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Dear Friends of Farm Viability,

I was asked to serve on the dairy review panel for NYFVI back in 2006. I was nominated by my colleagues on the dairy committee to join the board in 2016. Today I’m writing to you as the organization’s chair.

I’ve been willing to volunteer my time to this organization because I think it is critically important that proposals selected for funding are evaluated by people with their boots in the field. This helps ensure that the ideas will be successful and creates an efficient use of resources. And, if you know farmers, you know we don’t like to waste money.

2019 was a good year for NYFVI. We had 110 farmers participate in the 2019 review process to select the work that was funded. Our impact number stayed strong; delivering more than $7 back to the ag community for every dollar invested in a completed project. And our 2020 FVI competitive program has generated strong interest, with 56 proposals in hand. Staff managed more than 85 projects throughout the year and oversaw $2.6 million in reimbursements to the projects. We also welcomed Emmaline Long to the board as the new representative for the NY Corn and Soybean Growers Association.

But we didn’t stop there. I’m excited to announce that staff identified an opportunity to bring in private sector funds through a collaboration with Love Beets USA in Rochester NY. $300,000 worth of work will be funded 50/50 between the two organizations. The work will be led by a partnership between Sarah Pethybridge with Cornell, and Jan Van Aardt with the Rochester Institute of Technology. They are seeking to learn how to use imaging to develop an algorithmic model that will help farms understand the optimal time of beet harvest and refine their management practices.

I’m also very pleased to see the progress that Empire State Farms is making with their Cook and Chill Facility. Back in 2017, we funded a small market analysis project that allowed them to conduct research among the potential buyer audience. The work demonstrated that there is a market for locally produced protein that meets the buyer’s precooked needs and specifications. In fact, the projections show that five years from launch, the facility will be able to market 24,000 lbs. of fresh and cooked beef, pork and chicken products PER DAY.

Work is underway and the facility, supported by a REDC grant, hopes to be fully operational within the next 24 months. In the interim, cooking is being subcontracted and Empire State Farms is working collaboratively with School Food Service programs to build this new local food supply chain.

This year’s annual report highlights many more stories of our projects as does the new nyfvi.org website. I hope you’ll take a few minutes to get to know us better.

Thanks for your support,

Chair, NYFVI
Noblehurst Farms
From our perspective, New York is fortunate that its farmers are passionate, knowledgeable and open to change. We’ve seen that in the recent U.S. Census numbers as the number of certified organic growers increased by 54%.

We’ve also seen it firsthand as the growers on our review panels strongly supported proposals seeking funding for work in biocontrols, biofungicides, high tech approaches for data collection, and low tech solutions such as netting and barn fans. The growers have also consistently supported work in developing winter forages, and nutrient management in corn fields.

We were really excited back in 2016 to see the review panels support a project by Daryl Nydam to develop a predictive model that helps dairy farmers reduce the use of antimicrobials. And, we’re proud now to be supporting the implementation of that model through our dairy education program on more than 40 New York farms. More information about it can be found on page 8.

The NYFVI board and review panels are all farmers. They know firsthand the challenges growers face every season. They also understand that the preferences of the U.S. consumer are changing. The projects they select for funding seek to address challenges and advance production practices.

For example, in 2017 the review panel recommended funding work by Faruque Zaman with the Suffolk County Cornell Cooperative Extension Office to evaluate alternatives to Chlorpyrifos.

In this annual report, we offer you stories about recently completed work that is developing novel seed coatings to fight damping off in cabbage, exploring two distinct approaches to fight powdery mildew. We also feature some strong work by Grow NYC that helped NY Greenmarket farmers grow wholesale enterprises.

You’ll want to read all the way to the end to learn about how a seed treatment for corn is deterring birds, and how precision feed management is improving profitability on dairy farms.

2019 NYFVI Program
The FVI program is our core competitive program. Last year, 110 farmers from across the state read and scored the proposals in their commodity area. The board evaluated 46 proposals requesting more than $4.9 million dollars. Resources allowed 15 projects to be funded.

The board discussed each proposal, along with the input from the review panels, and narrowed it down to 15 projects for funding. It wasn’t an easy task. Of the 46 proposals received only a handful were identified as “Do Not Fund” by reviewers.

New York is fortunate to have so many talented people seeking support for their efforts to advance agriculture.
NYFVI: A Track Record of Generating Results

For every dollar invested in a project that has been completed, seven dollars and fifty cents has gone back to the agriculture community. This information is provided by the project leaders in their final report. It includes increases in gross revenue, reductions in operating expenses, and new capital investments. The total economic return from the last 15 years of funding is now just over $143 million.

We are thankful for the steadfast support of New York State Governor Cuomo, Senator Metzger, Assemblywoman Lupardo and their respective agriculture committees. We are grateful for the trust and confidence they have placed in our organization and their support of our shared mission.

The Investment by Commodity Group chart shows how the funds were allocated by commodity area over the last several years with the FVI program.
The 2020 FVI RFP includes an “Insider’s Guide” that provided tips to applicants about what had fared well — and what hadn’t — among the review panels in 2019. The information was also covered in the grant writing webinars that we held with more than 20 participants. If you’re interested, it’s available online.

