New York State
Agricultural Experiment Station
CORNELL UNIVERSITY
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Cornell Uncorks the Grape Team

by Linda McCandless

Geneva, NY - In the major leagues of vines and wines, New York State plays with the big boys. The Empire State has 33,000 acres of grapes under cultivation, ranks second behind California in wine production, and dominates the nation's grape juice industry. The number of wineries has jumped from 19 to 125 since 1976, and winemakers on Long Island, in the Hudson Valley, in the Finger Lakes, and along Lake Erie are winning international wine competitions and gaining market share.

FRUITFUL LABOR: *Bruce Reisch, professor of grape breeding and genetics at the experiment station in Geneva, holds fruit being developed in the grape breeding program. Grapes at Geneva are bred for the table, juice, and wine markets.*
PHOTO: ROB WAY

Wines from New York satisfy the spectrum of consumer taste, from the sweet dessert wines to the dry table wines to the bubbly; while quality Rieslings, Chardonnays, Merlots, ice and late harvest wines,

and recent Pinot noirs tickle the palates of the more discriminating.

The development effort that fuels this major agricultural industry occurs on "farm teams" located at Cornell University: in labs and vineyards in Ithaca and at the New York State Agricultural Experiment Station in Geneva, at the Vineyard Research Laboratory in Fredonia, and at the Long Island Horticultural Research Laboratory. Partners include the New York Wine & Grape Foundation, Penn State University, Cornell Cooperative Extension, the USDA, grape growers and winemakers, processors, and visionaries in the state legislature.

"We view viticultural research as an essential ingredient in our members' ability to remain competitive in the world marketplace," says Tom Davenport, director of viticultural research for the National Grape Cooperative in Westfield, N.Y. "Cornell is one of the premier universities for viticultural research and for integrating research for enology and juice production and quality."

Home Team Advantage

New York's wine and grape industry is currently geared for expansion because of a happy coincidence of circumstances. Grape growers are capitalizing on various micro climates around the state whose extremes are mitigated by bodies of water.

FINE WINE: *Thomas Henick-Kling checks the progress of fermentation in this batch of experimental wine at Geneva. He directs Cornell's wine research and extension program in support of New York's $500 million wine industry.*
PHOTO: ROB WAY

The balmy, maritime climate of Long Island, the temperate Hudson River valley, the moderate climate in the Finger Lakes, and the escarpment-bound strip bordering Lake Erie simulate some of the best grape-growing regions in France and Germany.

Grape growers are also able to capitalize on experience. The wine and grape industry in the Finger Lakes, for instance, flourished from 1829 until Prohibition. French, German, and Italian immigrants whose families have worked with grapes and wine for hundreds of years have made their way to New York where the industry is open to new ideas and the land still relatively inexpensive ($1500 per good grape-growing acre). Immigrants have improved "native" varieties like Concord, Isabella, and Catawba and introduced hybrid fine wine varieties from the Old World. In the 1950s, pioneers like Konstantin Frank, Charles Fournier, and Hermann Wiemer revolutionized the industry by affirming the viability of classic Old World varieties such as Chardonnay, Riesling, and - increasingly -

Pinot noir. In 1976, the Farm Winery Act was passed, stimulating explosive growth in the wine and grape industry by allowing grape growers formerly dependent on large buyers to open their own farm wineries.

Another major factor in expansion is the bolstering effect of research. The New York State Agricultural Experiment Station in Geneva, N.Y., has conducted viticultural research since its founding in 1880 and enology research since the 1960s. Among its contributions are the introductions of 52 new varieties of juice and wine grapes suited to New York soils and weather. Horticultural scientists, plant pathologists, and entomologists at Cornell conduct basic and applied research on a variety of relevant topics such as vineyard site selection, grapevine physiology, mineral nutrition, rootstock development, new variety development, insect and disease control strategies, canopy development, and integrated pest management (IPM), while food scientists develop technologies for quality juice and wine production.

"The many research projects that have been conducted over the years by Geneva faculty have enormously broadened the basic knowledge in the industry," says Jim Trezise, president of the New York Wine & Grape Foundation, the not-for-profit organization created in 1985 by the state legislature to support the New York grape, grape juice, and wine industries. Since then, it has funded about $5 million in research projects in a matching funds program with state and industry dollars and spent more than twice that on promotion. "Most of the research we fund at Geneva has to do with producing large quantities of the highest-quality grapes for wine and juice year in and year out," says Trezise. "Innovations adopted by industry based on the experimentation done at Geneva have drastically helped improve the image of New York wines."

Cornell has led the world in the field of vineyard mechanization, for instance. Geneva researchers Herman Amberg, the late Donald Crowe, and professor Nelson J. Shaulis developed the Geneva Double Curtain training system more than 30 years ago, which improves juice grape yield and wine grape quality and has been adopted all over the world. A second team, consisting of professors E. S. Shepardson, from the agricultural and biological engineering department at Cornell, the late James Moyer from the food science department, and Shaulis worked to develop a mechanical grape harvester designed for the Geneva Double Curtain that has since become an industry standard worldwide.

