

Cornell University Cooperative Extension Regional Vegetable Programs

January 2012

Volume 8, Issue 1

Farm Employers and Employee Sessions at the Expo

Alison De Marree and Mario Miranda Sazo, Lake Ontario Fruit Program

LABOR & EMPLOYEE MANAGEMENT: TUESDAY, JANUARY 24

Boosting Workforce Productivity, *B. Ervin* - 8:45 am. Workforce productivity has a direct impact on the bottom line. What may appear to be a worker issue is in fact a critical management challenge. This topic will focus on:

1. **Background steps:** defining expectations for each position, building a worker-supportive culture, building a strong team of supervisors, and designing a positive work environment.
2. **Human resource management practices:** hiring the "right" people, well-planned orientation and training, removing barriers to motivation, putting motivators in place, providing performance feedback, and practicing two-way communication.
3. **Monitoring workforce productivity:** collecting productivity data, seeking feedback from employees, and making needed change.



Mario Miranda Sazo, CCE Lake Ontario Fruit Program, and Spanish-speaking employees after finishing a Honeycrisp harvest in Alton, Wayne County.

Effective Delegation – *B. Erven*, 12:30 pm. Delegation is a powerful management tool. Yet many managers believe "doing it myself is easier, better and faster." Delegation is important for managers to do both themselves and their employees a big favor. We will also discuss the steps for successful delegation, and guidelines for perfecting this skill.

Using Standard Operating Procedures (SOPs) – *A. DeMarree*, 1:45 pm. A standard operating procedure is a check list of the steps in completing a specific job satisfactorily. Included: SOP's in GAP food safety plans and other jobs, and SOP's in training employees. Handouts could be used in your USDA GAP or Primus food safety plan.

Succeeding as a Supervisor – *B. Erven*, 3:30 pm. This session emphasizes communication and other skills, actions, and step by step procedures to being an effective supervisor. Effective supervisors do much more than give orders. What changes when one becomes a supervisor? Please consider sending employees assuming new supervisory responsibilities.

Farmworker perspectives on worker satisfaction – *M.J. Dudley*, 4:45 pm. The Cornell Farmworker program recently surveyed NY farmworkers. Find out what you can do as an employer to improve farmworker job satisfaction.

SPANISH-SPEAKING EMPLOYEES HAVE A LOT TO LEARN: THURSDAY, JANUARY 26

The 2012 Empire State Fruit and Vegetable Expo will include, for the first time, two educational sessions in Spanish on Thursday, January 26 at the Oncenter in Syracuse. These sessions are focused on **"Work Smarter Not Harder."** DEC credits will be available. Major topics: fundamentals of plant physiology, pruning, production economics, marketing, food safety,

Continued on page 3

Veg Edge

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Veg Edge is a shared publication of two Cornell Cooperative Extension teams, the **Cornell Vegetable Program**, serving 12 counties in Western & Central NY, and the **Capital District Vegetable & Small Fruit Program**, serving 11 counties in the Capital Region of NY



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This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are possible. Some materials may no longer be available and some uses may no longer be legal. All pesticides distributed, sold or applied in NYS must be registered with the NYS Dept of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide usage in NYS should be directed to the appropriate Cornell Cooperative Extension (CCE) specialist or your regional DEC office.

CCE and its employees assume no liability for the effectiveness or results of any chemicals for pesticide usage. No endorsement of products or companies is made or implied.
READ THE LABEL BEFORE APPLYING ANY PESTICIDE.

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plant pathology, and emergency planning. We encourage you to send your Spanish-speaking employees to let them learn more about the science of agriculture, and network with their peers. Are you committed to growing the highest quality produce, with a well-trained labor force? If so, send your Spanish-speaking employees to the Expo January 26th! See details in the Expo program, or go to: www.nysvga.org and Click on EXPO. ■

USDA Email Subscriptions for Ag Statistics

<http://usda.mannlib.cornell.edu/subscriptions>

USDA, in cooperation with the Ag Library at Cornell, offers free subscriptions to over 100 reports from statistical agencies within the Department. Most reports contain statistics for individual states as well as regional and U.S. totals. The reports arrive in your mailbox within minutes after release. Auction reports are also available from across the nation. The second new offering is for the "Census of Agriculture." This subscription will alert you to products and services generated by all NASS census programs. This is available at: <http://usda.mannlib.cornell.edu/subscriptions> under "C" for Census. Questions? Call 607-255.5406 or email help@usda.mannlib.cornell.edu. ■

Climate Change & Agriculture in NYS

Dave Wolfe, Horticulture Dept, Cornell

New York's climate is already changing. Since 1970, the annual average temperature in New York has increased nearly 2° F, while New York's winter temperatures are almost 5° F warmer. A number of Cornell researchers in many different departments have been researching climate change. Several new fact sheets on climate change and its impact on NYS agriculture are available at: <http://www.climatechange.cornell.edu> The fact sheet topics are:

Farming Success in an Uncertain Climate (focused on adaptation of NY agriculture); **Farm Energy, Carbon and Greenhouse Gases** (focused on reducing greenhouse gases); **The Earth's Changing Climate**; and **New York's Changing Climate**

Recently the "ClimAID" report, *Responding to Climate Change in New York State*, focused on climate change vulnerabilities and adaptation strategies for New York, was released and is available at the following NYS Energy Research and Development Agency (NYSERDA) website:

<http://nyserdera.ny.gov/en/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx> You can download the Synthesis report, individual chapters (The Agriculture section is Chapter 7), or the full report. ■

WNY Vegetable Farms Make Top 100 List

Tom Rivers, trivers@batavianews.com; edited by C. MacNeil, CVP

Four WNY vegetable farms are included in the list of top 100 vegetable growers in the Northeastern US, a ranking done by the American Vegetable Grower magazine. Torrey Farms, Elba, ranked 13th, grew vegetables on over 6,000 acres in 2010. My-T Acres, Batavia, had over 5,000 acres, Kludt Brothers Inc, Kendall, had over 3,000 acres, and Lynn-Ette and Sons Inc, Kent, had 2,600 acres in 2010. The four WNY farms are all family-run operations, noted Patti Riner, co-owner of My-T Acres. The farms grow vegetables for processing as well as for fresh market. ■

2012 Cornell Guidelines Available

The Pesticide Management Education Program, Cornell

2012 Cornell Integrated Crop and Pest Management Guidelines for Commercial Vegetable Production

The 2012 edition of the *Cornell Commercial Vegetable Production Guidelines* is now available. This annual publication provides up-to-date vegetable crop production information for New York State. It has been designed as a practical guide for vegetable crop producers, crop consultants, and ag suppliers.

In addition to the annually revised pesticide and crop production information, highlighted changes in the 2012 *Vegetable Guidelines* include:

- Updated tomato late blight information;
- Revised broccoli variety disease and insect resistance chart;
- Addition of tomato varieties suitable for high-tunnel production; and
- Revised pesticide regulatory information.

The cost of this *Guide* is \$31.

2012 Cornell Guide for Integrated Field Crop Management

The 2012 *Cornell Field Crop Management Guide* provides up-to-date field crop production information for NYS. The *Field Crops Guide* for 2012 includes detailed soil management and tillage info, revised pesticide regulatory info, and revised IPM guidance. The cost of this *Guide* is \$23.

If you ordered the 2012 Guidelines on your Extension enrollment/subscription form then they will be mailed to you soon. All others can order the publications through Cornell Cooperative Extension offices or from the Pesticide Management Education Program (PMEP) Distribution Center at Cornell University. To order from the PMEP Educational Resources Distribution Center, call (607) 255-7282, send an email to patorder@cornell.edu or visit <https://psep.cce.cornell.edu/store/guidelines> Costs include shipping. ■

Designing a Better Sprayer for Strawberry Pesticide Applications

Laura McDermott, CCE Capital District Vegetable & Small Fruit Program, and Andrew Landers, Cornell

Strawberry growers using conventional boom sprayers find it difficult to obtain good disease and insect control due to poor pesticide coverage on the undersides of leaves, on the lower leaves, and on the fruit when the strawberry plant is in full canopy. Inadequate crop protectant coverage results in higher levels of disease and insect activity translating to consumer rejection of poor quality fruit and lower overall profitability of the planting.

