

A SMALL FARMERS  
**CAMPUS to FARM** Guide

A directory of Cornell University  
RESEARCH and EXTENSION projects  
supporting small farms



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Edited by Rachel Whiteheart

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## ABOUT THIS GUIDE

This guide highlights small farms-focused research and extension projects led by Cornell faculty and educators around the state. Some of these projects are ongoing and offer long-term results and farmer-friendly resources. Others are new or temporary. Contact the project leader or follow website links for more information. If you are aware of a current research or extension project missing from the guide, please send us an email at [smallfarmsprogram@cornell.edu](mailto:smallfarmsprogram@cornell.edu).

### *Cover Credits:*

*Left:* Central Campus, Cornell University. Photo by Cornell University Photography

*Right:* Dave and Anne Lincoln rotational graze Hereford Cattle on their farm in Willsboro, NY. Photo by Anne Lincoln

*Cover design:* by Violet Stone, Cornell Small Farms Program Coordinator

*Editing & Compilation:* by Rachel Whiteheart & Violet Stone

# HORTICULTURE

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## Horticulture Research

The following is a sampling of horticulture research projects relevant to small farms. If you have a specific interest that is not addressed here, contact Marvin Pritts, Chair, Department of Horticulture, at 607-255-1778 or [mpp3@cornell.edu](mailto:mpp3@cornell.edu).

### IMPROVEMENT OF STRAWBERRY, RASPBERRY, AND BLACKBERRY CULTIVARS

The ultimate goal of this project is to develop improved strawberry, raspberry, and blackberry cultivars through the integration of traditional breeding and biotechnology. The main focus is New York State and the northeastern U.S. with possible testing in other regions. Fruit quality characteristics evaluated include size, firmness, color, flavor, texture, and overall appeal. Yield components include overall tonnage and harvest efficiency and are a combination of fruit size and numbers and uniformity of maturity. Pest resistance includes resistance to microbial pathogens and arthropod pests.

Trials of new varieties are an integral part of the program to provide accurate comparisons to the industry standards. New, high quality strawberry, raspberry, and blackberry cultivars adapted to the NY climate are key to the continued viability of the NY small fruits industry. Varieties developed in the local climate will perform better and require fewer inputs, making them more profitable to local growers. Compared to mass market varieties from California or Florida, Cornell varieties maintain a better flavor and eating quality that the local consumer demands.

**Duration:** Ongoing

**Project Leader:** Dr. Courtney Weber,  
(315) 787-2395,  
[caw34@nysaes.cornell.edu](mailto:caw34@nysaes.cornell.edu)

**Project Partners:** Dr. Greg Loeb, Dr. Wayne Wilcox, Dr. Kim Lewers, Dr. Marvin Pritts

**Funding Sources:** Federal Formula Funds/Hatch Funds; Royalties on patented strawberry and raspberry varieties collected from plant sales.

### NEW VARIETIES FOR THE NY APPLE INDUSTRY

This project establishes test plantings of NY apple breeding selections in commercial orchards to fast track the development and testing of potential new breeding varieties. Sites include growers with roadside marketing and targets apple selections suited to their unique needs.

**Project Period:** Ongoing

**Project leader:** Susan Brown,  
[skb3@cornell.edu](mailto:skb3@cornell.edu)

**Funding source:** NY Farm Viability Institute

## SOIL MANAGEMENT IN BERRY CROPS AS A MODEL FOR MANAGEMENT EDUCATION

This project will provide in-depth berry crop nutrition and soil management training and resources for agriculture educators and the commercial berry growers they serve. The project will focus on helping agriculture educators build berry crop nutrient and soil management expertise through 1) a series of in depth webinars and case study learning modules and 2) development of Internet resources to be used by educators in grower training. The project will help educators to 3) develop and implement grower training programs and 4) carry out one-on-one consultations with participating growers. It will also involve educators in monitoring adoption and success of analysis-based berry crop nutrient and soil health management implemented by growers. A whole farm soil and nutrient management decision tool for commercial berry crops will be developed from existing resources. This tool, along with accompanying agriculture educator and commercial grower training materials, made available via the Internet, will provide a “one-stop-shop” resource for agriculture educators interested in building skills or providing training and commercial berry growers interested in improving berry crop soil and nutrient management. Soil and nutrient management principles and practices gained through this project will have application to other crops as well.

**Top Impact from Work Thus Far:** Hosted webinar series covering berry soil and nutrient management practices

**Duration:** Ongoing

**Project Leader:** Marvin Pritts, [mpp3@cornell.edu](mailto:mpp3@cornell.edu)

**Project Partners:** Mary Catherine Heidenreich, [mcm4@cornell.edu](mailto:mcm4@cornell.edu), see [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Adoption of better soil management practices, resulting in better crop yields

**Funding Source(s):** SARE, grant # ENE11-120

**For More Information:** <http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=ENE11-120>

## PUMPKIN TRANSPLANTS AS AN ALTERNATIVE TO DIRECT SEEDING

Pumpkins are traditionally started in bare soil by direct seeding. Growers often over-seed and must later thin to the proper populations. As the price of pumpkin seed rises for improved hybrid varieties, growers have experimented with using pumpkin transplants. Preliminary field trials suggest transplants might out yield traditional direct seeding by 25 to 40%. This project, conducted by Sarah Hulick, MS candidate in Horticulture, includes trials comparing the use of plastic mulch to bare soils. Hulick will be assessing the results for yield as well as the cost of production practices.

**Top Impact from Work Thus Far:** Transplants, both in bare ground and in black plastic, showed improved yields compared to direct seeding. Direct seeded plots in bare ground were the lowest yielding. The best options for growers to increase yields are to transplant in bare ground or direct seed in plastic mulch.

**Duration:** June 2011 -December 2012

**Project Leader:** Steve Reiners, (315) 787-2311, [sr43@cornell.edu](mailto:sr43@cornell.edu)

**Project Partners:** Sarah Hulick, Chris Wien, Brad Rickard

**Potential Benefits for Small Farms:** Greater yield while using less land. Precision planting of transplants allows for cultivation/weed control both parallel and perpendicular to rows. Pumpkins rank in the top three crops produced by NY vegetable growers (following sweet



**For More Information:** Contact Sarah Hulick, [seh95@cornell.edu](mailto:seh95@cornell.edu)

corn and tomatoes) and are often grown on small acreages.

**Funding Source(s):** Cornell University Graduate School

## DEVELOPMENT OF COLD-HARDY, DISEASE RESISTANT WINE GRAPES

The Cornell grape breeding program is developing new wine grape varieties adapted for the northeastern U.S. One important feature of this effort is the selection of new varieties in vineyards receiving no fungicide or insecticide treatments. Disease pressure is severe and yet there are selections that grow well and produce fruit of good quality under such conditions. Disease resistance genes are being sought from a variety of wild species of North American grapes. Highly disease resistant selections are being tested for wine quality with Dr. Henick-Kling in the Food Science department. Further trials with interested growers are just beginning. This project is expected to help small farm operators make good use of easy to grow grapes that require little or no pesticide application.

**For More Information:** <http://www.hort.cornell.edu/reisch/grapegenetics/grapeinfo.html>

**Duration:** Began 1988, ongoing

**Project Leaders:** Bruce Reisch, 315-787-2239, [bir1@nysaes.cornell.edu](mailto:bir1@nysaes.cornell.edu) and Dr. Thomas Henick-Kling, 315-787-2277, [th12@cornell.edu](mailto:th12@cornell.edu)

**Funding Source(s):** USDA Viticulture Consortium-East; NY Wine and Grape Foundation

## BIOLOGICAL CONTROLS FOR GRAPE DISEASES

The objective of this research is to determine how prevalent *Agrobacterium vitis*, the cause of grape crown gall, is in grape propagation material and whether specific biological controls for the disease are effective.

In the laboratory, researchers developed a new, sensitive method for indexing grape cuttings according to the presence of the pathogen, and have been using it in collaboration with stakeholders. Nurseries provide the lab with materials used to test biological control strains.

**Top Impact from Work Thus Far:** The project's newly developed, highly sensitive indexing method is now being tested with plant material from northeastern nurseries.

**Duration:** Ongoing

**Project Leader:** Thomas J Burr, [tjb1@cornell.edu](mailto:tjb1@cornell.edu)

**Project Partners:** Amberg Nursery, Weimer Nursery, Dr. Frank Nurser

**Potential Benefits for Small Farms:** The benefits include important knowledge on whether *A. vitis* is present in grape propagation material. Also in development is a biological control that can be implemented by commercial nurseries and grape growers.

**Funding Source(s):** Hatch, FFF, USDA National Clean Plant Network

## A TRANS-DISCIPLINARY APPROACH TO DEVELOPING AN EASTERN BROCCOLI INDUSTRY

A confluence of economic, social, and scientific conditions has created an opportunity to make broccoli a significant crop in the eastern U.S. Broccoli hybrids are evaluated in five eastern trial locations. Results provide feedback to broccoli breeding programs, identify top material for commercial release, and inform production recommendations for growers. Nutrient analysis on trial material provides insights to genetic and environmental bases for improved nutritional quality. Commercial partners, including Bejo Seeds USA, Seminis Vegetable Seeds, Syngenta Seeds, and Johnny's Selected Seeds, will identify new varieties for commercial release based on trial performance. The companies will assume responsibility for scaling up seed production and marketing new releases to eastern growers. Several lines that were advanced in the pipeline were released as varieties and became available for the 2012 season. Extension partners are working to develop grower networks along the Eastern Seaboard that together will be able to supply eastern broccoli year-round. GAP certified growers manage small production trials and will eventually scale up to fill a supply slot for distributor partners. Economic analysis, including crop budgets and a variable transshipment model, allows cost-of-production benchmarking and guides growers to the most competitive production and post-harvest practices. Project partners are working with distribution and retail collaborators to build acceptance for eastern-grown broccoli among produce buyers and general consumers. Consumer surveys will provide feedback to broccoli breeders on the acceptability of various product attributes that may differ from western norms.

**Top Impact from Work Thus Far:** Release of new lines of seeds in the 2012 season

**Duration:** Ongoing

**Project Leader(s):** Thomas Bjorkman,  
[tnb1@cornell.edu](mailto:tnb1@cornell.edu)

**Project Partners:** Jeanine M. Davis, Miguel Gómez

**Potential Benefits for Small Farms:** Adoption of new techniques to produce greater yields of quality broccoli in the eastern U.S.

