Cornell University Cooperative Extension

Eastern NY Commercial Horticulture Program

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Weekly Vegetable Update

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North Country—Clinton, Essex, northern Warren and Washington counties

The daily rains, sometimes heavy, have continued all week. Fields are completely saturated, many are flooded. Raised beds and sandier soils are really helping this year and some crops in those locations are putting on decent growth. We had a short break in the weather and saw a few hours of sun earlier this week but rain is in the forecast for the rest of the week.

Growers are trying to keep crops protected with sprays, conventional and organic, but the daily rains make this a real challenge.

Capital District—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington counties

Have you ever wondered what row covers really do in the event of severe hail? The picture at the right is where the row cover was blown off of half of the plant but the other half was protected. The plant has had about two weeks to recover.

We are seeing a greater diversity of diseases now, including some viruses, early blight on tomato, timber rot on tomato, and cercospora on beets. Squash bugs are laying eggs on cucurbits.

Mid-Hudson Valley—Columbia, Dutchess, Greene, Orange, Sullivan and Ulster counties

Wet field conditions last week made harvest miserable and several crops were showing increased disease levels. Greens and other leafy crops were probably the hardest hit. The high heat following the excessive moisture also created stress for many crops.

Larger acreages of corn are reaching maturity and we expect harvest to be in full-swing in the next week. The high temperatures will "push-together" plantings. If you have fields you will not harvest due to this and are in Orange or Ulster Counties, please contact Stiles with our Gleaning program to harvest for the hungry at 845-800-2056.

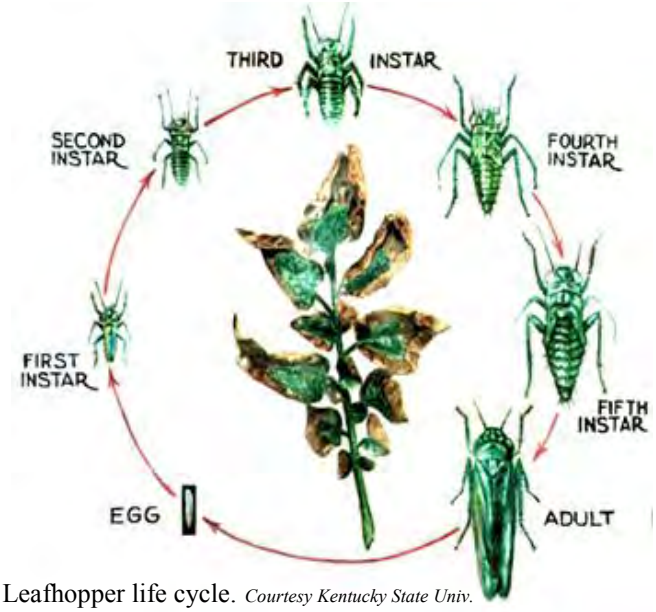
Also remember that high temperatures it is likely to cause some flowers to abort on peppers and some cucurbits.

Do Your Potatoes Have Hopperburn?

Leafhopper pressure has really been ramping up on many farms across the region. Make sure to check your potatoes and control leafhoppers when the reach threshold (see below for information on this).

Leafhoppers damage plants by inserting their beaks into the leaf tissue, sucking the plant sap, and secreting a toxic substance into the plant during feeding. The leaf tips of injured plants turn yellow. Leaves develop a scorched tip and larger yellow "V"-shaped areas then die. Infested leaves may curl and /or be shed prematurely. The field begins to look discolored at a distance. This is called "hopperburn". Leafhopper injury reduces plant and field production by decreasing photosynthetic areas.

Potato leafhoppers survive on over 200 species of plants and migrate from the south. Once they are in the region, they often move from alfalfa onto potatoes and other plants such as beans after the field is cut. If you want to verify that you are dealing with hopperburn and not late blight, don't hesitate to call us.



