Cornell University
Cooperative Extension
Cornell Vegetable Program

Serving Allegany, Cattaraugus, Erie, Genesee, Monroe, Niagara, Ontario, Orleans, Seneca, Wayne & Yates Counties

CORNELL VEGETABLE PROGRAM HIGHLIGHTS

APRIL – JUNE 2015

Hands-On Weed Management Field Days Stimulate New Ideas

The 1st Annual Fresh Market Weed Management Field Days appealed to the diversity of fresh market vegetable farms in western NY, with over 40 growers in attendance each day of the two-day program. The diverse dynamics between conventional/organic, beginning/seasoned, and small/large operations stimulated numerous conversations on weed biology and management tools.

The event kicked-off on June 22nd with an afternoon of live cultivation demonstrations at Fenton's Produce in Batavia, NY. Wayne Hansen, a retired processing and vegetable grower from Bellona, NY, gave us his perspective on cultivation tools that have worked for him and techniques he's learned over the years to manage weeds in his vegetable crops. Members of the Cornell Vegetable Program (CVP) led discussions on equipment needs and proper calibration for different crops.

The next day featured an intense educational program at the newly established Fresh Market Weed Management Demonstration Site in Batavia, NY. Growers were able to visit CVP demonstration and research plots that included:

- Perennial beds of mixed vegetables with living row covers
- Between-row weed management for tomato and squash
- Herbicide injury demonstration
- A replicated sweet corn herbicide trial
- Zone-tillage for pumpkins and sweet corn

Cornell Vegetable Program (CVP) staff educate attendees of the Fresh Market Vegetable Weed Management Field Days at the CVP Demonstration Site in Batavia in June.
Photos: Angela Parr, Cornell Vegetable Program

Static displays of the latest tillage, planting, mulching, and fertilizing equipment from Cummings and Bricker, Empire Tractor and K.U.L.T. Kress weeding systems were also on-site. Additional displays from industry representatives and Extension educators included the Cornell Soil Health Team with a rainfall simulator to show different management effects on aggregate stability (soil structure). Allan Seigworth, a retired Pennsylvania vegetable farmer, led an invigorating discussion on essential equipment for the farmer and how that equipment has evolved over time.

Growers commented that this field day provided a great mix of information and examples. One grower stated, *"I'm really glad I took the time to attend – the content and conversations stimulated new ideas and helped me to let go of some of the things I am doing and as a result I am considering some desires and ideas I had put on the back burner – I am coming away with more focus on what I want to accomplish and how to get there."* A majority of the participants stated that they would like to see similar programing in the future. Ninety-one percent of the growers agreed that this program gave them some new factors to consider for weed management on their farm, including shallow cultivation when weeds are less than two inches tall, flame weeding, cover crop use, and the importance of weed identification. Fifty percent responded that they will give more consideration to the use of cultivation and tillage equipment for weed management and 96% agreed that they will try out a new weed management tool that they learned about during the field days. Thirty-six percent found the program to be useful, while 59% thought the program was very useful and one grower commented "we need more programs like this."

Portions of this program and the Fresh Market Weed Management Demonstration Site were funded using the Cornell Vegetable Program Challenge Fund.

Improving Soil Health – Rating the Level of Soil Function on Vegetable Farms in the CVP Area

Variable and extreme weather, like our region saw this spring and summer, make good soil function and good soil health more important than ever to maintain profitable vegetable production. Soils need to function optimally, for rapid rainfall infiltration vs. run-off, deep crop rooting, rapid nutrient cycling, etc. The Cornell Vegetable Program recently received a USDA-NRCS Conservation Innovation Grant (CIG) to sample growers' fields for the Cornell Soil Health Assessment to pinpoint constraints to soil function and crop production. Twenty-six fields were sampled, and soil compaction was tested, on 13 farms in Niagara, Monroe, Genesee, Wayne, Ontario and Yates Counties. Soil management on the farms varied from good to poor. Cropping, cover cropping, tillage, and manure application data were collected for 2013 – 2016 (planned) for all fields.

Eleven earthworms were found in one soil sampling hole where organic matter was present, ensuring that the earthworms will be well fed and ready to "till" the soil.
Photo: Carol MacNeil, Cornell Vegetable Program

One measure of soil health stood out: the average number of earthworms per hole in the ten soil sampling holes dug per field (an add-on evaluation we conducted). In six fields with good soil management (aggressive use of cover crops, good crop rotation including soil-building crops, manure use, and/or reduced tillage) there was an average of 8 to 20 earthworms per hole! In eight fields where few cover crops were used, only row crops were grown, and/or conventional tillage was done, an average of no more than 1 earthworm per hole was observed. Earthworms create channels for root growth and water percolation, and are a good indicator of soil health and crop yield potential. Earthworms can't survive, however, if they don't have food. Regular use of cover crops, soil-building crops, manure (fresh organic matter), and reducing tillage to avoid "burning up" organic matter too quickly, can ensure that earthworms will be well fed and ready to "till" the soil.