**Funding Source(s):** USDA's National Institute of Food and Agriculture through the Specialty Crops Research Initiative

**For more information:**  
[http://ashs.org/abstracts/2012/abstracts12/abstract\\_id\\_9709.html](http://ashs.org/abstracts/2012/abstracts12/abstract_id_9709.html)

## ADOPTION OF ADAPT-N TECHNOLOGY ON FARMS

The web-based Adapt-N tool was designed to improve corn nitrogen use efficiency by shrinking the uncertainty around the agronomic optimum nitrogen rate. It accounts for the dynamic, complex and locally-specific interactions among weather, soil, and management that affect crop-available nitrogen by using field-specific information supplied by users, and near real-time high resolution climate data, as inputs for a dynamic simulation model (Precision Nitrogen Management model). The Adapt-N web-interface provides a sidedress nitrogen recommendation and

**Duration:** Ongoing

**Project Leader(s):** Harold Van Es, [hmv1@cornell.edu](mailto:hmv1@cornell.edu); Bianca Moebius-Clune, [bnm5@cornell.edu](mailto:bnm5@cornell.edu)

**Project Partners:** Marlene van Es; Jeff Melkonian, [jjm11@cornell.edu](mailto:jjm11@cornell.edu); Keith Severson, [kvs5@cornell.edu](mailto:kvs5@cornell.edu)

additional information to the user. In collaboration with consultants, extension staff, and growers in the Northeast (mostly NY) and Midwest (mostly IA), researchers beta-tested the Adapt-N tool to compare Adapt-N recommended rates with current grower practices in 84 replicated on-farm strip trials in grain and silage corn in 2011 and 2012. On average, nitrogen application rates were reduced by 53 lb/ac with the use of the Adapt-N tool. Yield losses from reduced nitrogen rates were negligible, except in a few cases where the tool was improperly used, model adjustments were needed, or unpredictable late season factors influenced outcomes. Adapt-N use increased grower profits by an average \$27/ac (79% of trials had increased profits). Adapt-N also significantly reduced estimated leaching and denitrification losses. On-farm testing shows potential for Adapt-N to improve nitrogen use efficiency in corn, increase grower profits, and reduce environmental impacts of nitrogen use.

**Top Impact from Work Thus Far:** Farm strip tests showed that adoption of Adapt-N successfully decreased need for addition of nitrogen to soils.

**Potential Benefits for Small Farms:** Adoption of new techniques to reduce amount of soil nitrogen inputs

**Funding Source(s):** New York Farm Viability Institute; International Plant Nutrition Institute

**For more information:**  
<http://adapt-n.cals.cornell.edu/>

## INCREASING QUALITY, DIVERSITY, AND SEED AVAILABILITY OF POTATO VARIETIES FOR SMALL-SCALE FARMS

To identify varieties that perform well in both field and market, 310 specialty potatoes were evaluated, 48 of which were trialed by a network of 113 small-scale growers. Through multi-year, free-choice trialing, the growers documented relative yield of 27 potato varieties. By project's end, 46 growers had adopted one or more of ten varieties new to the region. These high-performing potatoes include an American heirloom variety and cultivars originating from Europe, Peru, Alaska, and Cornell University in New York. They exhibit an array of tuber sizes, shapes, and skin/flesh colors, thus substantially adding to the diversity of potato choices for both growers and consumers in the Northeast. One double-certified (i.e., organic and state certified) potato seed grower started production in 2009 and is focusing on specialty varieties. As indicated by an end-of-project survey, 23 growers adopted one or more improved potato pest management practices (including extended rotation, increased row spacing for improved air flow around plants, rouging of volunteer potatoes, and use of clean seed and resistant varieties) that had been advocated at project outreach events.

**Duration:** 2008-2011

**Project Leader(s):**  
Michael Glos, [mag22@cornell.edu](mailto:mag22@cornell.edu);  
Keith Perry, [klp3@cornell.edu](mailto:klp3@cornell.edu)

**Project Partners:** Elizabeth Dyck, Organic Growers' Research and Information-Sharing Network

**Potential Benefits for Small Farms:** Adoption of new potato breeds that have been field-tested for the Northeast region

**Funding Source(s):** SARE, grant # LNE08-272

**For more information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LN E08-272>

**Top Impact from Work Thus Far:** The increased variety of potatoes available to growers helps diversify small farms.

## REDUCING CLIMATIC AND DISEASE RISKS THROUGH MINIMUM TILLAGE SYSTEMS FOR VEGETABLES

Reduced and modified tillage (RT) systems (e.g. no-tillage, zone-tillage, strip-tillage) represent strategies to reduce soil degradation and erosion and protect water quality. This project has shown that zone and deep zone tillage systems can provide the environmental and economic benefits of an RT system for many vegetable crops without the harvest delays or losses observed in no-tillage systems. Each season, more vegetable growers express interest or try RT on their farms. The intent of this research is to evaluate the ability of RT systems to ameliorate large fluctuations in water supply which may result from climate change and to explore the role of RT in reducing crop losses to flooding, drought, and vegetable diseases like *Phytophthora capsici*.

**Top Impact from Work Thus Far:** Researchers hosted a series of workshops for farmers new to RT to learn more about how to successfully implement it on their farms.

**Duration:** Ongoing

**Project Leader(s):**  
Anusuya Rangarajan,  
[ar47@cornell.edu](mailto:ar47@cornell.edu)

**Project Partners and Collaborators:**  
See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:**  
Adoption of reduced and modified tillage systems which can facilitate increased management flexibility and timeliness and improved profitability

**Funding Source(s):** SARE, grant # LNE10-301

**For more information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE10-301>

## IMPROVING THE YIELD AND QUALITY OF SWEET POTATOES GROWN IN NEW YORK

The objective of this project was to improve quality and production of sweet potatoes on 8 – 10 farms in the Capital District Vegetable and Small Fruit Program. Fifty additional growers attended workshops and meetings and twenty of them added sweet potatoes to their operations, helping diversity the industry. Researchers worked with 8 vegetable growers currently growing sweet potatoes as part of their crop plan. Of the 8 growers, all of them added at least 2 new varieties (Covington, O’Henry, and Beauregard), and 4 growers actually changed their variety selection completely from Georgia Jet and Centennial to Beauregard and Covington as a direct result of this project’s variety trial studies. These growers verbally reported that the selection changes resulted in a higher percentage of marketable roots (less growth cracks and more uniform roots), but could not give specific

**Duration:** 2010-2012

**Project Leader(s):**  
Charles Bornt,  
[cdb13@cornell.edu](mailto:cdb13@cornell.edu)

**Project Partners and Collaborators:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increased production of sweet



yield data. All of the growers continued to increase their acreage according to how early they sold out of sweet potato roots in the winter. One doubled his acreage from 3 to 6 acres and another from 1 to 2 acres.

**Top Impact from Work Thus Far:** By January of 2013, sweet potato slip sales had tripled from 2009. Nine out of 10 sweet potato growers who were given slips and instructed on how to plant, manage, and harvest the roots said that they would purchase slips in 2013.

potatoes

**Funding Source(s):** SARE, grant # LNE10-292

**For more information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE10-292>

## SUSTAINABLE PEST MANAGEMENT IN HIGH TUNNEL WINTER GREENS PRODUCTION

This project seeks to enhance farm sustainability by researching which greens varieties are more attractive to aphids and to promote early fall releases of parasitoids, late fall and winter applications of biorational pesticides, specifically *Beauveria bassiana*, a naturally occurring fungal pathogen of aphids (OMRI approved). A farmer-developed technique of mixing diatomaceous earth with the spray, as well as neem oil, will also be evaluated. On-farm demonstrations, winter meetings, and newsletters will promote these techniques across New York State. Judson Reid, project leader, has successfully implemented numerous projects on biological control and high tunnels. A project technician will survey grower adoption of biological/biorational controls during the project.

**Top Impact from Work Thus Far:** On-site grower trials have been successful thus far in reducing aphid populations.

**Duration:** Ongoing

**Project Leader(s):** Judson Reid, [jer11@cornell.edu](mailto:jer11@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Enhanced farm sustainability

**Funding Source(s):** SARE, grant # LNE10-302

**For more information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE10-302>

## DEVELOPMENT OF DISEASE MANAGEMENT, FERTILITY, AND WEED CONTROL BEST PRACTICES FOR NORTHEAST GARLIC PRODUCTION

As the number of garlic growers and acreage in garlic have increased, the number of diseases associated with this once trouble-free crop have also increased. Nearly 25% of growers surveyed indicated they have lost 30% or more of their garlic crop at least once in the last five years. To reduce these losses and increase productivity, this project seeks to develop best practices for garlic in the Northeast through a series of research trials. A trial will examine marketable yield and disease incidence after post-harvest treatments, including heated curing, cutting garlic tops and roots prior to

**Duration:** Ongoing

**Project Leader(s):** Crystal Stewart, [cls263@cornell.edu](mailto:cls263@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increasing garlic yields

curing, and washing immediately following harvesting.

A weed control trial will compare both organic and conventional options to determine which weed controls are the most efficient, effective, and feasible for organic and conventional growers. A fertility trial will compare available recommendations from the Northeast to determine optimal timing and rates of fertilizers. These trials will be replicated from the Albany, NY area down to Long Island, providing a diversity of soils, environmental conditions, and hardiness zones which will be applicable throughout the Northeast.

**Funding Source(s):** SARE, grant # LNE12-319

**For more information:**

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE12-319>

**Top Impact from Work Thus Far:**

Widespread dispersion of garlic growing publications provided farmers with in-depth explanations of beneficial growing techniques.

## INNOVATIVE UNDERTRELLIS MANAGEMENT FOR VINEYARDS

This project evaluates alternative strategies for undertrellis (under-vine) management through research plots and demonstration plots that explore a range of management options including mowing and the use of seeded perennial ground covers. This work will include a detailed examination of management practices on vine growth, fruit composition, and nitrate leaching to groundwater. By incorporating data and observations from research and demonstration plots, growers will possess the knowledge and tools for evaluating and implementing alternative strategies in their own vineyards.

**Top Impact from Work Thus Far:** Project results concerning green covers and reducing need for pesticides in vineyards continue to be widely distributed to Northeastern grape growers.

