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The Produce Pages

**A Newsletter for Vegetable, Small Fruit, Tree Fruit
and Grape Growers in Eastern New York**

The Effect of the “Polar Vortex” on Fruit in Eastern NY

By Steve Hoying, ENYCHP

Immediately after being visited by the “Polar Vortex” January 3rd and 4th, everyone in the fruit world was talking about the potential for “winter injury”. There is plenty of information and opinion regarding critical temperatures for spring frost, not so much for deep winter cold. Scientists in the colder states (Iowa, Maine, and Minnesota) have worked on this issue for their entire careers. Despite that there are no hard and fast rules since field research is hard to duplicate from year to year and there are so many factors that can influence the result. These include, but are not limited to, acclimation of the tree, previous season's crop load, the tree age, the rate of temperature drop, the duration of the cold temperature, the presence of snow cover, and the actual minimum temperature. Add to that the sensitivity of the variety and rootstock. Actively growing tissue is the most susceptible to winter injury (thus problems in late fall and early spring), then roots, damaged primarily in open winters without a snow cover and when soils are dry, then pith, mature sapwood, bark, and finally cambium. Hardiness occurs lastly at the collar of a tree at soil line. Winter damage can often resemble collar rot or fire blight girdling and is seen when trees



Figure 1. Tip die-back of young tree caused by winter cold injury.

leaf out in the spring. Young trees are more susceptible than older ones.

The most insidious winter injury occurs when roots are killed. It is root death that is responsible for many winter dormant killing events. It can be significant on gravelly and sandy soils. Years with a heavy blanket of snow protect the roots from freezing. Symptoms of root injury are usually failure to thrive and grow and can appear to be much like nitrogen

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Electronic versions of *The Produce Pages* past issues are available at the following:

Nov 2013 Issue http://rvpadmin.cce.cornell.edu/pdf/submission/pdf166_pdf.pdf

Dec 2013 Issue http://rvpadmin.cce.cornell.edu/pdf/submission/pdf173_pdf.pdf

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Effect of the "Polar Vortex" on Fruit, continued from page 1

deficiency initially. These trees finally die during periods of mid-summer drought stress. Root injury is much more commonly seen on young trees with limited roots systems. The best we can do is estimate an average condition based mostly on our experience and others that we trust who have experienced similar events.

Temperature lows across eastern NY according to NEWA ranged from -24°F in parts of the Champlain Valley apple region (the temperature was below -20°F for 5 hours):

-17°F Shoreham, VT	-4°F Highland, NY at the Hudson Valley Lab
-18°F Granville, NY	
-14°F Clifton Park, NY	-4°F Marlboro, NY
-14°F Hudson, NY	0°F White Plains, NY
-9°F Modena, NY	0°F Riverhead, NY
-6°F Clintondale, NY	on Long Island.

What does this really mean for the various fruit crops?

Our best guess from years of accumulated experience is that apple flower buds are killed from -25 to -32°F, apple wood from -30 to -40°F, peach flower buds -12 to -20°F, peach wood around -20°F, plums depending on variety from -2 to -25°F, Japanese plums are more sensitive. Vinifera grapes are sensitive near 0°F so it is likely that most areas has suffered bud kill and pruning practices should be amended depending on the severity of the injury.

Recent cold temperatures probably had no effect on mature apples but

may have affected some young or weak trees; there likely was some flower bud damage to a small proportion of peach, plum, and cherries. This probably had a beneficial effect reducing flower numbers. Snow cover, where present, also likely has protected roots from winter damage.

Cold Injury Symptoms

Normally healthy buds are bright green. Frozen buds appear brown and water-soaked. Buds should be warmed a few days after the freeze before cutting with a very sharp knife. Peach and cherry bouquets can be collected after a freeze and put in water in a warm room. This will force them to bloom. Assess the health of flowers to determine the presence or absence of winter injury. Winter cold will cause misshapen flowers often with damaged pistil, stamen, and petals. In some cases buds do not develop further than tight-cluster. An accurate estimate of injury in the orchard from these counts is impossible without extensive sampling throughout the orchard on all cultivars.



Figure 2. "Black Heart" winter injury to an established tree that occurred several years ago.

Internal browning of cambial tissue is a sure sign of injury and is easily seen by cutting through the bark after trees have had a chance to warm up. Look first on the southwest side of the tree where the daily temperature variations are greatest. In the spring, delayed and slow terminal growth followed by tip die back is a common a symptom. Winter injury can result in poor fruit set despite what appears good flowering and pollination. Shortened fruit stems, misshapen fruit and fruit russet have all been attributed to winter injury.

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Effect of the "Polar Vortex" on Fruit, continued from page 2

Lateral cracks along the trunk on apple are not significant but can be a problem on stonefruit since bark tends to separate from the wood and provide canker entry points.

What to do if your orchard is winter injured?

There is not much you can do now except adjust your pruning to preserve more fruit buds for the coming year. If you know you have had a winter cold events apply Dr. Warren Stiles's "Spring Tonic" at tight cluster or pink. The "Tonic" is a fertilizer mix that provides nutrients directly to injured tissue. The tonic is a tank mix of 3 lbs of urea (feed-grade) plus 1 lb. of a sprayable Boron plus 1 quart zinc chelate EDTA per 100 gallons. If winter injury has significantly reduced the crop consider root pruning, chainsaw girdling, or applications of Apogee to reduce tree vigor. Consider significantly reducing crop load to reduce stress on the tree. If severe collar injury occurs, use bridge grafting to

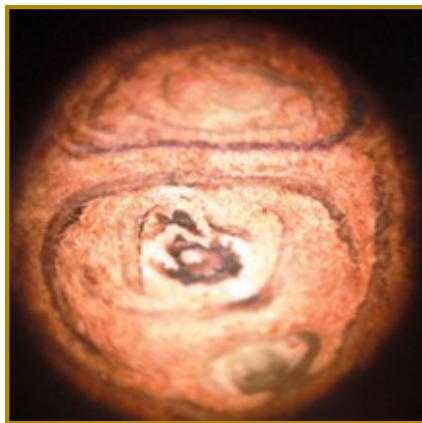


Figure 3. Chardonnay with winter killed primary bud and healthy secondary and tertiary bud.

connect the lower trunk or roots with the uninjured trunk.

What can you do to minimize winter damage?

It is a little late now but painting tree trunks, especially on the south and west side, will reflect some the extremes in temperature on susceptible tree trunks. This is essential for stone fruit.

Prune only after trees have reached sufficient hardiness through lengthy exposure to

cold temperature and the risk of rapid temperature drops has abated. Improve orchard drainage

Use a well-balanced nutritional program that encourages neither too little or excess growth and supplies adequate potassium. Maintain quality foliage through the season. Defoliation by insect or disease exacerbates winter injury.

Worker Protection Standard Basic Question & Answer

By Maire Ullrich and Teresa Rusinek, ENYCHP

It's the beginning of the season and numbers of workers will be increasing at your farm. Below are some common questions about the EPA requirement to train workers who work on farms where any pesticides are applied.



Q: Who has to be trained?

