Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

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Vegetable News

Post Emergent Sweet Corn Herbicides

Chuck Bornt, CCE ENYCHP

Now that row covers and plastic are coming off some of the earliest sweet corn, my attention turns to weed control. Some of the worst weed issues I've seen are in these plantings and former Cornell Weed Scientist Robin Bellinder and I believe that, because of the climate modification with these covers, our pre-emergent herbicides breakdown quicker. Therefore, we need to rely on some post-emergent options.

The post-emergent materials to choose from can be found in Table 1, but there are a couple of other things you will need to know before making your selection. First, you need to know what weeds you are going after. Second, you will need to know the stage of your sweet corn in order to know if you can broadcast the materials or use drop tubes to keep the herbicides out of the whorl in order to reduce the chance of injury to the crop. As always, you need to really pay attention to the labels of these materials. In order for these herbicides to perform their best and have the best crop safety, you need to know which are the right adjuvants required and other additives such as a nitrogen source. Read the labels to make sure that the chemicals and, almost as important, the additives are compatible. This is not only for crop safety, but efficacy of the materials used too. To assist you with that, see Table 2 to help determine which additives are recommended for the different herbicides, but this is no substitute for reading the product labels!

Stinger is another material that is highly effective, but on a very narrow range of weeds. It is effective on ragweed, certain nightshades and Canada thistle. I have also seen it hurt wild buckwheat and Jerusalem Artichoke, but not completely kill it. You are allowed 2 applications of Stinger per season not to exceed 2/3 of a pint total per

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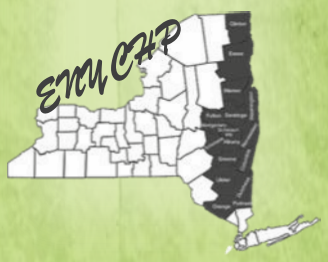

acre per season. The recommended rate is 0.33—0.66 pints per acre. If you use the highest rate of 0.66 pints, you have used the maximum amount allowed for the season. See the label for more specific information on this material and if you are thinking of using any of these products with the ones mentioned earlier, please consult the labels to determine if they are compatible.

Notes about Atrazine: Many of the products mentioned will benefit from the addition of 0.25—0.5 pounds of active ingredient of atrazine. As atrazine has been one of the key materials used in our pre-emergent programs, it has been recommended that vegetable growers not use more than 1.5 lbs of active ingredient of atrazine per acre per season. This is so that other vegetables can be planted the following season without worrying about atrazine carryover and injury issues on those crops. Lumax, Lexar and Acuron have all become a popular pre-mix pre-emergent herbicide and each contain atrazine. At the recommended rate of 2.5 quarts per acre, there is 0.62 lbs. of actual atrazine (active ingredient) in those mixes, which means you can still use some atrazine in your post-emergent applications. For example, if you have in your shed AAtrex 4L (4 pounds atrazine per gallon) and you want to add 0.25 pounds as part of your post emergent mix, you would add 1/2 pint of AAtrex 4L. Also, the label states that atrazine should not be used on corn taller than 12" in height. For assistance with calculations of other formulations, contact Chuck Bornt at 518-859-6213.

