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VEGEdge

YOUR TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

Volume 10 | Issue 3 | March 2014

Cornell University
Cooperative Extension
Cornell Vegetable Program

Will We Have Effective Herbicides Going Forward?

Julie Kikkert, CCE Cornell Vegetable Program

In January, I had the fortune of traveling to Philadelphia, PA to attend the Meetings of the Northeastern Weed Science Society and American Society for Horticultural Science. Leading weed scientists from the US gathered at a symposium to discuss new innovations in weed management. While much of the information presented was from those working in field crops, the clear message about herbicide effectiveness and availability will significantly affect the vegetable industry as well. Allen Gent, US Soybean Product Manager for Bayer Crop Sciences, stated that there was a 62% yield gain from 1965-1979 due to herbicides and that USDA currently estimates a 20% yield loss if herbicides were no longer available or effective. What role do herbicides play on your farm? There is no doubt that the situation has and will continue to change. Here are some things to know:

Linuron herbicide resistant pigweed in a New York carrot field.
Photo: Julie Kikkert, Cornell Vegetable Program

HERBICIDE RESISTANCE – A WARNING TO ALL

Several of the conference presenters echoed how serious the problem of herbicide resistant weeds has become, especially in the southern states. Dr. Robert Scott, Extension Weed Scientist at the University of Arkansas, illustrated how fast resistance can spread. In 2005, glyphosate resistant Palmer Amaranth was detected in a single Arkansas county. Merely 5 years later, it

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VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serving 11 counties in Western New York.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

We're interested in your comments. Contact us at:
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VegEdge is published 25 times per year, parallel to the production schedule of Western New York growers. Enrollees in the Cornell Vegetable Program receive a complimentary electronic subscription to the newsletter. Print copies are available for an additional fee. You must be enrolled in the Cornell Vegetable Program to subscribe to the newsletter. For information about enrolling in our program, visit cvp.cce.cornell.edu. Cornell Cooperative Extension staff, Cornell faculty, and other states' Extension personnel may request to receive a complimentary electronic subscription to VegEdge by emailing Angela Parr at aep63@cornell.edu. Total readership varies but averages 750 readers.

Help us serve you better by telling us what you think. Email us at *cce-cvp@cornell.edu* or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.

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<<< BREAKING NEWS >>>

From Betsy Lamb, NYS IPM, Cornell: **If you haven't been checking for symptoms of Tobacco Mosaic Virus (TMV) on your incoming plant materials, you should be. Particularly petunia - but this is a good excuse to start checking all incoming plant materials. Remember that TMV is one of those viruses that you can spread by handling, so pay attention to sanitation when handing any plants. Nora Catlin's article in e-GRO is very thorough – with information on ID and sanitation – including using milk as a sanitizer: http://e-gro.org/alerts.php number 3.15**

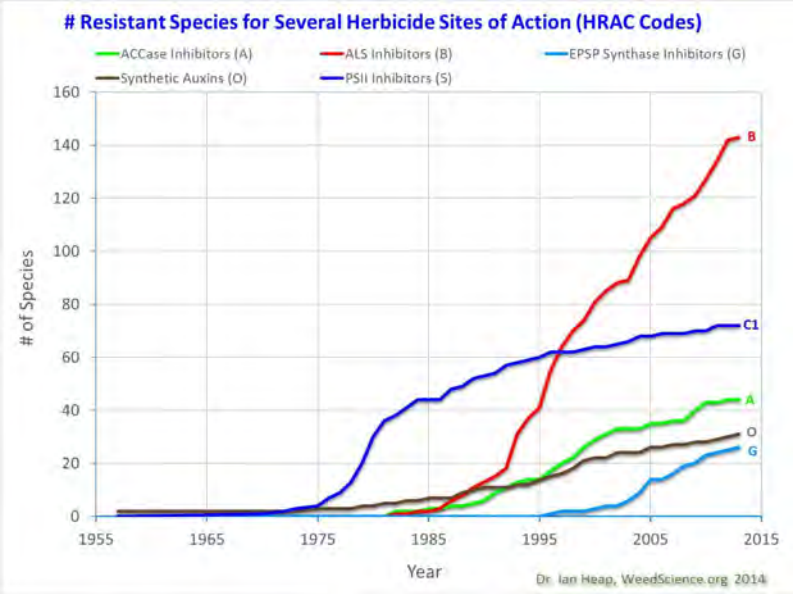
You can purchase TMV test strip kits from Agdia at https://orders.agdia.com/InventoryD.asp?attribute_Size=5&collection=ISK+57400&loc=IN

was detected in all 33 of the major agricultural counties of the state. Dr. Scott believes that resistance evolved in different places at the same time and moved around via rivers, combines, etc.

