RUTGERS
New Jersey Agricultural Experiment Station

Rutgers Master Gardeners of Morris County Community Garden IPM Team Report #6
June 30, 2022

WHAT'S IN THIS REPORT			
TIPS	**NEW PROBLEMS SEEN**	**PROBLEMS LIKELY TO BE SEEN SOON**	**SPOTLIGHTS**
• Row covers- Stop those flying pests!	• Squash bugs • Squash Vine Borer adult • Bacterial wilt of cucumbers • Japanese beetles • *Cercospora* on beets • Angular leaf spot on cucumbers • *Ramularia* on lovage • Strawberry leaf spot	• Mexican Bean beetles	• Goldenrod Soldier beetle- Beneficial Insect • Common Burdock- Weed

GARDENS SCOUTED FOR THIS REPORT: Morris County Park Commission's Community Garden in Morristown, Madison Community Garden and ValleVue Preserve Community Garden in Morris Township.

GENERAL OBSERVATIONS AND TIPS

The summer rollercoaster of various pests, diseases, fluctuating temperatures and moisture have returned, and the pressure is beginning to build. Both Squash bug eggs have been found on leaves and Squash vine borers have taken flight. Now is the time to be vigilant of these pests, and it's not too late to try row cover. Using row cover is one of the most effective physical methods we use in IPM.

Row covers are target specific and create a physical barrier preventing flying insects from egg laying or other animal intruders, so your loss of yield is kept to a minimum. They are available in a variety of lengths, weights, light transmission rates, and can be found at garden supply centers, garden catalogs or online. With a little thought and careful planning, these can be constructed to suit your needs within your plot. Just be sure to seal the base with sturdy weight to prevent pests from getting in. Use season appropriate fabrics, for example , lightweight in summer so plants are protected, but won't wither in the heat, and heavier for frost protection in spring or fall. Most importantly, do not cover your plot if you're already experiencing a pest infestation. You will simply be providing more shelter for pests to thrive.

Here we show applications for summer crops, but stay tuned as we will cover season extension with our final report at the end of September. Till then, give this a try!

IPM Team member, Mary Albright with row cover she constructed to repel Colorado Potato beetle. This plot was planted and covered at same time.

These frame supports were constructed from PVC, then fitted with Agribon 15, a lightweight cover that allows 90% light transmission and water to permeate. Inside crop is potatoes, which post-harvest she will replant with cole crops. The cover then protects against caterpillars and whiteflies. J. Basile, NJAES

Pest and damage free potato plants. No Colorado Potato or Three lined potato beetles, with NO insecticides required.

REPORTS ON NEW PROBLEMS

Squash vine borer ***(Melittia satyriniformis synonym M. cucurbitae)***	**Morris Township Home Garden 6/27**

Description :

The squash vine borer adult, *Melittia satyriniformis or Melittia cucurbitae*, has arrived with first flight confirmed at the Morris Township Community Garden. Begin to scout your squash plants and pumpkins, as mating and egg laying will now commence. This 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 borer(s) are not removed, they will cause the plant to wilt and later die. Use row cover now for any new direct seeded or planted zucchini or squash.

Frass (excrement) from Squash vine borer on squash plant stem
M. Albright, NJAES

Squash Vine Borer inside a stem
P. Nitzsche, NJAES

Squash Vine Borer adult
Rutgers Fact Sheet #229

Management:

- 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 Deadbug Brew and Monterey Garden Insect Spray) or *Bacilus 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. ***Read and follow all pesticide label instructions. Be cautious- Read the label.

A study is being done at the Morris County Community Garden to determine if spraying the leaves with *Bt* and injecting the stems with *Bt* will kill the larvae.