This project allowed an opportunity to work with strawberries – a high value crop with a low, 3-dimensional canopy. Strawberry diseases are a big concern for growers, so adequate spray coverage is important – better coverage would allow growers to make fewer applications of fungicides during the growing season.

Drift is often targeted as being the biggest source of problems with spray deposition. In fact there are other, inter-related factors that combined with drift, make designing the perfect crop protectant delivery system a challenge. These include the sprayer design, the droplet size and the size of the spray fan. The air volume, direction and velocity will also affect the amount of material that is deposited vs. the amount that is lost to drift. Application rate, nozzle orientation and the speed of the tractor, plus the skill and attitude of the tractor operator are also factors. Additionally the crop canopy will determine deposition rate and the weather has a great deal of influence.

There is very little work published specifically for strawberry spraying. Nils Bjugstad, a colleague at the University of Norway has conducted an eight year trial on improving spraying equipment. Bjugstad and Sonsteby (2004) observed the main issue is to obtain approximately the same spray and pesticide coverage and amount on the leaf surface on the outer and inner leaves as well as the upper and underside of the leaves

(mainly spraying against grey mold in Norway). Because the plant canopy increases considerably during the growing season, they concluded that they had to adapt the volume rate according to this change of mass. As shown in their papers, they recommend using three nozzles in the start of the season; two from each side and one from the top, and for larger plants five nozzles per single row; one from the top and two from each of the sides, and in this way adjust the volume rate from 6 litres (12.5 pints), to 9 litres (19 pints), to 12 litres (25 pints) per 100 m (109 yards) row length as the season progresses.

Table 1. Application volumes

Treatment	Litres/100 meter	Gallons/A
1	6	40
2	9.5	79
3	12	105.2

A prototype ‘modified boom’ was built at Cornell University and in 2007 the first field work was conducted to determine appropriate volume rates, proper nozzle selection and the best pressure and nozzle positioning. There were 3 treatments, one from a traditional boom, a

hoop with 3 nozzles and a hoop with 5 nozzles. Deposition onto the crop was measured by adding Pyranine fluorescent tracer into the sprayer tank. Leaves were picked from the top, middle and bottom part of the canopy. Three leaves from each area were placed into plastic bags and sealed. 10 plants per treatment were selected, there were 5 replicates.

It was found that adjusting the volume rates from 6 litres/100 meter of row length to 9.5 litres then finally to 12.5 litres per 100 metres row length as the season progressed and as the crop canopy grew resulted in the best spray deposition over the season. See Figure 1.

The most appropriate nozzles were found to be 02 and 03 nozzles because 015 nozzles were too small and the resulting small droplet size increased the risk of drift and lowered the capacity (rows per hour). See Table 2. Best coverage results were at 75 psi with the nozzles 4-8 inches above the target. See Figure 1.

The following growing season, 2 more “hoops” were constructed and fitted to the sprayers belonging to berry growers John Hand of Hand Melon Farm in Greenwich, NY and Dale Ila Riggs of The Berry Patch in Stephentown, NY. The



Modified boom attached to spray rig.

modified booms or hoops were connected to the existing plumbing system. The hoop was designed with 5 nozzles and the grower could target the canopy with the appropriate number of nozzles, most likely increasing from 3-5 targeted nozzles as the strawberry canopy developed. See photo on previous page.

Florescent pyranine tracer was used to reveal the coverage of spray distributed throughout plant canopy at two different dates. The traditional boom sprayer delivered the best coverage to the outer leaves at both farms on both dates, but this was not the case for the mid and lower canopy leaves as the season progressed. The farm (Farm D) with the smaller boom sprayer and lower pressure application got better coverage from the modified hoop sprayer in the mid and lower canopy leaves and the improved coverage continued throughout the season. The larger boom that uses higher pressure during spray application did not see an advantage to the hoop until later in the season. Then, the inner and lower leaves were covered more thoroughly by the modified boom than they were with the traditional boom. See Figure 2.

Biological effectiveness was rated by noting the presence or absence of infection or insect damage on leaf and fruit tissue. These observations were made for 3 different canopy stages on 2 farms. The degree of infection on leaf and fruit tissue was also rated. Seven leaves were evaluated for each of 5 replications with a rating of 1 being no infection/damage and 5 being entire surface infected/damaged. Twenty-five fruit for each of 4 replications were evaluated using the same rating system. This rating protocol helped to determine if differences existed in effectiveness of spray coverage from each treatment.

The biological data did not support significant statistical differences between treatments (except on Farm A for one date), however, clear and consistent

Continued on page 6

Table 2. Application methods

Treatment #	Nozzle Type	Nozzle Number	Flow rate/nozzle	Pressure	Speed
1	Flat fan – yellow 80 02	Horizontal boom	0.98 l/m (0.26 gpm)	5bar (75psi)	3.2 km/h 2 mph
2	Flat fan – blue 80 03	3 nozzle hoop	1.52 l/m (0.4 gpm)	5 bar (75 psi)	3.2 km/h 2 mph
3	Flat fan – blue 80 03	5 nozzle hoop	1.52 l/m (0.4 gpm)	5bar (75 psi)	4.0 km/h 2.5 mph

Fig. 1 - Amount of spray coverage measured on Plant Canopy - 2007

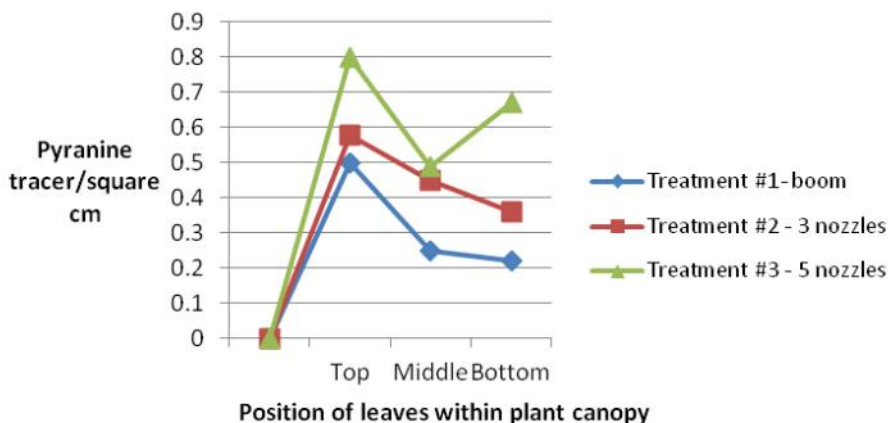
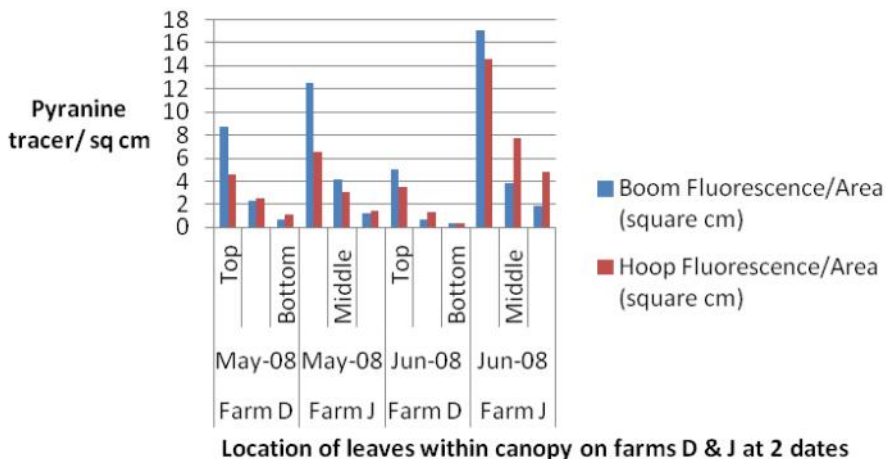


Fig. 2. Spray coverage within strawberry canopy - 2008



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trends are apparent. See Figures 3 and 4. The biological data did not support significant statistical differences between treatments, however, clear and consistent trends are apparent. See Figures 3 and 4. For 4 of the 6 comparisons, the use of the modified boom (hoop) appears to have an advantage over the traditional boom in the control of foliar disease. For all 6 comparisons, the use of the modified boom (hoop) appears to result in a lower incidence of disease infection and/or insect damage on the fruit than does the use of the traditional boom.

