Cornell University
College of Agriculture and Life Sciences

New York Berry News

Volume 13, Number 3 ***March 17, 2014***

Features:

Highlights:

Test Drive a Possible New Variety!

Dale Ila M. Riggs, President, NYS Berry Growers Association and Dr. Courtney Weber, NYSAES Small Fruit Breeder

Two years ago, the NYS Berry Growers Association and Dr. Courtney Weber from Cornell's Small Fruit Breeding Program entered into an agreement where members of the Association will be able to "test drive" advanced selections from Courtney's breeding program. This is a phenomenal opportunity for all members of the Association and will make it possible for members to try potential raspberry and strawberry varieties before any other member of the grower community has the opportunity. This is a huge competitive advantage!

The NYSBGA and Courtney are now seeking growers that want to evaluate and provide feedback regarding the second advanced selection from Courtney's strawberry breeding program under this agreement. The selection, NY01-16, is very large for the early mid-season. The largest fruit were 51 g (almost 2 ounces) without irrigation. Subsequent fruit hold their size well. The fruit have very aromatic flavor, are slightly dark red, firm, with an attractive conic shape. In 2013 it started fruiting on June 4 (one week prior to Jewel) and fruited until about July 1.

If you would like to trial this selection, you must be signed up as a member of the NYSBGA by April 1. If you are not a member, contact Paul Baker, Executive Secretary for the NYSBGA (716-807-6827) to get signed up. You can also download a membership form from

http://www.hort.cornell.edu/grower/nybga/MembershipBlank.pdf. After your membership has been confirmed, Paul will need your address, your shipping address, and your requested date for shipment. As part of the evaluation process, a one page site report form and a one page fruit/plant evaluation form will be submitted to the Berry Growers Association and the data will be forwarded to the Small Fruit Breeding program.

This is a wonderful opportunity brought to you by the NYSBGA and Cornell. Cornell is excited about being able to get data to see how advanced selections perform in commercial situations. Members can get a minimum of 1000 plants to a maximum of 2000 plants to test on their farm. Don't miss out. Contact Paul Baker today!

Addendum from last issue: *For those wanting to learn more about white pine blister rust regulations in NYS please note the highlighted web site in the previous article was outdated. The current site is www.dec.ny.gov/regs/4079.html.*

That's a Berry Good Question: Spring Bramble and Blueberry Fertilization

K. Demchak, Penn State University, and Cathy Heidenreich, Cornell University

Our berry good question this month brought to mind a number of other questions about fertilization that we are frequently asked. So more questions and answers follow this first question from Sarah Blevins, S.J. Blevins Berries, etc. Thanks for asking, Sarah!

Q1. I'd like to get some tasks out of the way before field work gets too busy. What's the earliest date when I can make my spring nitrogen applications for my raspberries?

A1. The plants won't actually take up much fertilizer until plants start to grow, so fertilizing before then will provide little benefit, and the fertilizer may wash away or leach out if heavy rains occur. With raspberries, blackberries, and blueberries, the fertilizer applications can be split – in fact, for blueberries it is recommended that half of the fertilizer be applied at bud-break, and the other half 4 to 6 weeks later. Of course, you actually have to make *both* applications in order for this practice to be of benefit.

Q2. Rates for spring fertilization are given as "per acre". Is this assuming that the fertilizer is banded, or broadcast? It seems like a waste to fertilize the row middles.

A2. The rates given are given per acre, but the fertilizer is applied along the rows for brambles (over the rows in about a 2' wide band if these are primocane-fruiters that are mowed down). For blueberries, the fertilizer can be applied in a circle around blueberry bushes. Just be sure to stay about a foot from the plants to avoid burning the roots.

Foliar symptoms of magnesium deficiency in blueberry, photo courtesy K. Demchak

Q3. It's sometimes easier to find fertilizers like 10-10-10 than it is to find just nitrogen. Can I apply 10-10-10 or a similar blend instead of just nitrogen?

A3. There can be some negative consequences to applying unneeded nutrients. With phosphorus (the second number on the bag), there are environmental issues such as those concerning the Chesapeake Bay, but additionally, you could be causing your plants problems, too. Farm soils that have received manure applications, or phosphorus frequently, often have very high phosphorus readings. Sometimes when a tissue test is done - usually because the plants look lighter green than usual - the plants are found to be low or deficient in zinc or iron. Excess phosphorus can tie up micronutrients, and it is very difficult, if not impossible, to remove the phosphorus. This situation is often first seen on sweet corn on the farm, but we also frequently see low micronutrient levels in berry crops from excess phosphorus.

We less frequently see other deficiencies occur when extra potassium (the third number on the bag) is applied, with the exception of occasional magnesium deficiencies. It is important to note brambles have a relatively high need for potassium in fruit. Preplant incorporation is the most effective means of supplying K and subsequent additional of K is not often needed. The exception to this is on sandy soils where K has a tendency to be leached out. Fertigation may be used to supply additional K in established plantings. While muriate of potash (KCl) is an

That's a Berry Good Question: *(continued)*

inexpensive source of K, it is best to use another K source for brambles and blueberries as they are chloride-sensitive. Recommended K sources include potassium sulfate or potassium magnesium sulfate (SulPoMag).

Also, note that excess calcium, such as from heavy liming, can result in deficiencies of both potassium and magnesium.

Q4. How often should I be doing a soil test in perennial berry crops?

A4. Every second year is good enough if you are in a "status quo" situation. However, if adjustments needed to be made last year, it's good to re-test this year to see if changes are on track.

Q5. Do I need to do a soil test if I do a tissue test?

A5. Doing both often really helps, especially when a deficiency of one element is caused by an excess of another, as in the scenarios mentioned under Q3. The plants would not have typically shown excessive phosphorus or excessive calcium levels in the tissue test results, so the soil test gives us the real cause. In addition, only the soil test will tell us the soil pH, which affects the availability of almost all elements significantly.

Q6. How can I tell whether dead tips on my blueberries are from winter injury or boron deficiency?

A6. In last month's newsletter, Marvin Pritts discussed ways to diagnose winter injury, and for blueberries, suggested putting some branches in water for a few days, and then cutting through them for signs of brown (i.e., dead) tissue. However, it's always useful to have a history of soil or tissue analysis for your farm – this also gives a good indication of whether your soils are likely to be deficient in boron or not.

In general though, New York State soils have a tendency to be low in boron, a micronutrient essential for root growth. In Pennsylvania, boron levels tend to be adequate in heavier soils, but can be low in lighter soils. Soil boron is very prone to leaching, especially in soils with low organic matter content, so it is one of the most commonly observed micronutrient deficiencies in berry plantings. Boron deficiencies lead to poor root growth, which in turn causes deficiencies of other nutrients due to poor uptake. This sometimes manifests itself when leaf analyses indicate nutrient deficiencies, even though the soil pH is in range and soil test results indicate sufficient levels of the nutrient(s). (Note that poor root growth from other causes can have the same effect). Boron is also important in pollination.

Comparison of strawberry roots grown in complete nutrient solution plus boron (left) and nutrient solution minus boron (right). Note sparse, stubby roots of boron deficient plant. Photos courtesy: Marvin Pritts.

AG NEWS

PRELIMINARY 2012 CENSUS RESULTS PROVIDE A SNAPSHOT OF NEW YORK AGRICULTURE

USDA Releases a First Look at 2012 Census of Agriculture Results

Feb. 20, 2014. Albany, New York– Today the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) released the 2012 Census of Agriculture preliminary results providing a first look at state and national data.

The 2012 Census report included information on farm numbers, land in farms and farmer demographics. In New York:

Between 2007 and 2012, the amount of land in farms in New York increased by less than one percent, from 7.17 million acres to 7.18 million. This small increase reverses a long term trend of acreage declines.

According to the 2012 Census, principal farm operators are becoming older. The average age of a principal farm operator was 57.1 years, up almost one year since 2007, and continuing a long term trend of steady increase.

New York had 35,538 farms, down 2 percent in 2012. In terms of farm size by acres, all categories declined except the largest category.

In 2012, the value of agriculture products sold totaled $5.42 billion, up 23 percent from 2007. Crop sales were $2.25 billion and livestock sales totaled $3.17 billion.

"One of the most important takeaways to remember about the Census of Agriculture is that the information is used for decision-making by producers as well as all those who serve farmers, ranchers and rural communities – federal, state and local governments, agribusinesses, trade associations and many others," said Blair Smith, State Statistician.

"When we look at the data for our state, we can all use it as a snapshot in time to see how New York agriculture is changing over time and how it compared to the rest of the country."

Conducted since 1840, the Census of Agriculture accounts for all U.S. farms and ranches and the people who operate them.

When available in May, the final report will provide even more detailed data on all farm operators and data down to the county level.

The publication will also provide new insights into the agriculture industry reporting new or expanded data on Internet access, regional food systems, biomass production, agro-forestry and equine.

For more information about the Census, including access to the 2012 Census of Agriculture preliminary report and the full report when it is released in May, visit www.agcensus.usda.gov.

AG NEWS *(continued)*

New Water Resources Law May Affect You! -

Teresa Rusinek, Eastern New York Horticulture Team

Background

In 2011 Governor Cuomo signed legislation to further protect New York's waters, including the Great Lakes, by requiring a DEC permit for water withdrawal systems having the capacity to withdraw 100,000 gallons per day [gpd] or more of surface or groundwater. The law also requires statewide **registration of existing agricultural withdrawals** that are greater than 100,000 gpd (30 day average). The law became effective on February 15, 2012 and final implementing regulations became effective on April 1, 2013.

Depending on several factors, agricultural facilities may be required to register, obtain permits, and/or report water withdrawals annually.

If you have the *capacity* to withdraw 100,000 gallons of water per day, this law affects you.

Water Sources and Multiple Farm Parcels

Regulations cover withdrawals from water sources including wells and surface water sources such as ponds and creeks. Farms with multiple locations withdrawing water are considered a unit, i.e., one agricultural facility, as long as parcels are within 40 miles.

Agricultural Facility

The DEC defines an agricultural facility as "farming for crops, plants, vines and trees, and the keeping, grazing, or feeding of livestock for sale of livestock or livestock products, and the on-farm processing of crops, livestock and livestock products."

Annual Reporting

All agricultural facilities with the ***capacity*** to withdraw water equal to or in excess of an average of 100,000 gallons per day in any thirty day consecutive period (3 million gallons during a 30 day period) must file an annual report with the New York State Department of Environmental Conservation on an annual basis. Annual reports are due by March 31st of each year.

Registration

Registration is required if water use in any 30-day period exceeds 3 million gallons. This is equal to 110.5 acre-inches per 30 days or a daily average water use of 100,000 gallons (3.7 acre-inches). A 30-day running total record of the days that irrigation took place and the amount of water applied per acre will help determine the need for registration.