**Duration:** Ongoing

**Project Leader(s):** Alice Wise, [avw1@cornell.edu](mailto:avw1@cornell.edu)

**Project Partners:** Elizabeth Tarleton, [lt68@cornell.edu](mailto:lt68@cornell.edu)

**Potential Benefits for Small Farms:**

Decreasing pesticide usage in vineyards

**Funding Source(s):** SARE, grant # LNE12-322

**For more information:**

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE12-322>

## USING CANOPY MANAGEMENT TO REDUCE FUNGICIDE USE AND IMPROVE FRUIT COMPOSITION IN WHITE WINE GRAPES

The goal of this project is to develop, demonstrate, and implement grower-identified practices in NY/Northwestern PA vineyards that reduce fungicide use and improve wine quality, resulting in increased economic returns to wine grape growers and decreased environmental impact. Through collaboration with grower-partners, researchers will

**Duration:** Ongoing

**Project Leader(s):** Justine Vaden-Heuvel, [jev32@cornell.edu](mailto:jev32@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for

introduce low-cost practices (shoot thinning, leaf removal) with potential to increase fruit quality and reduce pesticide demand. Researchers expect these practices to result in a more open canopy and improved air circulation, which in turn will reduce fungal pressure by decreasing the duration of wetness events, and improve penetration and efficacy of pesticides. Furthermore, they expect improved fruit composition resulting from optimized light interception by clusters. The project will consist of the following components: initial survey of grower practices, applied research comparing canopy management practices to control vines, on-farm demonstrations of each of the practices (also implemented in combination) compared to traditionally-managed canopies, on-farm workshops, newsletters, other educational opportunities, and final project assessment including a survey and interviews.

**Top Impact from Work Thus Far:** At least 15 vineyards have become newly involved in experimentation with canopy management practices.

complete list

**Potential Benefits for Small Farms:**

Adoption of canopy management practices to improve fruit composition and lower disease pressure

**Funding Source(s):** SARE, grant # LNE09-289

**For more information:**

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE09-289>

## Horticulture Extension Resources

### Cornell University Department of Horticulture

The Department of Horticulture generates and extends knowledge about fruits, vegetables, and landscape plants for the purpose of sustaining the environment, enhancing economic vitality, and improving the quality of life for individuals and communities. 134A Plant Science Building, Cornell University, Ithaca, NY 14853. 607-255-4568. [hort@cornell.edu](mailto:hort@cornell.edu) | <http://hort.cals.cornell.edu/>

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to fruit and vegetable, greenhouse, and ornamentals production. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Production.

### Geneva Agricultural Experiment Station

The NYS Agricultural Experiment Station in Geneva serves millions of NY consumers, agricultural producers, food businesses and farm families throughout the state by translating state-of-the-art research into industry innovation and economic growth. 630 West North Street, Geneva, NY 14456. 315-787-2011. <http://nysaes.cornell.edu/cals/nysaes/>

### Horticultural Business Management and Marketing Program

This program in the Department of Economics and Management places emphasis on adaptation of new technologies to enhance productivity while maintaining environmental quality and sustainability. Contact: Wen-fei Uva, Senior Extension Associate, 607-255-3688 [w132@cornell.edu](mailto:w132@cornell.edu) | <http://hortmgt.aem.cornell.edu>

## PALS – Plants and Life Sciences Publishing (Formerly NRAES)

PALS produces publications and conferences on: horticultural production, dairy, livestock, and poultry production systems, agricultural waste management, consumer education, natural resources management, farm safety, biological engineering, environmental engineering, and more. For more information: PALS, Cooperative Extension, PO Box 4557, Ithaca, New York 14852-455.

[PALSpublishing@cornell.edu](mailto:PALSpublishing@cornell.edu) | <http://palspublishing.cals.cornell.edu>

## SMALL DAIRY

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### Small Dairy Research

The following is a sampling of research projects relevant to small dairies. If you have a specific interest that is not addressed here, contact Alan Bell, Chair, Department of Animal Science, 607-255-2862, [awb6@cornell.edu](mailto:awb6@cornell.edu).

### DAIRY FARM BUSINESS SUMMARY, NEW YORK SMALL HERD FARMS, 80 COWS OR FEWER

The primary objective of the Dairy Farm Business Summary (DFBS) is to help farm managers improve financial management of their business through appropriate use of historical data and the application of modern farm business analysis techniques. This information can also be used to more effectively create and reach monetary goals. In short, DFBS provides business and financial information needed in identifying and evaluating strengths and weaknesses of the farm business.

#### Top Impact from Work Thus Far:

For 2011 data, 54 New York small dairy farms used the DFBS to analyze their farm business. The average data for these 54 farms are summarized in the publication. Net farm income without appreciation, increased 43.9 percent from 2010 to 2011. A positive rate of return of 4.2 percent was an improvement over -1.1 percent in 2010.

**For More Information:** Informational website: <http://dfbs.dyson.cornell.edu/>. To order copies of the publication: <http://dyson.cornell.edu/outreach/order.php>

**Duration:** Ongoing

**Project Leader(s):** Wayne Knoblauch, 607-255-1599, [wak4@cornell.edu](mailto:wak4@cornell.edu)

**Project Partners:** New York Dairy Farm Operators/Managers, Cornell Cooperative Extension Educators, agribusiness consultants, Pro-Dairy, Dyson School faculty

**Potential Benefits for Small Farms:** Small farms are facing increasing management challenges in their efforts to control costs and remain profitable. This publication reports the average performance and characteristics of small farms and the average of the top 25 percent of those small farms with highest rate of return on assets (without appreciation). Thus, not only can the average performance of small farms be used as a benchmark, but the performance of the most profitable small farms as well.

**Funding Source(s):** NYFVI, Pro-Dairy, The Bank of Castile, NBT Bank, Dyson School of Applied Economics and Management.

## EVALUATING OVERALL HEALTH AND PHYSICAL MOVEMENT OF DAIRY HEIFERS IN CONFINEMENT VS. MANAGEMENT INTENSIVE GRAZING

The main goal of this project is to encourage more dairies in the Northeast to utilize Management Intensive Grazing to raise their heifers for a portion of the year. This will be accomplished by adding to existing knowledge about the practice. Existing knowledge includes: economics, environmental impact and health benefits. This project will add three new areas of knowledge to the practice. Specifically, this project is reviewing records of 3 groups of 60 heifers which spent a summer (150 days) on pasture during the ages of 8-12 months. Researchers will assign age appropriate herd mates which will spend the summer in confined housing. The total study group will number approximately 360 animals. Through the use of Dairy-Comp 305 Software researchers will look for any significant differences in overall health indicators such as: breedings per conception, longevity in the herd, milk production, and health problems. The other component of this project involves data collection using the IceTag 300, a wireless pedometer that can measure differences in physical movement between a group of heifers in confinement vs. a group on pasture. The pedometers will also be used to measure differences in movement related to the length of residency in a paddock.

**Top Impact from Work Thus Far:** Data-logging of steps taken by heifers while on pasture has been conducted for several seasons. The high volume of data should lend itself to statistically significant interpretations.

**Duration:** Ongoing

**Project Leader(s):** A. Fay Benson, [afb3@cornell.edu](mailto:afb3@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Improved health of dairy heifers and increased productivity of dairy farm

**Funding Source(s):** SARE, grant # ONE11-134

**For More Information:** <http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=ONE11-134>

## DAIRY FARM BUSINESS SUMMARY, NEW YORK INTENSIVE GRAZING FARMS

This program is provided to farms utilizing intensive grazing as part of the Dairy Farm Business Summary and Analysis Program. Managers of each participating farm business receive a comprehensive summary and analysis of their farm's production and financial performance. This study of intensive grazing focuses on 28 New York farms where farms were not organic, were not first year grazers, and at least 30 percent of forage consumed during the grazing season was grazed. Fifty-four non-grazing farms of similar herd size to the 28 grazing farms were included as a comparison.

**Duration:** Ongoing

**Project Leader(s):** George Conneman, 607-255-4597, [gjc4@cornell.edu](mailto:gjc4@cornell.edu)

**Project Partners:** New York Dairy Farm Operators/Managers, Cornell Cooperative Extension Educators, agribusiness consultants, Pro-Dairy, Dyson School faculty



**Top Impact from Work Thus Far:**

NY farm operators are able to consider the option of intensive grazing on their farm. Case studies in the publication provide first-hand experiences by intensive grazing farm operators.

**For More Information:** <http://dfbs.dyson.cornell.edu/>. To order copies of the publication: <http://dyson.cornell.edu/outreach/order.php>

**Potential Benefits for Small Farms:**

Small farmers have the ability to compare the effects of different grazing practices

**Funding Source(s):** NYFVI, Pro-Dairy, The Bank of Castile, NBT Bank, Dyson School of Applied Economics and Management.

## USE OF WHOLE FARM ANALYSIS TO REDUCE NUTRIENT LOSSES, IMPROVE NUTRIENT CYCLING, CARBON STATUS AND ENERGY USE ON SMALL DAIRIES IN NEW YORK STATE

Four dairy farm management teams conducted three years of farm analyses, and all teams saw a trend in improved nutrient use efficiency. Tools used for farm nutrient use assessment were Mass Nutrient Balance, Illinois Soil Nitrogen Test (ISNT), Soil Test Phosphorus (STP), Soil Test Potassium (STK), Corn Stalk Nitrate Tests (CSNT), manure analysis, and farm maps. Teams met annually to discuss changes that were made on each farm, review results, and identify action items for the next year. A final evaluation allowed management teams to identify tools they will continue to use beyond the duration of this project for whole farm analysis and improving nutrient use. Useful tools identified were whole farm soil testing, farm maps, and farm mass balance trends. The usefulness of whole farm soil testing was found to be linked to the presentation style of the results. Maps and graphs of soil testing results were used to make manure distribution decisions and prioritize manure applications. The soil test information most frequently used was the ISNT, STP and STK. Other nutrients and soil pH were useful when presented in a summary table with interpretations. Corn stalk nitrates were found useful on the conventional dairy farms but were not on the two organic dairy farms. Farm maps were rated as highly useful tools on all farms.

**Top Impact from Work Thus Far:** Identification of relevant agro-environmental indicators (AEI's) led to their inclusion in annual nutrient mass balance assessments on 75 NY small farms.