Leafhopper life cycle. *Courtesy Kentucky State Univ.*

Potato leafhopper adult.
Courtesy of Purdue University

To scout for hoppers walk through the field and rustle the plants. If you see small light green bugs hopping about you have them. To truly assess populations for treatment it is best to use a sweep net. Adult is wedge-shaped, iridescent green in color, and 1/8 inch long. The body is widest at the head. If one or more than 1 adult is captured, on average, in the sweeps, it is time to treat. If you don't have a sweep net, you can also count nymphs. Nymphs look similar to the adults but are smaller, slightly less wedge-shaped, and do not yet fly. They will move quickly around the leaf, however. The threshold for control is 15 nymphs per 50 leaves.

Some varieties of potato are resistant to potato leafhoppers - Elba, Prince Hairy and King Hairy. Cornell staff studied which varieties are more susceptible than others for hopper damage. That study can be found at: http://nysipm.cornell.edu/reports/ann_rpt/AR05/projects/seaman2.pdf *–MRU, edited by CLS*

Summer Cover Crops for Weed Suppression

By Justin O'Dea, CCE Ulster County

Summer weeds can be especially difficult to manage because many management options are lost as cash crops grow bigger and weeds are more difficult to reach, and harder to kill. Growers are less likely to be thinking about cover crops for weed control during summer, but summer cover cropping can be a worthwhile investment into long-term weed control strategies if they can be accommodated. For example, if you are developing serious problems with summer annual weeds such as pigweed, galinsoga, velvetleaf, lambsquarters, etc. in ground currently planted to shorter, cooler season crops, a subsequent summer cover crop may be an option to help control the infestation. In addition to cover crops providing weed suppression, they also 1) benefit soil health, conservation, and tilth, 2) increase nutrient-use-efficiency, 3) add beneficial diversity to crop rotations, and 4) sometimes contribute nitrogen and pest-suppressive biochemicals to soils. Besides areas with heavy weed infestation problems, areas that may also benefit most from cover crops are where soils are showing signs of decline/fatigue and/or have developed issues with soil-borne pests.

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Purple Blotch

By Ray Range, CCE Orange County

Purple blotch is caused by the fungus *Alternaria porri* which attacks onions, shallots, leeks and chives. It is an opportunistic pathogen that often appears on leaves that have already been damaged in some other way like disease, insects or environmental factors.

Purple Blotch requires three conditions for infection:

1) The disease is present in the field;
2) Water is present to allow for spore germination;
3) Temperatures range between 55 to 95 degrees, with 77 degrees being the optimal temperature for the growth of purple blotch.

Purple blotch symptoms include water-soaked spot on the leaves that rapidly enlarge to brown with purple around the edges of the lesion. The lesion may become surrounded with a yellow zone. In wet conditions a dark, dusty, brown to black mass of fungal spores may develop over the lesion.

Leaves that are affected by purple blotch are easily girdled and may easily blow over and die. In general, older leaves are more susceptible than younger leaves however, when plants are infested by onion thrips, the younger leaves are especially susceptible and the severity of the disease is much greater than infected plants without thrips damage.

Control methods for purple blotch include:

- Reduce inoculum by destroying infected crops, remove or relocate cull piles
- Rotate to non-host crops (e.g. carrot, celery, lettuce)

Purple blotch lesion. *Image: OMAFRA*

- Monitor and control onion thrips levels
- Harvest onions during dry weather and when the tops are dry to prevent introduction into storage
- Quadris, Quilt, Endura, Bravo, Champ, Vangard, Switch, Reason, Rovral, Diathane, ManKocide, Ridomil Gold Bravo, Catamaran, PropiMax, and Cabrio are some of the materials that may be used. Check the label carefully for complete application details.
- *Organic growers may use copper sprays for chemical control. For a complete list of onion fungicides, visit http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Onion_LabRts.pdf – editor's note*

Source: "Purple Blotch of Onions," Ontario Ministry of Agriculture and Food.