Permits

Any agricultural facility with a water source over the threshold volume but did not register or report usage to NYSDEC prior to February 15, 2012 must file for a water withdrawal permit**.**

How to estimate water withdraws

- One 70 gpm pump operating for a 24 hour period will withdraw 100,800 gpd.
- Irrigating at a rate of 3.7 inches water per acre per day equals 100,000 gpd.

The DEC website http://www.dec.ny.gov/lands/25677.html gives more detail on estimating withdraws for reporting as well as a worksheet and other handy resources.

More about Registering,

Reporting, & Permitting

Interpreting the new regulations can be a little tricky, so I called up to NYSDEC Division of Water in Albany to get clarification. The key points are these: Registration is basically filling in your name and location on the Ag Withdrawal Reporting Form, but not necessarily filling in the numbers on how much water you estimate you used. Why would you do this? Some farm operators may have no idea how much water they use. Sending in a registration with or without the water use report, will let the DEC know you are out there. They will work with you to determine if you need to report water withdrawals and or obtain a permit in the future.

If you registered/reported by Feb. 15 in 2012, you are now exempt from having to get a permit if you withdraw at or over threshold. Whether or not you reach threshold, you have to report annually by March 31, if you have the capacity to withdraw 100,000 gpd.

At this time the DEC is encouraging farm operations to use this reporting system as a tool to learn about their water usage. *(continued on back cover…)*

AG NEWS *(continued)*

Agriculture Secretary Announces $3 Million for a New Program to Improve Pollinator Health

Feb. 25, 2014. Washington, D.C. – The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) will provide close to $3 million in technical and financial assistance for interested farmers and ranchers to help improve the health of bees, which play an important role in crop production. The funding is a focused investment to improve pollinator health and will be targeted in five Midwestern states, Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin.

"Honey bee pollination supports an estimated $15 billion worth of agricultural production, including more than 130 fruits and vegetables that are the foundation of a nutritious diet. The future security of America's food supply depends on healthy honey bees," said Agriculture Secretary Tom Vilsack. "Expanded support for research, combined with USDA's other efforts to improve honey bee health, should help America's beekeepers combat the current, unprecedented loss of honey bee hives each year."

Funding will be provided through the Environmental Quality Incentives Program (EQIP) to promote conservation practices that will provide honey bees with nutritious pollen and nectar while providing benefits to the environment. Recent studies have shown that beekeepers are losing approximately 30 percent of their honey bee colonies each year, up from historical norms of ten to fifteen percent overwintering losses experienced prior to 2006.

This assistance will provide guidance and support to farmers and ranchers to implement conservation practices that will provide safe and diverse food sources for honey bees. For example, appropriate cover crops or rangeland and pasture management may provide a benefit to producers by reducing erosion, increasing the health of their soil, inhibiting invasive species, providing quality forage and habitat for honey bees and other pollinators, as well as habitat for other wildlife.

Midwestern states were chosen because from June to September the region is the resting ground for over 65 percent of the commercially managed honey bees in the country. It is a critical time when bees require abundant and diverse forage across broad landscapes to build up hive strength for the winter.

Applications are due March 21, 2014.

Since 2006, when heightened numbers of honey bee colony losses were first reported, significant progress has been made in our understanding of the factors that are associated with Colony Collapse Disorder and the overall health of honey bees. The USDA is actively pursuing solutions to the multiple problems affecting honey bee health. The Agricultural Research Service (ARS) maintains four laboratories across the country conducting research into all aspects of bee genetics, breeding, biology and physiology, with special focus on bee nutrition, control of pathogens and parasites, the effects of pesticide exposure and the interactions between each of these factors. The National Institute of Food and Agriculture (NIFA) supports bee research efforts in Land Grant Universities. The Animal Plant Health Inspection Service (APHIS) conducts national honey bee pest and disease surveys and provides border inspections to prevent new invasive bee pests from entering the U.S. The Farm Service Agency (FSA) and NRCS work on improved forage and habitat for bees through programs such as the Conservation Reserve Program (CRP) and EQIP. Additionally, the Economic Research Service (ERS) is currently examining the direct economic costs of the pollinator problem and the associated indirect economic impacts, and the National Agricultural Statistics Service (NASS) conducts limited surveys of honey production, number of colonies, price, and value of production which provide some data essential for research by the other agencies.

For more information on this program, visit the NRCS website.

USDA Announces Efforts to Expand Support for Small and Mid-Sized Farmers and Ranchers

March 10, 2014. Santa Fe, N.M.,–Today in remarks at the National Farmers Union National Convention, Agriculture Secretary Tom Vilsack announced new and expanded efforts to connect small- and mid-sized farmers and ranchers with USDA resources

AG NEWS *(continued)*

that can help them build stronger businesses, expand to reach new and larger markets, and grow their operations.

"The recent Census of Agriculture shows that there is tremendous growth potential for small and mid-sized producers in the American agricultural landscape," said Vilsack. "USDA is taking a hard look at our existing resources to ensure that they work for producers of all sizes. We've adjusted policies, strengthened programs and intensified outreach to meet the needs of small and mid-sized producers. These producers are critical to our country's agricultural and economic future."

Efforts include improved access to USDA resources; revised risk management tools that better fit the needs of smaller producers, additional support for hoop houses, and expanded collection of valuable market news information. USDA is also introducing a series of education tools focusing on opportunities for farmers engaged in local and regional food systems. In addition, USDA field staff will be boosting their outreach efforts to small and mid-sized farmers and ranchers.

More information about tools and resources available to small and mid-sized farmers will be rolled out in the coming months, including information about access to capital, risk management, food safety, and locating market opportunities on USDA's Small and Mid-Sized Farmer Resources webpage.

The new efforts announced by the Secretary today include:

ACCESS TO CAPITAL

- **Changes to the Farm Storage and Facility Loan (FSFL) Program to help small and midsized fruit and vegetable producers access the program for cold storage and related equipment like wash and pack stations.** Diversified and smaller fruit and vegetable producers, including Community Supported Agriculture programs, are now eligible for a waiver from the requirement that they carry crop insurance or NAP coverage when they apply for a FSFL loan. FSFL can also be used to finance hay barns and grain bins.

- **Funding for producers under the popular microloan program.** USDA launched the microloan program to allow beginning, small and mid-sized farmers to access up to $35,000 in loans using a simplified application process. Since their debut in 2013, USDA has issued more than 4,900 microloans totaling $97 million.

- **Funding for hoop houses to extend the growing season.** Hoop houses provide revenue opportunities while also promoting conservation for small and mid-sized farmers. The hoop house cost share program began as a pilot in 2010. Since then, more than 10,000 hoop houses have been contracted. USDA will soon announce an additional $15 million for hoop house development in persistent poverty counties in nineteen states as part of USDA's StrikeForce for Rural Growth and Opportunity Initiative.

RISK MANAGEMENT

Developing tools to help small and midsized farmers and ranchers make sound financial decisions as they plan for their future. USDA is developing a whole farm insurance policy that will better meet the needs of highly-diversified producers, particularly small and midsized fruit and vegetable growers. Using new tools provided by the Farm Bill, USDA is working to reduce crop insurance costs for beginning farmers and ranchers. And organic producers will benefit from the elimination of a previously-required five percent surcharge on crop insurance premiums.

LOCATING MARKET OPPORTUNITIES

USDA's Farm to School Program has put seven new Farm to School Coordinators on the ground in regional offices to help build direct relationships between small and mid-sized producers and school districts. One priority area for Farm to School is creating more opportunities for small and mid-sized livestock and poultry producers. Since 2013, USDA has invested nearly $10 million in Farm to School grants that support schools as they purchase from local and regional sources. In the 2011-2012 school year alone, schools spent nearly $355 million on local and regional food purchases.

Expanded price, volume, supply and demand information through Market News. Market News is now collecting price data on grass-fed beef to arm producers will real pricing information from the sector. Market News will also

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soon begin collecting data about local food prices and volume, valuable to small and mid-sized producers engaged in that marketplace. Market News provides real time price, volume, supply, and demand information for producers to use in making production and marketing decisions. Access to timely, unbiased market information levels the playing field for all producers participating in the marketplace.

Broadened the National Farmers Market Directory to include CSAs, on-farm stores and food hubs. This information will help small and mid-sized producers find new market opportunities. USDA will begin collecting data to update the directory for the 2014 season this spring. The USDA National Farmers Market Directory receives over 2 million hits annually.

FOOD SAFETY
Launched pilot projects in five states to help small and mid-sized farmers achieve Good Agricultural Practice (GAP) certification. GAP certification indicates farmers have met food safety standards required by many retail buyers. Under these pilot programs, small and mid-sized producers will be able to share the costs and fees associated with the certification process as a group. Group GAP efforts are being developed in partnership with small and mid-sized producer groups in Michigan, Wisconsin, Montana, Pennsylvania and Missouri.

EDUCATIONAL RESOURCES AND OUTREACH
Created a Learning Guide Series for small and mid-sized producers to help them navigate available USDA resources, available on the Know Your Farmer, Know Your Food website. The first in this series will be for small and mid-sized livestock and poultry producers. Additional Learning Guides will be released later this year. USDA field staff and StrikeForce teams will increase outreach to small and mid-sized producers using the Learning Guides.

Launched Small Scale Solutions for Your Farm, a series of educational resources designed for both small livestock and fruit and vegetable producers. This includes tips on simple management activities such as planting cover crops to complex structural practices such as animal waste management systems or innovative irrigation devices

2014 FARM BILL
The recently-signed 2014 Farm Bill provides USDA with more direct resources to support small and mid-sized farmers, including:

- **Beginning Farmer and Rancher Development Program (BFRDP),** which provides grants to organizations that train, educate and provide outreach and technical assistance to new and beginning farmers on production, marketing, business management, legal strategies and other topics critical to running a successful operation. The 2014 Farm Bill provides $100 million total to BFRDP over the next 5 years.

- **Value-Added Producer Grant Program** was modified to allow USDA to better target small and mid-sized family farms, beginning and socially-disadvantaged farmers, and veterans. The 2014 Farm Bill provides $63 million over the next 5 years.

- **Farmers Market and Local Food Promotion Program** is expanded to support both direct-to-consumer opportunities and other supply chain projects such as food hubs. The 2014 Farm Bill provides $30 million annually.

USDA FY2015 BUDGET PROPOSAL
USDA last week released its FY2015 Budget, which includes additional resources to help small and mid-sized farmers and ranchers, including:

- $2.5 million to provide food safety training to owners and operators of small farms, small food processors, and small fruit and vegetable vendors affected by Food Safety Modernization Act.