**Duration:** 2008-2011

**Project Leader(s):** Quirine Ketterings, [gmk2@cornell.edu](mailto:gmk2@cornell.edu)

**Project Partners:** Patricia Ristow, [plr27@cornell.edu](mailto:plr27@cornell.edu); see [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increase dairy farm profitability

**Funding Source(s):** SARE, grant # LNE08-271

**For more information:** <http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LN E08-271>

## PRECISION FEED MANAGEMENT FOR IMPROVED PROFITABILITY AND ENVIRONMENTAL STEWARDSHIP IN YATES COUNTY, NY

Cornell University Cooperative Extension (CCE) of Yates County is partnering with Cornell University's Northwest New York Dairy, Livestock, and Field Crops Team (NWNYS Team) to work with owners of small dairy operations on adopting Precision Feed Management (PFM), an approach for using farm resources more wisely. Both nutritionists and nutrient management specialists are contributing time towards the promotion and implementation of this project. Replication of these efforts within regional watersheds is expected. Initial contact was made via informational flyers sent to 258 small farm owners. Participating farms will be involved with forage management field days, pasture management tours and nutrient management workshops. Throughout the project, individual farm visits by members of the PFM Work Group will facilitate PFM plan implementation and data collection. Emphasis will be placed on tracking feed nitrogen and phosphorus inputs, feed costs, milk production, overall cow health, forage quality improvements, forage intake, and manure management.

**Top Impact from Work Thus Far:** The project generated interest in precision feed management by key community leaders.

**Duration:** Ongoing

**Project Leader(s):**  
Gerald Bertoldo,  
[grb23@cornell.edu](mailto:grb23@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increase dairy farm profitability

**Funding Source(s):** SARE, grant # LNE11-308

**For more information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewPr oj&pn=LNE11-308>

## PRODAIRY PROFIT DISCUSSION GROUP PROGRAM

The objective of the ProDairy profit discussion group program is to increase the profitability of New York dairy businesses. Discussion groups promoted effective use of management strategies, implementation of appropriate technology, and monitoring of production and economic parameters. They represented diversity in both geography and production management systems that characterize the New York dairy industry.

**Top Impact from Work Thus Far:** Discussion groups increased implementation of appropriate technology and management practices.

**For more information:**

<http://www.ansci.cornell.edu/prodairy/index.html>  
<http://www.ansci.cornell.edu/prodairy/program/discgroup.html>

**Duration:** Program initiated in April of 2008. Current funding runs through March 2013.

**Project Leader(s):** Kathy Barrett, 607-229-4357, [kfb3@cornell](mailto:kfb3@cornell)

**Project Partners:** Cornell Cooperative Extension, Dairy One, Farm Credit East

**Potential Benefits for Small Farms:** Discussion groups are based on farmers with a shared commonality (i.e. small farms, grazing, young farmers) meeting on a regular basis to discuss topics that are pertinent to them. The emphasis is on the shared knowledge of group members.

**Funding Source(s):** New York State Dairy Farmers

## Small Dairy Extension Resources

### Cornell University Department of Animal Sciences

The Department of Animal Science's mission is to discover and disseminate new knowledge about the biology & management of domestic animals and to apply this knowledge to benefit society. For Animal Science Department information, contact W. R. Butler, Chair and Professor at 607-255-5497 or [wrb2@cornell.edu](mailto:wrb2@cornell.edu). Morrison Hall, Cornell University, Ithaca, NY 14853. <http://www.ansci.cornell.edu/>

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to business and financial planning, cattle health, feed and forages, organic production, and value-added processing. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Small Dairy.

### PRO-Dairy Program

This program facilitates New York State economic development by increasing the profitability and competitiveness of its dairy industry. PRO-DAIRY enables farm families and other agricultural professionals to realize their values and strive to achieve their professional and personal goals. There are several focuses of the program, including developing farm business, production, environmental, and facilities engineering systems management. For more information contact Tom Overton, Director, 272 Morrison Hall, Cornell University, Ithaca, NY 14853. (607)255-2878, [tro2@cornell.edu](mailto:tro2@cornell.edu) or visit <http://ansci.cornell.edu/prodairy/index.html>.

### Transitioning to Organic Dairy Production

This workbook will help you explore questions such as: How stable is the market for organic milk? How much will it cost? What are the yield reductions in forage production? What are some herd health/cull rate considerations? After completing the workbook, you should have a business plan, a budget, and an action plan to follow during this challenging time. \$12. To order a copy, call the NY FarmNet office at 1-800-547-3276. View the full list of FarmNet publications at [nyfarmnet.org/](http://nyfarmnet.org/).

### Dairy Profit Manager

The Dairy Profit Monitor (DPM) is a web-based business management tool that allows producers and their advisers to track operating performance in five key areas: milk production, herd health, milk check analysis, efficiency parameters, and financial management. It can highlight how the dairy changes month to month, quarter to quarter and over 12 rolling months. DPM is unique in how it incorporates herd production and health data with key financial and efficiency information and provides a baseline report for determining how different parts of the dairy business are affecting each other. Farms can sign up at [dairyprofit.cornell.edu](http://dairyprofit.cornell.edu) and use the program free of charge for 3 months.

# LIVESTOCK

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## Livestock Research

The following is a sampling of research projects relevant to non-dairy livestock producers. If you have a specific interest that is not addressed here, contact Alan Bell, Chair, Department of Animal Science, 607-255-2862, [awb6@cornell.edu](mailto:awb6@cornell.edu)

### CORNELL SHEEP PROGRAM RESEARCH

Sheep flocks are relatively economical to establish and take advantage of forage-producing land. They can provide significant income to owners of small farms who take advantage of the many high value markets for lambs in the Northeast.

The Cornell Sheep Program evaluates and disseminates information on management, nutrition, health, selection, and marketing strategies for highly productive sheep systems. Purebred Dorset and Finnsheep flocks and a commercial Finnsheep x Dorset flock are managed under the Cornell STAR management system, which emphasizes carefully timed development of maternal ewe flocks. Research topics include: 1) quantifying the amount of fermentable fiber necessary in diets for sheep and other ruminants, 2) ways to control internal parasites, 3) the bonding process between ewes and their newborn lambs to reduce labor and feed associated with lambing management, 4) identifying genotypes that are better at lambing more frequently, and 5) ways to improve vaccinations.

**Duration:** Ongoing

**Project Leader(s):** Michael L. Thonney, 607-592-2541, [mlt2@cornell.edu](mailto:mlt2@cornell.edu)

**Project Partners:** Dr. Mary C. Smith, Dr. Tatiana Stanton, CCE educators with animal agriculture responsibilities, Empire Sheep Producer's Association

**Potential Benefits for Small Farms:** Connects small farmers to information about sheep, value-added products, management, production, and marketing

**Funding Source(s):** Cornell University Experiment Station, Cornell Cooperative Extension, USDA Sheep Improvement Center, and Northeast SARE.

**For more information:**

<http://www.sheep.cornell.edu/>,  
<http://sheepgoatmarketing.info>

### COMPOSTING LIVESTOCK MORTALITIES

Cornell Waste Management Institute (CWMI) serves the public through research, outreach, training, and technical assistance with a focus on organic residuals. CWMI developed several multi-media resources on topics related to livestock composting, such as a 20-min video,

**Duration:** Ongoing, started in 1998.

**Project Leader(s):** Jean Bonhotal, Cornell Waste Management Institute, 607-255-8444, [jb29@cornell.edu](mailto:jb29@cornell.edu), [cwmi@cornell.edu](mailto:cwmi@cornell.edu)

“Natural Rendering: Composting Livestock Mortality & Butcher Waste”. Other topics include Composting Poultry Mortality, Horse Mortality: Carcass Disposal Alternatives, Natural Rendering for Horses, and US Mortality and Butcher Waste Disposal Laws. A map of NY Compost Facilities has been developed and includes compost education and demonstrations sites These are available at:

<http://cwmi.css.cornell.edu>

**Top Impact from Work Thus Far:** Farms are composting and better managing livestock mortality.

**Project Partners:** Cornell Farm Services, Pro-Dairy, CCE Associations, NYSDOT, NYSDEC, NRCS, NYSDAM, NE SARE, APHIS, EPA, US Compost Council, Penn State, University of Maine, participating farms and butchers

**Funding Source(s):** Empire State Development (Environmental Investment Program), Highland Institute, American Association of Meat Processors, the Northern New York Program, Cornell Cooperative Extension, NESARE, NYSDEC, NYSDOT

**For more information:** Visit CWMI web site <http://cwmi.css.cornell.edu> for educational materials, research, and program updates

## COMPOSTING MANURE PROJECT

Research project topics include investigating the use of compost on turf, landscaping, and vineyards and assessing use of manure as bedding in terms of herd health, economics, and nutrient management. The goal of this project is to help farmers better understand how and when to use compost. Among newly developed resources is a computer model that helps to calculate time and cost of production for composting a certain amount of space.

**Top Impact from Work Thus Far:** Farms have implemented composting to manage nutrients and produce value-added products for use on and off farm.

**Duration:** Ongoing

**Project Leader(s):** Jean Bonhotal, Cornell Waste Management Institute, 607-255-8444, [jb29@cornell.edu](mailto:jb29@cornell.edu), [cwmi@cornell.edu](mailto:cwmi@cornell.edu)

**Project Partners:** Staehr, Stehman, Cornell University Applied Economics & Management, Vet School, Farm Services, multiple CCE associations, NYSDEC, NYSERDA, NRCS, NYFVI, NYSDAM, APHIS, USEPA, US Compost Council, participating farms

**Potential Benefits for Small Farms:** Waste reduction, value added products, bio-security, and nutrient management

**Funding Source(s):** NYS Energy Research and Development Authority, Dept. of Economic Development, NYS Farm Viability Inst., Cornell Cooperative Extension

**For more information:** Visit CWMI web site <http://cwmi.css.cornell.edu> for educational materials, research and program updates



## IDENTIFYING HELPFUL MANAGEMENT PRACTICES TO REDUCE LABOR, EXPENSES, AND STRESS DURING LAMBING AND KIDDING

This project seeks to provide outreach resources on management practices contributing to: 1) the reduction of inputs during indoor winter lambing or kidding; and 2) success of pasture birth systems. Twenty of 30 farmers that participated in an in-depth record keeping and interview project on their lambing/kidding seasons identified and adopted birthing management changes. Changes resulted in a total savings of \$60,000 due to reductions in labor and/or feed expenses without reducing reproduction or growth rate. Of 300 meat, goat, and sheep farmers who attend regional workshops on birth management practices, 200 farmers were contacted to track changes in their birthing systems for the following year, and 150 made birth management changes. One hundred farmers reported improved quality of life and monetary savings totaling \$75,000 over the next two years.

