UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

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In this issue:

1949 Allis Chalmers meets 2019 Tilmor finger weeders at Golonka Farm in Whately, MA. Photo: UMass Extension

Crop conditions

As we type up this issue of *Vegetable Notes*, we are seeing visions of farmers across the state doing their best rain dances. The bit of rain in the forecast today and tomorrow would be welcome on most farms, where fields have been drying out in the heat these past few weeks. This is the time of year when one extra task, like hauling around irrigation equipment and setting up drip lines, feels like one thing too many on top of harvesting, weeding, and spraying to control pests. Weeds are starting to get the better of some fields, and now is a critical time in the battle against these persistent foes. Some fields are looking better than ever though, with more and more folks adopting various finger weeders and getting creative about how they put them together on a variety of tractors and toolbars. Here's an in-depth video from MSU Extension to help you learn about these newly re-vamped cultivation tools if you are curious. They also have videos on flex-tine weeders and torsion weeders—check 'em out!

Sweet corn harvest is finally getting started; spring plantings were substantially delayed due to cold and wet weather. Winter squash is starting to vine out, onion bulbs are forming, and garlic is nearing harvest. Fresh onions are rolling in and the first of the peppers and eggplants are being picked.

Pest alerts

Alliums:

Downy mildew was reported on one farm in MA last week, and on several farms in the onion growing regions of NY. Downy mildew is favored by cool temperatures and disease should be slowed above 80°F, but it may be persisting due to cool nights and overnight dew which favors growth of the pathogen. Protectant fungicides like mancozeb or copper may be helpful in reducing spread of disease—see the New England Vegetable Management Guide for more targeted options.

Bean:

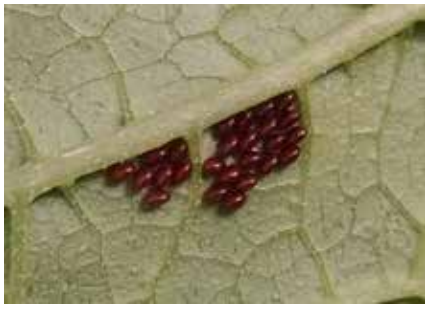
Potato leafhopper development is about a month behind last year, but more nymphs are being seen across the region now and we're seeing lots of hopperburn developing. From 3rd trifoliate leaf to bud stage, treat when PLH exceed 1 nymph/leaflet or 5 adults per foot of row, and repeat application in 7 to 10 days, if necessary. Be sure to treat lower leaf surfaces. In fields where a systemic seed treatment was used (e.g. Cruiser), foliar treatment should not be needed before bloom. Pyrethroids and/or azadarctin-containing products are the most effective foliar sprays.

Mexican bean beetle egg masses are just starting to be seen, so now is the time to get out and scout for eggs if you plan to release the parasitic wasp *Pediobius foveolatus* to control this pest of u-pick bean fields. See the article in last week's Veg Notes for more information.

Brassicas:

Lots of damage from **imported cabbageworm** and **diamondback moth** caterpillars is being seen in untreated fields. There are many generations of these pests throughout the season, so continue scouting and spray when thresholds (15% infested for leafy or headed crops and 35% infested for pre-head formation crops) are reached.

Cucurbits:



Squash bug eggs on the underside of a cucurbit leaf. Photo: A. Radin

Squash bug: Egg laying continues and pressure seems quite high in some fields, but we have not seen nymphs yet. Small plants are very susceptible to feeding damage and resulting wilt, so it is critical to inspect plants at early flowering. Squash bugs prefer squash and pumpkins but they will feed on other cucurbits too. Look for neat clusters of metallic bronze eggs on undersides of leaves and treat if a threshold of 1 egg mass/plant in squash is reached. Use pyrethroids (e.g. Asana, Mustang, Pyganic^{OG}) on adults and switch to azadirachtin-containing materials (e.g. Azatin O^{OG}, Aza-Direct, Molt-X, AzaGuard, Azatrol) when nymphs are present.

