

The Produce Pages

Serving the fruit and vegetable growers of Eastern New York

February 2019

Above: Cherry trees in bloom at Bowman's Orchard

Beating the Odds: Young Farmers on Multi-Generational Family Farms in Eastern NY

An Interview with Katie Bowman-Oathout, of Bowman Farms and Sarah Dressel of Dressel Farms

Elizabeth Higgins, CCE ENYCHP

Statistically few farms (or family owned businesses in general) in the United States make it to the third or higher generation. Referred to as the "third generation curse" various studies have indicated that 16 percent make it to the third generation and only six percent make it to the fourth or higher. The Eastern New York region right now has quite a few farms that are working to beat the odds and make a successful transition beyond the second generation to the third generation. We interviewed Katie Bowman-Oathout of Bowman Orchards in Rexford, NY and Sarah Dressel of Dressel Farms in New Paltz, NY who are part of this wave of incoming third generation farmers.



continued on page 3

The Produce Pages

Regular contributors:

Vegetables

Chuck Bornt

Phone: 518-859-6213 Email: cdb13@cornell.edu

Ethan Grundberg

Phone: 617-455-1893 Email: eg572@cornell.edu

Elisabeth Hodgdon

Phone: 518-650-5323 Email: eh528@cornell.edu

Teresa Rusinek

Phone: 845-691-7117 Email: tr28@cornell.edu

Crystal Stewart

Phone: 518-775-0018 Email: cls263@cornell.edu

Fruit

Dan Donahue, Apples

Phone: 845-691-7117 Email: djd13@cornell.edu

Jim Meyers, Grapes

Phone: 845-417-8005 Email: jmm533@cornell.edu

Laura McDermott, Berries

Phone: 518-791-5038 Email: lgm4@cornell.edu

Mike Basedow, Apples

Phone: 518-691-7117 Email: mrb254@cornell.edu

Business , Marketing and Economics

Liz Higgins

Phone: (518) 949-3722 Email: emh56@cornell.edu

Newsletter Layout: Andy Galimberti

Content editor: Crystal Stewart

The *Produce Pages* is a monthly publication of the Eastern New York Commercial Horticulture Program. For more information about the program, please visit our website at <http://enych.cce.cornell.edu/>.

Contents

General Updates

Beating the Odds.....	1
Welcome Elisabeth!.....	3
Crop Insurance: Claim Guidelines	4
2019 Eastern NY Fruit and Veg Conference	6
2019 Food System Outlook	16
Technical Assistant Grants	17

Vegetable Production/Marketing

The Stricken Pickle	10
---------------------------	----

Fruit Production/Marketing

How Grapevine Flowers Form	13
----------------------------------	----

Upcoming Events18



What is your farm's history? Katie - "My grandfather, Ray, and his wife, Bev, purchased our family's farm in 1952. My dad and his brothers worked the farm, my mom came into the family and worked the farm, as little kids we helped out the best we could around the farm doing odds and ends, things like putting tops on cider bottles, or walking ponies for pony rides." Sarah - "Our grandfather Rod, Sr. and great grandfather, Fred, bought the farm together in 1957. So it's a grey area whether we are the third or fourth generation transition."

Why do you want to continue as the next generation on your family's farm? Katie - "I was born and raised living this life, on this farm. It is who I am and that would never change! This farm and family have given so much to me as a person, now it's my turn to give back to it, and help it blossom!" Sarah - "I want to continue the farm because I love this lifestyle and can't imagine doing anything else. I'm optimistic that the interest in supporting local agriculture will keep people coming to our farm because we've worked hard to maintain good relationships with our neighbors."

Do you have other siblings or family members of your generation who also plan to be part of the succession

of the farm business? How is this a challenge or an advantage? Katie - "My brother has always worked on the farm full time with my Dad. I don't really see having more than one family member as much of a challenge, other than the occasional family feud. Mostly this is an advantage as my brother; our spouses and I all work together as a team, to collectively come up with ideas to help improve the farm and bring it into the next generation." Sarah - "I am the middle child of three, and my older brother, Tim and his wife are also back on the farm. Working with so much family has ups and downs but definitely more pros than cons. Tim and I balance each other out."

Have you always known that you wanted to continue on the farm or is this a new decision? Katie - "After a few years of working in the equine industry as well as a dog daycare facility I decided that in 2012 the timing was right for me to come work full time for my parents on our family's farm and make this a career and lifetime commitment." Sarah - "I always planned on returning to the farm; I went to Cornell and got a degree in Ag Sciences. I never considered doing anything else."

What has your family done to help with the transition of the farm?

continued on next page

Welcome Elisabeth!

ENYCHP is excited to welcome our new vegetable specialist, Elisabeth Hodgdon!

Elisabeth grew up on a farm in Vermont, where her interest in growing vegetables began. She studied plant science and agricultural economics at McGill University and later went on to complete her Master's degree at the University of New Hampshire, where she studied cover cropping for weed suppression. While at UNH, she also assisted with vegetable variety trials and high tunnel research. Elisabeth returned to Vermont to earn her PhD at UVM where she researched organic management strategies for swede midge, an invasive pest of cole crops.

Elisabeth will be based out of the Clinton County office, and will primarily cover the Champlain Valley. She is excited to share her expertise in pest management, high tunnel production, season extension, organic agriculture, and more with the growers of the Champlain Valley and beyond.



Katie – “My parents have done a fantastic job of growing this business into a successful one. I am optimistic that as a team we will continue to grow this business and thrive. They have gone above and beyond to help prepare for the adjustment period for when my brother and I take over the farm someday. They have set up accounts for the estates tax so we are not left with burdens of huge tax estates fees if they pass, they have wills, insurance, and everything documented. Dad is working hard to include us in all aspects of the business, so we have a strong sense of how things work so we are not in shock if he is just gone suddenly one day. No one likes to talk or think about it, but it is good to be prepared!” Sarah – “We currently have three generations working together on the farm. Our grandfather is still extremely active at 83, and our parents are doing most of the management. The older generations are working to plan the estate accordingly, and always make sure to include Tim and I in discussions for the future.”

What are you worried about? Katie – “One of my biggest fears is failure, of course. The biggest issue I foresee in the future is employment! Let’s face it, it’s a MAJOR issue these days! We are immensely blessed with a good group of friends from our local church who help us out a lot and we couldn’t do it without them, but as we grow each year it is getting harder and harder to find outside help!!” Sarah – “I’m worried that governmental regulations will push us out of markets; foreign and domestic. Increasing costs of doing business will continue to be a serious hindrance to farms.”

What are you doing to prepare yourself for the transition? Katie – “I try to involve myself as much as possible, in fact, I try to push mom and dad away sometimes... HARD! if not IMPOSSIBLE someday. They have to learn to take a step back and let us kids take some of the load off their shoulders! I am hoping to get my class A CDL as dad can’t do all the driving himself, so I am working towards getting that in the spring. Last year my brother and I went and got our pesticide applicator licenses. So, we’re definitely working towards getting everything we need to run this farm on our own if, God forbid, we have to.” Sarah – “I’m participating in various boards and going to lots of seminars and fruit schools and just trying to stay on top of the new science and regulations so we can be in compliance. We are really lucky in the Hudson Valley because there are lots of other young people to network with (we had a semi-organized group for awhile), and really excellent resources.”

One key to successful farm transitions is long-term planning and active engagement and communication between the generations. Research has indicated that the transition of management capacity is a bigger barrier to many farm transitions than the transfer of assets and wealth. If you want to learn more, CCE Sullivan County is offering a farm transition planning workshop with NY Farm Net on February 6th <http://sullivanccce.org/events/2019/02/06/farm-transfer-succession-planning>. Other resources are available on the NY Farm Net website <https://www.nyfarmnet.org/>.