**Top Impact from Work Thus Far:** The project has developed an online handbook to aid with dissemination of lambing and kidding information and hosted numerous workshops with hands-on activities as education tool.

**Duration:** Ongoing

**Project Leader(s):** Tatiana Stanton, [tls7@cornell.edu](mailto:tls7@cornell.edu)

**Project Partners:** Michael Thonney, Cornell Teaching & Research Sheep Farm, 607-592-2541, [mlt2@cornell.edu](mailto:mlt2@cornell.edu)  
See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:**  
Reduce labor, expenses, and stress during lambing and kidding

**Funding Source(s):** SARE, grant # LNE10-304

**For more information:**

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE10-304>

## Livestock Extension Resources

### Cornell University Department of Animal Sciences

The Department of Animal Science's mission is to discover and disseminate new knowledge about the biology & management of domestic animals and to apply this knowledge to benefit society. For Animal Science Department information, contact Alan Bell, Chair and Professor at 607-255-2862 or [awb6@cornell.edu](mailto:awb6@cornell.edu) Website: [www.ansci.cornell.edu](http://www.ansci.cornell.edu)

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to livestock processing, marketing, training and certification, and funding opportunities. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Livestock.

### Cornell University Beef Cattle Management Program

The Beef Cattle Management Program, made up of Cornell Animal Science experts, is a resource for educational materials, workshops, and trainings pertaining to silvopasture, beef quality assurance, marketing, and cattle management. Contact: Mike Baker, Beef Cattle Extension Specialist, Department of Animal Science, 607-255-5923, [mjb28@cornell.edu](mailto:mjb28@cornell.edu) Website:

<http://ansci.cornell.edu/wp/beefcattle/>

### **Cornell Sheep Program**

The Cornell Sheep Program is a source of information about sheep, sheep wool, sheep milk, and their management, production, and marketing in the Northeastern United States. Contact: Mike Thonney, Department of Animal Science, 607-255-2851, [mlt2@cornell.edu](mailto:mlt2@cornell.edu) Website: [www.sheep.cornell.edu](http://www.sheep.cornell.edu)

### **Cornell Goat Management Program**

The Cornell Goat Management Program's mission is to improve the sustainability of goat farms in the Northeastern US by providing educational resources and communication outlets to producers.

Contact: Tatiana Stanton, Department of Animal Science, 607-254-6024, [tls7@cornell.edu](mailto:tls7@cornell.edu) Website:

<http://www.ansci.cornell.edu/goats/index.html>

# FIELD CROPS AND FORAGES

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## Field Crops and Forages Research

The following is a sampling of research projects relevant to field crop and forage growers. If you have a specific interest that is not addressed here, contact Tim Setter, Chair, Department of Crop and Soil Science, 607-255-5459, [tls1@cornell.edu](mailto:tls1@cornell.edu)

### CORNELL SMALL GRAINS PROJECT

The Cornell Small Grains Project has a long history of developing innovative approaches to crop improvement. Research uses a range of technologies including molecular genetics, physiology, pathology, and breeding to develop improved varieties for the northeast. Currently, this project utilizes grants from the USDA Organic and Research Extension Initiative (OREI) and Sustainable Agricultural Research and Education to evaluate heritage and ancient grains under organic management. OREI is building a mobile grain processing unit, connecting producers with NYC Farmers Markets, and conducting an economic analysis of the markets for organic specialty grains. Several of the best-performing grains will be evaluated for flavor and quality.

**Top Impact from Work Thus Far:** Evaluated more than 100 different grains under organic management in 2012.

**Duration:** Sept 1, 2011 – August 31, 2015 and Sept 1, 2012 – August 31, 2014

**Project Leader(s):** Mark E. Sorrells, 607-255-2180 (Main Office), 607 255-1665 (Lab), [mes12@cornell.edu](mailto:mes12@cornell.edu)

**Project Partners:** Margaret Smith, Gary Bergstrom, Bill Cox

**Potential Benefits for Small Farms:** Superior small grains varieties for both conventional and organic production.

**Funding Source(s):** USDA  
NIIFA, SARE, Hatch

**For More Information:** Visit Mark Sorrells' faculty website <http://plbrgen.cals.cornell.edu/cals/pbg/people/faculty.cfm>

### CORNELL NUTRIENT MANAGEMENT SPEAR PROGRAM

The goal of this research program is to improve understanding of nutrient release and risk for runoff and leaching losses from inorganic and organic amendments as affected by soil type, hydrology, time and rate of application, and the use of specific soil and fertilizer amendments. Publications and research information are available at the program website: <http://nmssp.cals.cornell.edu>

**Duration:** Ongoing

**Project Leader(s):** Quirine Ketterings, 607 255-3061, [qmk2@cornell.edu](mailto:qmk2@cornell.edu)

**Project Partners:** Numerous statewide collaborators

**Funding Source(s):** USDA NIIFA, SARE, Hatch

## WEED SEED MANAGEMENT

Farmers often have opportunities for reducing the input of weed seeds to the soil by actions either during crop production or after harvest. However, weeds often continue to develop seeds even after the plant is killed. The objective of this project is to determine the developmental stage at which various weed species are able to mature seeds after the plant is killed. Six common weed species will be terminated at three growth stages and by three methods: cutting at the base of the plant, chopping up the plant, treating the plant with glyphosate (Roundup). This research will determine the point at which each species must be killed to prevent seed development.

**Duration:** Oct. 2011-2016

**Project Leader(s):** Charles Mohler, 607-255-0199, [clm11@cornell.edu](mailto:clm11@cornell.edu)

**Project Partners:** Robin Bellinder, Russel Hahn, Antonio DiTommaso

**Potential Benefits for Small Farms:** Results will provide information for farmers to more efficiently manage weed populations.

**Funding Source(s):** MultiState Hatch

## BIOCHAR APPLICATIONS

Biochar is a charcoal-like product that is now offered for sale to improve soil properties. Biochar can also be produced from farm, crop, and food residues. This project evaluates what soil and environmental constraints can be addressed with different types of biochar. Possible benefits applicable to small farms in the Northeastern US include improved infiltration or water retention depending on the soil texture, reduced need for compost application in organic farms for reasons of improved tilth, reduced disease incidents, or accelerated composting with lower nitrogen losses.

**Top Impact from Work Thus Far:** Increased awareness and sales of biochar products

**Duration:** Ongoing

**Project Leader(s):** Johannes Lehmann, 607-254-1236, [cl273@cornell.edu](mailto:cl273@cornell.edu)

**Project Partners:** Janice Thies, Todd Walter, Anthony May, Eric Nelson, Stone Barns Farm

**Potential Benefits for Small Farms:** Information pertinent to the applicability and utility of biochar in soils

**Funding Source(s):** USDA Hatch, TSF

## FARM-BASED SELECTION AND SEED PRODUCTION FOR VARIETIES OF BREAD WHEAT, SPELT, EMMER, AND EINKORN ADAPTED TO ORGANIC SYSTEMS IN THE NORTHEAST

There is growing interest in producing bread wheat, spelt, emmer and einkorn in the Northeast; however there are very few sources of organic seed, and most varieties of these crops are either developed for conventional systems or for different ecological regions such as the Midwestern or Western US and Canada. This project proposes to address these related problems by providing training in seed production to organic growers in New England, NY and PA, and by starting the process of developing varieties adapted to organic agriculture in this region through on-farm selection with experienced organic farmers.

Information from ongoing projects evaluating existing varieties under organic conditions in the Northeast and discussions with farmers will be used to determine priorities for seed production and deciding on parents for developing breeding populations. Certified seed production workshops for organic growers will be conducted in the first two years of the project, and technical support will be provided to farmers interested in producing organic certified seed of varieties identified as top performers for agronomic performance and quality in previous Northeast SARE and OREI projects.

**Top Impact from Work Thus Far:** Widespread dispersion of information concerning organic seed growing methodology

**Duration:** Ongoing

**Project Leader(s):** Mark Sorrells,  
[mes12@cornell.edu](mailto:mes12@cornell.edu)

**Project Partners:** See  
sare.org for complete list

**Potential Benefits for Small Farms:** Increased organic crop seed production throughout the Northeast

**Funding Source(s):** SARE,  
grant # LNE12-318

**For More Information:**  
<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE12-318>

## FORAGE BREEDING PROJECT

The Forage Breeding Project develops varieties of alfalfa and birdsfoot trefoil for higher forage yield and quality and for multiple disease and insect resistances. The project also investigates switchgrass and other warm season grasses for the emerging biofuel industry. New varieties of perennial forage species are evaluated at various locations across New York to provide yield data to farmers, extension educators, and the seed industry.

**Top Impact from Work Thus Far:** N-R-Gee, a new alfalfa variety, is the first variety bred for a higher

**Duration:** Ongoing

**Project Leader(s):** Donald R. Viands, 607-255-3081,  
[drv3@cornell.edu](mailto:drv3@cornell.edu)

**Project Partners:** Dr. Julie Hansen, Dr. Gary Bergstrom, Dr. Elson Shields, Brian Richards, Mike Hunter, Joe Lawrence, Dr. Paul Salon, Doug Shelmidine, Brian True

**Potential Benefits for Small Farms:** New forage varieties may lower feed inputs by allowing small farmers to produce abundant, high quality forage, thus enhancing economic vitality of livestock operations. Yield data provide farmers with information needed to select forage varieties that will perform well in their operations.



concentration of pectin, translating to better conversion of forage protein for more efficient milk production. Due to N-R-Gee's increased digestibility, more protein goes into milk production and less protein goes through the animal.

**Funding Source(s):** Federal Hatch funds through the Cornell University Agricultural Experiment Station, New York Farm Viability Institute, Northern New York Agricultural Development Program, USDA-NIFA, US Department of Energy, Seed royalties, Fees from companies for variety yield evaluations

**For more information:**

<http://plbrgen.cals.cornell.edu/cals/pbg/programs/departm-ental/forage/index.cfm>

## Field Crops and Forages Extension Resources

### Department of Crop and Soil Sciences

Cornell's Department of Crop and Soil Sciences provides extension support in the following areas: Composting, Cornell Nutrient Analysis Lab, Crop Production, Disease Management, GIS and Remote Sensing, Forages, Pest Management, Precision Agriculture, Nutrient Management, Soil Conservations, Waste Management, and Weed Management | <http://css.cals.cornell.edu/>

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to field crops and forages.. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Production > Field Crops & Forages

### Cornell Nutrient Management Spear Program

The goal of this extension program is to improve grower and agricultural industry awareness of crop nutrient needs, crop quality, management of organic amendments, environmentally sound nutrient management practices, and overall soil fertility management in the state of New York.