- $3 million for Small, Socially Disadvantaged Producers Grants Program to ensure historically underprivileged rural Americans have opportunities for cooperative development.

- $2.5 million for a new Food and Agriculture Resilience Program for Military Veterans (FARM-Vets) that promotes research, education, and extension activity for veterans.

- $11 million for the Value-Added Producer Grants Program. The 2014 Farm Bill provides an additional $63 million in mandatory funding

AG NEWS *(continued)*

that is available until expended.

- $2.5 million in funding for the National Agricultural Statistics Service to conduct a survey on land ownership and farm financial characteristics. This supports an Administration priority that will provide additional demographic data related to small and beginning farmers and ranchers.

- $1.2 million for the Office of Advocacy and Outreach to carry out these responsibilities and the provisions of the 2014 Farm Bill related to outreach to beginning, small, and socially disadvantaged farmers, and ranchers, including veterans, and rural communities.
- $25.7 million for Departmental Administration to maintain critical support activities and oversight for the Department, including management of small and disadvantaged business utilization programs.

USDA Enhances Farm Storage Facility Loan Program

WASHINGTON, March 10, 2014 — The U.S. Department of Agriculture (USDA) today announced the expansion of the Farm Storage and Facility Loan program, which provides low-interest financing to producers. The enhanced program includes 23 new categories of eligible equipment for fruit and vegetable producers, and makes it easier for farmers and ranchers around the country to finance the equipment they need to grow and expand.

This is part of a broader effort to help small and mid-sized farmers and ranchers, as announced today by Agriculture Secretary Tom Vilsack.

Producers with small and mid-sized operations, and specialty crop fruit and vegetable growers, now have access to needed capital for a variety of supplies including sorting bins, wash stations and other food safety-related equipment. A new more flexible alternative is also provided for determining storage needs for fruit and vegetable producers, and waivers are available on a case-by-case basis for disaster assistance or insurance coverage if available products are not relevant or feasible for a particular producer.

Additionally, Farm Storage and Facility Loans security requirements have been eased for loans between $50,000 and $100,000. Previously, all loans in excess of $50,000 required a promissory note and additional security, such as a lien on real estate. Now loans up to $100,000 can be secured by only a promissory note.

“The Farm Storage and Facility Loan program has helped American farmers and ranchers to finance on-farm storage for almost 13 years,” said Farm Service Agency Administrator (FSA), Juan M. Garcia. “We anticipate these changes will increase the number of individuals who qualify for these loans and help them access new market opportunities.”

The low-interest funds can be used to build or upgrade permanent facilities to store commodities. Eligible commodities include grains, oilseeds, peanuts, pulse crops, hay, honey, renewable biomass commodities, fruits and vegetables. Qualified facilities include grain bins, hay barns and cold storage facilities for fruits and vegetables.

Other new changes to the Farm Storage and Facility Loan program will allow FSA State Committees to subordinate Commodity Credit Corporation’s lien position.

These changes to the program were issued via an official notice to state and county Farm Service Agency offices and are effective immediately.

More than 33,000 loans have been issued for on-farm storage, increasing grain storage capacity by 900 million bushels since May 2000.

More information about tools and resources available to small and mid-sized farmers will be rolled out in the coming months, including information about access to capital, risk management, food safety, and locating market opportunities on USDA's Small and Mid-Sized Farmer Resources webpage.

Visit www.fsa.usda.gov or an FSA county office to learn more about FSA programs and loans, including the Farm Storage Facility Loan Program.

Post-Harvest Water Sanitation Food Safety Workshop with Dr. Trevor Suslow

Wednesday, April 2, 2014, 9:30 am to 3:30 pm

Albany County Cornell Cooperative Extension Office, 24 Martin Road, Voorheesville, NY 12186

Cost: $20.00 per person

Please Pre-register by March 28, 2014

The ENYCHP is excited to announce that Dr. Trevor Suslow, Extension Research Specialist at the University of California, Davis, Department of Plant Sciences, will join us for a one of a kind lecture and hands-on post-harvest water sanitation food safety workshop in the Albany area.

Dr. Suslow is an industry leader and world renowned expert in preharvest and postharvest research and outreach education on diverse fresh and fresh-cut horticultural foods. His emphasis is microbial safety and disinfection within the pre-harvest and postharvest environment and postharvest pathology. Other interests include biological control and other biologically mediated controls of postharvest diseases and pathogens of human food safety concern.

Joining Dr. Suslow will be our own Dr. Elizabeth Bihn of the National GAP's Program and Produce Safety Alliance. The full day workshop is a diverse mix of hands on training and lecture style presentations. To register please click here!

It doesn't matter if you are a vegetable or fruit grower; fresh marketer or wholesaler — this is a great opportunity to learn from one of the best about postharvest sanitation and food safety!

Postharvest Water Sanitation Workshop

A Produce Safety Workshop

Jordan Hall Auditorium, NYSAES, 630 W. North St., Geneva, NY 14456

April 1, 2014 (No fooling!)

9:00 am – 4:00 pm

Made possible by a grant from the **Genesee Valley Regional Market Authority**

Co-sponsored by: Cornell Cooperative Extension, National GAPs Program, Produce Safety Alliance, and Cornell University

We are excited to announce that **Dr. Trevor Suslow**, an Extension Research Specialist at the University of California, Davis, Department of Plant Sciences will join us for a one of a kind lecture and hands-on postharvest water sanitation food safety workshop in Geneva, NY. Dr. Suslow is an industry leader and world-renowned expert in pre-harvest and postharvest research and extension education focused on diverse fresh and fresh-cut fruits and vegetables. His emphasis is on quality and microbial safety within the pre-harvest and postharvest environment. Joining Dr. Suslow will be Dr. Betsy Bihn of the National GAPs Program and Produce Safety Alliance. The full day workshop is a diverse mix of hands on training and lecture style presentations.

It doesn't matter if you are a vegetable or fruit grower; fresh marketer or wholesaler—
This is a great opportunity to learn from one of the best about
postharvest water sanitation and food safety!

Pre-registration is requiredI
Meeting open and refreshments at 8:30 am, program begins at 9:00 am

<u>Program Topics to Include:</u>

- **Overview of Postharvest Water Sanitation**
- **Selecting the Right Sanitizer for Your Farm and Monitoring it Properly**
- **Hands-On with Sanitizers and Monitoring Tools**
- **Challenges in Water Sanitation for Small Farms**
- **Importance of Sanitation in the Packinghouse**
- **Developing an Effective Sanitation Program for Packinghouse Equipment**

Registration – Postharvest Water Sanitation Workshop

April 1, 2014

Technical Program including lunch: **$20 per person**

DEADLINE FOR REGISTRATION: Friday March 28, 2014

Name of Person(s) _____

Company _____

Address _____

Email/Phone _____

Please specify any dietary restrictions here: _____

_____

Make checks payable to **Cornell University**

If paying by credit card please fill out section below.
We accept American Express, MasterCard, & Visa.

Amount: _____

Card Number: _____

Name on Card: _____

Expiration Date: _____

Signature: _____

Please return registration to:
Sarah Lincoln
NYS Agricultural Experiment Station
Department of Food Science
630 W. North St.
Geneva, NY 14456-0462
Phone: 315-787-2255; Fax: 315-787-2284; E-mail SJL38@cornell.edu

$ MONEY TALK $

Berry Growers Business Management for Direct Marketers

Tuesday, March 25, 2014 10:00 am - 2:00pm
Cornell University's Hudson Valley Laboratory
3357 Rt. 9W, Highland, NY 12528

This program has been generated from work done through the NY Farm Viability funded project "Building a Better Bottom Line for NYS Berry Growers".

The information presented will inform all direct marketers, with examples of farm business summaries coming from exclusively berry operations. This same program was planned for the afternoon Berry Session Thursday, February 13th as part of the Hudson Valley Fruit School. This portion of the program was cancelled due to weather. If you had pre-registered and paid for that program, you will not be charged for this rescheduled program, but we still need you to register.

Program includes:

- Farm Business Summary History
- Introduction to Financial Statements
- Using the Berry Farm Business Summary Results to Improve Your Bottom Line
- Recordkeeping in 2014
- Using Social Media to Improve your Outreach

Speakers:

- Sandra Buxton, CCE CAAHP
- Megan Burley, CCE Erie County
- Dan Welch, NY FarmNet/NY FarmLink, Cornell University

Cost is $10/person includes lunch, refreshments and handouts Please pre-register by March 21st by clicking here to fill out the registration form. Contact Marcie Vohnoutka, CCE Rensselaer County, 61 State St., Troy, NY 12180, or call 518-272-4210 or email mmp74@cornell.edu. You can also register and pay online by clicking here.

Please make checks payable to "CCE ENYCHP".

Sponsored by: CCE Capital Area Agriculture & Horticulture Program & the Eastern NY Commercial Horticulture Program with Support from NY Farm Viability Institute

FSA Borrower Training Credits are available for this class.

$ MONEY TALK $ *(continued)*

Capturing Money Using Quickbooks: Basic Course in the Use of Quickbooks for Farmers

When: Tues-Thurs April 1, 2, 3 from 12:30pm – 3:00pm

Where: Cornell Cooperative Extension Ulster County's (CCEUC) Education Center located at 232 Plaza Rd (Hannaford Plaza), Kingston, NY 12401

This hands-on course is designed and targeted to those that have little or no knowledge of using Quickbooks. You'll learn the basics of this useful recordkeeping computer program to set up a chart of accounts and automate the recording of receipts and expenses as well as generate useful financial reports to monitor and track your agricultural business.

Pre-register here for all three sessions. The cost is $50 per farm for up to two people. Space is limited. For additional information please call Elizabeth Higgins at 845-340-3990 x316 or email emh56@cornell.edu.

A case farm will be used as an example throughout the class to give you a sense of how to use Quickbooks in your own business. If you are able to bring a laptop computer to the class we will be able to help you set up your business.

Those that attend are encouraged to come 30 minutes early (12:00pm) and bring something to eat if they wish. Elizabeth Higgins and Steve Hadcock of CCE will be there to answer questions you might have relative to using Quickbooks.

For more information about Cornell Cooperative Extension of Ulster County's community programs and events visit our online calendar at www.cceulster.org.

Cornell Cooperative Extension of Ulster County provides equal program and employment opportunities. Please contact our office at 845-340-3990 if you have special needs.

Additional financial support for this program is provided by the Local Economies Project of the New World Foundation.

FOCUS ON PEST MANAGEMENT

EPA Proposes New Safety Measures to Protect Farm Workers from Pesticide Exposure

February 20, 2014. Washington, D.C. — Today, the U.S. Environmental Protection Agency (EPA) announced proposed revisions to the Worker Protection Standard in order to protect the nation's two million farm workers and their families from pesticide exposure.