Crop Insurance: Claim Guidelines

Lucas Clifton, Program Specialist University of Delaware Targeted States RME

Because the government shutdown does not affect private insurance sales, you should still be able to purchase a crop insurance policy. For many producers, crop insurance deadlines are coming up:

- Spring-Planted Field Crops – Corn, Oats, Soybeans: **March 15**

- Vegetables (except onions) – **March 15**
- Onions – **Feb 1**
- Whole Farm Revenue Protection – **March 15**
- Forage Seeding – **Spring-planted/March 15; Fall-planted: July 31**
- Fall-planted Barley and Wheat: The deadline to enroll is **September 30**
- Apples, Grapes, Peaches, Tart Cherry Pilot – **November 20**
- Nursery and Greenhouse: **Monthly enrollment for new applicants, 5/1 Renewal**

continued on next page

- Hay - Pasture, Rangeland and Forage (PRF) Deadline to enroll or make policy changes for the next calendar year is **November 15**.

- Apiculture – Deadline to enroll or make policy changes for the next calendar year is **November 15**.

Hopefully 2019 will be a better growing season than 2018, but if not, the guidelines below will help you in the event that you need to make a crop insurance claim in 2019. You are responsible to report damage promptly.

- Before replanting (many policies have replanting payments),
- Within 72 hours of discovery of damage,
- 15 days before harvest begins (if loss is possible),
- Within 15 days after harvesting is completed (by insurance unit) or the end of the insurance period. Caution: Do not destroy evidence that is needed to support your claim without clear direction from the insurance company, preferably in writing.

How do I know when to file a claim? Any time you have crop damage that will adversely affect your yield, or the value of your crop, you may be eligible to file a claim. The loss adjuster will determine whether your yield falls below the yield guarantee stated in your crop insurance policy. This applies to revenue guarantee policies as well as to traditional yield protection policies. Most policies state that you (the insured) should notify your agent within 72 hours of discovery of crop damage. As a practical matter, you should always contact your agent immediately when you discover crop damage. In some cases, you may discover a loss while you are harvesting (a row crop for instance). Stop harvesting and contact your agent right away. In the event of losses, you must file notice immediately after each unit is harvested (within 15 days) and before the end of the insurance period. For sweet corn and corn cut for silage, you must file notice at least 15 days before harvest begins.

How do I initiate a claim? Call your crop insurance agent and follow up in writing (keep a copy for your records). Your crop insurance company will arrange for a loss adjuster to inspect your crop. It is your responsibility to call your crop insurance agent and initiate this process.

How soon should I expect an adjuster? In practice, there are different levels of urgency for crop inspectors. If you are still within the window of opportunity to replant your crop, or switch to another crop, contact your crop insurance agent immediately. The insurance company should make every effort to get an adjuster out right away. If, later in the growing season, your crop is wiped out by a hurricane, for example, or if a severe drought has damaged your crop, you still need to contact your agent — but the urgency for an inspection depends on your intentions. If you want to destroy the crop (perhaps to plant a cover crop), then an adjuster needs to come out first — before you do anything. If, on the other hand, you intend to continue to care for the crop and harvest what you can, there is less urgency for the adjuster to make the inspection immediately. Even so, an assessment of damage should be done as soon as practical. While you wait for the adjuster, remember these rules: Do not destroy any of your crop. Do not disk. Do not plow. Do not replant. Do nothing to destroy your crop until you have permission from a claims adjuster or an insurance company representative. Remember: Don't destroy the evidence.

What should I expect from the adjuster? The adjuster should contact you to schedule an inspection. He or she will expect and welcome your presence and help during the inspection. The adjuster will be interested in what you have to say. You can expect the adjuster to be familiar with your policy and to explain your options. You should have your Farm Service Agency (FSA) documents ready to show the number of acres and locations of your insured crops. The adjuster should have copies of your crop insurance policy documents and your Actual Production History (APH).

For more information: Contact a crop insurance agent. To find an agent, visit the RMA online locator at: <https://www.rma.usda.gov/Information-Tools/Agent-Locator-Page>. For more information on crop insurance options in New York, visit: <https://agriskmanagement.cornell.edu>. Cornell University delivers crop insurance education in New York State in partnership with the USDA, Risk Management Agency. This material is funded in partnership by USDA, Risk Management Agency, under award number RM17RMETS524020 Diversity and Inclusion are a part of Cornell University's heritage. We are an employer and educator.

2019 EASTERN NEW YORK FRUIT & VEGETABLE CONFERENCE



**Tuesday, February 19
Wednesday, February 20
Thursday, February 21**



**The Desmond Conference Center
660 Albany Shaker Road
Albany, NY 12211**



Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

**Day 1: Tuesday, February 19th
Tree Fruit**

**4.50
DEC credits**

Morning Sessions:

9:00am—Fungicide Efficacy Trials for New York Apple Disease Triad: Fire Blight, Apple Scab, Sooty Blotch, & Flyspeck

Dr. Srdjan Acimovic, Cornell University

9:30am—Characterization of *Erwinia amylovora* (Fire Blight) and *Pseudomonas syringae* pv. *Papulans* (Blister Spot) Isolates from New York Apples

Dr. Ricardo Delgado Santander, Cornell University

10:00am—Orchard Management of Brown Marmorated Stink Bug in NYS

Peter Jentsch, Cornell University

11:00am—Disease Management Highlights from 2018 Apple Field Research at Cornell Agritech

Dr. Kerik Cox, Cornell University

11:30am—Management of Nitrogen, Potassium, and Calcium in High Density Apple Orchards

Dr. Lailiang Cheng, Cornell University

Afternoon Sessions:

1:30pm—Apple Industry Updates

Cynthia Haskins, New York Apple Association

2:00pm—Hail Netting for Pest Exclusion

Mike Basedow, CCE ENYCHP

2:15pm—Precision Crop Load Management

Dr. Terence Robinson, Cornell University

3:00pm—The Occurrence of an Endemic Mosema Pathogen in BMSB Populations in NY and Surrounding States

Carrie Preston, Cornell University

3:15pm—Update on Apple Decline

Dan Donahue, CCE ENYCHP

3:30pm—Identification and Characteristics of New Apple Fungal Pathogens in New York: *Colletotrichum* spp. Causing Fruit Bitter Rot and *Marssonina corocaria* Causing Marssonina Leaf Blotch

Dr. Fatemah Khodadadi, Cornell University

The Eastern New York Commercial Horticulture Program is a Cornell Cooperative Extension Partnership between Cornell University and the CCE Associations in the 17 Eastern New York counties.