Product (active ingredient)	Pre-harvest interval	Weeds controlled	Rate	Comments
Impact or **Armezon** (topramezone)	45 days	barn-yard grass, fall panicum, foxtails,crabgrass lambsquarter, ragweed and velvetleaf	0.75 fluid ounces	Best control will also occur if broadleaf weeds are less than 4" tall and grass weeds are less than 3" tall. It is also recommended that 0.25—0.5 lbs active ingredient of atrazine be added to improve weed control and residual. Weeds need to be actively growing and coverage is essential. In tall corn, I recommend drop nozzles be used in order to get the spray material down through the canopy and onto the weeds **Adjuvants:** Methylated seed oil (MSO) or petroleum-based or vegetable seed-based oil concentrate (COC, HSOC) at 0.5 to 1.0 gallon per 100 gallons of water [0.5% to 1.0% volume/volume (v/v)]. **Nitrogen Fertilizer:** nitrogen-based fertilizers include urea ammonium nitrate(UAN; 28% or 34%) at 1.25 to 2.5 gallons per 100 gallons of water (1.25% to 2.5% v/v) or a spray grade ammonium sulfate (AMS) at a minimum rate of 8.5 to 17 pounds per 100 gallons of water.
Armezon Pro (topramezone + dimethenamid-p)	50 days	Broadleaves and several annual grasses (barnyard grass, crabgrass, Giant Foxtail, Wild Proso Millet)	For sweet corn and popcorn label recommends 20 fluid ounces per acre	Best control will also occur if broadleaf weeds are less than 4" tall and grass weeds are less than 3" tall and actively growing. **Applications can be made from corn emergence to 12-inches tall. DO NOT apply within 50 days of harvesting sweet corn ears. Adjuvants:** Armezon PRO Alone: Methylated seed oil (MSO) or petroleum-based or vegetable seed-based oil concentrate (COC, HSOC) at 0.5 to 1.0 gallon per 100 gallons of water [0.5% to 1.0% volume/volume (v/v)]. **Tank Mixtures with Armezon Pro**: Use nonionic surfactant (NIS) at 0.25 to 0.5 gallon per 100 gallons of water [0.25% to 0.5% volume/volume (v/v). Oil-type adjuvants (COC, HSOC, and MSO) may be used in tank mixtures with Armezon PRO, however, combinations with these adjuvants can cause elevated necrosis within a few days after treatment and occasionally crop height reduction**. Oil-type adjuvants are not recommended when tank mixing with atrazine. Nitrogen Fertilizer:** nitrogen-based fertilizers include urea ammonium nitrate(UAN; 28% or 34%) at 1.25 to 2.5 gallons per 100 gallons of water (1.25% to 2.5% v/v) or a spray grade ammonium sulfate (AMS) at a minimum rate of 8.5 to 17 pounds per 100 gallons of water.

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Accent Q (nicosulfuron plus a safener)		Mostly annual grasses	0.9 ounces per acre	Accent Q will provide post emergent control of most annual grasses (limited crabgrass control) and if applied alone has very little broadleaf control (Redroot pigweed). If additional broadleaf control is also needed, consider tank mixing Accent Q with another herbicide listed in the label. Applications of ACCENT® Q may be applied broadcast or with drop nozzles (post-directed) on sweet corn up to 12 inches tall or up to and including 5 leaf-collars (V5). **For sweet corn 12 - 18 inches tall, apply only with drop nozzles. Do not apply to sweet corn taller than 18 inches or those which exhibit 6 or more leaf-collars (V6).** DO NOT APPLY ACCENT® Q to corn previously treated with "Counter" 15G or to corn treated with "Counter" 20CR in-furrow or over the row at cultivation. Applications of ACCENT® Q to corn previously treated with "Counter" 20 CR, "Lorsban", or "Thimet" may cause unacceptable crop injury, especially on soils of less than 4% organic matter. **Adjuvants:** Crop oil concentrate (COC) or Non-Ionic Surfactant (NIS) plus a sprayable grade ammonium nitrogen such as UAN or AMS. See label for specific rates and uses.
Supplemental labeling for **Accent Q tank mixed with Impact and atrazine** – If using this combination, the user must have in their possession a copy of this supplemental label! Accent Q may be applied with 0.5 – 0.75 fluid ounces per acre of Impact plus 0.375 – 1.5 pounds per acre active ingredient atrazine (12 – 48 fluid ounces of a 4L formulated atrazine product). However, if you have used any atrazine containing pre-emergent products, the general rule of thumb for rotating vegetables the following year after using atrazine is no more than 1.5 pounds total active ingredient per acre. More than that and you greatly increase the potential for atrazine injury to susceptible crops.				
Permit (halosulfuron)		Broadleaves (pigweed, velvetleaf, ragweed) and Yellow nutsedge	0.67 ounces per acre	Apply Permit over the top or with drop nozzles from the spike through layby stage of the corn. Treat young actively growing broadleaf weeds 1 to 3 inches in height. **Adjuvants:** Nonionic Surfactant (NIS) is required in the spray solution. Use NIS at 0.25 to 0.5% v/v concentration (1 to 2 quarts per 100 gallons of spray solution). Do not use COC or MSO as the potential for injury is too great. **Nitrogen fertilizers:** May be added but are not necessary for post-emergent applications. Apply a high quality, granular spray grade ammonium sulfate at a rate of 2 to 4lb/A or a liquid nitrogen fertilizer solution (e.g. UAN 28%) at a rate of 2 to 4 quarts/A. Use of soil or foliar applied systemic organophosphate insecticides on PERMIT treated crops may increase the potential for crop injury and/or the severity of the crop injury.
Stinger (clopyralid)	30 days	Broadleaves (ragweed, wild buckwheat, Common cocklebur, Jerusalem artichoke, Canada thistle)	0.33 – 0.66 pints per acre	Apply Stinger any time after sweet corn emergence through 18-inch tall sweet corn uniformly with ground equipment as a broadcast or directed spray in 10 to 20 gallons total spray volume per acre. Do not exceed 2/3 or 0.67 fluid ounces per year. Do not apply to sweet corn that is greater than 18" tall. Control of common cocklebur, common ragweed, giant ragweed, sunflower, other annual weeds and Jerusalem artichoke, apply 1/4 to 1/2 pint of Stinger per acre from weed emergence up to the 5-leaf stage of growth. I would recommend using Stinger alone and not in tank mixtures at this time. *continued on next page*

