



## 2019 FVI Projects

\$1.58 million awarded among 15 projects.

Our program, and the valuable knowledge it creates, wouldn't be possible without the support of New York State government. We are humbled by the confidence and trust placed in our organization to make wise use of State funds.

On behalf of the NYFVI board and staff, I would like to thank Governor Cuomo and Senator Jen Metzger, Assemblywoman Donna Lupardo and their respective ag committees for our funding

Dave Grusenmeyer,  
Executive Director, NYFVI

What a grant season it has been! 46 proposals requesting nearly \$5 million dollars were evaluated for funding. The Farm Viability Board of Directors is to be commended for their diligence in reading the more than 500 pages of ideas to help New York farmers.

Thankfully 110 farmers from across the state participated in the review process this year. Each of them read, commented and scored the proposals in their commodity area. Following the individual submission of scores, review panels also held conference calls to discuss the ranking.

The work that rose to the top of those lists is a testament to the open minds of our review panels. These are not farmers who are resistant to change, they simply need research to identify the most productive paths forward.

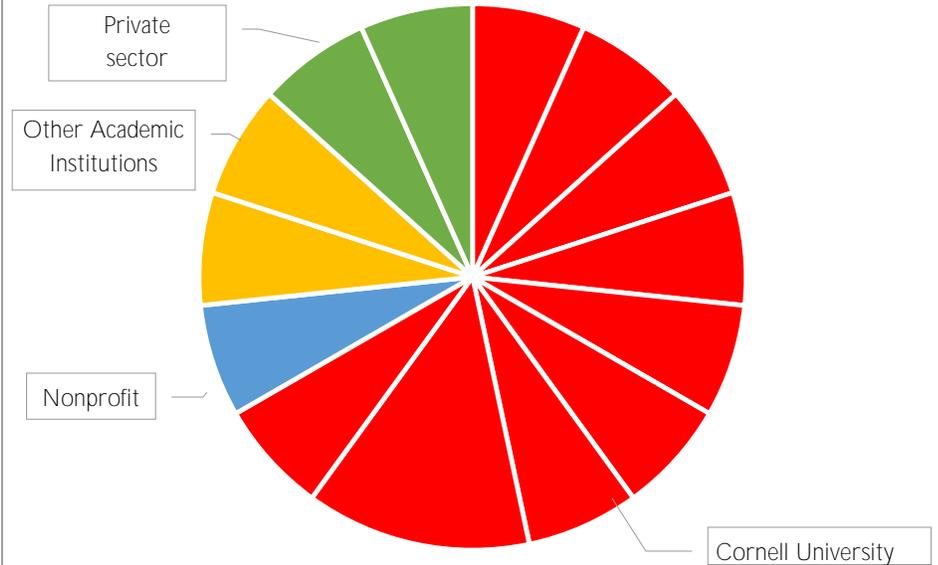
Our reviewers were enthusiastic about pest management using biological controls; UV light to replace fungicides, evaluation of new handheld tools to measure the nutritional value of feed; ways to more precisely use agrichemicals; and the use of electrical conductivity maps in vineyards.

The board was also supportive of a wildly new idea by Combplex, a start-up out of Cornell University, using lasers to zap the deadly Varroa mite on bees as they enter the hive.

The farmer reviewers also acknowledged that they could use some help in the human resource department. One project will explore a new way to look at safety on dairy farms using a developing human behavioral field called **“behavioral nudging”** while another project will create and share knowledge about how to improve the onboarding process for new employees on a dairy farm.

Last but certainly not least, our new hemp panel evaluated four proposals. They were most eager to see work by Larry Smart at Cornell AgriTech to optimize industrial hemp production for CBD move forward.