Fact Sheet / References:

1. Rutgers Fact Sheet: https://njaes.rutgers.edu/pubs/publication.php?pid=FS229
2. University of Connecticut Squash Vine Borer (uconn.edu)

Squash Bugs
(Anasa tristis) Morris Township Community Garden 6/28

Description: Squash bug eggs have been found on various zucchini plants in the Morris Township Community Garden. The adults are flying, mating and egg laying has begun. These eggs will soon hatch and their nymphs will suck the sap from leaves, stems and vines of squash, pumpkins, gourds and melons. Leaves become speckled, later turning yellow to brown. Plants can wilt and small plants can be killed completely, while larger plants begin to lose runners.
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 eggs on underside of leaf. These will hatch in ten days and nymphs mature in just over a month. S. Brighouse, NJAES

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

Squash bug egg cluster with newly hatched nymphs. 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 very important. Remove trash, old vines, dead leaves and plant residue to help prevent buildup of the pest and remove overwintering protection for squash bugs.
- The insecticide Neem can be applied 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.

More Information: Fact Sheet / References

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

Bacterial Wilt on cucumber plants (*Erwinia tracheiphila*)	**Madison Community Garden 6/26**

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 and zucchini 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 hawthorn, until their host crops are available.

Once a plant is infected with bacterial wilt, there is no cure. They usually succumb to disease 2-6 weeks post initial infection.

Bacterial Wilt Disease on cucumber plant. Entire plant affected. M. Albright, NJAES

Striped Cucumber beetles found weeks earlier on the same plant., 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 is showing 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 cover 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. This must come in contact with the beetles to be effective. Spinosad, Captain Jack's Deadbug Brew may also help manage beetles. Kaolin clay, such as Surround, creates a barrier to leaf surface and disrupts beetles landing and feeding

Fact Sheet/References:

1. Rutgers University https://njaes.rutgers.edu/pubs/publication.php?pid=FS225
2. Rutgers University https://njaes.rutgers.edu/fs1123/
3. University of Minnesota https://extension.umn.edu/yard-and-garden-insects/cucumber-beetles
4. University of Massachusettshttps://ag.umass.edu/vegetable/fact-sheets/cucurbits-bacterial-wilt

Japanese beetle ***(Popillia japonica)***	**Morris Township Community Garden 6/26** **Madison Community Garden 6/25**

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 brown head, crème 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 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 easy mechanical method of beetle removal from rhubarb plant.

Use cup of soapy water and simply shake off beetles into 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.
J. Basile, NJAES

Management:

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

Fact Sheet / References:

1. Rutgers University https://njaes.rutgers.edu/fs1009/
2. University of Minnesota Japanese beetles in yards and gardens | UMN Extension

***Cercospora* leaf spot on beets (*Cercospora spp.*)**	**Morris County Community Garden 6/21**

Description:

Cercospora leaf spot is an overwintering fungal disease that causes small circular spots with tan or white center and red halo 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 carrots, beets, spinach, Swiss chard, peanuts, cucumbers, squash, melons and pumpkins.

Cercospora leaf spot on beet plants
M. Albright, NJAES

Cercospora leaf spot close up on beet plant
Purdue 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.
- Plant resistant beets such as Boldor, Bulls Blood, Cylindra, Detroit Dark Red and Touchstone Gold.
- Practice a two-year crop rotation.
- Remove weed hosts of lambsquarters and pigweed.

Fact Sheet / References:

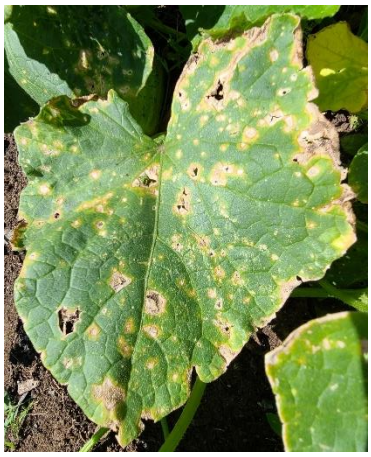
1. Rutgers University https://plant-pest-advisory.rutgers.edu/controlling-cercospora-leaf-spot-in-beet/
2. University of Massachusetts https://ag.umass.edu/vegetable/fact-sheets/cercospora-leaf-spot-of-swiss-chard-beets-spinach

Angular Leaf Spot **(*Pseudomonas syringae*)**	**Morris Township Community Garden 6/27** **Morris County Community Garden 6/20**

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 is seed-borne. Initial symptoms are small, 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 that leads to plant demise. Stems and fruit can also become infected, with fruit transferring bacteria to seed.