Cover Crops, continued from page 2

Cornell recommends two specific cover crops for early to mid-summer plantings:

- **Buckwheat** is a low-maintenance, short-season summer annual broadleaf cover crop that can be sown after the last spring frost date to early August. Because buckwheat grows very fast into a dense canopy it can be very competitive with summer weeds, and may help inhibit germination by keeping soils cooler through shading; this also gives time for weed seeds to fall prey to microbial decomposers and fauna that eat weed seeds. Buckwheat cover crops are typically grown for 35-45 days. Cornell Cooperative Extension faculty Dr. Thomas Bjorkman notes that the keys to weed suppression with buckwheat is 1) quick crop establishment, 2) no gaps in the stand, and 3) kill no longer than 10 days after flowering. Buckwheat provides multiple services, but does not help reduce compaction and plow pans, and performs very poorly when soils are poorly drained/ prone to flooding.

  A complete detailed Cornell guide to growing buckwheat cover crops (including seed sources) can be found at: http://www.hort.cornell.edu/bjorkman/lab/buck/handbook/main.php

- **Sudangrass and sorghum-sudangrass (i.e. "Sudex")** are longer-season annual grasses that are well adapted to hot, dry midsummer conditions, giving them an edge over summer weeds. Sudangrass can be sown earlier than sorghum-sudangrass, and is noted by Cornell to be easier to manage as a cover crop, and to be a better weed suppressor. If nutrients are low following vegetables, fertilizer may be helpful for these crops to reach their weed-suppressing potential; ideally most fertilizer added will end up in the cover crop, and be incrementally available for following crops as cover crop residues break down. These cover crops need to be mown down after ~40 days into a mulch; the stand will regrow and continue to compete with weeds until incorporating, or

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Leek Moth

During the summer of 2009 leek moth (*Acrolepiopsis assectella*) was identified in the United States for the first time, in Plattsburgh, NY. It is a serious pest of members of the *Allium* family which includes onions, garlic, leeks, chives and shallots.

Leek moth larva and damage to garlic leaf. *Photo by A. Ivy*

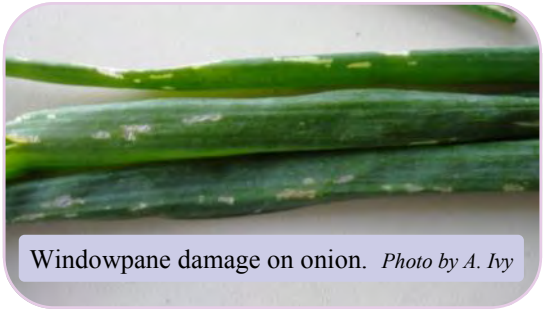
Leek moth is native to Europe and is now found in Russia, Japan, Algeria and in Ontario and Quebec, Canada. It was first found in Ontario in 1993 and is now well established in Canada. In 2010 it was confirmed near Watertown and Canton, NY and in 2012 it was confirmed near Willsboro, NY and Burlington, Vermont.

Onion leaf split open to reveal larva, frass and debris. *Photo: A. Ivy*

There are 2-3 generations of leek moth a year. The adult moth is nocturnal and is rarely seen unless trapped. The larva (*see photo*) is a creamy yellow, slender caterpillar, less than a half inch long when fully grown. The pupa has a net-like structure over the cocoon and is attached to dying foliage or other nearby structures. The eggs are tiny and translucent. They are laid on the undersides of leaves and are very difficult to see.

Damage

The leek moth larva is a small, leaf-mining caterpillar. The first generation (May-June) feeds on the leaves. The worst damage is done by the second generation (July-August) as it continues to damage emerging leaves and moves towards the bulb. Feeding damage stunts plant growth, introduces rot and can compromise the storage life of onions and garlic.