## Projects Funded by Organization



- CCE, CALS, Cornell University
- College of Veterinary Medicine, Population Medicine and Diagnostic Sciences, Cornell University
- Entomology, CALS, Cornell University
- Entomology, CALS, Cornell University Hudson Valley Research Lab
- ENY Commercial Horticulture Program, CCE, Hudson Valley Research Lab
- Horticulture Section, SIPS, CALS, Cornell AgriTech
- NYS Integrated Pest Management Program, CCE, Cornell AgriTech
- Plant Pathology and Microbe Biology Section, SIPS, CALS, Cornell AgriTech--2 projects
- Soil and Crop Sciences Section, SIPS, CALS, Cornell University
- NYCAMH, Bassett Research Institute
- Rensselaer Polytechnic Institute
- SUNY at Buffalo
- Advanced Ag Systems LLC
- Complex Inc.

CALS is the College of Agriculture and Life Sciences at Cornell University.  
SIPS is its School of Integrated Plant Sciences  
CCE is Cornell Cooperative Extension

# 2019 FVI Grants Awarded

Title	Organization	Project Lead	Award
Optimizing Industrial Hemp Production for CBD In New York	School of Integrated Plant Sciences, Cornell AgriTech	Larry Smart	\$124,298
How Regional Differences in <i>Erwinia amylovora</i> Strains Synergize with Novel Fire Blight Management Approaches to Mitigate Grower Losses	School of Integrative Plant Sciences, Cornell University	Kerik Cox	\$ 90,954
Refinement and Implementation of Newly-Developed Technologies to Significantly Reduce Producer Losses to <b>Bitter Pit in the Honeycrisp™ Apple.</b>	Eastern NY Commercial Horticulture Program Cornell University, Hudson Valley Research Lab	Daniel Donahue	\$124,999
Faster, Cheaper and Safer: Re-engineering Best Management Safety Practices on NY Dairies.	NYCAMH, Bassett Research Institute	Julie Sorensen	\$ 96,930
Onboarding Dairy Farm Employees: Safe, Productive, and Engaged From Day One!	Cornell Cooperative Extension, Cornell University	Richard Stup	\$124,945
The Effect of Season as Well as Dry Period Management and Nutrition on Colostrum Quality and Quantity.	College of Veterinary Medicine, Cornell University	Sabine Mann	\$124,280
Regaining Control of Herbicide-Resistant Weeds in Corn and Soybean	New York State Integrated Pest Management Program, Cornell Agritech	Bryan Brown	\$121,542
Forage Evaluation On-Farm using Hand-Held NIR Units	School of Integrated Plant Sciences, Cornell University	Jerry Cherney	\$102,956
Red Clover: Optimum Stage of Harvest, Feed Value Compared to Alfalfa	Advanced Ag Systems LLC	Tom Kilcer	\$ 96,952
Predicting Soil Cation Exchange Capacity to Enhance Vineyard Management Practices	SUNY at Buffalo	Erasmus Oware	\$119,609
Examining the Efficacy of a Novel Control Method for <i>Varroa destructor</i> in New York Honey Bee Colonies.	Complex Inc.	Hailey Scofield	\$ 41,000
Putting the Heat on Seed-borne Pathogens of Garlic	School of Integrated Plant Sciences, Cornell AgriTech	Frank Hay	\$124,892
Prophylactic UV Treatment to Prevent Cucumber Downy Mildew	Lighting Research Center, Rensselaer Polytechnic Institute	Mark Rea	\$124,980
Biological Control of Colorado Potato Beetle with Persistent Entomopathogenic Nematodes.	Entomology, Department, Cornell University	Elsion Shields	\$ 41,838
Expanding the Range for Establishing the Samurai Wasp, <i>Trissolcus japonicus</i> in Orchards and Vegetable Crops of NYS	Entomology Department, Cornell University, Hudson Valley Research Lab	Jentsch, Peter	\$124,099



# NYFVI Mission and Priorities

## Led by Farmers, Focused on Farm Viability

Our mission is to help New York's farmers become more profitable and to improve the long-term economic viability and sustainability of our state's farms, the food system, and the communities which they serve.

