2024 ANNUAL REPORT



ADAPTING TO A CHANGING ENVIRONMENT

Real-World Research • Field-Tested Results Ag-Based Economic Sustainability • Natural Resources Conservation Extreme Weather Resiliency • Cooler Climate Crops Development Robust Maple Industry • Young Farmer Opportunities www.nnyagdev.org

> NNYADP established and funded by the New York State Legislature to grow NY's farms and foods economy. Funding administrated by NYS Department of Agriculture & Markets.

> > November 2024

Working Together for New York Agriculture

New York State Legislature Agriculture Committees

New York State Assembly Ag Committee 2024 • Chair: Donna A. Lupardo

"The Northern New York Agricultural Development Program is widely recognized as a leader in the development of New York's agricultural industry, producing quality research with statewide and national significance. Northern New York is critical to our state's thriving food economy." — NYS Assemblywoman Donna A. Lupardo, Assembly Agriculture Committee Chair

 Members: Didi Barrett • Ken Blankenbush** • Marianne Buttenschon • Catalina Cruz • Brian Cunningham Michael J. Fitzpatrick • Christopher S. Friend • Aileen M. Gunther • Stephen Hawley Billy Jones*/** • Anna R. Kelles • John Lemondes • Brian D. Miller • Steven Raga • Linda B. Rosenthal
 Angelo Santabarbara • Amanda Septimo • Al Stirpe • Chris Tague • Jaime R. Williams • Carrie Woerner • Stefani Zinerman

*Special thanks to Assemblyman Billy Jones for advocating for NNYADP funding.

New York State Senate Ag Committee 2024 • Chair: Michelle Hinchey

Members: George M. Borrello • Pamela Helming • John W. Mannion • Rachel May Jessica Ramos • Kevin Thomas • Mark Walcyzk** • Lea Webb

**Northern NY Legislators above and William A. Barclay, Scott Gray, Joseph A. Griffo, Matthew Simpson, Daniel G. Stec

Northern New York Agricultural Development Program

Co-Chairs: Joseph Giroux, Plattsburgh, 518-563-7523 Jon Greenwood, Canton, 315-386-3231 Jon Rulfs, Plattsburgh/Peru, 518-572-1960, 518-643-7958 https://www.nnyagdev.org



Clinton County: Sam Dyer, Plattsburgh • Tom Everett, Peru • Willie Giroux, Chazy • Joy Herfurth, Ellenburg Center • Tony LaPierre, Chazy • Al & Cindy Mulbury, Peru • Tom Remillard, Peru • Dan Tetreault, Champlain • Shannon Wilkins, Peru

Essex County: Ian Ater, Keeseville • Lucas Christenson, Keeseville • Tony Corwin, Lake Placid • Henry Drinkwine, Ticonderoga

• Craig DuMond, Ray Brook • Lee Garvey, Willsboro • Pierre-Luc Gelineau, Willsboro • Shaun & Linda Gillilland, Willsboro

• Adam Hainer, Wadhams • Rob Hastings, Keene Valley • Kristen & Mark Kimball, Essex • Bernard Leerkes, Ticonderoga

• Bob Perry, Essex • George Sayward, Essex • Lucas Strong, Willsboro • Clayton Wrisley, Essex • Mark Wrisley, Essex

Franklin County: Bruce Bonesteel, North Bangor • April Gokey, Malone • Steve Gokey, Malone • Doug Malette, Chateaugay

• Mike Murphy, Malone • Randy Ooms, Constable • Jo Ellen Saumier & Kirby Selkirk, Chateaugay • Norm Shipman, Burke

David Stauffer, Brushton • Peter Zelinski, Moriah/Keene

Jefferson County: Dani Baker, Wellesley Island • David Belding, Wellesley Island • Jay Canzonier, Belleville • Dennis Forrester, Henderson

• Bruce Gibson, Mannsville • Delta Keeney, Watertown • Mike Kiechle, Philadelphia • Patsy Makuch, Carthage • Greg Mason, Cape Vincent

• Gail Millard, Watertown • Lynn Murray, Copenhagen • Doug Shelmidine, Belleville • Nathan Smith, Evans Mills • Bill Stine, Redwood