Table 2: Comparison of adjuvants and other additives used in post-emergent sweet corn herbicides. This is not a substitute for reading the herbicide labels.

Herbicide	Crop Oil Concentrate (COC)	Non Ionic Surfactant (NIS)	Methylated seed oil (MSO)	Nitrogen (UAN or AMS)
Impact/Armezon	X		X	X
Armezon Pro (used alone)	X		X	X
Armezon Pro (in tank mixes)		X		X
Accent Q	X	X		X
Permit		X		X
Callisto	X	X		
Stinger				

Allium Leafminer Spring Flight Update

Ethan Grundberg, CCE ENYCHP

The spring flight of the new invasive insect pest, the allium leafminer, began in late April with the first confirmed activity in the Red Hook area. Adults have gradually emerged from pupae in the soil and in cull piles for the past four weeks and have been feeding and laying eggs on allium leaves during that time. The diagnostic sign of this adult feeding and egg-laying is a vertical line of dots, typically found near the tip of host crop leaves. These oviposition scars are sometimes accompanied by faint, mostly vertical lines that run down the leaf blade toward the soil. These "mines" are caused by allium leafminer (ALM) maggots feeding on the interior leaf tissue.

Adult allium leafminer fly with characteristic vertical line of oviposition feeding and egg-laying scars (Photo E Grundberg)

We are still actively studying this new pest to better guide allium growers in the region on best management practices. Here are some important updates based on that work:

1. Not all oviposition scars are egg-laying sites: Adult females use their ovipositor (egg-laying organ) to create the small dots in the leaf tissue. Adults feed on the plant exudates that are released through those physical wounds. We are studying leaf samples from multiple allium species during the adult flight period to try to determine what percentage of those oviposition locations are, on average, active egg-laying sites versus feeding sites. What is certain at this point is that **NOT ALL OVIPOSITION SCARS ARE ACTIVE EGG-LAYING SITES**. That means that even if you find 20 oviposition dots on a leaf, there are likely far fewer eggs in the leaf tissue. Fewer eggs mean fewer maggots, which means less potential for significant damage to crops.

2. I still found several adult flies in the field on Monday, May 21st. Though some adults may still be active, I am confident that we are past the period of peak flight and that there is little risk of additional egg-laying on crops at this time. **THIS MEANS THAT GROWERS USING ROW COVER OR INSECT NETTING TO EXCLUDE ADULTS CAN REMOVE THEM AT THIS POINT WITH LITTLE RISK OF ADDITIONAL ALM DAMAGE**. Maggots will continue to hatch from recently laid eggs and further damage crops for the next couple of weeks.