We strive to achieve our mission through a farmer-driven grant making process connecting farmer-identified needs to practical research and education solutions. We amplify our efforts and the efforts of others through leadership and collaboration. This creation and sharing of knowledge results in positive farm-level impact.

## NYFVI STRATEGIC PRIORITIES

### Improve Operational Practices

Sometimes it's the willingness to do something differently that can put more money in a farmer's pocket. These projects are focused on helping as many farmers as possible refine existing production practices, or learn how to implement a new process to improve their profitability. Some projects will utilize outreach and education to drive changes, others may use applied research to demonstrate the effectiveness of the proposed change. In any case, the risks are fairly low and the project should deliver an impact in less than two years.

### Foster Industry-Wide Innovation

Applied research is a tricky area. While there is always valuable knowledge gained from testing in the field, sometimes what you learn is what doesn't work well in in specific conditions, or perhaps in New York overall. This group of projects is focused on learning how New York farmers can best adopt new production practices. The risks involved are moderate, and mainstream adoption of the practice is likely to be 2 to 5 years from demonstrated success.

### Incubate New Ideas

While most NYFVI projects are building from existing knowledge, sometimes there are projects that are focused on developing a new idea or technique. These projects may nor may not succeed, but have the potential to significantly alter the industry. The projects are likely to be high risk, and if successful may take five or more years to reach mainstream adoption.

### Improve Route to Market and Marketing Practices

In addition to producing quality products, farmers must ensure they have profitable sales outlets. Farms of all sizes benefit from increased access to aggregators, and processors that add value to their products. And, for farms that sell directly to consumers, they must understand the most effective way to market their product. This group of projects work to build market share by increased route to market opportunities, and improve profits by improving marketing expertise. The risk level for these projects is moderate, and they should be delivering a return on investment in their first two years.

### Develop Human Capital

Strong management practices, and training and development of workers are critical in almost every industry. Farming is no different. Projects in this area of our portfolio strive to develop better managers and management practices, build business plans and ultimately, better bottom lines for all involved. Projects should be delivering an impact in less than two years.

# Hemp and Honey



## Optimizing Industrial Hemp Production for CBD in New York

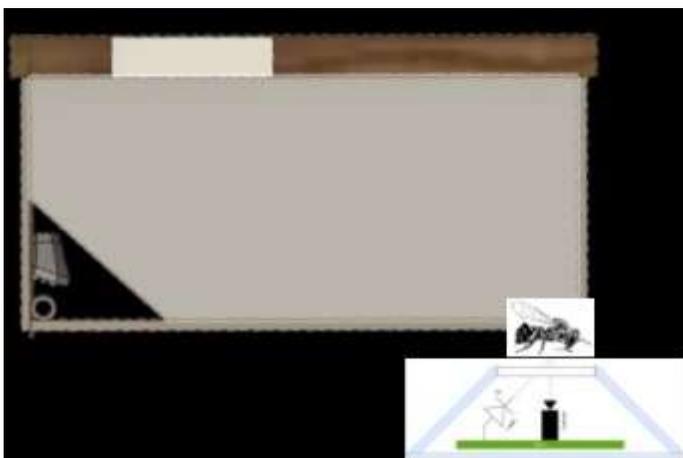
The 2018 U.S. farm bill has made it clear: Hemp is here to stay. While the plant can be used many purposes, consumers are clamoring for Cannabidiol, commonly known as CBD. Led by Larry Smart at Cornell AgriTech, this project will compare four production methods for yield of CBD, including development of novel dual purpose grain/CBD field crop production and extended season production in high tunnels. The project will also evaluate the disease incidence and suitability of cultivars under different cultivation scenarios and compare the capital, labor and input costs compared with revenues for each method in order to define profitability. Extensive outreach will be conducted to ensure New York growers are well prepared to profit from this growing opportunity.