• Ed Walldroff, LaFargeville • Steve Winkler, Rodman

Lewis County: Emily Beller, Carthage • Violet Colwell, Glenfield • Larry Herr, Lowville • Michael Lisk, Glenfield • Nadeen Lyndaker, Croghan • Jake Moser, Croghan • Gary Rosiczkowski, Turin • Sharon Stewart, Turin • Dean Yancey, Lowville • Haskell Yancey, Belfort • Timothy Yancey, Belfort

St. Lawrence County: Kevin Acres, Madrid • Bob Andrews, Gouverneur • Dan Chambers, Heuvelton • David Fisher, Madrid • Rich Hamilton, Hermon • Andy Hurlbut, Canton • Brian Knight, Lisbon • Kenneth Tupper, Canton • Bob Zufall, Lisbon

Adjunct: Oswego County: Mark Savage, Boonville • Oswego County: Bruce Gibson, Lacona, (sister farm in Jefferson County)

"We thank the New York State Legislature, particularly the Assembly Agriculture Committee, for recognizing the value of the NNYADP's prioritized research to our farms and the financial sustainability of our communities." – NNYADP Co-Chair Joe Giroux



The New York State Legislature, seeing NNY's potential to be a farm-based economic powerhouse, established the Northern New York Agricultural Development Program (NNYADP). With State funding, the NNYADP continues to fulfill that mission, helping farms adapt to challenges that include changing climate, swiftly advancing technology, and market fluctuations, all while encouraging new growth, young farmers, entrepreneurism, and natural resource conservation. NNYADP research is prioritized by an 80-plus volunteer member Farmer Committee; 98.5% of funding goes directly to research and results delivery.

Wiven Research • Real-World Re

The return on investment in NNYADP research is seen in this report in:

- Continuing growth of the NNY maple industry: now 36% of NY state's maple production and still growing (p. 11)
- Local foods' production extension: winter greens (p. 8), miniature melons (p. 9), superfruits and nuts production (p. 9)
- Whole farm sustainability: NNY farms are increasing N, P & K efficiency (p. 7)
- Natural resource stewardship: water quality (p. 4), greenhouse gas emissions reduction (p. 7), focus group-guided cover crops evaluation (p. 6), filling soil health knowledge gaps (p. 6)
- climate resiliency: dairy cow comfort heat stress relief (p. 5), crops (p. 6) apples (p. 8).

Northern NY Agricultural Economic Growth Indicators (p. 11) include a \$45 million dollar investment in NNY's dairy future, a solar grazing service, diversified young farmers, flower businesses blooming, and a new maple sugarhouse with a 21,000-gallon sap silo. A fruit grower has renovated a 1926 tavern into an artisanal fruit winery. A woman-owned/veteran-owned hydroponic enterprise distributes product to the NNY, central/eastern NY, Finger Lakes, and Saratoga regions and has repurposed a 19th-century railroad depot as a NNY regional foods market.

NNYADP research helps grow NY's farms and foods economy with results that include enterprise budgets, production & conservation best practices, climate adaptability for dairy animals & crops, resilient variety trials, year'round high tunnel trials, and new technology testing. NNYADP projects show the steady, purposeful, year-to-year advance of real-world research that provides farmers with field-tested data they can use to make the best decisions for their farms, families and communities.

New results coming in early 2025! www.nnyagdev.org

NNYADP Hallmarks

- Fiscal Efficiency: 98.5% of NNYADP funding goes directly to research and results delivery
- Priority research selected by 80-plus volunteer member NNYADP Farmer Committee
- Addresses NNY unique challenges and opportunities: northern climate/weather extremes, diverse soils, markets in NNY and beyond

98.5%

- NNYADP project results sought after in NY and adaptable for other areas, e.g., tile drainage, dairy animal comfort, persistent biocontrol nematodes (PBN) ... recent PBN presentations made in Cayuga, Franklin, Lewis, Oneida & St. Lawrence counties, NY; PBN now applied to ~100,000 acres in 13 states & 2 Canadian provinces
- Fosters local food security
- Unprecedented regional maple industry growth with continuing potential
- NNYADP serves diverse agricultural sectors individually and with whole-farm approach
- NNYADP funding by NYS Legislature recognized in NNYADP public/media outreach
- Publicly-accessible NNYADP project results: www.nnyagdev.org

Congratulations! Ben Wever Farm Family

Recognized as a NY Agricultural Environmental Management-Leopold Award finalist for soil health, water quality & conservation practices on their 495 acres in the Reber Valley. Farm established in 1829. Nominated by Essex County Soil & Water Conservation District.