So yes, I'll admit much of this is due to widespread use of glyphosate on RoundUp Ready field crops…but hold on: **Did you know that the first reports of herbicide-resistant weeds go back to the 1950's?** RoundUp Ready soybeans were introduced in 1996, followed by corn in 1998. (The herbicide class including Roundup was not the first to show weed resistance, nor is it the class with the most resistant species.) According to Dr. Ian Heap, who maintains the International Survey of Herbicide Resistant Weeds, resistant biotypes are becoming increasingly common. These biotypes survive herbicide application at doses that usually give effective control of the species. According to Dr. Heap, there are currently 427 unique cases (species x site of action) of herbicide resistant weeds globally, with 232 species (137 broadleaf weeds and 95 grass weeds). Weeds have evolved resistance to 22 of the 25 known herbicide sites of action and to 152 different herbicides. Herbicide resistant weeds have been reported in 80 crops in 64 countries. **There are currently 14 herbicide-resistant species reported from vegetable crop fields globally**. Recently, Dr. Robin Bellinder and I have identified pigweed resistant to linuron and metribuzin in some New York carrot fields. If you have tough to control weeds, they may be resistant.

FEWER AVAILABLE HERBICIDES

Additional alarming statistics presented at the conference by Alan Gent is the fact that no new herbicide modes of action have been developed since the 1980's (sulfonylureas). In 2000, there were 70 new active ingredients in the pipeline, while in 2012 that number dropped to 28. This means that there are very few new products coming in the next decade. New brands are being introduced, sometimes with mixtures of products, but these are with existing modes of action. We are now in a catch-up mode with herbicide discovery and we need to be good stewards of the products we have. The risk of herbicide resistance is even greater and there will be fewer "band-aids" in the future. To add to the distressing news, more and more herbicides are being lost due to regulatory issues or loss of demand in specialty crops. Case in point has been with table beet growers – a small industry compared to sugar beets. Nearly all sugar beets grown today are RoundUp Ready, reducing the demand for beet herbicides and incentive for them to be produced.



WHAT CAN VEGETABLE GROWERS DO TODAY?

It is now more important than ever to have a whole farm plan to manage rotation of herbicide classes. This can be accomplished both by rotating to different crops where herbicides with different modes of action can be used and also to use different herbicide classes within a crop as much as possible. The Herbicide Resistance Action Committee (HRAC) assigns classes to the different chemistries. The codes can usually be found on herbicide labels. A comprehensive list is on the HRAC website (below). There is also general information in the Cornell Vegetable Guidelines, in the weed management section in the front of the book at: http://veg-guidelines.cce.cornell.edu/4frameset.html.

GENERAL PRINCIPLES OF HERBICIDE RESISTANCE MANAGEMENT (FROM THE HRAC WEBSITE)

1. Apply integrated weed management practices. Use multiple herbicide sites-of-action with overlapping weed spectrums in rotation, sequence, or mixtures.
2. Use the full recommended herbicide rate and proper application timing for the hardest to control weed species present in the field.
3. Scout fields after herbicide application to ensure control has been achieved. Avoid allowing weeds to reproduce by seed or to proliferate vegetatively.
4. Monitor fields and clean equipment between fields.

For annual cropping situations also consider the following:

- Start with a clean field and control weeds early by using a burn-down treatment or tillage, in combination with a preemergence residual herbicide as appropriate.
- Use cultural practices such as cultivation and crop rotation, where appropriate.
- Use good agronomic principles that enhance crop competitiveness.

FOR MORE INFORMATION

- International Survey of Herbicide-Resistant Weeds located at: http://www.weedscience.com
- Herbicide Resistance Action Committee (HRAC) at: http://www.hracglobal.com/

Resistant Melon Varieties Provide Good Powdery Mildew Suppression

Margaret McGrath, Cornell - Riverhead, and Sandra Menasha, CCE Suffolk Co.

(Meg McGrath believes the powdery mildew resistance results in this trial should apply to upstate NY as well as to Long Island. C. MacNeil, CVP)

Varieties with resistance are a valuable tool for managing powdery mildew (PM) in melons. PM is the most important disease affecting cucurbit crops, occurring every year throughout New York. Successful control of PM in melon is critical to ensure leaves remain healthy until fruit mature and obtain high sugar content, which results in good flavor. Resistant melon varieties can provide a very good level of control of PM; however, there is concern that evolution in the pathogen will result in appearance of another new race. Providing growers with information about the performance of resistant varieties under local conditions, in terms of disease suppression as well as yield and fruit quality, has been a goal of variety evaluations conducted at the Long Island Horticultural Research and Extension Center (LIHREC).

Resistance in melons is race-specific. Genes have been identified and bred into commercial varieties that confer resistance to Race 1 and Race 2 of the pathogen. Race 1 has been the dominant race occurring recently based on the fact that PM has been effectively suppressed by a variety with resistance to just Race 1 in previous melon variety evaluations. Varieties with resistance to both races have provided better control some years indicating that Race 2 has also been present. Most powdery mildew resistant varieties currently marketed have resistance to both races. Varieties with resistance to both races do not always exhibit similar suppression.

The goals of research conducted in 2013 at LIHREC were to evaluate recently-released resistant melon varieties in terms of ability to suppress PM, fruit quality, and yield compared to a variety without resistance and also to established resistant varieties; and in the process, monitor the pathogen for a new race able to overcome genetic resistance in melons. Growers need to know the level of suppression provided by resistant varieties to effectively manage PM with an integrated program. There are now several types of melons with resistance to PM.