Publications and research information are available at the program website:

<http://nmisp.cals.cornell.edu>. For more information, contact: Quirine Ketterings, Department of Animal Sciences, 607 255-3061, [gmk2@cornell.edu](mailto:gmk2@cornell.edu)

### Forage-Livestock Systems at Cornell

Forage-Livestock Systems focus on interdisciplinary basic and applied research on forages and the animals that consume them. Forage crops are one of the few resources that can be converted to food while sustaining and restoring our soil, water and atmosphere. Contact: Jerry Cherney, Department of Crop & Soil Sciences, 607-255-0945, [jhc5@cornell.edu](mailto:jhc5@cornell.edu) Website: <http://forages.org/>

### Cornell Soil Health

The goal of the Cornell Soil Health Program is to identify critical soil problems hindering profitability and sustainability in the Northeast, develop appropriate management solutions, and work with growers to incorporate new, beneficial practices. Contact: George Abawi, Co-chair, Department of Plant Pathology, [gsa1@cornell.edu](mailto:gsa1@cornell.edu) or David Wolfe, Co-chair, Department of Horticulture, [dww5@cornell.edu](mailto:dww5@cornell.edu) Website: <http://soilhealth.cals.cornell.edu/people/index.htm>

# AGROFORESTRY & NATURAL RESOURCES

## Agroforestry Research

The following is a sampling of research projects relevant to agroforestry and woodlots. If you have a specific interest that is not addressed here, contact Marianne Krasny, Chair, Department of Natural Resources, 607-255-2821, [mek2@cornell.edu](mailto:mek2@cornell.edu)

### CULTIVATION OF SHITAKE MUSHROOMS AS AN AGROFORESTRY CROP FOR NEW ENGLAND

Forest farming of shiitake mushrooms is an agroforestry practice that increases crop diversity while providing diversified income for farmers and other forest owners. Mushroom farmer advisers, the UVM Center for Sustainable Agriculture, and Cornell University's Arnot Forest work to lead education and research activities. Key elements in workshops conducted by this project include: tree acquisition (forest management), hands-on learning of essential skills, site visits to growers and guidance in development of a 5 year enterprise plan The NE Forest Mushroom Cultivator's Network (Visit <http://blogs.cornell.edu/mushrooms/>) will be used to foster communication among experienced and novice growers and to disseminate research results and a research-derived Best Management Practices publication..

**Top Impact from Work Thus Far:** Determined that, contrary to conventional wisdom, there is great flexibility in time between felling of tree and production of bolts for inoculation.

**Duration:** Ongoing

**Project Leader(s):** Ken Mudge, [kwm2@cornell.edu](mailto:kwm2@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increased shiitake mushroom yields

**Funding Source(s):** SARE, grant # LNE10-298

**For more information:** <http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE10-298>

## Agroforestry Extension Resources

### The Cornell Sugar Maple Research & Extension Program

The Cornell Sugar Maple Program exists to improve the production and use of maple products by working with producers, consumers, and others interested in this fascinating local product. Contact: Stephen Childs, 607-255-1658, [slc18@cornell.edu](mailto:slc18@cornell.edu) Website: <http://maple.dnr.cornell.edu/>

### Woodlot Management Assistance

Contact: Peter J. Smallidge, Department of Natural Resources, Cornell University, 607-592-3640, [pjs23@cornell.edu](mailto:pjs23@cornell.edu)

ForestConnect website: <http://www2.dnr.cornell.edu/ext/forestconnect/>

Master Forest Owner Program website: <http://www.CornellMFO.info>

Arnot Teaching and Research Forest website: <http://www2.dnr.cornell.edu/arnot/>

Publications are available through <http://palspublishing.cals.cornell.edu/> via the forestry and natural resources links.

# BUSINESS PLANNING & MANAGEMENT

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## Business Planning & Management Extension Resources

### Department of Applied Economics and Management (AEM)

Cornell's AEM Department is home to several programs pertinent to small farmers, such as Agribusiness and Economic Development, Agriculture Management and Marketing Program, Emerging Markets Program, and Commodity Promotion Research Program, among others. Visit <http://aem.cornell.edu/programs/index.php> for a full list and access to AEM programs. Contact: Loren Tauer, AEM Professor and Chair, 607-255-4402, [lwt1@cornell.edu](mailto:lwt1@cornell.edu) Website: <http://aem.cornell.edu>

### Horticultural Business Management and Marketing Program

The Cornell Horticultural Business Management and Marketing Program (Hortmgt) is designed to enhance the competitive position of the New York fruit, vegetable, and ornamental horticultural industry through targeted, curriculum-driven educational programs. Contact: Miguel Gomez, Department of Applied Economics and Management, 607-255-8159, [mig7@cornell.edu](mailto:mig7@cornell.edu) Website: <http://hortmgt.dyson.cornell.edu/>

### Cornell Cooperative Enterprise Program

The Cornell Cooperative Enterprise Program (CEP) conducts applied research on the economics of collective action, cooperative decision-making, management and marketing. Contact: Todd Schmit, CEP, Department of Applied Economics and Management, 607-255-3015, [tms1@cornell.edu](mailto:tms1@cornell.edu)

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to the latest business management tools such as software and calculators. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Tools and Technology. For grant, loan, and financing information, click on Resources > Funding.

### NY FarmNet and Farm Link Programs

NY FarmLink provides one-on-one consulting via business planning assistance to farmers who are interested in adding value to agricultural products, business transfers, partnerships, retirement planning, and estate planning. Business planning assistance is made available to all farm types through a grant from the New York Farm Viability Institute. The program has also developed resources for farmers to use in the business planning process (a full list of which can be found at <http://nebeginningfarmers.org/farmers/planning-2/business-plan-templates/>). For more information call 1-800-547-FARM (3276) or visit <http://www.newyorkfarmlink.org/>

# MARKETING, ADDING VALUE, & AG DEVELOPMENT

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## Marketing, Adding Value, and Ag Development Research

The following is a sampling of research projects relevant to small business owners. If you have a specific interest that is not addressed here, contact Loren Tauer, Chair, Department of Applied Economics and Management, 607-255-4402, [lwt1@cornell.edu](mailto:lwt1@cornell.edu)

### LOCAL FOOTPRINTS AND FOODSHEDS PROJECT

The Foodprints and Foodsheds project is developing tools for evaluating the sustainability of dietary patterns and the geography of the American food system. In particular, it analyzes the potential of local food systems, considering both the diet and number of people that could be fed with various agricultural resources. It also estimates the footprint (the area needed to feed one person) for various diets. New York State, Michigan, New Mexico, Mississippi have been studied in detail, and the program's final effort considers all of the adjacent 48 states.

**Top Impact from Work Thus Far:** Researchers concluded that in regions rich in pasture land, animal products should be included in the diet to efficiently feed the most people.

**Duration:** 2009 to 2013

**Project Leader(s):** Gary W. Fick, 607-255-1704, [gwf2@cornell.edu](mailto:gwf2@cornell.edu)

**Project Partners:** Jennifer Wilkins, Christian Peters, Arthur Lembo

**Potential Benefits for Small Farms:** The project results identify regions where there is potential to develop and expand local food systems.

**Funding Source(s):** W.K. Kellogg Foundation

**For more information:**

<http://www.cals.cornell.edu/cals/css/extension/foodshed-mapping.cfm>

### ENHANCING LEADERSHIP AND ORGANIZATION FOR FARMERS MARKET SUCCESS

This project applies information about the structure and function of Northeast Farmers Markets in order to evaluate their efficiency and identify where changes need to be made. The information contained in this article is intended for general discussion by New York State Farmers Market managers and vendors. It includes an overview of NYS Farmers Markets and in-depth analyses of the roles of each level of management.

**Top Impact from Work Thus Far:** The often complex,

**Duration:** Completed in 2007

**Project Leader(s):** Jude Barry; Brian Henehan, 607-255-8800, [bmh5@cornell.edu](mailto:bmh5@cornell.edu)

**Project Partners:** Carol Thomson, 607-255 5464, [cmt8@cornell.edu](mailto:cmt8@cornell.edu)

**Potential Benefits for Small Farms:** Gain insights for a more productive Farmers

behind-the-scenes workings of Farmers Markets are elucidated for the small farmer

For more Information:

[http://dyson.cornell.edu/research/researchpdf/sp/2007/Cornell\\_Dyson\\_sp0701.pdf](http://dyson.cornell.edu/research/researchpdf/sp/2007/Cornell_Dyson_sp0701.pdf)

Market

**Funding Source(s):** Department of Applied Economics and Management, NY Farm Viability Institute, Farmers Market Federation of NY State

## LOCAL FOOD MARKETING

How much does agriculture affect your local economy? Most of the impact that local producers have on the economy has to do with where they purchase their inputs from, hire the services they use, and sell their outputs. While it is known that purchases and sales strategies by smaller producers often differs from larger commodity based operations, adequate information at a level that differentiates these behaviors does not currently exist. To better understand how local agricultural producers manage these operations, researchers asked a sample of producers in the Capital District region (i.e., producers in Albany, Columbia, Fulton, Greene, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, and Washington counties) that sell at least a portion of their products to local (regional) buyers to complete a short questionnaire about these activities. Detailed sales expenditure data for 2010 was gathered from over 100 farms. The information is being used to assess the economic impacts of local food production in the region, particularly focused on contributions from small- and medium-scale agricultural producers.

**Top Impact from Work Thus Far:** Small and medium scale producers show higher levels of sales and purchases within the Capital District Region.

**Duration:** Ongoing

**Project Leader(s):** Todd Schmit, 607-255-3015, [tms1@cornell.edu](mailto:tms1@cornell.edu)

**Project Partners:** Becca Jablonski, Yuri Mansury, Capital District Vegetable and Small Fruit Program

**Potential Benefits for Small Farms:** Better understand economic contributions of small- and medium scale producers to regional economies

**Funding Source(s):** CALS/CCE Summer Intern Program, Ruth and William Morgan Professorship

## Marketing, Adding Value & Agriculture Development Extension Resources

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to organic marketing, value-added production, wholesale, Community Supported Agriculture (CSA), agri-tourism, and direct marketing. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Marketing.