Photo Credits: Cover: Bilow Dairy; p4,5: Miner Institute; p6: Lynda Richardson/NRCS, Clinton County Soil & Water Conservation District; p7: Michele Ledoux; p8: Elisabeth Hodgdon, Michael Basedow; p9: Elisabeth Hodgdon, Kara Lynn Dunn, Michael Davis; p10: NYS Maple Producers Association, Michele Ledoux, Adam Wild; p11, clockwise from top: Bilow Dairy (2), Connie Mandeville, Brian P. Whattam, HumbleBee Farms, Brian P. Whattam, North Country Creamery, Gokey's Gardens, Bregg's Winery, J&R Pierce Family Farm, Dani's Daffodils, Katie Kearney; back cover: clockwise from top: CCE Lewis County Farm to School Program/Farm and Market Discovery Zone, Scott Bauer/USDA, Brian P. Whattam, Doug Wilson/USDA, Michele Ledoux. Special thanks: Bill Woodruff.

Farm-Based Natural Resource Conservation New Study Begins Assessing Impact of Combined Cropland Management Practices

How do specific cropland management practices impact water quality stewardship on tile-drained farmland? That is a question that newly focused research by the farmer-driven Northern New York Agricultural Development Program (NNYADP) has begun evaluating. Miner Institute Nutrient Management Researcher Laura Klaiber is conducting trials to characterize the combined effect of three different cropping practices on water quality. Field trials are underway on tile-drained land under no-till corn production with a over-wintering cover crop.

- **Tile drainage** helps support corn production on poorly draining soils.
- **No-till** practices over time help improve the soil structure in previously heavily tilled fields.
- **Cover crops** filter surface & ground water, add organic matter to soil, reduce weeds, and sequester carbon in the soil.
- **Fall-planted cover crops** provide a winter covering and can hold nutrients during spring snow melt.

"This first phase of the new research in northern New York is looking at whether specific farming practices are achieving the intended environmental quality benefits," Klaiber says. "Our field trials provide the opportunity to compare data sets on nutrient retention and egress from untiled land, previously-tiled land, and, now, from previously-untiled land with newly-installed tile."

The desired benefits include reducing the loss of nutrients such as phosphorus and nitrogen from fields into nearby waters.

Working Dairy Farm Hosts Side-by-Side Trials

A working dairy farm in Peru, New York, has hosted tile-drainage research trials since 2016. The side-by-side trials utilize two fields of the same soil type, specifically poorly draining silt loam. Until 2023, one field was tiled, one untiled. Data generated from the field tiled in 2023 will be compared to its own untiled dataset and to the data from its sister field that was first tiled in 2016. The farmer is applying the same cropping practices to both fields going forward.

The data sets include measures of nitrogen and phosphorus, total surface and subsurface runoff, and total suspended solids as an indication of soil erosion. The data are also correlated with local storm events. **NNYADP Research Update to Be Presented Nationally** Klaiber presented an update on this research at the November 2024 meeting of the American Society of Agronomy.

"A broad range of audiences, including agricultural producers, water resource managers, and the public, is interested in learning about how the ways we manage our land influence how nutrients and sediment move through soil, surface water, and ground water. This NNYADP research begins to fill a gap in knowledge about whether our practices are achieving the environmental quality benefits we all seek." — Laura Klaiber

The next NNYADP report on this on-farm environmental stewardship research will post in the spring 2025 at nnyagdev.org.



Newly-tiled field that will drain excess water into NNYADP water quality monitoring equipment.

"This research is essential for showing how we can adopt better farming practices while minimizing nutrient loss and improving water management. By closely monitoring how tile drainage, no-till systems, and cover crops work together, we can create more resilient, environmentally-friendly farming systems that benefit both producers and the environment."

— Mike Contessa, Champlain Valley Agronomics, Peru, NY

Cow Comfort: Heat Stress Relief Research Presented at American Dairy Science Research Conference

In 2024, NNYADP funding of dairy animal climate adaptability research drew the attention of the American Dairy Science Association (ADSA). An evaluation of cows' well-being and performance before and after cooling fans were installed at the same farm was presented at the ADSA Annual Meeting in Florida by project leader Katie Ballard, Miner Institute's Director of Research. The research was keyed to the short periods of heat stress that are common in northern NY and do not allow sufficient time for the cows to acclimate. Earlier NNYADP research showed that higher-producing cows were particularly negatively impacted by NNY's episodic high heat periods. The data showed decreased milk production, changes in milk composition, decreased reproductive performance, and increased rates of lameness during the episodic heat events when the cows were not sufficiently cooled.