Summary: Applying crop protectants to strawberries can be improved with attention to variables like drift reduction, appropriate nozzle selection, increasing spray volume as the canopy grows and applicator skill and attention. The use of a modified boom may help growers perfect spray application, but more work on this prototype is necessary to better understand the importance of factors like row alignment in the field. The two farmer participants observed that straight rows and level fields would positively affect the spray application from a modified boom even more than those field attributes affect the performance of a traditional boom. Conversely, sloping fields and crooked rows will make it very challenging to use the more exacting modified boom successfully.

Funding for this project was made possible by Northeast Region Sustainable Agriculture Research and Education Program (SARE) and The North American Strawberry Growers Research Foundation Inc. Additional funding that supported on-farm work was made available by the NY Farm Viability Institute. We wish to acknowledge the kind assistance of the cooperating growers, Dale Ila Riggs of Stephentown, NY and John Hand of Greenwich, NY.

Reference -

Bjurgstad N. and Sonstebly A. (2004) Improved spraying equipment for strawberries. In: *Aspects of Applied Biology* 71, International advances in pesticide application. Pp.335-342 ■

Fig. 3 - Severity of foliar damage following sprays with modified boom vs. traditional boom

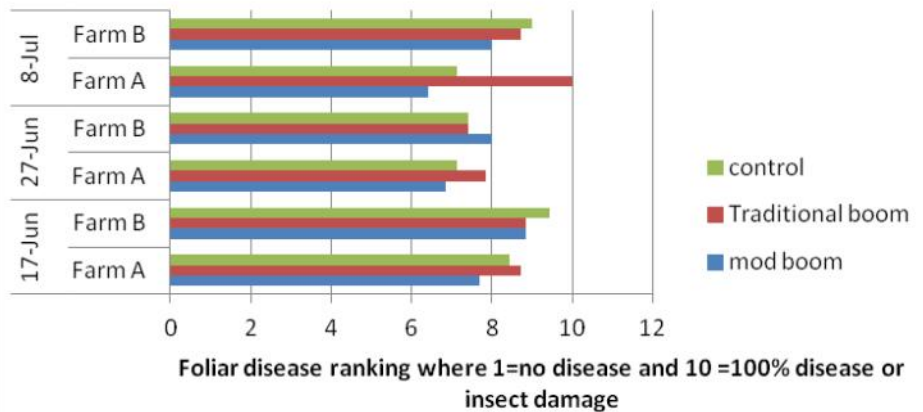
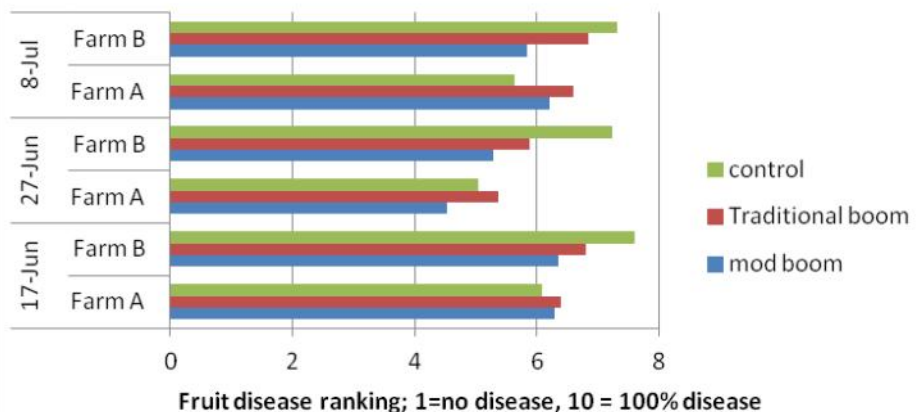


Fig. 4. Severity of fruit diseases following sprays with modified boom vs. traditional boom



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Teaming Up Against the Brown Marmorated Stink Bug

Mary Woodsen, IPM Program

A new pest has been pigging out on many of North America's most important crops, posing an unprecedented threat to U.S. farmers. The brown marmorated stink bug (BMSB) burst onto the scene in 2010, causing catastrophic damage in most mid-Atlantic states. Some growers of sweet corn, peppers, tomatoes, apples, and peaches reported total losses that year. The USDA has now awarded \$5.7 million to ten institutions across the country for research and education to help growers cope. The value of susceptible crops in the 33 states where BMSB has been established or sighted exceeds \$21 billion, says Tracy Leskey, USDA entomologist. Last year, the pest cost apple growers alone \$37 million. The team of 51 researchers' goal is to uncover the mysteries of BMSB and use that knowledge to find management tactics that work—traps and lures, bio-pesticides, and natural enemies that kill BMSB. The Northeastern IPM Center will coordinate outreach to growers.

BMSB arrived from Asia circa 1996, in Allentown, PA, and quickly becoming a nuisance pest by overwintering in homes and commercial buildings. By 2004 it was showing up on farms and in forests. BMSB has a huge host range, hitting field crops, ornamentals and trees, feeding on about 300 species altogether. "It's the worst I've seen yet," said University of Maryland entomologist Galen Dively, whose career spans 45 years. Growers will need sprays for the near

term, so Dively and a group of researchers are testing conventional and biological pesticides on tomato, pepper and eggplant. "You can kill 90% of them, but the next day you might have just as many," Dively said last June 2011. The population might have been higher except for July's record heat and drought. Young BMSB are vulnerable to drying—and dying—right after they've shed their skins during molting.



Brown Marmorated Stink Bug adult. Photo courtesy of G. Dively

Growers have sprayed aggressively to keep BMSB in check. But broad-spectrum sprays such as pyrethroids also kill beneficial insects that feed on pests, hampering nature's own checks and balances. Beneficials help IPM growers protect crops through science-based tactics that keep environmental and economic costs as low as possible.

Henry Chiles of 1,500-acre Crown Orchard in Virginia saw severe damage in 2010. "We tried everything possible, including many sprays of pyrethroid insecticides, with no results," he reported in a letter to USDA in 2010.

New York is among northeastern frontier states where BMSB is on the move, and 2011 marked the first ag sighting. "Organic peppers were badly injured on a Hudson Valley farm," says Peter Jentsch, a Cornell researcher on the BMSB team. No organically approved pesticides keep BMSB at bay. Traps and lures, beneficials, and biorationals could be several years from deployment.

The spark for a broad-based BMSB management project came in early 2010 when Tracy Leskey, USDA entomologist, put out the call to colleagues and assembled a working group funded by the Northeastern IPM Center. This spurred a coordinated solution, and within a few months plans for national research and outreach were underway. The BMSB working group wants to stay one step ahead, and it met with the BMSB team in late November to share the lessons from this season. Scientists at Cornell and 9 other universities or experiment stations are sharing in the USDA Specialty Crop Research Initiative grant on the biology, ecology, and management of BMSB. ■

Regulating the Use of New York's Water

New York Farm Bureau, <http://www.nyfb.org> (edited by C. MacNeil, CVP)

Under the new 2011 law, agricultural water users withdrawing an average of 100,000 gallons/day of water over any 30-day period must report their water use to the Dept. of Environmental Conservation on an annual basis. *It is critical that farms report their water use to DEC prior to Feb. 15, 2012 and then file similar reports annually. A farm that waits*

until after this deadline will be required to obtain a permit for their water withdrawals if they exceed the threshold. There is no fee. "Agricultural purposes" includes production of food, feed, livestock or their products, and on-farm processing. Non-agricultural users will be required to have a permit. For additional info and water reporting forms

visit DEC's website at: <http://www.dec.ny.gov/lands/55509.html> The site may be updated but you can report water use on the forms at the site now. Questions? Contact Richard Kruzansky, DEC's Bureau of Water Resources management at 518-402-8182. ■

What is Agricultural Mediation?