The RFP moved from a general call for technology to a request for what will “Help Farmers Know What Works”. What we learned with the general technology focus was that we received a number of proposals seeking support to develop software tools and platforms — but there weren’t always solid plans for how these tools would be broadly available to farmers and maintained past the life of the grant.

We encouraged applicants to make sure that the private sector wasn’t already working on the ideas they were exploring. What we heard from our 2019 review panels was “isn’t somebody already doing that”.

This year we encouraged applicants to consider evaluating tools on the ag community’s behalf so they can help farmers know if they are worth purchasing. We also encouraged educators to help farmers adopt known practices, whether that’s about using data to make production decisions or to try a new product. In fact, the project featured on page 13 led by Amara Dunn with the IPM program at Cornell evaluated the efficacy of new biofungicides to combat powdery mildew in squash.

Other examples of previous efforts to help farmers understand which new tools are ready for adoption include work for the dairy industry. In 2017 Julio Giordano with Cornell was awarded funds to evaluate the accuracy and cost effectiveness of automated health monitoring systems for cows against a person in the same role. And this past spring, Jerry Cherney’s proposal was funded to evaluate the pros and cons of various near infrared readers, an on-farm device, that help farmers evaluate forage quality.
Since our first year in operation NYFVI has encouraged collaboration between researchers. In recent years we’ve vigorously encouraged collaboration between researchers at different institutions. One challenge with these collaborations is the size of our funding opportunity. We’re excited about Paired Proposals because they allow researchers to bring more expertise to projects, take on bigger more complex problems, and each institution can compete for the full funding amount.

Paired Proposals. Another change in our RFP was to encourage “Paired Proposals” this was done because we had seen the value of multi-disciplinary, multi-organizational collaboration on projects. Quirine Ketterings the lead of the SPEAR program at Cornell and Erasmus Oware from University at Buffalo teamed up with two proposals in 2018 to pair her nutrient management and agronomy expertise with his computational skills to see if they can further refine her work on management zones — or that is “What makes a good field, good”.

We think that when more people, with varied backgrounds, are focused on helping the agriculture industry succeed, the synergy is good for everyone.

56 Submissions. We are pleased with the interest that this year’s RFP and our outreach generated. 25 organizations submitted their ideas to help New York’s farmers. 8 of the proposals were submitted for consideration as a “paired proposal approach”.

A key strength of Farm Viability is our flexibility. Without commodity specific quotas we are able to respond to the best ideas submitted, making maximum use of available resources. The bar chart above illustrates the trends by commodity area over the last three years.

2020 FVI Applications Received by Type of Organization

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Dave Grusenmeyer
Executive Director
NYFVI
Since its inception, Farm Viability’s dairy program has supported 21 Topic Specific Teams that have worked with more than 270 of New York’s dairy farmers. In this year’s RFP we encouraged proposals that would help farms adopt Selective Dry Cow Therapy and reduce their antimicrobial

In the summer of 2019 Farm Viability released a RFP for our Topic Specific Team, “TST” program. This model asks educators to identify a common need among farmers in their region and develop a deep dive curriculum on the topic. Where appropriate, the educational model includes both peer-to-peer discussion group learning and individual on-farm consultations.

While we welcomed proposals on all topics, we expressed specific interest in receiving proposals that would help New York dairy farmers adopt Selective Dry Cow Therapy (SDCT).

Since the 1970s it’s been a common practice on dairy farms to use “blanket” dry cow therapy; that is to administer antimicrobial drugs that prevent and treat costly mammary infections to all cows as they enter a dry off period.

Although the practice may have been warranted as it began, animal care and the milking process have become much more sophisticated over time with many dairies keeping detailed cow specific records. With NYFVI funding, Daryl Nydam DVM, PhD and his collaborative team harvested the power of that data to predict which cows do—and don’t—need treatment.

Using a farm’s data, the prototype software applies a predictive SCDT model that sorts the high-risk cows from their low-risk herd mates. The farm data is accessed from widely used industry herd management tool Dairy-Comp 305.

The new protocol is designed to maximize treatment of cows that exhibit clinical or subclinical mastitis and minimize unnecessary treatment of cows that will likely remain healthy throughout the dry period.

A herd using a SDCT protocol that has a somatic cell count of 200,000 or less and an adequate diet that maintains the immune system could expect to reduce antimicrobial use by 60% without adversely affecting production and clinical health outcomes.

Three organizations submitted proposals to help the farms adopt this practice, and all were funded. By the end of 2020, more than 40,000 cows are projected to be managed with this protocol. Non-profit CADE will be working with 10 farms, Countryside Veterinary Clinic and Dairy Health and Management Services will each support 15 farms.