A farm that had previously helped establish no-fans-in-use baseline data had 51-inch, variable-speed, auto-control fan installed in 2023. The research team collected data on environmental temperature and relative humidity, the reticular temperature of the cows in the study, lying and standing time, lameness, bulk tank yield and milk composition, and reproduction rates.

	COOL	нот	SE	P-value
THI	< 65	≥72		
Reticular Body Temperature (°I	F)			
No Fans (2019)	101.7	103.3	0.15	<0.01
With Fans (2023)	102.4	103,5	0.07	<0.01
Lying Time (Hours/day)				
No Fans (2019)	11.2	8.9	0.33	<0.01
With Fans (2023)	12.2	10.4	0.28	<0.01
Lying Bouts (#/day)				
No Fans (2019)	8.7	9.3	0.64	0.02
With Fans (2023)	9.1	10.7	0.35	<0.01
Lying Bout Duration (min/day)				
No Fans (2019)	86.4	65.5	4.8	<0.01
With Fans (2023)	81.3	63.3	4.2	<0.01

2023 NNYADP-Miner Institute dairy heat stress abatement project data.



to which lying time was impacted appeared to be mitigated by the installation of fans. Lying time decreased by over 2¹/₄ hours when there were no fans and a little over 1 hour after fan installation. This one hour improvement of lying time has been equated to the opportunity to gain 2 to 3.5 pounds more milk per cow per day," Ballard notes.

The installation of the fans also reduced incidence of lameness and improved conception rates, milk production, and milk components during the summer months. Air velocities over the cows were improved by the installation of fans (<1 mph vs. 3 mph, over resting cows).

The dairy farm participating in this NNYADP study is planning to increase the angle of the fans to generate even more air flow (>6 mph).

The economic impact of heat stress along on the U.S. dairy industry was estimated at \$900 million in annual losses in 2006 (R.J. Collier et al., ADSA Journal of Dairy Science). That number is likely higher today with the increasing temperatures recorded in NNY in recent years.

Updating, Adapting to Meet Needs

Data from Northern New York farms support a statewide effort to update New York's 30-year-old manure value crediting protocol in light of how advances in dairy and livestock nutrition, new manure treatment systems, and farm efficiencies have impacted manure composition and nutrient availability for crops. This research is evaluating the nutrient value of different types of manure sources beyond those common at the time the original manure crediting system was developed. This NNYADP project also considers the variability of manure nutrient composition between farms, on-farm storage systems, and days within a spreading interval. Results from 16 different sources on five regional farms showed that farm-specific manure management greatly impacts nutrient composition. Replicated field trials where the nitrogen benefits of manure were tested show that corn silage yield and quality benefited from manure application with varying results for Farm A: dairy liquid manure injected and Farm B: solid dairy manure broadcasted.



Crope

Filling a Soil Health Knowledge Gap

NYADP field trials into how soil compaction (density) impacts crop yield are providing baseline data for developing methods to both "repair" damaged soil and protect healthy soils. Work begun in 2019 identified consistent and highly variable soil compaction from surface to 18 inches of depth on participating farms. In 2021, a significant relationship between soil compaction and corn yield variation across conventionally tilled fields was documented. Most recently, 2023 field data correlated yield stability zone type with maximum recorded soil resistance.

Interseeding Research Impacted by Atypical Weather

Trials of alternative forages to improve the economics of interseeding by adding yield or quality to silage corn crops were impacted by atypical weather in Northern New York in 2023. Forage sorghum and forage kale were interseeded with a dwarf variety of corn at Chazy and a conventional corn at Mooers. Results from this first-year trial, posted at www.nnyagdev.org,

2023 Weather Conditions in NNY

- Abnormally dry & warmer spring
- Notable cold spells in May
- Anomalously wet summer
- Warmer-than-typical fall with extremely rapid dry-down
- Total yearly precipitation 142.7% of normal as measured at Chazy

should be cautiously considered regarding when, in terms of both date and crop growth, to interseed for best results, as well as choice of other potential alternative forages in terms of how they establish

and how they impact main crop establishment and compete for nutrients. Two points of note: harvesting the sorghum tops captured additional lipids in the forage; kale caused forage samples to be slightly drier than that of the interseeded sorghumcorn and corn-only samples.