A: The Worker Protection Standard (WPS) protects employees on farms, forests, nurseries, and greenhouses from occupational exposure to agricultural pesticides. The regulation covers two types of employees:

- Pesticide handlers -- those who mix, load, or apply agricultural pesticides; clean or repair pesticide application equipment; or assist with the application or transport of pesticides in any way. Some regulations apply to workers who might handle or clean contaminated person protective equipment, too.
- Agricultural workers -- those who perform tasks related to the cultivation and harvesting of plants on farms or in greenhouses, nurseries, or forests.

Q: Who is a Worker?

A: Workers include anyone employed for any type of compensation (including interns) doing tasks -- such as weeding, harvesting, carrying nursery stock, repotting plants, or watering -- related to the production of agricultural plants on an agricultural establishment.

Workers (for the purpose of WPS) do not include such employees as office employees, truck drivers, mechanics, and any other workers not engaged in worker or handler activities.

Basically, anyone who gets a paycheck (or would if there was not some other agreement like an intern or WWOFe) on the farm, and is in contact with the crop needs to be trained.

Q: Are Consultants Exempt?

A: Yes, certified or licensed crop advisors, Extension Educators, Seed company representatives and persons under their direct supervision are exempt from WPS provisions except for pesticide safety training. The exemption applies only after pesticide application ends and while performing crop advising tasks.

Q: Who else is exempt?

A: Anyone with a valid pesticide applicators license is except from WPS training. Also, immediate farm family member owners who would be exempt from DOL regulations (spouse, children) are exempt from WPS. Siblings, cousins etc. are NOT exempt if they are NOT owners in the ag. business.

Q: What is required of an employer?

A: Protection during applications - Applicators are

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Worker Protection Standard Basic Q&A, continued from page 3

prohibited from applying a pesticide in a way that will expose workers or other persons. Workers are excluded from areas while pesticides are being applied.

- Restricted-entry intervals -- Restricted-entry intervals must be specified on all agricultural plant pesticide product labels. Workers are excluded from entering a pesticide-treated area during the restricted-entry interval, with only narrow exceptions.
- Personal protective equipment -- Personal protective equipment must be provided and maintained for handlers and early-entry workers.
- Notification to workers -- Workers must be notified about treated areas so they may avoid inadvertent exposures.
- Decontamination supplies -- Handlers and workers must have an ample supply of water, soap, and towels for routine washing and emergency decontamination.
- Emergency assistance -- Transportation must be made available to a medical care facility if a worker or handler may have been poisoned or injured. Information must be provided about the pesticide to which the person may have been exposed.
- Pesticide safety training and safety posters -- Training is required for all workers and handlers, and a pesticide safety poster must be displayed.
- Access to labeling and site-specific information -- Handlers and workers must be informed of pesticide label requirements. Central posting of recent pesticide applications is required.

Q: What information must be displayed?

A: The following three types of information must be displayed at a central location before a pesticide is applied:

1. Pesticide-specific application information, which must include: the location and description of the area to be

treated, product name, EPA registration number, and active ingredient(s) of the pesticide, time and date the pesticide is scheduled to be applied, and restricted-entry interval for the pesticide.

2. Emergency information, which must include the name, telephone number and address of the nearest emergency medical facility.
3. A pesticide safety poster, which must be either the WPS safety poster developed by EPA or an equivalent poster that contains the concepts listed in Criteria for Pesticide Safety Poster.

Q: Where must the information be displayed?

A: Display the required information together in a central location on your agricultural establishment where it is readily accessible and can be easily seen and read by workers and handlers.

Q: When must the information be displayed?

A: Display the information whenever any worker or handler you employ is on your agricultural establishment and, in the past 30 days, a pesticide has been applied or a restricted-entry interval has been in effect. The information may be displayed continuously.

Q: Are organic farms exempt?

A: No, organic producers are not exempt. Only if NO pesticide application, of any type at all, occur anywhere on the farm. OMRI-approved pesticides are still pesticides under this regulation and farms applying those chemicals must still comply with WPS regulations.

For more in-depth information and access to training videos and poster requirements go to the EPA website at <http://www.epa.gov/agriculture/index.html> and go to the Worker Protection Standard section in the Quick Finder"bar.

Catching the Amber Wave, 1: Considerations for Growers Interested in Small Grains Production

By Justin O'Dea, CCE Ulster

Amber waves washing over the northeast:

Due to rising market demands, there has been mounting interest in grains sourced from NY and the greater northeast. Extension is getting a lot of inquiries about small grains production and growers in eastern New York are increasingly reporting that bakers, chefs, brewers, and distillers are knocking on their doors to ask *if* they grow small grains, and *why they don't* (the latter is largely the case). Perishable crops have had most of the spotlight in the local food boom (a boon to fruit and vegetable growers),

while "local" and "fresh" dry-commodities have largely been off the radar. Recently though, consumers seem to be looking at their plates of fresh, local salad greens, steamed kale, and roasted rutabaga and thinking that something missing from their local palate. Even though it's relatively easy to bulk up on whole local vitamins, minerals, and fiber into to our diets, we're coming up short on locally-grown calories needed to power through the day. These consumers are asking: My bakery is local, but what about the wheat? What's local about the crust on this pie? The durum for this pasta? The barley for my local craft brew? My morning cereal?? Local meat, dairy, and eggs aside, a substantial

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amount of plant-based calories can, and often do, come in the form of some sort of grain, and of those, small grains (mostly wheats, oats, barleys, and ryes) often play a central role.

The rising demand for locally sourced grains stems from a surge in local food businesses interested in sourcing local products, and can be illustrated in numbers: [Grow NYC/Greenmarket's Regional Grain Project](#) has archived 25 instances of media coverage documenting rising interest in local small grains since 2008; craft brewer members in the [NYS Craft Brewers Association](#) has swelled to well over 100 members (a two fold plus increase in a little over 2 years); 7 maltings have opened in NYS in the past year (previously there were none); and at least two dozen craft distilleries have opened in NY in recent years (with increasing brewery and distillery numbers attributed to the farm brewery and distillery laws). Eastern NY is also importantly home to two grain milling operations that specialize in processing small batch, locally sourced grain ([Wild Hive Flours](#) in Clinton Corners, NY and [Champlain Valley Milling](#) in Westport, NY). Nearby, and also in accordance with local market demand, the northern New England-based [Northern Grain Growers Association](#) formalized in 2004 to support a local grains economy with 75+ current growers and stakeholder members, and hosts a well-attended annual conference. Northeastern growers have also been in recent years pioneering ways to locally market small grains, even on very small scales. Strategies include 1) marketing higher-value ancestral wheats such as emmer, einkhorn, spelt, and heirloom wheats or organically-grown grains, 2) marketing directly to restaurants, artisan bakers, and craft brewers and distillers, and/or 3) marketing grains as novel components of CSAs or farmers market arrays. Eastern NY growers likewise have begun to utilize strategies such as these to seize market opportunities in NYC, Albany, and Burlington, VT metro areas.

Currently there are a few initiatives that are pushing the budding local small grains economy even more; [Grow NYC/Greenmarket](#) requires that vendor products using small grains contain a percentage of grain sourced from within a [250-mile radius of New York City](#), and [New York State's Farm Brewery and Distillery Licenses](#) will require that farm brewers and distillers increasingly source a percentage of their ingredients from New York State (90% by 2024).