Other 2019 TST projects include:

- Dairy Product Development Education for Upstate New York Farms, SUNY Cobleskill
- Improved Pasture Management: Leveraging Technology and Building Resiliency, NOFA-NY
- Focus on Farm Management: Areas of Opportunity and Excellence in Calves, Transition Cows, and Cow Comfort, CCE Regional Teams
- Improving the Management and Economics of Raising Dairy Replacements, Cornell Cooperative Extension of Chautauqua County

“We are confident in the research results from the collaborative Dairy Health/Cornell trials. That’s why I was excited to learn about the TST opportunity. These funds are allowing us to help farms learn how to implement this new approach. The practice is a win for everyone: It meets consumers’ needs, saves farmers some money and is the right thing to do.”
Mark Thomas, DVM
Dairy Health and Management Services

“We are confident in the research results from the collaborative Dairy Health/Cornell trials. That’s why I was excited to learn about the TST opportunity. These funds are allowing us to help farms learn how to implement this new approach. The practice is a win for everyone: It meets consumers’ needs, saves farmers some money and is the right thing to do.”
Mark Thomas, DVM
Dairy Health and Management Services
He described how developments like the transistor and communications satellites would allow people in 2000 to be in instant communication at all times, “wherever we may be on Earth, even if we don’t know their actual physical location. It will be possible in that age, perhaps only 50 years from now, for a man to conduct business from Tahiti or Bali just as well as he could from London. People will no longer commute. They will communicate,” he said.

Clarke went on to predict the advent of technologies like 3D printing, machine learning, the mainstream use of robotics, and artificial intelligence. Amazingly, a lot of this is becoming everyday reality in the world around us as we head into 2020.

Thinking about technology and the future and the possibilities it can bring to agriculture is exciting, but it can also be a frustrating exercise. We often focus on the elusive perfect tool that will solve all of our problems, while overlooking so much of what’s already happening and, in many cases, available to farmers right now.

Robotics and autonomous equipment are here and improving. Greenhouse growers are adopting new planting equipment that uses machine learning technology and robotics to stick cuttings quickly and efficiently for large scale production. And we’re seeing the first autonomous sprayers and driverless tractors moving into fields and orchards across the country.

A lot of good work is also being done at the university level. Carnegie Mellon’s Robotics Institute, for example, is collaborating with programs at Cornell, the University of Florida, and the University of California, combining its robotics research with the Land Grants’ ag knowledge to solve tough grower problems.

There are some interesting approaches being used with tools we’re already somewhat familiar with, too. Innovators are using drones for tasks that go beyond gathering images of a crop. Drones are now distributing beneficial insects more accurately and efficiently for crop protection, and applying pollen to supplement the work of natural pollinators.

We’re even seeing protected production techniques being used in completely unexpected ways. A grower co-op in Florida, for example, is responding to a decade of devastation from citrus greening disease by growing more than 100 acres of citrus in fully enclosed screen houses. The structures exclude greening’s vector, the Asian Citrus Psyllid, allowing these growers to produce high-quality citrus.

Innovations like those described by Arthur C. Clarke 50 years ago are happening all around us in agriculture. It’s up to us to take advantage of the opportunity.

What are we waiting for?
NYFVI Projects: Fostering Innovation in Agriculture

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 specific conditions, or perhaps in New York overall. This group of projects is focused on learning how 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.

Projects Completed 11/1/2018-10/31/2019

Selective Dry Cow Therapy: Increasing profits and decreasing antibiotic use.  
Cornell University, $102,036

Decision Agriculture: Managing Nitrogen and Yield in Corn and Forage Sorghum Utilizing Drone NDVI Imaging.  
Cornell University $148,192

Open Field Study with Avipel Shield Seed Treatment on Field Corn to Deter Birds from Feeding on Corn Seedlings  
Cornell University $25,358

Trials to Reduce Onion Rot  
Cornell University $119,715

Optimizing Variable Rate Seeding in NYS Advanced Ag Alliance, Inc.$102,428

Use of under vine fescues in Long Island vinifera vineyards to reduce production costs and environmental impact CCE Suffolk County, $61,028

Increasing producer profitability through farm level interventions designed for optimization of spore counts in raw milk  
Cornell University, $106,444

Active Projects

Insects On-Line: Forecasting insect management for nursery and Christmas tree growers  
Cornell University, $70,665

Insect-killing nematodes for biocontrol of greenhouse thrips and fungus gnats  
Cornell University, $105,069

Improving Dairy Cow Health and Reducing Dairy Farm Labor Cost by Automating Health Monitoring and Management  
Cornell University,$139,676

Improving Apple Grower Profitability Through Precision Management by Developing and Implementing a Smart App  
Cornell University $127,297

Biological Control of Corn Rootworm using Native NY Entomopathogenic Nematodes  
Cornell University $99,979

Rapid and Cost-effective Pathogen Detection Assay for Fire Blight Management in Apple Orchards  
Plant Pathology, Geneva, Cornell University, $101,259

Nutrient Management Program, Cornell University, $143,092

Using Statistical Pattern-Recognition Tools to Unveil Combination of Factors that Affect Corn Yield to Instruct Resource Allocation within a Field  
SUNY at Buffalo, $140,246

Effect of Corn Plant Characteristics and Harvester Setup on Kernel Processing Scores and Starch Digestibility  
ProDairy, Cornell University, $78,659

Quantifying benefits of biofungicides in vegetable disease management using novel disease detection methods  
Integrated Pest Management, Cornell University, $84,641

Practical application of UV-light to suppress plant pathogens  
Lighting Research Center, Rensselaer Polytechnic Institute, $130,034

Refining and evaluating NY adapted freshmarket tomato lines with combined resistances to bacterial and fungal diseases  
Plant Breeding and Genetics, Cornell University, $142,756

Advancing New York’s Hop Industry with Unique Varieties and Quality Assurance  
Northeast Hop Alliance, $33,342