Windowpane damage on onion. *Photo by A. Ivy*

We are asking all growers of alliums, of any scale, to keep an eye out for this pest so we can track where it is spreading. The caterpillar/larva of this insect spends most of its life inside the hollow leaves of onions, shallots and chives. In leeks and garlic the caterpillar stays mostly out of sight within the fold of the leaves (see photo of leek damage) but it can also be found feeding near the developing bulbils on garlic scapes.

Larval damage to leek. *Photo courtesy Lorraine Chilson*

In onions, look for the characteristic 'windowpane' feeding damage (see photo), then split the leaf open and look for debris, frass and depending on the stage, the caterpillar itself. Other pests of onions feed from the outside of the leaf and those leaves will be clean inside when split open.

If you suspect you have leek moth please contact Amy Ivy at adi2@cornell.edu or call 518-570-5991.

For more information and resources concerning leek moth visit the Information Center for the U.S. at: http://web.entomology.cornell.edu/shelton/leek-moth/ *-ADI*

Cover Crops, continued from page 3

mowing again to winterkill in late fall. Cornell notes that if incorporated at ~6 weeks, sudangrass can have biofumigant properties, notably against Northern Root Knot Nematode. University of Vermont Extension reports that vegetable growers are experimenting with sorghum-sudangrass undersown with red clover, which will take over in spring after sorghum-sudangrass winterkills, compete with spring weeds, and fix nitrogen. To date, Cornell has not developed formal guidelines for a sorghum-sudangrass/red clover mixture though.

- A complete detailed Cornell guide to growing sudangrass and sorghum-sudangrass cover crops (including seed sources) can be found at: http://www.hort.cornell.edu/bjorkman/lab/covercrops/sudangrass.php
- Video produced by UVM extension on sorghum-sudangrass undersown with red clover: http://www.youtube.com/watch?v=qDXCbJNDeL4
- Cornell Cover crops Guide for Vegetable growers: http://www.hort.cornell.edu/bjorkman/lab/covercrops/index.php

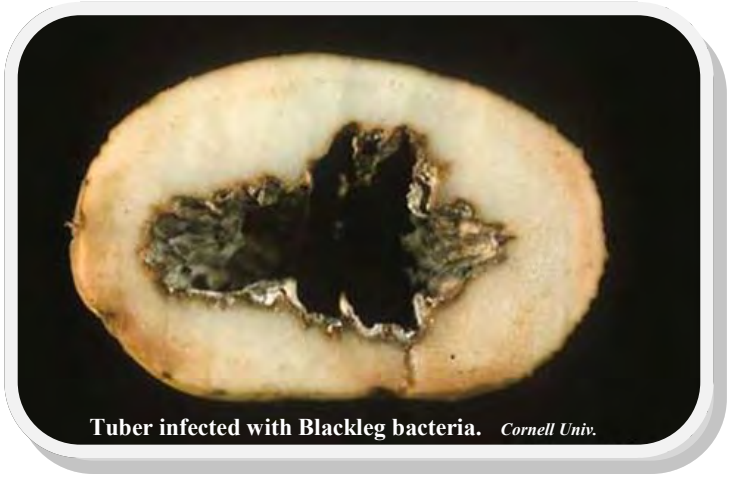
Blackleg Problem in Potato

This past week I was called out to a field of potatoes, variety Katahdin, that appear to be infected with the bacteria *Erwinia carotovora* subsp. *atroseptica* (Eca) causing Black leg. Other varieties on the farm do not appear to be infected at this time.

Blackleg is caused by the bacterium *Erwinia carotovora* subsp. *atroseptica*. The name of the disease comes from the black lesions produced on infected stems. The disease affects stems and tubers. Stems of infected plants typically have inky black symptoms, which usually begin at the decaying seed piece and may extend up the entire length of the stem. Stem pith can be decayed above the black discoloration, and vascular tissues can be discolored. Leaves turn yellow and leaflets tend to roll upwards at the margins. Leaflets, and later entire plants, may wilt and eventually decline. In wet weather, decay is wet and slimy and may spread to most of the plant. Under dry conditions, infected tissue becomes dry and shriveled, and the disease is often restricted to the underground portions of the stem. Blackleg that occurs early in the growing season results in weak, upright, yellowed plants that usually succumb to decay.