Methods: To provide a source of inoculum, two plants of a PM-susceptible squash variety were planted between each plot in each row. No fungicides were applied with activity for PM. Fungicides were applied preventively for anthracnose, downy mildew and Phytophthora blight. Area Under the Disease Progress Curve (AUDPC) values were calculated to obtain a measure of severity.

Results: Symptoms were first seen on 15 July. The resistant varieties provided a very high level of suppression of PM. Degree of control relative to the susceptible variety, Superstar, on 12 August, when first fruit were ripe, ranged from 83% to 100% on upper leaf surfaces and 86% to 100% on lower surfaces. Subsequently, PM severity increased on the resistant varieties, reaching 8% to 29% on upper leaf surfaces and 3% to 20% on lower surfaces on 27 August. Leaves on the susceptible variety were dead on 20 August. Eclipse, which has major-gene resistance only to race 1 of the pathogen, was not significantly more severely affected by PM than any of the varieties with resistance to races 1 and 2, suggesting that race 1 was the dominant race present. Thus evidence was not obtained in 2013 for a new race being present on LI affecting control achieved with resistant varieties.

Fruit of Sugar Cube had the numerically highest sucrose concentration and received the highest taste rating (see Table). Sucrose content typically is related to taste. Samoa (Harper type), SXM 7057 (canary type), and Athena (standard cantaloupe) also had good fruit quality. Fruit quality was the worst for Superstar, which was at least partly due to the impact of unsuppressed PM on foliage. Sugar Cube produced smaller fruit than the other varieties (personal-sized fruit) but twice as many fruit.

Recommendations for 2014 are to use an integrated program, consisting of fungicides applied to varieties with resistance to pathogen races 1 and 2, to ensure PM is effectively managed as well as to manage against further selection of new pathogen strains. Fungicide applications should start before or at the first sign of PM. Examine both surfaces of at least 50 old leaves each week, beginning when fruit start to enlarge. It is especially important to turn leaves over and examine the lower (under) side where PM develops best. The action threshold for starting fungicide applications is 1 affected leaf out of the 50 examined. Make additional applications on a 7- to 14-day interval based on when additional symptoms develop. PM development can be delayed and slower on resistant varieties compared to susceptible ones.

Conventional production. Apply mobile fungicides that have selective activity for PM tank-mixed with a contact, protectant fungicide (e.g. chlorothalonil, copper, oil). Torino (FRAC Code U6 fungicide) and Quintec (Code 13) are expected to be the most effective. As with other targeted fungicides, they need to be applied in alternation to manage development of fungicide resistance, and to be in compliance with the label. Procure (or another FRAC Code 3 fungicide) and Pristine (Code 7 + 11) are other targeted fungicides that could be used. Their effectiveness has been variable from year to year in fungicide efficacy experiments conducted on LI most likely reflecting presence of fungicide resistant pathogen strains. Both were effective in 2013. FRAC Code 1 and 11 fungicides are not recommended due to resistant strains being very common. (See the 2014 Cornell Veg Guidelines Disease Management section at http://veg-guidelines.cce.cornell.edu/2frameset.html)

Organic production. There are several OMRI-listed products demonstrated to be effective protectant fungicides for controlling PM on upper leaf surfaces in experiments conducted at

LIHREC. In past trials, of the OMRI-listed products tested sulfur was the most effective material, followed by mineral and botanical oils, followed by potassium bicarbonate products. OxiDate wasn't effective but a new formulation has become available since testing which may provide control.

This project was supported by funding from the Friends of Long Island Horticulture Grant Program.

The specific directions on fungicide labels must be adhered to -- they supersede these recommendations, if there is a conflict. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.

Control of powdery mildew and fruit quality for melon varieties evaluated in 2013.

Variety (resistance, fruit type) [w]	Fruit quality [x] Brix (% sucrose)	Taste
Superstar (S, C)	6	4
Eclipse (R1, C)	10	5
Athena (R, C)	11	8
Verona (R, C)	9	6
Majus (R, C)	8	6
Sugar Cube (R, PC)	14	9
SXM 7057 (R, Ca)	12	7
Angelina (R, HD)	11	4
Inbar (R, G)	9	6
Samoa (R, H)	12	8

[x] Brix measured with a refractometer. Taste rated on a 1-9 scale with 1=poor, 3=fair, 7=acceptable, 9=excellent.

[w] R1 indicates resistance to Race 1 of the powdery mildew pathogen; R1,2 = resistance to Race 1 and 2. C=cantaloupe, PC=personal-size cantaloupe, Ca=canary, G=galia, H=Harper, HD=honeydew, and T=tuscan.

Superstar melon with leaves dying early because of powdery mildew. *Photo: M. McGrath, Cornell - Riverhead*

Verona melon with no powdery mildew visible on leaves. *Photo: M. McGrath, Cornell - Riverhead*

Early Season Weed Control in Peas

Julie Kikkert, CCE Cornell Vegetable Program

Ideally, weed control in peas and other vegetables should start several years before planting the crop. You'll get the best results by using good crop rotation, cover crops and other practices that suppress weeds. This is especially true for weeds that are problematic in peas such as corn chamomile ("daisy"), nightshades, and Canada thistle. Ideally, fall applications of herbicides would have been applied to control any daisy or thistle problems for the coming year. A comprehensive article on nightshade management can be found in the pea section of our website http://cvp.cce.cornell.