NYS Agricultural Mediation Program

Agricultural mediation is a tool for farmers and others in the agricultural community to communicate clearly, negotiate effectively, and to find fair and workable solutions. NYS Agricultural Mediation Program (NYSAMP) services are usually free and always affordable, thanks to the support of our funders and the dispute resolution community. Decisions are made by the people directly involved, and not by mediators or other

outside authorities. Mediation Research shows that over 80% of mediation results in agreements. NYSAMP works with affiliated mediation centers to provide services for every county in New York. Trained and experienced NYSAMP mediators provide a way to solve problems between parties, and to avoid the high costs of litigation. NYSAMP is a program of the New York State Dispute Resolution Association, an independent, non-

profit membership organization. To determine whether mediation can work for your situation contact NYSAMP at: <http://www.nysamp.com/> or your [local NYSAMP affiliate](#). All conversations are treated as private and confidential. For more information contact Charlotte Carter at 518.687.2246, 866.669.7267, or charlotte@nysdra.org ■

Planning Ahead to Avoid Legal Problems

Sandy Buxton, CCE Capital Area Ag & Hort Program

At the recent *Labor Issues for Ag Employers* seminar, Terence Robinson Jr, an immigration law litigator with Nixon Peabody, LLP discussed the need for developing an emergency management plan for handling legal problems involved with farm labor. Farms need to develop a system that everyone understands and follows, including owner/managers and employees. Without a plan, it is too easy for all of us to say something when driven by emotion and it will be impossible for the farmer or their attorney to recall exact words. Once the plan is in place, make sure that everyone understands the need to be careful and to always refer all law en-

forcement people (including INS, ICE sheriff dept, state trooper etc.) to the farm owner or designated speaker. This is key, even if the person in question is a beer drinking buddy from the local basketball league – if that person is a legal representative of an agency and can be interviewed later, you cannot provide casual information. Remember, you are never “off the record”!

There are 4 statements that a person must use:

1. I am represented by a lawyer. Then provide a card with the name and number.
2. My lawyer has instructed me not to talk with you unless they are present.
3. My lawyer says I must not consent to a warrantless search.
4. My lawyer says I must not waive any of my rights.

These statements can be included on one side of a card with the law firm's contact information on the other side. These cards should be in everyone's wallet. This means you have to have a lawyer. Each farm can have a “letter agreement” where they have filed a letter with the firm requesting representation should the need arise. This way, the lawyer will agree and say that you are a client if called. Once the system has been activated, the farm must pay the retainer fee.

Is this over-the-top thinking?

What happens if the un-thinkable occurs? An accident, a crime, or some other type of liability or action, draws law enforcement to your farm. Your farm employees will be scrutinized. The farm ‘team’ must know how to act and understand that the plan will facilitate the process. At least then, people will have the ability to have a witness present to document how everything takes place. This is not just an immigration issue-related plan. Employees and owners have been injured and killed on farms all around NYS. And other types of crime have also occurred.

It is important to remember and be proactive, but the action of all parties must also be consistent. No matter what the situation, all members must be prepared to speak and act in a unified manner. This is not being obstructive, it is simply ensuring that an attorney will be present to help preserve the rights that every person has while they stand on the soil of the United States of America. Cornell Cooperative Extension in the Capital District has been requested to coordinate an additional labor seminar which will take place within the next 12 months. If you would like more information about the meeting or would like to make suggestions, please contact Sandy at sab22@cornell.edu or 518-380-1498. ■



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daumc@helenachemical.com

John Ivison: 585-509-2262
ivisonj@helenachemical.com

Cris Wunder: 315-727-1300
wunderc@helenachemical.com

Kevin Witkop: 585-738-9882
witkopk@helenachemical.com

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585-589-4195 (Office)

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315-789-4450 (Office)

Crop Insurance Deadline for New York Onions

USDA Risk Management Agency

New York onion producers should be aware that the final date to apply for insurance on onions for 2012 is **February 1, 2012**, according to the Raleigh Regional Office, USDA Risk Management Agency. Current policyholders also have until February 1 to make any changes to their existing contracts. Crop insurance provides protection against a loss in on-

ion production due to natural perils, such as drought or excessive moisture. The price elections for 2012 are as follows: Yellows @ \$11.75 per cwt., Reds & Whites @ \$18.75 per cwt. Crop insurance on onions is available in the following NY counties: Cayuga, Genesee, Madison, Oneida, Ontario, Orange, Orleans, Oswego, Seneca, Steuben, Wayne, and Yates. Producers are urged to contact a local crop insurance agent for premium quotes and further details. For a list of crop insurance agents in your area, contact the local USDA Farm Service Agency (FSA) office or log on to the following Risk Management Agency web site: <http://www3.rma.usda.gov/tools/agents/> ■

Webinar Series - Marketing for Profit: Tools for Success

Laura Biasillo, Cornell Cooperative Extension - Broome County

The Farmers Market Federation of NY and the NY Farm Viability Institute have partnered with USDA Northeast SARE to present a series of webinars on marketing, *"Marketing for Profit: Tools for Success"*. The series will include 5 categories of marketing concepts: Self-Assessment, Market Assessment, Customer Assessment, Communications Assessment and Business Assessment. Each Assessment will be a series of 3 webinars. These webinars have been designed with the assistance of regional and national marketing experts throughout the northeast.

Many producers believe the Field of Dreams version of *"Build it and they will come"*. Marketing is a concept that must be learned to achieve maximum profits from chosen marketing channels, whether it is farmers markets, CSA's, direct to restaurant sales, or another venue.

Marketing encompasses identifying your market and customers, satisfying your customers and maintaining your customers long term. It includes: all marketing channels and business decisions: what to grow or produce and how it will be produced (conventional, organic, bio-dynamic or some amalgam of these); how you choose to make products available; how product is presented; and how you present your business through advertising, promotions, signage, pricing, etc. Marketing is complex and is the most misunderstood and least successful part of many farm businesses.

We invite all farm direct marketers and farm service providers to participate. To register for the webinars contact Diane Eggert at deggert@nyfarmersmarket.com. For detailed descriptions of the webinars contact Diane Eggert at deggert@nyfarmersmarket.com or David Grusenmeyer at dgrusenmeyer@nyfvi.org. In addition, each webinar will be made available for presentation in local workshops. The webinar schedule follows:

Who Dat? Assessing Your Own Identity

January 10, 10 am – 11:30 am, OR

January 12, 7 pm – 8:30 pm

Laura Biasillo, Cornell Cooperative Extension, Broome County

Steve Hadcock, Cornell Cooperative Extension, Columbia County

Who ELSE is Dat? Marketing Channels and Fellow Travelers

February 7, 10 am – 11:30 am, OR

February 9, 7 pm – 8:30 pm

Matthew LaRoux, Cornell Cooperative Extension, Tompkins County

Where are We and Where do we Want to be?

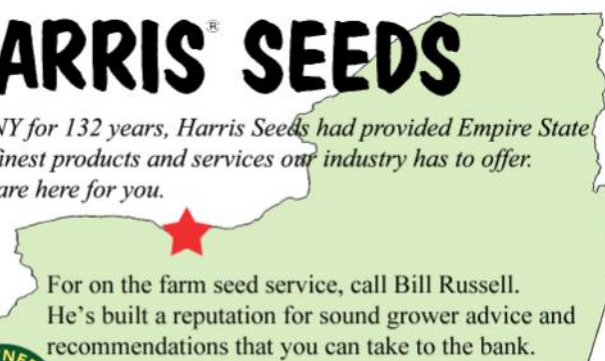
February 21, 10 am – 11:30 am, OR

February 23, 7 pm – 8:30 pm


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Upcoming Meetings

Winter Wednesday Vegetable Production Webinars

Presented by the Extension Vegetable and Small Fruit Production Program, Penn State

Dates & topics available:
see description
12:00 noon - 1:00 pm

Dates and topics:

January 4 - New resources for beginning organic vegetable growers: What you need to know and where to find it

February 29 - Vegetable disease management: What you need to know for 2012

March 14 - New insect pests

To register go to: <http://www.cvent.com/events/winter-wednesday-lunch-series-vegetable-production-webinars/event-summary-5bd38ff53bbf47e7a31275cb16c444f6.aspx>

GAPs Food Safety Workshops: Develop Your Own Farm Food Safety Plan

January 4 & 5 - Mt. Morris
February 15 & 16 - Rochester
March 14 & 15 - Albany
March 28 & 29 - Syracuse
8:30 am - 3:30 pm

Cornell Cooperative Extension, NYS Dept. of Agriculture & Markets, and the National GAPs Program collaborate on 2-day workshops to help produce growers learn about GAPs and write their own farm food safety plans. You must attend both days. A laptop computer is required for the second day. If you need to borrow one please let us know in advance. After attending the workshop, growers are invited to a mock third party audit during the growing season.

