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Problem: Whiteflies
(*Aleyrodes proletella*)

First Sighting: Overwintered

Description: Cabbage whiteflies are an emerging pest that now overwinters in New Jersey and have become a significant pest of brassica plants, especially kale. The grey spots on the whiteflies indicate that they are cabbage whiteflies, *Aleyrodes proletella*. These pests are native to Europe, found worldwide, and have remained a pest in the Northeast since first found in 1993. They are now established in Oregon and California, and they can overwinter in Canada. Brassica crop preferences include kale, brussels sprouts, broccoli, and cauliflower.

These small, piercing sapsuckers damage and deform foliage. Plants quickly become overrun, due to adults and nymphs equally feeding on plant sap. Their feeding leaves honeydew (feces) behind, with sooty mold fungus to follow. With favored host plants available throughout winter and rapid reproduction, infestation will survive and multiply if not controlled swiftly.



Whiteflies on the underside of a kale leaf
Photo: M. Albright, NJAES



A heavily infested kale leaf
Photo: M. Albright, NJAES




A close up of cabbage whiteflies showing their identifying grey spots. The small white ovals are other stages of the whitefly lifecycle
Photo: P. Nietzsche, NJAES

Management:

- Inspect overwintered brassica plants early in the gardening season.
- If infestations of whiteflies are found, bag and remove the plants.
- As the weather warms up, the whiteflies will start to fly when disturbed and will become more difficult to remove.
- If the whiteflies are left on overwintered plants in the garden, they will infest new brassica plants. Populations of whiteflies can grow quickly.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS240>
- University of Maryland <https://extension.umd.edu/resource/whiteflies-vegetables>

Problem: White Grubs <i>(many species)</i>	First Sighting: March 31
Description: White grubs are the larvae of scarab beetles. They feed on the roots of many vegetables, including corn, bean, beet, potato, spinach, turnip, and other root crops. Some of the species include May or June beetles, European Chafer beetles, the Asiatic garden beetle, the green June beetle, the Japanese beetle, and the Oriental beetle.	
	<p>White Grubs Photo: Rutgers University</p>
Management: <ul style="list-style-type: none"> • As soil is prepared for planting, hand collect and destroy the grubs. 	
References: <ul style="list-style-type: none"> • Rutgers University https://njaes.rutgers.edu/pubs/publication.php?pid=FS293 • University of Massachusetts ag.umass.edu/vegetable/fact-sheets/scarab-beetle-japanese-oriental-asiatic-garden-beetles 	

Problem: Imported Cabbageworm
(Pieris rapae)

First Sighting: April 4 Adults

Description: Imported Cabbageworm butterflies lay their eggs on brassicas such as cabbage, broccoli, and cauliflower. The green color and small size of the larvae make it difficult to detect them, but you will know they are there if you begin to see holes in the leaves.

The butterfly lays single white eggs on the underside of leaves. Eggs hatch three to five days later, and the green caterpillars begin feeding on the leaves. After two to three weeks of feeding, the caterpillars pupate and form a chrysalis on or near the affected plant. This matures in about two weeks and the cycle begins again. In our location, it is possible to have two to three overlapping generations in a season.

If you see this...



Adult imported cabbageworm butterfly



Imported cabbageworm larva
Photo: P. Nitzsche NJAES

The larvae won't be far behind



Adult imported cabbageworm larva
Photo: P. Nitzsche, NJAES

Damage to cabbage plants



Damage from imported cabbageworm feeding
Photo: P. Nitzsche NJAES

Management:

- Handpick eggs and caterpillars and dispose of them by crushing or dumping them in a jar of soapy water. The caterpillars are well camouflaged so your first inkling of a problem may be damage to leaves. Planting red cabbage varieties makes it easier to see the caterpillars.
- Row covers placed immediately after planting seedlings will keep the butterflies from laying eggs.
- Apply *Bacillus thuringiensis var. kurstaki* when caterpillars are small and actively feeding. The *BT* must be ingested to be effective.
- In the case of plants that form heads, harvest affected plants early to minimize tunneling by larger caterpillars into the head.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS286>

Problem: Allium Leaf Miners <i>(Phytomyza gymnostoma)</i>	First Sighting: April 10
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Description: Allium leaf miner adults are small flies that are active in Morris County from late March/early April to late May/early June. A second generation occurs in September to October/November. The adults lay eggs on the leaves. The larvae mine the leaves and migrate into the bulb and pupate. The injury caused by the larvae often leads to a rot in the bulb or neck of the plant and distortion of leaves. Injury to leeks, onions and scallions can be severe. Large numbers of orange pupae may also be found in harvested alliums, particularly leeks.



Feeding marks from Allium leaf miner adults

Photo: M. Sample, NJAES



Allium leaf miner adults

Photo: Pennsylvania Department of Agriculture



Allium leaf miner pupae

Photo: Pennsylvania Department of Agriculture



Plants damaged by allium leaf miner larvae

Photo: Pennsylvania Department of Agriculture

Management:

- Row covers are effective at preventing egg laying during periods of adult activity. The spring row covers can be removed in early June after the adults stop flying. Row covers should be used again in the fall to prevent damage from the second generation of adults.
- Spinosad (for example, Captain Jack's Dead Bug Brew) can be used for allium leaf miners. Please spray only allium foliage (not other plants) to protect beneficial insects and pollinators.
- Removal of all host debris before the end of the season can help prevent overwintering.

References:

- Cornell University <https://cals.cornell.edu/new-york-state-integrated-pest-management/outreach-education/fact-sheets/allium-leafminer>

Problem: Leaf Miners
(Various species)

First Sighting: May 6 Adults,
April 17 Eggs

Description: Leaf miners lay eggs that hatch within a week, and the larvae burrow immediately into the leaf. They feed on the leaf tissue for nearly 12 days forming “mines” and then fall to the soil and pupate. Nearly three weeks later, the next generation of flies will hatch, and the cycle begins anew. Crops most affected are spinach, Swiss chard, beets, and lambsquarter.



Leaf miner larvae in Swiss chard and tunnel damage on leaf
Photo: M. Albright, NJAES



Leaf miner eggs
Photo: Utah State University

Management:

- Remove affected leaves to help decrease the impact of subsequent generations of leaf miners. There are three to four generations per year.
- Remove nearby weeds as these may harbor leaf miners. Keep the garden clean.
- Rotate crops as pupae may overwinter in soil.
- Thorough cleanup of debris in the fall.
- Spinosad (Captain Jack’s Dead Bug Brew) and neem oil may help prevent egg laying but will not kill the larvae that are already in leaves. Timing is critical, scout your plants for eggs.
- Row covers can be effective.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS276>

Problem: Flea Beetles
(many species)

First Sighting: April 19

Description: There are many species of flea beetles and most feed on specific plants. Most flea beetle species are 1/20th to 1/8th inch long and are black, bronze, bluish, or brown to metallic gray in color. Since most flea beetles are very small, new gardeners often wonder what is causing the holes in their plant leaves. Flea Beetles feed on many different vegetables including tomato, potato, eggplant, radish, Swiss chard, sweet potatoes, kale, and others. Flea beetle infestation may affect the growth of young plants and can be a significant pest of eggplant. Flea Beetles are so small they can sometimes be mistaken for specks of soil but will jump if disturbed.