### Empire State Food and Agricultural Leadership Institute (LEAD NY)

LEAD is an agriculture sector leadership development project that accepts approximately 30 students every other year for a 2-year cohort program. Small farm operators are encouraged to participate.

Contact: Larry Van De Valk, Director, LEAD-NY, 607-255-6891, [www.leadny.org](http://www.leadny.org)

### **Northeast Center for Food Entrepreneurship**

The NE Center for Food Entrepreneurship provides comprehensive assistance to beginning and established food entrepreneurs in the areas of business and product process development, product safety, process/product technology transfer and product commercialization. Through the center, entrepreneurs have access to established Cornell facilities such as brewing laboratories and processing plants to test the production of value-added products. Contact: 315-787-2273, [necfe@cornell.edu](mailto:necfe@cornell.edu), or visit <http://necfe.foodscience.cals.cornell.edu/>

### **Smart Marketing Bulletins**

This program in the Department of Economics and Management places emphasis on adaptation of new technologies to enhance productivity while maintaining environmental quality and sustainability. Contact: Gerald White, Professor, 607-255-2299 Email: [gbw2@cornell.edu](mailto:gbw2@cornell.edu) or visit <http://hortmgt.dyson.cornell.edu/index.htm>



# OTHER EFFORTS

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## Organic Farming Research

### ENHANCING ORGANIC AGRICULTURE RESEARCH AND EXTENSION IN THE NORTHEASTERN US

The objective of the project is to understand the consequences of fertilization with compost for weed management. Researchers observed that compost applications frequently increase the growth of weeds more than they do the growth of the crop, and that long term application of compost can increase weed problems even after application is reduced or stopped. Preliminary results indicate that manure may pose similar problems. Organic vegetable farms typically use compost as their primary nutrient source, and many apply it at high rates annually. Dairy farms generally use manure as a major nutrient source in their crop rotations. If a build-up of phosphorus from compost or manure is a reason for increased weed growth, farmers could potentially reduce the problem by using more N-fixing legume cover crops as a fertility source.

**Top Impact from Work Thus Far:** Several growers have adopted more conservative nutrient management plans as a way to avoid increasing their weed problems.

**Duration:** Ongoing

**Project Leader(s):** Charles Mohler, 607-255-0199, [clm11@cornell.edu](mailto:clm11@cornell.edu); Antonio DiTommaso, 607-254-4702, [ad97@cornell.edu](mailto:ad97@cornell.edu)

**Project Partners:** Klaas Martens, Kreher's Poultry Farms

**Potential Benefits for Small Farms:** Better nutrient and weed management strategies

**Funding Source(s):** MultiState Hatch

### LEARNING FROM FARMER INNOVATION IN NITROGEN FIXATION FOR IMPROVED NUTRIENT MANAGEMENT ON ORGANIC FARMS

The crux of this project was to combine on-farm research with outreach activities in order to measure nitrogen fixation in working vegetable farms and promote farmer-farmer and farmer-researcher knowledge exchange. Detailed measurements of soil properties, cover crop biomass and biological nitrogen fixation rates were conducted in 27 fields located on 11 farms. Researchers observed that nitrogen fixation rates are generally greater in hairy vetch cover crops compared to peas and that overall nitrogen fixation is highly variable across farms and fields. Nearly all farmer collaborators sought advice on management options related to legume cover crops and all of them modified their cover crop management practices in some way during the three years of this project. This project provided information on legume management to nearly 30,000 stakeholders through Q and A columns published in newsletters and other publications targeting farmers in the Northeast. Lastly, researchers produced a new legume management resource which was published in The Natural Farmer (readership of 5500) and will also be made available online.

**Duration:** 2007-2011

**Project Leader(s):** Laurie Drinkwater, 607-255-9408, [led24@cornell.edu](mailto:led24@cornell.edu)

**Project Partners:** See [sare.org](http://sare.org) for complete list

**Potential Benefits for Small Farms:** Increased organic crop production throughout the Northeast

**Funding Source(s):** SARE, grant # LNE07-252

**For more information:**

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=LNE07-252>

## CORNELL ORGANIC CROPPING SYSTEMS PROJECT

This project is a collaborative effort between scientists and organic farmers. The intent is to find methods for further improving organic cropping systems. By comparing cropping systems that use different approaches to building soil quality, the project will reveal effects of compost, cover crops and tillage practices on soil physical and biological quality. It will also reveal interactions between soil quality and weed, insect, and disease management. Researchers also expect to identify practices that assist in transition from conventional to organic management.

The approach of the project is to compare well managed organic vegetable and grain farms on experiment station fields to variations that represent more typical organic practices that may be more easily adopted by growers.

**Top Impact from Work:** Published economic results for small vegetable farms—

[http://www.hort.cornell.edu/extension/organic/ocs/vegetable/pdfs/economic\\_performance.pdf](http://www.hort.cornell.edu/extension/organic/ocs/vegetable/pdfs/economic_performance.pdf)

Published cover crops info for vegetable farms—

<http://www.hort.cornell.edu/extension/organic/ocs/reports/Cover%20Crops%20Planting%20and%20Termination.pdf>

**Duration:** 2007-2011

**Project Leader(s):** Laurie Drinkwater, 607-255-9408, [led24@cornell.edu](mailto:led24@cornell.edu)

**Project Partners:** Charles Mohler, Brian Caldwell, Janice Degni, Abby Seaman, Robert Hadad, Keith Waldron, Matt Ryan, Quirine Ketterings, Harold Van Es, Chaw Chang, Anton Burkett, Eric and Anne Nordell, Lou Johns, Lou Lego, Tony Potenza, John Myer, Klaas Martens, Erick Smith, Thor Oechsner, Betsy Leonard

**Potential Benefits for Small Farms:** Our vegetable experiment results are easily applied to small farms, and our economic analysis has been targeted toward small and very small (1-5 acres) farms.

**Funding Source(s):** USDA OREI

**For more information:**

<http://www.hort.cornell.edu/extension/organic/ocs/>

## Organic Farming Extension Resources

### Organic Production and Research at Cornell

There are numerous efforts at Cornell focused on organic production systems. For a list of current research efforts, visit the Cornell Organic Production and Marketing Working Group Website at [www.organic.cornell.edu/](http://www.organic.cornell.edu/). Research reports are organized by topic, including vegetables, fruits, field crops, dairy, cover crops and rotations. For more information or for a print copy of the Summary, contact Anu Rangarajan, Department of Horticulture, 607-255-1780, [ar47@cornell.edu](mailto:ar47@cornell.edu)

### Dilmun Hill Student Farm

Dilmun Hill is a campus, student-run organic farm. Its mission is to provide experiential learning opportunities and educational facilities for Cornell students, faculty, staff and the local community in the exploration of sustainable food and agricultural systems. Contact Betsy Leonard for more information, [bai1@cornell.edu](mailto:bai1@cornell.edu) or 607-423-8366

# Integrated Pest Management Research

## IPM FOR SMALL PONDS AND LAKES

Over the past decade researchers have developed an integrated pest management approach for dealing with weeds in small ponds and lakes. The step-wise approach includes an overview of the benefits of aquatic plants in ponds, evaluating a set of criteria to determine which aquatic weed management strategy will be most successful, and a summary of advantages and disadvantages of the eight different strategies that are available.

**Top Impact from Work Thus Far:** The Pond Guidebook received the 2009 Best Book Award from the NYS Agricultural Educators Association.

**For more information:** The Pond Guidebook can be viewed as a PDF or purchased at think link:

[http://palspublishing.cals.cornell.edu/nra\\_order.taf?function=detail&pr\\_id=163&UserReference=977694762127E2024FAA7532](http://palspublishing.cals.cornell.edu/nra_order.taf?function=detail&pr_id=163&UserReference=977694762127E2024FAA7532)

**Duration:** Ongoing, started in 1998

**Project Leader(s):** Rebecca Schneider, 607-255-2110, [rls11@cornell.edu](mailto:rls11@cornell.edu)

**Potential Benefits for Small Farms:** An IPM approach to pond weed management can improve pond water quality for dairy cows, for fish and other valuable wildlife, and for recreational swimming

## Integrated Pest Management Extension Resources

### New York State IPM Program

The NYS IPM Program is an integrated research-extension program. The mission of the NYS IPM Program is to help develop and deliver pest management tools that pose minimal environmental, economic and human health risks. Contact your local Cornell Cooperative Extension association to find out what's happening locally.

For a catalog of print publications call 1-800-635-8356. The IPM web site includes sections on Fruit Crops, Livestock, Field Crops, Nursery and Greenhouse, Landscape and Turfgrass, Field Crops, and Vegetable Crops at: [www.nysipm.cornell.edu](http://www.nysipm.cornell.edu).

### Network for Environment & Weather Applications

The Network for Environment & Weather Applications provides weather information, forecasts, insect models, and disease forecasts designed to help farmers reduce crop losses, improve IPM practices, save on spray applications, and improve planning for crop management. Users have reported that they can save, on average, \$19,500 per year in spray costs and prevent, on average, \$264,000 per year in crop loss as a direct result of using NEWA pest forecast models. To access the network, please visit [www.newa.cornell.edu](http://www.newa.cornell.edu). For more information, contact Juliet Carroll, New York State IPM Program, 315-787-2430, [jec3@cornell.edu](mailto:jec3@cornell.edu)

### Trac Software

NYS IPM designed this software that allows farmers to keep records up-to-date, generate reports, analyze pest management strategies and improve their IPM practices. Instead of filling out several forms for different reports, enter the record once in Trac software. Trac creates reports for you, plus

an EPA Worker Protection Standard (WPS) Central Posting form. To access this software, please visit <http://nysipm.cornell.edu/trac/default.asp>. For more information, contact Juliet Carroll, New York State IPM Program, 315-787-2430, [jec3@cornell.edu](mailto:jec3@cornell.edu)

## Farm Energy Research

### CELLULASES AND BIOFUEL PRODUCTION

This research focuses on using protein engineering of cellulases to increase their activity on native cellulose. This information should allow researchers to increase the rate of cellulose hydrolysis so lower amounts of cellulases are needed for biofuel production. So far researchers have succeeded in identifying multiple residues in two different exocellulases that have this function.