Development of Impatiens plants that are resistant to the devastating disease, Impatiens Downy Mildew  
Long Island Horticultural Research Center and Extension program, Cornell University, $139,753

Investigating the true potential of the Industrial Hemp crop for New York State agriculture  
Morrisville State College, $57,155

Optimizing Industrial Hemp Production for CBD in New York School of Integrated Plant Sciences, Cornell AgriTech $124,298

Predicting Soil Cation Exchange Capacity  to Enhance Vineyard Management Practices  
SUNY at Buffalo $119,609

Biological Control of Colorado Potato Beetle with Persistent Entomopathogenic Nematodes.  
Entomology, Department, Cornell University $ 41,838

Expanding the Range for Establishing the Samurai Wasp, Trissolcus Japonicus in Orchards and Vegetable Crops of NYS  
Entomology Department, Cornell University, Hudson Valley Research Lab $124,099
New Technology Unlocks Super Powers of Natural Enzymes

The natural world is full of enzymes with antimicrobial properties. The challenges? How to identify which enzymes will help fight common plant pathogens, and how to make sure they are in place and active at the moment when their super powers are needed most. Zymtronix is developing the answers.

In 2012, while at Cornell University, Stephane Corgie, figured out a new way to immobilize enzymes without interfering with their natural properties and founded a company, Zymtronix, to develop the technology. This new biocatalyst process opens up new product development for many industries seeking sustainable, green solutions in their manufacturing processes.

Corgie quickly identified agriculture as an industry that could benefit from his process and brought in Marie Donnelly, a bioengineer, to lead the way.

Zymtronix applied for funding in 2018. Based on Farm Viability’s application and scoring criteria, Donnelly thought her work should start with seed coatings to prevent damping off in cabbage seedlings and black rot in established crops. These diseases are significant, and current seed treatment options were limited to just a few fungicides and disease resistance had been building. Foliar applications of copper antimicrobials were also options but they both had limitations. The time was right to focus on a new approach.

The farmers on the vegetable review panel agreed and Donnelly’s proposal was one of their highest ranked projects. In year one, she worked to identify the right natural ingredient with an enzyme that could fight the damping off and black rot pathogens. She also developed a biopolymer blend to ensure the active ingredients would stay at the seed’s surface.

Alan Taylor with Cornell was a key collaborator in the seed coating process, and several extension agents provided support in identifying growers for the trials.

Several growers participated in trials and all were happy with the ease of use in handling coated seeds.

The first threshold was to confirm that the seed treatment didn’t inhibit germination. The results were encouraging, with germination rates in the treated seeds comparable to the untreated. Further greenhouse testing was conducted to evaluate performance in heavily disease infested soil. In this trial, the treated seed germinated and grew whereas the untreated seeds succumbed to the disease.

The results have been especially informative, as seeds germinated in a greenhouse for sale as transplants are the target market for many vegetables.

Donnelly says, “While there is still more work to be done, for an early stage trial we are very pleased with the progress. The product is being developed to be safe and biodegrade completely in the soil. We are confident we can market a product that both organic and conventional farmers will be happy to use.”

Corgie says, “This work has built the company’s agricultural credentials and allowed us to compete for start-up funds in many ag incubators in the US and Europe.”
**NYFVI Projects: Incubating 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. Work of this nature may or may not succeed, but have the potential to significantly alter the industry. These projects are likely to be high risk, and if successful take five or more years to reach mainstream adoption.

**NYFVI Projects: Improving 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 be delivering an impact in less than two years.

### Active Projects

- Application of electromagnetic electrical conductivity measurements for precision agriculture for NYS vegetable growers. 
  SUNY at Buffalo $84,840
- Assessing spatial distribution of grape mealybug, fruit *lecanium* scale, ants and leafroll virus for targeted management strategies in Long Island vineyards 
  Suffolk County CCE, $94,980
- A novel enzyme based seed coating to reduce damping off and black rot in cabbage 
  Zymtronix Catalytic Systems, Inc. $59,262
- Examining the Efficacy of a Novel Control Method for Varroa destructor in New York Honey Bee Colonies. 
  Comoplex Inc. $41,000
- Prophylactic UV Treatment to Prevent Cucumber Downy Mildew 
  Lighting Research Center, Rensselaer Polytechnic Institute $124,980

### Projects Completed 11/1/2018-10/31/2019

- Improving Milk Quality by Understanding Environmental Pathogens in Different Bedding Types 
  Quality Milk Production Services, Cornell University $100,000
- Impact of normalized yield on fall and spring nitrogen recommendations for early planted winter forage 
  Advanced Ag Systems LLC, $87,757
- Adoption of Controlled Release Nitrogen Fertilizer as a Best Management Practice in Potato Production 
  CCE Suffolk County, $90,620

