RUTGERS
New Jersey Agricultural Experiment Station

Rutgers Master Gardeners of Morris County Community Garden IPM Team Report #3
May 31, 2024

WHAT'S IN THIS REPORT

TIPS

- Scout for pests regularly
- Look under leaves for pest eggs and larvae
- Before destroying insects, be sure they are pests

NEW PROBLEMS SEEN

- Colorado potato beetle adults
- Three lined potato beetles adults & eggs
- Diamondback moth caterpillars
- Cross-striped caterpillar eggs
- White rot on garlic plants
- Aphids
- Four lined plant bugs
- Spittlebugs
- Sunscald on strawberries and other plant leaves
- Cercospora disease on beet plants
- Rhubarb leaf spot

SPOTLIGHTS

- Beneficial insect: Ladybird beetles and their larvae (also called Lady beetles and Ladybugs)

GARDENS SCOUTED FOR THIS REPORT: Wick Garden in Jockey Hollow National Park, Madison Community Garden, and ValleVue Preserve Community Garden in Morris Township.

GENERAL OBSERVATIONS

Vegetable gardens are beginning to flourish. Gardeners are starting to reap the rewards of their hard work with harvests of spring crops such as strawberries, peas (early varieties), radishes, asparagus, lettuce, kale, spinach, and other crops.

Most gardeners have planted some warm season crops such as tomatoes, peppers, squash, cucumbers, and eggplants. Early June is still a good time to plant more. Warm season crops should begin to grow vigorously soon.

The warmer weather also provides ideal conditions for many garden pests, so be on the lookout for early signs of insect pests and diseases.

Some spring crops: Strawberries, lettuce, early snap peas
Photos: M. Albright, NJAES

TIPS

Scout for Pests Regularly

Many insect pests are easiest to manage if they are spotted and destroyed early when their numbers are small. Since one female insect often lays dozens or hundreds of eggs and there are often multiple generations per year, pest numbers can often grow rapidly. Early action helps since destroying adults prevents egg laying, destroying eggs prevents them from hatching, and catching larvae early can help prevent feeding damage.

Proactively scouting for pests can often help gardeners find pests and remove them before they reproduce and get out of control. The IPM Team reports have photos of the lifecycle stages of pests to help gardeners recognize pest adults, their eggs, and their larvae.

Look Under Leaves for Pest Eggs and Larvae

When you scout for pests, be sure to look under leaves for pest eggs and larvae. You can crush them or knock them into a jar of soapy water. Once you learn how to identify pest eggs and larvae, they are often easy to spot. The eggs of many pests can often be seen under leaves and removed such as Colorado potato beetles, spinach leaf miners, three striped potato beetles, squash bugs, cross-striped cabbageworms, imported cabbageworms and Mexican bean beetles.

Look under leaves for pest eggs and larvae
Photo: M. Albright, NJAES

Yellow eggs of three lined potato beetles under a leaf
Photo: M. Albright, NJAES

Yellow egg mass of cross-striped caterpillars
Photo: L. Terrareo, NJAES

Before Destroying Insects, Be Sure They are Pests

There are many beneficial insects that help keep other insect pests under control. For example, ladybird beetles and their larvae (also called lady beetles and ladybugs) are voracious eaters of aphids and other insect pests. See the Spotlight on them at the end of this report. Before destroying insect adults, larvae, or their eggs, be sure they are pests.

REPORTS ON NEW PROBLEMS

Problem: Pest: Colorado Potato Beetle adult ***(Leptinotarsa decemlineata)***	**Pequannock Community Garden (5/19)**

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, eggplant, tomatoes, peppers, groundcherry 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 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 underside of leaf.
Photo: Rutgers Fact Sheet 224

Newly hatched red-orange larvae eating leaves. Shows whole leaf damage happens quickly.
Photo: Rutgers Fact Sheet 224

Adult 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, plant *Solanaceae* family as far as possible from previously infected area.
- A biological insecticide, *Bacillus thuringiensis var. tenebrionis*, is available (Novodor). This biopesticide utilizes a bacterium that kills small potato beetle larvae when used according to label directions.

References

- Rutgers University Fact Sheet FS224 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 Beetle adults & eggs ***(Lema daturaphila)***	**Where: Morris Township Community Garden (5/20)**

Description: Three-lined Potato Beetles are found on plants in the family Solanaceae. 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. Both adults and larvae feed on 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 on underside of leaf
Photo M. Albright, NJAES

Three-lined Potato Beetle larvae on defoliated leaf
UNH Cooperative Ext.