Disease spreads quickly in wet conditions. Sandra Brighouse, NJAES

Close up of spots on top of leaf. J. Basile, NJAES



Here is same leaf showing top and bottom surface. J. Basile, NJAES

Management:

- Purchase certified seed and try resistant varieties such as Calypso, Diva, Fanfare and Marketmore.
- Prune off infected leaves and stems. Dispose of infected plants. Throw out, do not compost.
- Practice good garden cleanup as bacteria overwinters on seeds and diseased plant debris.
- Practice a 2-year crop rotation plan.
- Prune off infected leaves and stems.
- Avoid overhead watering and don't handle plants when leaves are wet to avoid transmission.
- Try growing vertical on a trellis to limit contact with soil and water splash.

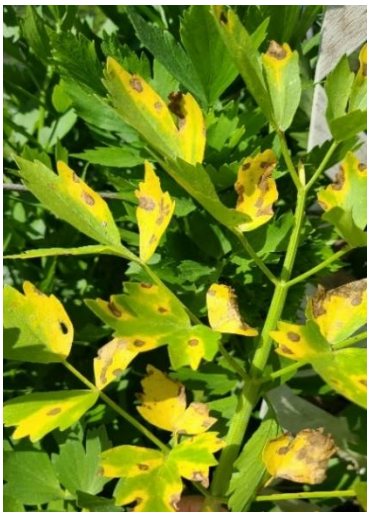
Fact Sheet / References:

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

Ramularia* on Lovage (*Ramularia sp.)	**Morris County Community Garden 6/13**

Description: This plant disease is a new one identified in the Morris County Community Garden. A sample was taken from a plot and sent to the Rutgers Plant Diagnostic Laboratory for analysis. Symptoms included angular lesions that appeared as tan-brown water-soaked leaf spots with yellow halos on margin. This was found on older leaves at the base of plant with several lower leaf stalks curled or completely wilted. *Ramularia* sp. was confirmed by Rutgers plant pathologist, Andy Wyenandt, PhD.

Lovage is a member of the *Apiaceae* (Carrot) family, which are prone to various fungal and bacterial leaf blight diseases. Recent wet and warm conditions created the perfect setting for this minor fungus to thrive.



Leaf stalk with all leaves showing signs of disease.

Closeup of leaves with brown spots and yellow halo.

Wilted stems at base of plant.
J. Basile, NJAES

Management:

- Inspect plants, remove and dispose of infected material. Do not compost.
- Water at base of plant and allow foliage to dry in between waterings.
- Proper plant spacing will allow for light and air circulation.
- Practice good garden hygiene, remove diseased plant debris at end of season.

Fact Sheet / References:

1. Rutgers Plant Diagnostic Laboratory https://njaes.rutgers.edu/plant-diagnostic-lab/

Strawberry Leaf Spot *(Ramularia grevilleana)*	**Morris County Community Garden** **Morris Township Community Garden** **Ongoing issue**

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. They appear scattered over 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 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.
J. Basile, NJAES

Disease spreading through patch.
M. Albright, NJAES

Close up of extensive disease.
M. Sample, NJAES

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

Examples of black seed disease on strawberry.
Cornell University

Fact Sheet / References:

1. Rutgers University https://njaes.rutgers.edu/fs097/
2. Rutgers University https://plant-pest-advisory.rutgers.edu/identifying-and-controlling-strawberry-leaf-spot-2-2/
3. University of Wisconsin https://hort.extension.wisc.edu/articles/common-leaf-spot-of-strawberry/
4. Cornell University http://blogs.cornell.edu/livegpath/gallery/strawberries/leaf-spot-of-strawberry/