### Active Projects

- Increased Farm Profitability and Diversification Through Value-Added Forest Products 
  CCE Chenango County, $59,697
- Increasing Dairy Farm Profitability by Reducing the Interbreeding Interval and Optimizing Conception Rate of Lactating Dairy Cows 
  Cornell University $110,953
- Optimize Selection/Management of Short Season Sorghum/Millet Varieties for NY 
  Advanced Ag Systems, LLC $39,366
- Evaluation of Alternatives to Chlorpyrifos Insecticides for Controlling Cabbage Maggot in Brassica Vegetables 
  CCE Suffolk County $38,135
- Development of Effective Spray Program for Post-Infection Fire Blight Management in Apples and Cost-Benefit Analysis of its Key Components 
  Cornell University $114,950
- On-farm spore interventions to produce value added low spore raw milk for production of extended shelf-life fluid milk products 
  Milk Quality Improvement Program, Cornell University, $95,858
- Determine if Sulfur is a Limiting Nutrient in Soil and New York Soybean Production. 
  NWNY Dairy & Livestock Extension Team, Cornell University, $68,747
- How Regional Differences in Erwinia amylovora Strains Synergize with Novel Fire Blight Management Approaches to Mitigate Grower Losses 
  School of Integrative Plant Sciences, Cornell University $90,954
- Refinement and Implementation of Newly-Developed Technologies to Significantly Reduce Producer Losses to Bitter Pit in the Honeycrisp™ Apple 
  Eastern NY Commercial Horticulture Program Cornell University, Hudson Valley Research Lab $124,999
- The Effect of Season as Well as Dry Period Management and Nutrition on Colostrum Quality and Quantity. 
  College of Veterinary Medicine, Cornell University $124,280
- Regaining Control of Herbicide-Resistant Weeds in Corn and Soybean New York State Integrated Pest Management Program, Cornell AgriTech $121,542
- Forage Evaluation On-Farm using Hand-Held NIR Units 
  Cornell University $102,956
- Red Clover: Optimum Stage of Harvest, Feed Value Compared to Alfalfa 
  Advanced Ag Systems LLC $  96,952
- Putting the Heat on Seed-borne Pathogens of Garlic 
  Cornell AgriTech $124,892
Powdery Mildew: New Approaches Evaluated, More Work Needed

New York squash sales hit $32 million in 2017, with more than 11,000 acres harvested. One of the growers’ biggest challenges in producing this delicious, healthy food? Powdery mildew. New York vegetable growers have been seeking better management solutions against this airborne pathogen for years. In 2018, two proposals were funded to tackle the problem. As is often the case with agricultural research, more work is needed.

For conventional growers, the current protocol for powdery mildew management is a weekly spray of chemical fungicides, rotating through the limited choices of fungicides not already affected by resistance to minimize its further development. There is less data to guide organic growers in choosing effective fungicides to manage powdery mildew. While disease severity varies from year-to-year, growers can count on this disease being an annual problem. Spray applications need to begin when the disease is just getting started, so frequent scouting is an important part of the management protocol.

One project, led by Amara Dunn with the Integrated Pest Management Program at Cornell, examined the use of biofungicides to control powdery mildew in squash as well as white mold in snap beans.

Biofungicides are a relatively new choice on the market and have some interesting attributes. Made from microbial or botanical ingredients, they have a short pre-harvest interval and most are acceptable for organic production. Some of the products are known to reduce cucurbit powdery mildew infection, but may be less effective than conventional fungicides when used alone.

Dunn’s research sought to answer three questions:

- Can we improve control by adding biofungicides to a conventional fungicide rotation?
- Can we replace some conventional fungicides with biofungicides and achieve as good or better powdery mildew control?
- Can we use biofungicides in an effective organic management program?

The results from the trials, conducted on Long Island and in Eastern and Western New York, were mixed. None of the combinations of products tested consistently achieved any of these goals with the protocols used. While some options showed promise, overall more research is needed before any specific approach could be recommended.

In short, this project demonstrated how important research to understand efficacy of new products really is. It is critical that researchers continue to focus on understanding the benefit, if any, of these new products coming to market. Sharing the knowledge of these trials can help growers make good choices as they develop their management plans for this challenging disease.

“It’s good to host trials and meetings because you get ideas about what to improve on your farm from a bunch of different people. I always learn a lot. The powdery mildew trial answered questions about whether the biocontrol products make sense in our rotation. For now we will stick with our conventional sprays.”

Tim Korona
Korona’s Korn and Produce

Pictured on the left is Tim Korona during a tour of his high tunnel that was a secondary part of the field day for this squash project.
The review panel and the board of directors were intrigued by the concept and liked the DIY plans that were proposed as part of the project. If the approach proved efficacious they wanted to make sure it would be available quickly. The proposal was funded.

Based on the Florida strawberry project, the LRC team knew UV-C light would kill powdery mildew. Based on work by colleagues in Norway and Cornell they also knew a lower dose could be used (enabling faster speeds) if the light was delivered after dark, to avoid the DNA repair mechanisms that are activated by blue light from the sun.

What they didn’t know was the optimum amount and duration of exposure that would allow the squash plant to thrive while killing the pathogen. In order to keep the new approach as cost effective as possible, the target goal was to follow the typical spray schedule with once a week dosing. Based on the lab work, it appeared this would work.

But, as farmers and researchers know, results are sometimes different in the field. While weekly dosing demonstrated some control of the disease, unlike with its use in Florida strawberry fields, it was no better than the fungicidal treatments. One possible reason is the structure of the squash plant with its large leaves. Another factor was that the disease severity was high for all three conditions (untreated, fungicide and UV-light), suggesting that the disease control procedures may have been applied too late.

Past NYFVI board member, Larry Eckhardt and his son Andrew were actively involved in the project.