Flea Beetle feeding holes on radish plants
Photo: M. Albright, NJAES



Flea Beetles and their characteristic feeding holes on an eggplant leaf
Photo: P. Nitzsche, NJAES

Management:

- Row covers can protect young plants.
- Plants grown from small seeds are less tolerant to flea beetle damage than transplants, thus planting large-seeded crops or transplants can help.
- Early season plantings usually have more severe flea beetle infestations. Delaying planting, if possible, can reduce flea beetle problems.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS233>
- University of Minnesota <https://extension.umn.edu/yard-and-garden-insects/flea-beetles>

Problem: Common Asparagus Beetles
(*Crioceris asparagi*)

First Sighting: April 24

Description: The common asparagus beetle, *Crioceris asparagi* (Linnaeus), is 1/4 inch long, slender, and blue-black in color with three yellowish-white squares on each wing cover. Asparagus beetle adults feed on young shoots during the harvest season, chew holes in the shoots, and lay small, dark brown eggs standing on end on the spears.

There is also a spotted asparagus beetle, but they are usually active later in the season (mid-May).



Common asparagus beetle adult
(1/4 inch long)

Photo: J. Basile, NJAES



Asparagus beetle eggs

Photo: University of Maryland



Close up of asparagus beetle eggs.
The eggs will hatch in a week and feed for two.

Photo: J. Basile, NJAES



Asparagus beetle larvae
(1/3 inch long when fully grown)

Photo: University of Minnesota



Asparagus beetles can be found feeding within spears, disfiguring, and destroying crops. Fast removal of eggs will help prevent damage and additional generations.

Photo: J. Basile NJAES

Management:

- Hand pick any existing beetles, larvae and eggs and destroy them.
- Asparagus in the affected area should be harvested daily.
- The best time to check for asparagus beetles is in the afternoon when they are most active.
- Organic controls include neem, pyrethrin, and Spinosad. Be sure to read the label, make sure asparagus beetles are included, and follow the directions.

References:

- Rutgers University <https://njaes.rutgers.edu/FS221/>
- University of Minnesota <https://extension.umn.edu/yard-and-garden-insects/asparagus-beetles>

Problem: Aphids
(Aphis spp.)

First Sighting: May 8

Description: Aphids can overwinter as eggs on bark or buds and become active in early spring. They are small, 1/16" to 1/8" long, soft-bodied, pear-shaped insects that range in color from pink, green, bluish green, black, brown, tan, or yellow. Aphids suck the juices from plants, which causes the leaves to curl and wilt. The sweet honeydew excreted by aphids often attracts ants. Aphids will flourish with temperatures of 65-80 degrees and reproduce rapidly with several generations a season.



Aphids on underside of plum leaf
Photo: J. Williams, NJAES



Aphid found on Calendula
Photo: J. Basile, NJAES



Winged aphid on horseradish leaf
Photo: S. Brighthouse, NJAES

Management:

- Encourage beneficials such as ladybugs and lacewings, which feed voraciously on aphids.
- Use a strong stream of water to knock aphids off plants.
- Avoid over-fertilization with nitrogen, as the lush growth that results makes the plants especially attractive to aphids.
- To avoid spreading the problem, remove severely affected plants from the garden.
- As a last resort, spray with insecticidal soap or neem.

References:

- Rutgers University <https://njaes.rutgers.edu/fs230/>

Problem: Colorado Potato Beetles
(Leptinotarsa decemlineata)

First Sighting: May 14 (Adults)

Description: Adult Colorado potato beetles overwinter in the soil and emerge in early spring, laying bright, orange-yellow eggs in small clusters on the undersides of the leaves of host plants in the *Solanaceae* family. Both adults and their larvae will feed on the foliage of potatoes, eggplants, tomatoes, peppers, groundcherries, and other nightshade plants. The Colorado potato beetle is approximately 3/8th of an inch long and has a black and yellow striped body with an orange head. A second generation will emerge in late summer and then overwinter in the soil. If not controlled, they can reproduce rapidly and defoliate plants. Monitor and destroy to disrupt any future infestations.



Colorado potato adult with yellow eggs on the underside of leaf.
Photo: Rutgers University



Newly hatched red-orange larvae of Colorado potato beetle eating leaves. Shows whole leaf damage happens quickly.
Photo: Rutgers University



Adult Colorado potato beetle sitting on potato leaf.
Photo: M. Olin, NJAES

Management:

- Colorado potato beetle adults and larvae can be effectively hand-picked.
- Destroy beetles and their larvae by crushing or placing them in a can of water with a few drops of dish detergent. Be sure to scout under leaves for their yellow eggs and remove/crush them.
- Row covers can protect young plants and prevent the beetles from reaching crops.
- Rotate crops each year and plant Solanaceae family as far as possible from previously infected areas.
- A biological insecticide, *Bacillus thuringiensis var. tenebrionis*, is available (Novodor). This biopesticide uses a bacterium that kills small potato beetle larvae when used according to label directions.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS224>
- University of Maryland <https://extension.umd.edu/resource/colorado-potato-beetle-vegetables>

Problem: Three-lined Potato Beetles
(Lema daturaphila)

First Sighting: May 15

Description: Three-lined potato beetles are found on plants in the Solanaceae family. Both adults and larvae feed on leaves including tomatillo, potato, and sometimes tomato and eggplant. Damage to tomatillos can be severe. Eggs are yellow and often found on the underside of leaves. Gardeners sometimes mistake three-lined potato beetle adults for striped cucumber beetles.



Three-lined potato beetle
Photo M. Albright, NJAES



Eggs of Three-lined potato beetle
Photo M. Albright, NJAES



Three-lined potato beetle larvae.
The backs of the larvae are often covered with a dark layer of their own excrement.
Photo: L. Terraneo, NJAES.

Management:

- The eggs, larvae, and adults can be handpicked.
- Floating row covers are an effective barrier to the beetles while the plants are small.
- Neem and pyrethrins can be used. As with any pesticide, be sure the plant and pest is listed on the label and use according to instructions.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS242>
- University of New Hampshire https://extension.unh.edu/resources/files/Resource001192_Rep1517.pdf

Problem: Earwigs

Note: Earwigs are both garden pests and beneficial predators (Dermaptera order)

First Sighting: May 15

Description: Earwigs are night-feeding insects that can be both pests and beneficial predators. As pests in the vegetable garden, they may feed on seedlings, plant leaves, flowers, soft fruit, and corn silk. Leaves chewed by earwigs often have a ragged or shredded look. As beneficial predators, they feed on eggs and immature stages of insects, such as fleas and aphids, as well as snails and other slow-moving invertebrates.

Earwigs usually feed at night and seek out dark, cool, moist places to hide during the day. Common hiding places are under loose clods of soil, boards, or dense vines or weeds. The best way to identify whether they are causing damage in the garden is to look for them with a flashlight in the dark.

