RUTGERS
New Jersey Agricultural Experiment Station

Rutgers Master Gardeners of Morris County Community Garden IPM Team Report #8 August 9, 2024

WHAT'S IN THIS REPORT		
TIPS	**NEW PROBLEMS SEEN**	**SPOTLIGHTS**
• Prolonged hot weather and its effects on the vegetable garden • Testing soil pH	• Citrus Flatid Planthopper • Corn Leaf Aphid • Downy mildew on cucumbers • Bean Common Mosaic Virus • Catfacing and cracking on tomatoes • Hornworm • Celery Anthracnose	• Common Yellow Woodsorrel (weed) • Photo of a well-renovated strawberry bed

GARDENS SCOUTED: The Morris County Rutgers Master Gardener IPM Team scouts one of four community gardens each week: the Morris County Park Commission Community Garden, The Morris Township Ted Largman Community Garden, the Madison Community Garden, and the Wick Garden in Jockey Hollow National Park. The team also reports on sightings in the Pequannock Community Garden and their own vegetable garden plots in Morris Township and Denville.

GENERAL OBSERVATIONS AND TIPS

Effects of Prolonged Hot, Dry Weather in the Vegetable Garden

WEATHER…everyone has an opinion on it…too hot, too cold, too rainy, too dry. It is a favored topic of conversation which is almost guaranteed to elicit a response from most people. Weather extremes often cause people to withdraw into a controlled environment where they feel more comfortable. As vegetable gardeners, we worry about our plants which are rooted in the ground and unable to seek a more agreeable climate. This summer, in New Jersey, we have experienced a prolonged period of hot, dry weather that made us sigh with relief when even a brief rain shower came along. It is likely our plants had a similar response.

Prolonged hot, dry weather can result in a variety of effects that may prove puzzling to the gardener. One is flower abortion which can occur at temperatures ranging from 75°F to 95°F. Tomatoes are a good example of this. Exposure to prolonged heat (temperatures greater than 85°F during the day and 70°F at night) can cause stress changes in tomato plants which affect their flowers, making them more difficult to pollinate. Unpollinated flowers drop off without producing a fruit. This can happen with green beans as well, particularly if the soil is dry and temperatures climb over 95°F.

A different issue may occur in cucurbits (cucumbers, squash, pumpkins, melons) when daytime temperatures are above 90°F and nighttime above 70°F. Cucurbit plants, which typically produce separate male and female flowers, will begin to produce only male flowers resulting in a lack of developing fruit.

Lack of pollination or insufficient pollination can also occur at high temperatures. Many types of bees are deterred from getting out and pollinating flowers when the temperatures get above 90°F. Under these conditions, honey bees may switch their focus from gathering nectar and pollen to searching for water which they carry back to their hive. The purpose is to help keep the developing brood from overheating, resulting in death. The resulting poor pollination may produce small fruits which begin to rot and develop molds.

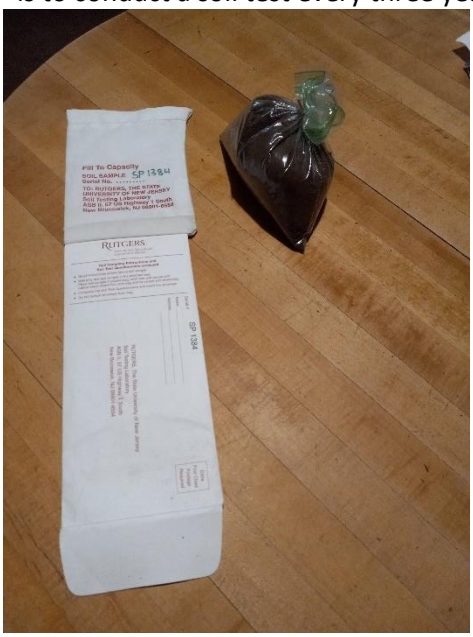
Lastly, tomato ripening can be interrupted when temperatures are high for a prolonged period. When it is above 85°F, tomato plants fail to produce the red pigment which signals that tomatoes are ripening. The plants benefit from cooler nights which provide an opportunity to generate the necessary pigment. In fact, green tomatoes can be fully ripe but need a cool night to develop their red coloring. Is this, perhaps, why fried green tomatoes is a dish commonly associated with the generally hotter southern United States?