## Examining the Efficacy of a Novel Control Method for Varroa Destructor in Honey Bee Colonies.

One of the most significant challenges faced by beekeepers is disease and colony loss caused by the Varroa mite and the viruses it transmits. Hailey Scofield co-founder of Combplex, a NY start-up, believes her team has engineered the solution. They have designed a device which uses optical recognition to identify the parasite on the bee's body as it enters the hive. If it is present, the battery-powered device uses a high-powered laser to kill the mite. These miniature devices have been successful in the lab and are currently undergoing short term tests in the field. With support from Cornell University, Combplex will scale-up the test and trial the device in 150 commercial hives in New York State. Design input from New York State's commercial beekeepers will ensure an optimum solution is developed and collaboration with beekeepers will be an integral part of the overall process.

As illustrated by the project with Combplex, the range of strategies to being explored by New York researchers and educators is truly impressive. I think the board, informed by the review panels, did an excellent job identifying the proposals with the most promise for NY agriculture.

Mike Jordan  
NYFVI Chair  
Olde Chautauqua Farm



The Combplex device is embedded in the frame of commercial hives. The diagram to the left shows where it located and illustrates how it targets the abdomen of the bee as it enters the hive.



The work by Bryan Brown and the CCE team will be invaluable in helping manage herbicide resistant weeds. The knowledge created from this applied research will help us all be better farmers

Amos Smith  
Lawnel Farms #2  
NYFVI Board Member  
NY Corn & Soybean Growers  
Association

# Field Crops and Dairy

## Forage Evaluation On-Farm Using Handheld NIR Units

The use of Near Infrared Reflectance Spectroscopy (NIRS) analysis for forage quality was developed in the mid 1970s. It allows for fast, accurate and precise evaluation of the chemical composition and associated feeding value of forages and other feedstuffs. Since that time, the knowledge of animal nutrition has grown exponentially, and now dairy farms are increasingly practicing **“precision feed management” an approach that evaluates the nutritional value** of feed relative to its cost and the benefit of increased production. In the US, most farms that are using this approach are sending forage samples to labs for testing on a regular basis. The development of new handheld NIRS devices offers potential for on-farm testing and immediate results. Jerry Cherney with Cornell University wants to help farmers know how well these tools work. This project will evaluate four commercially available devices for accuracy, precision and practicality of use on the farm. At its conclusion NY dairy farmers will understand the potential value of using these tools on their farm.

## Regaining Control of Herbicide-Resistant Weeds in Corn and Soybean.

New York corn and soybean growers are fighting to keep horseweed (marehail) and waterhemp out of their fields. Both plants have developed resistance to certain herbicides and improved management approaches are needed to keep corn and soybean fields productive. Bryan Brown, with the Integrated Pest Management Program at Cornell AgriTech will be trialing a number of options at five farms across the state to help growers understand which combination of cultural, mechanical and chemical processes may prove to be most effective. Cost effectiveness of the practices will also be evaluated. Results will be shared via the NYSIPM YouTube channel, podcasts other traditional outreach methods such as field days.

## Growing the Potential of Red Clover: Optimum Stage of Harvest, Feed Value Compared to Alfalfa

**Across New York there are soils that simply don't drain well enough to grow** alfalfa, particularly in a wet year. Farmers are looking for profitable alternatives. Recent Cornell varietal trials demonstrated that red clover can match alfalfa yield in short rotations and the University of Wisconsin found it potentially equals or exceeds alfalfa in feed value. In this project, Tom Kilcer, with Advanced Ag Systems, seeks to establish the value compared to alfalfa in NY; and the unknown optimum time frame for NY farmers to harvest based on the analysis of the nutritional profile at various stages. Trials will take place on three farms and the results will be shared broadly within the ag community. The livestock panel also reviewed this proposal.