Cornell's Mid-Hudson Valley wheat and barley trials in Dutchess County, NY. Credits: Elizabeth Higgins, CCE Ulster

So why aren't we currently growing small grains?

New York was a major small grains producer in the 1800s (including the Hudson Valley), but a number of practical reasons caused the center of small grain production to migrate west. While western NY still grows a significant but relatively limited acreage of soft wheat (for pastry-grade flours and/or animal feed), eastern NY has particularly been out of the small grains business in any substantial way for nearly 200 years, when pest pressures, soil fertility decline, and the Erie Canal dealt fatal blows to the eastern NY small grains economy. Market quality standards have progressively become much more exacting since then, and population increases and associated land use pressure and has risen significantly in many parts of

NY, generally necessitating more and more growers to produce higher value-per-acre crops to keep agriculture viable. Nonetheless, the climate and soils of eastern NY are capable of producing small grains (especially regarding yield potential), but producing high quality small grains for modern human consumption markets in our humid climate can present challenges for NY growers, and NY growers will likely need to sell to markets that will pay premiums for locally sourced grains to be economically viable.

So why bother?

Several aspects of small grains production may be tantalizing to vegetable growers:

- 1) *Production economy*: Generally, small grains are considerably *less* management and input intensive to produce and postharvest handle than vegetable crops. Growers growing field corn as a rotational crop in vegetable production are also starting to consider small grains as another option for a rotational field crop.
- 2) *Net return potential*: Direct marketing a small grain to emerging specialty markets (currently somewhat stabilized by the GrowNYC/Greenmarket and NYS Farm Brewery & Distillery license's regulations) presents an opportunity to sell at a premium for more competitive per-acre net returns. Secondary small grains markets are concurrently emerging for alternatives to corn-soy based animal feeds (lower value than human consumption markets, but still with the opportunity to sell at a relative premium price).

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Catching the Amber Wave: Small Grains Production, continued from page 5

- 3) *Rotational Benefits:* Including small grains in rotation with vegetables can importantly help manage weeds and break certain pest, disease pressures that NYS vegetable growers commonly face, especially for growers mainly growing warm season annuals (all small grains are cool season annuals).
- 4) *Strategic Marketing:* Including a small grain in your crop array presents opportunities for more market diversity and developing more stable, resilient marketing strategies. Including a less perishable dry commodity into a vegetable crop marketing scheme can also allow vegetable growers more opportunity to sell throughout the entire year as needed and/or when the price is right.

So what's the hitch?

- 1) *Land base, equipment, and infrastructure:* For most small grains, economy-of-scale is something worth paying close attention to. As a reference: if you currently don't have the capacity and/or land base to produce field corn or a similar field crop, do some serious number crunching and thorough research before you get too excited about small grain production. Having a grain drill, combine, and the right grain drying and storage and infrastructure can really be a game changer in whether small grains production could pay off for you. Some growers may be able to viably produce grains on a smaller, less mechanized scale but will likely need to be growing grains that can fetch premiums at the upper end of the spectrum, and end up needing to creatively engineer ways to make equipment and infrastructure work for their scale.
- 2) *Meeting grain quality standards:* Small grains evolved in a semi-arid climate, but have been selected over time to be adaptable to different climates. New York's humid climate still presents challenges for small grains though. Under wet growing conditions, disease can threaten yield somewhat, but mostly grain quality (principally, [Fusarium head blight](#)); also, when grains are mature and ready for harvest in wet conditions, kernels can sprout before they are harvested and also negatively affect grain quality. Both of these issues are managed on a fundamental level by choosing appropriate varieties. Additionally, growing wheats with high quality gluten proteins for bread baking can be difficult and variable in New York; wheat has a limited ability to form high concentrations of gluten in

a climate with relatively high in-season rainfall (many bread wheats are grown in regions with markedly arid growing seasons). Growing good quality bread wheat in the northeast wheat is highly dependent on variety and a high available nitrogen supply (through topdressing and/or legume-enriched soils with a high N supplying capacity), particularly during grain fill (June).

- 3) *Market Risk:* As with any new market, there are potential risks and growing pains that will likely occur as a new direct market small grains economy develops. In eastern NY, many growers and end-use producers will be in a learning curve for a while, and some will likely not make it through. Currently though, the NYS Farm Brewery and Distillery law and GrowNYC/Greenmarket's regulations are leveraging to incite development of a local small grains economy.

What is Cornell doing about it?

[The Cornell Small Grains Project](#) is a program working on selecting and developing small grain varieties for growers working with NY's environmental conditions and markets. In accordance with small grains production and markets in western NY, the core thrust of Cornell's variety election and breeding efforts has been on soft wheat varieties. Recently though, due to increasing market demand, Cornell began researching grains and varieties for emerging specialty markets, including wheat varieties for bread flours, specialty heirloom varieties of wheat, ancestral wheats (emmer, einkhorn, and spelt), malting barleys, hybrid ryes, and selections optimized for organic production. The Cornell Small grains project is currently running two small grains trials in eastern NY, in the Champlain and Mid-Hudson Valleys.

For New York State's environment, two of the most pertinent varietal traits Cornell focuses on for growing quality grains (besides yield) are: *low pre-harvest sprouting* and *high resistance to Fusarium head blight (aka, "scab")*. Fusarium head blight is a particularly formidable reality of growing grains in the humid northeast, and Cornell's plant pathology department is also actively working on ways for growers to better manage this disease. *Fusarium gramineum* is a widespread fungal pathogen ubiquitous in the environment that spreads via the air; this pathogen can infect the kernel at flowering, causing shrunken kernels and development of the fungal toxin, [deoxynivalenol \(DON\)](#), aka, "[vomitoxin](#)". The FDA regulates Vomitoxin levels in

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Movento gets Full Onion Label

Movento now has full registration in NY for onions. No section 18.

If you need a copy of the new label contact Maire at 845-344-1234 or email mru2@cornell.edu or Justin at 845-340-3990 x390 or email jko32@cornell.edu

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grain, and small grain growers in the northeast commonly struggle with meeting the minimum thresholds set for human consumption, especially in wet years. Fusarium is most commonly controlled by an integrated strategy consisting of 1) genetic resistance, 2) triazole fungicide applications in a 3-5 day window around flowering, and/or 3) effective seed cleaning that culls out the Fusarium-infected, shrunken kernels.

The [University of Vermont Crops and Soils Team](#) and [The University of Maine](#) has also contributed significant research working towards expanding northeastern small grains production for local direct markets. The University of Vermont importantly also houses the northeast's only [cereal grain quality testing lab](#). The Northeast Organic Farming Association of NY ([NOFA-NY](#)) and the Organic Grower's Research and Information-sharing Network ([OGRIN](#)) is also playing a significant role in working with organic and smaller-scale growers to support value-added small grains production.

So I'm still intrigued, how can I minimize risk?

- 1) *Do your homework.* Review grain production guidelines from Cornell and other northeastern based sources, attend small grains networking and education events, and talk to other northeastern grain growers. Know what goes into producing a small grain and what to expect in managing the crop from seed to market.
- 2) *Do the math.* Consider the economics from several aspects with regard to the scale of production you are interested in: 1) how much can you gross per unit for a crop, 2) infrastructure and equipment investment, 3)

management costs, and 4) how much acreage and yield would you need to net a profit that would justify allotting acreage to a small grain crop. Also consider whether a small grain could help economize production costs through reducing weed, pest, and/or disease pressures in a crop rotation.