Squash vine borer has emerged with a vengeance! Egg laying is occurring now in thick-stemmed crops like zucchini and winter squash (though butternut is not affected by this pest). Treatment threshold is 5 moths per week in the pheromone trap for bush varieties and 12 moths per trap for vining cucurbits. Treatments should target the base of the stem. Some selective materials used for other caterpillars in squash, such as spinosyns and *Bacillus thuringiensis aizawi*, have demonstrated efficacy in trials.

Powdery mildew has arrived in cucurbit fields across the region. When scouting for this disease, be sure to check the lower surface of leaves, as disease often starts there. Top fungicide choices based on fungicide efficacy and resistance monitoring work by Meg McGrath of Cornell University are "Vivando, DMI fungicides (e.g. Proline, Procure, etc.), and Quintec. Sulfur is the best protectant fungicide to tank-mix with these and to use before symptoms on a preventive schedule, but it can be phytotoxic to cantaloupe. Mineral oil (ex. JMS Stylet Oil) and chlorothalonil (Bravo) are other options."

Bacterial wilt is starting to show up in cucumbers now. This disease is vectored by the striped cucumber beetle and is spread through its feeding. At this point there is nothing to do to control this disease except trying to reduce its spread by controling SCB.

Solanaceous:

Potato leafhopper: We're seeing lots of adults and nymphs and early signs of hopperburn in potato and eggplant fields. Pyrethroids and/or azadiractin-containing products can be effective in reducing numbers and damage. Treatment threshold is >15 nymphs on 50 leaves.

Colorado potato beetle: We are still seeing all stages of CPB (adults, eggs, and small and large larvae) in potato, eggplant, jilo, and the weed host horsenettle! In other years, the first generation larvae would be pupating in mid-July, but it's reasonable that we're still seeing the overwintering adults and resulting eggs and larvae given the slow start to this year's growing season.

Three-lined potato beetle is present in potato but is especially numerous and damaging in tomatillo. If damage is severe, pyrethroids should be effective in controlling adult stages. Switch to or add an azadiractin-containing material if larvae are also present.

Tomato spotted wilt virus was confirmed in two different locations in RI this week. Tomato, pepper, and low-growing groundcherry are all hosts for the disease, which is transmitted by thrips (primarily western flower thrips) and is common in greenhouses with veggies and ornamentals, which can also be hosts.

Septoria leaf spot and **early blight** are popping up across the region. These fungal diseases are favored by warm temperatures (75-80°F) and leaf wetness caused by rain or overnight dew. Provide optimum nutrition throughout the season. If planting in an area with a history of either disease, begin fungicide applications before disease is evident, usually when first fruit are half-grown or approximately the first week of July. See the New England Vegetable Management Guide for current fungicide recommendations.

Sweet Corn:

European corn borer trap counts are dropping off as the first flight is ends, but damage is being seen in tasseling and silking corn now. Use 30% threshold for younger corn. After late whorl stage, use 15% threshold.

Corn earworm trap captures are being reported across MA and NH but numbers are still quite low. No spray is recommended with 0 to 1.4 moths per week. For sites with 1.4 to 3.5 moths per week, a 6 day spray interval is recommended. More traps are continuing to get setup as more corn begins to reach silking stage.

Location	GDDs base 50°	SVB Weekly Total	ECB Weekly Total	FAW Weekly Total	CEW Weekly Total	Spray Interval for CEW
Western MA						
Westhampton	1151	3	-	-	-	
Whately		0	1	-	0	
Central MA						
Bolton	1052	-	1	-	0	
Leominster	1113	24	0	-	0	
Eastern MA						
Concord		-	2	0	0	
Ipswich	900	-	0	0	1	*no spray*
Millis		-	3	-	-	
North Easton		49	-	-	-	
Seekonk	1120	-	1	0	0	
Sharon	1092	33	0	-	2	*6 days*
Spencer		-	0	0	0	