## Faster Cheaper and Safer: Re-engineering Best Management Safety Practices on NY Dairies

Between 2007 and 2014, 36 workers died on NY dairy farms. Although, on-farm safety training has been provided for decades by the New York Center for Agricultural Medicine and Health (NYCAMH), injury statistics demonstrate that additional solutions for encouraging workers to adopt safety best practices are needed. This project seeks to apply advancements in human behavioral research to the field of dairy safety. Led by Julie Sorenson with NYCAMH/Basset Healthcare Network, the project will integrate international expertise in “behavioral nudging”. Anticipated outcomes include the development of safety solutions that increase worker adoption, reduce risks, reduce time and effort required to complete identified work-tasks and increase farm profitability either through improved work efficiencies or the elimination of waste. Farmers will be involved in many phases of the project, from identifying priority work-tasks to evaluating solutions. Results can be implemented on most NY dairy farms and will be shared through multiple, existing partner networks and NYCAMH promotional activities.

## Onboarding Dairy Farm Employees: Safe, Productive and Engaged from Day One!

Recent research with large dairy farms indicates annual employee turnover rates ranging from 20% to 80%. Assuming a 500 cow farm with 10 employees, a 50% turnover rate mean 5 new employees each year. Getting them started right can make or break the business. The goal of this work is to help farm managers learn how to “onboard” their farm employees to help them be safe, productive, and engaged from day one of employment. A closely related goal is for farm employers to become more professional in their human resource practices and fully compliant with existing state and federal employment regulations. This project, led by Richard Stup of Cornell University and executed through regional extension educators will work with 50 NY dairy farms to develop their onboarding process. A wide array of templates and training materials will be created and made available to ensure the knowledge can be utilized by all dairy farms.

## Measure to Manage: Why Does the Colostrum Vary?

**Colostrum is the “liquid gold” produced by mammals before giving birth, and is known to be critical for a healthy start of the newborn.** Parturition risk factors influencing colostrum production of modern dairy cows are largely unstudied despite the fact that the volume and/or quality of colostrum may vary significantly among operations and individuals. Cornell researcher Sabine Mann, with the College of Veterinary Medicine and her colleagues want to understand what factors affect the quality and quantity of colostrum produced. The possible contribution of age of animal, nutrition, stocking density and season (photoperiod/temperature/heat stress) will all be evaluated. This information will help farms understand the practices that they can modify to ensure that all their calves receive high quality colostrum to aid in the prevention of preweaning diseases such as diarrhea and pneumonia. Research will take place on 21 New York dairy farms.



I was pleased to see the strong support from the dairy panel for the HR projects, and it makes sense. Labor is our biggest asset and we need to make sure we are always improving.

On the production front, I'm eager to see how we can improve colostrum to give calves a better start.

Rob Noble, Noblehurst Farms  
NYFVI Vice Chair  
NYFVI Dairy Committee



Eight of the 46 proposals submitted in the 2019 FVI grant round were specific to apples. Three projects, for a total of nearly \$350,000 were funded. As a point of comparison, between 2012 to 2016, only 9 apple proposals were submitted. New York growers are truly fortunate that so many dedicated researchers and educators are working to support the industry.

Jill MacKenzie  
Two of Clubs Orchard  
NYFVI board member,  
NYS Horticulture Society

# Apples and Other Fruit

## Mitigating Apple Grower's Losses from Fire Blight with Novel Management Approaches

*Erwinia amylovora* is a devastating bacterial infection known to apple growers as “fire blight”. Current Cornell production guidelines recommend treating preemptively with antibiotics. In 2002, 2011 and 2018 new, antibiotic resistant strains of the pathogen were discovered in NY orchards. This project, led by Kerik Cox from Cornell AgriTech, will collect and “fingerprint” fire blight samples from across the state to determine if differential management programs are needed for different growing regions. It will also conduct on-farm efficacy trials to understand the potential for new programs of plant growth regulators, plant defense activators, and biological bloom protectants to help growers protect their orchards. An economic analysis of each program will be conducted.