Earwigs make up the insect order *Dermaptera*. The adult earwig is identified by a pair of prominent forceps-like appendages at the tail end of its body. Most species have wings under short, hard wing covers, but they seldom fly. Immature earwigs look like adults except they are smaller and lack wings. The adult is about 3/4 inch long and reddish brown.



Earwig on horseradish leaf
Photo: N. Gardner, NJAES



Holes in leaves of Swiss chard plant eaten by earwigs
Photo: M. Albright, NJAES



Male earwig
Photo: Iowa State University

Management:

- Earwigs can be trapped with a rolled-up newspaper, corrugated cardboard, bamboo tubes, or a short piece of hose. Place these traps on the soil near plants just before dark and shake accumulated earwigs out into a bucket of soapy water in the morning.
- Remove hiding sites for earwigs, such as weeds, piles of rubbish, and leaves. Mulches may also harbor earwigs.
- Natural enemies include toads, birds, and other predators. Chickens and ducks will consume many earwigs.

References:

- University of Connecticut <https://homegarden.cahnrc.uconn.edu/factsheets/earwigs/>
- University of California <https://ipm.ucanr.edu/PMG/PESTNOTES/pn74102.html>

Problem: Sowbugs and Pillbugs
(Porcellionidae family)

First Sighting: May 15

Description: Friend or foe? Usually considered beneficial due to its contributions breaking down dead matter, this tiny crustacean can also prove to be a nuisance, especially in great numbers. They will feed on seedlings and fruit that comes in contact with the ground, such as strawberries and melons, and root crops.

Characteristics include a grey-brown armored exoskeleton, with seven pairs of legs, length of half inch, antennae and two pointy 'tails' at the end. Sowbugs differ from pillbugs, aka roly-poly bugs, as the end appendage prevents them from their namesake rolling response when disturbed. They thrive in moist soil, and do not bite. Their natural predators are small mammals, spiders, beetles, and toads.



Sowbugs at the base of radishes
Photo: C. Mathis, NJAES



Pillbugs and Sowbugs
Photo: J. Kalish, University of Nebraska

Management:

- To prevent damage to tender plants, eliminate garden debris, leaf piles, fallen fruit, and weeds from gardens and growing areas.
- Use coarse mulch, which will allow water to drain easily. Improve air circulation by providing trellises for vines.
- If possible, raise fruits like strawberries and melons above the ground.
- Apply diatomaceous earth as a barrier; it will function as a desiccant and may protect plants.
- Practice good garden sanitation to remove hiding spaces.
- The use of landscape fabric can be effective to create a barrier between soil, seedlings, and low fruiting plants.

References:

- University of California
<https://ipm.ucanr.edu/PMG/GARDEN/FRUIT/PESTS/sowbugs.html#:~:text=Solutions,surfaces%20are%20drier%20by%20evening.>

Problem: Harlequin bugs
(*Murgantia histrionica*)

First Sighting: May 17

Description: Harlequin bug adults and nymphs pierce stalks, leaves, and veins with needle-like mouth parts and extract plant juices from cabbage, cauliflower, collards, mustard, Brussels sprouts, turnip, kale, kohlrabi, radish, and horseradish. If infestations are heavy, harlequin bugs may also feed on asparagus, bean, beet, corn, eggplant, lettuce, okra, potato, squash, and tomato. Damaged plants develop irregular cloudy spots around the puncture wound. Young plants may wilt, turn brown, and eventually die while older plants become stunted or deformed. Harlequin bugs can become a significant pest if not controlled.

Adult bugs overwinter on plant debris and rubbish. In spring, adults congregate on any cole crop available. Females usually lay eggs in double clusters of approximately 12 on the undersides of leaves, until the female has deposited a total of about 150 eggs. Eggs hatch in 4–11 days, depending on weather and temperature. Nymphs feed for about five to six weeks and pass through five instars over the next two months before becoming adults. There are two generations annually.



Harlequin bug adults. Feeding damage can be seen on the leaf.
Harlequin bugs often have different colorations.
Photo: M. Albright, NJAES



Harlequin bug eggs
Photo: Rutgers University

Management:

- Handpicking of adults, larvae and eggs is an effective means of managing Harlequin bugs. Since the bugs have an odor, gardeners may want to wear disposable gloves.
- Remove all plant debris at the end of harvest since adults overwinter on plant material.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=fs246>

Problem: Cross-striped cabbageworms
(Evergestis rimosalis)

First Sighting: Eggs May 27
Larvae June 10

Description: The larvae (caterpillars) of cross-striped cabbageworm moths eat brassica plants such as cabbage, broccoli, kale, cauliflower, and collards. Leaves, buds, and small heads can quickly become riddled with holes. Cross-striped cabbageworm can be a significant problem in the home or community garden, where a limited number of plants are grown, as damage is frequently severe on several consecutive plants within a row. Eggs are light yellow and deposited in flattened masses on the undersides of leaves. The newly hatched larvae is a small gray caterpillar. Mature larvae are about 3/4 inch long, bluish gray above with tiny distinct transverse black stripes. On each side of the body there is a black stripe with a yellow stripe underneath it. There are multiple generations per year.



Cross-striped cabbageworm caterpillars on broccoli rabe.
Photo: M. Albright, NJAES



Cross-striped cabbageworm egg mass on the back of a broccoli plant leaf. The egg mass is about 1/4 inch wide.
Photo: M. Albright, NJAES

Management:

- Hand-pick egg masses and larvae, which is effective but time consuming.
- Cover plants with row covers after transplanting.
- The insecticide, *Bacillus thuringiensis*, can be used and only affects the caterpillars. Neem, pyrethrin and Spinosad can also be used.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS287>
- University of Massachusetts <https://www.umass.edu/agriculture-food-environment/vegetable/factsheets/cross-striped-cabbage-worm>

Problem: Mexican bean beetles
(*Epilachna varivestis*)

First Sighting: May 31

Description: Mexican bean beetle (MBB) adults are round-to-oval, hard-bodied insects, about 1/3 inch in length, yellow to coppery brown, with 16 black spots. Females lay clusters of yellow eggs on the undersides of leaves. The adults and eggs resemble lady bird beetles (also known as ladybug) adults and eggs. Mexican bean beetles are, in fact, in the same family. Mexican bean beetle larvae are yellow, cylindrical but tapered towards the rear, with branched spines. Pupae are also yellow and are on the undersides of leaves. These beetles and their larvae remove leaf tissue between the veins, resulting in a skeleton-like or lacy appearance. Severe defoliation may affect the harvest.