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 NJAES, Three-lined Potato Beetle, FS242: https://njaes.rutgers.edu/pubs/publication.php?pid=FS242

Problem: Diamondback moth caterpillars ***(Plutella xylostella)***	**Where: Morris County Community Garden (5/13)** **Morris Township Community Garden (5/15)** **Madison Community Garden (5/27)**

Description: Diamondback moth (*Plutella xylostella*) caterpillars are small (up to 1/3 inch long), yellowish-green, and tapered at both ends. If disturbed, they often wriggle vigorously and sometimes hang by a silk-like thread. When the population is low, feeding damage often appears as small holes from beneath the leaf but not completely through to the upper surface of the leaf, or as very small, numerous pinholes. When the population is high, plants may become riddled with holes.

Caterpillars of the diamondback moth feed almost exclusively on cole crops such as broccoli, cabbage and kale.

The females lay small, round, yellowish-white eggs that are difficult to see on the underside of leaves. Young larvae can become fully grown in 20–25 days and attach themselves to the underside of the leaf in a small, delicate-appearing, lace-like cocoon which loosely covers the pupa. There are multiple generations per year.

Diamondback moth caterpillars are yellowish-green and up to 1/3 inches long
Photo: Rutgers Pest and Plant Advisory

Diamondback moth pupa (about 3/8 inch long)
Photo L. Terrareo, NJAES

Diamondback moth adult (about 3/5 inch)
Photo: J.R. Baker, N. C. State U.

Management:

- Use row covers to prevent egg laying. Be sure to check under row covers regularly to make sure no pests have gotten under them.
- Scout for caterpillars and pupae.
- Because the diamondback moth can overwinter in plant debris, clean out cole crop plants after harvest.
- *Bacillus thuringiensis* can be used to treat severely infested crops (As with any pesticide follow directions carefully. This pesticide only works if the insect eats a treated leaf and needs to be re-applied after rain.)

References

- Rutgers fact sheet 232 – diamondback moth: https://njaes.rutgers.edu/pubs/publication.php?pid=FS232
- NC State Extension: https://content.ces.ncsu.edu/diamondback-moth

Problem: Cross-striped cabbageworm eggs (caterpillars not seen yet) *(Evergestis rimosalis)*	**Where: Madison Community Garden (5/27)**

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 larva 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.

Management:

- Hand-pick egg masses and larvae.
- Cover plants with row covers after transplanting.
- The insecticide, Bacillus thuringiensis, can be used and only affects caterpillars. Neem, pyrethrin and Spinosad can also be used.

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 ¼ inch wide. Photo: M. Albright, NJAES

References

- Rutgers Fact Sheet FS287, Cross-Striped Cabbageworm: https://njaes.rutgers.edu/pubs/publication.php?pid=FS287
- Rutgers Fact Sheet FS1123, Vegetable Insect Control Recommendations for Home Gardens https://njaes.rutgers.edu/fs1123/
- University of Massachusetts: https://ag.umass.edu/vegetable/fact-sheets/cross-striped-cabbage-worm

Disease: White rot in garlic plant	Where: Morris Twp. Community Garden (5/25)

Description: Garlic can be a very easy-to-grow herb in the garden; however 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.

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 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 6 inches to help kill the overwintering spores by stimulating them to germinate with no real host.

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

Fact Sheet / References:

- Cornell: http://plantclinic.cornell.edu/factsheets/garlicdiseases.pdf
- University of Massachusetts: https://ag.umass.edu/vegetable/fact-sheets/alliums-white-rot

Problem: Aphids *(Aphis spp.)*	**Where: Morris Township Community Garden (5/20)** **Morris Township home garden (5/21)**

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. Brighouse, 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 spread of the problem, remove severely affected plants from the garden.
- As a last resort, spray with insecticidal soap or neem.

References

- Rutgers Fact Sheet FS230, Aphids on Vegetables: https://njaes.rutgers.edu/fs230/

Problem: Four-lined Plant Bugs ***(Poecilocapsus lineatus)***	**Where: Wick Garden (5/20)** **Madison Community Garden (5/27)**

Description: The adult four-lined plant bug is a 1⁄2 inch long, yellowish to yellowish-green true bug with four longitudinal black lines down the wing covers and black antennae. This plant bug looks somewhat like a striped cucumber beetle. Nymphs of the insect are wingless and bright yellow to red with rows of black spots on the abdomen. Older nymphs are yellowish-green with a yellow stripe on each wing pad.

These bugs feed on a variety of plants, including herbs (especially members of the mint family and basil), peppers, potatoes, currants and gooseberries, and many ornamentals. The damage inflicted by their sucking mouth parts can at first appear to be a fungus or other sooty disease, but close inspection reveals mechanical damage, with the injury going all the way through the leaf, not just resting on one surface. In great numbers, they can disfigure the plant and reduce its vitality. Their damage makes herbs appear unappetizing.

Four-lined plant bugs overwinter as eggs in plant debris. There is only one generation per year.

