PEST ALERTS: Onion thrips are beginning to build up, don’t let them get out of hand; Brassica flea beetles are thriving on uncovered/unsprayed bok choi, cabbage, mustard greens; Possible Molybdenum deficiency in red cabbages; Damage from cabbage maggots is now obvious where they are present, on large brassicas; Imported Cabbage Worm very heavy, locally, on large brassicas; heavy Cercospora on transplanted beets—this may have begun in conducive conditions of the greenhouse, possibly seed transmitted; beet are leafminers on beets and chard, but seemingly not too bad this year; striped cucumber beetles very active in some locations; young eggplants and potatoes are being attacked by potato flea beetles; transplanted green beans were seen with two spotted spider mites and black bean aphids—the mites probably started in the greenhouse, the aphids are out and about and have also been seen on Faba beans; the very first Eurpean Corn Borer moths have been collected in a few traps in Eastern Mass.

Inches of rain, just in time to leach N

May has been a dry month, with only 1.87 inches measured at URI until last Saturday. The 2.75 inches over last weekend is, of course, welcome: the soil is now really well charged up. A drawback of getting this much rain at this particular time is that 3 or 4 inches below the surface where there was still a little moisture, mineralization of organic nitrogen has been going full tilt. What that means is that organic materials that contain N, such as decomposing cover crop, other decomposing organic residues, and organic N fertilizers, are rapidly being converted by bacteria into “mineralized” (non-organic) soluble forms of N. These, such as ammonium and nitrate, are what plant roots absorb. It’s going full tilt right now because the soil has finally warmed up below the surface, and this affects the rapidity of bacterial activity. While organic forms of N are typically less prone to leaching at the time of application, once the soil gets warm, the resulting mineralized N is just as prone to leaching as inorganic N (unless it’s a controlled release synthetic N fertilizer.)

As to other nutrients besides nitrate N ($\text{NO}_3^-$), most are positively charged, except for phosphate* ($\text{PO}_4^{3-}$), borate ($\text{BO}_3^{3-}$), sulfate ($\text{SO}_4^{2-}$), and molybdate ($\text{MoO}_4^{2-}$). In properly limed soils (pH upper 5s to mid 6s) with decent cation exchange capacity, the important cations, like calcium, magnesium and potassium, will remain available to plants. But that’s not the case in sandier soils which (unavoidably) have lower cation exchange capacity, where deficiencies in these key nutrients are a little more common.

We are launching into that period of the season where you can watch vegetative growth and the start of flowering happen in front of your eyes, and that should hold with next week’s temperatures forecast to be in the 80s. Now is the time when

Need to discuss? Got something you need looked at? URI Extension: 401-256-7393/andy_radin@uri.edu, hfaubert@uri.edu

A happy rain gauge
plants need a full buffet of nutrients available to them in appropriate quantities. If you’ve split up your applications, now would be a good time to apply. Fertilization makes this easy if you’ve got all your irrigation set up and have nutrient sources that are easily “fertigatable.” Note that while seaweed extracts do have some growth-promoting properties, they have very low analysis of plant nutrients, even if blended with fish emulsion materials. If you are top-dressing, bear in mind that if using organic fertilizer, you must make sure there is good contact between it and the soil. Organic fertilizer relies upon soil bacteria to decompose it in order to mineralize the organic N, P and S. This means at least “scratching it in.” Putting mulch over it is even better if you don’t plan on another application later. If using synthetic, particularly urea, it must also be put under the soil or else it will volatilize (sublimate) right into the air.

*Phosphate is a special case: depending on pH, it is mostly bound up by either calcium, aluminum, and iron. But heavy rains can both dissolve more P, making it a little more leachable, or erosion can carry P away.

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**LOOK**

RIDEM’s LASA Grant program deadline has been extended to JUNE 13

http://www.dem.ri.gov/programs/agriculture/grants-lasa.php

The RI Food Policy Council can provide assistance with your application:

https://rifoodcouncil.org/asa/
The Chrysomelidae ("cry-so-melody"), commonly known as the "leaf beetles," is one of the largest beetle families in the world. They are often very colorful and highly visible, and their damage is usually obvious. Many of our most troublesome crop pests are Chrysomelids, and most of them are very much out and feeding right now. This includes: Colorado potato beetle, three-lined potato beetle, striped and spotted cucumber beetles, both the brassica and potato flea beetles, spinach and amaranth flea beetles, common and spotted asparagus beetles, Mexican bean beetle, squash beetle, tortoise beetle, and numerous pests of ornamentals.

You may notice that common names of most of these have their favorite vegetable built into them. That is because they are very often specialists within particular plant families, which is a result of what is known as co-evolution. Over hundreds of thousands, if not millions, of years, species of plants and the herbivores that eat them do a sort of mutual dance of adaptation to each other. For instance, a random mutation in a very small local population of plants might cause the alteration of a phytochemical that is distinctly toxic to a local group of insects that eat them. Because these plants are fed upon less by this local group of insects, the plants with this slight difference live to survive and produce new seeds among themselves, passing on this trait of the altered phytochemical. These offspring and their later progeny then begin to dominate the local population of this type of plant. Those insects, though, can only feed on the older version, which is being locally replaced by the new plants. But then because of a genetic predisposition, a small number of individuals within that local insect population survive and reproduce perfectly well after feeding on the new version of the plant because these few are already in possession of a detoxification mechanism to handle the new version. The progeny of these individual insects then come to dominate the local population. These kinds of "adjustments" can go on for a very long time and the result may be entirely new, more highly adapted species of both plant and insect.