Mexican bean beetle adults are 1/3 inch in length and yellow to coppery brown with 16 black spots.
Photo: M. Albright, NJAES



Mexican bean beetle eggs on the underside of a leaf.
Photo: M. Albright, NJAES



Newly hatched Mexican bean beetle larvae.
Photo: M. Albright, NJAES



Mexican bean beetle larvae feeding on the undersides of leaves.
Photo: M. Albright, NJAES



Mexican bean beetle pupa.
Photo: M. Albright, NJAES



Extensive leaf damage from Mexican bean beetle feeding.
Photo: M. Sample, NJAES

Management:

- Inspect plants and handpick adults, eggs, larvae and pupae. The eggs, larvae, and pupae are usually found on the undersides of leaves. Handpicking is effective but time consuming.
- The New Jersey Department of Agriculture (NJDA) has a program to breed a tiny beneficial wasp that is helpful in the control of MBBs. The adult wasps or their mummies are available to farmers and the public for release in fields where MBBs are a problem. The adults are 2 – 3.5 mm in size and do not bite or sting humans or other animals. This parasitic wasp lays its eggs in MBB larvae. Wasp larvae feed inside the MBB larvae, kill it, and pupate inside it, forming a case called a mummy. More information can be found: [The Mexican Bean Beetle Outreach Project \(nj.gov\)](http://nj.gov)
- Insecticides (*Beauveria bassiana*, neem, pyrethrins) can be used. Be sure to target both tops and bottoms of leaves. The first application should be made when eggs begin to hatch because small Mexican bean beetle larvae are easier to control with pesticides than large larvae or adults.
- Clean up and remove all plant debris after harvest.
- Try growing fast maturing varieties of beans.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS227>
- Rutgers University <https://njaes.rutgers.edu/fs1123/>

Problem: Striped cucumber beetles
(Acalymma vittatum)

First Sighting: June 2

Description: Striped cucumber beetles feed on and damage the foliage and fruit of cucurbit plants (cucumbers, squash and pumpkins). Importantly, striped cucumber beetles carry the bacterial wilt pathogen that can cause plants, especially cucumbers, to wilt and die. Cucurbits are broadly susceptible. These beetles become active in late May or early June and feed on the blossoms of early flowering plants, such as dandelions, apples, and hawthorns, until their host crops are available.



Striped cucumber beetle adults
Photo: M. Albright, NJAES



Damage caused by striped cucumber beetles on zucchini plant
Photo: M. Olin, NJAES

Management:

- Check for cucumber beetles early in the season, especially in the cotyledon and first to third true-leaf stage, when the plants can suffer defoliation and bacterial wilt. Once beetles are present, monitor more frequently (every couple of days).
- Keep your garden clean. Remove weeds in and around your garden, as they may be potential hosts for adults. If a plant is showing signs of bacterial wilt, remove the infested plant before more beetles can feed on the plant and spread the bacterium.
- Use a physical barrier, such as a floating row cover, during early to mid-June to keep the striped cucumber beetles away from your plants. Be sure to remove the barrier when cucurbits start to flower unless you are growing a parthenocarpic variety (one that doesn't require insect pollination).
- Choose a pesticide that has a minimal impact on beneficial insects, such as ladybird beetles and pollinators. Neem is a plant-based pesticide that prevents insects from feeding, which eventually kills them. Spinosad and pyrethrins can also be used. Pyrethrins should come in contact with the beetles to be effective.

References:

- Rutgers University <https://njaes.rutgers.edu/fs1123/>
- University of Maryland <https://extension.umd.edu/resource/cucumber-beetles-spotted-or-striped-vegetables/>

Problem: Squash Bugs
(*Anasa tristis*)

First Sighting: Adults June 10
Eggs June 21

Description: Squash bugs are a major pest of squash and pumpkins. Squash bugs and their nymphs cause damage by piercing and sucking the sap from plants. Leaves can wilt rapidly, blacken, and die. Small plants, as well as runners of large plants, may be entirely killed. During the feeding process, squash bugs inject a poisonous substance causing a wilting known as *Anasa* wilt of cucurbits, closely resembling a disease called bacterial wilt. Squash bugs can also transmit Yellow Vine Disease of Cucurbits that causes vines to turn yellow and die.



Squash bug eggs close up. Females lay clusters of yellow to bronze-colored eggs on underside of leaf. These will hatch in ten days, and nymphs mature in just over a month.

Photo: M. Albright, NJAES



Squash bug adult on leaf. Squash bugs are 5/8th inch long and resemble stink bugs. Adults can overwinter in leaf debris.
Photo: M. Albright, NJAES



Squash bug egg cluster with newly hatched nymphs.
Photo: M. Albright, NJAES

Management:

- Gardeners should inspect their plants and hand-pick (remove and crush or drop in a jar of soapy water) adults, eggs and nymphs. The eggs and nymphs are often found on the undersides of leaves.
- Flat boards can be placed on the ground since adults like to hide under them. Gardeners can lift the boards in the morning and destroy the squash bugs found.
- Sanitation is especially important. Remove trash, old vines, dead leaves and plant residue to help prevent the buildup of the pest and remove overwintering protection for squash bugs.
- The insecticide neem can be used for adults and nymphs. As with any insecticide, make sure the product label includes the plant and pest, and follow the instructions on the label.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS228>
- University of California <http://ipm.ucanr.edu/PMG/PESTNOTES/pn74144.html>

Problem: Japanese Beetles
(Popillia japonica)

First Sighting: June 14

Description: This serious pest of flowers, trees and shrubs, fruits, vegetables, field crops, and turf has returned to the gardens. Adults feed on more than 300 plant species, while the grubs feed mainly on the roots of grasses. This beetle is native to Japan and was first reported in the United States in 1916 in New Jersey. Currently, they are established from Maine to Georgia and in nearly every state east of the Mississippi River and several mid-western states. Beetle larvae (white grubs) have a brown head, cream-colored body and appear “C” shaped. They overwinter in the soil, actively feed on roots and emerge as flying adults when spring soil temperatures warm. These adults then feed on leaves and shoots over a four-to-six-week period. Adults are 9/16 of an inch in length and metallic green with coppery-brown wing covers (called elytra). Adults usually feed on tissue between leaf veins, resulting in leaves with lace-like or skeletonized appearance. They are most active during warm days, feeding on plants exposed to full sun throughout the day. Japanese beetle adults start feeding at the top of plants, migrating downward after depleting food sources.



Typical damage caused by adult beetles found at the top of plant. Skeletonized leaves are telltale signs of recent activity. Adults assemble in masses and are often found mating.



IPM Team member, Mary Olin, demonstrates an easy mechanical method of beetle removal from a rhubarb plant.

Use a cup of soapy water and simply shake beetles into the container. Dispose of remains, but get ready to begin anew, as they can be prolific. Handpicking can also work if you are so inclined.

Top plant choices of feeding are rhubarb, beans, tomatillo, grapes, peach, plum, cherry, rhododendron, roses, and many other ornamentals.
Photos: J. Basile, NJAES

Management:

- Handpick Japanese beetles daily in the morning or evening when air temperatures are cooler. Collect them in a jar, bucket of soapy water or rubbing alcohol (70% isopropyl alcohol).
- Pheromone traps can be problematic, since they actually attract more than they can capture.