European corn borer (ECB), Fall armyworm (FAW), Western bean cutworm (WBC), Corn earwom (CEW)

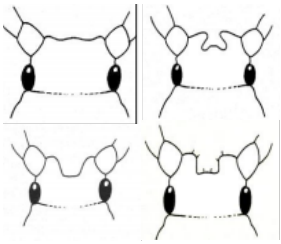
Other/Multiple Crops:

Scarab beetles, including Japanese beetles, Asiatic garden beetles and oriental beetles are emerging in great numbers across the region. These do not always reach pest status in a given field or year, but can cause a lot of damage at times. There aren't a lot of great spray options but pyrethroids should provide the best control.

APHIDS AND VIRUSES

Aphids can cause a lot of damage, distorting leaves and draining plants of sap, but they can also transmit certain viruses, including all of the potyviruses like cucumber mosaic virus, bean common mosaic virus, and potato virus Y. If you have an aphid problem in your field, it's important to identify the species of aphid present so that you can order the proper parasitoids, if you are using biocontrol, or apply the correct type of pesticide (either systemic, oil, or soap).

Virus Transmission. Viruses are classified as non-persistent, semi-persistent, or persistent, depending on the length of time the insect vector can retain infectious virus particles. Non-persistent viruses are only retained within insect vectors for minutes to hours. Semi-persistent viruses can be retained for days, and persistent viruses can be retained for the lifetime of the vector or even be passed on into the next generation of vectors. Most of the aphid-transmitted viruses we encounter in the Northeast are non-persistently transmitted by many species of aphid, meaning that the aphids acquire and spread virus particles quickly. Aphids probe plants as they move throughout and between fields to determine whether or not a plant is their preferred host. Even this quick probing on non-host crops can be enough for an aphid to spread the virus. Aphids can pick up virus particles anywhere along their path and are very efficient at spreading them, often causing 100% of the crop to be affected. Once a virus is transmitted into a plant, it is there to stay, though fruit may not be affected if the virus was transmitted after pollination occurred. In situations where the goal of aphid control is reducing spread of viruses, systemic insecticides such as imidacloprid or thiamethoxam should not be used, as they cause increased muscle twitching and more probing. Insecticidal soaps and horticultural oils do not have this effect because the insect is smothered in place. Mechanical transmission of viruses from plant to plant may also occur via movement of plant sap by equipment or workers (e.g. during pruning or harvesting). Some viruses can be seed-borne and



Aphid headshapes for identification. From top: Melon, green peach, potato, and foxglove aphid.

others may overwinter on weed hosts.

Aphid Species

Taken, in part, from "Common Greenhouse Pests – Aphids", by C.E. Frank & M. Skinner, University of Vermont, Entomology Research Lab, 2013.

Green peach aphids.
Photo: UC Statewide IPM Project

Green peach aphids (*Myzus persicae*)

Body color: Variations of green, pink, or red

Body length: 0.05 to 0.08 inches

Antennae: Same length as body

Cornicles: ½ length of body, swollen and dark at tips, light green to brown color.

Legs: Short

Host range: Includes peach, apricot, and over 200 species herbaceous plants including vegetables and ornamentals.

Melon aphid. Note the two aphid mummies, just above the horizontal leaf vein. Photo: M. Spellman

Melon/cotton aphids (*Aphis gossypii*)

Body color: light yellow to light/dark green

Body length: 0.04-0.07 inches

Antennae: ¾ body length

Cornicles: Short, convergent, and black in color

Legs: Short

Host range: Many vegetables such as pepper, eggplant, spinach, asparagus, okra. Particularly damaging on cucurbits.

Foxglove aphid.

Foxglove aphids (*Aulacorthum solani*)

Body color: Yellow-green to brown-green

Body length: 0.07 to 0.12 inches

Antennae: 1 ½ body length

Cornicles: Short. Bulge towards tip. Green color with black tip. Distinct dark spots at base of cornicles.