**The Dragon: UV Light for Disease Management**

In 2015 as part of a Cornell University project in collaboration with the University of Florida, Mark Rea and his team at RPI’s Lighting Research Center (LRC) designed “the dragon”, a tractor-pulled implement that delivers precise doses of UV-C light to replace the use of fungicides to fight powdery mildew in strawberries. In 2017 they sought NYFVI funding to bring this novel light-based approach to summer squash.

**International Collaboration: Light and Plant Health Group**

The Light and Plant Health group is a diverse international group, working collaboratively to promote this research area and its applications, and to act as a resource to train others. The group includes Rensselaer Polytechnic Institute’s Lighting Research Center (RPI/LRC), Norway’s Institute of Bioeconomy Research (NIBIO), the Norwegian University of Life Sciences (NMBU), the University of Florida Gulf Coast Research and Education Center (UFL/GCREC), and Cornell University’s Geneva Experiment Station (Cornell/Geneva). The work spans disciplines from plant growth and photobiology to physics and lighting technology.

In addition to modest support provided by the New York Farm Viability Institute, the work has been generously supported by grants from the USDA Organic Research and Extension Initiative (OREI), the Specialty Crops Research Program (SCRI), and the The Research Council of Norway (RCN), as well as by assistance from the lighting companies OSRAM, Ushio, Cree, and the Asahi Glass Company.
involved with the research trials which took place on their farm in Stepheontown. Kinderhook Creek Farm is a diverse vegetable and field crop operation which grows both organic and conventional crops, primarily for the wholesale market.

“This approach offers some clear advantages. While the light needs to be delivered at dusk, unlike pesticides, the wind and rain doesn’t interfere with the schedule. Additionally, there are no concerns about treatment immediately prior to harvest” said Larry.

He continued “I really liked the DIY aspect of the project. My son Andrew was able to follow the plans and build the dragon that was used for field trials in less than a day.”

Downy Mildew. The project had a second component which was to understand the effect of UV-C light on the equally vexing pathogen downy mildew in the lab. They learned that, unlike powdery mildew, light dosing wasn’t as effective to fight the downy mildew pathogen once it was present. However, it was very interesting to learn that prophylactic light dosing may stimulate a defense response in the plant allowing it to fight the downy mildew pathogen.

In 2019 the LRC team received NYFVI funds to test the prophylactic approach in cucumber fields. That work will be trialed in the summer of 2020.

Next steps: LRC submitted a 2020 NYFVI proposal to continue their work in summer squash. Their hope is to incorporate leaf agitation into the dragon, and examine the impact of starting earlier in the season with more frequent dosing. The proposal also seeks to evaluate the “unintended consequences” of the UV-C approach. Some of the collaborators believe that the dosing may be controlling not just powdery mildew, but also downy mildew and angular leaf spot disease!

Since UV-C is a well-established germicidal modality, it is expected to be lethal to a wide range of bacterial, fungal and viral diseases. The ability to translate this capability to agriculture is dependent on the right design, field conditions, dose and schedule. Just like the large investment of prior approaches using chemistry, UV-light optimization represents another approach to integrated pest management.
Scaling Up: Wholesale opportunities provide profitable growth

The competition among farmers selling directly to consumers is fierce and some feel that opportunity has plateaued. Yet wholesale buyers lament the lack of reliable access to locally grown products. Grow NYC’s FARMroots program saw this opportunity and worked with New York farmers to learn how to profitably diversify their offerings and increase their revenues.

“GrowNYC, the organization that manages the city’s Greenmarkets as well as a small wholesale market, and its technical assistance program FARMroots is uniquely positioned to work with buyers and farmers to help identify key growth opportunities. In 2017 year, they received a $124,000 grant to help Greenmarket farmers diversify into profitable wholesale enterprises. "Our experience shows us that profitable farmers utilize diversified marketing channels. A mixture of direct to consumer and wholesale channels minimizes risk, provides consistent sales, and increases brand penetration” says Christopher Wayne, FARMroots Director. The first step was to understand the market demand and specific needs of the buyers. FARMroots staff interviewed 34 farmer-focused buyers. Regional distributors, fast casual restaurant chains, grocery stores and institutions with local food procurement programs, and value-added food businesses provided specific information about what they needed in a business relationship. Types of production, operational requirements, and marketing preferences were all queried. Face-to-face interviews, often held in the buyer’s place of work, encouraged candid discussions about the opportunities and challenges of sourcing from local farmers. Through this work they evaluated the

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“I don’t grow in big quantities now because I have always been worried about leaving product in the field. But with these new wholesale channels I can plant much more and not be scared of leaving it in the field. With the prices they are paying me it covers the cost of work. These prices work for me. This is an enormous difference compared to the past.”

Claudio Gonzalez, Gonzalez Farms
(Translated from Spanish).
NYFVI Projects:
Building Routes to Market and Improving Marketing Practices

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 increasing 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.

Projects Completed 11/1/2018-10/31/2019
Promoting Direct Local Seafood Marketing on Long Island through Community Supported Fishery (CSF) Programs
CCE Suffolk County, $64,977

Active Projects
Scaling Up: Developing New and Additional Wholesale Enterprises with Greenmarket Farmers

The work also clearly highlighted what was needed beyond the delicious products. Three C’s for success emerged: Capacity, Consistency and Communication were the most emphasized attributes during wholesale buyer interviews. A farmer needs to determine whether they possess the skill sets required to sell in the wholesale marketplace and if the demands are in line with their values.