## Keeping the Money In, and Bitter Pit Out, of Honeycrisp™ Apples

Consumers love Honeycrisp apples and growers across the country have been producing this apple in increasing quantities. The challenge? Bitter Pit, a physiological disorder that leads to high cull rates, as well as fruit that often rapidly declines in storage. With increasing product available on the market, producing a Honeycrisp apple that stores well is critical to the crop's profitability. Through prior grower funded research, it was confirmed that a commonly used plant growth regulator, applied early in the season could mitigate bitter pit by 50%. Models to help growers predict the storage capability of their fruit were also developed. This project led by Daniel Donahue with CCE's Eastern NY Commercial Horticulture Program will educate growers on new options for managing bitter pit, refine the prediction models and evaluate additional agrichemicals for bitter pit suppression. Conservative estimates of bitter pit loss in NY are at \$2.3 million annually, so even modest improvements could have significant impact.



## Expanding the Range for Establishing the Samurai Wasp in Orchards and Vegetable Crops

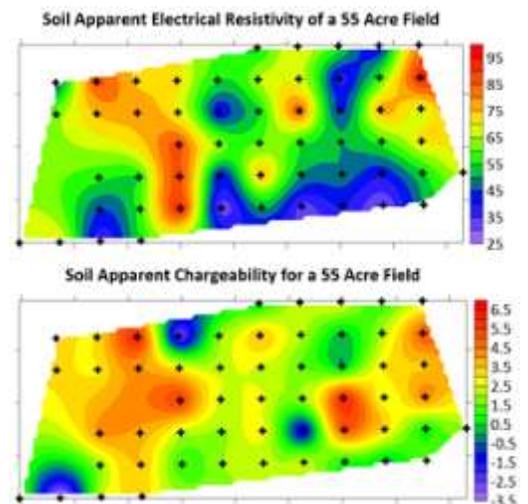
Nobody likes stink bugs. From homeowners to agricultural enterprises the Asian invasive brown marmorated stink bug (BMSB) can cause significant economic damage as well as nuisance. In New York BMSB was first reported in **2012. Since the pest's arrival, researchers across the country have been** working to identify management practices to contain it. The *Trissolcus japonicus*, a parasitoid known as the Samurai Wasp has been identified as a viable biological control. Redistribution of the wasp is underway in Oregon and Washington State with recent approval by the DEC for redistribution in New York. Building on a prior NYFVI project, Peter Jentsch with Cornell University's Hudson Valley Research Lab, will lead this project to understand the presence of native parasitoid populations to determine the need for biological release of the Samurai Wasps. Activities will include the use of BMSB traps, commercially available smartphone scouting tools and a USDA funded EDDMaps to track the prevalence of BMSB. Following the first year of measurement, the Samurai Wasp will be released in areas where it is deemed necessary to counter BMSB to protect crops.



Adult Samurai Wasp Emerging from Parasitized Egg of the Brown Marmorated Stink Bug

## Using ECa to Predict Soil Cation Exchange Capacity in Vineyards

Cation Exchange Capacity (CEC) is an important soil characteristic that relates to soil fertility. While knowledge of spatial variations in CEC is crucial to site-specific management of vineyards, the conventional approach to estimating CEC is time-consuming and expensive with low spatial resolution. Soil apparent electrical conductivity (ECa) and chargeability depends on bulk soil properties and are used as proxies to estimate CEC. With this project, Erasmus Oware of SUNY Buffalo, will develop a framework to rapidly estimate high-resolution CEC of a vineyard from ECa and chargeability measurements. The resulting CEC maps will support site-specific vineyard management decisions that reduce off-site impacts, such as the placement of drainage tile to reduce runoff as well as targeted fertilization practices to reduce nutrient leaching. Six grower-collaborators will ground-truth their CEC maps. If successful, a strategy to rapidly evaluate CEC on a large-scale will benefit not only vineyards, but also have broad applications in other production systems to reduce input costs and minimize environmental impacts of agricultural production.



Soil electrical conductivity ECa (top) and chargeability (bottom) of a 55 acre farm field. The differences in the spatial patterns of the two maps indicate that the two data types of the project will provide independent information to improve estimation of CEC.