Legs: Long, with dark bands.

Host range: Includes foxglove, lettuce, potato, clover, and bulbs.

Potato aphids.

Potato aphids (*Macrosiphum euphorbiae*)

Body color: Variations of green, pink, and red

Body length: 0.07 to 0.12 inches

Antennae: 1 ¼ body length, clear to dark near tip

Cornicles: ½ length of body, slight bend outwards, light-brown color

Legs: Long and darker at tips

Host range: roses (winter), potato and tomato (summer).

*A good distinguishing characteristic of potato aphids is their speed; potato aphids move more quickly than other aphid species.

Cabbage aphids.
Photo: UC Statewide IPM Project

Cabbage aphids (*Brevicoryne brassicae*)

Body color: Grey-green with dark heads. Adults produce a powdery wax coating that makes them appear dusty.

Body length: ~0.07 inches

Cornicles: Short, dark.

Host range: Brassicas. Cabbage aphids are especially problematic on Brussels sprouts, where they get into buds.

Bean aphids (*Aphis fabae*)

Body color: Dark-green to black. Body is matte, compared to the shiny cowpea aphid.

Body length: 2 to 2.6 mm

Antennae: ¾ body length. Pale with dark ends.

Legs: Pale with dark tips.

Cornicles: Short, dark.

Bean aphids.
Photo: UC Statewide IPM Project

Root aphid: There are many species of root aphid, but the most common among vegetable crops belong to the genus *Pemphigus*. Root aphids overwinter as eggs and infest plants in the spring and fall. They may be misidentified as mealybugs because they are covered with white wax, although they are smaller than mealybugs. Root aphids have reduced cornicles resembling rings, which are located on the end of the abdomen. These cornicles are difficult to see with the naked eye, but can be seen when magnified.

Virus Prevention. Once a virus becomes visible in your crop there is no cure or chemical treatment, so prevention is essential. Furthermore, the severity of disease caused by viruses is usually determined by the timing of infection—the earlier infection occurs, the greater the impact on plant growth, fruit symptoms, and fruit set. Delaying the onset of infection by several weeks can have a dramatic effect on the amount of damage.

Cultural Practices

Start with certified virus-free seed, as some viruses can be seed-borne in particular crops.

Where possible, do not grow ornamental plants and vegetable transplants in the same greenhouse, as viruses often have wide host ranges including vegetables, ornamentals, and woody plants and may be introduced on infected plugs.

Plant cultivars with resistance to viruses. Many resistant varieties are available in a variety of crops including cucumber, summer squash, and melons. Resistance to viruses is derived from traditional breeding as well as through genetic engineering; some species are also naturally resistant to certain viruses.

Cover crops with floating row covers in the spring to prevent infestation by the early influx of virus-carrying aphids. Be careful with this tactic, as aphid populations can develop quickly under row cover if already present when the crop is covered, and row covers will exclude beneficial insects that might otherwise help control aphid populations. Make sure plants are not already infested before you apply row covers.

Reflective mulches can repel aphids. Though slightly more expensive, they may be cost-effective if viruses are a chronic problem. Keep in mind, especially with crops that require lots of labor during the season, that reflective mulches can be hard on workers' eyes.

Keep fields as weed-free as possible, as many weeds can serve as alternative hosts.

Remove wild cherry trees from around fields to make the area less attractive to green peach aphids. Prunus species (peaches, cherries, etc.) are attractive to green peach aphids. The green peach aphid is not the only aphid that transmits viruses, but it is important because it can vector a wide range of viruses.

Handle plants as little as possible, clean tools frequently. If you know you have a virus in a crop, work in clean fields first and affected fields last to minimize mechanical transmission of viruses by workers and equipment

Remove and destroy affected plants to prevent a source of virus for further infections.