"Today marks an important milestone for the farm workers who plant, tend, and harvest the food that we put on our tables each day," said Gina McCarthy, EPA Administrator. "EPA's revised Worker Protection Standard will afford farm workers similar health protections to those already enjoyed by workers in other jobs. Protecting our nation's farm workers from pesticide exposure is at the core of EPA's work to ensure environmental justice."

EPA is proposing significant improvements to worker training regarding the safe usage of pesticides, including how to prevent and effectively treat pesticide exposure. Increased training and signage will inform farm workers about the protections they are afforded under the law and will help them protect themselves and their families from pesticide exposure.

Workers and others near treated fields will now be protected from pesticide overspray and fumes. In addition, EPA has proposed that children under 16 be legally barred from handling all pesticides, with an exemption for family farms. These revisions protect workers while ensuring agricultural productivity and preserving the traditions of family farms.

This proposal represents more than a decade of extensive stakeholder input by federal and state partners and from across the agricultural community including farm workers, farmers, and industry on the current EPA Worker Protection Standard (WPS) for Agricultural Pesticides first established in 1992. For more information on the EPA's Proposed Worker Protection Standard: http://www.epa.gov/oppfead1/safety/workers/proposed/index.html.

Ecologist and Future Director of Northeastern IPM Center Ready for Long Run against Pests - *Chris Gonzales, NEIPM Program*

In the Nebraska winter, he faced snow, cold, and high winds. In the summer, he dealt with pestilence and weeds. To top it off, he swam 2.4 miles, raced a bike 112 miles, and ran a 26.2 mile marathon, all in the same event. Steve Young has seen a lot of challenges related to climate and pests, and he's ready for more when he comes to Ithaca, New York in May to direct the Northeastern Integrated Pest Management Center at Cornell University.

"Any time you've done endurance athletics, you reach a point of near-total mental and physical exhaustion," Young said. "You think: *Can I get out of this?* Avoid that. Don't ever go down in the valley. You might not get out." The idea of not giving up often runs through his mind, particularly because he's usually pushing himself so hard.

Prior to coming to the Northeastern IPM Center, Young conducted research and extension programming on the ecology and management of weedy and invasive plant species at the University of Nebraska-Lincoln West Central Research and Extension Center. His recent publications tackled long-term management of invasive plant species with a focus on plant response to extreme climate events.

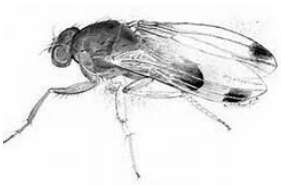
Young brings extensive knowledge in weed ecology along with an understanding of the biological relationships between plants, animals, and insects in developing long-term management strategies. He also brings insight and experience in assembling large-scale projects, which he believes will be an area of opportunity for the Northeastern IPM Center. He recently led the development of a $7 million proposal to a private foundation on conservation of lands infested with invasive plants to sustain rural communities in eastern Montana.

As director of the Northeastern IPM Center, Young will oversee one of four regional IPM centers established by the USDA in 2000. With an annual budget of about $1.4 million, the Northeastern IPM Center serves 12 northeastern states from Maine to West Virginia, plus the District of Columbia. Several of its programs are national in scope. Based at Cornell University, the Center promotes integrated pest management, a science-based approach for dealing with pests, for environmental, human health, and economic benefits.

Young earned his PhD in soil science from the University of California, Davis, and a bachelor's degree in horticulture from Washington State University in Pullman. In a book Young recently published, he gathered 13 of the top engineers, biologists, and economists in the world to envision a time in the near future where robot-like devices perform mechanical weed control.

"We are limited only by our own thinking," Young said. As Director, he will pursue funding opportunities in education and regional issues to promote integrated pest management in a shifting economic landscape. His service will overlap with outgoing director Carrie Koplinka-Loehr until July 15.

Spotted Wing Drosophila



Workshop

Spotted Wing Drosophila (SWD) is a serious pest of small fruit in our area. Millions of dollars have been lost in New England due to this pest.

ALL is NOT LOST! Growers can minimize loss with careful planning and good management practices.

We are **offering a hands-on workshop to build your skills to implement new practices on your farm or teach others how to!** This workshop brings specialists from within and outside the region to share important **up-to-date, new information for you to use this growing season!** There will be sessions on new monitoring methods, as well as cultural control and organic and conventional spray options for ***SWD*** in small fruit. **These workshops are for small fruit growers and those who teach or work with these growers. Hannah Burrack of North Carolina State University** will present her extensive research on SDW control methods. **Vern Grubinger, UVM**, will talk about netting, **George Hamilton, UNH** will discuss cultural practices and spray application factors that reduce SWD damage and **Alan Eaton, UNH & Margaret Skinner, UVM** will demonstrate trapping methods and adult ID.

The Program:

9:45-10:15 Registration & Coffee

10:30-11:15 Monitoring for SWD

- How to do it and why bother

11:15-12:15 Fruit & Trap Sampling *Hands-on* Demo

- The key to early detection
- SWD adult ID
- Adult & immature trapping options

12:15-1:00 Lunch & Grower-to-Grower Discussion

1:00-3:00 What's a Grower to Do?

- ✓ KEEP them OUT: Results of VT netting study
- ✓ KEEP them DOWN: Cultural control & Spray practices
- ✓ TAKE 'em OUT: Organic/conventional insecticides
- ✓ CHILL!: Effective Harvest and storage practices

3:00-3:30 Take Home Messages for this field season

5 Pesticide Credits awarded

Think Ahead Be Ready:
New Ingredients in the Recipe for Success with IPM

REGISTRATION FORM

Where and When:

Thursday, April 10

New Community Ctr., 152 South St. Claremont, NH

Registration Fee: $25 (includes coffee, snacks, cold drinks and handouts). Bring your own lunch or add $6 to receive lunch (sandwich buffet, chips and a pickle) provided by us on site. **Make checks out to The University of Vermont.** Forms and checks should be received by **April 1**.

Enrollment is limited. To ensure a place, register early.
Pre-registration required.

Name (s):_____

Address:_____

_____

Tel:_____

Email:_____

☐ I also want to receive your lunch special for $6.

Persons from any state are welcome to attend. All registrants will receive notification of their place in the workshop and a map with directions.

Send registration and fees to:

Cheryl E. Sullivan, Entomology Research Lab.
661 Spear Street, Burlington, VT 05405-0105

Questions? Call Cheryl E. Sullivan at 802-656-5434
Fax: 802-656-5441, email: cheryl.frank@uvm.edu
http://www.uvm.edu/~entlab/

Sorry, No Refunds.

This Educational Event brought to you by:

Margaret Skinner, Cheryl Sullivan &
Vern Grubinger, Univ. of VT Extension

Alan T. Eaton, George Hamilton and Seth Wilner
Univ. of NH Extension
and
Vermont Vegetable & Berry Growers Association
New Hampshire Vegetable & Berry Growers Association
New Hampshire Dept. of Agric., Markets & Food
Vermont USDA Extension IPM Program

WE HOPE TO SEE YOU!

Is It Time To Finally Take The Plunge Into Drip Irrigation? – *Ron Goldy, Michigan State University Extension*

The advantages of drip irrigation are well documented, but many large- and small-scale growers still have not adopted the technology. If you're one of those growers, maybe it's time to take another look.

Onions being drip-irrigated using drip tape.

February 20, 2014 Drip irrigation is adaptable to many agricultural and landscape situations. Systems have been developed so water can easily be applied to any planting shape, size and topography. About the only crops not using drip systems are large scale, agronomic crops and those crops requiring overhead irrigation for frost protection. If you're still a doubter or on the fence about drip irrigation, I encourage you to keep reading. Perhaps this is the year for you to change your mind.

Drip irrigation will not be perfect for all situations, but it does have several advantages in those situations where it can be used. Those advantages are described in detail below.

Increased yield. This is especially true if it can be combined with plastic mulch. I've had some vegetable producers tell me that by switching from bare ground production with overhead irrigation to raised, plastic-mulched, drip-irrigated beds, they were able to cut their land area in half and still double yield.

Water savings. Drip irrigation waters only the area where plants are growing using up to 50 to 70 percent less water than if the same area were overhead irrigated. Irrigation can also occur during the heat of the day when plants most need water. This is when a significant portion of overhead irrigation would be lost to evaporation

Lower pressure/lower volume. Most drip systems operate with pressures of 10 to 15 pounds, not 60 pounds or more like many overhead systems. They also don't need the significantly higher volumes required for overhead. Limited volume systems can simply be zoned off so smaller portions can be watered separately.

More efficient use of other inputs. Being able to achieve higher yields off fewer acres makes fertilizer, pesticide, labor and other inputs more efficient. Plant maintenance activities, like pruning, staking, spraying, harvesting, etc., can also be conducted while irrigation is taking place.

More consistent soil moisture levels. Drip irrigation makes it is easier to maintain uniform soil moisture leading to more consistent uptake of nutrients needed for good growth. This is important for reducing physiological disorders such as blossom end rot in tomatoes, peppers and other susceptible crops.

Easily automated. Any size system can be set up so it can be turned on and off using programmed timers. The systems can also be controlled remotely.

Improved fertilizer application. Plants can be fed on an "as needed" basis, increasing nutrient use efficiency, plant and fruit quality and yield.

Environmentally friendly. Slow application rate and the ability to regulate flow and time decreases potential for runoff and leaching.

Flexible delivery. The ability to

Drip Irrigation *(continued)*

use tapes, emitter tubes, drippers, spikes, misters and other mechanisms and also vary rates within these mechanisms makes the system highly adaptable to many applications.

Overall economy. Drip systems can be installed, maintained and operated generally at lower costs than other systems.

Left: Five-gallon bucket being drip-irrigated using a spike at the end of a spaghetti tube.

*(Reprinted from **Michigan State University Extension**)*

General Principles of Day-Neutral Production *-Kathy Demchak, Department of Plant Science, Penn State University*

Understanding the Plant

In general, it helps to understand what triggers growth in the strawberry, as this explains why and how certain production practices work. Strawberry growth is very dependent on temperature and daylength. In general, short days and cool temperatures, as occur in Fall and early Spring, trigger growth of branch crowns and flowers buds, while long days and warmer temperatures trigger growth of runners, and leaves to a lesser extent. Our typical June-bearing strawberry varieties produce their crop in the spring because they initiate flower buds during conditions of short days and cool temperatures in the fall and early spring; these flower buds then grow when plants resume growth after winter dormancy, resulting in only a spring crop.

Day neutral strawberries under plasticulture production. Photo courtesy Jim Ochterski.

