, onion thrips and tobacco thrips, but not the common eastern flower thrips) are also vectors of tomato spotted wilt virus (TSWV), a potentially devastating disease of pepper. Infected plants have dark lesions on the foliage and fruit show characteristic spotting. If plants are infected early in the season they remain small and never produce a crop. If infected later in the season fruit often becomes unmarketable. Only immature thrips can acquire the virus when they feed on an infected plant, adults cannot, but only adults can vector the virus to another plant. TSWV has not been much of a problem in Maryland, but can be intermittently found in tomato, but usually not pepper fields in August and September in the southern

parts of the state. Although research in the SE United States has demonstrated that even low numbers of thrips can infest fields with TSWV, in Maryland it is rare that any field would have economic infestations of thrips and TSWV unless many pesticide applications had been made. **Management** to determine thrips presence; sample 20-40 flowers while scouting. Thrips will be visible inside the flower using a 10x hand lens, or the flower may be shaken over a piece of paper to dislodge the thrips for observation. The recommended thrips treatment threshold is five thrips per flower. Reduced risk chemicals that will control thrips include: Assail, SpinTor, and Venom, with these other chemicals: pyrethroids, Renounce and Proaxis also working. DO NOT over apply chemicals for thrips control as this will increase the likelihood of resistance developing. Over application of pyrethroid insecticides favors the increase of western flower thrips which are very good vectors of TSWV and also cause more damage to peppers than other thrips species.

Flea beetles All solanaceous plants are susceptible to flea beetle attack, but eggplant is especially vulnerable and to a lesser extent pepper and potato. There are many different species of flea beetles that will attack solanaceous and cruciferous crops. The more common species that attack solanaceous plants are

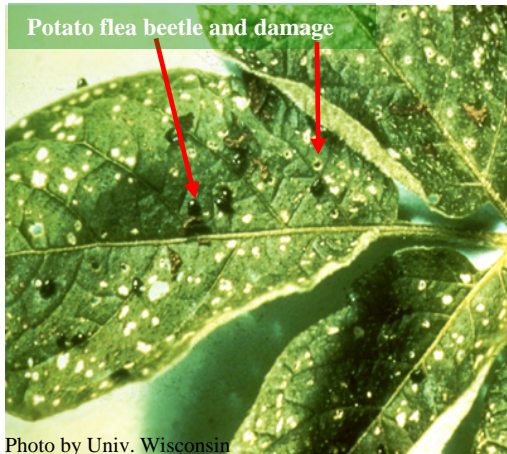


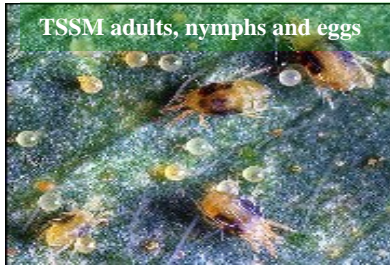
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the eggplant (*Epitrix fuscula*), tobacco (*Epitrix hirtipennis*) and potato (*Epitrix subcrinata*) flea beetles. The eggplant flea beetle adult is an oval, black; 1/10 inch long beetle that has thickened, "jumping" hind legs. Its antennae are about 2/3 the length of its body. This species resembles the potato flea beetle but has black legs and slightly hairy wing covers. The potato flea beetle is also about 1/10 inch long and brownish black. The tobacco flea beetle is about the same size, but is yellowish brown with a dark band across its wings. All eggs of these species are $\leq 1/250$ inch long and

pointed at one end. Though white at first, they gradually become yellowish-gray. A typical flea beetle larva is white with a brown head and three pairs of brown legs near its head which becomes 1/16 inch long when fully grown. In general, flea beetles overwinter as adults in soil or crop debris and emerge from hibernation in mid- to late March. Weedy hosts such as horsenettle and pokeweed are infested until crop hosts become available. Eggs laid in soil near the bases of plants hatch in about one week. Larvae emerge from the eggs and feed on roots for 2 to 3 weeks. After developing through three instars, larvae pupate in the soil. The pupal stage lasts 7 to 10 days. Beetles emerge from the soil, and feed on leaves for 2 months or more. Flea beetles complete 1-3 generations each year in Maryland. Adult flea beetles feed on both leaf surfaces but usually on the underside where they chew small, circular holes (red arrow) through to the upper cuticle, which frequently remains in place for a time before falling out. The