- 3) *Know your market:* Establish market connections before seed goes in the ground. Narrow down the market you would like to grow for, and get in touch with potential buyers. Figure out what quality and quantity of product they desire and what they're looking for in a potential direct farm business partnership. Gauge whether they are also someone/a business that you'd like to be in a direct business partnership with as well. It is also important to build a connection with a local animal feed market outlet in case your crop doesn't meet human consumption quality standards - the likelihood for this to occur is relatively high, especially when you're in the learning stages and/or in wet years.
- 4) *Get your ducks in a row, start at a manageable scale.* Make sure that you have the equipment and infrastructure you need in order to get your grain seeded, managed, harvested, post-harvest processed, and stored. Go easy on yourself while you're in the learning curve; start with a manageable acreage of small grains in accordance with what you can economically move to market, pay close attention, and scale up as you improve.

Stay tuned for: **Catching the Amber Wave, 2: Getting started in small grains production** in a future issue of the monthly ENYCHP newsletter.

Role of Spray Adjuvants with Postemergence Herbicides

By Bob Hartzler, Extension Weed Management Specialist, Department of Agronomy, Iowa State University

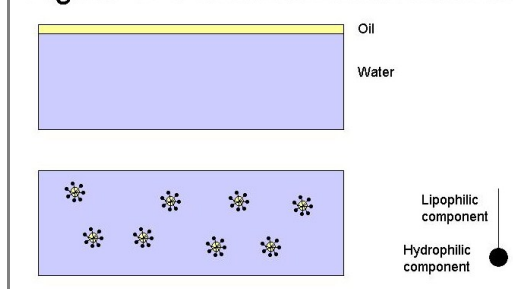
Spray adjuvants are used with postemergence herbicides to help overcome the barriers that impede movement of the herbicide from the leaf surface to the interior of the cell. The Weed Science Society of America defines an adjuvant as any substance in a herbicide formulation or added to the spray tank to modify herbicidal activity or application characteristics. Some products are formulated with sufficient additives such that the user usually does not need to add them to the tank (Roundup Ultra), whereas other products require addition of adjuvants for all uses (Pursuit, Basis Gold, etc.). This article will discuss the types of adjuvants commonly used with postemergence products to improve herbicide absorption, and describe the mechanisms by which they function. Other additives commonly

used with postemergence herbicides, such as drift retardants, compatibility agents, etc., will not be covered in this paper. These products often are called utility adjuvants.

There are three primary types of adjuvants used to enhance herbicide performance: surfactants, crop oil concentrates and ammonium fertilizers. Surfactants are a class of adjuvant widely used with herbicides in corn and soybean production. The word surfactant is derived from the term surface active agent, and describes the ability of these

compounds to function at the interface between compounds with different solubilities (Figure 1). Surfactant molecules have two distinct components, one is hydrophilic (water soluble) whereas the other is lipophilic (oil soluble). The lipophilic portion of the molecule typically is a long alkyl chain. The two portions of the

Figure 1. Function of surfactants



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Role of Spray Adjuvants with Postemergence Herbicides, continued from p. 7

surfactant molecule allow it to associate with liquids having wide ranging solubilities. In the figure the surfactant allows the oil to go into suspension in water by creating an emulsion.

There are several types of surfactants available, but most products marketed for use with postemergence herbicides are classified as nonionic because they have a neutral charge. Cationic surfactants are formulated with several herbicides, including most glyphosate products. A measurement frequently used to describe surfactants is the HLB (hydrophilic/lipophilic balance). The HLB describes the ability of the surfactant to associate with hydrophilic and lipophilic compounds. Surfactants with a high HLB balance associate better with water soluble compounds than with oil soluble compounds. Most surfactants used with postemergence herbicides have HLB values of 12 or greater. In recent years silicone surfactants have been introduced for agricultural uses. The carbon-based lipophilic chain is modified with silicone in silicon surfactants to dramatically change their characteristics.

Crop oil concentrates (COC) are a combination of a surfactant and a non-phytotoxic oil. Most COC's contain between 15 and 20% emulsifier. COC's are frequently classified by the type of oil used to manufacture them, either a petroleum-based oil or a modified vegetable oil. A methylated seed oil (MSO) is manufactured with a vegetable based oil that has been chemically altered by attaching methanol units to the oil. The attachment of the methanol to the oil alters the HLB of the oil to an optimum level. Methylated seed oils seem to have the greatest advantage over traditional COC's in situations where weeds are under stress from environmental conditions.

The final class of additive used are the nitrogen based fertilizers. Ammonium sulfate, 28% N and 10-34-0 have all been used at some time for this purpose. It is believed that the ammonium ion is largely responsible for the beneficial effect of fertilizers on herbicide performance.

Adjuvants can enhance herbicide activity in several different ways. The effect of surfactants on the surface tension of

spray droplets is well documented. The epicuticular wax on the surface of leaves repels water, resulting in beading of spray droplets as they land on leaves. In some situations a high percentage of spray droplets may simply bounce off leaves, resulting in the herbicide falling harmlessly to the ground. Surfactants reduce the surface tension of spray droplets, increasing spray retention and allowing the spray droplets to spread over a larger area (Figure 2). An increase in spray coverage is especially important with contact

herbicides that do not move within plants. In most situations the optimum effect of surfactants is reached at concentrations higher than needed to minimize droplet surface tension. This indicates that the effect of surfactants on herbicide activity is due to more than a simple reduction in spray droplet surface tension.

Silicon surfactants reduce the surface tension of water much more than traditional surfactants, resulting in a rapid spreading of spray droplets. These products have been found to increase

rainfastness with some products. While in some situations silicon surfactants may have advantages over traditional surfactants, they can also be deleterious to herbicide absorption. Silicone surfactants do not always perform well with herbicides that require small, concentrated spray deposits to maximize uptake.

While the effect of surfactants and crop oil concentrates on spray retention and spread are well documented, the other mechanisms by which they enhance herbicide absorption are less clear. It is believed these products are primarily involved in aiding herbicide movement through the cuticle, but there is evidence that they may also facilitate movement across the cell membrane. Some additives have been shown to disrupt the integrity of the epicuticular wax layer on leaf

surfaces. The wax platelets on the surfaces of many leaves may be softened or disrupted by the oils in COC's. It is speculated that some additives act as humectants. As spray droplets dry on the leaf surface the herbicide molecules may form solid crystals. It has been demonstrated that herbicide absorption from a solid is much slower than from a herbicide in solution. An additive that reduces the rate at which the spray droplet evaporates may enhance absorption by keeping the herbicide in solution for a longer time.