Upcoming Workshops :

January 4 & 5 — Mt. Morris, Livingston Co. Highway Facility, 4389 Gypsy Lane, 8:30 am – 3:30 pm, cost - \$100. For info contact Craig Kahlke at 585-735-5448 (cjk37@cornell.edu), Robert Hadad at 585-739-4065 (rgh26@cornell.edu), or David Thorp at 585-658-3250 (dlt8@cornell.edu). Send your contact info, check and computer request to: Kim Hazel, CCE Orleans Co., 12690 NYS Rt 31, Albion, NY.

February 15 & 16 — Rochester

March 14 & 15 — Albany

March 28 & 29 — Syracuse

Check: <http://www.gaps.cornell.edu/> for more info on the workshops.

Online Marketing Course for Beginning Farmers

Northeast Beginning Farmers
Wednesdays, January 4 - February 8
7:00 pm - 8:30 pm

The Beginning Farmer Project at Cornell is offering an online course in marketing strategy for new and start-up farmers. The bulk of the course happens on students' own time, with discussions, readings and assignments in a virtual classroom. The weekly webinars include outside presenters, questions & answers, and collaboration with other participants. Students that successfully complete the course are eligible for borrower training credits through the USDA NYS Farm Service Agency (FSA). For details: <http://www.fsa.usda.gov/FSA/webapp?area=home&subject=fmlp&topic=bfl> Cost: \$175. To register: <http://nebeginningfarmers.org/online-courses/register-for-upcoming-courses/>.

January 4: Intro to Marketing; Mission Statement, Goals & Overview of Market Channels

January 11: Marketing Strategy - Where Do I Fit in this "Buy Local" market?

January 18: Expense Budgets - How Much Should I Charge/How Much Does It Cost Me to Produce

January 25: Marketing Tactics

February 1: Implementation of Marketing Tactics, Pricing and Local/Global Economy

February 8: Overview of Marketing Plan

Winter Production of Vegetable Crops

Thursday, January 12
8:30 am - 2:30 pm
CCE Ontario County
480 N Main St, Canandaigua

Learn about possible winter crops, scheduling, tunnels, heating/irrigation guidelines, etc. from Cornell Vegetable Program Extension Specialists Judson Reid and Robert Hadad, and experienced growers, including Jan van der Hyde, Bejo Seeds, and Chaw Chang, Stick and Stone Farm. Cost: \$25, includes lunch. Contact: Nancy Anderson, 585-394-3977 x427, or send name, address and phone number to: nea8@cornell.edu

<p>Become a Strong Farm Business Partner <i>Annie's Project Risk Management Education for Farm Women</i> Thursdays, January 12 - February 16 10:00 am - 2:00 pm</p>	<p>Included: production, marketing, and financial, legal (estate planning), and human resources risk management, ag software, crop insurance and renting land. Contact: Lewis Co. – Margaret Murray, 315-376-5270 Oneida Co. – Bonnie Collins, 315-736-3394 x104 Otsego Co. – Amy Chamberlain, 607-547-2536 Schoharie Co. – David Cox, 518-234-4303 Pre-registration (\$50) required a week in advance. <i>Supported by the Northeast Center for Risk Management Education and by Annie's National Network Initiative for Educational Success.</i></p>
<p>Basic Farm Business Management Planning Several dates and locations, choose the one most convenient for you</p>	<p>Helping your farm business achieve success, \$25. Choose the site, time most convenient for you. Contact Sandy Buxton at 518-380-1498 or sab22@cornell.edu January 14 - CCE-Washington Co, 411 Lower Main St, Hudson Falls, 9:30 am to noon. February 7 - CCE-Washington Co, 411 Lower Main St, Hudson Falls, 6:00 – 8:30 pm. April 4 - CCE-Albany Co, 24 Martin Rd, Voorheesville, 6:00 – 8:30 pm. May 10 - CCE-Greene Co, Acra, 6:00 – 8:30 pm.</p>
<p>Vegetable Growers Association of NJ Convention Tuesday - Wednesday, January 17 - 18 Trump Taj Mahal, Atlantic City, NJ</p>	<p>For more info contact Rocco DiGerolamo, Jr. at 857-797-1686 or visit: www.njveggies.org</p>
<p>1st Northeast Organic Research Symposium Thursday - Friday, January 19 - 20 Saratoga Springs Hilton</p>	<p>There will be presentations, discussions and poster sessions on organic vegetable, fruit, livestock and grain systems, and on organic soil management, pest and weed management, economics & marketing. Register at: http://www.nofany.org/ or call Katie at (585)271-1979 x512.</p>
<p>2012 NOFA-NY Winter Conference: The Cooperative Economy Friday - Sunday, January 20 - 22 Saratoga Springs</p>	<p>Key speakers: John Ikerd, Professor Emeritus of Ag Economics, U. of MO, Kathlyn Terry, Appalachian Sustainable Development, and Paul and Maureen Knapp, 2012 NOFA-NY Farmers of the Year. Register online at www.nofanyconference.org or call Katie (Membership & Registration Coordinator) at 585-271-1979 ext. 512.</p>
<p>Empire State Fruit & Vegetable Expo, Direct Marketing Conference and Becker Forum Monday - Thursday, January 23 - 26</p>	<p>OnCenter Convention Center, Syracuse, and Holiday Inn, Syracuse – Liverpool. See your Expo Program for details and pre-registration, or go to: www.nysvga.org Click on EXPO for details and online preregistration. For Labor and Employee sessions see pgs 1-2.</p>
<p>Ontario Processing Vegetable Industry Conference Tuesday - Wednesday, January 24 - 25 London, Ontario</p>	<p>For more information: 519-681-1875 or opvg@opvg.org or visit www.opvg.org</p>
<p>Mid-Atlantic Fruit & Veg Conference January 31 - February 2 Hershey, PA</p>	<p>For more info contact William Troxell at 717-694-3596, pvga@pvga.org or visit www.mafvc.org</p>
<p>27th Annual North American Farmers' Direct Marketing Association Convention February 10 - 17 Williamsburg, VA</p>	<p>For more info contact the NAFDMA at 413-529-0386 or visit: www.nafdma.com</p>

Pesticide Trainings & Recertification Classes

2012 DEC Core Recertification Classes

Dates, times and topics
listed to the right

CCE Monroe County
249 Highland Ave, Rochester

January 24: DEC Rules and Regulations, Updates, 9:00 am - 12:15 pm - Learn the rules and regulations in becoming a certified pesticide applicator, especially record keeping and reporting.

January 26: Water Quality: Ecology and Environmental Considerations of Pesticides and Fertilizers, 1:00 pm - 4:15 pm - Learn about pollutant monitoring in our waterways, EPA regulations concerning water quality, solutions for pesticide & nutrient pollution in our water.

February 7: Pesticide Education I, 1:00 pm - 4:15 pm - Pesticide types, formulations, toxicity, and environmental considerations of pesticide use, calibration, mixing calculations, and application equipment.

February 14: Pesticide Education II, 9:00 am - 12:15 pm - Pesticide security including proper transportation, storage and disposal. Safety precautions including poisoning symptoms, residue and tolerance. Integrated Pest Management also presented.