Resources:
University of Minnesota: https://extension.umn.edu/yard-and-garden-news/heatwave-makes-vegetables-misbehave

Soil Testing and pH

IPM Report #4, published in June, provided a good overview of caring for your soil, covering several different aspects of soil composition and care. It is worth looking more closely at the effects of pH changes that may occur slowly over time in your garden plot and how these changes can impact your ability to grow specific crops. Perhaps you successfully grew a particular crop for several years but, gradually, you begin to notice that this crop no longer thrives. Alternatively, perhaps you would like to grow a specific crop but never seem to have success with it and yet see it growing exuberantly in a nearby garden plot. A number of different factors might cause this but one that can be remedied fairly easily is adjusting the pH of your soil to be more favorable to the crop you would like to grow. Having a favorable pH for your crop can impact what essential nutrients are available to your plants.

Many different types of vegetable plants grow quite happily in neutral soil (about pH 6.2 to 6.8). Numbers below this range indicate increased acidity and above it, increased alkalinity. Some plants, such as blueberries, prefer a more acid soil. Others grow better in slightly more alkaline (also called basic) soil. The best way to determine your garden soil's pH is to conduct a soil test every three years and have it analyzed by a soil testing laboratory. The resulting report will provide information on your soil pH, as well as other things, and how to correct it if it is too acidic or too basic for your intended use. Testing now into early Fall gives you ample time to take corrective action by applying lime (makes soil more basic) or elemental sulfur (makes soil more acidic) in preparation for next year's growing season.



Soil sample collected and ready to load into soil test kit mailer.
Photo: M. Olin, NJAES

Portable soil pH measurement meters are available but can be more costly than sending your sample to a lab. The inexpensive metal-probe meters are too inaccurate and not recommended. For more details, see Rutgers Fact Sheet 767 (link below).

Soil test kits can be purchased at the Morris County Extension office for a nominal fee (cash or check only). Alternatively, you can obtain instructions and purchase the test online via the Rutgers Soil Testing Laboratory (link below). The resulting comprehensive report will be emailed to you in about 2 weeks.

Resources:
Rutgers Soil Testing Laboratory: https://njaes.rutgers.edu/soil-testing-lab/
Rutgers Fact Sheet: https://njaes.rutgers.edu/pubs/publication.php?pid=FS767
Penn State Extension: https://extension.psu.edu/understanding-soil-ph

REPORTS ON NEW PROBLEMS

Problem: Citrus Flatid Planthopper *(Metcalfa pruinosa)*	**Where: Madison Community Garden (7/22)**

Description: Planthoppers are hopping, sucking insects that are related to aphids. Their mouthparts allow them to pierce plant tissue and suck the sap from the plant cells. The Citrus Flatid Planthopper, as you might guess from its name, is a pest on citrus plants but they also prey upon a wide variety of woody plants, many of them ornamentals. Their range includes the Eastern United States from Florida to Ontario and Quebec, Canada. They are also found in the Great Plains and Southwest U.S.

The Citrus Flatid Planthopper is white when a newly emerged adult, gradually changing in color to gray or tan with a black spot on each wing. They are only about 1/32 inch long. These insects tend to congregate in groups and their nymphs produce a waxy, white exudate on plant stems and leaves. This can often lead observers to suspect the presence of mealybugs or wooly aphids. It is easy to identify a planthopper adult by giving one a gentle nudge on the tail end with a pencil or other probe. If it is a planthopper, the insect will jump away. The nymphs also produce copious amounts of honeydew which can develop a coating of black sooty molds.

In general, these insects do not cause a great deal of damage by feeding unless the infestation is heavy or there is some other factor such as freeze damage which makes the plant more vulnerable.

Citrus Flatid Planthopper mature adult on eggplant
Photo: L. Terrareo, NJAES

Planthopper exudate on stems of climbing hydrangea
Photo: J. Boggs, Ohio State Univ. Extension

Management:

- Planthopper nymphs can be killed by insecticidal soap which also helps to wash away their fluffy white exudate.