Feeding damage penetrates through oregano leaves
Photos: D. DuBrule, NJAES

Adult four-lined plant bug

Photo: L. Terrareo, NJAES

Nymph of four-lined plant bugs
Photo: Ohio State University

Management:

- Begin monitoring in early May for signs of feeding (leaf damage).
- Hand-pick (although bugs are fast).
- Insecticidal soap can be used on edible plants and ornamentals.

References:

- University of Wisconsin-Madison: Four-Lined Plant Bug – Wisconsin Horticulture
- Ohio State University: Four-lined Plant Bug Crushing Oregano (and other plants) | BYGL (osu.edu)
- University of Minnesota: Fourlined plant bugs | UMN Extension

Problem: Spittlebug *(Cercopidae spp.)*	**Where: Blairstown home garden (5/13)**

Description: According to the University of Connecticut, spittlebugs are common and easily recognized by the white foamy 'spittle' produced by the nymph or immature stage of the insects as they feed. Adults are less commonly seen but are known as froghoppers (close relatives of leafhoppers, etc). There are anywhere from 30 to 60+ spittlebug species in the United States. All feed on plants, including both woody and herbaceous types. Some spittlebugs have broad host ranges and others narrow. There is usually only one generation per year and most overwinter in the egg stage inside overwintering plant tissue where they were deposited by the females in mid to late summer to early fall, depending on species. Hatch occurs in the spring, probably in May. Even though Spittlebugs feed by extracting plant sap/juice through needle-like mouth parts, they seldom cause notable injury to the plant. There are a few exceptions including the meadow spittlebug (*Philaenus spumarius*) and the pine spittlebug (*Aphrophora cribrata*).

Spittlebug foam on mint plant
Photo: S. Brighouse, NJAES

Adult meadow spittlebug.
Photo: Cheryl Moorehead, Bugwood.org/UCONN Edu

Management: Spittlebugs are unlikely to cause significant damage to either vegetable or ornamentals. According to UConn, "the biggest problem with spittlebugs in the garden, whether it's an ornamental or food garden, is the unsightliness of the spittle masses. Spittle and nymphs can both be washed off the plants with a steady stream of water. Normally, no chemical controls are recommended, and the spittle protects nymphs from contact insecticides. Not sure if there are enough spittlebugs to cause plants to be weakened? Look for distorted or stunted new growth, and of course numerous spittle masses on the same plant."

References:

- UConn Extension, Spittlebug: A Unique Little Insect: https://bugs.uconn.edu/2017/07/24/spittlebug-a-unique-little-insect/#

Problem: Sunscald (sunburn) on strawberries and other plants	Strawberries: Morris Township Community (5/22) Other plants: Morris Township Community Garden (5/22) and Madison Community Garden (5/27)

Description: Sunscald on tomato plants was reported in the Hardening Off Tip in the prior IPM Team report (#2). Since then sunscald has been seen on strawberry fruit and the leaves of other plants including beans, peppers, squash and cucumbers. Sunscald can occur when plants that are not sufficiently hardened off or develop under cloudy or rainy conditions are exposed to sudden direct sun and heat.

On strawberries, symptoms occur on portions of fruit exposed to the sun and appear on the upper side of fruit just prior to ripening. Some strawberry varieties are more prone to sunscald than others.

Sunscald on the leaves of plants shows as an area on the leaf turning papery white or tan. The affected leaf tissue rapidly becomes desiccated with the extra light/heat exposure, causing the light tan to white discoloration on the leaves and stems of sensitive plants.

Sunburn can occur on many other fruits and plants. Sunburned peppers, tomatoes, and raspberries are often seen later in the gardening season.

Sunscald on strawberries
Photo: M. Albright, NJAES

Sunscald on tomato plant
Photo: J. Guarrino, NJAES

Sunscald on bean plant leaf
Photo: M. Albright, NJAES

Management:

- Maintain a good plant canopy over fruit by promoting plant vigor and by using good cultural practices.
- Harden off plants before transplanting them. See the Tip in the prior IPM Team report (#2) on hardening off plants.
- Irrigate when soil is dry to reduce fruit and plant stress.

Fact Sheet / References:

- Cornell University: https://blogs.cornell.edu/berrytool/strawberries/strawberries-upper-sides-of-berries-exhibit-a-water-soaked-bleached-out-appearance/
- University of Delaware: https://sites.udel.edu/weeklycropupdate/?p=11875

Problem: *Cercospora* leaf spot disease on beet plants *(Cercospora spp.)*	**Where: Madison Community Garden (5/27)**

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

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, Cylindra, Detroit Dark Red and Touchstone Gold.
- Practice a two-year crop rotation.
- Remove weed hosts of lambs quarters and pigweed.