In addition to alignment with buyer’s needs, the team ensured that the math worked for the growers. Crop costing tools for pork, vegetables, cheese and high tunnels were developed. These tools allowed participating farmers to fully understand and evaluate which, if any, of the wholesale opportunities were a good financial fit for their business.

17 farmers participated in an educational program that walked them through these tools and helped them conduct a feasibility analysis and assess their readiness for wholesale markets.

Once the farms that were ready for wholesale were identified, Wayne’s team introduced them to potential buyers and helped them take a look at the complicated and costly logistics of selling and delivery in New York City. These efforts made sure that farmers were focused on creating business relationships that they could reliably service.

Fruit Mash-Up. Driven by the interest in purchasing local fruit, a networking and Q&A session was held in NYC. It connected value-added wholesale buyers to NY State farms. The hour-long panel discussion addressed the challenges for both growers and buyers in sourcing from small to mid-scale farms. Results captured two months after the event reported 5 farmers sold over 2700 pounds of fruit to 10 different value-added buyers. In an evaluation survey, farmers noted that they were very likely to continue to grow those wholesale relationships, and buyers stated that they were very likely to expand their sourcing to include local farm products as a result of the event.

The bottom line. Diversification can be a good business strategy in agriculture. It can increase revenue and protect a farm from market conditions. But if you’re a small scale farmer, identifying the right opportunity can be challenging. In just two years, this work by FARMroots increased the revenue among 12 small scale farmers by more than $100,000. The best part? With the knowledge the farmers gained about how to profitably meet the needs of wholesale buyers, the revenue increases should be able to grow every year.

“The crop-costing tool developed Grow NYC/FARMroots has been a game changer for my business. I use it on an ongoing basis to understand my costs. It influences how I source my inputs and manage my labor. It has also been incredibly useful as a business planning tool I use it to predict future costs and infrastructure needs that will be necessary for my farm’s growth.”

Lee Hennessy
Moxie Ridge Farm

Photo by Julie Goldstone
Kevin Ganoe, Regional Crop Specialist and David Balbian, Area Dairy Management Specialist with Cornell Cooperative Extension set some pretty big goals in their 2015 proposal. They said that by working with 22 dairy farms to benchmark the economics of their farm’s feed costs and net milk income per cow, they could help 75% of the farms improve their net milk income minus total feed costs by 30 cents per cow per day.

NYFVI’s board and dairy review panel had seen the power of benchmarks and discussion groups and were eager to see that approach used to help farms with feed management. They saw the work as a way to bring together Ganoe’s expertise in growing quality forage, with Balbian’s passion about the link between nutrition and economic milk production.

With funding secure, the project leaders quickly completed the recruitment process and established three discussion groups based on geography. Each participating farm shared farm specific data that was aggregated for comparison. This analysis helped them evaluate if their feeding program was generating the milk income needed to be profitable.

Project leaders met individually with each farm to gather the data, then met in groups to discuss the overall bench-
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 deliver an impact in less than two years.

NYCAMH, Bassett Research Institute $ 96,930

Onboarding Dairy Farm Employees: Safe, Productive, and Engaged From Day One!
Cornell Cooperative Extension, Cornell University $124,945

“I like this project because it helps farmers really focus not just on feed costs, but on their milk components. It allows them to see that what they spend on feed can more then come back to them”

David Balbian
CCE Area Dairy Management Specialist

marks. All data was anonymized. One-on-one meetings were also held with individual producers about their specific numbers. Throughout the project benchmarks were compiled six times.

Four of the participating farms were grazing dairies and they received support specific to their needs.

One farmer that participated in the discussion groups is Mike Cantwell from Richfield Springs. He’s a fifth generation dairy farmer with a 200 cow dairy. At the 2019 NYFVI annual meeting he shared how comparing his results to the group helped him see that his butterfat percentage was lower than other participating farms. This prompted a change in the farm’s nutritionist and a significant increase in his numbers. The result was an increase in their milk price of about $2 per hundredweight.

Across the discussion groups other farms had similar experiences with an average net improvement of 65 cents in net milk income minus total feed costs per cow. For every 100 milking cows that comes out to $23,725 a year!

In 2017 Ganoe continued work with many of the farmers to conduct corn silage digestibility forage testing as part of the NYFVI Topic Specific Team Program.

Also as part of the TST program, Balbian is working with Madison County farmers to develop precision feeding benchmarks.

Pictured on the left: Project leader David Balbian at Woodlawn Dairy with Tim & Mike Cantwell and the farm’s nutritionist Kienan Gridley.
Bird Damage in Crops: It’s More Than a Nuisance

There’s almost nothing that will get farmers talking more than a discussion of tricks to get birds out of their fields. The economic damage can be significant and the old fashioned scarecrow doesn’t really work. Fortunately, there is a hopper seed treatment that can help NY farmers take back control of their fields.

Rows, ravens, black birds, starlings, grackles, Canada geese and wild turkeys have long been a problem for some corn growers in New York. The birds arrive as the corn is planted and many linger until the field is stripped bare. While loss varies field by field, some estimates are as high as 15% an acre.

