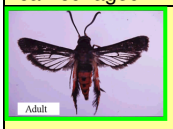
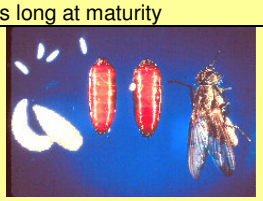
Master Gardener Journal
MG-602
March 1, 2002

Destructive Insects of Vegetables

Insects	Crops	Symptoms & Damage	Control Methods
 **Aphids or Plant Lice** Tiny (less than 1/8 A long), soft-bodied, usually wingless insects. Color ranges from pale green to black. Slow-moving. Often not noticed until there are many upon a plant.	Bean, Broccoli, Cabbage, Cucumber Irish Potato, Muskmelon, Squash, Sweet Corn, Tomato, Watermelon.	Curled leaves; "honeydew" (clear, sticky substance on leaves and fruit given off by aphids, turns black from mold growth); many tiny, soft-bodied insects.	**Non-Chemical** Predators such as ladybird beetle adults and larvae, green lacewing larvae, syrphid fly larvae, and several parasitic wasps all help reduce aphid numbers when insecticides are not used. Heavy rains help dislodge aphids from the plant and, during periods of high humidity, fungal diseases may greatly reduce populations. The remarkable reproductive capacity of the aphid normally overcomes the effects of natural controls in spring when cool temperatures hinder the development of natural enemies. These natural controls most often catch up in the warmer weather of summer and fall.
 **Colorado Potato Beetle** Adult Colorado potato beetles are easy to spot. They have bright yellow bodies with black stripes running the length of their backs and black spots behind their heads. The beetles are about 3/8" long with hard, rounded shells.	The beetles prefer to feed on potato, but they will also feed on eggplant.	Look for clusters of bright yellow-orange eggs on the undersides of leaves beginning in early May (120 DD_{50}) Both adults and large larvae are voracious leaf feeders. They can chew holes larger than 1/8" across into the leaves of susceptible plants. They often consume entire leaves beginning with young, succulent leaves. Larvae typically feed in groups and may completely defoliate plants.	**Non-Chemical** The large larvae and adults can be hand picked or removed with a net. Be sure to wash your hands before touching your eyes or mouth. Cover the plants with floating row covers to keep the beetles out. **Biological** Colorado potato beetle is highly resistant to most garden insecticides. However the biological insecticide Btt (Bacillus thuringiensis var. tenebrionis or san diego) is effective against first instar (185 DD_{50}) and second instar (240 DD_{50}) larvae and must be applied as an early spray against small larvae. The more commonly available Bt var. kurstaki (Btk), which is effective on caterpillars, will not affect beetle larvae.
 **Cucumber Beetle** The striped cucumber beetle is 1/5" long and yellow-green in color with three black stripes running the length of its body. Spotted cucumber beetles are yellow-green with 12 black spots on their backs.	Cucumbers and muskmelons are particularly susceptible. Watermelons, pumpkins, and squash are rarely affected.	Cucumber beetle larvae feed on roots and stems and can stunt or kill seedlings or transplants. The adults feed on stems, foliage and fruit. More importantly, these beetles transmit the bacteria that cause bacterial wilt. This disease plugs the water-conducting vessels of the plant, eventually resulting in plant death. Once the bacteria are in the plant, it travels through the vascular system and causes blockages of the vessels.	**Non-Chemical** Cover the plants with floating row covers to keep the beetles out. Make sure you uncover flowering plants to allow the bees to enter and pollinate the plants. If bacterial wilt infections have already occurred, remove the diseased plants immediately to prevent the spread of the disease while insects are present. **Chemical** There are several insecticides available for control of cucumber beetles. Refer to UWEX publication A2088, "Managing Insects in the Home Vegetable Garden", for a complete listing of available products. If the insecticide *carbaryl* is selected, care must be taken when making applications while bees are present. Applications should be made late in the day to reduce bee mortality.
 **Cutworms** Cutworms are the larval stage or caterpillar of night-flying moths. Up to 1 ½" long. Black, gray, or mottled caterpillars. Usually a single cutworm found curled up beneath soil surface at base of damaged plant.	Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Eggplant, Kohlrabi, Pepper Sweet Corn, Tomato.	Cut-off or wilted plants. Cutworms chew through plant stems at or just beneath soil surface. They also may feed on ripening tomato fruits, leaving small, round holes	**Non-Chemical** Where damage is seen, search for and destroy the cutworms. Protect young plants with an aluminum foil collar, paper cups, or tin cans with bottoms removed pushed into the soil at least 1 ½ ". **Chemical** Commercial cutworm baits containing carbaryl are available, but must be used before damage begins