Ammonium salts are also widely used with postemergence herbicides. The effect of AMS on reducing antagonism of glyphosate by calcium and other salts present in water has been discussed in an earlier article. Two other possible benefits of ammonium salts on postemergence herbicides

Figure 2. Effect of Surfactants on Surface Tension and Herbicide Activity

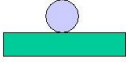



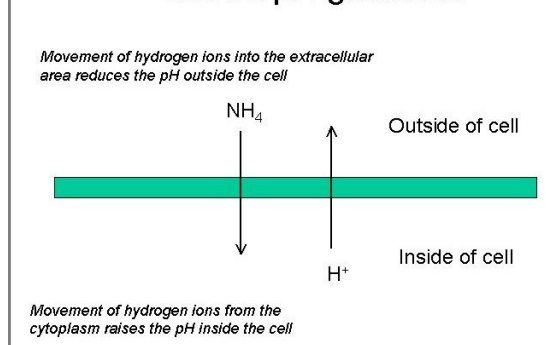
	Surfactant concentration	Weed Control
	0%	45%
	0.12%	60%
	0.25%	85%
	0.50%	98%

Figure 3. Effect of ammonium salt on pH gradients



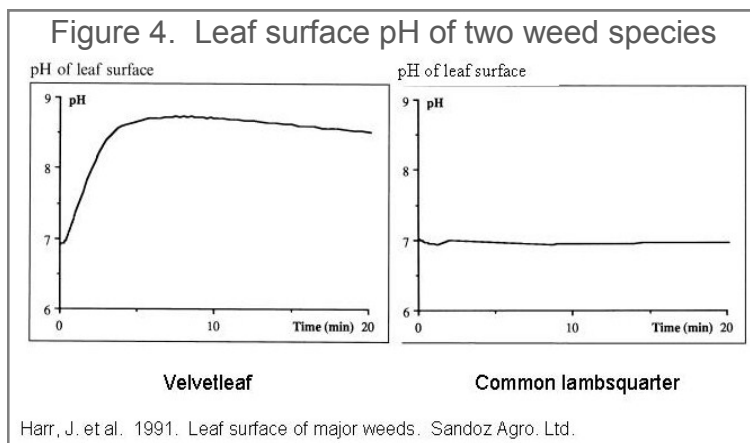
Role of Spray Adjuvants with Postemergence Herbicides, continued from p. 8

have also been described. Most postemergence herbicides are weak acids, and their polarity is dependent upon the pH of the solution they are in. At lower pH's (acid) these herbicides become more lipophilic and better suited to penetrate through cell membranes. Plants are efficient at absorbing ammonium due to their need for nitrogen. An active transport mechanism has been proposed where ammonium absorption is driven by the transfer of hydrogen ions (H^+) to the outside of the cell (Figure 3). Pumping hydrogen ions to the extracellular space will reduce the pH of this area. Thus, use of ammonium as a spray additive may enhance herbicide absorption by creating a pH gradient across the cell membrane that favors absorption due to the behavior of weak acid herbicides.

The benefit of ammonium salts on herbicide absorption is frequently more consistent on velvetleaf than other weed species. This may be due to the fact that the leaf surface of velvetleaf is alkaline (high pH). The pH of a neutral water droplet placed on the leaf surface of velvetleaf rapidly increased whereas on a lambsquarter leaf there was no change in pH of the droplet (Figure 4). The specific benefit of the ammonium ion for enhancing herbicide absorption in velvetleaf has yet to be elucidated, but it may be due to preventing the formation of calcium salts of the herbicide parent acid.

Selecting the appropriate adjuvants can be confusing even for experts. There are many products available, and since adjuvants are not regulated, manufacturers usually do not provide specific information about the composition of their products. This makes comparing products difficult, if not impossible. Because of this, it is usually best to purchase adjuvants from persons directly involved in the sale of herbicides. It is in the best interest of these persons to sell products that will work well with the products they sell.

The herbicide label is the best source of information and specifies the legal requirement for the type of adjuvant to be used with that product. Herbicide manufacturers expend considerable effort to determine what adjuvants provide the most consistent product performance. Sometimes labels give users options on what adjuvant to use with respect to environmental conditions, target species, and tank-mix partners. For example, hot, dry



weather hardens plants off and reduces herbicide absorption. Under these conditions the higher rates of a COC or surfactant would be beneficial. Under cool, wet conditions the cuticle often is thinner and less of a barrier to absorption (Figure 5). A surfactant might be more appropriate than a COC under these conditions in order to reduce the risk of crop injury. Ammonium based fertilizers are especially important for many herbicides when velvetleaf is present. Also be sure to consider the impact of the spray additive on tank-mix partners. The use of spray additives for one product may not be appropriate for another product. Finally, in recent years several products have been introduced that contain more than one type of additive. Before using combination products determine the components and the rates of each component to ensure that they are appropriate for the intended use.

Proper use of spray adjuvants is a critical step in successful postemergence weed control. Select adjuvant types specifically recommended on the herbicide label and manufactured for use with postemergence herbicides. Remember there are no miracle products that allow reductions in herbicide rates. While reduced herbicide rates often can provide acceptable results, success

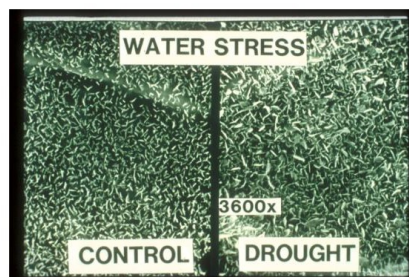
depends upon timely application and understanding the susceptibility of target weeds, not because one spray additive is superior to another.

Acknowledgement: Jerry Green, DuPont, reviewed this article and made numerous helpful suggestions. His willingness to assist in its preparation is greatly appreciated.

For additional information and more on spray additives for postemergence herbicides go to:

<http://www.weeds.iastate.edu/reference/visuals/additives/default.htm>

Figure 5. Effect of water stress on epicuticular wax deposits on giant foxtail leaves.



Pitty, A. and M.D.K. Owen. ISU. 1986.

About Baby Corn

There's a great factsheet on selecting and growing baby corn at:

<http://cru.cahe.wsu.edu/CEPublications/pnw0532/pnw0532.pdf>



Local Economies Project Announces Innovative “Farm Hub” to Support Hudson Valley Agriculture

Gill Farm Property to Serve as New Regional Farming Center for Sustainable Agriculture, Offering Training and Services for Local Farmers

December 20, 2013 Press Release, Novo Foundation

<http://novofoundation.org/pressreleases/local-economies-project-announces-innovative-farm-hub-to-support-hudson-valley-agriculture/>

The Local Economies Project (LEP), a Hudson Valley based project of the New World Foundation, announced today that it is facilitating the purchase of Gill Farms in Hurley, NY for the creation of an innovative new “Farm Hub” dedicated to sustainable agriculture – offering Hudson Valley farmers access to hands-on training, education, and services. The project will aim to bolster the local agricultural economy, while ensuring that the area’s rich agricultural heritage and open space will be maintained for years to come on one of the largest and most visible tracts of farmland in the region.

Elected leaders welcomed the news.

“Not only will the Gill property remain a working farm, but it will also serve as a resource for business development and environmental sustainability in the region,” said Ulster County Executive Mike Hein. “Farming in Ulster County is an important part of our history. But it’s equally vital to our future - to public health and to the local economy. The ‘Farm Hub’ will position the Hudson Valley as a focal point for sustainable food and farming - It’s also terrific that LEP has chosen to locate in Ulster County,” he continued.