For peas that haven't yet been planted, there are pre-plant incorporated (PPI) or pre-emergence (PreE) herbicides that can be used (see the 2014 Pea Herbicide Chart on our website at http://cvp.cce.cornell.edu).

- Sharpen (saflufenacil) can be used PPI or PreE, but at the rate used in peas, provides only fair control of lambsquarters, pigweed, eastern black nightshade and velvetleaf.
- Pursuit (imazethapyr) can be used PPI or PreE. Its strengths are redroot pigweed, mustards and nightshades. When used PPI, it also has good activity against common lambsquarters.
- Optill (saflufenacil + imazethapyr) can be used Pre-Plant, PPI or PreE. Its strengths are lambsquarters, pigweed, mustards, and both eastern black and hairy nightshade.
- Treflan HFP (trifluralin) and Prowl 3.3EC or H_20 (pendimethalin) are applied PPI and each has good annual grass activity. In addition, Prowl is effective against lambsquarters, purslane, pigweed and velvetleaf.
- Command 3ME (clomazone) (PreE) has good activity against annual grasses and some broadleaves (esp. velvetleaf). Be aware that peas will turn white in areas where the herbicide is overlapped. The peas will grow out of this and usually will not be harmed.
- Dual Magnum or Dual II Magnum (s-metolachlor) – apply only pre-emergence after planting and do not incorporate. If soils are wet and cold during emergence, Dual may delay maturity and/or reduce yields. Dual provides excellent control of annual grasses and yellow nutsedge. It is also good on several broadleaves including lambsquarters, purslane, pigweed, galinsoga, and eastern black nightshade. Dual is a great choice if you have the right soil moisture conditions.

Cultivation isn't used much by processing growers because they want a uniform field surface for harvesting. Fresh market growers may find cultivation with a flex-tine weeder or harrow a useful way to manage weeds in peas.

PPI and PreE herbicides won't provide complete control of weeds alone. You'll need to be scouting and managing weeds well into the season. Look for follow-up info in VegEdge on how to manage pesky weeds once your peas are growing.

Using Growing Degree Days to Time Sweet Corn Planting

Stephen Reiners, NYSAES, Cornell; edited by Carol MacNeil and John Gibbons, CCE Cornell Vegetable Program

The goal for sweet corn growers is to have product to sell all summer long. That means no harvest gaps that leave you scrambling to buy corn from a neighbor or bunching up of several fields so that you have too much at one time. Every time an acre is bypassed, you lose at least $1,000. Developing a reliable planting schedule can lead to season long production without too much or too little at one time. One of the most accurate ways to spread out your corn harvest is by using growing degree days (GDDs). You know that when it's very cool corn grows very slowly, and when its warm corn grows much faster. GDDs reflect corn growth much better than calendar days or days to maturity. Seed companies have information on the GDDs to maturity for their varieties, information needed to use the system. If GDDs are not provided contact your seed dealer.

The 86/50 degree F GDD system is most predictive of corn growth. In the 86/50 GDD system average temperatures below 50°F are not counted because corn doesn't grow at that low a temperature. In addition, average temperatures above 86°F are not used because at very hot temperatures high plant respiration cancels out photosynthesis so there's no net growth. Recording and adding up the GDDs from planting provides a pretty good idea of when the corn will be ready. You can calculate GDDs from daily average temperatures with a well calibrated max/min thermometer. See the end of the article for the procedure. If there is a Network for Environment and Weather Applications (NEWA) weather station near your farm you can access the 86/50 degree F GDD log at: http://newa.cornell.edu/index.php?page=growing-degree-days

Problems with Using Days To Harvest (DTH) - *Seed catalogs and seed companies also provide information on days to harvest (DTH). The problem with scheduling plantings using DTH is that they are not exact. A variety listed as 70 DTH may be ready in 70 days if you plant it in mid to late June when the soil and air temperature are warm. Planted in early May, that 70 day corn may take 90 days to mature. Why? DTH ratings are calculated by seeding the corn when the soil is already warm. The corn emerges quickly and grows steadily. When corn is planted in cool soils early in the year, however, emergence may take 14 days rather than 4. Using DTH to time corn planting can lead to gaps and gluts in sweet corn.*

Example: Using Growing Degree Days (GDDs) - Suppose an April 15 planting of a 68-day (68 DTH) corn that requires 1400 GDDs to mature. Looking online at NEWA weather records for 2010 and adding up the GDDs for the time since planting, 1400 GDDs were reached on July 18. Had the season been warmer, the GDD threshold would have been reached earlier and the corn would be ready for harvest earlier. Cooler weather would have slowed GDD accumulated and delayed harvest. (In actual practice, use long term average daily degree days for your area to estimate future GDDs. This information is available at the Northeast Climate Center. See the directions at the end of this article. If you are not on the internet contact our office and we'll send you a hard copy.)