References:

- University of Florida: https://entnemdept.ufl.edu/creatures/orn/shrubs/citrus_flatid_planthopper.htm
- Ohio State University: https://bygl.osu.edu/node/348

Problem: Corn Leaf Aphid ***(Rhopalosiphum maidis)***	**Where: Morris Township Community Garden (7/23)**

Description: Corn leaf aphids are a common pest in corn fields but can also be found on small corn plantings in community gardens. This insect, like other aphids, is soft-bodied and quite small with coloration that can vary from blue-green to gray. They have piercing, sucking mouthparts and excrete honeydew which can attract ants. In fact, observing ants traveling up and down a corn stalk is a good indicator that the real problem may be aphids. They can be found in the sheltered area of leaf folds and the corn tassels where they form colonies. Their sticky honeydew can result in clumping of the tassels and the development of mold causing a black, sooty appearance. In general, this insect pest does not cause any significant economic loss but the buildup of honeydew may interfere with the free distribution of pollen from the tassel.

Generally seen from early July through autumn, dry weather favors an increase in their numbers. They grow from nymph to adult in 7 to 14 days and 8 or 9 generations can occur over the course of the season. The female Corn leaf aphid does not lay eggs but produces live nymphs which can mature into wingless or winged adults. They leave behind flaky, white cast-off skins as they grow. Winged nymphs can fly away and populate other plants. In addition to corn, they feed upon sorghum, small grains and other grasses. They are a vector for Barley yellow dwarf virus.

Corn leaf aphid colony with cast-off skins.
Photo: Univ. of Kentucky Extension

Corn leaf aphid colony on corn plant with ant harvesting their honeydew.
Photo: R. Terry (NJAES)

Management:

- Damage by this insect is relatively minimal but they can be knocked off plants with a forceful spray from the hose.
- Insecticidal soap is also effective in killing the aphids.
- At the end of the gardening season, clear infected plant material out of the garden.

References:

- Rutgers University FS077: https://njaes.rutgers.edu/pubs/publication.php?pid=FS077
- Rutgers University FS230: https://njaes.rutgers.edu/fs230/
- Kentucky University, College of Agriculture: https://entomology.ca.uky.edu/ef126
- Penn State University Extension: https://extension.psu.edu/corn-leaf-aphid-on-field-corn

Disease: Downy mildew on cucumber plants *(Pseudoperonospora cubensis)*	**Where: Morris Township Community Garden (7/29)**

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 varieties that have resistance to downy mildew. For pickling cucumbers: Citadel and Peacemaker. For slicing cucumbers: Bristol, DMR 401, Marketmore 76, and Brickyard.
- Plant early in the season to help escape high disease pressure.
- Do not allow water to remain on leaves for long 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

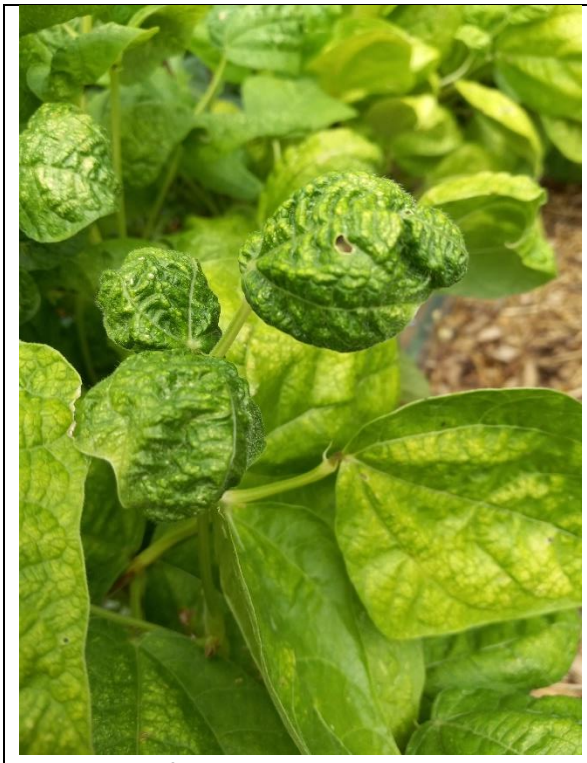
- Rutgers Fact Sheet E310: https://njaes.rutgers.edu/E310/
- University of Minnesota: https://extension.umn.edu/disease-management/downy-mildew-cucurbits
- Michigan State University: https://www.canr.msu.edu/news/cucumber_downy_mildew_management_practices_for_home_gardeners
- Cornell University: Cucumber and Cantaloupe Varieties Resistant to Downy Mildew (cornell.edu)

Problem: Bean Common Mosaic Virus *(Potyviridae family)*	**Where: Morris Township Community Garden (7/20)**

Description: Plants infected with Bean Common Mosaic Virus (BV-1 or BCMV) may exhibit a mottled pattern of light yellow and green on leaves or a band of darker green may follow the leaf veins while the rest of the leaf remains green. Leaves may become puckered or malformed and often exhibit a downward cupping of the entire leaflet. This disease can stunt the plants and reduce yield. There is no cure and removal of infected plants is recommended to help stem the spread of the disease.