**Top Impact from Work Thus Far:** Researchers have identified a novel type of cellulase, processive endocellulase, that has the highest activity on native cellulose of any class of cellulase.

**Duration:** This research has been going on for thirty years and has three more years of funding

**Project Leader(s):** David B. Wilson, 607-255-5706, [dbw3@cornell.edu](mailto:dbw3@cornell.edu)

**Project Partners:** John Brady

**Potential Benefits for Small Farms:** This research should lower the cost of converting sugars from biomass, thus lowering the cost of producing fuels from crops or crop residues.

**Funding Source(s):** DOE through the BESC

**For more information:**

<http://mbg.cornell.edu/cals/mbg/faculty-staff/faculty/wilson.cfm>

### GRASS PELLETS FOR BIOHEAT

As the USA focuses on energy security, grass bioenergy is one of the ways that rural communities can move towards energy security. New York State has about 1.5 million acres of unused or underutilized agricultural land, most of which is already growing grass. Grass biofuel production does not need to divert any of the current agricultural productivity into the energy market; this biomass can be completely independent from, but complimentary to, the production of food and animal feed.

**Top Impact from Work Thus Far:** Several grass pelleting and briquetting operations have been initiated in the Northeast.

**Duration:** Ongoing

**Project Leader(s):** Jerry Cherney, 607-255-00945, [jhc5@cornell.edu](mailto:jhc5@cornell.edu)

**Project Partners:** Ke Max Zhang, Mike Hunter, Joe Lawrence, Paul Peterson

**Potential Benefits for Small Farms:** Grass pellets have great potential as a low-tech, environmentally-friendly, renewable energy system that can be locally produced, locally processed and locally consumed.

**Funding Source(s):** US Department of Energy

For more information:

[www.grassbioenergy.org](http://www.grassbioenergy.org);

[www.forages.org/grass](http://www.forages.org/grass)

## RAISING WILLOW AS FUEL FOR ON-FARM HEATING

This project is working to demonstrate the cultivation, harvesting, storage, and use of shrub willow as a fuel for on-farm heating. Researchers have established 25 acres of willow in Geneva, half of which will be harvested each year with a small-scale, tractor mounted harvester. The chips are stored and dried in a pole barn, and then used to fuel a 750 kBtu wood chip boiler which heats two campus buildings. There is still much to optimize, including weed management during establishment, harvesting logistics, chip drying efficiency, and chip storage logistics.

**Top Impact from Work Thus Far:** Researchers have successfully demonstrated the harvesting, drying, and conversion of willow wood chips as on-farm heating fuel.

For more information:

<http://willow.cals.cornell.edu>

**Duration:** Ongoing

**Project Leader(s):** Larry Smart, 315-787-2490, [lbs33@cornell.edu](mailto:lbs33@cornell.edu)

**Project Partners:** Dan Aneshansley, George Hudler, Greg Loeb, Dennis Rak, Dave Dungate, Mary Wrege, Penn State, Michigan State, West Virginia, SUNY-ESF

**Potential Benefits for Small Farms:** This has the potential to provide a long-term, low-cost fuel system to replace propane or fuel oil based heating with a sustainable, renewable fuel grown on underutilized, marginal farm land.

**Funding Source(s):** USDA Hatch, NY Farm Viability Institute, NYS Energy Research and Development Authority

## Farm Energy Extension Resources

### Cornell Small Farms Program

The Cornell Small Farms Program maintains current resources pertaining to sustainable farm energy. Visit [www.smallfarms.cornell.edu](http://www.smallfarms.cornell.edu) and click on Resources > Farm Energy.

### Sustainable Farm Energy Field Day Series

Each Fall, the Cornell Small Farms Program and Northeast SARE host a field day series on farms around NYS. Farmers give tours and share “How-to” information on incorporating solar panels, wind turbines, radiant heat, passive solar and ecological stewardship practices into a farm or homestead. To receive announcements of upcoming events, visit <http://smallfarms.cornell.edu/contact/e-news-sign-up/>

### New Generation Energy: Sustainable Power for Your Farm or Homestead Webinar Series

A four-part online webinar series sponsored by the Cornell Small Farms Program and NE-SARE has been archived and can be accessed through the Cornell Small Farms Program website. This series provided examples of energy conservation measures, solar arrays, wind turbines, compost heat, and

a variety of other ecological production techniques. Stream the webinars at <http://smallfarms.cornell.edu/resources/farm-energy/>

## **Farm Energy Innovators: Successful Conservation and Renewable Energy Strategies**

This booklet describes how farmers save energy and decide which renewable systems are right for their farm. Profiles detail the cost of installation, any grants or incentives available, amount of energy saved or produced, and where to go for further information. Download at <http://smallfarms.cornell.edu/resources/>

## **Beginning Farmer Extension Resources**

### **The Northeast Beginning Farmers Project**

This program works in cooperation with a team of extension educators to enhance and coordinate training and resources for beginning farmers across the Northeast. The project offers an online resource center, online courses taught by experienced Extension educators, new informational resources (like the Guide to Farming in NY), a series of farming videos, and a service provider map. Learn more at <http://nebeginningfarmers.org/>

### **NY FarmLink Program**

NY FarmLink is an assistance and referral organization that links beginning farmers with retiring farmers and other farm business opportunities. A network of counselors is available to assist with farm transfers, partnerships, and other business agreements by calling 1-800-547-FARM (3276). Website: <http://www.newyorkfarmlink.org/>

### **New Farmer Development Project**

A collaboration of the Council on the Environment of NYC/Greenmarket, Cornell Cooperative Extension-New York City, the New Farmer Development Project (NFDP) identifies, educates, and supports agriculturally experienced immigrants in the NYC region to establish economically and environmentally sound, small- scale farm operations. NFDP provides education, direct marketing opportunities through Greenmarket's farmers markets, placement on organic training farms in Queens, Staten Island, and Dutchess County, New York, loans, and assistance in establishing new farms. For information contact Cornell Cooperative Extension-NYC, 212-340-2950 or visit <http://www.grownyc.org/greenmarket/nfdp/>

### **New England Small Farm Institute**

The program's mission is to promote small farm development by providing information and training for aspiring, beginning and transitioning farmers. Resources for new farmers are located at [http://www.smallfarm.org/main/for\\_new\\_farmers/](http://www.smallfarm.org/main/for_new_farmers/). General contact: 413-323-4531, [info@smallfarm.org](mailto:info@smallfarm.org)



# CORNELL SMALL FARMS PROGRAM

Our mission is to foster the sustainability of diverse, thriving small farms that contribute to food security, healthy rural communities, and the environment. We do this by encouraging small farms-focused research and extension programs and fostering collaboration in support of small farms. Contact Cornell Small Farms Program: 607-255-9227, [smallfarmsprogram@cornell.edu](mailto:smallfarmsprogram@cornell.edu)

## Small Farms Extension Resources

### BiMonthly E-newsletter

Stay connected to the latest agricultural news, events, funding opportunities, and resources by signing up for Cornell Small Farms Program E-newsletter: <http://smallfarms.cornell.edu/contact/e-news-sign-up/>



### Small Farm Quarterly Magazine

Engage with fellow farmers, aspiring farmers, and educators by reading their stories and insights in the *Small Farms Quarterly*, a seasonal publication celebrating the vibrancy of agriculture in the Northeast:

<http://smallfarms.cornell.edu/quarterly/>

### Small Farms Online

Our website contains a wealth of small farm resources, including production information, business planning, marketing and publications.

<http://smallfarms.cornell.edu/>

### Cornell Small Farms Collaborators

We collaborate with a broad network of educators to create new resources and programs to serve you!

#### Small Farms Program Staff

Anu Rangarajan, Director  
Violet Stone, Program Coordinator  
Erica Frenay, Coordinator, NE Beginning Farmer Project  
Ryan Maher, BF Learning Network Coordinator  
Fay Benson, Small Dairy Educator with CCE Cortland Co.

#### Small Farms Leadership Team

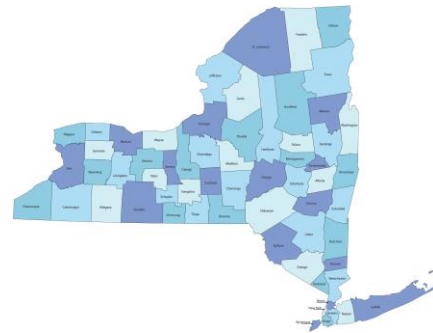
Monika Roth, Cornell Cooperative Extension, Tompkins County  
Nancy Glazier, CCE Yates County  
Lynn Bliven, CCE Allegany County  
Fay Benson, CCE Cortland County  
Bernadette Logozar, CCE Franklin County  
Karma Glos, Kingbird Farm  
Jim and Adele Hayes, Sapbush Hollow Farm  
Leo Siemion, Summit Naturals Organic Farm  
Liz Martin, Muddy Fingers Farm  
Mike Baker, Cornell Animal Science  
Peter Smallidge, CALS – Natural Resources  
Tatiana Stanton, Cornell Animal Science Department  
Heidi Marie Mouillesseaux-Kunzman, Developmental Sociology  
Daniel Welch, Business and Succession Planning Coordinator, FarmNet  
Phil Metzger, Consultant, Natural Resource/Conservation

# CORNELL COOPERATIVE EXTENSION

Cornell Cooperative Extension consists of an integrated network of professionals that includes campus-based faculty and staff, regionally deployed specialists and county-based educators and professional employees provided literally thousands of different programs throughout the state that reached business owners, community leaders, entrepreneurs, homeowners, and families. CCE programs support a diverse, sustainable, and profitable NY agriculture industry, aim to encourage improved nutrition and health practices, educate New Yorkers on a broad range of natural resources concerns, and engage New Yorkers in land-use training, among other services.

## Contact a Local Small Farm Educator

Not sure who to talk to at your local Extension office? Almost all of New York's 57 counties -- and New York City -- now have a designated "Small Farm Contact" who can help you get the information and assistance you need. Give them a call. If they can't answer your questions, they will probably be able to connect you with a regional Extension specialist, farmer, or other resource person in your area.



We encourage all small farm operators in New York to join your local Cornell Cooperative Extension Association. That way you can stay better informed about educational programs, farm tours, Cornell research, and local ag related news. You can also let Extension know what you need, and even serve on a Program Committee to help guide Extension programming in your county.