NNY-Specific Needs Guide Cover Crops Research

F all-planted cover crops help reduce soil erosion and nutrient runoff, filter surface and ground water, add organic matter, reduce weeds and pests, and sequester carbon in soil. A focus group of NNY farmers and agribusinesses expressed a need to identify cover crop

varieties that will establish well specifically in Northern New York's short growing season, colder soil, and at times wet soil conditions, and have winter hardiness after a late fall planting. Since 2022, Cornell researchers; dairy and vegetable farms in Croghan, Mooers, and Plattsburgh; and Clinton and Lewis County Soil & Water Conservation Districts are evaluating cover crop varieties for seedling emergence



after various planting dates from September into November, growth, vigor, winter survival, biomass and weed resistance. Additionally, selective breeding trials to improve cereal rye's northern climateutility are underway at the Willsboro Research Farm. Farmer feedback will be collected in 2025. The NNY data is provided to the national Cover Crop Breeding Network.



Suite of Research Supports Whole Farm Sustainability

Greenhouse gas (GHG) emission reduction is now part of NNYADP-prioritized whole farm research that is helping farms more efficiently apply resources for crop

production and science-based natural resources conservation. New work is assessing whole farm GHG emissions in relation to whole farm nutrient mass balances (NMB). This project aims to identify key performance indicators (KPIs) that can be used to identify drivers for whole farm nitrogen and phosphorus balances and nitrous oxide (N2O) emissions.

Seventeen indicators have been identified for predicting when farms are at high risk of exceeding feasible whole-farm balances. Four years of data from 10 NNY farms provide a basis to begin drawing a relationship between annual whole-farm N balances and N2O emissions. Work continues with special attention to six areas identified as key drivers of both NMB and N2O emissions on NNY farms: animal density; N, P (phosphorus), and K (potassium) in purchased feed; N fertilizer imports; and crude protein in homegrown feed.

Analysis of data from 33 farms statewide identified enteric fermentation and the associated methane as the major sources of GHG emissions, with important contributions by feed production and manure management contributing to both N2O and methane production. Scenario analysis of practices in use on farms in the study suggests progress can be, and is, being made to reduce GHG emission intensity through the

Data from 10 NNY dairies applying NMB lessons learned through participating with NNYADP-funded research successfully met optimal balances/acre limits for N: 50%, P: 70%, and K: 80%. use of reduced tillage, cover crops, liquid manure storage covers, and anaerobic manure digesters. Cornell University Nutrient Management Spear Program (NMSP) Director Quirine M. Ketterings, Ph.D. leads a suite of NNYADP whole farm NMB research.

Yield Zone Mapping Supports NNY Environmental Stewardship

NYADP research is analyzing the use of satellite technology as a less costly, less time-consuming, and potentially more accurate way of mapping variable crop yield within fields. This mapping helps farmers more precisely target resources to achieve higher crop yield & quality and advance on-farm environmental stewardship. Four regional dairy farms, Champlain Valley Agronomics, the Cornell School of Integrated Plant Science and the

Carlson Center for Imaging Science at the Rochester Institute of Technology have collaborated on this project led by Quirine M. Ketterings, Ph.D., Director, Cornell Nutrient Management Spear Program.

Satellite images of fields were captured for a 1-2 day pre-planting window and canopy images collected about weekly until harvest. The images were used to identify six groups of key predicting features for analysis: raw satellite bands (4), vegetation indices (7), soil indices (5), climate variables (14), elevation, and landform class (6). Additionally, ~32 features were identified for developing, calibrating, and validating the "machinery" involved with assessing the many satellite data features.

Results: Satellite image collection between R2 and R4 crop growth stages resulted in best yield class estimations. • Elevation and landform

were the most significant predictors of yield classes. • Nearly all the soil indices considered were important in predicating yield zones. • Vegetation indices (green and near infrared bands) were influential. • Interestingly, none of the climate variables emerged as top relevant features, likely due to insufficient spatial variability. • Work is now underway to determine the number of fields required for building a reliable prediction model with three classification models under consideration for comparison across a number of farms.