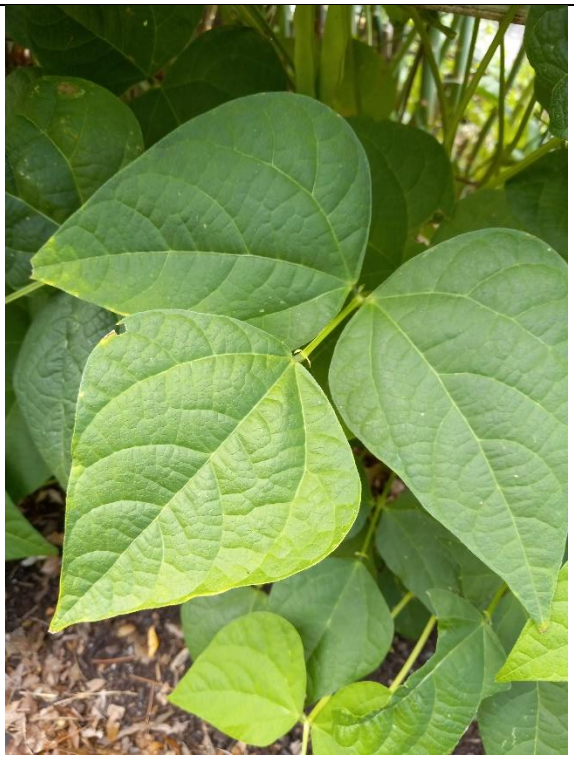
BCMV is spread by aphids which acquire the virus by feeding on infected plants. However, disease transmission is non-persistent, meaning the aphids will readily acquire the virus via feeding but will only continue to transmit it for a few days to a week. This disease is also carried by seed upon which it can survive up to 30 years.

There are a number of bean varieties that are resistant to BCMV. To learn more, visit the Cornell University website (link in Resources below).



Symptoms of Bean Common Mosaic Virus include mottled coloration and downward cupping of leaves

Photo: M. Olin, NJAES



Healthy bean leaflet

Photo: M. Olin, NJAES

Management:

- Plant certified disease-free seed.
- Avoid planting beans near other legumes.
- Practice aphid control early in the season. Foil/reflective mulch may help deter aphids.
- Support top aphid predators, such as lady beetles and green lacewings, by planting flowers from the carrot family (Queen Anne's Lace, Cilantro, Fennel, Dill, Parsley) and the aster family (Zinnia, Marigold, Calendula, Echinacea, Sunflowers, Yarrow).
- Destroy infected plants to help limit the spread of disease.

References:

- University of Connecticut: https://ipm.cahnr.uconn.edu/bean-viruses/
- Washington State University: https://hortsense.cahnrs.wsu.edu/fact-sheet/bean-common-and-yellow-mosaics/
- Cornell University: https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/disease-resistant-bean-varieties/

Problem: Catfacing and Cracking on Tomato Fruit	Where: Morris Township home garden (7/20)

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 area, but avoid heavily damaged fruits.
Photo: P. Nitzsche, NJAES

Management:

- Avoid cooler temps, 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 FS678: https://njaes.rutgers.edu/fs678/
- University of Maryland: https://extension.umd.edu/resource/catfacing-problems-tomato

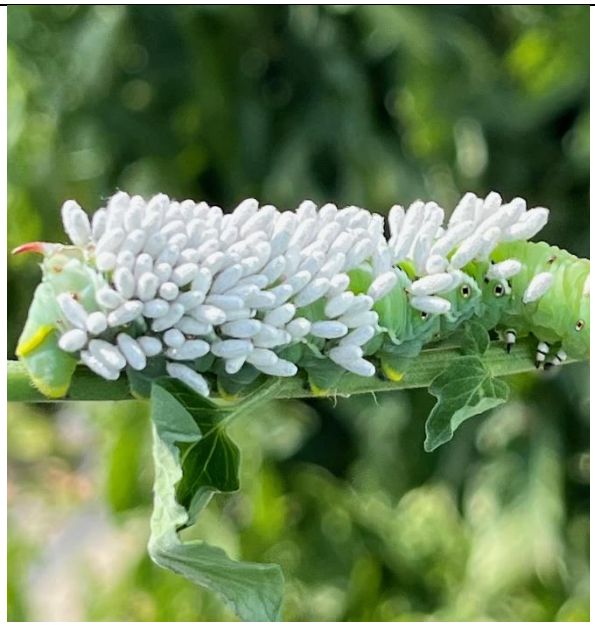
Problem: Tomato and Tobacco Hornworms	Where: Morris Township Community Garden (7/25)