References:

- Rutgers University <https://njaes.rutgers.edu/fs1009/>
- University of Minnesota [Japanese beetles in yards and gardens | UMN Extension](#)

Problem: Squash vine borers
(Melittia satyriniformis synonym M. cucurbitae)

First Sighting: Adult June 20, Eggs June 22
Entry holes with frass, larvae July 11

Description: The squash vine borer, *Melittia satyriniformis* or *Melittia cucurbitae*, is a significant pest of squashes and pumpkins and a lesser pest of cucurbits and melons. Frass, which is greenish yellow excrement, indicates that borers are feeding and tunneling inside the stems of the plants. If the borers are not removed, they will cause the plant to wilt and die.



Squash vine borer inside a stem

Photo: P. Nitzsche, NJAES



Frass (excrement) from Squash vine borer

Photo: M. Albright, NJAES



Squash vine borer adult

Photo: L. Voo, Gardener at Morris Township Community Garden



Squash vine borer eggs

Photo: B. Werling, MSU Extension

Management:

- Watch for and destroy adults.
- Inspect plants for eggs. They can be anywhere on the plant. Most often they are at the base of the plant, on the stems, or on leafstalks. They can be removed with the sticky side of tape.
- If frass is seen, cut a longitudinal slit halfway through the vine above the frass to find and remove the borer.
- If there are multiple locations with frass, there may be multiple borers.
- Remove infested vines that cannot be saved to prevent the borers from overwintering, and remove all vines once the plants have stopped producing fruit.
- Floating row covers can be used early in the season to keep adults from laying eggs on the plants. The covers need to be removed when the plant flowers to allow for pollination. If row covers are used, don't plant near locations that had borers the previous year, since adults could emerge from the soil under the row cover.
- Spinosad (Captain Jack's Dead Bug Brew and Monterey Garden Insect Spray) or *Bacillus thuringiensis* can be applied to kill the young larvae as they hatch from the eggs before they bore into the stem. The pesticides will not work once the larvae enter the stem. Be sure to read and follow all pesticide label instructions.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS229>
- University of Connecticut [Squash-Vine-Borer.pdf](#)

Problem: *Cercospora* leaf spot disease on beets and Swiss chard
(*Cercospora* spp.)

First Sighting: Beets May 6
Swiss Chard July 19

Description: *Cercospora* leaf spot is an overwintering fungal disease that causes small circular spots with tan or white centers and red halos on leaves. The lesions begin small but can expand in size, resulting in significant loss of foliage. This fungus favors high humidity and temperatures between 75 and 85 degrees. It is spread by wind, rain splash, insects, shared tools, nearly anything in the garden it comes in contact with. Crops at risk are beets, Swiss chard, carrots, spinach, peanuts, cucumbers, squash, melons, and pumpkins.



Cercospora leaf spot on beet plants
Photo: M. Albright, NJAES



Cercospora leaf spot close up on beet plant
Photo: Purdue University



Cercospora leaf spot on Swiss Chard
Photo: B. Monaghan, NJAES



Cercospora Leaf Spot on Swiss Chard
Photo: Cornell University

Management:

- Remove infected leaves.
- Feed and water affected crops regularly to avoid undue stress to plants and harvest infected crops as soon as possible.
- Since the fungus overwinters in plant debris, remove all infected plant material. Throw out, do not compost.
- Avoid planting succession crops of beets, Swiss chard, and spinach close together.
- Water in the morning at the base of the plant to help make sure the plant is not wet during the night.
- Plant resistant beets such as Boldor, Bulls Blood, Cyindra, Detroit Dark Red, and Touchstone Gold.
- Practice a two-year crop rotation.
- Remove weed hosts of lambsquarters and pigweed.

References:

- Rutgers University [Controlling Cercospora leaf spot in beet crops in 2023 — Plant & Pest Advisory \(rutgers.edu\)](https://plantpestadvisory.rutgers.edu/2023/03/23/controlling-cercospora-leaf-spot-in-beet-crops-in-2023/)
- University of Massachusetts <https://ag.umass.edu/vegetable/fact-sheets/cercospora-leaf-spot-of-swiss-chard-beets-spinach>

Problem: White rot disease in garlic plant

First Sighting: May 25

Description: Garlic can be a very easy-to-grow herb in the garden, but it is also prone to several diseases. One of those diseases is white rot (*Sclerotium cepivorum*). White rot is a destructive disease that causes symptoms of stunting, yellowing, and dieback of foliage. When bulbs are dug out of the soil, they are either coated with a white to gray colored fuzz (mycelium) or with a crusty covering that is embedded with tiny black poppy-seed sized sclerotia (reproductive structures). White rot can live in the soil for indefinite periods of time.



Note the soil sticking to bulb, white mycelium, and black poppy-seed sized sclerotia.

Photo: P. Nitzsche, NJAES



Stunted garlic plant with white rot shown by arrow. The other plants are healthy.

Photo: M. Albright, NJAES

Management:

- Buy certified disease-free garlic seed. Never plant garlic purchased from a grocery store because it may be a symptomless carrier of disease.
- Remove and dispose of infected plants. Do not compost these plants.
- Allow adequate spacing of plants.
- Do not plant garlic, onions, or other members of the allium family in the infested soil again for at least a couple of years.
- Sanitize tools before using them again in another garden area to avoid spreading the disease. A 10% bleach solution can be used to sanitize tools.
- Gardeners with previous white rot can try using a garlic powder treatment of 4.5 ounces of garlic powder per 100 square feet with half applied to the soil in October and half in March. The powder should be incorporated to a depth of six inches to help kill the overwintering spores by stimulating them to germinate with no real host.

References:

- University of Massachusetts <https://ag.umass.edu/vegetable/fact-sheets/alliums-white-rot>

Problem: Strawberry Leaf Spot Disease
(Ramularia grevilleana)

First Sighting: May 27

Description: This fungus produces symptoms of small, round, white to tan leaf spots that are surrounded by dark purple to reddish tissue that varies in size. The spots appear scattered over the leaf surface, which reduces leaf function. These spots can also be found on petioles and calices. Older plantings are most susceptible where it occurred previously. This pathogen survives in overwintering leaf tissue.

Leaf spot can affect yield directly because it causes small black spots on fruit, and indirectly because leaf death increases likelihood of sunscald. Additionally, where leaf spot becomes severe, plants can be predisposed to winter injury and flower bud production can be inhibited the following year. Young leaf tissue is susceptible to infection if exposed to a period of leaf wetness that persists for more than 12 hours. Long wet periods over several days combined with warm temperatures over 50°F favor disease development in the spring and in summer after bed renovation.

The fungus also can infect fruit in what is called black seed disease. Berries usually have one or two spots but may have as many as 10. Spots are brownish black, hard, and leathery and appear on one to several achenes. Fruit does not rot but discolors under the spot.

Management:

- Space plants properly to allow for air circulation.
- Practice good weed management and garden sanitation.
- Use drip irrigation if possible. Limit overhead watering to minimize the length of time that leaves are wet.
- For June bearing strawberries (not everbearing / day neutral strawberries) renovate the bed after the last harvest by removing old leaves being careful not to damage the crown. A hedge clipper or mower can be used to remove the leaves. Sanitize tools.
- Some moderately resistant varieties are Allstar, Atlas, Cavendish, and Jewel.