3. We are still collaborating with the Cornell entomologist Dr. Brian Nault on insecticide efficacy evaluations of both conventional and OMRI products. We will update growers prior to the beginning of the

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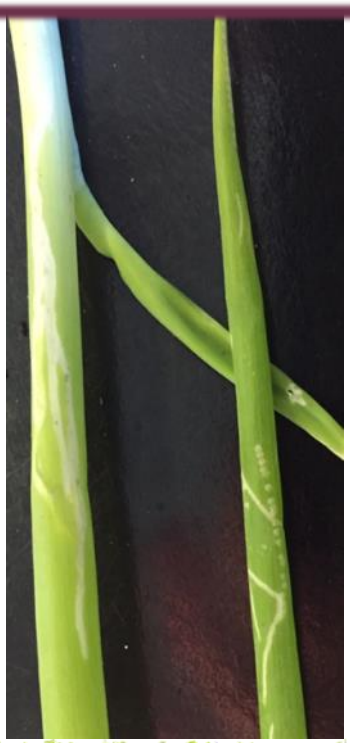
fall flight of ALM (anticipated in mid-to-late September) with findings from those trials. If extensive maggot mining is observed, Radiant SC (spinetoram, IRAC group 5) mixed with a penetrating surfactant (such as LI 700) can be used with a 1-day Pre-Harvest Interval (PHI) on most allium crops for dipteran leafminer control. Since the maggots are inside the leaf tissue, only active ingredients with translaminar (penetrates locally through the leaf tissue where the product makes contact) or systemic (is absorbed through the leaf tissue and moved upward throughout the plant vascular system) activity will reduce damage. Contact insecticides, such as pyrethroids (IRAC Group 3A) will NOT be effective at this point.



4. We have confirmed ALM activity as far north as Schoharie and Grafton and as far east as Berkshire County, Massachusetts. **ALLIUM GROWERS AS FAR NORTH AS GLENS FALLS SHOULD BE PREPARED TO PROTECT FALL ALLIUMS FROM ALM** and be on the lookout for alerts from the ENYCHP team once the fall emergence in confirmed.

If you suspect ALM activity on your farm and would like further recommendations for management, feel free to reach out to me directly at 617-455-1893 or Teresa Rusinek at tr28@cornell.edu.

Photo Left: Allium leafminer larval mining visible on scallion leaf tissue (Photo T. Rusinek)

Foliar Feeding: What Works and What Doesn't

Amy Ivy, CCE ENYCHP

We receive a lot of questions from growers about applying nutrients to their crops through the leaves rather than the roots. This is a complex topic and I'll include links to 2 articles for those who want to better understand the details, but I'll give a brief overview here.

The macro-nutrients (N, P, K, Ca, Mg) are needed in larger quantities, over 100 lbs per acre for nitrogen and potassium each season for most vegetable crops, for example. Micro-nutrients are just as important but are needed in much smaller (micro) quantities.

Plant roots are good at taking up nutrients and, in general, this is the most efficient pathway to provide nutrients. Pre-season soil nutrient tests help growers fine tune their fertility plans. This not only can save money, but can help avoid problems from excessive applications of nutrients to the environment and the chemical balance between the nutrients. Excessive calcium and magnesium can tie up potassium, so that it is unavailable to the plant, for example.

Mid-season deficiencies, especially in the micro-nutrients, can be adjusted with foliar applications. However, you need a foliar nutrient analysis to know just how much, and which specific nutrient, is needed. In years where excessive rains impair root uptake of nutrients, remedial applications of nitrogen can help a crop survive, but this is not a usual circumstance.

Manganese (Mn) deficiency in high tunnel tomatoes is most often caused by high pH of irrigation water that binds up the Mn. Although this could be handled with a foliar application of Mn chelate, that would only help affected leaves, not the overall plant health. A longer term and better solution for plant health would be to lower the water pH to 6.0-6.5 through acidification (sulfuric acid for conventional growers, citric acid for organic growers)

Plant leaves are built for photosynthesis and gas exchange. The process of moving nutrients from the leaf surface into the plant is quite complicated. Ammonium, potassium and magnesium are the few nutrients that can be readily taken up through the leaf tissue to correct a

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short term deficiency, but not as the sole supply route for the season. Other nutrients that can be absorbed through leaves include calcium, manganese, iron, zinc, and copper; however, these nutrients have stronger positive charges on their molecules and do not move out of the leaf tissue area. Gordon Johnson, Extension Vegetable & Fruit Specialist at the University of Delaware explains this thoroughly in his article *Foliar Fertilization of Vegetable Crops* which includes a helpful list of the major plant nutrients that are effective as foliar applications, the fertilizer forms best used for foliar applications, and recommended rates.