Insects	Crops	Symptoms & Damage	Control Methods
  **Imported Cabbageworm** Imported cabbageworm adults are the white butterflies commonly seen flying in great numbers on warm summer days. Female butterflies have 2 black dots on each forewing while the smaller males only have one dot per wing. Larvae are velvety green worms up to 1 inch long with a faint yellow stripe running down the back	Broccoli, Brussels sprouts, Cabbage, Cauliflower Collards Chinese cabbage	Larvae of the imported cabbageworm moth feed on cole crop leaves between the large veins and midribs. Feeding occurs primarily on the upper leaf surface near the midrib producing large, irregular holes. As older imported cabbageworm larvae move toward the center of the plant, they may remove all but the main leaf veins. Severe feeding damage will stunt cabbage and cauliflower heads. Larval damage to the developing bud on young cabbage can cause the head to abort. The copious quantity of greenish-brown frass produced by the larvae makes the heads and foliage unsightly (but still edible).	**Non-Chemical** Floating row covers can provide a physical barrier to imported cabbageworms in small cole crop plantings. Natural controls are frequently quite effective in holding cabbageworm populations down. **Chemical:** *Bacillus thuringiensis* var. *Kurstaki* or *Aisawai* applied to early instar larvae can be very effective in controlling imported cabbageworms. There are also a wide variety of chemical insecticides that are effective in controlling caterpillar pests of cole crops. Refer to UWEX publication A2088, "Managing Insects in the Home Vegetable Garden", for specific insecticide recommendations. Target early instar larvae and insure good plant coverage to improve efficacy when using insecticides. Use pest-specific insecticides in early to mid-season when diamondback moth and imported cabbageworms are prevalent so natural enemies are conserved.
  **Cabbage Looper** Got its name from the way it arches its body while moving. When fully grown, its greenish body is 1½ inches long and tapers near the head. There is a thin white line along each side and two white lines along the back. The cabbage looper adult is greyish-brown, night-flying moth with a wingspan of 1½ inches. The mottled brown forewings are marked near the middle with a characteristic small, silver-white figure 8 or letter Y.	Broccoli, Brussels sprouts, Cabbage, Cauliflower Collards Chinese cabbage	Larvae of the cabbage looper moth feed on cole crop leaves between the large veins and midribs. Feeding occurs primarily on the upper leaf surface near the midrib producing large, irregular holes. Severe feeding damage will stunt cabbage and cauliflower heads. Larval damage to the developing bud on young cabbage can cause the head to abort. Head boring by cabbage loopers is also common in early cabbage and can result in unmarketable heads. The copious quantity of greenish-brown frass produced by the larvae makes the heads and foliage unsightly (but still edible).	**Non-Chemical** Floating row covers can provide a physical barrier to cabbage loopers in small cole crop plantings. Natural controls are frequently quite effective in holding cabbage looper populations down **Chemical:** *Bacillus thuringiensis* var. *Kurstaki* or *Aisawai* applied to early instar larvae can be very effective in controlling cabbage loopers. There are also a wide variety of chemical insecticides that are effective in controlling caterpillar pests of cole crops. Refer to UWEX publication A2088, "Managing Insects in the Home Vegetable Garden", for specific insecticide recommendations. Target early instar larvae and insure good plant coverage to improve efficacy when using insecticides. Use pest-specific insecticides in early to mid-season when cabbage loopers are prevalent so natural enemies are conserved.
  **Diamondback Moth** A small, greyish-brown, night-flying moth with a 1 inch wingspan. It holds its wings together, roof-like over its back, when at rest. When in this position, a pattern of three diamond-shaped spots can be seen along the top of the moth's body. The small caterpillars (up to 3/8 inch long at maturity) are pointed at both ends and range in color from cabbage green to yellow. When disturbed, the larva rapidly wiggles its body back and forth, often causing it to fall off the plant	Broccoli, Brussels sprouts, Cabbage, Cauliflower Collards Chinese cabbage	Larvae of the diamondback moth feed on cole crop leaves between the large veins and midribs. Diamondback moth larvae prefer to feed on the lower leaf surface, leaving the upper epidermis intact thereby creating a "window-paning" effect. Severe feeding damage will stunt cabbage and cauliflower heads. Larval damage to the developing bud on young cabbage can cause the head to abort. The copious quantity of greenish-brown frass produced by the larvae makes the heads and foliage unsightly (but still edible).	**Non-Chemical** Floating row covers can provide a physical barrier to diamondback moths in small cole crop plantings. Natural controls are frequently quite effective in holding diamondback moth populations down **Chemical:** *Bacillus thuringiensis* var. *Kurstaki* or *Aisawai* applied to early instar larvae can be very effective in controlling diamondback moths. There are also a wide variety of chemical insecticides that are effective in controlling caterpillar pests of cole crops. Refer to UWEX publication A2088, "Managing Insects in the Home Vegetable Garden", for specific insecticide recommendations. Target early instar larvae and insure good plant coverage to improve efficacy when using insecticides. Use pest-specific insecticides in early to mid-season when diamondback moths are prevalent so natural enemies are conserved.
 **Cabbage Maggot** Ash-gray, bristly, fly that resembles a housefly but is half as long and has black stripes on its thorax. The larvae are legless and white with a 1/3-inch long bodies that taper toward the head.	Cabbage, Broccoli, Cauliflower, Brussels sprouts, Rutabagas Collards Chinese cabbage	Cabbage maggot larvae damage cole crops by feeding on the roots and lower stem of the plant. They can be especially damaging to seedlings, injuring the growing point of the root and thereby stunting plant growth. Affected plants appear stunted and off-color. Severely damaged plants may wilt during hot weather.	**Non-Chemical** Prevention is the best method of cabbage maggot management. Plant in well-drained soils when soil temperatures exceed 50°F. Late plantings (mid-June) are generally damaged less than early plantings. If possible, time planting dates to avoid peak fly emergence. Transplants should be planted one week before peak fly emergence while seeds should be sown at least three weeks before, or one week after emergence. Floating row covers are also effective in protecting plants during flight periods.