Insecticides. Because many viruses are transmitted non-persistently (rapidly) during probing, systemic insecticides generally DO NOT act quickly enough to prevent infection or control disease spread. Systemic materials are usually considered the most effective insecticides available for aphid control because they are taken into the plant tissue and remain there until ingested by aphids during feeding, providing residual protection from otherwise hard-to-reach pests. However, aphids do not actually feed when they probe a leaf—they do not ingest plant sap nor any insecticides present when they probe. In fact, the presence of these insecticides may actually stimulate aphids to probe more quickly, and to move from

plant to plant more rapidly. This can increase the spread of non-persistently transmitted viruses in various crops. When trying to control aphids where viruses may be present or where you hope to reduce the spread of virus in a crop, mineral oil or soap-based sprays are the best choice. These materials smother aphids and act as a repellent, deterring aphids from feeding. Unfortunately, this method can be costly and unreliable as you need thorough coverage and repeated applications.

Aphid mummies parasitized by Aphidius *parasitoid. Photo: T. Smith*

Biocontrol. Predators such as ladybeetle, lacewing, predatory midge, and syrphid fly larvae can do a great job cleaning up aphid outbreaks—the larvae just chew them all up. Releasing predators into a tunnel or field, or planting insectaries to support adult lacewings, syrphids, and ladybeetles can help lower the population of aphids on your farm. Parasitic wasps can also help control aphid populations. These tiny wasps lay an egg within the aphid body, and as the egg hatches and the wasp larva grows it consumes and kills the aphid, leaving behind an aphid "mummy". You must know what species of aphid present if you'd like to order parasitic wasps, as there are certain species of wasps that control only certain species of aphid (see table). This is most effective in greenhouses but may be a useful tool in an integrated aphid control program.

Parasitic Wasp Species	Aphid Hosts*
Aphidius colemani	GPA, MA
Aphidius ervi	PA
Aphelinus abdominalis	PA, FA
Aphidius matricariae	GPA
**GPA: Green peach aphid; MA: Melon aphid; PA: Potato aphid; FA: Foxglove aphid*	

--UMass Vegetable Program

PHYSIOLOGICAL LEAF ROLL VERSUS GROWTH REGULATOR HERBICIDE DAMAGE

Written by Gordon Johnson, Vegetable & Fruit Specialist, University of Delaware Extension. Originally published in the University of Delaware Extension Weekly Crop Update, Volume 27, Issue 14, June 28, 2019.

Leaf curling, cupping and rolling in vegetables can be caused by virus diseases, aphid infestations, herbicides and growth regulators. We are currently finding physiological leaf roll and leaf curling due to exposure to growth regulator herbicides in vegetable fields. It is important to know how to distinguish between the two.

Physiological Leaf Roll

Physiological leaf curl on tomato. Photo: G. Johnson

Late spring and early summer is the time of the year that we often see leaf cupping and rolling disorders appear in vegetable crops that are not related to pests or chemicals. This can be seen in tomatoes, peppers, potatoes, watermelons, beans, and other crops. This is a physiological disorder that may have many contributing factors.

In tomatoes, leaf roll starts at the margins which turn up, then roll inward, most commonly on the lower leaves. Upward cupping is also found commonly in watermelons and potatoes. Beans, peppers, and other vegetables may cup downwards. Leaves may stay in this rolled or cupped state for a short period of time and then return to normal, or they may remain permanently rolled or cupped. Rolled leaves may become thicker but are otherwise normal. Physiological leaf roll or cupping is often variety dependent with some varieties being more susceptible than others.

There are several possible causal factors for physiological leaf roll or cupping. Water relations are suspected in many cases where there has been a reduction in water uptake or increased water demand placed on the plant. The plant responds by rolling the leaves which reduces the surface area exposed to high radiation. High temperatures, excessive pruning, cultivation, and vine moving activities may also trigger leaf rolling. High nitrogen fertility programs followed by moisture stress may also trigger this type of leaf roll. Inadequate calcium moving to leaf margins may also cause a different type of leaf cupping. This is also related to interrupted water movement.