At Farm Viability’s annual meeting in November, grower Douglas Purinton with Elm Tree Farm in Norway New York reported losing 24 newly-planted acres in two days. Over the years he explored many tactics, including planting the seed deeper, but in wet years the seed would rot before it could emerge. Guns and other noisemakers, aluminum pans, and hanging dead crows were all proven to be ineffective. He even confessed to resorting to a delayed planting schedule, hoping the birds would dine on neighboring fields and depart. Instead they saw his fields as dessert.

That’s why when he was asked to participate in an on-farm research trial evaluating a bird deterrent, his response was an emphatic “yes!”

The research found that there was a statistically significant difference in plant populations in plots using treated seed, even in fields that typically experienced high levels of bird damage. Although the plots with treated seed had more plants, it is interesting to note that they did not produce higher yields.

Growers believed that the birds felt the effect of the product and abandoned the fields—both the treated and untreated plots—much earlier than they would have done previously. They reported that the fields included in the trials had “higher yields than they ever have.” In fact, many of the farms participating in the research hoped to begin using the treated seed after the first year.

More than 750 growers and agricultural industry professionals have been reached through the outreach efforts of the team. Additionally, a peer-reviewed research paper was published by Paul Curtis and the research team in the journal Crop Protection.
USDA Specialty Crop Block Grant Program: Putting NYFVI’s Farmer Review Process to Work.

In 2019, the New York State Department of Agriculture and Markets continued to administer the USDA Specialty Crop Block Grant Program in partnership with NYFVI. The Farm Viability review panels scored and evaluated 21 proposals, seven were selected for funding.

**2019 Awards**

Improving Winter High Tunnel Soil Nitrogen Management  
Cornell University $86,551

Harvest timing and storage conditions for the New York apples varieties, SnapDragon and RubyFrost to ensure maximum fruit quality  
Cornell University $54,047

qRT-PCR for Rapid Detection and Differentiation of Colletotrichum Fungi Causing Fruit Bitter Rot on New York Apple Farms and Storages  
Cornell University $99,999

High-quality NY-adapted tomato hybrids combining enhanced Early Blight resistance & other fungal resistances to reduce disease impact & fungicide use  
Cornell University $99,989

Developing Microbial Seed Treatments for NY Sod Growers for Environmentally Safe Pest Management and to Enhance the Value of Sod for NY School Grounds  
Cornell University $95,912

Protecting Onions in New York with Entomopathogenic Nematodes  
Cornell University $98,671

Mitigate Honeycrisp BP by understanding early Ca distributions and rootstock-conferred resistance using novel non-destructive and high-throughput approaches.  
Cornell University $98,204

“These projects will improve disease-resistance and nutrient management for our specialty crops and advance on-farm food safety practices, helping our growers to better compete in the marketplace. We thank our partners at New York Farm Viability Institute for supporting projects that directly benefit our producers and support New York agriculture.”

Commissioner Richard Ball  
New York State Department of Agriculture and Markets
USDA Specialty Crop Block Grant Projects

Projects Completed in 2019
Expanding Market Opportunities for New York Growers Through On-farm Evaluation and Development of New Kale Hybrids
Cornell University, $99,801
Improved Management of Strepheylium Leaf Blight of Onion in New York
Cornell University, $99,962
Improving Profitability of Garlic Production through Understanding and Management of Fusarium Diseases
Cornell University, $75,841
Increasing Production and Profitability of Log-Grown Shiitake Mushrooms in New York
Cornell University, $77,939

Active Projects
Moisture content of cut fir Christmas trees at point of sale
Christmas Tree Farmers Association of NY, $98,429
Breeding Tomatoes with Enhanced Early Blight Resistance in Combination with Late Blight and Septoria Leaf Spot Resistances and Acceptable Fruit Type
Cornell University, $99,902
Novel Seed Treatments for Early Season Disease Control and Increased Profitability of the Table Beet Industry in New York
Cornell University, $99,834
Enhancing Vine Health with Soil Microbial Stimulators in Vineyards
Cornell University, $88,479
Quantifying Survival Rate of Erwinia amylovora in Cankers and Its Impact on Fire Blight Outbreaks and Management
Cornell University, $99,887
Sustainable and Safe Methods to Address Biological Threats to the Rapidly Growing NY Hops Industry
Cornell University, $97,903
Strengthening diagnostics for oak wilt, Ceratocystis fagacearum, through implementing new technologies, improving techniques and increasing outreach education
Cornell University, $98,988
Enhancing the Sustainability of Foliar Disease Control by Decision Support Systems for the New York Table Beet Industry
Cornell University, $99,551
Improving the Durability of Disease Management of Onion in New York Through Monitoring of Fungicide Resistance
Cornell University, $97,567
Pathogenicity of New York State Fire Blight Bacterial Strains and Development of a Cultivar Set and Cider Apple Varieties for Fire Blight Resistance Breeding
Cornell University, $82,059
Refining Reduced Tillage Systems for Vine Crops and Sweet Corn on Muck Soils
Cornell University, $68,491
Management of Wireworms in Organic and Conventional Production Systems
Cornell University, $83,613
Diversifying New York's marine aquaculture industry: Integrating sugar kelp into oyster farms
Research Foundation of SUNY, $99,928
Harvest and storage of New York's SnapDragon® and RubyFrost®: Getting it right
Cornell University, $68,598