While many of the growers' fields had several serious constraints to good soil functioning and crop growth there were a handful of fields where soils tested much better. These growers had been using reduced/zone tillage, intensive cover cropping, diverse crop rotations, and/or frequent manure applications, for many years. The growers with the best soils consistently used two or more of these practices, particularly cover cropping.

Analysis and individual interpretation of the results will be done with growers over the next six months. *This project is supported by an NRCS Conservation Innovation Grant on soil health.*

Evaluation of High Tunnel Programming in Yates County

Judson Reid cooperated with a graduate level evaluation course at Cornell University, Ithaca campus to implement an evaluation of high tunnel programming in Yates County. This work was accepted for presentation at the Eastern Evaluation Research Society annual meeting on April 27 in Absecon, NJ.

Results of this evaluation plan included the following:

- Farmers who participate in CCE programming adopt Best Management Practices (BMPs) in their high tunnels
- Adoption of BMPs is associated with increased revenue
- Farmers prefer personal and individualized resources, particularly twilight meetings

Conclusions

- While all of the resources CCE provides are valuable, BMP adoption is mostly associated with and credited to personal technical assistance.
- Increased revenue for high tunnel farmers in Yates County comes from lengthening the growing season, increasing tomato quality and selling tomatoes earlier in the season. BMP adoption or just the use of high tunnels is shown to be associated with these three indicators.
- Formal CCE programming is most useful for beginning farmers while the network that CCE creates becomes more useful for experienced farmers.

This work may be further developed for publication in a peer reviewed journal this fall.

As a Member of the Northeast Regional Post-Harvest and Extension Working Group, CVP Specialist Further Develops and Expands Farm Food Safety Trainings

Vegetable Specialist Robert Hadad became an active member of the Northeast Regional Post-Harvest Research and Extension working group. The group is comprised of Extension and research specialists who work closely with produce farmers centering educational assistance on farm food safety. The group pools resources, shares information, figures out what's missing, and collaborates on research.

Robert launched a focused food safety training workshop. This is a USDA-ERME (Extension Risk Management Education) funded project that focuses training on the topics of produce washing, facility design, using sanitizers, and post-harvest handling. In addition to workshops in Seneca and Ontario Counties earlier this year, during the second quarter Robert held a workshop in Allegany County, hosted by one of the Amish farmers who helped to start the Genesee Valley Produce Auction. Twenty Amish and English farmers attended.

Robert was also invited by the Northeast Regional Post-Harvest Research and Extension working group to run two workshops in New England. The first was hosted by University of Connecticut. Eighteen farmers attended plus their state Department of Agriculture. University of Massachusetts hosted the second workshop, where 55 farmers attend plus faculty and state inspectors. From this experience, Robert realized that NY is way ahead of the NE states with food safety education and acceptance by farmers.

Another project that Robert has been developing is training for food hub workers and farmers who sell to food hubs. Food hubs are becoming a big thing with a lot of support and funding through state efforts and USDA. There are at least 4 in WNY. The marketing by the hubs have brought them head-on with food safety requirements by buyers. The food hub managers and workers needed training in the principles and practices of food safety as now the hubs are to be classified as food handlers.

Tying in with the training for the food hub staff was the realization by their management that if the hubs become food safety certified then their farmers need to be also. Surprisingly, many of the farms were not. So this has created another opportunity for farm food safety education. Robert developed an educational program on food safety for food hubs, which was launched this quarter at a farm near Ithaca upon request of a local educator. Twelve workers, 3 managers, and 8 buyers attended a three hour session. These workshops will be expanded into the CVP region and this coming winter trainings will be held for farmers that not only center on food safety standards but vegetable quality and grading. From the initial session, it became clear that each food hub has separate needs to focus on. This requires knowing how each operates and how to tailor trainings accordingly.