For more information about macro and micro nutrient needs of specific vegetable crops and foliar feeding see also this article by Chuck Bornt, ENYCHP and Steve Reiners, Cornell University: *Foliar Feeding Vegetable Crops – Is there a time and place for it?*

A Few Things about Spinach Leafminer

Teresa Rusinek, CCE ENYCHP

This leafminer species only feeds on plants in the goosefoot family, chenopodiaceae, like beets, Swiss chard, and spinach. Maggots tunnel through the leaf tissue creating mines and blisters that often coalesce into larger areas of dead leaf tissue. Leafminer adult flies become active early in the season typically late April through May. The flies lay white, oblong eggs in clusters on the undersides of leaves. Eggs hatch out yellowish larvae that burrow into leaf tissue. Larvae are the only life stage that causes foliar damage. Depending upon environmental conditions, the maggots feed for 10-16 days then fall to the ground to pupate in the soil. Early scouting to determine presence of eggs and the beginning of larvae emergence and feeding is critical for effective chemical control. Since the maggots are embedded in the leaf tissue, insecticides with translaminar activity (such as Trigard WSP, Agri-Mek, Coragen, Radiant, and Entrust) are most effective. If affected leaves are manually removed, make sure that they are destroyed through shredding, burning, or deep burial to ensure that larvae do not survive and emerge during the next flight (usually in early July). There may be as many as 4 flights during the course of the season, but the greatest amount of damage is usually seen during this first flight because alternate hosts, particularly weeds such as lambsquarters, and pigweeds are plentiful later in the season.

Typical Spinach leafminer damage on a chard leaf.

Cutworm Seedling Damage

Amy Ivy, CCE ENYCHP

Cutworms attack a wide variety of vegetable plants across the United States. Their typical damage is to sever young transplants right at the soil line, so a tell-tale clue is finding the severed plant tops lying next to their bases in the morning. A rabbit or deer would have eaten off the tops and consumed them, only the cutworm leaves the tops behind. Dig around in the soil at the bases of affected plants to look for the caterpillars. They are large, 1-2" long, smooth, and dark in color but are quite easy to see. They are nocturnal and spend the days hidden just under the soil surface so you need to sift through the soil with your fingers or tines of a hand cultivating tool. They usually curl up when disturbed and vary quite a bit in color (see photo). Eventually transplants become large enough that they can withstand cutworm feeding and

Photo credit: Eric Burkness, UMN Extension website

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they are no longer a threat.

Cutworms tend to be worst when transitioning from sod, alfalfa or other cover crops that contain legumes. Turn under the residue at least 2 weeks before planting so it has time to break down and starve out any larvae. Usually cutworm damage will occur in a few isolated spots within a field rather than the entire area so treatment of the whole field is seldom necessary.

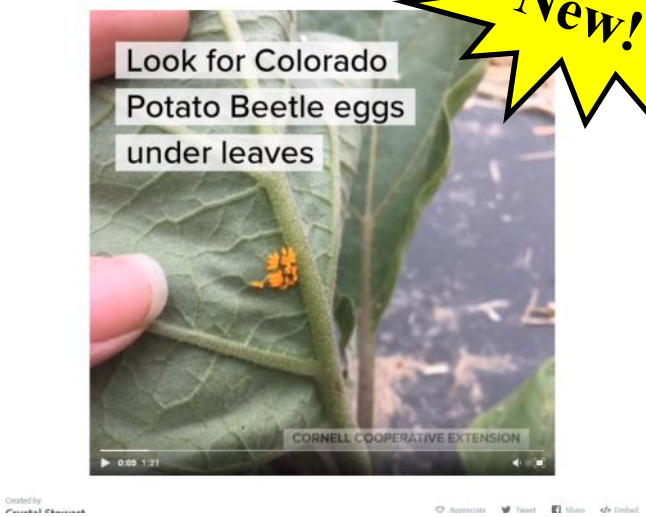
In May the caterpillars feed on and topple seedlings but by early summer some can move up into the plant at night and feed on leaves and even the tomato fruit itself. They return to the soil for the day so the damage will be noticeable without any caterpillars visible. For more information visit http://ipm.ncsu.edu/AG295/html/cutworm.htm

Check for Lurking Asparagus Beetle Larvae

Amy Ivy, CCE ENYCHP

As you harvest the last of the asparagus crop, take a close look at the spears for signs of asparagus beetle feeding injury. The larvae are out in full force now, but are mostly tucked away out of sight. Look for the their characteristic feeding injury to the spears (photo left) and check for any lurking larvae in the clusters of developing fronds (photo right).