circular holes give the plant a “shotgun” appearance; large numbers of these shotgun holes may destroy entire leaves. Flea beetles can be serious pests early in the season when plants are small, less than six inches tall. As plants grow larger they can withstand substantial flea beetle damage without loss of yield. Flea beetle larvae feed on roots where they seldom cause any yield loss to pepper. **Management** Cultural practices such as destruction of crop residue, weed control and late planting help minimize flea beetle problems. The removal of crop residue reduces the number of favorable overwintering sites for flea beetles. Covering plant beds and destroying trash around them also is beneficial. Control of weeds such as horsenettle and pokeweed around field sites eliminates important early beetle food sources. Delayed planting favors the development of host plants over the establishment of flea beetles in the pepper field. If defoliation becomes severe on small or medium sized plants one application with a pyrethroid will usually take care of the problem.

Twospotted spider mites (TSSM) (*Tetranychus urticae*) are very small, 1/80 - 1/60 inch long, with 2 spots on their back that are pest problems usually in late July



and August during hot dry weather. Mites overwinter in leaf debris in and around fields. In spring, overwintering mites (which are usually reddish) feed on weed hosts, such as chickweed, clovers, and some grasses. Females find their way into fields by climbing to the top of their feeding sites and releasing a long string of silk from their abdomen that catches a breeze and they become airborne.

Because they have such a wide host range, wherever they land they can usually start to feed. Females can lay 50-100 spherical eggs. Unfertilized eggs turn into males, and fertilized ones turn into females. The life cycle of the mites can be as short as 5-7 days in the summer. Mite infestations usually start on the field edge and move towards the center over time. Hot, dry weather conditions favor rapid development of eggs, increases feeding of nymphs and adults, and decreases the abundance of pathogenic fungi. Dusty conditions also favor mite activity. Both nymph and adult mites feed by piercing the cell walls of the leaf and sucking out the juices. Twospotted spider mites damage appears as a yellow discoloration or



a mottled sand blasted appearance on tomato leaves, which can take on a bronze, then brown color. **Management** If hot, dry conditions continue for several weeks, then fields should be checked closely, especially along borders and near grassy areas. The underside of several lower leaves should be checked for mite activity. A 10X hand lens can be used to identify mites. Also, leaves can be shaken over a piece of paper, and the dislodged mites can be seen crawling about. If mites are found along the border of a field, the whole field

should be checked for the presence of mites. An exact threshold for mites has not been developed. If there are only a few mites along the field borders with little mite activity in the interior of the field, then a treatment is not necessary, or just the border around the field may be treated. If there are mites found in scattered areas throughout the field and there is webbing found on the undersides of leaves, then a treatment will be necessary. Natural enemies help control and reduce mite populations under most circumstances and therefore, insecticide applications should be kept to a minimum. Natural enemies, however, can be overwhelmed by mite reproduction during hot, dry weather. There are several reduced risk chemicals available for mite control in pepper: Acramite and Agri-mek. These other pesticides will also control two spotted spider mites: Oberon and if populations are not large bifenthrin.

Cabbage loopers (*Trichoplusia ni*) can be found in pepper fields, but they rarely



Cabbage looper larva

cause serious damage. It is a foliage feeder, and rarely attacks the fruit. When large populations are present they can lower yields by reducing plant vigor and increasing sun scald of fruit through foliage loss. Loopers are green with white stripes running lengthwise down the body.

Loopers have only three pairs of prolegs. The young larvae are often found on the underside of leaves where they feed leaving most veins intact. Insecticides applied to control tomato fruitworm keep cabbage looper under control.

Pepper Weevil (*Anthonomus eugenii*) is a pest of peppers almost exclusively confined to subtropical regions of the world. Pepper weevils must have a host throughout the year as they do not hibernate; therefore they cannot overwinter north of South Carolina. However an infestation of weevils has been found in NJ in pepper fields for the last few years. This very unusual occurrence has researchers perplexed as to the reason for the yearly problem in peppers in this



Pepper weevil in pepper flower

particular growing area of NJ. Growers in Maryland should not be concerned about this pest, but should at least be aware of its possible presence. Any very small long-snouted beetle found in peppers should be quickly and properly identified.



Pepper weevil adult

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