Identification and Management of Diseases and Weeds in Processing Lima Beans

Baby lima beans for the freezing industry (Bonduelle, Inc. with plants in Bergen and Oakfield, NY) have become established as a new crop in Western, NY having grown from 400 acres in 2012 to roughly 2,000 acres planted in 2015. The production region includes the Cornell Vegetable Program (CVP) partner counties of Genesee, Monroe, Niagara, and Orleans. A challenge to lima bean production is management of weeds and diseases. CVP specialist Dr. Julie Kikkert has teamed up with Cornell University Plant Pathologist, Dr. Sarah Pethybridge and Weed Scientist, Dr. Robin Bellinder to conduct research on lima beans. With funding from the Genesee Valley Regional Marketing Authority this year, 10 lima bean fields are being scouted for weeds, tan leaf spot disease, and pod rots caused by white and gray mold. Diseased leaves are being analyzed at the Geneva Experiment Station to unravel the complex of fungi and bacteria causing the tan leaf spots. In addition, fungicide trials are being conducted on three commercial fields and in one controlled plot at the Geneva Experiment Station. Herbicide trials are on-going at the Cornell Research farm in Freeville, NY. The grant includes remote sensing (using cameras mounted on a piloted plane) of the 10 fields to correlate with the presence of weeds and diseases, and to determine what extent yields are being compromised. This project will lead to improved understanding of the impact of diseases and weeds on yields, and improved management strategies to maintain a strong industry in New York.

Vegetable Specialist Julie Kikkert scouts for diseases in a processing lima bean field.
Photo: Angela Parr, Cornell Vegetable Program

On-Farm Demonstrations Foster Adoption of Herbicide Use in Garlic Resulting in 92% Reduction in Weed Management Costs

On-farm demonstration of fall-applied herbicide, Chateau (right) compared to untreated check (left), (grower cultivated between row) which provided excellent season-long control of a wide range of broadleaf weeds for less than a tenth of the cost of mechanical and manual cultivation and hand weeding. *Photo taken May 12, 2015 by C. Hoepting, Cornell Vegetable Program.*

Weed management is extremely important in garlic production with weed competition causing yield reductions of 30% or more. Garlic can be a lucrative crop valued at $60,000 to $150,000 per acre. Thus, losses from poor weed control can range from $6000 to $45,000 per acre or more. Although several herbicides are labeled in garlic, conventional garlic growers have been reluctant to use them for fear of crop injury and yield reductions; too high of a risk for such a high value crop. Instead, mechanical and manual cultivation (e.g. hoeing) and hand weeding is relied upon, at an expense of $450 to $600 per acre in labor costs alone. Additionally, the labeled uses of the herbicides for garlic tends to mimic their uses in onions, but onions are planted in the spring, while garlic is planted in the fall, so their practicality is questioned. In 2014 and 2015, CVP Specialist, Christy Hoepting set up three replicated demonstrations of several herbicides labeled in garlic on two farms in Orleans and Genesee counties to evaluate their relative efficacy and crop tolerance. Results showed that a single application of the herbicide Chateau 6 oz per acre applied in the fall pre-emergent to garlic and weeds within 3 days of planting provided excellent control of a wide range of broadleaf weeds right up until harvest. At a cost of only $35 per acre, this represents a 92% savings in production costs per acre. For season-long control of annual grasses, Dual Magnum, Outlook or Prowl applied in the spring in May provided excellent control for only an additional $20 per acre. Both of the grower cooperators were very impressed with the results and are planning to use Chateau this fall, and a grass herbicide next spring when needed. Plans are to share these results and grower testimonials region wide, so that all conventional CVP garlic growers will have the opportunity to save $400 to $565 per acre in weed management costs.

Newly Funded Grants

Each year, the Cornell Vegetable Program is tasked with generating a certain percentage of our operating funds, or Program Generated Income (PGI), through research grants, sponsorships, and meeting registration revenue. This quarter, we are pleased to have received the following grant funds:

- **Conduct Grower-Extension Yield Trials of Advanced Potato Breeding Clones & New Varieties**, Empire State Potato Growers Research & Development Fund (DeJong, MacNeil), $500.
- **Improved Profitability and Productivity of Lima Beans in Western NY**, Genesee Valley Regional Market Authority (Pethybridge, Bellinder, and Kikkert), $74,518, 6/1/15 - 5/31/16.
- **Understanding Weed Escape Issues and Fostering Adoption of Effective Management Strategies in Muck Grown Onions**, NYS Smith Lever grant (Hoepting), $60,000, 10/1/15 - 9/30/2018.

- **Together, over 1,000 farm visits and phone/email consultations were made by the Cornell Vegetable Program team**
- **14 educational events were organized by the Cornell Vegetable Program during this quarter**
- **Over 725 people attended meetings where presentations were made by our Vegetable Specialists**

For more information about our program, contact Julie Kikkert at jrk2@cornell.edu or 585.394.3977 x404 or visit our website

http://cvp.cce.cornell.edu