Day 1: Tuesday, February 19th Small Fruit

1.50
DEC credits

Morning Sessions:

10:00am—*Making & Marketing Fruit Wines on Your Farm*
Jamie Jones, Jones Family Farm, Shelton, CT

10:30am—*Berry & Fruit Winemaking Basics*
Dr. Jim Meyers, CCE ENYCHP

11:00am—*Regulations & Requirements of Fruit Wines*
Lindsey Pashow, CCE Harvest NY

Afternoon Sessions:

2:05pm—*Use of Repellants for Averting Deer & Rabbit Damage*
Scott Williams, CT Agricultural Experiment Station

2:35pm—*Using Lasers for Bird Control: What We Learned in 2018*
Chuck Bornt and Laura McDermott, CCE ENYCHP

2:50pm—*Upgrade Your Social Media Marketing with Harvest Connection*
Sarah McFadden, CCE Rensselaer County

3:00pm—*What Crop Insurance Has to Offer Your Farm*
Elizabeth Higgins, CCE ENYCHP

3:30pm—*Exclusion Netting and Attract and Kill: Can These Technologies Work for Your Berry Farm?*
Peter Jentsch, Cornell University

4:00pm—*Training Youth Workers in Agritourism Ventures*
Richard Stup, CCE

Day 1: Tuesday, February 19th Business Management

9:00am—*Transitioning from Individual Performer to Supervisor: An Introduction*
Richard Stup, CCE

11:00am—*Developing SOP's in Fruit and Vegetable Production: Best Practices*
Richard Stup, CCE & Elizabeth Higgins, CCE ENYCHP

**Join us Tuesday Evening for our
Post-Conference Social at The Lodge**

Day 1: Tuesday, February 19th FSMA/PSA Grower Training 8:00am—5:15pm

This course is designed for fruit and vegetable growers and others interested in learning about produce safety, the Food Safety Modernization Act (FSMA) Produce Safety Rule, Good Agricultural Practices (GAPs), and co-management of natural resources and food safety. The PSA Grower Training Course is one way to satisfy the FSMA Produce Safety Rule requirement outlined in 112.22(c). This requirement states that at least one supervisor or responsible party for your farm successfully complete food safety training equivalent to that received under adequate standardized curriculum as recognized by the Food and Drug Administration.

2.00 DEC Credits Available
**Pre-registration and payment is
mandatory for this training.**

Day 2: Wednesday, February 20th General Sessions

1.00
DEC credit

Morning Sessions:

9:00am — *Today's Cornell Cooperative Extension*
Dr. Chris Watkins, Cornell University

9:20am—*Pollination from the Perspective of the Honeybee & the Beekeeper: How to Enhance the Beneficial Relationship between Growers, Bees, & Beekeepers*
Jack Rath, DVM, Betterbee and Northeast Center for Beekeeping

10:00pm—*Protecting and Preserving Pollinator Habitat*
Emily May, Xerces Society

Day 2: Wednesday, February 20th Tree Fruit

3.00
DEC credits

Morning Sessions:

11:00am—*Updates on Management of Bitter Pit and Other Storage Disorders of Honeycrisp and Gala*
Dr. Chris Watkins, Cornell University

11:30am—*Bitter Pit & Honeycrisp in NY*
Dan Donahue, CCE ENYCHP

Afternoon Sessions:

1:30pm—*Managing Key Apple Pests Through Ecologically Based IPM*

Dr. Jaime Pinero, University of Massachusetts

2:00pm—*Rootstock Choice Can Have Big Economic Consequences*

Dr. Terence Robinson, Cornell University

2:30pm—*Adding the SCO Endorsement to Your Apple Crop Insurance Policy*

Elizabeth Higgins, CCE ENYCHP

3:00pm—*2018 Orchard Survey for Invasive and Exotic Pests in New York*

Julie Carroll, NYSIPM

3:30pm—*An Update on the NEWA Platform for Orchard Pest and Disease Management (pre-recorded video)*

Dan Olmstead, Cornell University

Day 2: Wednesday, February 20th

Vegetables

3.50
DEC credits

Morning Sessions:

11:05am—*What's the Status of the New Late Blight Strain and Managing Phytophthora capsici with New Fungicides*

Chris Smart, Cornell University

11:35am—*The Latest Research on Garlic Fusarium*

Crystal Stewart, CCE ENYCHP

11:45am—*2018 Pumpkin Variety Trials and Laser Scarecrow Update*

Chuck Bornt, CCE ENYCHP

Afternoon Sessions:

1:50pm—*New Fungicide Recommendations for Alternaria Leaf Spot of Brassicas*

Christy Hoepting, CCE Cornell Vegetable Program

2:20pm—*Using Technology to Manage Recordkeeping at Moses Farm*

Seth Moses, Moses Farm

2:45pm—*Tomato Stake Pounding Made Easy*

John Altobelli, Altobelli Family Farms

3:10pm—*Addressing Bacterial Diseases in Tomatoes*

Chris Smart, Cornell University

3:40pm—*Using Entomopathogenic Nematodes for Wireworm Control in Sweet Potatoes*

Teresa Rusinek, CCE ENYCHP

4:00pm—*What's New With Allium Leaf Miner*

Ethan Grundberg, CCE ENYCHP

Day 3: Thursday, February 21st

Fertility

0.50
DEC credits

Morning Sessions:

9:00am—*Managing Ca, Mg, & K Nutrition*

Dr. Joseph Heckman, Rutgers University

10:00am—*Foliar Feeding: What Works?*

Dr. Steve Reiners, Cornell University

11:00am—*Plant Growth Promoting Rhizobacteria (PGPRs): Using Biology to Help Unlock Soil Fertility*

Patrick Clark, Biosafe Systems

11:40am—*Using Injectors for Effective Product Placement*

Liz Madison, Empire Irrigation

Day 3: Thursday, February 21st

CSA Marketing

Morning Sessions:

9:00am—*What's Happening with CSAs in the United States: Consumer Trends, New Markets, and New Models*

Dr. Tim Woods, University of Kentucky

10:45am—*CSAs in New York: History, Current Trends, and Future Directions*

Elizabeth Higgins, CCE ENYCHP & Dr. Dan Lass, University of Massachusetts, Hudson Valley CSA Coalition

12:00pm—*What Do We Need, What Do We Need to Know? Opportunity for Input into Future Projects*

Elizabeth Higgins, CCE ENYCHP

Day 3: Thursday, February 21st

Irrigation

1.00
DEC credit

Afternoon Sessions:

1:35pm—*Current Irrigation Issues Facing the Industry*

Crystal Stewart, CCE ENYCHP

2:30pm—*Irrigation Design Considerations*

Trevor Hardy, Brookdale Fruit Farm & Emily Madison, Empire Irrigation

3:30pm—*Innovative Irrigation Technology for Germination and Frost Control*

Trevor Hardy, Brookdale Fruit Farm & Emily Madison, Empire Irrigation

Day 3: Thursday, February 21st

Grapes

2.00
DEC credit

Afternoon Sessions:

1:35pm—*Under Vine Cover Crops*

Dr. Justine Vanden Heuvel, Cornell University

2:35pm—*VitisGen2* Dr. Tim Martinson, Cornell University

3:15pm—*Pallisage* Dr. Justine Vanden Heuvel, Cornell University

3:35pm—*Canopy Architecture Optimization*

Dr. Jim Meyers, CCE ENYCHP

Registration for the 2019 Eastern New York Fruit & Vegetable Conference

Farm/Business Name: _____
 Address: _____ City: _____ State: _____
 Zip: _____ Telephone: _____ Email: _____

Pre-Registration Rates Per Attendee	Attend only 1 day	Attend any 2 days	Attend all 3 days
Enrolled	\$55	\$94	\$140
Non-Enrolled	\$70	\$119	\$179

Walk-In Rates Per Attendee	Attend only 1 day	Attend any 2 days	Attend all 3 days
Enrolled	\$70	\$124	\$185
Non-Enrolled	\$90	\$159	\$239

Day 1 Registration:

attending _____ x cost _____ = \$ _____

Attendees: _____

Attendees: _____

Attendees: _____

Day 2 Registration:

attending _____ x cost _____ = \$ _____

Attendees: _____

Attendees: _____

Attendees: _____

Day 3 Registration:

attending _____ x cost _____ = \$ _____

Attendees: _____

Attendees: _____

Attendees: _____

FSMA/PSA Grower Training (Feb 19, 8am-5:15pm)

In-State*: \$55

Out of state: \$140

*NYS Ag and Markets are subsidizing PSA training for in-state growers to provide training manual and certificate.