Day-neutral strawberry varieties differ from June-bearing (short-day) varieties in that they have the ability to initiate flower buds regardless of daylength, within certain temperature parameters. This ability allows fruit production to continue throughout the entire growing season, unless temperatures become too hot (upper 80's or warmer). Typically flowering and fruiting will occur in flushes, though the exact pattern varies with variety. Generally the highest production occurs during the fall in the Mid-Atlantic region, except for high elevation areas above 2500 feet where summer temperatures remain cool and fall arrives early. There, fruit

General Principles of Day-Neutral Production – *(continued)*

production is highest during the summer. There are several different mechanisms that negatively affect fruit production during warm spells with both air and soil temperatures playing a role.

Day-neutrals are also referred to as "everbearers", and this is often how they are listed in nursery catalogs. Another terms that that you may see – primarily used in research – to describe day-neutrals is "remontant strawberries", which simply means that the plants flower more than once, derived from the French language, meaning "to rise again" (i.e., to mount again).

Production Systems

Day-neutral strawberries can be grown in many different systems. In open fields, they can be grown successfully on plastic-mulched raised beds, or on bare ground.

Day-neutral strawberries can be grown in high tunnels usually in plastic-mulched raised beds, or in containerized systems - horizontally in gutters or in vertically in pots.

Finally, production in greenhouses either for fruit production, or for hanging basket sales, is also possible. Most growers currently find field production to be more economically feasible than high tunnel or greenhouse production, as the increase in yields from protected culture either does not offset the additional costs of the structure, or other crops such as tomatoes or cut flowers return more per square foot of space.

In field production, the majority of day-neutral production is on plastic-mulched raised beds, where irrigation and fertilization can be more closely controlled, plants dry faster following rains, weeds are more easily controlled, and harvest generally proceeds faster. Most recently-introduced day-neutral varieties were developed for plasticulture production. Information is generally limited on performance of new day-neutral cultivars in bare ground production. However, information will be presented in this talk that will be applicable to either system.

Site Selection

Appropriate sites for day-neutral varieties are the same as for June-bearing varieties, with the exception that frost pockets are somewhat less of a concern since the plant will continue to produce new blossoms. A well-drained soil with a pH of 6.0-6.5 or slightly higher is ideal. Following other fruit crops or plants in the solanaceous plant family (tomatoes, potatoes, etc.) should be avoided. Well-aerated soils such as sandy loams or soils with a high organic matter content generally produce the highest yields. Heavier soils are more of a challenge, but production can be equally high with good management. Strawberries should be rotated out of a given field for at least 3 to 5 years and the longer the time between strawberry crops, the better. Many growers come back to the same fields to grow strawberries because of location, but plant performance often worsens over time.

Planting

Day-neutral plantings can be established in either the spring or fall, though spring planting is most frequently used. In the spring, a greater selection of varieties is available, mostly as dormant bare-root plants, which can be planted in bare ground plantings as for June-bearing strawberries. Dormant bare-root plants can also be easily planted through plastic in soils that are relatively rock-free by using a V-shaped metal planting tool to hold the roots, and then inserting plants into the soil through the plastic. If using a water-wheel planter, "plugs" can be created from dormant bare-root plants by trimming the roots and growing the plants in 32-cell trays in a greenhouse, or outdoors if temperatures are mild. This method is labor-intensive, but gives the plants a head-start, allows easy removal of blossoms, and makes timing of planting less critical should field preparation be delayed. A limited number of nurseries provide plug plants for fall planting.

In bare ground production, a

General Principles of Day-Neutral Production – *(continued)*

close spacing of 5" to 10" apart in single rows, or 7" x 7" apart in double rows is recommended. On plastic, staggered double rows with plants 12" apart in each row has worked well.

Blossom and Runner Removal

Our current recommendation is to remove blossoms for 3-4 weeks after planting, which generally means removing the first flush of blossoms plus some stragglers. Research at the Univ. of Maryland with plugged plants showed that yields were very similar over the course of an entire season whether blossom were removed following planting or not. Plants began fruiting sooner, but subsequent harvests were slightly reduced, and berry size was slightly reduced. This also meant that there was no yield loss from removing the first blossoms, and there is still is some question as to whether the stress of fruiting could reduce later yield especially if establishment conditions are poor.

Runners remain in bare-ground plantings, and are usually removed in plantings on plastic to improve air flow and foliage drying, and to prevent daughter plants from rooting in the row.

Planting Life and Harvest

Traditional recommendations were to fruit day-neutral plantings for 2 or 3 years. However, given labor concerns and the consumer appeal of large berries, most growers keep day-neutral plantings for only a portion of the second harvest season, especially when growing on plastic.

Typically, harvest will take place from late June through the first hard frost the first year, and plantings are kept for the second spring. Growers generally find that berry size becomes too small to continue harvest beyond that point, as the number of branch crowns produced and thus the number of berries exceeds the plant's ability to size the fruit. If plug plants were planted in late summer or early fall, harvest occurs earlier in the first spring, but fruit size may only be acceptable for one harvest year.

Plastic Color

Aluminized plastic can result in higher yields (15-20% higher), presumably due to decreased soil temperatures and reflected light early in the season. However, so far aluminized plastic has been difficult to obtain and relatively expensive, so standard black plastic (embossed, 1.25 mil) is used. Results in PA with other plastic colors have been inconsistent.

Irrigation

Because the plants are continually fruiting, irrigation – preferably trickle – is considered a necessity whether on bare ground or plastic. Dry conditions can result in a complete lack of fruit production.

Fertilization/Nutrition

Traditional recommendations for bare-ground production of day-neutrals was to apply nearly 1 pound of nitrogen per acre per day on average. This may have been to account for leaching from rain, or to ensure that sufficient nutrients were available. However, when plants are grown on plastic, leaching from heavy rains is not an issue.

In research with 'Seascape' on plastic in 2006-07 in both PA and MD, 1 pound of nitrogen per acre per week as 20-10-20 fertilizer (calculated on a mulched acre basis), following pre-plant incorporation of 60 lb of nitrogen/acre prior to bed-making, produced high yields, a reasonable amount of foliage, and high-quality fruit, with little additional increase in yields from higher nitrogen rates. Regression analysis showed that both nitrogen and potassium likely contributed to higher yields.

Varieties

Please note that comments below reflect performance under PA conditions. Varieties often perform better or worse in other locations, so small trials on your farm are recommended.

Albion – Produced firm, elongated, large fruit. Moderate yields were produced on different plants at different times. Produced many runners. Was moderately susceptible to fruit anthracnose.

Evie 2 – Produced large uniform fruit that was light in color, soft, and tended not to sweeten. Plants were very vigorous, and fruit production was low relative

General Principles of Day-Neutral Production – *(continued)*

to the amount of foliage.

Mara Des Bois – Considered a "gourmet" berry by chefs. Fruit was small, so yields tended to be low, but was very flavorful and aromatic. Performance has been better in tunnels due to high susceptibility to fruit anthracnose in the field.

Monterey – Produced large fruit with good color and very good flavor. Yields were good. Was extremely susceptible to fruit anthracnose and susceptible to powdery mildew.

Portola – Produced high yields of soft large fruit with little flavor.

San Andreas – Had a great combination of large fruit size (28g/berry, or 16 berries/pound), nice color, nice flavor, and good, but not great, yields. Some berries were asymmetrical in shape.

Seascape – Considered the eastern standard for Mid-Atlantic day-neutral production for the past 6-7 years. Very productive, berries were sweet and medium-sized, and split in the slightest amount of rain. Was extremely susceptible to powdery mildew.

Marketing/Economics

In New York and Pennsylvania, only 3-4% of the strawberries purchased are actually grown in-state. Despite this, grower experiences with selling off-season day-neutral varieties vary widely, with some growers reporting that they can't sell the crop, and others having a waiting list for berries. Sales are often higher at farmers markets than on the farm. Whether this is due to different clientele (i.e., urban and suburban customers who may be more familiar with purchasing berries year-round in supermarkets), or a matter of convenience is not yet known.

Diseases and Pests

The most common diseases encountered in day-neutral production are powdery mildew and fruit anthracnose. The higher powdery mildew incidence is in part due to cultivar susceptibility, but also probably because fruit is present during hot humid spells in the summer, unlike with June-bearing cultivars. Fruit anthracnose can become very widespread in a planting if susceptible cultivars are grown, and fungicides are likely to be needed. Use of straw mulch helps with minimizing rain-splash of anthracnose spores.

Two insects that become more problematic as the summer and fall progress, and hence are problematic in day-neutral plantings, are tarnished plant bugs and spotted wing drosophila. Both pests have multiple generations, and increase in numbers during the growing season. To help with control of tarnished plant bugs, weeds should be closely controlled, and the area around the planting kept mown. At least one insecticide spray is likely to be needed specifically for tarnished plant bugs. Difficulties with spotted wing drosophila have varied widely, ranging from no larvae present in research plantings, even without sprays, to 80% of fruit lost in grower fields. Cultural practices probably played a role, as the research plantings with few SWD were surrounded by agronomic crops and harvested very cleanly. It should also be noted, however, that raspberry and blueberry plantings used for SWD studies - where no insecticides being applied - were approximately 800 feet away. In two instances with high losses to SWD on farms, muskmelon fields with cull fruit between the rows were present in nearby fields. Growers should be prepared to spray for SWD.

Additional Reading

Season-Long Strawberry Production with Everbearers for Northeastern Producers. 2010. W. Lantz, H. J. Swartz, K. Demchak, and S. Frick. EB-401, Univ. of Maryland. 70 pages. Available on-line from the SARE Web site at http://www.sare.org/Learning-Center/Project-Products/Northeast-SARE-Project-Products/Season-Long-Strawberry-Production-with-Everbearers-for-Northeastern-Producers and at http://www.fruit.cornell.edu/berry/production/strawberryproduction.htm .

Day-Neutral Strawberry Production Guide. 1989. M. Pritts and A. Dale. Available on-line at http://hdl.handle.net/1813/3275

Acknowledgements

Much of the above work was conducted as part NE-SARE Project LNE06-241 “An integrated approach to developing a day neutral strawberry production industry”, W. Lantz, K. Demchak, and H. Swartz.

Additional funding for cultivar trials was provided by the Pennsylvania Vegetable Growers Association.

Day-Neutral Strawberry Variety Performance and Planting Date Affects in Plasticulture – *Dr. Courtney Weber, Small Fruits Breeder, Department of Horticulture,*

Day-neutral and short day (June-bearing) strawberry variety performance was evaluated over a 3-year period in an annual plasticulture system modified for multiple harvest periods and overwintering. The trials were established at 6 different planting dates over 2 years using either dormant-bare root crowns or green plug plants grown from dormant crowns for spring and summer plantings. Observations from the first trial planted in 2011 and harvested in 2011-12 led to the conclusion that early planting in both the spring and summer was critical to strong plant development and higher yields. It also demonstrated the potential to utilize the plasticulture system in NY to produce fruit outside the traditional June harvest period.