A discussion of the characteristics of members of this family is too complicated for this article, but there is a lot of variety within the family. Some have only a single generation within a growing season, others have two or more. The larvae of some feed on foliage right alongside of adults, while the larvae of others feed underground on roots. Some are dome-like in shape, while others are more elongated. Many Chrysomelids (though by no means all) have very striking and colorful markings, which are forms of "warning coloration," known by the term aposematism. This can be seen on many kinds of animals, so it has arisen many times in biological evolution. These striking patterns seem to warn predators of bad consequences if they eat such a creature. There is a classic set of biology textbook pictures of a young, naïve blue jay, first eating a monarch butterfly, and then barfing it up. These were pictures from studies by the entomologist, Dr. Lincoln Brower.
**Pest Panopoly**

**Above:** If you zoom in, you will see a cabbage maggot feeding away on the roots; several others are below in the soil.

**Below:** Black bean aphids on the underside of this snap bean leaf. Ants were also in attendance, providing protection to the aphids. Many leaves in this planting also had two-spotted spider mites. These probably came from the greenhouse, because these were transplanted. The entire planting of beans had a dull green to bronze color.

**Above:** Cercospora on transplanted beets. **Below:** this has the look of Molybdenum deficiency, which is rarely seen. Zoom in and look at the elongated, distorted leaves.
Striped Cucumber Beetles don’t have a chance to get into this netted tunnel at Roots Farm, Tiverton!

Survey Participants Needed. Researchers at the University of Rhode Island are currently distributing an online survey about fresh market sweet corn. If you grow fresh market sweet corn you are eligible to take this short 5 minute online survey. Your participation and feedback are extremely valuable to the success of this research.

The survey will gather information on growers bird damage levels to sweet corn and prevention methods used to deter bird damage. To take this survey, please click here or paste the following link into your URL, https://uri.co1.qualtrics.com/jfe/form/SV_8qBBBeU2HAIwcKYL.

We thank you in advance for taking our survey. If you have further questions or interested in this study please see the contact information below.

Natalie Meyer at natalie_meyer@uri.edu
who along with his first wife, scientist Dr. Jane Van Zandt, studied the evolutionary biology of warning coloration. This includes the phenomenon known as Batesian Mimicry, in which some species evolved warning coloration yet aren’t actually toxic to eat at all! But among Chrysomelids, it’s usually the case that these insects have warning coloration and are inedible because they feed on plants that contain toxic phytochemicals which they can sequester in their bodies without any toxic effects. But woe is the naïve bird that eats certain of these insects and is unable to detoxify the phytochemicals.

Another phenomenon of evolution is that some insect species can strongly resemble each other, yet they aren’t that closely related. Once or twice every spring, I realize in conversation with a grower that they are not aware that brassica flea beetles and potato flea beetles are not the same species. In fact, they aren’t even in the same genus! They look, superficially, nearly the same, but they specialize on different plant families.

Most of these pestiferous Chrysomelids have life history strategies based in excessive amounts of reproduction. The strategy is to saturate the environment with short-lived individuals in a mass attack. Each individual has a low probability of surviving to reproduce, but there is a high probability that at least a few will survive to reproduce. At this time of year, the first thing that springs to mind is Colorado potato beetles. This is in contrast with a strategy in which few offspring are produced, but these individuals have a high probability of surviving to reproduce and are long-lived. An example of this would be big birds of prey. But these are extremes of life history strategies that more often fall somewhere in between, or possess complete contradictions. A species in the news right now that has a huge contradiction in these life history strategies is the periodical cicadas that are emerging in the mid-Atlantic states. Outrageous numbers of individuals are saturating the environment, and the predators are feasting. (I understand that humans are, as well.) And yet, these insects live underground for 13 or 17 years. After such a lengthy investment of time, most are probably not even getting a chance to reproduce. C’est la vie!
YOUR Partners in Rhode Island Agriculture

Consisting of six primary program areas, the Rhode Island Division of Agriculture works to sustain, promote and enhance Rhode Island’s agricultural viability today and for generations to come.

Farm Service Agency (FSA) is an agency of the U.S. Department of Agriculture (USDA) that serves all farmers, ranchers and agricultural partners through the delivery of effective, efficient agricultural programs for all Americans. There are 48 programs that they administer, including microlending, direct farm ownership loans, farm storage facility loans, non-insured crop disaster assistance, and much more.

A complete list of programs can be found at this link. They are located at: 60 Quaker Ln, Suite 62, Warwick, RI (401) 828-3120 Option 1

NRCS, a federal agency, helps landowners develop conservation plans, create and restore wetlands, restore and manage other natural ecosystems as well as advise on storm water remediation, nutrient and animal waste management and watershed planning.

United States Department of Agriculture
Natural Resources Conservation Service

NRCS is located at 60 Quaker Lane, Suite 40, Warwick, RI 02886 0111 Phone: 401-828-1300, Option 1 fax: 855-924-4748 https://www.nrcs.usda.gov/wps/portal/nrcs/main/ri/contact/state/

The RISBDC employs a dedicated, experienced and knowledgeable staff of business counselors and administrators who can assist you in growing your business.

The Rhode Island Agricultural Energy Program is a competitive grant program for the implementation of agricultural projects that improve energy efficiency and facilitate renewable energy. It is a collaborative project of RI RC&D, the RIDEM, Division of Agriculture, and Office of Air Resources and the Office of Energy Resources.

Contact: Jo-Anne Pacheco, Program Coordinator, RI Farm Energy Program, Rhode Island RC&D info@rifarmenergy.org 401-500-0399 www.rifarmenergy.org