Close up of spots on leaf.
Photo: J. Basile, NJAES



Disease spreading through patch.
Photo: M. Albright, NJAES



Close up of extensive disease.
Photo: M. Sample, NJAES



Leaves removed and renovation underway for June bearing berries.
Photo: M. Albright, NJAES



Examples of black seed disease on strawberry.
Photo: Cornell University

References:

- Rutgers University <https://njaes.rutgers.edu/fs097/>
- Rutgers University <https://plant-pest-advisory.rutgers.edu/identifying-and-controlling-strawberry-leaf-spot-2-2/>
- Cornell University <http://blogs.cornell.edu/livepath/gallery/strawberries/leaf-spot-of-strawberry/>

Problem: Tomato Disease, Early Blight (*Alternaria linariae*, formerly known as *A. solani*) & Septoria Leaf Spot (*Septoria lycopersici*)

First Sighting: May 27

Description: Septoria and early blight are common diseases seen in tomato plants in New Jersey. The diseases are caused by distinct pathogens, but have a similar appearance. They thrive in similar conditions and can coexist. Management and prevention are the same. Both diseases usually begin on the lower, older leaves of plants. As the condition progresses, newer, higher leaves are affected, wither, and defoliate. Prolonged wet humid weather is favorable to these fungi and allows the condition to worsen. The disease spores can overwinter on plant debris. Good cultural techniques can help prevent the spread, or at least, slow its progress. Use of a copper-based fungicide can work as a preventative, but it needs to be applied repeatedly. As with any garden chemical, read and follow the label instructions carefully.

Septoria leaf spot is a soil-borne fungal disease that only infects tomato leaves and stems. The spots enlarge to 1/8-inch in diameter and are distinguished by a dark brown edge with a white or gray center. As the disease progresses and more leaf spots develop, the areas surrounding spots will turn yellow causing leaves to wither and die.

Early blight is also a fungal tomato disease that thrives in wet, humid weather. It is wind-borne, soil-borne and can be introduced by purchased plants or infected seeds. Early blight is characterized by a few (5 to 10) brown, circular spots up to half an inch in diameter with concentric rings or ridges that form a target-like pattern surrounded by a yellow halo. As the disease progresses, stem and fruit also become infected forming dark, sunken spots. Dark, sunken cankers with concentric rings may also appear at or above the soil line on stems in the case of an *Alternaria* infection.

Over time, the plant leaf will yellow and the leaves drop. These diseases move from plant base to the top of plant. Defoliation will reduce yield but also exposes fruit to sunscald. It's possible to get a good tomato yield if the disease(s) arrive late in the season, so use good cultural practices to delay onset and reduce speed of transmission.

There are some varieties on the market and in development that have some resistance to multiple fungal and bacterial tomato diseases. If you have an issue with early blight and/or Septoria this year, you may want to try one of them next year to see if they do offer disease resistance and how you like the taste. Be on the lookout for more info as these varieties are tried locally.



Septoria leaf spot
Photo: Rutgers University



Septoria leaf spot on tomato leaves.
Photo: M. Sample, NJAES



Early blight lesion on Brandywine tomato leaf.
Photo: M. Sample, NJAES



Early blight characteristic concentric brown lesion and yellow halo.

Photo: Rutgers University

Management:

- Avoid overhead watering. Use drip irrigation or water at base of plants. Water early in the day to allow plants to dry quickly.
- Mulch with landscape fabric or straw early to prevent the fungus from splashing up onto the plant. Use hardwood mulch for paths only.
- Good air circulation, provide at least 18" spacing between plants. Fungal diseases like moist, humid conditions.
- Stake or cage plants to limit foliage and fruit contact with the soil.
- Crop rotation of three years or longer. Try planting cultivars with some resistance such as Juliet, Mountain Magic, Jasper, Iron Lady, or Verona.
- Remove all plant debris since fungal spores of the diseases can overwinter in infected plant material.
- Control weeds.
- There are some organic copper-based fungicides that can help prevent the disease. Be sure the product label includes the plant and disease, and follow all instructions on the label.

References:

- Rutgers University <https://njaes.rutgers.edu/fs547/>

Problem: Bacterial leaf spot disease on peppers
(Xanthomonas campestris spp.)

First Sighting: May 29

Description: Bacterial leaf spot damage is caused by a variety of different bacteria in the *Xanthomonas* family for which favorable conditions include high humidity, heat waves, and extended periods of leaf wetness. Rain splash or the gardener handling infected plants while they are wet can spread the disease. Alternatively, hot, dry weather can slow the spread of this disease.

Symptoms appear on the lower surface of older pepper leaves as small pimples and on the upper leaf surface as small water-soaked spots. As the disease progresses, the spots develop gray to tan centers with darker borders. Lesions may enlarge during warm, humid weather with leaves turning yellow or brown and, finally, dropping off. Lesions can develop on stems and may also present as small, raised rough spots on fruits that affect appearance but not eating quality. If leaf drop is extensive, it can result in sunscald of the fruit and reduced yield.

This disease also occasionally attacks tomatoes.

Management:

- Select disease resistant varieties (Strains or Races 1 through 10 in New Jersey). A list can be found at: [Disease Resistant Vegetable Varieties | Cornell Vegetables](#)
- Check transplants to make sure they don't have any symptoms of possible disease before purchasing them.
- If you grow your own transplants from seed, do not save seeds from plants that have disease.
- Mulch plants deeply with a thick, organic material.
- Avoid overhead watering.
- Remove and discard badly infected plant parts, as necessary.
- Plant peppers in a different garden location next season, if possible.



Beginnings of bacterial leaf spot on pepper leaf
Photo: M. Olin, NJAES



Lower surface of leaf with bacterial leaf spot
Photo: S. A. Johnson, Rutgers University



Pepper leaf drop due to bacterial leaf spot disease
Photo: University of Minnesota

References:

- University of Maryland [Bacterial Leaf Spot on Peppers | University of Maryland Extension \(umd.edu\)](#)
- University of West Virginia <https://extension.wvu.edu/lawn-gardening-pests/plant-disease/fruit-vegetable-diseases/bacterial-leaf-spot-of-pepper>
- University of Minnesota <https://extension.umn.edu/disease-management/bacterial-spot-tomato-and-pepper>

Problem: Basil Downy Mildew Disease
(Peronospora belbahrii)

First Sighting: May 30

Description: Basil Downy Mildew is neither a true fungus nor a mold, but a specialized pathogen called “oomycetes.” It is wind-borne and can spread quickly, especially during wet, humid conditions. Infected plants develop yellow leaves that can be misdiagnosed as a nutrient deficiency or waterlogged soil. However, check the underside of the leaf and there you’ll find a fuzzy mass of purplish-brown spores. Commonly grown sweet basils, such as Genovese, are the most susceptible to downy mildew, but new resistant cultivars are available. Spice types such as Thai, Cinnamon, Lemon, Lime, or Red Rosie are also less susceptible.