Insects	Crops	Symptoms & Damage	Control Methods
 **Common Aspargus Beetle** Bluish-brown with cream spots about ¼ inch in size. Larvae are slug-like and cream-colored or grey with dark heads.	Asparagus	Adults of the common asparagus beetle feed on the spears and ferns. Eggs are laid on the spears. Defoliation of plants can occur if large populations are left unchecked. The beetles overwinter as adults in the soil or mulch. Adults can be active as soon as the host plants emerge in the spring. Eggs of the common asparagus beetle are laid in rows on the emerging spears and ferns. Larval feeding continues for 10-14 days at which time, they migrate to the soil and pupate.	**Non-Chemical** Destruction of crop residues and trash eliminates adult overwintering sites. Adults can be hand picked early in spring before egg laying. Most larvae and adults are more active in the afternoon when the temperature and sunlight are greatest. **Chemical:** *Carbaryl, rotenone or malathion may be used if damage is severe.*
 **Spotted Aspargus Beetle** Orange with black spots, about ¼ inch in size. Larvae are slug-like and cream-colored or gray with dark heads.	Asparagus	Adult spotted asparagus beetles feed only on the fruit produced and not on the ferns. The spotted asparagus beetle becomes active later in the spring than the common asparagus beetle. The beetles overwinter as adults in the soil or mulch. They lay eggs on the ferns. When the eggs hatch, the slug-like larvae migrate to the tips of the ferns where they begin feeding on the foliage. Defoliation of plants can occur if large populations are left unchecked.	**Non-Chemical:** Destruction of crop residues and trash eliminates adult overwintering sites. Adults can be hand picked early in spring before egg laying. Most larvae and adults are more active in the afternoon when the temperature and sunlight are greatest. **Chemical:** *Carbaryl, rotenone or malathion may be used if damage is severe.*
 **Flea Beetle** Include the crucifer, eggplant, horseradish, pale-striped, potato, spinach and striped flea beetles. All flea beetles have characteristically large hind legs that give the adult beetles the ability to jump. Adult flea beetles range in size from about 1/10 to 1/5 inches in size. Larvae are delicate and threadlike with white bodies and brown heads.	Cole Crops, Horseradish, Eggplant, Bean, Beets, Lettuce, Melon, Peas, Pepper, Pumpkin, Radish, Potato, Spinach	Adults feed on both leaf surfaces but usually on the underside where they chew small, circular holes through to the upper cuticle, which often remains in place for some time before drying and falling out. The circular holes give the plant a "shotgun" appearance. Heavy feeding on young plants may reduce yields or even kill plants in severe cases. Larvae feed on the roots and tubers of susceptible plants but often don't cause economic damage. Larvae of the horseradish flea beetle will also mine the stem and leaf veins. Many are also vectors of plant pathogens.	**Non-Chemical**: Enclosing seed beds with floating row covers will protect plants from egg-laying adults. Flea beetles overwinter as adults in the soil or beneath They become active in early spring when temperatures reach 50 ° F, and begin feeding on weeds or early-planted crops. Adults lay eggs in the soil at the base of host plants in May. Eggs hatch in 7-14 days and larvae feed on various plant parts until fully grown. They pupate in earthen cells for 11-13 days before emerging as adults. Adult flea beetles are particularly active on warm, calm, sunny days. Depending upon the species, there may be 1-3 generations per year. **Chemical:** Usually, beetles are present for only a short time and can be excluded as noted above, or controlled with carbaryl.
 **Potato Leafhoppers** Small (1/8 inch), bright green, wedge-shaped insects with whitish spots on their head and thorax (upper body). They have piercing-sucking mouthparts and commonly jump, fly, or crawl when disturbed. Nymphs are similar in appearance to the adults but lack fully developed wings.	Snap Beans Potatoes	Potato leafhoppers don't overwinter in Wisconsin; they are blown into the state each spring on southerly winds. They feed by inserting needle-like mouthparts into the plant and extracting plant sap. Their saliva causes the plant to become stunted and the outer margins of the leaves to turn yellow or brown. This damage is called "hopperburn" and is often mistaken for a disease. Potato leafhoppers are frequently found in large numbers in alfalfa. When alfalfa is cut, nearby fields are often inundated. Leafhopper feeding may reduce yields, but the average gardener can tolerate this damage.	**Non-Chemical** Healthy plants will withstand damage more effectively than stressed plants. Irrigation and cultural practices, which favor the crop, are recommended. Infestations are more likely to occur in crops planted adjacent to alfalfa fields. **Chemical:** Many foliar insecticides used for other pests provide excellent control for potato leafhoppers.