A second trial was planted in 2012 to compare planting dates (April 27, May 23, July 16 and August 14) as well as varieties in this modified plasticulture system. This trial was harvested in 2012-2013. This trial was established using the most appropriate plant type for the planting date, dormant bare-root crowns in the spring and green plugs in the summer. In order to plant in early spring, beds were formed and covered with plastic in October 2012 (the previous fall) and left overwinter so that planting could be done in April and May. For the summer planting dates, the plugs were produced in-house using bare-root crowns from the same batch of dormant plants as the spring plantings. The crown roots were trimmed to approximately 2 inches and placed in 2”x2”x2 ¾”, 50-well plug trays filled with soilless Cornell mix. The plants were grown in open cold frames with overhead irrigation for 6 weeks prior to planting in the field.

The day neutral varieties harvested in 2013 included Albion, Evie 2, Monterey, Portola, San Andreas, Seascape and Tribute. The short day varieties included Jewel, Chandler, Clancy, Ovation, Seneca and Ventana.

The summer/fall harvest of the April and May 2012 planted plants began on July 18, 2012, 82 days post planting, and lasted until October 1. The spring 2013 harvest of all 4 planting date trials began on June 4 and lasted through July 9.

The summer/fall 2013 harvest for the day-neutral varieties planted in 2012 began on July 22 and continued until October 11. Four, ten-plant plots were harvested from each variety. The fruit was weighed and counted for total yield and mean fruit size calculations. The timing, intensity and uniformity of flowering among varieties, plots and in some cases within varieties and plots varied greatly. These trials will be overwintered for observation and possible harvest in 2014 as well to determine the potential longevity of plantings using the plasticulture system.

Of the short day plants, Jewel and Seneca were the most productive over all 4 dates and Clancy and Chandler were the least productive.

The highest yields were produced from July planting date using plugs followed by the August planting date. The spring planting dates produced similar yields with a maximum of 8,400 lb/ac for Jewel. The summer plantings with plugs were much more productive with a maximum yield for the July planting of 14,100 lb/ac for Ventana and greater than 10,000 lb/ac for all varieties except Clancy at 9,500 lb/ac.

The August planting was much more variable but was uniformly lower for all varieties by 10-40% but was still higher than the spring

Day-Neutral Strawberry Variety Performance and Planting Date Affects in Plasticulture – *(continued)*

plantings in all cases except Chandler.

Yield in the day-neutral varieties was greatly variable by planting date. The highest yields overall were again produced from the July planting of plugs with similar but consistently less production from the August plantings. This was true even though there were only 2 harvest periods on these plantings, spring/summer 2013 and summer/fall 2013. Yield averaged 18,200 lb/ac across all varieties for the July planting with a high yield of 23,000 lb/ac for Evie 2 and 22,800 lb/ac for Seascape. The lowest yield for the July planting was for Portola at 12,800 lb/ac.

The spring plantings of day-neutral varieties produced significantly less fruit over 3 harvest periods (summer/fall 2012-spring/summer 2013-summer/fall 2013) compared to the summer planted plots with only 2 harvests.

Yield was 39% less for the April bare root planting compared to the July plug planting. The May planting was less productive than the April planting producing 36% less fruit.

However, it should be noted that the reduction in yield between the April planting and the July planting was due to the differences between the first spring/summer crop of each planting. The first summer/fall crop for the April planting was in 2012 starting less than 3 months post planting and produced a viable crop in the planting year. The second crop in this case was the spring/summer 2013 harvest.

The first summer/fall crop for the July planting occurred 12 months after planting following the first spring/summer crop in 2013. While the order of variety productivity was not identical, the average yields for the first summer/fall crop was similar, whether in the planting year or in the following year.

From the first trials, it appears that day neutral varieties can be used in plasticulture with an early April planting to produce high yields during a long harvest season from late May to October with only a small window in June-July when fruit is not available. Day neutral varieties with the most potential include San Andreas, Seascape and Evie 2. Overall, Seascape had the best combination of high yield and good eating quality.

The varieties Aromas, Diamante, Tribute, Portola and Monterey were less productive and/or had poor fruit quality. The short day varieties were not as productive and generally runner excessively so that much pruning is required. The varieties typically planted in the fall/winter in the SE U.S. (Chandler, Festival, Palomar, Radiance, Camino Real, Ventana) were not productive and do not seem adaptable to the NY climate.

The Cornell varieties Jewel and Seneca were the most productive and adapted to this system in NY. Based on the observations made and data collected over the 3-year project, production using plasticulture systems may be a viable option for growers in NY and other regions of similar climate, especially for day-neutral varieties. Cumulative yield exceeded 23,000 lb/ac in one growing season (2 harvest periods) for the most productive varieties when summer planted plug plants were established in late July. Based on the data from the late August planting that saw a small reduction of yield, a likely planting window of July 15 to August 15 is optimal for maximum yields in the following year.

So depending on the goals of the grower, the optimal planting date may vary. If the goal is to produce fruit quickly in the traditional off-season in NY in the planting year only, then the most appropriate approach would be to plant as early in the spring as possible, preferably in April or sooner when the ground is still cold and moist.

This allows the plants to come out of dormancy slowly and naturally and avoids much of the potential heat stress observed with planting bare root plants in black plastic later in the year. This produces the largest, healthiest plants, which can begin production 10-12 weeks post planting. For this system, it is recommended that the first flowers be removed from the emerging crowns to allow greater crown development prior to the development of new flowers for summer and beyond.

Overwintering of the plantings utilizing this system was not productive in open field production, presumably due to the high stress level from producing fruit up until frost in the fall, which does not allow the plant to adequately prepare for winter dormancy and growth the following spring. Utilizing additional technology such as

Day-Neutral Strawberry Variety Performance and Planting Date Affects in Plasticulture – *(continued)*

high or low tunnels may mitigate some of this and produce stronger plants going into winter making the overwintering of these plants more viable.

If the goal of the grower is to maximize yields across both the traditional June production season as well as the following off-season from July to October, then a summer planting between July 15 and August 15 is most suitable. Plug plants would need to be produced either on farm or with collaboration with a nursery in order to obtain the appropriate plants at the appropriate time. Currently, plug plants are not available from commercial nurseries in this time frame so special arrangements are necessary.

A similar benefit to planting short-day (June-bearing) varieties in the plasticulture system was observed for the July planted plug plants and less so for the August planted plants. The yield and fruit size was superior to most trials conducted in matted row system and comes with much more manageable weed control options using hooded sprayers between the rows and the plastic to control within the row. There are higher costs associated with the system due to the added cost of plastic and machinery to apply it as well as at least 100% increase in plant costs due to higher planting density and the cost of producing or buying plugs. The grower will need to carefully analyze the cost benefits to less weed control and higher quality and possibly yield of fruit to determine if this system is a viable option for them. The most promising varieties for this system based on yield were Jewel and Seneca with Jewel displaying the highest fruit quality for retail and wholesale sales.

(Reprinted from: Proceedings 2014 Empire Producers EXPO, Syracuse, NY)

Day-Neutrals: Strawberry Weed Management -*Kathy Demchak, Department of Plant Science, Penn State University*

Weed control methods fall into one of several categories: 1) fumigation, 2) cultural controls, and 3) herbicides use. Fumigation methods and cultural controls are similar whether June-bearing or day-neutral varieties are being grown, whereas herbicide use is more limited because fruit is present for most of the growing season.

Fumigants

Weed control is one of the main reasons for the use of fumigants prior to planting. The most commonly used material is metam sodium (Vapam). 1,3-dichloropropene alone (Telone) or with chloropicrin (Telone C17, Telone C35) does not have efficacy against weeds. A newer fumigant, dimethyl disulfide (Paladin) does have efficacy against weeds. Combinations of fumigant materials are currently being tested that appear to give improved results.

Cultural Methods

Use of plastic-mulched raised beds is a main method of controlling weeds in day-neutral strawberry production. When growing strawberries on plastic, the size of planting holes should be kept as small as possible to minimize the area from which weeds can emerge. In our day-neutral plots at PSU, our weed control program consists of measures to suppress perennial weeds prior to planting (cultivation and glyphosate application), and then purely cultural controls afterwards: growing plants on plastic, applying straw mulch along the edges of the plastic to suppress weeds and keep the berries clean, mowing the row middles once weeds start to grow, and using hand-weeding and weed-whacking for touch-ups.

Other cultural methods consist of growing competitive cover crops prior to planting, cultivation before and after planting, mowing, mulching with straw, and hand-weeding. Biology of individual weeds and its effects on cultural control measures are further discussed below.

Herbicides

Not all herbicides that can be used for June-bearing strawberries can be used to the same extent in day-neutral plantings, mainly because of days-to-harvest limitations. When plants are grown in plastic-mulched raised beds, no herbicide should ever be applied over the beds, as the material can wash off the beds and become concentrated in the planting holes.

Herbicides fall into 2 categories: post-emergence, which are used to control weeds after they have emerged, and pre-emergence, which are used to prevent seed or sometimes very young weeds from being able to establish themselves. Some herbicides (Sinbar, Goal, Chateau) are used mainly for their pre-emergence activity, but also have either "kickback" activity on seedlings (Sinbar), or both burndown and preemergence activity (Goal and Chateau). Post-emergence translocated herbicides work better when weeds are not stressed by heat or drought, so that the weeds are actively growing and the herbicide will be taken up. Preemergence herbicides work better when conditions exist that would encourage weed seed germination. Descriptions of herbicides and their uses follow, including additional limitations that must be considered when growing day-neutrals. Because herbicide use is more limited in day-neutral plantings, a follow-up discussion that focuses on cultural controls of troublesome weeds, combined with pointers on getting the most from herbicide use. Rates and timings should be followed they appear on the label, and are also in the "2014 Cornell Pest Management Guidelines for Berry Crops" or other local extension publications.

Day-Neutrals: Strawberry Weed Management – *(continued)*

Post-Emergence Herbicides

For simplicity, only one commonly-available brand name of herbicide containing each active ingredient is discussed below; however, others may be available that are equally effective. Check your states extension information for formulations that are labeled in your state.