February 21: Personal Protective Equipment and Interpreting Pesticide and Fertilizer Labels, 9:00 am 12:15 pm - Appropriate use of personal safety equipment. Reading a label for effective application and preventing misuse of the product.

3 core credits available for each class. Individual sessions are \$40 for Monroe CCE enrollees, \$47 otherwise. Contact Karen at 585.461.1000.225 or ksk8@cornell.edu for registration or further information.

Pesticide Training & Recertification Classes

Mondays, February 6, 13, 20, 27

7:00 pm - 9:30 pm

(Exam: March 5, 7:00 pm - 11:00 pm)

CCE Ontario County
480 N Main St, Canandaigua

Anyone interested in obtaining pesticide certification and meeting the DEC experience/education requirements, or current applicators seeking pesticide recertification credits should attend. **This is NOT a 30-hour certification course.**

The cost for the pesticide training to obtain a license is \$120.00, includes training manuals and attendance at all four classes. **This does not include the \$100.00 DEC exam fee, due the day of the exam payable by check.** Certified applicators, private and commercial, seeking recertification credits will receive **2.5 core credits per class**. The cost for recertification is \$70.00 for all four classes or \$20.00 per class. To receive registration materials contact CCE Ontario County at (585) 394-3977 x427 or x436, nea8@cornell.edu or rw43@cornell.edu. The registration form is available on-line at www.cceontario.org

Pesticide Recertification Day

Thursday, March 15

The Century House
997 New Loudon Rd/Rt 9, Latham

Pesticide use, safety, pest management, up to 6 DEC credits. Morning - core credits; afternoon - category specific credits for 3a, 1a, 7a and private categories.

Registration required. Contact Chuck Schmitt at 518-765-3513 or [cgs34@cornell.edu](mailto:cds34@cornell.edu)

Canadian Potato Production Down

SOURCE: Canadian Potato Production November 2011

Statistics Canada has published the preliminary production estimates for the 2011 potato crop. The Canadian potato production is estimated at more than 92,000,000 cwt, down 4% from 2010, due to decreased yields. Ontario had the greatest decrease with yields down 19%, while New Brunswick yields were down 17%. British Columbia showed the greatest yield increase from last year, up 68%, after bad weather during harvest in

2010. The average value on all potatoes sold, consumed or fed to livestock was \$11.58 per cwt, up from \$11.27 per cwt in 2010. ■



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Pinkeye of Potato in 2011 - The Most Significant Appearance in 4 Years

Thomas Zitter, Cornell

Pinkeye (PE) of potato, formerly associated with two *Pseudomonas* bacterial pathogens*, and often associated with other diseases such as Rhizoctonia black scurf and Verticillium wilt, is now recognized to be an abnormal periderm disorder caused by several overlapping factors. This condition is not a seedborne problem, but is due to current season growing conditions associated with excessive moisture and high soil temperatures leading to cell damage and death of both the natural tuber periderm and the underlying cortical cells. If diseases such as bacterial soft rot, leak, and Fusarium dry rot do occur, they are the result of injury on the PE-affected tissue or additional wounding during harvest. Tubers affected by PE are therefore at risk for postharvest losses.

Diagnostic symptoms on affected tubers – Pinkeye derives its name from the pink and somewhat raised areas around and between the eyes on the surface of the periderm, especially on the bud (apical) end of the tuber (see Fig. 1). A subtle pink coloration may be seen internally when cut through the affected eyes and corky area (Fig. 2).

The pinkeye symptoms appear at or before harvesting and in most situations will gradually disappear in storage as the tuber dries out. The “corky patch” is associated with extensive suberin polyphenolic accumulation in the cortical parenchyma internal to the now damaged native periderm. Internally, browning of cortical cells underneath the native periderm develops. Below the periderm the tissue may appear link pink



Fig. 1. Pink exterior coloration and “corky patch” as seen on the variety Pike. Note that this scaly skin appearing in the affected area is another diagnostic feature for PE.



Fig. 2. Subtle pink discoloration noticed below the affected areas and internally on the variety Snowden.

(Fig. 2). However, if severe environmental and physiological conditions exist in the field prior to harvest or storage, pinkeye can be manifested as intensive corky areas of the periderm (“elephant hide” or “bull hide”) which can make the tubers unmarketable for either fresh market or processing use (see Figs. 3-5, below). The occurrence of growth cracks as seen on two tubers occasionally occurs. The “elephant hide” symptoms occur late in the growing season and are best described as severe manifestations of earlier PE symptoms. Another problem associated with tubers manifesting such damage is that these tubers cannot be used for seed in the coming season, as the presence of viable eyes is unlikely.

Conditions that encourage the occurrence of pinkeye – It is generally accepted that there are Pinkeye years and non-PE years. A strong relationship exists between crop stress that occurs early in the season (high temperatures) and wet soil conditions later in the season. In general older potato land with many potato crops in a rotation can also be associated with PE. A comparison of climate data over the past four seasons shows that extremes did occur during the 2011 growing season (Table 1). No correlation exists between soil type and the occurrence of PE.

Continued on page 14

Table 1. Climate comparisons for a 4 year period from April – September (Ithaca, NY)¹

Year	Deviation from long term average (30 yr norm)		Comments
	<u>Accumulated aver. temp (F)</u>	<u>Rainfall (inches)</u>	
2008	+5	-2.18	PE noticed on Snowden
2009	-3	+0.4	Summer without a summer; LB a severe threat
2010	+17	-3.11	Resprouting seen on potato
2011	+14	+12.1	Wet spring and late planted crop; dry and hot in July; wettest Sept on record for Ithaca

¹ (http://nrcc.cornell.edu/climate/ithaca/moncrt_04-11.html) etc.



Fig. 3 - 5, left to right. Snowden showing various degrees of periderm destruction prior to harvest and storage. The stem attachment is on the left in all tubers.

Varietal susceptibility – Reports of the occurrence of PE have come from throughout the US, and include the states of ME, NY, MI, WI, MN, NE, ND, ID, OR and WA. Given this geographical distribution, it stands to reason that pinkeye has been reported on many different varieties. Western-grown varieties included Russet Burbank and Russet Norkotah and FL1879, while eastern varieties include Yukon Gold, Kennebec, Katahdin, Shepody, Superior, Pike and Snowden. Snowden was particularly susceptible in 2011, given that the condition was diagnosed for four different NYS growers. Other varieties grown nearby were either not affected or showed a minor occurrence of PE.

Management practices to reduce the occurrence of pinkeye – Wisconsin researchers have recently published on the cause the physiological tuber disorder known as PE (Sabba et al., 2008). They concluded that excessive moisture and high temperature contribute to hypoxic/anoxic (low oxygen) soil conditions that result in cell death and death to the

tuber periderm. Additional studies in Wisconsin established that a densely compacted soil layer can result in poor water drainage and increased susceptibility to tuber diseases and disorders (Copas et al., 2008). Efforts to reduce compaction through subsoil tillage can lead to better water drainage, thus reducing the occurrence of PE. Field and varietal selection are important since both can influence the occurrence of PE in challenging production seasons. Since pinkeye-affected tubers are more vulnerable for invasion by soft rot bacteria, tubers need to be provided with cool and dry conditions in storage. For processing tubers with severe pinkeye an advanced schedule is recommended to reduce losses in prolonged storage.

* Koch Postulates - To prove the cause of infectious disease: (1) the suspected causal organism must be consistently associate with the disease; (2) the organism must be isolated and grown in pure culture; (3) when a healthy plant (tuber) is inoculated, the original disease must be reproduced; and (4) the same

organism must be reisolated from the experimentally infected plant (tuber), has never been completed in the case of the suspected causal organism responsible for PE.

Photographic Acknowledgment – Thanks to Dept. of Plant Pathology photographer Kent Loeffler.