FSMA/PSA Registration:

attending _____ x cost _____ = \$ _____

Attendees: _____

Attendees: _____

Attendees: _____

HOT BUFFET LUNCH IS INCLUDED

Total Cost: \$ _____

Make checks payable to **CCE ENYCHP**

Mail this registration form, along with payment, to:

Ag & Life Sciences Building

61 State Street

Troy, NY 12180



Contact us at 518-272-4210 ext 111,

518-746-2553 or

enychp@cornell.edu with any questions.

Online registration also available at enychp.cce.cornell.edu

Scientists Are Fighting For The Stricken Pickle Against This Tricky Disease

Written by Carolyn Beans

Every summer, downy mildew spreads from Florida northward, adapting to nearly every defense pickle growers have in their arsenals and destroying their crops.

The pickle is in peril. Each summer since the mid-2000s, Florida winds carry downy mildew to cucumber fields north. By summer's end, the disease reaches Michigan, leaving a trail of withered leaves and thwarted pickling plans.

With failed harvests, fewer growers are taking a chance on cucumbers. According to USDA records, pickling cucumber acreage declined nearly 25 percent between 2004 and 2015. Globally, downy mildew threatens fields as far flung as India, Israel, Mexico and China.

"This is the number one threat to the pickle industry," says vegetable pathologist Lina Quesada-Ocampo of North Carolina State University. The growers, she says, lose money on failed crops and pricey fungicides. "It is a really bad double whammy."

Fortunately for pickle lovers, vegetable breeder Michael Mazourek of Cornell University is close to releasing varieties that resist downy mildew. "It's been one of our proudest David and Goliath stories," he says. But his success hinges on funding at a time when public support of agricultural research is declining.

The story of saving the pickle, then, is not just about preserving the deli sandwich's sidekick. It's a story of how much we value our food supply. And who we think should pay to protect it.

Trying to hit a moving target

Cucurbit downy mildew, caused by the fungal pathogen *Pseudoperonospora cubensis*, was once a minor nuisance. Starting in the 1960s, a Clemson University plant breeder, Carroll Barnes, produced a series of cucumber cultivars containing a strong resistance gene known as dm-1. For more than four decades, this gene helped keep the disease in check.

But in 2004, the pathogen overwhelmed the defense. In North Carolina, pickling cucumber growers were a third of

the way through harvesting when downy mildew arrived. Within about a week, the crop "almost melted," says Thomas Joyner, president of Nash Produce. "It burned the leaves and there was almost nothing left."

That year, downy mildew struck cucumbers from Florida to New Jersey. The following year, it reached Michigan, the number one pickling cucumber state. And it has spread from Florida every summer since.

"I have never seen something that moves this fast and is this devastating," says Quesada-Ocampo. "You see a lot of brown, dead leaves on the ground, and cucumbers ... almost becoming bleached white because of the sun scalding."

Growers turned to fungicide, but downy mildew quickly adapts faster than the industry can release new ones. "Some that were very effective just a few years ago are absolutely ineffective now," says Phil Denlinger, vice president of agricultural procurement for Mt. Olive Pickle Company. "It is a serious situation."

Breeding in resistance

"Every year we wonder, will our tools hold up?" says plant pathologist Mary Hausbeck of Michigan State University. As extension specialists for each of their states, Hausbeck and Quesada-Ocampo test fungicides and advise growers on methods that remain effective.

In 2014, Hausbeck was becoming increasingly concerned about running out of means for growers when she approached Cornell's Mazourek with a personal plea for help. As she saw it, the industry was at terrible risk and, having grown up in Michigan pickle country, she hated to see it collapse. She recalls Mazourek listening politely and then saying, "You know, we might be able to do something."

Mazourek had already developed a downy mildew resistant slicing cucumber, the kind we eat fresh on a salad, by crossing two cultivars with moderate levels of resistance and then selecting the most hardy offspring over multiple generations.

But a pickling cucumber is a different cuke altogether. Unlike the much smoother slicers, pickling cucumbers have enough bumps on the skin for brine to pass through, and seed cavities that don't disintegrate during that process. And those destined to become pickle spears must fit neatly in jars.

Accepting the challenge, he crossed his slicing cucumber with pickling cucumbers already on the market and selected the most disease resistant

continued on next page



Vegetable breeder Michael Mazourek is working to develop cucumbers that have both the best pickling traits and are most resistant to downy mildew.

Photo- Carolyn Beans/NPR

and pickle-like offspring. He tested plants in Florida, New York and Michigan to select for cucumbers that could resist downy mildew across the planting range.

In 2017, Hausbeck invited a few pickling cucumber growers and processors to meet Mazourek and assess his progress. Downy mildew had already swept through the MSU experimental farm, but the leaves of Mazourek's plants were mostly green. "The growers were just about ready to hoist him on their shoulders and carry him through downtown East Lansing," says Hausbeck.

But they also told him that many of his cucumbers weren't quite pickling ready. Some, for example, had pockets between the seed cavity and flesh that could cause the center to fall out of a sliced pickle. Others were simply too short to make enough crosswise slices to top hamburgers.

Mazourek took cuttings of the plants the pickle experts liked best. He then crossed some and self-pollinated others to make the next generation of new and, hopefully, improved pickling cucumbers.

A growing threat

If downy mildew prevails, the pickling cucumber wouldn't be the first crop lost from a region. A century ago, a related downy mildew helped drive commercial hops from the Northeast to the Pacific Northwest. In the second half of the 19th century, coffee leaf rust wiped out the plantations of Ceylon, now Sri Lanka, pushing growers to switch to tea.

Crop pathogen problems may only get worse. "I've been doing plant pathology research for more than 30 years, and we're seeing more threatening plant diseases now than in the past," says plant pathologist Jean Ristaino, who directs N.C. State's Emerging Plant Disease and Global Food Security program.

The change stems, in part, from global trade. "Over the past 100 years, there has been more movement of plants, and the volume is much higher, so it is harder ... to monitor all the pests and pathogens coming in," says Ristaino. Climate change is also a factor. Fungi could move to where it was once too cold. And with milder winters, seasonal pathogens could become year-round residents.

Faced with these challenges, Mazourek recognizes that any pickle fix may be temporary. "The last resistances that were deployed lasted for decades. While we hope that's true, more and more we're seeing new diseases, faster evolution of diseases," he says.

A fall in funding

Despite these threats, U.S. public spending on crop protection is declining. According to the USDA, total federal and state funding for agricultural research and development fell between 2002 and 2015 from about \$6 billion to \$4.4 billion. Meanwhile, Brazil, India and China increased spending, with China surging to about twice U.S. levels.

Agricultural researchers at land-grant universities like Cornell, MSU, and NC State once received enough set federal and state support to cover their programs. With this funding declining, they must apply for competitive grants from the USDA and other institutions to make up the difference. In the competition for funds, crops like the pickling cucumber are often passed over for crops that cover more acreage, says Quesada-Ocampo.

N.C. State plant breeder Todd Wehner says there were many more publicly funded cucumber breeders when he began his program nearly four decades ago. But today, with less funding, there are far fewer jobs. In fact, Wehner and Mazourek are

continued on next page

among the last few still breeding.

Private industry steps in

Though public funding is waning, private investment in agricultural research and development, not including food manufacturing, increased from about \$3.2 billion to \$6.3 billion between 2002 and 2014, according to the USDA.

And the pickle has profited. Nischit Shetty, a geneticist for Seminis, a Bayer Crop Science vegetable seeds brand (formerly of Monsanto), led efforts to develop the first two commercialized pickling cucumber hybrids resistant to downy mildew. Released two years ago, Shetty says that they remain the only two such hybrids on the market. But they don't fend off downy mildew completely, so growers must still use at least some fungicide.

Private fungicide research has also protected pickles. When downy mildew first struck, the pesticide producer Valent stepped in with a new fungicide called Presidio that was initially very effective. Unfortunately, the pathogen evolved resistance to Presidio within a few years. Other companies also developed fungicides. The industry advises growers to rotate sprays to limit the pathogen's chances of adapting to any one of them.