> At right: 18 of the more than 60 satellite image features identified in the NNYADP field mapping project.





Fall & Winter Greens *High Tunnel Trials Produce A Mixed Salad of Results*

N orthern New York growers have added high tunnels for early, late, and year'round production and sales opportunities. With NNYADP grant funding, Cornell Cooperative Extension vegetable and ag business development & marketing specialists, Elisabeth Hodgdon, Ph.D. and Lindsey Pashow respectively, conducted trials of 20 varieties of salad greens in an unheated tunnel.

Trials of direct-seeded arugula, kale, Asian mustards, fall lettuce, and spinach from mid-September to early March produced data on which varieties had the best chance for high yield and high quality.

Crop yields across the trials in 2022 and 2023 were higher in fall than in winter. The all-varieties fall harvest yield total in 2022 was 109 pounds, 11 for the winter. The fall harvest total yield in 2023 under cooler, cloudier conditions was 49 pounds; 14 for the winter.

"Our data suggest that the greens we trialed may be most worthwhile as a late fall crop to extend the season into November and December for the holiday markets, late-season community supported agriculture shares, or wholesale markets. The greens could be terminated in December rather than keeping the crop overwinter for regrowth in February-March." — Dr. Elisabeth Hodgdon

The enterprise budget calculated for the trial in 2023 used an average yield of 0.17 pounds per square foot of tunnel space at \$10 per pound grown in a 20-foot by 48-foot tunnel. Price per pound was based on grower interviews. Cost calculations showed the most expensive inputs as compost, seed, and harvest labor. The net result was a loss of \$1,424.91, however, participating growers suggested considerations that may offset the risk of loss with these winter-grown crops.

"While the winter season data suggest these greens may not be profitable for overwintering production, some growers noted that extended-season greens can serve as a 'loss leader' that adds value to winter CSA shares, allow farms to retain their labor force, and maintain their wholesale markets year'round."" — Lindsey Pashow

Trials Test New Orchard Thinner for NNY Temperatures

NY's cool spring temperatures have apple growers in search of alternative orchard thinning materials, particularly after poor results with some traditional thinners in 2018, 2019, 2020, and 2022: leading to small fruit in some varieties and poor return bloom in 2019 and 2021 of Honeycrisp, an economically valuable variety.



Tree Fruit Specialist Michael Basedow, with Cornell Cooperative Extension, is testing a new product that may help regional apple growers in Northern New York achieve optimal crop load levels, the single most important driver of orchard income.

^{cc}Thinning at traditional timings is particularly challenging in Northern New York as thinning treatments are heavily driven by temperature, and temperatures are often too cool for good thinning efficacy. ²⁹— Michael Basedow

When a new thinning product was announced with the potential to work under Northern New York's often cooler temperatures, Basedow conducted trials at orchards in Chazy and Peru, NY. Four different treatments were applied to three varieties. The question: could it be a more reliable material for growers to use during the late window of time before fruit becomes unresponsive to thinning, and how much efficacy could we expect compared to thinning with traditional materials at bloom, petal fall, and fruit set?

In some cases, there was no difference in the number of Gala or Honeycrisp fruit per tree or yield, suggesting this product could potentially be used in place of some others if the weather is not cooperative at the earlier timings. A significant increase in Gala fruit size was measured when the trees were thinned at petal fall, 12 mm, and with the product under evaluation



at 20 mm. At another site, there were significant differences in Macoun fruit number/tree and yield with the new product, but no significant gain in fruit size or color, while the product improved Honeycrisp color in one treatment. A mid-May freeze that lasted 4 hours impacted results at one orchard.

As a first-year evaluation, mixed results are often the case and backstop the need for trials in multiple years under varying conditions. More data will be added before any conclusions can be made.

Jocal Miniature Melons: Profitable For NNY High Tunnel Growers?

Production data and enterprise budgets from NNYADP-funded trials of two varieties of miniature muskmelons grown in an unheated high tunnel under three growing systems provide growers with "food"



for thought. "Sugar Cube" and "Tasty Bites" mini muskmelons were grown untrellised (left), on a mesh netting trellis (right), and by double leader vertical trellis (below) in a 30x96-foot high tunnel.

Organic production methods included the use of pest exclusive netting and beneficial insects (bumblebees, lady-beetles, and parasitoid wasps).