In most cases, yields are not affected by physiological leaf rolling or cupping. However, growers may choose to select varieties that are less susceptible to this disorder.

Growth Regulator Herbicide Damage

Growth regulator herbicide damage on tomato. Note leaf cupping, strapping, twisiting, and unusual vein pattern. Photo: G. Johnson

Growth regulator herbicides are often of most concern for drift damage to vegetable crops. This group includes dicamba, 2,4-D, MCPA, MCPP, triclopyr, picloram, clopyralid, aminopyralid, and quinclorac. These herbicides can drift over one mile from where they were applied when volatilized.

Symptoms include leaves becoming cupped, crinkled, puckered, strap-shaped, stunted, and malformed. Leaf veins can appear parallel rather than netted, and stems become bent, twisted, and brittle.

When compared to physiological leaf roll, growth regulator herbicide injury symptoms will be concentrated on the upper part of the plant (growing points), the leaf veins will be affected showing a parallel pattern, and stems may be twisted – none of these symptoms will be present in physiological leaf roll.

SHORT-TERM SUMMER COVER CROPS

Many fields had a late start this year, however, there is still plenty of opportunity to plant a summer cover crop into fields that will be fallow for the rest of the season. Bare soil is subject to pounding rains, erosion, and weeds going to seed. Shade produced by a thick cover crop in the summer can keep weed seedheads from forming. There are several good legume and non-legume cover crop choices for planting in July that grow rapidly in the summer heat. When planting mixtures in the summer, select equally vigorous crops (similar height and growth rate) so they will not compete and shade each other out. For example, Jean Paul Cortens, of Roxbury Farm in New York, likes a mix of 50 lbs/A sun hemp, 10 lbs/A Japanese millet, 5 lbs/A sunflower, and 50 lbs/A cowpea or field pea.

Legumes

Cowpea (*Vigna unguiculata*), also known as black-eyed or southern pea, is fast-growing with peak biomass often reached in 60 days. It also tolerates drought and heat. Cowpeas can fix up to 100 lbs N/A with biomass of 3000-4000 lbs/A. It breaks down rapidly after incorporation. Cowpeas also can be harvested in the immature pod stage as a fresh legume. *Drill at 40-50 lbs/A and broadcast at 70-100lbs/A.*

Sunhemp (*Crotalaria juncea*): This tropical legume (not related to other hemps) has great potential in our humid, tropic-feeling summers. Sunhemp can produce very high amounts of biomass (3-4 tons/A in Massachusetts). It is a high nitrogen-fixing legume and can contribute over 100 lbs N/A to a following crop. Sunhemp grows very fast in the summer, reaching 6 feet or taller in 8 weeks. Allow sunhemp to grow 1-3 feet tall, then mow it and let it regrow. If allowed to get too tall, the stems will become tough and fibrous and will not decompose rapidly. This crop is an excellent companion for sorghum sudangrass, which can also be mowed to keep it from getting too fibrous. Sunhemp is a day length-sensitive crop; it will grow anytime during the summer, however it will not flower and go to seed until the days start getting shorter in very late summer. Seed is mostly sourced from Hawaii at this point and may be expensive, but the N contributions may be worth it! *Drill 20-30 lbs/A.*

Sunhemp. Photo: M. Hashemi

Crimson Clover (*Trifolium incarnatum*) is a beautiful cover crop that is a great choice for a short-term summer cover or perhaps seeded between plastic rows to reduce splash, weeds, and erosion. It is not typically considered an overwintering cover crop in Massachusetts, but in a cover crop research trial conducted by the UMass Extension Vegetable Program in 2016, it overwintered well on four MA farms. It tolerates well-drained soils, heat and drought and has good tolerance to shade and low fertility soils. Shade tolerance makes this cover crop a good choice for mixes. De-

pending on coverage, it can fix 70-150 lbs N/A. *Drill 10-20 lbs/A, and broadcast at 12-24 lbs/A.*