But one consequence of our increasing reliance on agriculture companies is that growers foot a larger portion of the bill, says Wehner. Companies must charge growers enough to make a return on investment. Alternatively, public research expenses are spread across society, and the results of that research are shared openly. "It really comes down to: Do Americans want to help with their food production system, or do they want it to fall on the shoulders of the growers?" says Wehner.

The future of the pickle

In late September, Mazourek sat in a room on an MSU experimental farm with his graduate student and lab technician, laying out their pickling cucumber vision for seven growers and processors that Hausbeck invited, including some who assessed Mazourek's plants last year.

Breeders often cross two plant varieties, each genetically uniform, to make a new "hybrid" variety that boasts the best genes from each parent. But because downy mildew is quickly evolving, the best genes for resistance in 2018 may not be the same for the years ahead.

Rather than a hybrid, Mazourek described developing what are called open-pollinated varieties. Each of these varieties is really more like a population of plants that each have slightly different sets of genes, all growing together in a

field. Mazourek observes which cucumbers are the most disease resistant and have the best pickling traits and then chooses those to keep in the gene pool for the next generation. The plants are uniform enough for repeatable results, but genetically diverse enough to resist whatever tricks downy mildew might devise next.

"By having that mix of plants, the disease can't really get a foothold," said Mazourek. "And if it does, it can't wipe out the whole field, and we can continue to, every year, find the most resistant plants and select from that. And it just keeps evolving." A seed company could continue this process, but so could a grower, just by saving some seed from the best plants for the next year's planting.

Later, the group arrived at the field where Hausbeck was testing Mazourek's progress. Before them lay about 500 cucumber plants, most with barely a hint of downy mildew.

The growers and processors spread out, cutting open "pickles," as they dub them even before brining, and staking pink flags by promising plants. One cucumber got flagged for a seed cavity without pockets. Another's boxier ends meant squeezing more slices out of a pickle. After much enthusiastic cucumber slicing and squeezing, the pickle experts left and the Cornell team and Hausbeck stood gazing at their glowing assessment — 30 pink flags across the field. There was still room for improvement, Mazourek concluded, but it was time to scale up. They were close enough that some growers could test the plants next year.

Against the clock

He's eager to release something fast. Downy mildew isn't getting weaker. And the funding clock is ticking — unless renewed, USDA support for Mazourek's pickle program ends in 2020.

But for now, pickle prospects look good — at least according to grower and fermenter John Swanson's evaluation of Mazourek's plants. "They're alive," he says. "And they're pickles."

This article was originally published on NPR's The Salt. December 14, 2018:02 AM ET – Reprinted with permission from author. Carolyn Beans is a freelance science journalist living in Washington, D.C. She specializes in ecology, evolution, and health.

How Grapevine Flowers Form

By Tim Martinson

Grapevine flowers turn into berries, so the process by which they are formed is a key component of vineyard productivity. How many inflorescences form and how many florets and berries they end up producing is heavily influenced by the process of bud formation, the light environment in which the buds are formed, and the physiological state of the vine – both during the middle and end of the growing season, and early on as buds awaken from dormancy in the spring.

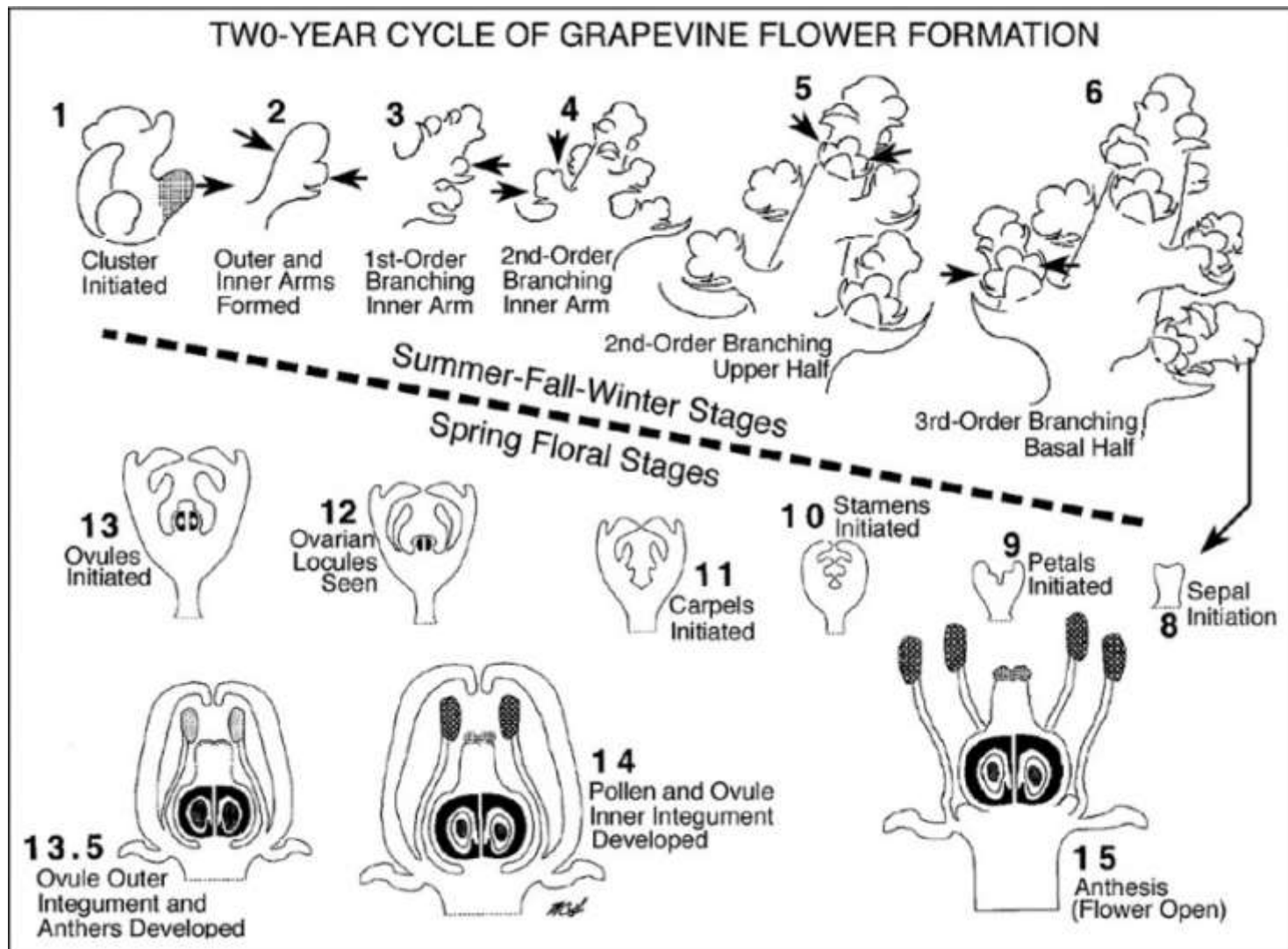
Like many other perennial crops, grapevine bud and flower formation is a two-year process. Buds initiated during shoot growth in the first season produce shoots with

flowers for the following growing season. Anatomists divide flower formation into three separate processes:

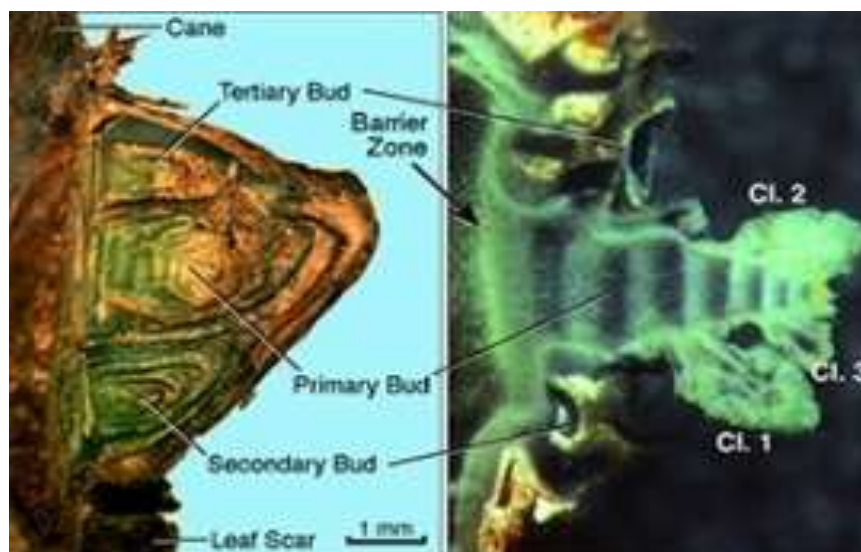
Inflorescence initiation. Inflorescences form within complex, or compound, buds in grapevines. Fruitful buds are initiated in leaf axils (located where the leaf stalk, or petiole, meets the growing shoot). A bud's apical meristem (cells at the tip of developing tissues that actively divide) produces lateral meristem primordia that are at first "uncommitted" – that is, each lateral meristem can either develop into a tendril or an inflorescence, depending on factors influencing tissue differentiation. This occurs within each of the individual bud branches (primary, secondary, and tertiary) that will make up the final compound bud retained over the coming winter period.

Flower initiation. Around the time that four or five leaf primordia have been formed inside the

continued on next page



Floral development follows a two-year cycle. Stages 1 to 6 depict initiation of clusters in primary buds of grapevine in June to time of winter dormancy in December. Stages 8 to 15 depict post-winter stages from floral initiation through anthesis (bloom) the next growing season. Stage 7 would describe the very rare instance of a flower initiated by winter. Figure by Martin Goffinet.



Dormant buds carry the crop potential for the coming year. They have a set number of clusters, whose development started around bloom during the previous growing season. Photo by Martin Goffinet

newly-developing bud, the lateral meristem tissue differentiates into either an inflorescence or a tendril. This process is influenced by the light environment surrounding the bud and leaves (particularly the leaves on the same side of the stem that are one node above or below the developing bud), the amount of photosynthate flowing into the developing bud, temperature conditions, and the vine's nutrient status. By around véraison (about three months after budburst), the number of inflorescences within "fruitful buds" up and down the canes is pretty much set.



Floral differentiation: Inflorescence branch formation before dormancy. Committed inflorescence primordia further develop by forming branches (initiating several lateral meristems that turn into

branches and individual florets). This process begins around bloom, starting with the most basal buds and moving up the shoot, and continues until buds enter dormancy. At dormancy, inflorescence primordia branching is well developed, but individual flowers and their parts are not yet initiated.

Floral differentiation: Bud swell to bloom. As buds are reactivated in the spring, floral development resumes. Each fine-branch meristem produces clusters of 3-4 flower primordia before

bud burst, with formation of a calyx (fused sepals at outer edge of Grape vine four leaf shootflower). After bud burst, individual flower organs (corolla made up of fused petals and pollen-producing stamens) first appear, followed by the pistil, ovaries and individual ovules (female organs). This process may be largely complete by about 15 days after bud burst.

Anthesis (flowering). About two weeks after ovules are formed, the calyptra (fused petals surrounding flower parts) separates at the base, and is shed. In our climate, most flowers open within 5-7 days; but cool temperatures can delay and extend the bloom period. Bloom is well-synchronized in our climate with its severe winters, but can extend over 3-4 weeks in Mediterranean

climates with mild winters. Anthers (pollen-laden structures at the tip of stamens) release pollen after cap fall.

Pollination. Commercial cultivars with perfect flowers (both male and female parts) are often self-pollinated, but most wild grapevines have either male or female flowers, and require cross-fertilization. Once the pollen lands on the stigma (receptive part of the pistil), the pollen germinates and produces a pollen tube, which fuses with the ovule.



Importantly, the rate of growth is critical, because the ovules are only receptive for a short time after bloom. At high temperatures (25-30° C) fertilization occurs within 12 h; at 20°C, this process takes 24 h, and at low temperatures (15°C), 48 hours. With cooler temperatures, growth of the pollen tube may be so slow that fertilization doesn't occur.



Factors affecting flower formation and fertilization. Weather conditions, the light environment, and vine stressors such as water or nutrient deficits can have dramatic effects on the processes leading to inflorescence and flower formation, and ultimately fruit set – many of which are beyond a grower's control. Here are a few of them:

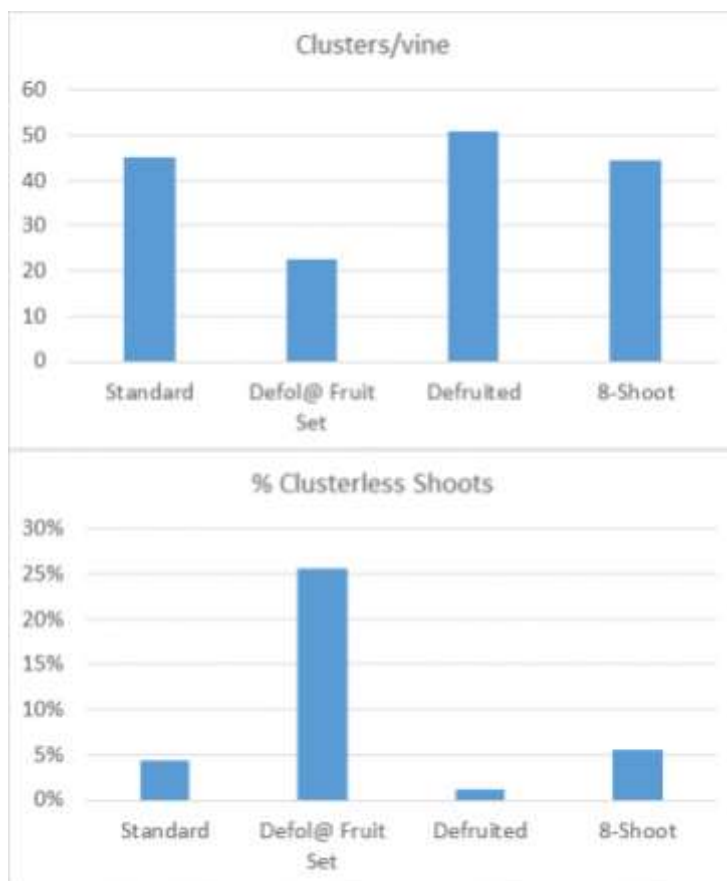
continued on next page

- **Light environment.** Shoots that are shaded in a dense canopy tend to have less fruitful buds. In practice, the period of inflorescence induction for the first 6-10 nodes retained at pruning tends to occur during 3 or 4 weeks centered around bloom.
- **Supply of photosynthates to buds.** Assimilates (sucrose, N), whether produced by leaves or from stored reserves, are key factors influencing inflorescence induction in developing buds. Stored reserves that fuel early-season growth are largely exhausted by bloom, so reductions in leaf area from cluster-zone leaf removal or poor early-season canopy development can reduce bud fruitfulness and return bloom the following year.

One example comes from a 2017 study where we completely defoliated Riesling vines at fruit set (we left the shoot tips on, and they produced a new canopy by veraison). In 2018, these vines had a 50% reduction in cluster number, and 25% of shoots were clusterless, compared to 4% in the 'Standard' treatment.