How do you use GDDs to determine when to make your second planting? You begin planting sweet corn on April 15, using the 68 DTH, 1400 GDD variety. You know from experience that the corn will probably mature in mid-late July. You also know that you have about a 3 day window to harvest the 3 acres you planted. When do you make your next planting to keep a steady supply?

First, for the 3 day harvest period in mid-late July estimate the number of GDDs that will accumulate from local, long term average temperatures. In the Geneva area, the average daily temperature is about 72°F in July. That means we accumulate about 22 GDDs (72 – 50 = 22) each day. That's a total of 66 GDDs for the 3 day harvest. We need to time our second sweet corn planting 66 GDDs after making our first planting. Using 2010 weather for the example, here is the planting schedule to keep a continuous supply of that 68 DTH, 1400 GDD variety.

April 15 ---------- April 29 ---------- May 3 ---------- May 16

It may seem strange to have two weeks between the 1st and 2nd planting and only 4 days between the 2nd and 3rd. But in 2010 we had very cool temperatures after April 15 and it took two weeks to accumulate 66 GDDs. Hot weather followed the April 29 planting, hence only 4 days to accumulate the 66 GDDs. And unseasonably cool temperatures were experienced between May 3 and May 16. The expected harvest dates are shown in Table 1.

Table 1. Expected harvest dates using the 86/50 GDD model to schedule corn plantings.

			PLANTING DATE			
			April 15	April 29	May 3	May 16
Variety	DTH	GDD	HARVEST DATE*			
1	68	1400	July 17	July 20	July 22	July 26

* Based on actual GDDs for 2010

Using Growing Degree Days with Several Varieties - Of course growers don't usually use the same variety for the entire season. A variety that does well early may not be the preferred variety for later plantings. Suppose on April 15 you plant four different varieties with DTH that range from 68 - 86 days, and GDDs to maturity ranging from 1400 – 1610 GDDs. When do you make your second planting? You need to calculate the difference in GDDs between the earliest and latest maturing varieties, in this example it is 210 GDDs (1610 – 1400 = 210). Add to that the 66 GDDs for the 3 days to harvest the first variety. That's a total of 276 GDDs. Keep

track of the GDDs from the day of the first planting on April 15. In 2010 the 276 GDD level was reached on May 26 when you would plant all of the varieties again (Table 2). Following this schedule you would have corn available from July 17 through August 9. Choosing varieties with roughly 66 GDDs difference between them would spread out the harvest dates even more evenly.

Using DTH as a guide, making our second planting May 5, the corn would bunch up with some of the later planted corn maturing when we're still harvesting from the first planting.

Table 1. Expected harvest dates using the 86/50 GDD model to schedule corn plantings.

			PLANTING DATE BASED ON 86/50 GDDs		PLANTING DATE BASED ON DAYS TO HARVEST	
			April 15	May 26	April 15	May 5
Variety	DTH	GDD	HARVEST DATE*		HARVEST DATE*	
1	68	1400	July 17	July 30	July 17	July 23
2	73	1460	July 20	August 2	July 20	July 26
3	80	1580	July 25	August 7	July 25	August 1
4	86	1610	July 26	August 9	July 26	August 2

* Based on actual GDDs for 2010

Using the 86/50 Growing Degree Day model to schedule corn plantings is an effective way to ensure a continuous supply of corn. All you need is the number of GDD's for the variety you are planting and access to average daily temperatures available on NEWA or from your max/min thermometer.

Calculating Growing Degree Days Using a Max/Min Thermometer - You can calculate 86/50 GDDs using a max/min thermometer, which physically records the daily high and low temperatures. (A max/min thermometer is available for about $35 through Gempler's at: http://www.gemplers.com/iCatalog or at: 1-800-382-8473, or through your farm supply store.) You need to record high and low temperatures and reset the thermometer every day from the first day you plant corn to the last day you plant corn.

If the maximum temperature on the previous day was 66°F and the minimum was 46° then the average temperature was 56° (66 + 46 = 112; 112 divided by 2 = 56). Only temperatures above 50° result in corn growth so the GDDs = 6 GDDs (56 – 50 = 6).

Later in the season the maximum temperature on the previous day may be 90°F and the minimum may be 70°. Since corn rate of growth peaks at 86° use that as the maximum, making the average temperature 78°. The GDDs are 78 – 50 = 28 GDDs.

Accessing Long Term Average Daily Degree Days – To access long term average daily degree days go to the Northeast Regional Climate Center website at:
http://climod.nrcc.cornell.edu

- Click on the Climod Test link at the top of the page under CLIMOD.
- On the left under Product Selection click on "Daily/Monthly Normals".
- Check "Daily"
- Click on the Variable entry to get the drop-down menu. Click on "GDD base 50".
- Click on Station/Area, enter your zip code, and type Enter.
- Click on the Station entry to get the drop-down menu.
- Select the site closest to you, and click on "Go"
- Add up the GDDs starting at your first planting date until you reach the GDDs for your variety. That's the estimated date of harvest. Save or print for future reference.