Basil plant with downy mildew disease

Photo: M. Albright, NJAES



Underside of a basil leaf showing purplish-brown spores of downy mildew

Photo: M. Albright, NJAES



Rutgers resistant basil varieties showing no signs of disease. Devotion left, Obsession right
Photos: M. Sample, NJAES



Management:

- Plant resistant varieties. Try Rutgers Devotion, Rutgers Obsession, or Prospera.
- If you buy basil plants from a nursery, check them carefully for disease symptoms before buying them. Do not purchase plants that show any disease.
- Cultural practices include proper plant spacing for optimum air flow, plant in full sun, and avoid overhead watering.
- Pathogen is transmitted by wind, rain splash, contaminated seeds, and plants.
- The disease moves from the bottom of plant to the top of plant, so harvest any unaffected leaves from top of plant and use promptly.
- Remove and throw out infected plants to reduce the spread of disease.
- Grow some plants in containers indoors.

References:

- Rutgers University <https://njaes.rutgers.edu/fs1279/>
- University of Maryland <https://extension.umd.edu/resource/downy-mildew-basil-home-garden>

Problem: Angular Leaf Spot Disease on squash plants
(Pseudomonas syringae)

First sighting: June 12

Description: Angular leaf spot (ALS) is a bacterial disease that favors warm, humid conditions and affects members of the Cucurbitaceae family, notably cucumbers. It is spread via water splash, handling, garden tools, and may be seed-borne. Initial symptoms are small, white or tan-brown water-soaked spots that eventually expand until they reach the leaf veins, resulting in the angular appearance. In wet conditions, a bacterial ooze may form on these spots, causing a white deposit when it dries. Infected spots may dry and crack, giving the leaf a tattered appearance. Eventually the leaves deteriorate, reducing plant vigor. Stems and fruit can also become infected, with fruit transferring bacteria to seed.



Early stage of angular leaf spot disease on squash leaf
Photo: M. Olin, NJAES



Later stage of disease on leaf showing tattered appearance
Photo: M. Olin, NJAES



Closeup showing angularity of diseased spot
Photo: J. Basile, NJAES

Management:

- Purchase certified seed and try resistant varieties such as Calypso, Diva, Fanfare and Marketmore.
- Try growing vertically on a trellis to limit contact with soil and water splash.
- Avoid overhead watering, and don't handle plants when leaves are wet to avoid transmission.
- Prune off infected leaves and stems or remove entire plant if the disease is widespread.
- Dispose of infected plants and diseased leaves responsibly, away from the garden. Do not compost.
- Practice good garden cleanup as bacteria overwinters on seeds and diseased plant debris.
- Practice a 2-year crop rotation plan.

References:

- Rutgers University <https://njaes.rutgers.edu/E310/>
- University of Massachusetts <https://ag.umass.edu/vegetable/fact-sheets/cucurbits-leaf-spots>

Problem: Powdery mildew disease
(Golovinomyces orontii)

First Sighting: June 17

Description: Windborne fungal spores cause this foliar disease. The first signs of infection are white, powdery deposits that can be found on older leaves of various cucurbit family members such as squash, zucchini, yellow summer squash, cucumbers, and melons. It is difficult to avoid during a New Jersey summer, as favorable conditions are hot and dry weather followed by humidity. As this fungus spreads throughout the plant, you'll notice the plant leaves begin to turn yellow, dry and wither. Eventually, both the plant vigor and yield will be affected by lack of photosynthesis. Of note, there is also normal white coloration on the leaves of many squash varieties that is **not** Powdery mildew. This coloration does not rub off, but is part of the plant's regular leaf pattern



Powdery mildew fungus spots on squash plant
Photo: M. Olin, NJAES



Powdery mildew fungus spots on zucchini plant
Photo: M. Albright, NJAES



Normal color variation of some squash, not powdery mildew fungus.
Photo: J. Basile, NJAES

Management:

- Provide full sun, air circulation and proper spacing. When planting at-risk crops, leave extra space between plants to promote air circulation and ample room to receive sunlight.
- Remove infected leaves to prevent spread of the disease, throw away and do not compost.
- Apply a spray made of potassium bicarbonate on the leaves to help prevent fungus.
- Remove debris at season end to help decrease spreading any spores.
- Clean your tools.
- Rotate crops (three-to-four-year rotation is ideal).
- Plant resistant varieties such as:
 - Cucumbers: Calypso, Diva, Green Finger, Marketmore, Parks Whopper II and Paraiso
 - Summer squash: Success PM Straightneck, Smooth Operator
 - Zucchini: Astia, Dark Star, Cocozelle, Spineless Perfection
 - Winter squash: Honey Nut, Autumn Frost, Bush Delicata

References:

- Rutgers University <https://njaes.rutgers.edu/E310/>
- Cornell University <https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/>
- University of Connecticut <https://homegarden.cahn.uconn.edu/factsheets/powdery-mildew-of-cucurbits/>

Problem: Bacterial Wilt on cucumber plants
(*Erwinia tracheiphila*)

First Sighting: June 26

Description: Bacterial wilt is a bacteria transmitted by the striped and spotted cucumber beetles. The bacterium survives in the beetle gut and is transmitted by contact with the mouth of an infected beetle or their feces. When the beetles feed on leaves and stems, this damaged plant tissue allows an entry point for *E. tracheiphila*. The bacteria multiply in the wound, enter the xylem vessels (water conducting tissues), and move through the petioles to the stems. Masses of bacteria, gums, and resin block the vascular system, resulting in wilt. Bacteria spreads further throughout the plant via adjacent xylem vessels and causes plant collapse and death. Infected plants retain the bacteria, becoming a source of infections for other plants. Cucumber and muskmelons are more susceptible to bacterial wilt than winter squashes and watermelon. Summer squash, zucchini, and pumpkins may also be affected.

Cucumber beetles become active in late May or early June and feed on the blossoms of early flowering plants, such as dandelions, apples, and hawthorns, until their host crops are available. Once a plant is infected with bacterial wilt, there is no cure. They usually succumb to the disease two to six weeks post initial infection.



Bacterial wilt disease affecting the top portion of a cucumber plant. Bacterial Wilt often starts on part of the plant and then progresses. Photo: M. Albright, NJAES



Bacterial wilt disease affecting an entire cucumber plant. Photo: M. Albright, NJAES



Striped cucumber beetles found weeks earlier on the plant to the left. Photo: M. Albright, NJAES

Management:

- Scout for cucumber beetles early in the season, especially in the cotyledon and first to third true-leaf stage, when the plants can suffer defoliation and bacterial wilt. Once beetles are present, monitor more frequently, every couple of days. They fly fast but can be caught and destroyed.
- Practice good garden sanitation. Remove weeds in and around your garden, as they become potential hosts for adults. If a plant shows signs of bacterial wilt, remove the infected plant before more beetles can feed on the plant and spread the bacterium. Stop the cycle.
- Use row covers at planting to prevent beetles from landing and feeding on plants. Be sure to remove the barrier when cucurbits start to flower or try parthenocarpic varieties, which don't require pollinators.
- Plant-based pesticides, such as Neem, prevent insects from feeding, which eventually kills them. Neem can also suffocate the insects but must come in contact with the beetles to be effective. Spinosad may also help manage beetles. Kaolin clay, such as Surround, creates a barrier to leaf surface and disrupts beetles landing and feeding.