- **Stored Reserves.** If vines enter the dormant season with low amounts of stored carbohydrates, floral development in the spring can be compromised. This can be the result of over-cropping, disease that reduces leaf area (think downy mildew), or early leaf fall in cool seasons. Goffinet (2004) measured carbohydrate reserves in minimally-pruned Concord vines, some of which were defoliated at veraison – and therefore over-cropped. The defoliated vines depleted starch reserves the following spring a week earlier than balance-pruned vines, and produced fewer mature leaves to export newly produced photosynthate to the flowers. High crop-to-leaf areas during the ripening season strongly influenced overwintered reserves and primary bud potential.
- **Low temperatures, cloudy weather and extended bloom.** Temperatures at or below 15° C can delay pollen tube growth, resulting in poor set. Cloudy weather that results in less carbon assimilation than on sunny days can limit the supply, also resulting in poor fruit set.

Understanding the timing and sequence of floral development – and the factors that affect it – can help growers diagnose some of the reasons for poor fruit development. Some practices (crop level adjustment, timing and extent of cluster-zone leaf removal) are manageable, while others (weather) are not.



Carryover effects on cluster number and the percent of clusterless shoots in 2018 resulting from complete defoliation at fruit set in 2017.

Literature Cited

Keller, M. 2010. The Science of Grapevines. First edition. Academic Press, Burlington, MA.

Goffinet, M. 2001. Grapevine buds: Construction, Development, and Potential for Cropping. Wine East, Sept-Oct 2001, L&H Photojournalism, Lancaster, PA, p. 14-23

Goffinet, M. 2004. Relation of applied crop stress to inflorescence development, shoot growth characteristics, and cane starch reserves in 'Concord' grapevine. Proc. 26 International Horticulture Congress, Acta Hort. 640, pp 189-200.

Tim Martinson is a senior extension associate in the Section of Horticulture, based at the NYS Agricultural Experiment Station in Geneva, NY. Experiment Station in Geneva, NY.

Originally published in Appellation Cornell, Issue 35, November 2018. Link to Online Article: <https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/2018-newsletters/issue-35-november-2018/grapes-101/>

2019 Food System Outlook

Kristen Park, Extension Associate
Dyson School of Applied Economics and Management,
Cornell University

This article has been shortened. For the full article visit:
<http://dyson.cornell.edu/outreach/smart-marketing-newsletter>.

The U.S. Food Marketing System

The food marketing system in the United States is responsible for getting food from our farms into the hands of our consumer. It transports and stores, packages, processes, handles, distributes, markets, and retails our food.

The marketing system moves food produced from farms through a variety of marketing channels to the end consumer. Changes in the world around us exert forces and pressures on this system. The size, complexity, and reactive nature of the system allow it to flex but not break with these pressures. When it flexes, the marketing channels in the system respond like water channels in a delta. Some channels thrive and grow larger while bending through different courses, others might diminish and dry up, and others arise in areas in which they never before occurred.

The largest volume of food by far travels through the grocery retail channel. A general rule of thumb is that about 75% of the volume of food moves through food-at-home markets, such as supermarkets. Roughly 25% of food moves through food-away-from-home markets, such as restaurants, accommodations, schools, etc.

When describing how consumers spend their food dollars, however, the model changes. Over half,

about 54%, of consumers' food expenditures are spent on food-away-from-home, while 46% is spent on food-at-home. This is because cost of food purchased in the form of meals served through restaurants and other food service establishments includes more than just the food, it includes the restaurant labor, real estate, etc. It is more expensive than purchasing the components for meals prepared at home.

In 2017, consumers spent almost \$870 billion on food-away-from-home and only \$750 billion on food-at-home (Figure 1).

U.S. Food Prices-

The 2018 gross domestic product (GDP) forecast is looking better than 2017, and the positive effects from this are stronger personal income (Table 1). Real disposable personal income has been looking up since 2017. The forecast for real disposable personal income in 2018 also looks positive and on pace with the consumer price index.

The expected consumer price index (CPI) for food in 2018 of 1.3% is higher than last year, in 2017, but is not keeping pace with the overall CPI for all goods which is expected to average 2.4% for 2018.

While prices for food-away-from-home, purchased primarily through restaurants, are forecast to increase between 2 to 3 percent, 2018 food-at-home prices, purchased primarily from supermarkets, are stagnant after 2 years of food **deflation**.

continued on next page

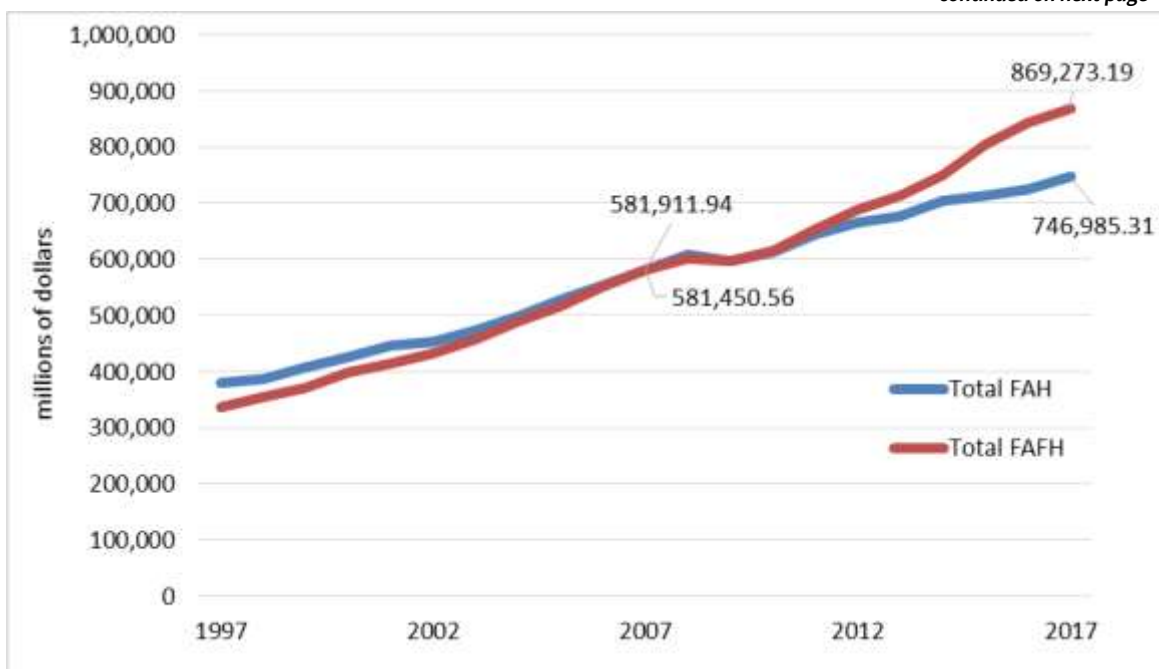


Figure 1. Food Expenditures, Food-at-Home Versus Food-away-from-Home.

USDA-Economic Research Service, Food Expenditure series. <https://www.ers.usda.gov/data-products/food-expenditure-series/>

Table 1. Economic Snapshot

Economic Measure	2015	2016	2017	2018 (forecast)	2019 (forecast)
Real GDP (annual % chg) ¹	2.9%	1.6%	2.2%	2.9%	3.0
Real Disposable Personal Income (% chg) ¹	4.1%	1.7%	2.6%	2.9%	na
Consumer Price Index (% chg) ²	0.1%	1.3%	2.1%	2.4%	2.4
Consumer Price Index, All Food & Bev. (% chg) ²	1.8%	0.3%	0.9%	1.3%	na

¹ Historical data from Bureau of Economic Analysis; GDP forecast from The Conference Board; 2018 DPI forecast from BEA

² Historical data from Bureau of Labor Statistics; forecast by International Monetary Fund.