After a May 18th spring frost stunted the first planting, reseeded transplants were moved to the tunnel on July 6th. The trellising systems were pruned and clipped for 6 weeks until they

reached the rafters in late August. Melons were harvested 2-3 times/ week beginning in early September and until first fall frost October 30th. Marketable yield from the three production systems ranged 4-6 marketable fruit with weights of 7.28-9.51 pounds per plant.

**The plants in the untrellised system were harvested slightly earlier which can be beneficial to farms interested in being the first to market with a particular crop. ** — Lindsey Pashow, project co-leader and Cornell Agricultural Business & Marketing Specialist

Enterprise Budget Data: Net Income NNYADP Trial Melons: \$1,184.43 to \$2,835.66 High Tunnel Tomatoes: \$1,374 (Penn State estimate) High Tunnel Cucumbers: \$2,550 (Iowa State estimate)

"While our data suggests that melons likely will not replace tomatoes and cucumbers in a high tunnel system, they may be a valuable addition to a farm's high tunnel cropping plan. Growers must compare the various aspects of the data from this trial and decide whether the addition of melon production is a good fit for their farm." -Dr. Elisabeth Hodgdon, project co-leader and Cornell Regional Vegetable Specialist

The NNYADP "Superfruits" research trials now include

- 25 varieties of juneberry
- 16 honeyberry varieties,
- 6 aronia varieties, and
- 7 varieties of elderberry

all high-antioxidant, highphytonutrient, and freshpick, u-pick, value-added opportunity crops.



NNYADP Adds Hazelnut & Chestnut Trials

"The hazelnut and chestnut research added to the NNYADP-funded novel crops spectrum is evaluating the opportunity to add nut-producing perennial crops onto northern New York's farms to diversify their income opportunities and biodiversity. "
— Michael H. Davis, Ph.D., Willsboro Research Farm

Hazelnuts are high in protein and oil content with 81% as monounsaturated oleic acid. Hybrid hazelnuts can be integrated into different cropping systems, including orchard-style, agroforestry alley cropping, and silvopasture. In April-May 2023, 116 seedlings representing eight varieties of American hazelnut were planted at the Willsboro Research Farm. Eight additional varieties of hybrid hazelnut, protective deer fencing, and an oat-pea fall cover crop along one row of the trial were added in 2024.

"As an agronomist and a conservationist, I am interested to begin seeing the trial data regarding expected positive environmental benefits from the hybrid hazelnut's impact on soil health, biodiversity, and water quality."
 — Agronomist Myra Lawyer, New England Interstate Water Pollution Control Commission, working with Lake Champlain Basin Program, assisted bazelnut trial planting

The NNYADP has just begun a small trial of chestnuts at the Willsboro Research Farm.



Northern New York Maple Industry Still Growing



To encourage long-term sustainability of maple tapping in Northern New York's slower-growing northern climate sugarbush, producers have expressed interest in tapping their trees with smaller diameter spouts (taps). In 2022-2024, Uihlein Maple Research Forest Director Adam Wild conducted trials with three sizes of spouts to understand the yield impact of decreasing the tap hole size. Traditional 5/16-inch and smaller 1/4-inch and 9/40 (0.225)-inch spouts were drilled 2 inches into trees selected for uniform size and health.

^{ce}Studies conducted outside New York state in 2015 and 2019 had shown smaller diameter tap holes yielded slightly less than traditional taps. This raised the question of whether a possible slight drop in yield could be outweighed by better production across all trees with the formation of less non-conductive wood and the potential for longer-term sustainability of the trees in a northern New York sugarbush. ^{**} — Adam Wild, Director, Uihlein Maple Research Forest

The 2022 maple season was above-average for production at Lake Placid; the 2023 season below-average with a quick heat wave of summer-like temperatures abruptly ending the season. Robust data was collected in 2024 with sap run starting early in February and continuing into mid-April in the colder, high elevation forests of Northern NY.

Yield Data Results	Spout Size	Sap Production
2022	Smallest (0.225-inch) spout	12.0% more than 5/16-inch
2023	0.225-inch spout	7.5% less than 5/16-inch
2023	¹ /4-inch spout	4.5% less than 5/16-inch
2024	0.225-inch spout	5.0% less than 5/16-inch
2024	¹ /4-inch spout	9.0% more than 5/16-inch
D 1.1.1		11

Sap Production ore than 5/16-inch s than 5/16-inch s than 5/16-inch ore than 5/16-inch ically significant.