# Vegetables

During this year's competitive grant round the vegetable review panel scored and ranked 10 proposals. I am pleased that 4 of the 10 were selected for funding for a \$415,809 investment. These funds will further research on issues important to vegetable growers across the state.

This year's projects will further the development of biological controls, continue to look at the on-farm feasibility and effectiveness of using UV light to control downy mildew and finally we were able to support work looking at heat treatment and seed storage practices to reduce seed-borne pathogens.

Shannon Kyle  
Torrey Farms  
NYFVI Board Member  
NYS Vegetable Growers  
Association

## Prophylactic UV Treatment to Prevent Downy Mildew

Cucumber Downy Mildew (DM), a foliar disease, produces asexual spores that are wind-borne and become widespread. Infected leaves die prematurely resulting in fewer or lower-quality fruit. The pathogen develops resistance to fungicides, and resistant varieties are only effective for current pathogen strains. A 2018 FVI project examined both powdery mildew and DM. It learned that unlike with powdery mildew, UV light is only moderately effective when delivered post infection. However, there is evidence that prophylactic UV doses induce the **plant's resistance to DM. This project, led by Mark Rea with the Lighting Research Center at RPI, will leverage the UV light delivery system built to treat powdery mildew in summer squash and modify it as needed to prophylactically treat DM in cucumbers. Trials will take place on an organic farm in the Hudson Valley. The annual value of New York fresh market cucumbers is approximately \$17 million.**

## Putting the Heat on Seed-borne Pathogens of Garlic

Over 400 New York farmers grow garlic, producing a crop worth \$27 - \$43 million annually. A 2011 survey by Cornell Cooperative Extension found almost 25% of growers had lost greater than 30% of their crop in the previous five years. These losses have been exacerbated by recent introductions of pests and diseases including bloat nematode, eriophyid mite, clove rots due to *Fusarium* and other fungi and the sporadic occurrence of white rot (caused by the fungus ***Sclerotium cepivorum***). **Cornell AgriTech's Frank Hay and a team of regional extension educators** want to help growers avoid these losses by developing cost-effective management solutions to fight seed-borne pests. The work will define optimum seed curing/storage conditions, investigate means of grading out infected/infested seed prior to planting, and reevaluate hot water treatment of seed cloves as well as seed treatments with OMRI listed/conventional pesticides.

## Can Biocontrol Nematodes Control the Colorado Potato Beetle?

Elson Shields at Cornell University is well known for his work with persistent entomopathogenic nematodes to fight pests in NY fields. A single field inoculation will provide pest suppression for multiple growing seasons. Since 2007, NYFVI has invested over \$400k into his research to help identify cropping systems and insect pests where this biocontrol technology can have the biggest impact and the greatest benefit for the grower. To date, these insect-attacking nematodes are extremely effective with the alfalfa snout beetle, western corn root and the root weevil complex in strawberries, cranberries and blueberries. With this project, Shields will conduct a preliminary trial at the Cornell Research Farm to understand if biocontrol nematodes can effectively attack the Colorado Potato Beetle and persist in the potato cropping system. In 2017, NY grew 14,500 acres of potatoes worth \$50 million.



*Left to right*  
 Chair  
 Mike Jordan  
 at-large member, juice grapes and wine  
 Vice Chair  
 Rob Noble  
 NYFVI Dairy Committee  
 Secretary/Treasurer  
 Jim Fravil  
 at-large member, livestock



*Left to right*  
 Peter Ferrante  
 at-large member, greenhouse  
 Chris Kelder  
 NY Farm Bureau  
 Shannon Kyle  
 NYS Vegetable Growers Assoc.  
 Jill MacKenzie  
 NY Horticultural Society



*Left to right*  
 Mary Jeanne Packer,  
 Empire State CAO  
 David Ryan  
 NYS Nursery and Landscape Assoc.  
 Amos Smith  
 NY Corn and Soybean Growers Association



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