In general, however, the prices forecast for various food at home categories in 2019 are slightly positive on top of some price swings between 2017 and 2018. The most notable exception is a projected decrease for prices for fats and oils in 2019. Some stronger increases are forecast for dairy products (3.0%-4.0%), fresh fruits (2.0%-3.0%), fresh vegetables (2.5%-3.5%), and cereal and bakery products (2.0%-3.0%).

Producer Prices

The PPI forecasts for fruits and vegetables, for fresh markets and processing, is not encouraging. PPIs for fruits and vegetables in 2018 are lower than for 2017 and are expected to be lower yet in 2019, decreasing from -4.0%

to -3.0% for fruits and decreasing -3.5% to -2.5% for vegetables in 2019 over and above the decreases seen in 2018. Large crops for apples and strawberries, two of the largest domestic commodities in terms of value, were seen in 2018. The apple crop will affect the marketing year in 2019.

“Smart Marketing” is a marketing newsletter for extension publication in local newsletters and for placement in local media. It reviews elements critical to successful marketing in the food and agricultural industry. ***Please cite or acknowledge when using this material.*** Past articles are available at <http://dyson.cornell.edu/outreach/smart-marketing-newsletter>.

Grant Opportunity – Technical Assistance Grants for Farm Employers

The Labor Ready Farmer Project is offering grants to provide up to 12 hours of Technical Assistance (TA) consulting services to farms who want to make improvements to their farm's processes in hiring, training, managing or evaluating employees. Applicants will **choose** from one of the following four areas for TA assistance and identify a specific project. If selected they will be matched with a “Smart Farming Team” of consultants who will provide one on one technical assistance.

Hiring Employees 101 – Getting Off to a Good Start (overall assistance for farms that are new to hiring employees)

On-Boarding & Training Employees Quickly and Effectively (paperwork and compliance, developing training plans, evaluation of current systems and recommendations)

Fine-Tuning & Improving the Working Environment (employee manuals and policies, management and leadership training)

H2-A Readiness (assessing whether or not H2A makes sense for your farm and what you would need to do to have H2A workers)

Priorities for the grants are new farmers (owned a farm 10 years or less); next-gen farms where the next generation is moving into an ownership/managerial role; and farms with a manager who is part of the farm succession plan.

For more information go to the following website: <https://smallfarms.cornell.edu/projects/labor-ready-farmer-2/> and look under “Smart Farming Teams”. You can also contact Elizabeth Higgins with the Eastern NY Team for more information (emh56@cornell.edu)

2019 Hudson Valley Pesticide Applicator Pre-Exam Training

March 18th and 20th, 2019

CCE ENYCHP Agriculture Specialists will be offering a training to review core concepts and commodity specific items in preparation for the exam.

PRE-REGISTRATION is REQUIRED by Monday 3/11/2019

Workshop cost is: \$50.00

(Additional costs for manuals and exam)

Hudson Valley Pre-Exam Pesticide Training
Hudson Valley Research Lab, 3357 US 9W, Highland, NY
Training Classes: Monday 3/18 & Wednesday 3/20, 9AM-12Noon

Exam: Friday 3/22, 9AM-1PM

THE CERTIFICATION EXAM will be administered by NYS DEC to qualified applicants.

Potential test takers MUST verify their eligibility with the DEC prior to taking this class.

Fee for the exam is \$100 payable to DEC the day of the exam. Depending on the number of candidates and the local NYS DEC Regional Office, the exam may be offered on location or offered on regularly scheduled dates and times at the appropriate NYS DEC Regional Office.

Training Manuals:

PMEP Training Manuals can be purchased online through the Cornell Store by visiting this link:

<https://www.cornellstore.com/books/cornell-cooperative-ext-pmep-manuals>

Each student should purchase the "Core Manual" for \$41, and the either the Fruit Manual #22, or the Vegetable Manual #23, \$36 each, depending on which better suits your needs.

This CCE training is not a substitute for the required 30-hour training class. CCE supplemental training is available only to those who already meet the education and/or experience requirements and are therefore qualified to sit for the Private Applicators Certification Exam. All participants must have experience working on their own farm, or through employment on another farm. Any questions on exam eligibility will be answered by your regional DEC representatives.

30-hour pre-test training courses can be found on the DEC website:

<http://www.dec.ny.gov/nyspad/find?2&tab=COURSES>



Cornell Cooperative Extension
Orange County presents

2019 Hudson Valley Nursery & Greenhouse Growers' School

Thursday, February 28, 2019

8:30 AM – 3:30 PM

Cornell Cooperative Extension
Orange County
18 Seward Ave, 3rd Floor,
Middletown, NY 10940-1919

NYSDEC Pesticide Recertification Credits
have been applied for

AGENDA:

- 8:30 Registration and sign in for NYS DEC credits
- 9:00 Welcome and announcements
- 9:15 **The Next Worst Thing: New and Persistent Pests** - Dan Gilrein
- 10:15 **Worker Protection Standards and Respirator Fit Test Information** - Maire Ullrich
- 10:45 Break
- 11:00 **Boxwood, Impatiens and More: Lessons Learned in 2018.** - Margery Daughtrey
- 12:00 Lunch
- 1:00 **Back to Basics: Growing Media 101** - Neil Mattson
- 1:45 **Predatory Mites in Greenhouse Production** - John Sanderson
- 2:15 **So You Want to Attract Pollinators and Natural Enemies** - Amara Dunn
- 3:00 **Cornell Annual Trial Gardens Results** – Neil Mattson
- 3:20 Evaluation and Adjourn

Registration required and seating is limited. Price includes lunch.

\$70 per person if postmarked by Feb 20, 2019. \$85 thereafter, including by phone. No refunds, substitutions are allowed.

In the event of inclement weather, call 845-344-1234 to see if we are cancelled/rescheduled.

For more info, call 845-344-1234 or jd863@cornell.edu

Calendar of Events

See the Website to register for many of these programs

<http://enych.cce.cornell.edu/events.php>

February 6, 2019	Farm Transfer & Succession Planning. , Liberty, NY. For registration and information: sullivan.cce.org .
February 19-21, 2019	Eastern NY Fruit and Vegetable Conference , Albany, NY. For registration and information: https://enych.cce.cornell.edu/
February 19, 2019	FSMA/PSA Grower Training. Desmond Hotel, Albany, NY. Pre-registration deadline is February 5 th , 2019 - Pre-registration is mandatory. For registration and information: https://enych.cce.cornell.edu/
February 28, 2019	Hudson Valley Nursery & Greenhouse Growers' School Middletown, NY. For registration and information: cceorangecounty.org .
March 5, 2019	Orange County Onion School. Pine Island, NY. For registration and information: https://enych.cce.cornell.edu/
March 5-6 , 2019	SAVE THE DATE Ag Labor Management 2-day workshop in Eastern NY. This program will be for owners and farm managers who want to improve their skills in HR Management.
March 12-14, 2019	Hudson Valley Respirator Fit Clinic CCE Ulster County, Kingston, NY. To schedule an appointment, call 607-547-7014 or 800-343-7527 between February 4 and March 1.
March 18, 2019 March 20, 2019	Hudson Valley Pesticide Applicator Pre-Exam Training Highland, NY. Pre-registration deadline is March 11 th , 2019 - Pre-registration is mandatory.
March 27-28, 2019	Capital District Respirator Fit Clinic CCE Rensselaer County, Troy, NY. To schedule an appointment, call 607-547-7014 or 800-343-7527 between February 18 and March 22.



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

Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.