LIKELY TO BE SEEN SOON

Mexican bean beetle *(Epilachna varivestis)*

Description: Mexican bean beetle adults will soon be making an appearance. Be on lookout for round-to-oval hard-bodied insects, about 1/3 inch in length, yellow to coppery brown, with 16 black spots. It is a species of lady beetle but is not a beneficial insect for gardeners. Females lay clusters of yellow eggs on the undersides of leaves. 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 remove leaf tissue between the veins, resulting in a skeleton-like or lacy appearance. Severe defoliation may affect the harvest.

From Left to Right.
Life stages of Mexican bean beetles.
Close ups of eggs, pupa, larvae, and adult
M. Albright, NJAES

Management:

- Inspect plants and handpick adults, eggs, larvae and pupae.
- The eggs, larvae, and pupae are usually found on the undersides of leaves.
- Clean up and remove all plant debris after harvest.
- Try growing fast maturing varieties of beans under row cover.

Fact Sheet / References:

1. Rutgers University https://njaes.rutgers.edu/pubs/publication.php?pid=FS227

BENEFICIAL SPOTLIGHT

Goldenrod soldier beetle (*Chauliognathus pensylvanicus*) aka "Leatherwing"

Morris Township Community Garden 6/26

This Goldenrod soldier beetle was found traveling around a patch of Swiss chard in search of some food- a neighboring plant had a case of aphids.
J. Basile, NJAES

Description:
The Goldenrod soldier beetle is a predator beetle which is brightly colored with golden hue, has prominent dark lined spots on wings, long antenna, and measures up to half an inch in length. It slightly resembles a firefly, but has no light emitting organ on abdomen. These beetles undergo complete metamorphosis. Eggs are laid in soil or leaf litter. They overwinter, pupate and emerge as adults here in spring. Adults can be found flying throughout summer in search of a mate for cycle to begin anew. Not only do the larvae and adults feed on aphids, but also grasshopper eggs and small caterpillars. Adults additionally feed on both nectar and pollen, but they do not chew flowers, damage plants, bite or sting.
Habitats commonly found during summer are gardens, yards, meadows, fields, basically anywhere adults may find some pollen, nectar, and a mate.
No management necessary, but you can encourage a pollen and nectar source with various flowers. As their name suggests, they can be found on Goldenrod (*Solidago* sp.), but also many other ornamentals in the *Asteraceae* family.

Fact Sheet/References:

1. NC State University https://content.ces.ncsu.edu/goldenrod-soldier-beetle

WEED SPOTLIGHT

Common Burdock *(Arctium minus)* **Morris Township Community Garden 6/20**

Description: Common burdock, also known as lesser burdock, is an invasive biennial with a large taproot which is very difficult to eradicate. First-year plants form rosettes of heart-shaped leaves; in the second year burdock sends up a branched flowering stalk which can reach six feet. Thistle-like pink to purple flowers appear July through October and are surrounded by hooked burs that dry and attach to clothing and animal fur, allowing the seeds to be dispersed over a wide area. A single plant can produce as many as 15,000 seeds. Although the blossoms are pollinator magnets, this is NOT a weed you want to tolerate in or near your garden; if allowed to grow, the deep taproot can be almost impossible to dig out, and the seeds can survive in the soil for a long time.

Management:

- Dig out plant and remove taproot as soon as they appear.
- Do not allow to set seed.

Fact Sheet/References

1. Rutgers University https://njaes.rutgers.edu/weeds/weed.php?burdock
2. Iowa State University https://crops.extension.iastate.edu/encyclopedia/common-burdock
3. NC State Extension https://plants.ces.ncsu.edu/plants/arctium-minus/

Large clump of burdock.
M. Albright, NJAES

Burdock leaves
at Morris Township Community Garden.
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

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