Description: Tomato Hornworm, *Manduca quinquemaculata,* and Tobacco Hornworm, *Manduca sexta*, are foliage and fruit eaters and can be found on the Solanaceae family – tomatoes, peppers, potatoes and eggplant. Adults are gray moths with 4-5 inch wingspan, aka hawk moths, that emerge in early summer and feed on flower nectar at dusk. Females lay eggs, singly, on the underside of leaves. Eggs usually hatch in a week after which the larvae then voraciously feed for a month. They burrow within the soil to pupate. There can be two generations a year.

Tomato and Tobacco Hornworms are nearly identical. Differences between them are that the Tobacco Hornworm has seven white diagonal stripes and a red "horn" on its tail, whereas the Tomato Hornworm has eight stripes and a green "horn". Regardless, they both devour the foliage.

Although they are large caterpillars, Hornworms often escape notice because their coloration blends in well with the foliage they are consuming. Gardeners often overlook them until evidence of attack by predatory wasps becomes apparent. The wasp lays its eggs on the caterpillar and, upon hatching, the wasp larvae burrow into the caterpillar and consume it from the inside. When ready to pupate, they form cocoons resembling grains of white rice on the caterpillar's back as seen in the photo below,

Tobacco Hornworm
Photo: J. Basile, NJAES



Hornworm with wasp cocoons
Photo: S. Brighouse, NJAES

Management:

- Scout plants for hornworms throughout the season. Because they are wonderfully camouflaged, sometimes the telltale sign is simply finding your foliage has gone missing.
- Carefully handpick and destroy only those without cocoons.
- In the Fall, clear all plant debris and till to destroy any pupae that may be in the soil.
- Practice a 3 year crop rotation plan.

References:

- Rutgers University FS226: https://njaes.rutgers.edu/pubs/search.php?searchstring=FS226&cat=9999&go=Go%21

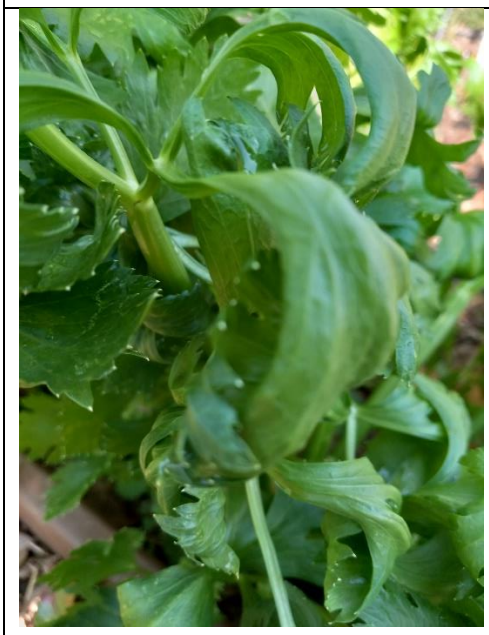
Problem: Celery Anthracnose, aka Celery Leaf Curl *(Colletotrichum fioriniae and C. nymphaeae)*	**Where: Morris County Community Garden (8/5)**

Description: Celery Anthracnose is a fungus that is seed borne. Signs include stunted plant growth, curling leaves and small brown lesions that develop on the petiole. Lesions on petioles turn dark reddish brown to black as the disease progresses. Lesions displaying gall tissue and adventitious roots are sometimes observed. Invasion by secondary bacteria may lead to heart rot, which can resemble black heart, a physiological disorder of celery caused by calcium deficiency.

Infection and disease development is most common and severe in warm, wet conditions, when celery leaves remain wet for long periods of time.