VEGETABLE RESEARCH TECHNICIAN POSITION AVAILABLE

The Cornell Vegetable Program seeks an individual to assist in research trial implementation, data collection and harvest. Work in field and greenhouses throughout Western NY. Full-time with benefits. Minimum 6 months training beyond HS diploma or Associate's degree.

Applicants will be required to apply online but the posting is not currently available. To receive our job posting notification, email us at cce-cvp@cornell.edu.

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Upcoming Events

We've added topic icons to our upcoming events to make it easier for you to scan through the event list and focus on events that are of interest to you. General meetings, covering multiple topics, will not feature an icon.

We're also drawing extra attention to meetings offering DEC recertification credits. Look for the DEC logo to denote availability of DEC recertification credits.

Farm Food Safety Training with GAPs

March 6-7, 2014 | 8:30 AM - 4:00 PM
NYS Ag Experiment Station, Food Research Lab, Rm 251, 630 W North St, Geneva 14456

This training is for those farmers who are being required by buyers to provide third party verification of their food safety practices and for farmers thinking about moving in this direction. The first day of training will focus on the details of what GAPs is, how it works and what it means for your farming operation. The second day will be devoted to helping you write a food safety plan as required for audit certification. A laptop computer is required for the second day. After attending the 2-day workshop, growers are invited to a mock audit during the growing season so they know what to expect from a third party audit.

Cost: $60. Pre-register by March 3, 2014. For more info or registering online, go to cvp.cce.cornell.edu or contact Craig Kahlke at cjk37@cornell.edu or 585-735-5448. *This workshop is partially funded through a grant from the Genesee Valley Regional Market Authority.*

Building Fertility Through Cover Crops

March 11, 2014 | 9:00 AM - 2:00 PM
CCE Ontario County, 480 N Main St, Canandaigua 14424

This workshop will focus on improving grower's ability to use cover crops to improve on-farm fertility management. Among other topics, speakers will address questions like 'how do I provide adequate N through cover cropping' and 'what are the nuts and bolts of using cover crops to improve fertility?'.

Cost: $10 for Cornell Vegetable Program enrollees; $20 all others. **Register by March 7** to Nancy Anderson (for lunch count) at nea8@cornell.edu or 585-394-3977 x427 but pay at the door. For more info, contact Elizabeth Buck at emb273@cornell.edu.

Solar and Renewable Energy for Farms: Finances, Incentives, and Insights

March 12, 2014 | 8:30 AM - 12:00 Noon
CCE Ontario County, 480 N Main St, Canandaigua 14424

CCE Ontario, in cooperation with RER Energy Group and several regional renewable energy enterprises, is hosting a FREE seminar for farmers and business owners about small-scale renewable energy, with an emphasis on solar photovoltaic applications. This two-part workshop will introduce financial and economic considerations and then will cover technological topics, such as net metering, utility interconnection, and remote power. To register, email bmaholick@rerenergygroup.com or visit http://www.rerenergygroup.com. Space is limited.

Hot Water Seed Treatment Clinic

March 14, 2014 | 9:00 AM - 3:30 PM
NYS Ag Experiment Station, Food Science Building, 630 W North St, Geneva 14456

This clinic will allow growers to learn about the benefits of hot water treatment of seeds for disease control. *Growers should bring their own tomato or brassica seeds, which will be hot water treated.*

Cost: $15 for Cornell Vegetable Program enrollees; $20 all others. Limited to 12 growers! Contact Robert Hadad at 585-739-4065 or rgh26@cornell.edu to reserve a seat but pay at the door.

NYS Dry Bean Meeting

March 18, 2014 | 9:00 AM - 3:00 PM
LeRoy Country Club, 7759 E Main Rd/Rt 5, 1 mile east of LeRoy

All growers and those interested in the NYS dry bean industry are invited to attend. Lots of dry bean dishes to taste! The NYS Dry Bean Industry Advisory Committee will meet at the end of the educational meeting. DEC and CCA credits available. Pre-registration cost: $20 CVP enrollees; $30 all others ($25 CVP enrollee; $35 non-enrollee at the door). Pre-register or find more details online at cvp.cce.cornell.edu or call 585-394-3977 x426 **by March 10.** *Sponsored by Carolina Eastern-Crocker, Genesee Valley Bean, and New York Bean.*

Winter Wednesday Lunch Series: Vegetable & Small Fruit Production Webinars

March 19, 2014 | Conventional and Organic Weed Control in Sweet Corn, Pumpkins, and Winter Squash | 1:00 - 2:00 PM
April 2, 2014 | Fertigation: Scheduling and Water Quality Considerations | 1:00 - 2:00 PM

Cost: $10/webinar. To register, go to http://extension.psu.edu/vegetable-fruit/winter-webinars or call 724-627-3745.

Trickle Irrigation / Fertigation Workshop

March 20, 2014 | 9:00 AM - 12:00 Noon
NYS Ag Experiment Station, Jordan Hall, 630 W North St, Geneva 14456

This workshop will provide details on "how-to" for size and setting up trickle irrigation and fertigation set-up and operation. Dr. Bill Lamont (Penn State) will give an in depth look at setting up and using a trickle irrigation system. Dr. Steve Reiners (Cornell) will walk participants through the math and other considerations related to fertigation systems.