References –

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- Lulai, E., Weiland, J.J., Suttle, J.C., Sabba, R.P., and Bussan, A.J. 2006. Pink eye is an unusual periderm disorder characterized by aberrant suberization. *Am. J. Pot. Res.* 83:409-421.
- Sabba, R.P., Bussan, A.J., and Lulai, E.C. 2008. Relationship between pink eye symptoms and cell damage in the tuber periderm and cortex. *Am. J. Pot. Res.* 85:466-476.
- Schultz, O. and Crispin, M. 1978. Potato pinkeye or brown eye. Cornell Cooperative Extension Fact Sheet 725.00. http://vegetablemdonline.ppath.cornell.edu/factsheets/Potato_PinkEye.htm.
- Secor, G. and Rouse, D. 1992. Proceedings of the 2nd conference on Pinkeye of potatoes. *Am Pot J.* 69:149-154. ■

Assistance for Adopting Deep Zone Tillage on Your Farm - Reduced Tillage Project 2012

Anu Rangarajan and Ryan White, Cornell University and Cornell Cooperative Extension

With funding from a NYS Department of Agriculture and Markets Specialty Crop Grant and a Northeast SARE Grant, we want to assist more growers in testing reduced tillage approaches on their farms. Growers who have tested deep

zone tillage have found savings in labor (between 25% and 60%) and fuel costs (between 25% and 70%) as compared to their conventional tillage systems (moldboard plow, plus other passes).

We can provide \$600 to sixteen growers this year for deep zone tiller rental and transportation. We will provide information, technical assistance and some cost share funds to help growers plan trials, rent or borrow needed equipment and learn how to adapt Reduced Tillage (RT) to their own farms. We are seeking growers with farms of all sizes, producing conventional or organic vegetables. Either direct seeded or transplanted crops may be tested. We will also assist with some economic analysis to quantify cash savings from these systems. Ideally, a deep zone tillage trial will be paired alongside conventional tillage in the same field and on the same crop.

Trying to find the equipment to test RT has been an obstacle for many growers. To help in this search, we have identified several equipment dealers around NY who will have deep zone builder units



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available in the Spring and Summer of 2012 for rental, for use in paired trials. The equipment dealers are working closely with Cornell and Cornell Cooperative Extension to make this equipment available and assist with transportation to interested growers. Please work with your local Cornell cooperative extension educators. Eastern NY: Chuck Bornt, 518-272-4210, ext 125, cdb13@cornell.edu. Western NY Carol MacNeil, 585-394-3977 x406, crm6@cornell.edu. Long Island: Sandy Menasha, 631-727-7850, srm45@cornell.edu. Meg McGrath, 631-727-3595 ext 20, mtm3@cornell.edu.

When deciding whether to try deep zone tillage, please consider this:

Limitations: Be sure you have the **horsepower** needed to pull the tillage unit you'll be using. If your soil is heavier or compacted you will need more horsepower or you will not be able to rip as deep and break up compaction layers. Equipment dealers estimate that 100-120 horsepower is needed to pull a four row unit. For growers located in Central, New York, our Cornell Yeoman's plow is a zone builder that has been built specifically for smaller farms where the horsepower rating may be lower, at a 55 rating or more. Our Unververth zone builder requires some more horsepower to run its two shanks at a rating of 85 or more. They are available by request.

For growers new to practicing reduced tillage for vegetables: We suggest that you do your first trials on sweet corn, followed by winter squash or dry beans, then cabbage or other transplanted crops. We also suggest that you try reduced tillage for vegetables on a small acreage, until your equipment is adjusted properly for your soils and conditions, to ensure a good seedbed and plant stand. Plan to rip the same number of rows that you plant since you will be planting in those narrow disturbed channels.

Preparing a trial: If you're planning a (RT) side by side comparison with your previous tillage practices: The deep zone tillage should be conducted next to a conventionally plowed plot in the **same field**. The same crop variety, planting date, soil management, weed management and fertility program should be applied to your deep zone tilled plot as your conventional plot.

Planting your crop: Plan to plant the same number of rows that you rip. It's very important that the planting row go right over the deep rip for vegetables. If the weather is dry this will allow roots to reach water below your compaction layer. Also, check the spacing between your planter units at the disc openers and between the ripper units at ground level before planting. Row cleaners on the ripper or planter are essential to moving residue out of the way.

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Lakeland Equipment Chad Walker Hall, NY 585-526-6325 chadwalker@lakelandequipment.com	Eastern NY- Cornell 2 row zone builder, contact Chuck Bornt, cdb13@cornell.edu , 518-272-4210, ext 125
Long Island- 2 row Unverferth, contact Sandy Menasha, srm45@cornell.edu , 631-727-7850	Central NY- 2 row Unverferth and Cornell 2 row zone builder, contact Ryan White, rew37@cornell.edu , 607-227-5912

If you are interested in participating in the project or have questions regarding reduced tillage, contact your local Cornell Cooperative Extension educator, Anu Rangarajan (ar47@cornell.edu) or Ryan White (rew37@cornell.edu) in the Cornell Department of Horticulture. Please also visit our team's website: www.hort.cornell.edu/reducedtillage for videos, fact sheets and stories from other growers who have transitioned to reduced tillage. ■



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You Can't Till or No-Till Out of a Soil Health Problem - Organic Matter is the Answer!

Tim Harrigan, Michigan State University Extension, MSU Extension News for Agriculture; edited by C. MacNeil, CVP

You cannot till, nor can you no-till your way out of a soil health problem. Additional organic inputs such as crop residue, manure and cover crops are needed to increase organic matter and water holding capacity, improve aggregate stability and water infiltration and build soil health in many other ways. Cropping systems that reduce tillage intensity, incorporate cover crops whenever practical, and use manure or other organic inputs in the crop rotation, can build soil health and productivity and protect the environment. Low-disturbance tillage and soil conservation practices that leave residues on the surface will keep nutrients in the root zone and protect surface waters from runoff and sedimentation. Cover crops trap and recycle crop nutrients so they're available to the next crop. They also increase water infiltration compared to soil where cover crops have not been used.

What is soil health? Soil health brings together the physical, chemical and biological characteristics that enhance the soil's ability to produce quality crops and protect the environment. Some of the *physical characteristics* of a good soil are an optimal structure for stand establishment and crop/root growth, stable aggregate structure and the ability to provide for water infiltration and aeration. Some of the *biological factors* are the

ability to mobilize nutrients when needed for crop growth yet minimize leaching loss, and the ability to maintain a balance of pests and beneficials. Finally, some of the *chemical factors* indicating good soil health are the ability to supply the nutrients needed for crop growth without having an excess susceptible to leaching or running off into surface water. If cropping systems are managed to create conditions that build and protect soil health, the soil will be more resilient and productive. If the soil is overwhelmed by excessive tillage, traffic or erosion, loss of nutrients or organic matter, or crop rotations that upset the biological balance of pests and beneficial soil microbes, efficient and profitable crop production will be a challenge.

Create a comfortable seed environment - A goal in efficient crop production is to create an optimal seed environment. An optimal environment provides the right soil temperature and moisture and allows seed-to-soil contact for rapid germination and emergence, maintains good soil tilth for root growth and drainage, and conserves moisture for plant use. Managing the farming system for soil health requires a commitment, yet many Michigan (and New York) producers are changing their farming systems with soil health in mind. It is important to understand that there isn't a single tillage tool, crop or management practice that will solve a soil health problem. Building soil health means managing the entire farming system—tillage and planting practices, cropping/cover cropping systems and rotations, harvest and traffic patterns. Look for opportunities to reduce tillage frequency and intensity, and use cover crops to, recycle nutrients, build stable soil aggregates and protect the environment.

Managing the farming system to build soil health - Tillage operations are important in many farming systems to prepare a seedbed, control weeds, insects and disease, manage soil compaction and crop residues, and incorporate soil amendments, so it may be difficult to reduce tillage operations in some cases. But you can't simply till your way out of a soil health problem. Tillage can degrade soil by breaking down aggregate structure. Stable soil aggregates are created slowly by biological processes, but they can break down quickly under the action of tillage tools. Look for opportunities to combine field operations and reduce tillage intensity.