Due to variability across replications within the forest, results are not statistically significant.

Smaller diameter spouts do not require trees to form as much protective non-conductive (prevents sap flow) wood, leaving more conductive wood for future sap production.



"What the results at this early point appear to suggest is that the smaller diameter spouts do not 'wound' the trees as much and create a better opportunity for tapping into healthy conductive wood for sap production in the future. Before any definite conclusions can be drawn, we need more data," Wild says.

Wild also tested the use of short barrel 5/16-inch barbed spouts reported elsewhere to increase sap production by at least 10%. They produced 9% less sap than 5/16-inch spouts in the short 2023 maple season; in 2024, 9% more sap than a traditional unbarbed spout but the variation across the replicates showed there was no statistical difference. When pulling the barbed taps, bark was removed from at least 50% of the trees in the trial.

The inner layer of bark contains the phloem that is important for transporting sugars throughout the

tree during the growing season; between the phloem and xylem is a thin cambium layer responsible for new growth of the tree.

"After three years of testing smaller diameter spouts, there does not appear to be a significant drop in sap production. This is great news for Northern NY maple producers as a smaller diameter tap hole provides more long-term sustainable tapping of our northern maple forests. "

— Adam Wild

Northern NY Maple Industry's Economic Impact

36% of New York State's maple production 40% of New York State's maple taps

(U.S. Census of Agriculture, 2022)

2000-2024 185% growth of NNY regional maple production: existing sugarbush expansion, entry of new producers

NNYADP Annual Report: November 2024

Northern New York Agricultural Economic Growth Indicators





Investing in Northern NY's Dairy Future, Malone: The Bilow Dairy family has invested \$25 million in two new 1800' barns and a 100-cow rotary milking parlor with an observation room for visitors, including NYS Assemblyman Billy Jones (above). On-farm renewable natural gas energy generation adds another \$20 million investment in NNY's farm-based economy.



Business Blooming in Denmark: Gen Z farmer Dani Thomas opened Dani's Daffodils and Flower Farm in 2022. She uses strip-till conservation, offers u-pick and on-farm workshops, supplies local retailers and event organizers



Certified Organic Soon, Plattsburgh: Friends Marisa Lenetsky & Mike Champagne established North Point Community Farm in 2022. They and their crew grow 30 acres of diversified vegetables for 200-member CSA, farmstand, farmers' markets & wholesale. They will be certified organic in 2025.

Modern Hydroponics, Historic Market, Lyons Falls: Kristin & Brandon Cunningham started HumbleBee Farms, a woman-owned/veteran-owned hydroponic enterprise, in 2023. They distribute products in NNY and beyond. They renovated a 19th century railroad depot as a local foods market in 2024.



Maple Sugarhouse & Silo, Adams: The Kurtz family-built maple sugarhouse has a 21,000-gallon sap silo that is expected to refill 50 times in the 2025 season.





Livestock Farm Adds Custom Solar Grazing, West Chazy: Young pasture-raised livestock farmers Josh & Rebekah Pierce of J&R Pierce Family Farm provide sheep for custom solar grazing in New York and Vermont.



Gardens a Go in Malone: Since Gokey's Gardens' start in 2022, Kim Gokey has increased her flower varieties for bouquet workshops, Flower Fridays roadside stand, wholesale to local florists & wedding designers. Hoophouse added in 2024.

Landmark Tavern Now Artisan Fruit Winery, Norfolk: Martin Bregg renovated his grandparents' and father's 1926-2014 tavern into Bregg's Winery, serving artisanal fruit wines made from his own-grown and others' fruits and vegetables.





Artisan Cheese & Creamline Yogurt, Keeseville: Young farmers Ashlee & Steven, and their North Country Creamery crew, process the milk from their 100% grass-fed dairy into artisan cheese and creamline yogurt for their on-farm store, at farmers' markets, and distribution to schools, camps, hospitals, grocers & restaurants.







FVELOPME

en Driven Research • Real-World Re



> Established by the New York State Legislature to Grow NY's Farm & Foods Economy Real-World Research • Field-Tested Results www.nnyagdev.org

Funding for the Northern New York Agricultural Development Program is supported by the New York State Legislature and administrated by the New York State Department of Agriculture & Markets.