Cost is $15 for Cornell Vegetable Program enrollees, $25 otherwise. Pre-register by calling Karen Krysa at 716-433-8839 x221 so organizers can adequately prepare, but note that payment will be at the door.

Forecasting Potato/Tomato Late Blight on Your Farm

March 20, 2014 | 1:00 - 4:00 PM
CCE Monroe County, 249 Highland Ave, Rochester 14620

Learn how to use this new LB forecast tool on your farm. Participants will set up their personal farm accounts on the Late Blight Decision Support System (DSS) website, defining the location of their farm/fields, and their varieties. They can sign up for email/text alerts regarding when fungicide sprays are needed. Once basic farm/crop information is in a user's account they can access DSS reports and input fungicide sprays by smartphone or tablet. 2.25 DEC pesticide credits will be available.

A laptop computer capable of wireless internet access is needed for the workshop. Be sure to indicate if you need to borrow one! If you have questions about the workshop or the LB Decision Support System contact Carol MacNeil at 585-313-8796. Free - but **pre-registration is required by March 13**. Pre-register online or call Carol MacNeil at 585-313-8976.

Organic Pesticide Applicator Training for Fruit & Vegetable Growers

March 25-26, 2014 | 9:00 AM - 4:30 PM each day
NYS Ag Experiment Station, Jordan Hall, 630 W North St, Geneva 14456

Join CCE, Cornell, NOFA-NY, and DEC representatives for a comprehensive 2-day training. Learn how to calibrate backpack and tractor sprayers, choose the best nozzle, assess and improve spray coverage, and properly maintain equipment. Participants will walk through the pesticide decision making process and spray preparation with experienced Cornell researchers. Classroom topics include pesticide rules, regulations and the organic grower; navigating the National Organic Program's pesticide rules; and organic product overview and efficacy.

Cost: $65 includes breakfast, lunch and the Northeast Pesticide Safety Education Core Manual. To register, contact Emily Cook to obtain the registration form at 845-943-9810 or ekc68@cornell.edu.

2014 Garlic School: Post-Harvest Focus

March 28, 2014 | 10:00 AM - 2:30 PM
NYS Ag Experiment Station, Jordan Hall, 630 W North St, Geneva 14456

Topics include harvesting to different drying techniques, thoughts on longer term storage, and a garlic bloat nematode update.

Cost: $20 per person, if enrolled in the Cornell Vegetable Program; $25 per person, if not enrolled. Fee includes lunch. **Register online by March 24** or mail in the registration form with your payment**.** For more info, contact Robert Hadad, rgh26@cornell.edu or call 585-739-4065.

Vegetable Grower Meeting

April 3, 2014 | 9:15 AM - 4:00 PM
CCE Erie County, 21 S Grove St, Suite 240, East Aurora 14052

CCE Erie and the Cornell Vegetable Program have teamed together to offer a comprehensive grower meeting. Topics include managing pests in transplants, weed management, growing for late season winter markets and CSA sales, the markets and economics of producing tomatoes, management of powdery mildew in vine crops, disease management in green beans, and using apps for your vegetable business. Updates on the HarvestNY Program and the NY Invasive Species Program will be presented. Plus growers will hear from the newest Cornell Vegetable Program Specialist, Darcy Telenko, on her experiences and what she plans to bring to the Cornell Vegetable Program region. The full agenda is available on the CVP website: http://cvp.cce.cornell.edu.

DEC credits will be available. Cost: $20 for CCE Erie Ag or Cornell Vegetable Program enrollees; $30 all others. To register, contact Kim Howell at 716-652-5400 x176 or kkh59@cornell.edu.

Using Soil Science to Refine Your Fertility Plan (Walk & Talk Discussion Group)

April 9, 2014 | 5:00 PM
CCE Allegany/Cattaraugus, 5435A County Rd 48, Belmont 14813

A foundation in basic soil science ideas - like understanding how your soil type behaves physically and chemically - gives you a strong basis for making field-level decisions that save you time, energy, and money. This meeting will focus on helping growers work ***with*** instead of ***on*** their fields to improve fertility and other management areas.

Contact Elizabeth Buck at 607-425-3494 or emb273@cornell.edu for more info, no pre-registration required.

Calibrate to Propagate

Judson Reid, CCE Cornell Vegetable Program

The 2014 greenhouse season is now underway. Both vegetable transplants and flowers are germinating and growing in local greenhouses. To keep plants healthy, water quality needs to be monitored and managed. The high pH/alkalinity of irrigation water can elevate root zone pH and interfere with nutrient uptake by young plants. To prevent this, acid is injected into the irrigation water. Sulfuric acid is the common choice, with organic growers using citric.