The Farm Hub will be a major center for sustainable agriculture in the Hudson Valley, offering programs and research opportunities to strengthen farming and food systems in the local community and the region. Goals include offering new and established farmers a range of resources, including:

- Hands-on training in sustainable farming practices to meet modern-day challenges
- Marketing assistance to help grow their businesses
- Information on cutting-edge practices and technologies that promote resilient agriculture through demonstration and research in conjunction with Cornell University
- Assistance with secure and affordable access to land
- Expanded access to capital to establish and expand their farming operations

“The Hudson Valley can be a very tough place for the new farmers that our region needs,” said Lindsey Lusher Shute of the National Young Farmers Coalition. “The Farm Hub will directly tackle many of the challenges that these young farmers are facing, while making the whole agricultural economy stronger and more sustainable.”

Gill Farms, in operation since 1937, is located on 1,255 acres stretching southward from Kingston to North Marletown, along the historic corridor known as the “Hurley Flats.” The \$13 million land purchase was funded by the NoVo Foundation with the intention of holding it until such time as an independent nonprofit organization can be formed to carry the Farm Hub’s work forward. The Local Economies Project will manage the development and growth of the Farm Hub during this initial phase.

John Gill, the farm’s current owner and life-long Ulster County resident, will be involved in the transition of the property from private farm to education and research center and will remain in the position of Farm Manager.



Photo courtesy of LEP

“It’s always been important to me that our farm remains a working farm – this way I can preserve my grandfather’s and my father’s legacy,” said Gill Farms owner John Gill. “I’m really happy that I’ll be involved in the next chapter, and to know that the farm will always remain viable and help prepare future generations of farmers.”

The Farm Hub’s educational and agricultural partners include The College of Agriculture & Life Sciences at Cornell University and Cornell Cooperative Extension of Ulster County, as well as Rondout Valley Growers Association (RVGA), GrowNYC, Hawthorne Valley Farm, Hudson Valley AgriBusiness Development Corporation (HVADC), and other groups working in the field of resilient agriculture.

“There is so much expertise to draw on here in the local community and across the Hudson Valley,” said Bob Dandrew, Executive Director of the Local Economies Project. “We look forward to working with all of our partners as we develop plans for the Farm Hub. A firm foundation is in place to create a dynamic center for food and farming.”

continued on page 11

Farm Hub, continued from p. 10

Kathryn Boor, Dean, Cornell University College of Agriculture and Life Sciences agrees, “Cornell University’s College of Agriculture and Life Sciences has been providing experiential education for students of agriculture for well over a century. The Farm Hub will provide an exciting new base for training, research and demonstration in the Hudson Valley as we continue to develop new methods for the next generation of farmers. We look forward to collaborating on this exciting project.”

Master planning for the new Farm Hub will begin in early 2014. The Local Economies Project will spearhead the planning process and work closely with a network of regional and local partner organizations to solicit input from a broad range of stakeholders and community leaders. The Farm Hub programs are slated to begin operations on-site by the spring of 2015.

BACKGROUND

The Local Economies Project (LEP) was launched in 2010 in the Hudson Valley to support sustainable local agriculture and ongoing efforts to create a resilient food system. In addition to providing funding to non-profit organizations working in agriculture in the region, LEP has conducted research, hosted conferences, and supported food and farm related educational programming. LEP is based in Kingston, New York and is a project of the New World Foundation, a philanthropic organization based in New York City.

For more information on the Farm Hub go to:

<http://www.localeconomies-hv.org/initiatives/farm-hub/>

Afraid of What Your Employees Might Say?

By Stan Moore, Michigan State University Extension, posted on September 27, 2013, <http://msue.anr.msu.edu>

As employers we are often afraid to ask employees for input on decisions, assuming they will ask for something that we cannot, or do not want to deliver.

Managing employees can be tough. As employers, in agriculture or otherwise, we have decisions we need to make every day – decisions that need to be implemented by our employees. Therefore, it is important to consider the impact of decisions on employees and their ability to implement them amid everything else they are already doing.

Good management starts with how we view employees and how we “manage” them. If we’re “old school”, believing in a “command and control” approach, then were not going to ask them for input. This management mindset expects that most employees can’t be trusted, that employees won’t exercise self-control, that employees are lazy by nature and that they have little ambition. If that’s your management mindset, why would you ask for input?

The problem with this is that it assumes that you, as the manager, have the best knowledge, that you are complete in what needs to be known, and that your decisions cannot be improved. Experience should tell us that that is not the case. The reality is that decisions that get talked about and debated are usually better decisions.

So what is the alternative management mindset? What if you held the opposite view of the statements listed in the command and control mindset? If we really value employees and respect them, then we need to involve them. If trustworthy, ambitious people are going to be what drives your business forward then it makes perfect sense to ask them for input on decisions. They need to become partners with you in reaching the goals of your business. They can only do that if they know and share the goals that you have set.

Practical examples of asking for employee input would be in making the best purchases and in scheduling. For example, when the business needs to purchase a new piece of equipment, why not ask the employees who will be working with the equipment to do the research on the possible options. Hopefully employees helped point out the need for the equipment as well. Not only does this help create a sense of belonging to a team, but it also provides you the opportunity to help build skills in your employees. You are helping them build decision-making skills, and you can also introduce such concepts as partial budgeting to determine which option will be the most profitable. Obviously, you still have to make the final decision, as you have to write the check, but including employees in farm decisions can make a huge difference in employee satisfaction.

What if you’re looking at a change in how you schedule employees’ work time? Wouldn’t it make sense to ask employees what they would prefer? On farms and in other businesses, this has limitations since there are tasks that have to get done on weekends (the cows have to be milked every day), but there is also likely more flexibility than you may think. Sometimes as managers we just can’t see a different way of doing it than how we are currently functioning. As Michigan State University Extension educators talk with dairy managers they have found that work time and schedules vary greatly by farm. Asking employees for input on scheduling, and procedure changes that may impact that scheduling creates another opportunity for you to build on teamwork and it may even help your business become more efficient.

Asking employees for input does not take away from your leadership of the business - you still have to make the ultimate decisions. Asking them for input does emphasize that as a leader, you understand that employees have valuable experience and knowledge and are best positioned to help move your business forward.

Search is Ongoing for Hudson Valley and Champlain Region Tree Fruit Educators

The Cornell Cooperative Extension Eastern New York Commercial Horticulture program (ENYCHP), in concert with Cornell University and Cornell Cooperative Extension of Ulster County are actively seeking candidates for two extension educator positions focused primarily on tree fruit production. We realize the importance of the tree fruit industry in Eastern New York and have been aggressively recruiting candidates on a national scale to support the tree fruit industry.

One position will replace the recently retired Kevin Iungerman, who worked in the Lake Champlain region (tree fruit and grapes). The other will replace Mike Fargione, who worked in the Hudson Valley (tree fruit). The Cornell Cooperative Extension system is committed to filling these important positions with highly qualified candidates to provide educational and research program for the tree fruit industry.

If you have comments or questions about these positions, please do not hesitate to contact Craig Trowbridge, CCE Administration at 607-255-5225 (cdt6@cornell.edu). We are also hoping that you will share these job openings and encourage qualified candidates to apply. To review the job postings please visit [CCE Tree Fruit Positions](#) and look for the pdf files under the “Announcements” section of the website. We are working to have both positions filled as soon as possible with quality staff, and will keep you updated on the progress throughout the late winter and spring.