Soil compaction is the loss of pore space in the soil. Pore space is needed for drainage and oxygen exchange, root growth, and efficient nutrient use. Tillage and traffic are the primary cause of most soil compaction. Soil symptoms of compaction are crusting, a cloddy seedbed, standing water, and an absence of deep, spreading crop roots in the soil. Common plant symptoms are variable emergence, slow growth, wilting, and yield decline. Soil compaction can occur in all soils—including mucks and sandy soils. It can be shallow—in the normal tillage zone, or deep—below the normal tillage zone, and is common in poorly drained, fine-textured soils. Generally, 70 to 90% of the increase in soil bulk density and compaction occurs on the first pass. Repetitive traffic drives compaction deeper.

Excessive tillage contributes to soil compaction, but strategic tillage is a fast and effective way to temporarily reduce compaction. Tillage can increase pore space in the root zone and improve infiltration and drainage, but tillage induced pores are not structurally stable and do not effectively resist traffic induced soil compaction. After years of reduced tillage and cover crops, soil is more resilient and resistant to compaction from traffic, but it can be damaged quickly by working or driving on wet soil.

Natural processes alleviate compaction and improve soil health - In the long-term, soil compaction can also be reduced by natural processes that cause the soil to shrink and swell such as wetting and drying, and freezing and thawing. Root growth helps fracture compacted soil. Plant roots and soil microbes produce exudates that form natural glue which helps in the formation of stable soil aggregates. Earthworm activity

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inverts soil and creates channels for water infiltration and root growth.

Reduce tillage intensity; add organic inputs—manure and cover crops - Reducing tillage intensity is important, but you can't simply no-till your way out of a soil health problem. To have an impact in a reasonable period of time you also need additional organic inputs such as crop residue, manure and cover crops. Cover crops protect the surface from wind and water erosion, recycle plant nutrients, improve water infiltration and add organic carbon to the soil. Manure provides many of the same benefits. Both manure and cover crops increase organic matter and water holding capacity, improve aggregate stability and water infiltration, and decrease evaporation and soil bulk density.

Putting it all together—integrating manure, cover crops and low-disturbance tillage - (New York growers are integrating cover cropping into reduced tillage systems without the use of manure. See how at the Cover Crop session Tues, Jan. 24th, at the Empire State Fruit & Vegetable Expo in Syracuse. www.nysvga.org and Click on EXPO. C. MacNeil, CVP) MSU Extension is cooperating with 3 farms to demonstrate and evaluate efficient and effective ways to incorporate manure and cover crops in modern cropping systems. At Blight Farms, we have seeded cereal rye, annual ryegrass, forage turnips, oats and oil seed radish with manure after wheat harvest with excellent results. At the Bloom Dairy and Baker Lad's farms we have seeded cereal rye alone or with oil seed radish with manure as a winter vegetative cover and as spring chopped forage. Again, we had excellent results. You can watch a short video of the seeding process and the resulting cover crops by clicking on: Blight Farms, 2011—<http://youtu.be/YUbfG0PXX2M>
Blight Farms, 2010—http://youtu.be/3st0qZ_3vH0
Bloom Dairy, 2010—<http://youtu.be/lzvr5miXxZ8> ■

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Robert Hadad
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Food safety; Western region fresh market vegetables; marketing; organic

Phone: (716) 433-8839 x228
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Email: rgh26@cornell.edu



Julie Kikkert*
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Christy Hoepting
Extension Specialist
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Phone: (585) 798-4265 x38
Cell: (585) 721-6953
Email: cah59@cornell.edu



Carol MacNeil
Extension Specialist
Potatoes, dry beans and soil health; Editor of Veg Edge

Phone: (585) 394-3977 x406
Cell: (585) 313-8796
Email: crm6@cornell.edu

John Gibbons, Field Technician
Phone: (585) 394-3977 x405
Email: jpg10@cornell.edu

Katie Klotzbach, Field Technician
Phone: (585) 798-4265
Email: kep39@cornell.edu

Visit our website at
<http://cvp.cce.cornell.edu>

CVP Administration

Mark Giles*, Regional Ag Team Leader
Cornell University
Phone: (607) 255-6619
Email: fmg4@cornell.edu

Angela Parr, Administrative Assistant
Veg Edge, Enrollment, & Sponsorships
Phone: (585) 394-3977 x426
Email: aep63@cornell.edu

Steve Reiners*, Co-Team Leader
Cornell University
Phone: (315) 787-2311
Email: sr43@cornell.edu

** Member of the Cornell Vegetable Program Administrative Management Team*

Cornell Cooperative Extension Offices of the CVP

Allegany County CCE
Belmont, NY
Phone: (585) 268-7644

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CVP Region Berry Program

Deborah Breth, Lake Ontario Fruit Program Team Leader
Monroe, Niagara, Onondaga, Orleans, Oswego & Wayne Co.
Phone: (585) 798-4265 x36
Email: dib1@cornell.edu
Website: <http://lof.cce.cornell.edu>

Cathy Heidenreich, Berry Extension Support Specialist
Allegany/Cattaraugus, Erie, Genesee, Ontario, Seneca & Yates Co.
Phone: (315) 787-2367
Email: mcm4@cornell.edu
Website: www.fruit.cornell.edu/berry.html

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Cell: (518) 775-0018
Email: cls263@cornell.edu
Address: 141 Fonclair Terrace
Johnstown, NY 12095

CDVSFP Administration

Mark Giles, Regional Ag Team Leader
Cornell University

Phone: (607) 255-6619
Email: fmg4@cornell.edu

Steve Reiners, Co-Team Leader
Cornell University

Phone: (315) 787-2311
Email: sr43@cornell.edu

County CCE Offices

Albany County CCE

William Rice Jr. Extension Center
24 Martin Road
Voorheesville, NY
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Warrensburg, NY 12885
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Washington County CCE

415 Lower Main Street
Hudson Falls, NY 12839
Phone: (518) 746-2560

Advisory Members

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*If you have questions or comments about
this publication or the Capital District
Program in general, please contact your
county's grower advisory member or the
Agricultural Program leader of your local
Cornell Cooperative Extension office.*



Dates to Remember...

January 4, February 29, and March 14 - Winter Wednesday Vegetable Production Webinars, *page 10.*

January 4 & 5, February 15 & 16, March 14 & 15, March 28 & 29 - GAPs Food Safety Workshops: Develop Your Own Farm Food Safety Plan, *page 10.*

January 4 - February 8 (Wednesdays) - Online Marketing Course for Beginning Farmers, *page 10.*

January 10 or 12, February 7 or 9, February 21 or 23 - Webinar Series - Marketing for Profit: Tools for Success, *page 9.*

January 12 - Winter Production of Vegetable Crops, *page 10.*

January 12 - February 16 (Thursdays) - Become a Strong Farm Business Partner, *page 11.*

January 14, February 7, April 4, or May 10 - Basic Farm Business Management Planning, *page 11.*

January 17-18 - Veg Growers Assoc of NJ Convention, *page 11.*

January 19-20 - 1st Northeast Organic Research Symposium, *page 11.*

January 20-22 - 2012 NOFA-NY Winter Conference, *page 11.*

January 24-26 - Empire State Fruit & Vegetable Expo, Farmers' Direct Marketing Conference and Becker Forum, *page 11.*

January 24-25 - Ontario Processing Vegetable Industry Conference, *page 11.*

January 24, January 26, February 7, February 14, February 21 - 2012 DEC Core Recertification Classes, *page 12.*

January 31-February 2 - Mid-Atlantic Fruit & Vegetable Conference, *page 11.*

February 6, 13, 20, 27 - Pesticide Training & Recertification Classes, *page 12.*

February 8 - Farm Market Management & Regulations: What Every Farm Vendor Should Know, CCE Ontario Co. For more details call 585-394-3977 x427 or visit www.cceontario.org.

February 10-17 - 27th Annual North American Farmers' Direct Marketing Association Convention, *page 11.*

February 14 - Seeding Winter Greens in a High Tunnel, Slack Hollow Farm, Argyle. More later.

February 29 - Capital District Vegetable & Small Fruit Program Annual Winter Meeting. Location TBA. 9:00 am to 3:30 pm.

March 15 - Pesticide Recertification Day, *page 12.*

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