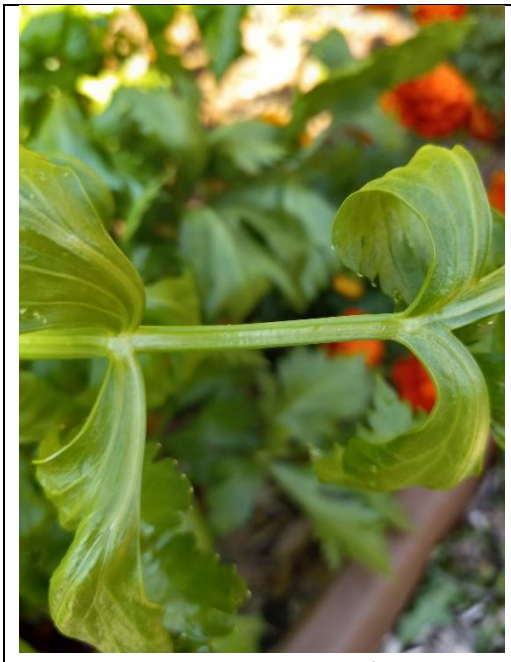
Spores are spread primarily by splashing rain or irrigation water.

Several common weeds, including common lambsquarters, redroot pigweed, yellow nutsedge, oakleaf goosefoot, and common groundsel may also serve as hosts.



Celery plant showing downward cupping, twisting foliage characteristic of Anthracnose disease
Photo: M. Olin, NJAES

Blackening of center foliage due to secondary bacterial infection
Photo: M. Olin, NJAES



Curled leaves characteristic of Celery Anthracnose
Photo: M. Olin, NJAES

Management:

- Destroy infected plants to help limit the spread of disease.
- Remove infected plants immediately.
- Avoid overhead watering as this fungus thrives in moist, warm conditions.
- Avoid working within the crop during wet weather to prevent spread of disease.
- Practice crop rotation for a period of 4 years.
- Start with clean seed and try planting resistant varieties such as Merengo, Hadrian, Geronimo, and Balada.
- Clear garden debris in the fall and keep garden free of potential weed hosts.

References:

- University of Massachusetts: https://ag.umass.edu/vegetable/fact-sheets/celery-anthracnose

WEED SPOTLIGHT

Common Yellow Woodsorrel
(Oxalis stricta)

Description: Common yellow woodsorrel is a tender perennial that thrives in moist soil and partial shade but adapts to a wide range of conditions. Typical height is 6 to 12 inches. Often confused with clover, it is identifiable by its five-petaled yellow flower and five sepals. Its trifoliate heart-shaped leaves are alternately arranged. Spreading or erect hairs come off its stems at 45-90 degree angles.

Common Yellow Woodsorrel
Photo: M. Olin, NJAES

Common Yellow Woodsorrel seed pods
Photo: Dr. J. Meade, weed scientist emeritus, NJAES

References:

- Rutgers University FS939: https://njaes.rutgers.edu/pubs/search.php?searchstring=FS939&cat=9999&go=Go%21
- Rutgers University NJ Weed Gallery: https://njaes.rutgers.edu/weeds/weed.php?oxalis
- University of Minnesota: https://extension.umn.edu/weeds/yellow-wood-sorrel

What Does a Well-Renovated Strawberry Bed Look Like?

Description: The topic of renovating a strawberry bed was covered in IPM Report #6 (July 12, 2024). Since a picture is worth a thousand words, here is a photo of a nicely done strawberry bed renovation recently seen in a local community garden.

Example of a nicely renovated strawberry bed.
Photo: M. Olin, NJAES

ADDITIONAL RESOURCES

All Rutgers Gardening and Landscaping Fact Sheets & Bulletins
https://njaes.rutgers.edu/pubs/subcategory.php?cat=5&sub=1001
Rutgers Master Gardener Program https://njaes.rutgers.edu/master-gardeners/
Rutgers Soil Testing Laboratory https://njaes.rutgers.edu/soil-testing-lab/
Community Gardening Series https://njaes.rutgers.edu/community-garden/
Office of the New Jersey State Climatologist https://climate.rutgers.edu/stateclim/
Rutgers New Jersey Weather Network https://www.njweather.org/
Ticks and Tick-borne Disease https://njaes.rutgers.edu/tick/
Rutgers NJAES You Tube Channel https://www.youtube.com/user/RutgersNJAES

Report Editor: Mary Olin
Spotlight: Joy Burdette (Woodsorrel) and Mary Olin (strawberry bed photo)