ENYCHP staff and Cornell University faculty are developing plans and are working hard to make sure you have as much support in terms of access to research findings and other educational needs as possible. The 2014 Tree Fruit Schools will be held in Lake George (February 10th) and Kingston (February 11-13th) as normal and DEC recertification credits and CCA credits will be available. To register for either of these schools, please call Marcie Vohnoutka at 518-272-4210 or email her at mmp74@cornell.edu

Plans are in progress for Special Permit Training meetings as well as fruit thinning field meetings. Tree fruit information is being incorporated into the Produce Pages, the monthly newsletter offered by the ENYCHP. Steve Hoying, Sr Research Associate in Hudson Valley will be assisting the team by providing tree fruit information through email alerts and newsletters.

We look forward to seeing all of you at the Fruit Schools—thank you for your patience and enjoy the lengthening winter days!

2014 Fruit Growers' Schools



Cornell University
Cooperative Extension
Eastern New York Commercial Horticulture

The Eastern NY Commercial Horticulture Program is happy to invite you to attend our Annual Fruit Schools being held in Lake George and Kingston, NY. Topics include fruit pest and disease management, planning for production trends, new cultivars, spray technology, reflective mulch and other strategies for SWD management, water management, business analysis and many more.

Detailed agendas and registration form can be found at: <http://cdvsfp.cce.cornell.edu/event.php?id=167>.

Pesticide recertification credits are available.

Upper Hudson/Champlain Commercial Tree Fruit School

Mon. February 10, 2014 Fort William Henry Hotel & Conference Center, Lake George, NY.

Single day event with a small trade show included.

Lower Hudson Valley Commercial Fruit Growers' School

Tues.-Thurs. February 11 - 13 Garden Plaza Hotel (formerly Holiday Inn), Kingston, NY

3-day event - First two days concentrating on Tree Fruit, and the third day devoted to Berries and Grapes.

A trade show is also included at the end of Tuesday's session.

Pre-register by Feb. 5 and save MONEY! If you pre-register now, the cost is \$40 per day (includes lunch, trade show and meeting materials). If you register at the door, the cost is \$60 per person per day.

For more information contact: Chuck Bornt at 518-859-6213 or cdb13@cornell.edu, or Marcie Vohnoutka at 518-272-4210 x111 or mmp74@cornell.edu



Farm Business Management for Women in Agriculture

Six sessions - Thursdays 9:30 am - 2:00 pm, February 6 - March 13, 2014

Hosted at various Cornell Cooperative Extension offices throughout NY State

Annie's Project: A Risk Management Perspective. This workshop series fosters problem solving, record keeping, and decision-making skills for farm women. Topics include farm business planning, marketing, financial statements, software training, agricultural production, employee relations and estate planning. Sessions include webinar followed by class discussion with local specialists, and each session includes morning refreshments and lunch to allow plenty of time for participants to network. For more information on Annie's Project go to www.NYAnniesProject.org.



Who Should Attend? Experienced farm and ranch women wanting a more active role in the business aspects of their farm operations will find this program motivating, enjoyable and practical. Register today to join other farm women in your community and across the county who have chosen Annie's Project as a comfortable place to come to strengthen their business and risk management skills. You will gain a network of colleagues and professionals who understand farming and what it takes to succeed in agriculture in the new millennium.

The following **CCE County Offices will host** the workshop: Broome, Chautauqua, Cortland, **Essex**, Jefferson, Livingston, Oneida, **Orange**, Orleans, **Saratoga**, **Schoharie/Otsego**, St. Lawrence, Tompkins, **Ulster** and Wayne counties.

Registration deadline extended to January 31. Register at https://pub.cce.cornell.edu/event_registration/main/events_landing.cfm?event=2014AnniesProject_230. The course costs \$60 per person with limited scholarships available to those who inquire. Lunch and course materials are included.



For more information contact
Bonnie Collins 315-736-3394 x104, bsc33@cornell.edu or
David Cox 518-234-4303, dgc23@cornell.edu.

2014 Eastern NY Commercial Vegetable Growers' Schools

Lower Hudson Valley Commercial Vegetable School Monday Feb. 24

The Falcon, 1348 Route 9W, Marlboro, NY 12542

- Food Safety Modernization Act -Update and Implications for Your Farm Business—Bob Weybright, CCE ENYCHP
- Brown Marmorated Stink Bug Vegetable Update *Peter Jentsch, Cornell HV Lab*
- Deer Management in Agricultural Landscapes *Mike Fargione, Cary Institute*
- Cover Crops Fertility Budgets *Brian Caldwell, Cornell*
- Review of Tomato Diseases *Dr. Chris Smart, Cornell*
- Review of 2013 Vine Crop Diseases *Dr. Chris Smart, Cornell*
- Interrow Weed Control in Plasticulture with Cover Crops 2013 Review and Update *Justin O'Dea, CCE Ulster*
- Garlic Fertility and Postharvest Research *Crystal Stewart, CCE ENYCHP*
- Fresh Market Tomato Variety Trial Results *Chuck Bornt, CCE ENYCHP*
- A Simple System for Recording Pesticide Applications Using Excel *Maire Ullrich, CCE ENYCHP*

Northern Commercial Vegetable Growers' School Tuesday Feb. 25*

Community Room, Plattsburgh City Recreation Dept., 52 US Oval, Plattsburgh, NY 12901

- Disease Round Up - Cucurbits, Brassicas, Solanaceous *Dr. Chris Smart, Cornell*
- Managing Cover Crops for Soil Health and Weed Suppression *Brian Caldwell, Cornell*
- Fresh Market Tomato and Brussels Sprout Variety Trial Results *Chuck Bornt and Crystal Stewart, CCE ENYCHP*
- What does the Food Safety Modernization Act Mean for Your Operation? *Bob Weybright, CCE ENYCHP*
- Managing Sweet Corn Insects and Resistance with New Insecticides *Peter Jentsch, Cornell*
- Guardian Plants: The Ultimate Trojan Horse for Insect Management *Margaret Skinner, UVM Extension*
- Weed Ecology and Management Tips *Justin O'Dea, CCE Ulster*
- Should You Add Berries to your Production? And SWD Update *Laura McDermott, CCE ENYCHP*
- Simplified System for Pesticide Applications Recordkeeping and Pre-Season Sanitation *Chuck Bornt, CCE ENYCHP*

Capital District Commercial Vegetable Growers' School Wednesday Feb. 26*

Best Western Albany Airport Inn, 200 Wolf Road, Albany, NY 12205

- Review of 2013 Tomato Diseases and Their Control *Dr. Chris Smart, Cornell*
- Managing Cover Crops for Soil Health and Weed Suppression *Brian Caldwell, Cornell*
- A Simple System for Recording Pesticide Applications Using Excel *Maire Ullrich, CCE ENYCHP*
- Industry Updates & Coffee Break
- Review of 2013 Vine Crop Diseases *Dr. Chris Smart, Cornell*
- What does the Food Safety Modernization Act Mean for Your Operation? *Bob Weybright, CCE ENYCHP*
- Deer Management in Agricultural Landscapes *Mike Fargione, Cary Institute*
- Do You Plan on Living and Farming Forever? An Introduction to Succession Planning *Dan Welch, NYS FarmNet*
- Managing Sweet Corn Insects and Resistance with New Insecticides *Peter Jentsch, Cornell*
- Fresh Market Tomato and Brussel Sprout Variety Trial Results *Chuck Bornt and Crystal Stewart, CCE ENYCHP*
- Advances in Spotted Wing Drosophila Monitoring and Control *Laura McDermott, CCE ENYCHP*

***Trade Shows** - The Plattsburgh and Capital District locations will also include a small trade show. The Lower Hudson Valley meeting will not have a trade show, but industry folks have been invited to attend and will be available to ask questions.