Non Legumes

Sorghum Sudangrass (*Sorghum bicolor* **x** *S. sudanense***)** Sorghum sudangrass is a cross between grain sorghum and sudangrass. It is a warm-season annual grass that grows well in hot conditions and produces a large amount of biomass. Its thick root system and high biomass makes it useful for soil building. Sorghum sudangrass can reach 6-12 feet tall. Expect 3-4 tons of biomass addition per acre in Massachusetts. As a grass, to get the most growth you will need to add nitrogen fertilizer (40-80 lbs/A) which will be cycled on to the next crop. Sorghum sudangrass is very effective at suppressing weeds and has been shown to have allelopathic and biofumigant properties useful for nematode management. Brown midrib types will decompose more quickly because they have less lignin. *Drill 35-40 lbs/A or 40-50 lbs/A broadcast.*

Mow sorghum sudangrass before it reaches 5 ft tall to avoid it becoming too fibrous. Photo: UMass Extension

Phacelia (*Phacelia tanacetifolia***)**, also known as blue or purple tansy, is a good cover crop for use in rotation on vegetable farms because it is in a different plant family than most vegetable crops. This fast-growing cover crop prefers mid-summer seeding. While it does not have a deep taproot, phacelia is a wonderful soil aggregator in the top 2 inches. Beneficial insects including parasitoids, bees, and pollinators are attracted by the fuzzy blue/purple flowers. This cover crop will winterkill at 15°F. *Seed at 1lb/A drilled and 3 lb/A broadcast.*

Phacelia. Photo: S. Scheufele

Forage-Type Pearl Millet (*Pennisetum glaucum***) or Japanese Millet (***Echinochloa* spp.**)** have similar functions as a summer cover crops: they grow rapidly but can be more easily managed than sorghun sudangrass, though with less biomass. Both millets grow about 4-6 feet tall and have similar seeding rates. They are well adapted to sandy and/or infertile soils and do well in the summer heat. Forage types are better adapted for soil improvement than the grain types. To get the most growth you will need to add nitrogen fertilizer (40-80 lbs/A). Pearl millet has been shown to suppress some nematodes. Forage pearl millet can make a good mulch for late-summer planted no-till or strip-till crops. *Seed at 12-15 lbs/A drilled or 15-20 lbs/A broadcast.*

Buckwheat (*Fagopyrum esculentum*): If weed suppression is the main goal, buckwheat is a good choice. It can be sown as early as May 20. As a broadleaf plant, it covers the ground earlier than grass cover crops, especially in early June, and out-competes weeds. A good stand of buckwheat attracts beneficial insects, improves soil tilth, and produces more biomass than any other cover crop in the short time it grows, but doesn't do well if the plow layer is compacted. It scavenges phosphorus from soil and makes it available to subsequent crops. If the field is low in nitrogen and phosphorous, buckwheat will do well without additional fertilizer. Buckwheat decomposes quickly after incorporation. The main production risks associated with buckwheat are a failed stand and letting it go to seed. *Buckwheat can be drilled at 50 lbs/A or broadcast at 70 lbs/A.*

Mow buckwheat ~40 days after planting or within 10 days of flowering to prevent it from going to seed. Photo: S. Scheufele

Additional Information

Summer Soil Improving Crops for Vegetable Rotations , Gordon Johnson, Extension Vegetable and Fruit Specialist, University of Delaware.

Cover Crop Guide for New York Vegetable Growers

Cover Crops: What a Difference a Few Weeks Makes! Results from Cornell Organic Cropping Systems Trials.

Cover Crop Periodic Table

--Updated for 2017 by Katie Campbell-Nelson

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Vegetable Notes. Katie Campbell-Nelson, Genevieve Higgins, Lisa McKeag, Susan Scheufele, co-editors.