Roundup (glyphosate) is a post-emergence material and has no residual activity once bound to the soil. It is translocated throughout the plant, and works by inhibiting amino acid production. This mode of action causes it to be non-selective, so any plant will be affected - with a few notable exceptions. It is commonly used during field preparation to kill or suppress existing weeds - this is an especially useful tactic for managing perennial weeds. Roundup can also be applied after planting with a 14-day pre-harvest interval. Because Roundup is translocated through the plant, and strawberry plants are attached to each other via runners, neighboring plants can be affected if one plant is exposed. The safest way to use Roundup after planting is with a wick or wiper to avoid the possibility of injury from drift. Symptoms of Roundup damage on strawberry plants could be mistaken for zinc deficiency. New leaves will be small and light-green or show interveinal chlorosis (yellowing), and may appear narrower than usual. In day-neutral plantings, Roundup can be used before planting, and as a spot treatment to control troublesome perennials. However, because of the 14-day PHI, it can only be used soon after planting, during a lull in summer production when at least 14 days will pass between application and the next harvest, or after harvest is over for the year.

Formula 40 (2,4-D) is a post-emergence translocated herbicide that acts like a type of plant hormone (auxin) and causes uncontrolled cell division. It is effective against perennial broadleaf weeds such as dandelion and dock, and also annual broadleaf weeds such as pigweed and nightshade. Application is allowed in strawberries at renovation or in early spring when plants are still dormant; however, since day-neutral plantings don't undergo renovation, it can only be used in early spring in plantings that are carried over for a second or third harvest year.

Stinger (clopyralid) use on strawberries is allowed through a Special Local Needs label that must be in possession of the user. Stinger, like 2,4-D, is a post-emergence translocated herbicide with a similar growth regulator effect. It has activity against a number of troublesome weeds in the legume family (clover, vetch), the aster family (thistles, groundsel, ragweed) and dock. Use is allowed in spring for established plantings, though not in the planting year, or in early fall. It has a 30-day PHI, so it can only be used in spring at least 30 days prior to the first harvest in plantings that are carried over for a second or third harvest year. Fall applications and harvest may be at conflict with each other, so the last day-neutral harvests may need to be foregone in order to apply Stinger.

Fusilade (fluazifop-P-butyl), **Poast** (sethoxydim), and **Select** (clethodim) are post-emergent translocated materials that only control grasses, and do so by killing their growing points. Fusilade can only be used in non-bearing fields, and so cannot be used in day-neutral plantings. Poast and Select have 7- and 4-day PHI's, respectively, which limits their use to times when frequent harvests are not underway. They can be applied overtop strawberry plants grown on bare-ground, but should never be applied over plastic-mulched raised beds.

Gramoxone Inteon (paraquat), **Aim** (carfentrazone-ethyl), **Axxe** (ammonium nonanoate), and **Scythe** (pelargonic acid) are non-selective burndown materials that are not translocated in the plant. Thus, they are most effective on annuals, as perennials can grow back from their root systems. Gramoxone is a restricted-use material with 21-day PHI, which limits it's used in day-neutral plantings to early spring or fall after harvest is over. Aim, Axxe, and Scythe can be used pre-plant, or as shielded sprays between the rows or beds.

Pre-emergence Herbicides

Dacthal (DCPA), **Devrinol** (napropamide), and **Prowl H_2O** are preemergence materials that are primarily effective against grasses and also some small-seeded broadleaf weeds. If day-neutrals are being grown on bare-ground, Dacthal, Devrinol, or Prowl H_2O can be applied at transplanting as with June-bearing strawberries, keeping in mind that Prowl has a 35-day PHI and Dacthal and Devrinol cannot be applied after bloom starts. Dacthal tends to be fairly weak on weed control, however. All can also be applied at fall dormancy or in spring if plants are being grown on bare ground and are being kept for another year. If

Day-Neutrals: Strawberry Weed Management – *(continued)*

day-neutrals are being grown on plastic, Devrinol can be applied to the beds before laying the plastic, or between the rows of plastic, but still cannot be used after the plants begin to bloom. Prowl H_2O can only be used between the beds as a shielded spray, and the 35-day PHI still must be observed.

Sinbar (terbacil), **Chateau** (flumioxazin), and **Goal** (oxyfluorfen) are primarily effective against broadleaf weeds. Sinbar has "kickback" activity on seedlings (Sinbar), while Goal and Chateau are "hot" materials that have both burndown and preemergence activity, and hence will damage any green tissue that comes in contact with the material. Goal use is limited to field application as a burndown material at least 30 days prior to planting. Sinbar has a 110-day PHI and so its use is limited to fall or early spring dormancy for bare ground day-neutral plantings that are being carried over for an additional harvest season, though it also could be used in the fall if later harvests are foregone. Sinbar can only be used in plastic-mulched systems in Florida. In bare-ground day-neutral production, Chateau can be used only over the plants only when the plants are dormant in late fall or early spring. In plastic-mulched systems, Chateau can be applied to the beds 30 days prior to planting before the plastic is applied. It can also be used between the rows as a shielded spray, but not after fruit set in either bare-ground or plastic-mulched plantings.

Putting It All Together – Management of Troublesome Weeds

Weeds are classified as summer annuals, which live through the spring or summer and into the fall; winter annuals, which germinate in the fall and live through the next spring; or perennials, which can continue growing for more than one year. Weather conditions affect exactly when they are most active. Our most problematic weeds are prolific seed producers, often equipped with seed dispersal mechanisms. Some weeds can also be propagated vegetatively, sometimes unintentionally with our help, and/or have large storage organs to ensure survival.

Summer annuals

Purslane, also known as wild Portulaca, has succulent fleshy leaves and stems, which if broken off or tilled, can re-root at each node. It needs high light and warmth, and soil temperatures of 70 to 75 degrees to germinate. One plant can produce 250,000 seeds, which can survive for 40 years. In wet years, its seeds will germinate all summer.

Pigweed (4 species – redroot, tumble, smooth, and Powell amaranth). Pigweed seeds germinate all summer, but mainly from bare soils. Germination is inhibited at temperatures above 95 degrees. Over 10,000 seeds are produced per plant, and seeds can survive for more than 10 years. Pigweed plants secrete a chemical that prevents other seeds from germinating. Tumble pigweed is the plant seen blowing around in old Westerns, as it was native to the Great Plains, but now is found in the east as well. The plants abscise at the ground when they mature, and their tumbling serves as a seed dispersal mechanism.

Eastern black nightshade is in the tomato family. The vegetative portions and immature fruit are poisonous, but ripe fruit is not. One plant can produce 1000 berries, and each berry can contain between 50 and 110 seeds. The berries are eaten by birds, which then disperse the seeds.

Lambsquarters, like other weeds, is a prolific seed producer and the seeds have a long dormancy period, though exact numbers aren't available.

Horseweed isn't usually a problem in June-bearing strawberries, but can be in day-neutrals where less tillage may be taking place. It can behave like a winter annual, summer annual, or biennial. It usually grows as an unnoticed rosette in the fall and/or spring, bolts and makes most of its growth in the summer, then goes to seed.

Cultural controls for summer annuals consist of hand-pulling, or mowing which is useful for taller summer annuals – the stub may survive, but seed production will be greatly reduced or eliminated, and avoids new weed seeds being brought to the soil surface. Cultivation helps, but should be down shallowly when weeds are still young, and is best performed when soil is dry.

Spot-treating with an allowable burndown herbicide is useful for summer annuals. Thorough coverage is important, especially with "softer" materials. With day-neutrals, allowable herbicides are limited because of fruit presence. Dacthal can be applied at planting, but is weak against all species mentioned above except for purslane and lambsquarters.

Day-Neutrals: Strawberry Weed Management – *(continued)*

Devrinol can be applied at planting for day-neutrals grown on bare-ground, or to beds before plastic is laid for plastic-mulched plantings. Devrinol has fair to good efficacy ratings for purslane, pigweed, and lambsquarters, but has little to no effect on nightshade and horseweed. Prowl H_2O has good activity on purslane and lambsquarters, and can be applied at planting if plants are grown on bare ground, or between the rows of plastic-mulched beds with a shielded sprayer, remembering to observe the 35-day PHI. Sinbar is efficacious against all the mentioned species, but timing is limited to dormancy in bare-ground systems because of its 110-day PHI. Chateau can be used as a shielded spray between the rows only prior to fruit set or at dormancy in carried-over plantings.

Winter Annuals

Winter annuals usually germinate in the fall, but can also germinate at other times of the year if weather conditions are conducive. Typically they die off when weather becomes hot and dry in the summer, but may persist if the summer is wet and cool.

Common chickweed (not to be confused with mouse ear chickweed, a perennial) germinates mainly in the fall, though it will germinate anytime weather is cool and moisture is sufficient. It can even germinate and grow under the snow, which explains those "Where'd that come from?" moments in the spring. It also tolerates shade better than most weeds. As the plant grows, it roots at its nodes, thus potentially forming a large mat of a plant that can produce over 10,000 seeds. Seeds can survive in the soil for over 10 years. It flowers and sets seed in the spring and early summer, and the seed is capable of germinating immediately. The plant only needs 5 weeks of growing conditions to progress from emergence to seed set. Typically there is only one generation per year, but two are possible. Chickweed does not tolerate is drought, so it is rarely a problem in unirrigated row middles in the summer.

Henbit (not to be confused with purple deadnettle) is in the mint family, and also roots at its nodes. It has a similar germination and flowering pattern as common chickweed. One plant can produce 2000 seeds, and its seeds remain viable for 25 to 40 years. Its seedlings are easily controlled by tillage, but timing is critical.

Shepherd's purse germinates in early fall, later summer, or early spring in the Northeast, and produces seed in late spring and early summer. One plant can produce as many as 38,500 seeds, which remain viable in the soil for up to 35 years.

Cultural management of winter annuals consists of keeping the strawberry planting healthy so it can outcompete the weeds, hand weeding even if you only see a few weeds, filling in any bare spots where seeds may germinate with straw mulch, and cultivating shallowly to avoid bringing up more weed seeds.

In June-bearing plantings in the establishment year, Devrinol or Sinbar can be applied around Labor Day, but this is not allowed if fall fruit is to be harvested from day-neutral plantings. Herbicide applications may be made dormancy in the fall prior to applying straw mulch as long as plants are not being grown on plastic. Chateau and Sinbar are effective against all three of the above-mentioned weeds. Devrinol is effective against chickweed; Prowl is weak on all three.

Perennials

Perennial weeds have multiple methods of propagation. Controls should be heavily focused towards pre-plant efforts, as many more options for management exist then.

Dandelion is a pervasive problem because of its windblown seeds and its large taproot that allows the plant to resprout several times if broken off. The flowers can continue to mature seeds even once the plants are pulled. If dandelion plants are recently established, shallow tillage can be effective, but if the weeds are established, hand-pulling and tillage have little effect. Plants can be mowed or weed-whacked close to the ground before bloom. In day-neutral systems, 2,4-D at spring dormancy, or Roundup with a wick applicator as long as the 14-day PHI is observed are the best options. Chateau, Devrinol, and Sinbar are effective pre-emergence materials and can be used at timings discussed above.