DEC recertification credits have been applied for at each site.

Cost to attend any location is \$30 per person for enrolled members of the ENYCHP (\$50 for non-enrolled) and includes lunch trade shows (where applicable) and all meeting materials. Pre-Registration is required and is due by Feb. 20

Watch your mail for a flier, and look for registration information at http://cvp.cce.cornell.edu/events.php?date=02_2014 or contact Marcie Vohnoutka at 518-272-4210 or email mmp74@cornell.edu.

Meet the Eastern New York Commercial Horticulture Program Staff

Vegetable Educators:



Chuck Bornt

Phone: 518-859-6213
Email: cdb13@cornell.edu
Weed & pest ID/monitoring, reduced tillage, tomatoes, peppers, eggplant, potatoes, sweet corn, GAPs

Cornell Cooperative Extension offers support to fruit and vegetable growers throughout Eastern New York. We have assembled a team with industry specific expertise in business practices for efficient production and sustainable growth.



Crystal Stewart

Phone: 518-775-0018
Email: cls263@cornell.edu
Organic production, small farm production, beginning farmers, garlic and other alliums, cooperative marketing



Amy Ivy

Phone: 518-570-5991
Email: adi2@cornell.edu
High tunnel production, insect pests, winter greens, biocontrols



Teresa Rusinek

Phone: 845-691-7117
Email: tr28@cornell.edu
Pest ID/monitoring, cultural and chemical recommendations, biocontrols, greenhouse vegetables



Maire Ullrich

Phone: 845-344-1234
Email: mru2@cornell.edu
Muck soils, onions and other alliums, ethnic vegetables, marketing

Fruit Educators:



Laura McDermott

Phone: 518-791-5038
Email: lgm4@cornell.edu
Small fruit, pest management, nutrition, GAPs, high tunnel production



Jim O'Connell

Phone: 845-943-9814
Email: jmo98@cornell.edu
Small fruit, pest management, grapes, IPM, weed management

Business and Marketing Educator:



Bob Weybright

Phone: 845-797-8878
Email: rw74@cornell.edu
Business management, marketing, new product and processing guidance, business and organizational development

The Cooperative Extension Association
of Rensselaer County
Agriculture and Life Sciences Building
61 State Street, Troy, NY 12180

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UPCOMING EVENTS

Jan. 29 Nursery & Greenhouse Growers School CCE Orange County, Middletown, NY Get the latest information on pest control, cultural controls, and other hot topics from industry experts; workshop expanded to include a wider variety of ornamental crops including perennials, shrubs and bedding plants. NYS DEC pesticide recertification credits have been approved. Pre-registration is required as seating is limited. Cost is \$65 per person before Jan. 21; \$75 thereafter. Lunch and handouts included. For more information or questions, please visit http://counties.cce.cornell.edu/orange/nursery_greenhouse_growers_school_14.pdf, or contact Cathy Hughes 845-344-1234 or email cah94@cornell.edu.

Feb. 6 - Mar. 13 Annie's Project: Farm Business Management for Women in Agriculture, A Risk Management Perspective. Workshop series on problem solving, record keeping, and decision-making skills in farm women on topics including marketing, production, employee relations and more. *See page 13 for details.*

Feb. 10, and Feb. 11-13 Fruit Growers Schools - for Commercial Tree Fruit, Berry & Grapes Growers Two locations and dates Feb. 10: Upper Hudson/Champlain Tree Fruit School, Fort William Henry Hotel/Conference Center, Lake George, NY Feb. 11-13: Lower Hudson Valley Commercial Fruit Growers' School Garden Plaza Hotel, Kingston, NY. First 2 days Tree Fruit, and 3rd day Grapes and Berries. *See page 13 for details.*

Feb. 24-26 Commercial Vegetable Growers' Schools 3 events and locations, Marlboro, Plattsburgh and Albany, similar but varied topics incl. vegetable pest and disease management, FSMA, cover crops, soil and more. *See page 14 for details*

Feb. 27-28 Farm Food Safety Training with GAPs 2-Day Workshop, 8:30 am - 3 pm both days. Civil Defense Center, 7220 State Rte 54, Bath, NY 14810 Training for farmers required by buyers to provide 3rd-party verification of their food safety practices, and for farmers thinking about moving in this direction. Day 1: what GAPs is, how it works, what it means for your farm. Day 2 (*laptop required*): writing a food safety plan as required for audit certification. Registration information at <http://cvp.cce.cornell.edu/event.php?id=165>. Register by Feb. 24. More info. at <http://www.gaps.cornell.edu/eventscalendar.html> or contact Craig Kahlke cjk37@cornell.edu or 585-735-5448.

Feb. 27-March 1 Navigating the Local Food Scene: NYS Farmers Market Manager Training Conference Double Tree by Hilton Hotel in Binghamton, NY. Plan now to attend this conference to help you grow your market, build profits for your farmers and renew your enthusiasm for another season. Full agenda and registration information at <http://nyfarmersmarket.com/work-shop-programs/annual-conference-ditto-with-the-annual-conference/program.html>. For more information contact Diane Eggert at 315-637-4690 or email deggert@nyfarmersmarket.com

March 7 Onion School CCE Orange, 18 Seward Ave., Suite 300 Middletown, NY
Times TBA (1/2 day). Watch your mail for a flier. For more information call Cathy Hughes 845-344-1234

March 10-11, 12-13, and 25-26 Organic Pesticide Applicator Trainings for Fruit and Vegetable Growers Three training sites, 2-day trainings from 9am-4:30pm combining classroom education on pesticide use and the rules and regulations of pesticides as they apply to organic growers with hands-on sprayer workshops, application efficacy, calculations, mixing pesticides and much more! Taught by CCE staff, DEC representatives, NOFA-NY, and Cornell Ag Experiment Station staff. March 10-11 @ the L.I. Hort. Research and Education Center, Riverhead, NY; March 12-13 @ NYSAES Hudson Valley Lab, 3357 US 9W, Highland NY; and March 25-26 @ NYASES, Geneva, NY 14456. \$65 incl. breakfast and lunch each day and the NE Core Pesticide Training Manual. Pesticide Recertification Credits have been applied for. For more information contact Emily Cook, CCE Ulster County at 845-943-9810 or email ekc68@cornell.edu.

Cornell Cooperative Extension and the staff assume no liability for the effectiveness of results of any chemicals for pesticide use. No endorsement of any product is made or implied. Every effort has been made to provide correct, complete, and current pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly and human errors are still possible. These recommendations are not substitutes for pesticide labeling. Please read the label before applying any pesticide. Where trade names are used, no discrimination is intended and no endorsement is implied by Cornell Cooperative Extension. *CCE provides equal program and employment opportunities.*