Disease is favored by moist conditions with temperatures less than 65 degrees F. It can be spread rapidly by wind-blown rain. Cool, wet soils at planting followed by high temperatures after plants emerge favor postemergence blackleg. Higher soil temperatures at planting favor seed piece decay and preemergence death of shoots. Invasion of seed pieces by Fusarium spp. tends to predispose the tissues to wet breakdown and favor blackleg development. Reduced stands can result from blackleg-infected seed lots. Affected stems may or may not turn yellow, but eventually they wilt and decay.

Tubers of infected plants may show symptoms ranging from slight vascular discoloration at the stolon end to wet breakdown of the entire pith, extending inwards from the stem end. The bacterium can enter tubers through stolons and produce various symptoms on the tubers. The most pronounced symptoms appear near midseason. Inky-black,



Tuber infected with Blackleg bacteria. *Cornell Univ.*

Blackleg on potato, note wilting and black lesion on stem. *Photo by Teresa Rusinek*

slightly sunken lesions develop at the stem end of the tuber. The flesh of the tubers is cream colored, gradually turning to grayish and finally black. Irregular cavities with blackened walls may extend through the center of the potato tuber. The blackleg organism may also infect lenticels, causing them to be slightly sunken and brownish to black in color. The infected lenticles can be up to 1/4 inch in diameter. The tissues under the infected lenticels are brownish and usually dry. This extends less than 1/8 inch into the tuber flesh. New tubers from infected plants may become soft and slightly discolored in the vascular tissue at the stem end. In advanced stages, the center of the tuber will be decayed, leaving only an outer shell. Spread in storage is minimal.

Disease severity is greatly influenced by the degree of seed lot contamination, seed-handling techniques, soil moisture and temperature at planting, environmental conditions during the growing season and exposure to external sources of the bacterium, such as irrigation. Most of the serious blackleg outbreaks are from seed-borne blackleg. The pathogen is spread from seed piece to seed piece by physical handling and by machinery, such as cutting knives and planting equipment. Insects can spread the bacterium in a field by feeding on an infected potato stem. Feeding wounds provide a site for the bacterium to invade.

Blackleg control centers on minimizing the amount of bacterial contamination in seed lots. If growers start with seed free from blackleg contamination, the disease can be kept at very low levels in a limited generation system. Seed pieces can be infected without showing any symptoms. The bacterium that causes blackleg does not survive well outside of the potato. A good rotation program (avoid planting potatoes after potatoes) will help control this disease.

Seed cutting can spread the bacterium from a low level in the seed lot to a high level very quickly. Sanitation and

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disinfesting of potato cutting equipment and proper handling reduces spread and aids in control of the pathogen. Treating seed to prevent seed piece decay by fungi can also contribute to blackleg control. Since the pathogen does well in cool, wet soils, avoid planting in overly wet soil.

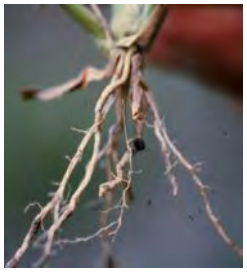
Providing good air circulation when storing the tubers, particularly as they enter the storage to promote drying, aids in control of blackleg. Growers do not have to live with blackleg. Much of the problem can be eliminated with sanitation.