But, how do we know how much to inject? Having water tested for both alkalinity and pH by a qualified lab is one option. Often these tests will come with recommendations for the quantity of acid for a given crop. Another option is to conduct the monitoring on site. pH meters are important tools for this purpose. However meters need to be calibrated periodically to ensure accuracy. Stock solutions of a given pH (4.0, 7.0 or 10.0) are available to calibrate meters. It is best to have all three on hand to conduct a two-way calibration for improved accuracy of the meter. Stock solutions are available from laboratory supply companies.

The calibration process will vary with the model of meter, but in general the instrument will have a calibration mode that will state the required stock solution and give options for one-way or two-way calibrations. Meters should be calibrated at the beginning of each season, and the stock solution needs to be fresh as well.

Calibration supplies
Photo: Judson Reid, Cornell Vegetable Program

What pH are we seeking? This varies with the crop and more importantly the ppm of alkalinity in the irrigation water. For some crops such as petunias and calibrachoas pH values can be as low as 5.2, whereas for vegetable crops, such as tomatoes and peppers, 6.2 is adequate. We can gradually add acid to the irrigation water to reach these levels; generally 1-2 ounces per hundred gallons total irrigation water. This varies considerably with the type and strength of the acid. Without an alkalinity test however, pH is simply a guideline. But, alkalinity is not determined with a meter but rather a lab titration test. Thus many seek the results and recommendations of a lab for acid recommendations.

Remember-acids are dangerous! Add them to water and not vice-versa. Wear protective equipment including eye protection when handling them. Blindly adding acid can make you blind. Not calibrating your pH meter is akin to not sighting in a rifle before deer season. Be sure to calibrate at the beginning of each greenhouse season for high quality water and healthy plants.

Proposed Changes to the Worker Protection Standard

From the US Environmental Protection Agency

(For more info go to: http://www.epa.gov/oppfead1/safety/workers/proposed/index.html View the details of the specific proposed changes. Information on submitting comments on these proposals is also included on the website. ed. Carol MacNeil, CVP)

We are seeking your input by the date specified in the Federal Register notice, which will publish within 10 days of Feb 20 at http://www.regulations.gov identified by docket number EPA-HQ-OPP-2011-0184-0002.

Changes are being proposed to the Agricultural Worker Protection Standard (WPS). Proposed changes include:

- Increased frequency of mandatory worker trainings (from once every five years to annually) to inform farm workers about their protections under the law, including restrictions on entering pesticide-treated fields and surrounding areas, decontamination supplies, access to information, and use of personal protective equipment. Expanded trainings will include instructions to reduce take-home exposure from pesticides on work clothing.
- Expanded mandatory posting of no-entry signs for the most hazardous pesticides.
- Children under 16 will be prohibited from handling pesticides, with an exemption for family farms.
- No-entry buffer areas surrounding pesticide-treated fields will protect workers and others from exposure from pesticide overspray and fumes.
- Measures to improve the states' ability to enforce compliance including requiring employers to keep records for two years of application-specific pesticide information as well as farmworker training and early-entry notification.
- Personal Protection Equipment (respirator use) must be consistent with the Occupational Safety & Health Administration standards for ensuring respirators are providing protection, including fit test, medical evaluation, and training.
- Make available to farm workers or their advocates (including medical personnel) information specific to the pesticide application, including the pesticide label and Material Safety Data Sheets.
- Continues the exemptions for family farms.

Spring 2014 CleanSweepNY will target NYSDEC Region 9: Allegany, Chautauqua, Cattaraugus, Erie, Niagara, and Wyoming Counties.

April 29, 2014
Cattaraugus County DOT
4474 Route 353, Salamanca, NY

April 30, 2014
Wyoming County DOT
3879 State Route 19 South, Warsaw, NY

May 1, 2014
Niagara County DOT
5055 Lockport Junction Rd, Lockport, NY

CLEANSWEEPNY IS AN ENVIRONMENTAL BENEFIT PROJECT that provides for the environmentally safe and economic collection and disposal of unwanted or unusable pesticides, school chemicals, golf course chemicals, and elemental mercury and mercury-containing devices (e.g. manometers and thermometers). CleanSweepNY also collects and recycles triple-rinsed HDPE plastic containers from agricultural and certain non-agricultural entities. The NYS Department of Environmental Conservation administers the CleanSweepNY project through its Albany, NY Central Office Pesticides Program. Funding for this environmental benefit project is administered by the Natural Heritage Trust.

CleanSweepNY is supported by Cornell Cooperative Extension, the Agricultural Container Recycling Council, Soil and Water Conservation Districts, New York Farm Bureau, and related grower associations. These services will be provided to New York State farmers and other entities within the New York agriculture community, certified pesticide applicators, and schools.

These services are NOT available to homeowners.

Pre-registration is required by April 4 for participants with unknown products and gas cylinders; by April 25 for all other participants. Interested individuals should call the local DEC office at 716-851-7220 or the Albany office at 877-793-3769 to obtain a signup packet. E-mail questions to info@cleansweepny.org.



Since CleanSweepNY's inception in 2002, over 1.2 million pounds of chemical wastes have been collected for disposal.

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VegEdge is the award-winning newsletter produced by the Cornell Vegetable Program in Western New York. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas and research results from Cornell and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.

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Cooperative Extension
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