References:

- Rutgers University <https://njaes.rutgers.edu/pubs/publication.php?pid=FS225>
- Rutgers University <https://njaes.rutgers.edu/fs1123/>
- University of Massachusetts <https://ag.umass.edu/vegetable/fact-sheets/cucurbits-bacterial-wilt>

Problem: Downy mildew disease on cucumber plants
(*Pseudoperonospora cubensis*)

First Sighting: July 22

Description: Downy mildew can infect all cucurbits including cucumber, melon, pumpkin, and squash. Pale green to yellow spots form on the upper surface of leaves and later turn brown. Leaf spots are angular and bounded by leaf veins. This is most distinct in cucumber plants. A telltale sign of downy mildew is the gray to black fuzz (spores) on the underside of the leaves, giving it a somewhat “dirty” appearance. This may be most evident in the morning or when the leaves are wet.

Downy mildew thrives in wet or very humid conditions. The pathogen can move on air currents, splashing water, and on the tools and hands of workers. Downy mildew does not overwinter in New Jersey; it blows into the area via air currents. Many cucumber varieties that previously had good resistance to downy mildew have now become susceptible to the disease.



Downy mildew disease on cucumber plant

Photo: M. Albright, NJAES



Downy mildew disease on cucumber plant: underside of a leaf, top of a leaf

Photo: M. Albright, NJAES



Characteristic angular spots caused by downy mildew on cucumber, as the disease progresses the leaves shrivel and curl upward

Photo: B. Gugino, Penn State



Underside of a cucumber leaf showing downy mildew dark, fuzzy spore masses

Photo: Michigan State University

Management:

- Plant cucumber varieties that have resistance to downy mildew: Bristol, DMR 401, and Brickyard.
- Plant early in the season to help escape high disease pressure.
- Avoid overhead watering. Water at the base of the plants or use drip irrigation.
- Do not allow water to remain on leaves for prolonged periods of time.
- Water at the base of the plants or use drip irrigation since downy mildew thrives in wet conditions.
- Promote good air circulation by not crowding plants and growing them vertically on trellises or fences.
- Remove infected plants to help keep the pathogen from spreading.

References:

- Rutgers University <https://njaes.rutgers.edu/E310/>
- University of Minnesota <https://extension.umn.edu/disease-management/downy-mildew-cucurbits>
- Cornell University <https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/cucumber-and-cantaloupe-varieties-resistant-to-downy-mildew/>

Problem: Anthracnose Disease on Tomato and Pepper Fruit (genus *Colletotrichum*)

**First Sighting: Tomatoes July 27
Peppers August 29**

Description: Anthracnose fruit rot is a soil-borne disease that affects ripe tomato and pepper fruit. Infections go unnoticed on green fruit and as fruit ripens depressed circular water-soaked spots appear on red fruit. These spots may slowly enlarge and produce black fungal structures (microsclerotia) in the center of the lesion just below the skin surface. Microsclerotia can overwinter in the soil and infect tomatoes in the next growing season.



Anthracnose on tomato fruit.
Photo: P. Nitzsche, NJAES



Advanced anthracnose on tomato fruit
Photo: M. Sample, NJAES



Anthracnose on pepper fruit,
Photo: M. Albright, NJAES

Management:

- Remove old plant debris, including fruits on the ground, since fungal spores can overwinter in infected plant material.
- At the end of the growing season, remove and discard all tomato and pepper refuse.
- Each year plant tomatoes and peppers in a new location away from areas where tomatoes, eggplant, potatoes, or peppers were grown in the past three years.
- Make sure plants have good air circulation to dry the leaves. Staking or caging tomatoes brings the plants up off the soil and allows more rapid drying of the plant.
- Mulch to create a barrier between the pathogen in the soil and plants.
- Control weeds and volunteer tomato and/or pepper plants.
- Water at the base of plants to keep leaves from getting wet.

References:

- Rutgers University [FS547: Diagnosing and Controlling Fungal Diseases of Tomato in the Home Garden \(Rutgers NJAES\)](#)
- Cornell University [Anthracnose on tomatoes | Vegetable Pathology – Long Island Horticultural Research & Extension Center \(cornell.edu\)](#)
- North Carolina State University <https://content.ces.ncsu.edu/anthracnose-of-pepper>

Problem: Sunscald on Peppers**First Sighting: July 5**

Description: Sunscald occurs when peppers (or tomatoes) are exposed to the sun during hot weather. It is more apparent on plants that have sparse foliage or have lost leaves to disease. Sunscald is especially prevalent on previously shaded plant parts that are suddenly exposed to the sun. Areas damaged by sunscald are vulnerable to attack by insects, fungi, and bacteria.



Sunscald on pepper fruit
Photo: N. Gardner, NJAES

Management:

- Maintain healthy plants with plenty of foliage. Never remove mature foliage from the plants
- Plant pepper varieties that resist diseases that defoliate the plants. One such disease, Bacterial Leaf Spot, is common in New Jersey. A list of disease-resistant peppers can be found at: [Disease-resistant pepper varieties \(cornell.edu\)](http://cornell.edu)
- At the end of the season, remove all plant debris to help prevent diseases from overwintering
- Rotate crops. Each year plant peppers in a new location away from where tomatoes, eggplant, potatoes and peppers were grown in the past three years

References:

- Michigan State University:
https://www.canr.msu.edu/news/hot_and_sunny_days_promote_sunscald_in_peppers_and_other_vegetables

Problem: Catfacing and Cracking on Tomato Fruit

First Sighting: July 5

Description: Catfacing is a physiological tomato disorder which presents with crevices and cracks that result in distorted, misshapen fruit at the blossom end. Cool temperatures can reduce pollination. Indeterminate varieties are more at risk when they are significantly pruned. Heavy pruning reduces the plants' hormone auxin. Heirloom varieties with large fruits are inclined to encounter problems with catfacing.

Fruit cracking appears as either concentric cracks around the stem end of the fruit or as radial cracks radiating from the stem scar. Cracking usually occurs after a heavy rainfall following dry conditions.



Cracked tomato fruit
Photo: M. Sample, NJAES

A variety of tomatoes with minor cracks and crevices.

Catfaced tomatoes are safe to eat. Simply trim off lightly blemished areas, but avoid heavily damaged fruits.

Photo: P. Nitzsche, NJAES



Management:

- Avoid cooler temperatures, refrain from setting transplants out too early.
- Avoid heavy pruning of plants.
- Plant less prone varieties.
- Cull severely damaged fruit. It burdens the plants' vigor and detracts from developing fruits.

References:

- Rutgers University <https://njaes.rutgers.edu/fs678/>
- University of Maryland <https://extension.umd.edu/resource/catfacing-problems-tomato>