Canada thistle has both vertical roots for food storage, and horizontal roots which allow it to spread. Shoots that emerge in the spring flower and produce wind-blown seed, while shoots that are produced in the fall make food for the winter. Mowing it or using a burndown herbicide in the spring is more effective than at other times of the year, as its food reserves are already low then.

Day-Neutrals: Strawberry Weed Management – *(continued)*

Frequent tillage, repeated as soon as the plants resprout, is also effective, but tillage used infrequently only multiplies it. Roundup is most effective in late spring and early summer just prior to bloom – a timing that cannot be used with day-neutrals. In the fall, either Roundup or Stinger can be used prior to frost - thistle plants become less susceptible to herbicides after frost. Some fall harvests may need to be forgone if either of these materials are used. No pre-emergent herbicides are very effective.

Quackgrass is active in late spring and early fall when temperatures are moderate, and goes "dormant" during midsummer heat. It reproduces by seed and rhizomes, which can travel several feet before sending up a new shoot. Control should be focused before planting, when repeated tillage can be used to chop the rhizomes into small pieces. The young plants that try to regrow will be susceptible to Poast, Select, or Roundup when they have 6 to 8 leaves as their reserves are already low, but little effect may be observed if a hot dry spell occurs at this time. Plants should not be allowed to re-establish.

Yellow nutsedge can be identified by having a 3-sided (triangular) base, and leaves in groups of three. This helps to distinguish it from grasses. It should be noted that the 3-sided base is only apparent on young plants below the soil line – otherwise, it may be mistaken for a grass. It produces nutlets, rhizomes, and seeds. One plant can produce hundreds to thousands of nutlets, which sprout once they are chilled over the winter, and can resprout 6 to 8 times if tilled. The rhizomes grow and produce new plants in late spring through summer, but in the fall, grow downward, produce nutlets, and die, which then separates the nutlets from the mother plant. Cultural controls consist of keeping the planting vigorous as nutsedge does not tolerate shade.

Nutsedge prefers high moisture, and is often found in wet spots or soils with poor drainage. Control measures should be focused on the period before planting. Repeatedly mowing can prevent the plants from going to seed, and tillage prior to winter (before planting) can bring nutlets to the surface where they freeze. Tillage in the spring only disseminates the nutlets. Crop rotations that allow the use of herbicides that effective against nutsedge are helpful (for example, corn). Roundup, when used, should be applied after 5-6 leaves are present and before flowering. Use a low gallonage of water to keep the material more concentrated, as little is retained on the plant. More than one application will probably be needed.

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Left: Hooded sprayer for row middle weed management in day neutral strawberries. Right: 'Albion' day neutral strawberry production in Ontario, Canada. Photos courtesy C. Heidenreich.

Goji Berry Culture

Kathy Demchak, Penn State University, and Cathy Heidenreich, Cornell University

Upon occasion, commercial growers try to find information on growing an alternative crop, and find that there just isn't much information available. One crop that has received a lot of good press lately has been Goji berry. We have very little experience with this crop here, so were fortunate enough to get some information from others who have. "Thanks" to Wei Yang of Oregon State University, and Evan Elford and Melanie Filotas of the Ontario Ministry of Agriculture and Food, for providing helpful information for this article. Additional sources of information are listed at the end.

Goji is also known by a number of other names including Goji berry, wolfberry, boxthorn, and matrimony vine. In China, where most of the world's commercial Goji berry production is found, most plants with high quality fruit are of *Lycium barbarum* L. var. *barbarum*, though some *Lycium chinense* Mill. var. *chinense* is also grown. World-wide, other closely-related species or subspecies may also be harvested and are known by the same or similar common names, though the fruit quality and productivity is likely to be lower. Plants can be found growing in nearly all U.S. states and Canadian provinces.

There have been various attempts at growing Goji undertaken throughout the U.S. and Canada. Probably the largest-scale attempts in the East are taking place in Ontario, where 4 acres are under cultivation. As many as 18 acres were under cultivation at one point in California.

The Goji plant is a slightly thorny deciduous woody shrub, typically 3 to 6 feet tall when cultivated and pruned, though plants can reach 12 feet tall in their natural state. Goji is a member of the solanaceous (tomato or nightshade) plant family, so its cultural and nutritional needs are similar.

Current recommendations for growing are as follows:

Soil Type and Site Selection: Goji plants are adaptable and grow in a range of soil types, with a preferred pH of 6.5 to 7.0. Goji won't tolerate salinity well (though information can be found indicating that some of its relatives will) and prefers high fertility soils. The best growth is made in relatively light soils that are well-drained such as sandy loams or loams and in areas with plenty of sunshine. Plants can be grown in USDA Hardiness Zones 2 to 7.

Varieties: Breeding efforts in North American have been undertaken only within about the last decade. Currently, only two named varieties, 'Crimson Star' and 'Phoenix Tears', are available to all growers. A Canadian company in Saskatchewan, Wolfberry Agrodevco, offers plants of 'Sask Wolfberry' to cooperating growers only.

Otherwise, plants may be grown from open-pollinated seed, but plant growth habit and productivity may be variable. Growers who intend to buy plants may wish to ask whether the plants were vegetatively propagated from superior clones or were grown from seed. Some nurseries that sell Goji plants are listed on the Cornell berry supplier web site at http://www.fruit.cornell.edu/berry/nurseries/ under the "Miscellaneous" category.

Planting: Plants grown from seed are similar in appearance to tomato seedlings at first. Seedlings and young plants are likely to be variable in appearance, and can be grown in a nursery until the following year, when they can be transplanted to the field. Dormant nursery stock should be planted in spring once danger of frost is past. Mulching after planting with an organic mulch can keep down weeds, moderate root temperatures, and promote establishment. Irrigation is highly recommended especially during the establishment year, as the root system is fine and can easily dry out, and the fruit are prone to blossom end rot under conditions of low or uneven moisture. However, overwatering should be avoided.

Goji berries. Photo credit: LianeM, www.Shutterstock.com

Plants should be spaced 3 to 5 feet apart within the row, and at least 6 to 8 feet allowed between rows, though wider between-row spacing may be needed to accommodate equipment.

Time to maturity and yield: Plants will begin fruiting two years after seeding, or the year after planting if one-year-old transplants are used. Full yields will be reached four to five years from seeding. Maximum yields in China are reported to be about 7000 lb/acre.

Goji Berry Culture– *(continued)*

Fertilization: No work has been conducted on fertility requirements in the region; however, a good starting point would be to amend the field as for tomatoes. Nitrogen at 75 to 90 pounds per acre per year is recommended for a mature planting, split into three applications applied at budbreak, at flowering, and then as fruit begins to ripen. Plants are sensitive to high salt levels; compost can be used to provide nutrients as long as salt levels are not excessive.

Pruning: Fruit is borne on the current year's wood, mainly from that which is grown in the spring and fall. The goals of pruning are to limit plant height, improve ease of harvest, encourage light penetration into the plant, improve foliage drying, and encourage formation of lateral branches to maximize fruit production. Canes that are untipped will continue to grow and produce few laterals branches while canes that are headed back will produce more laterals and higher yields. Little research has been conducted to determine the best pruning methods for our region. However, in other production areas, plants usually are limited to one single main stem. Pruning is done during the dormant season to remove spindly canes, remove dead and damaged wood, improve plant shape and shorten laterals. During the summer pruning is done to head back growth, encourage lateral formation, and remove new shoots. One of the most important goals of pruning is to produce an open canopy structure that allows plenty of sunlight infiltration.

Harvest: Plants first bloom in late spring to early summer, and fruit will begin to ripen in mid-summer. Currently harvesting is completed by hand, as the berries leak juice and turn black if they are bruised, or squashed. Berries are currently sold mainly as a dried product, but they can also be sold and eaten fresh, or turned into juice. Labor requirements are substantial.

Pests and Pest Control: In Ontario, pests of Goji included potato leafhopper, Japanese beetle, thrips, aphids and spider mites. Spotted wing drosophila adults have been present in production fields though extent of fruit infestation by larvae was not determined. Diseases included anthracnose, early blight, and powdery mildew. Blossom end rot was an issue as well if moisture levels were uneven. Aphids and a gall mite have been problematic in other countries, and birds are reported to have an affinity for the fruit. Goji is included in Crop Group 8-10 (Fruiting Vegetables) and subgroup 8-10A (Tomato Subgroup). Thus Goji appears on products that are labeled for this entire group or subgroup.

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New York Berry News (NYBN) is a monthly commercial berry production newsletter provided by Cornell berry team members. It is designed to help promote and strengthen commercial berry crop production in New York State. NYBN is available free of charge in pdf format at: http://www.fruit.cornell.edu/nybn/ .

Visit the NYBN web site to view back issues or to subscribe to monthly e-mail notices with table of contents and a link to the most current issue.

More on individual team members and their areas of expertise may be found at: http://www.fruit.cornell.edu/berry/berryteam.htm.

Questions or comments about the New York Berry News?

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Editor's Note: We are happy to have you reprint from the NY Berry News. Please cite the source when reprinting. In addition, we request you send a courtesy e-mail indicating the NYBN volume, issue, and title, and reference citation for the reprint. Thank you.

New Water Resources Law May Affect You! – *(continued from page 5)*

If you are over the pumping threshold and have not registered or reported, the DEC suggests that you do as soon as possible so they can evaluate your situation and help you comply without taking regulatory actions.

If you have questions, I encourage you to contact Richard Kruzansky, NYSDEC Div. of Water, 518-402-8182. He is very helpful and welcomes questions from farm operators. Also, for more information and reporting forms, visit the NYS DEC website Water Withdrawals for Agricultural Facilities found at http://www.dec.ny.gov/lands/86747.html

Upcoming Events

Small Farms Summit RESCHEDULED for March 24, 2014
Due to storm 'Vulcan', the 2014 NY Small Farms Summit, ***Beyond Direct Marketing: Exploring New Ways to Sell***, has been rescheduled to **Monday, March 24th**. The program features small farmers' perspectives on the pros and cons of selling wholesale. The meeting, which takes place from 9:30am - 3:30pm, will be video-linked to 7 locations around NY. It is free to attend and lunch will be provided. For meeting details, registration info and a list of host site locations, click here. General questions about the Summit should be directed to smallfarmsprogram@cornell.edu. If you were previously registered for this event and still plan to attend, please complete a new registration form.

March 25-26, 2014. 9:00 AM- 4:30 PM. *Organic Pesticide Applicator Training for Fruit and Vegetable Growers*. NYS Ag Experiment Station Geneva, Jordan Hall Auditorium, 614 W North St, Geneva, NY 14456. More info or to register: Emily Cook, CCE Ulster County, at 845-943-9810 or ekc68@cornell.edu.