The larval stage is the most vulnerable, so a well-timed spray could help knock back the population. Conventional options include Sevin XLR Plus, Lannate and Ambush. The organic option is Entrust, but you need to wait for the ferns to open, it is not to be used on the spears. For more information on insecticide options during harvest season, see Ethan Grundberg's article in the May 9th ENYCHP newsletter "**Common Asparagus Beetle Management During Harvest Season**."



New!

Video Pest Update

Now Available!

New from ENYCHP, watch a video update of pests we have seen in the field this week. See visuals, and learn what to look for!

Visit: https://spark.adobe.com/video/BDWJicaNj72zc

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Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

Reduced Tillage in Organic Systems

Field Day

Featuring in-field demonstrations of equipment and discussions with speakers and growers Rotate between 3 demonstration/discussion stations in the morning, 3 more in the afternoon.

Topics include: *roller-crimping, zone tillage in high residue, in-row cultivation tools, stale seedbed and weed seed bank management strategies with an overall focus on soil health.*

Tuesday, July 31st 9:00am—3:00pm
(Speakers will stay until 4:00 to continue discussion as needed)

Cornell Willsboro Research Farm
48 Sayward Lane
Willsboro, NY 12996

Free to the Public, Lunch included!
First 50 attendees will receive a program resource booklet, (also available online after the event)

Questions? Contact Amy Ivy, adi2@cornell.edu 518-570-5991 or Carly Summers, cfs82@cornell.edu 518-962-4810 x409

Coordinated by the Eastern NY Commercial Horticulture Program, CCE Essex County and the Cornell Willsboro Research Farm
with funding from NY State Soil Health Initiative & Lake Champlain Basin Program , Northern NY Ag Development Program

Featured Speakers:

Jack Lazor
Butterworks Farm
Westfield, VT

Mike Davis
Cornell Willsboro Research Farm Manager

Jean-Paul Courtens
Roxbury Farm,
Kinderhook NY

Heather Darby
University of Vermont Agronomist

Additional Speakers:

Kitty O'Neil, CCE North Country Regional Ag Team
Ryan Maher , Cornell Small Farms Program
Bryan Brown, NYS IPM Program Integrated Weed Mgt
John Wallace, Cornell Weed Ecology & Mgt Professor
Chuck Bornt , CCE Eastern NY Commercial Horticulture

20 Minute Ag Manager

All webinars run from 12:00-12:30pm

For more information:
Contact Liz Higgins at emh56@cornell.edu

To register, go to https://tinyurl.com/y9gfqbmx.

Registering once gives you access to the series.

June: Zoning and Land Use

- June 5—NYS Ag Assessment 101
- June 12—Local Zoning 101
- June 19—NYS Ag Districts 101
- June 26—Using On-line Data and Maps to Assess a Property Remotely

July: Managerial Accounting

- July 3—Budgeting 101
- July 10—Assessing a Capitol Investment
- July 17—Relevant Information and Sensitivity Analysis
- July 24—Pricing for Profit
- July 31—Know When to Hold'em, Know When to Fold'em (assessing performance)

August: Insurance

- August 7—Crop Insurance 101
- August 14—Crop Insurance for Diverse Farms
- August 21—Flood Insurance and Other Disaster Programs

July 12, 2018 – FSMA Training
Cornell Cooperative Extension, Albany County – Voorheesville, NY. More information at https://enych.cce.cornell.edu/event.php?id=951

FDA FOOD SAFETY MODERNIZATION ACT

July 18, 2018 - New York Soil Health Summit
Empire State Plaza, Downtown Albany, NY. For more information at this time, contact David Wolfe (dww5@cornell.edu) or Aaron Ristow (ajr229@cornell.edu).

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