References

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

Problem: Rhubarb leaf spot (*Ramularia rhei*)	**Where: Wick Garden (5/20), Madison Community Garden (5/27)**

Description: Rhubarb is usually relatively problem-free in the garden. *Ramularia rhei*, a rhubarb leaf spot disease, doesn't usually seriously impact yield but it can weaken the plants over time if left unchecked. It first appears as small red dots that gradually enlarge to form circular lesions a half-inch or more in diameter. Larger spots become white to tan with purplish halos. The larger spots can lead to sunken lesions in the stalk tissue. Stalk infections can come later, appearing as small spots that elongate as the stalk grows. White fungus can develop in the centers of spots on leaves and/or stalks, becoming brown as the tissue dies. Fungi overwinter in infected plant debris.

Leaf spot on underside of rhubarb leaf
Photo: J. Basile, NJAES

Leaf spot on top of rhubarb leaf
Photo: L. Terrareo, NJAES

Minor leaf spot on top of rhubarb leaf
Photo: M. Sample, NJAES

Management:

- Remove and discard all leaves after hard frost
- Don't add infected leaves to compost
- When harvesting, remove stalks with infected leaves first
- Don't over-water and avoid overhead watering as much as possible
- Provide sufficient air flow by using adequate spacing

References:

- University of Minnesota: https://extension.umn.edu/vegetables/growing-rhubarb#diseases-923465

BENEFICIAL SPOTLIGHT #1

The next two spotlights discuss Ladybird beetle adults and their larvae. Both are beneficial and feed voraciously on many soft-bodied insect pests, especially aphids. Be sure not to destroy them.

Ladybird beetle adults *(Family: Coccinellidae)*

Description: Ladybird beetles are also known as ladybugs. There are hundreds of species of ladybird beetles in North America. All but two (Mexican bean beetles and squash beetles) are beneficial as adults and larvae, feeding voraciously on many soft-bodied pest insects, especially aphids. They also feed on mites and other small insects and insect eggs.

The adults are usually 1/4 - 3/8" long, round, or oval, and ranging from black to pink, yellow or red, with or without spots on their wings. Females may lay between 20 and 1,000 eggs over a three-month period. The eggs are tiny, bright yellow-orange and spindle-shaped, laid upright in clusters of 5-30 and usually deposited near colonies of the insects that the larvae eat, most often in relatively protected locations on the undersides of leaves.

You can attract ladybird beetles by growing flowering plants that produce nectar and pollen eaten by adult ladybird beetles, and by avoiding the use of broad-spectrum insecticides. If any of your plants have aphids, undoubtedly ladybird beetles will follow!

A few species of ladybird beetles:

Ladybird beetle
(Harmonia axyridis)
Photo: Cornell University

Ladybird beetle
(Hippodamia convergens)
Photo: Cornell University

Ladybird beetle
(*Coleomegilla maculate)*
Photo: Cornell University

Exceptions that are not beneficial: There are two species of Ladybird beetles that are not beneficial: the Mexican bean beetle, *Epilachna varivestis,* and the squash beetle, *Epilachna borealis*.

Mexican bean beetles are a major pest of bean plants
The adult has 16 spots and is copper colored.

Photo: Purdue University

References:

- Rutgers Fact Sheet on Mexican Bean Beetles: https://njaes.rutgers.edu/pubs/publication.php?pid=FS227

BENEFICIAL SPOTLIGHT #2

Ladybird beetle larvae
(Family: Coccinellidae)

Description: Even though the insects in the pictures below look like they might be pests, they are actually the larvae of Ladybird beetles, sometimes called Ladybugs. The larvae look completely different from adults; they are tapered and alligator-like, growing from 1/25" up to 3/8" long, typically through four larval instars over 20-30 days. They have three pairs of prominent legs. The larvae are very active, moving around quickly in search of prey.

Ladybird beetle larvae, like their adults, are beneficial insects and voracious predators of aphids. They also feed on mites, small insects and insect eggs.

Take care not to destroy them.

Larvae of three of the many species of ladybird beetles are shown in the pictures below.

Photo: S. Brighouse, NJAES

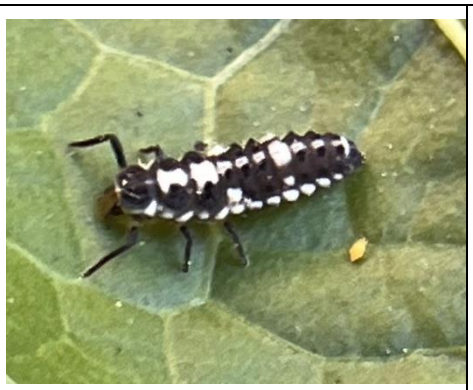

Photo: S. Brighouse, NJAES

Photo: M. Albright, NJAES

References:

- Cornell University: https://biocontrol.entomology.cornell.edu/predators/ladybeetles.php
- University of Maryland: https://extension.umd.edu/resource/ladybird-beetles-or-ladybugs

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 Albright