Insects	Crops	Symptoms & Damage	Control Methods
 **Hornworms** Hornworms are easily identified by their blue-green color and large size. When fully grown they can reach up to 4 inches in length. The caterpillars have seven (tobacco) or eight (tomato) white stripes on each side of their body. A large red or black spine protrudes from the posterior end of the worm, giving rise to the name "hornworm".	Tomato	Hornworms primarily feed on tomato leaves and fruit. While feeding on the latter, they may leave scars on green fruit. Hornworms can devour up to four times their weight in food each day. Although they are capable of defoliating a tomato plant, they are usually noticed before this occurs. Hornworms rarely cause economic damage to tomatoes in Wisconsin. Adults are large, heavy-bodied hawkmoths with a wingspan of up to 5 inches. They become active in July and are often mistaken for hummingbirds.	**Non-Chemical** Rarely do hornworms cause enough damage to warrant the use of insecticides. Because of their large size they are easily removed from the plant by hand. Trichogrammid wasps offer natural control by parasitizing hornworm eggs. Braconid wasps often lay their eggs on the bodies of hornworms. Upon egg hatch, the larval brachonids feed inside the caterpillar. If left unharmed, these parasitized caterpillars will produce wasps that can parasitize other hornworms, thereby providing a continual source of biological control.
 **Squash Bug** Adults are brownish gray to dark gray bugs about 5/8" long. Nymphs have a green abdomen with crimson head, thorax, legs and antennae later become grayish-white with nearly black legs and antennae well camouflaged	Squash Pumpkins	Squash bugs suck the plant juices and cause wilting.	**Non-Chemical:** Because these insects are usually present in small numbers, they can be hand picked. **Chemical:** Soapy water or carbaryl treatment provides some control.
  **Squash Vine Borer** A day-flying clearwing moth that resembles a wasp more so than a moth. The forewings are greenish-brown while the hindwings are transparent with a fringe of reddish-brown hairs. Wingspan is 1¼-1½ inches. The body is rusty orange with black bands on the abdomen. Borers are wrinkled and white with brown head capsules. Larvae are 1½-2 inches long at maturity	Pumpkin Squash	The damage caused by squash vine borer larvae often goes undetected until the infested plants wilt and die in late July and August. The first symptom of feeding damage is when plants wilt midday. As larvae tunnel through the vines they destroy the vessels that transport water. These wilt symptoms may be confused with those caused by bacterial wilt or *Fusarium* wilt. Look for entrance holes near the base of wilting vines. If frass is present near the entrance holes, split the stem lengthwise to confirm the presence of larvae. Fields that have been damaged in the past are likely to be damaged again.	**Non-Chemical**: Floating row covers may be used during the flight period of the adults to prevent egg laying on susceptible plants. Keep in mind that plants in bloom need bees to pollinate the flowers so row covers must be removed to allow the bees access. **Chemical:** Currently there are no treatment thresholds for the squash vine borer. Two to three insecticide treatments of carbaryl, 5-7 days apart during the three-week egg-laying period around 1000DD_{50} will control most of the larval borers before they become protected by the vines. It is important to treat plants in which runners are less than 2 feet long. Larvae boring into the main stem will kill the entire plant while those boring into a runner will only kill the runners and not cause economic damage in larger plants.
 **Onion Maggot** Adult maggots are slender, grey, large-winged, bristly flies that resemble houseflies, but are only ¼ inch long. Their wings are held overlapped over their bodies while at rest. Eggs are elongated and white and are laid at the base of the plant. There are three cream-colored, larval stages called maggots that develop over the course of 2-3 weeks.	Onion	Onion maggot larvae feed on the belowground tissue of seedlings. Larval feeding may kill seedlings. In larger plants, larvae may tunnel into the bulb causing plants to become flaccid and yellow. Onion maggot feeding can introduce soft rot bacteria into the plant. Onion maggots overwinter as pupae in the soil. Adults emerge around mid-May and mate over a 3-day period after which they begin laying tiny, white eggs at the base of the plant. The larvae, upon emergence, crawl beneath the leaf sheath and enter the bulb. The onion maggot pupates in the soil and the next generation of adults appears 3-4 weeks later. There are three generations per year.	**Non-Chemical** Onion crops should be rotated whenever possible to provide at least ½ mile between new seedings and previous crops or cull piles. This may not always be possible in home gardens and gardeners may need to occasionally rotate out of plants in the onion family. Overwintering populations of onion maggots can be reduced through the destruction of crop debris and removal of culls from the field **Chemical:** Once the damage has been detected, it's too late to take control actions. Preventative soil insecticide applications are recommended for the control of the first generation larvae if damage from the previous year's crop exceeds 5-10%. Foliar insecticide applications should be avoided since they are generally ineffective on adult populations that move in and out of fields.

SouthEast Wisconsin Master Gardeners

Milwaukee County UW-Extension
932 South 60th Street
West Allis, WI 53214-3346
Phone: (414) 290-2400
Fax: (414) 290-2424
http://milwaukee.uwex.edu

Compiled By
John T. Kovatch

Master Gardener Journal
MG-602
March 1, 2002