Source: Univ. Maine Bulletin #2493, Blackleg and Bacterial Soft Rot, introduced by TR

Wild Proso Millet (*Panicum millaceum*) and Grassy Summer Annual Weeds in Late Plantings

By Justin O'Dea, CCE Ulster County

Often indistinguishable to a casual glance, grassy weeds usually take at least some effort to correctly identify, and unfortunately this is a major part of effective grassy weed management. Perennial grassy weeds such as Johnsongrass and quackgrass warrant their own type of management strategy as do annual grassy weeds, and certain species may even warrant their own *individual* management strategies. Warm season summer annual grassy weeds are notably in their prime right now, and in regions where corn is grown intensively (including sweet corn) these weeds can become particularly problematic, *especially* when crop rotation is minimal or absent. You can inadvertently select for these weeds by continuously accommodating a corn crop's needs (i.e. they thrive in the same crop "niche" as your corn), allowing them to mature and proliferate. A particularly prominent grassy weed I've been observing is wild proso (WP) millet; this weed has been reported to be increasingly problematic in corn-growing regions of the US (Colorado State U. reports that WP millet infestations may reduce corn yields by 30-50%), and was notably problematic for sweet corn growers in the Hudson Valley and in western NY last year. If you've had a particular grassy annual weed that has been particularly difficult to control, you may want to investigate and see if wild proso (WP) millet is the culprit, since this is one weed that often requires more species-specific control efforts.



Black WP millet seed coat attached to root.
Credits: Iowa State Univ.

Young WP Millet plant.
Credits: Iowa State Univ.

WP Millet ligule, stem, and collar region.
Credits: Ontario IPM

WP Millet seedhead.
Credits: Steve Dewey, Utah State

Wild proso (WP) millet (*Panicum millaceum*) is a **warm season summer annual** in the **grass family** (*Poaceae*), presumed to be native to semi-arid central Eurasia. It is very closely related to the domesticated crop, proso millet (also *Panicum millaceum*), and to the weeds witchgrass (*Panicum capillare*) and fall panicum (*Panicum dichotomiflorum*). Similar to corn, WP millet has biochemical traits unique to many plants that evolved in more tropical/sub-tropical climates. This genetic trait helps this weed thrive more efficiently than most during hot and/or dry periods in northeastern summers, and in the poor water-holding capacities of sandy soils. Domesticated proso millet is likewise known for its extraordinary water use efficiency.

WP millet **seeds** have variable levels of dormancy and **germination** begins in the latter half of spring (often following field preparation for late season crops). Optimal germination tempratures are between 68-86° F, and germination continues intermittently throughout the summer (therefore often escaping cultivation and herbicide applications) seedlings are known to emerge from up 2" below the soil surface.

Seedlings are vigorous and often the seed coat remains attached to the root system for quite some time (this is an identifying trait). Seedlings often resemble hairy, thin-

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leaved corn plants. WP millet is *not* always easily distinguished from its close relatives, fall panicum and particularly, witchgrass. WP millet seedlings and **mature plants** can be considerably larger than its relatives (up to 3' taller at maturity), and lack the purple hues on the stem that witchgrass and fall panicum often have. WP millet is hairy on the stem and often on both surfaces of the leaf blades, *but* may become considerably less hairy on the bottom side of the leaf on upper leaves; witchgrass is considerably *more* hairy than WP millet, and fall panicum can be considerably *less* hairy than WP millet, with *no* hairs on the stem. WP millet's **ligule** is ~½ membranous and ½ hair-like, whereas witchgrass and fall panicum's ligules are *only* hair-like. Within 60-90 days, mature WP millet plants may be as tall as 6' at flowering, between July to September. **Seedheads** look very similar to witchgrass, but do not detach from the plant after seeds mature. Seed production can be prolific, but seedbanks are considered to be relatively short-lived. Seeds produced are commonly spread by tillage and harvest equipment. Known **diseases hosted** by WP millet are Pythium and Fusarium pathogens of many crops, and the corn diseases northern corn leaf blight and corn anthracnose.

WP millet **control** is complicated by the fact that it often escapes weed management efforts and that it's *not* particularly well controlled with pre-emergent herbicides that work for other similar grassy weeds. Because weed management in crops like corn becomes prohibitive after certain sizes and stages of growth, rotation is a key WP millet control strategy. Herbicide and/or cultivation programs are very unlikely to eradicate WP millet infestations on their own, without being coupled with some sort of cultural/rotational strategy. Rotational plans should allow for later season management windows (i.e. early crops, and crops and crop sequences that allow for more equipment access throughout the season). Competitive crops (including cover crops) will help suppress WP millet vigor, and in hay/forage crops (perennial or annual) seed production can be inhibited entirely. In corn crops, narrower row spacing may help somewhat by outcompeting WP millet. Avoiding tillage in fall will encourage substantial WP millet seed predation and mortality; subsequently, deep tillage in spring can reduce emergence and deplete seedbanks. Effective in-season cultivation is reported to include rotary hoeing 7-10 days after field preparation (before emergence) and by uprooting (as opposed to slicing) and burying small seedlings with inter-row cultivation. Pre-emergent herbicides will only provide limited WP millet germination control; also, once WP millet is beyond ~4-6' tall, post-emergent herbicide effectiveness declines considerably. See Cornell's recommended herbicide charts above for WP millet and some select grassy weeds.

Cornell recommended herbicides for select grassy weeds in sweet corn.
Courtesy Dr. Robin Bellinder, November 2012.

	Barnyardgrass	Large Crabgrass	Foxtails	Witchgrass	Wild Proso Millet
Pre emergent Products:					
Callisto		X			
*Degree	X	X	X	X	Suppress
Dual II Magnum	X	X	X	X	Partial Control
*Harness	X	X	X	X	Suppress
Outlook	X	X	X	X	Suppress
Prowl H2O	X	X	X	X	
*Keystone (LA)	X	X	X	X	Partial Control
Post-Emergence Products					
Accent	X		X	6"	4"
Callisto		X			
Laudis	X	X	X		4"
Impact	X	X	X		3"
Option	X		X	X	3"

*Recently Approved by NYS DEC

For more information see:

- http://agron-www.agron.iastate.edu/~weeds/Ag317-99/id/WeedID/wprosom.html
- http://www.colorado.gov/cs/Satellite/ag_Conservation/CBON/1251618874438#listc
- http://www.omafra.gov.on.ca/IPM/english/weeds-herbicides/gallery/proso-millet.html

Other sources:

- *Mohler, C.L., and DiTommaso, A. (unpublished, 2011) Manage Weeds on your Farm: A guide to ecological strategies. Version 6.0. Cornell University's Department of Crop and Soil Sciences.*

Meetings and Notices

Save the date: July 17th - Twilight Meeting with Tom Zitter at Charlie Brizzell's farm

This is Tom's final twilight meeting, as he will be retiring this year. Stop by to learn about the latest disease updates and to wish Tom a happy retirement. DEC credits applied for. Look for more details in next week's update.

Hudson Valley Lab Field Tour & Barbecue / Vegetable Twilight Meeting– July 18, 2013

Come help us celebrate Cornell's 90th year of tree fruit research in the Hudson Valley by attending the orchard tour and barbeque at the HV Lab on July 18th. There is a lot to see and learn, plus an opportunity to socialize with other growers at the barbecue in the orchard. The ENY Hort Program is hosting a grower meeting on vegetable diseases later in the evening, and we hope those growers will also join the event before their meeting.

Please pre-register for the barbecue ($20 per person) - go to: http://hudsonvf.cce.cornell.edu/meeting_announcements/HVL%20tour%20&%20barbecue%207-18-13.pdf or contact Donna Clark (djc16@cornell.edu or 845-691-7151) for more information on registration and the orchard tour and barbecue, or if you have any special needs.

Separate registration and fee is required for the Vegetable Diseases Meeting. More information can be found at: http://counties.cce.cornell.edu/orange/veg_field_meetings_2013.pdf or contact Cathy Hughes at 845-344-1234 or email cah94@cornell.edu.