YOU CAN TASTE IT: *Robert Pool (left), visits Swedish Hill Vineyard in Romulus, N.Y., and talks with owners Dave and Cindy Peterson about grape and wine quality. The Petersons produce 85,000 to 90,000 gallons of wine annually and sell two-thirds of it out of their tasting rooms.*
PHOTO: KEVIN COLTON

The program of effective vineyard management at Geneva has been carried on in the last 15 years by Robert Pool. "Every glass of wine does not have to be a religious experience," notes Pool, during a sampling tour of a vineyard at the experiment station early this fall with enologist Thomas Henick-Kling. The two described a wealth of flavors while sniffing out harvest dates based on the developing flavors in grapes of Merlot, Chardonnay, Pinot noir, and Cabernet Franc, and work closely to make sound wines of intense and diverse flavor based on clonal selection and harvest maturity.

"Juice extraction and fermentation techniques that fit the cultivar and wine style are critical," says Henick-Kling, who has been directing the wine research and extension program at Cornell since 1987. He is also in charge of the Wine Analytical Laboratory and Wine Data Bank. His German education included travels to the vineyards and wineries of Europe on wine tasting and buying trips with his father. Winemakers throughout the state attest to his analytical abilities as well as his affinity for the effect of wine yeast and starter cultures on wine quality.

"Our laboratory research concentrates on the physiology of lactic acid bacteria of wine, adaptation to low pH, ecology and metabolism of wine year, and the effect of yeast and bacteria on wine flavor," Henick-Kling says. Winemaking trials in the university's pilot plant at Geneva study the effects of viticultural production and vinification techniques on wine quality.

Another integral member of the grape team is geneticist Bruce Reisch who directs the grape breeding program to develop and improve cultivars for table grape, juice, and wine production.

Clean-up batters on the squad include plant pathologists Wayne Wilcox, Tom Burr, Dennis Gonsalves, David Gadoury, Tim Weigle, Robert Seem, and Jim Travis (Penn State); grape physiologists Alan Lakso and Martin Goffinet; and entomologist Greg English-Loeb. They develop new technologies to overpower infectious diseases and pests, with minimal use of pesticides, and work closely with extension staff located close to grape production areas to help growers understand and exercise their options.

Cornell released two results of this collaborative approach last year: Traminette produces spicy wines and exhibits more winter hardiness and disease resistance than its famous Gewürztraminer parent. And Marquis, a seedless white table grape, is being patented for distribution around the world.

The entire grape team strives for quality and New York adaptability. "The future success of the New York wine industry depends on growers and winemakers who plant the best varieties for the climate, use training systems to maximize exposure to light and air, pay close attention to brix and acidity at harvest, and then make the most of each cluster for every bottle," says Pool. Following that prescription for success, New York has proven to the world that it is capable of producing excellent wines of all types in its various regions - Lake Erie, the Hudson Valley, the Finger Lakes, and Long Island.

Grape Juice's Winning Streak

But wine grape production accounts for only one-third of the New York industry. A much larger volume is generated by grapes grown for juice, particularly Concords. The Vineyard Lab in Fredonia, N.Y., focuses on research and extension in support of the grape juice industry. It is supported by the Lake Erie Regional Grape Program, in a collaborative agreement between Cornell and Penn State that started in 1991.

Impetus for the development of that program came from industry representatives, growers, processors, and associated agribusinesses. The industry generates research support by contributing $.75/ton to the Lake Erie Program. Research and extension activities at Fredonia provide information relating to nutrition, crop management, production economics, and integrated pest management (IPM) programs. As is true with Cooperative Extension grape programs in the Finger Lakes and Long Island districts, growers and processors are provided with new information in a timely fashion through newsletters, grower meetings, and workshops.

"One of our goals is to have 75 percent of the growers actively using IPM practices on their farms," says Barry Shaffer, who is the business management educator on the Lake Erie regional extension team. He outlines recent developments in vineyard scouting for insect pests, cultural and management practices that have increased yield, and the use of weather stations and monitoring programs to reduce pesticide application. "Overall savings from these pest management and other cultural practices amount to $187 per acre. In New York, industry-wide savings could be as high as $6 million," says the National Grape Cooperative's Davenport.

Figures like these give Cornell administrators a strong case for additional funding. Industry and legislators and ALS dean Daryl Lund helped James E. Hunter, director of the Agricultural Experiment Station, which supports Fredonia as an outlying station, to parlay figures like Davenport's into $600,000 in additional support for Geneva from Governor George Pataki and the state legislature in the most recent budget. With support from the wine industry, the station has also just launched a new Vinification and Brewing Technology Laboratory to expand wine and beer research.

"The wine and grape program at Cornell is one of the gems of the college," Hunter says. "In 1996, nineteen research projects were funded by private funds funneled through the Wine & Grape Foundation to get the state match," he notes. "In addition, Cornell is in the midst of administering half of the second of two $500,000 federal Viticultural Consortium grants from the USDA Cooperative State Research, Education, and Extension Services." Broad research objectives include increasing sustained efficiency and stability of production; increasing grape yield and quality; preserving or enhancing the environment; lowering input costs; improving marketability; increasing quality of value-added end products; and utilizing unique regional differences to result in products of high value.

Hunter also points to another important partner in wine and grape research at Cornell. The USDA-ARS Plant Genetic Resources Unit located at the experiment station in Geneva, is charged with acquiring, maintaining, characterizing, documenting, and distributing germplasm of cold-hardy Vitis. This living collection of grapes comprises 1,275 different genotypes which are available to researchers at Cornell and around the world for grape breeding projects. The USDA Animal and Plant Health Inspection Service has also recently approved Geneva as a site for the introduction of grape material from selected countries for initial screening without going through the full and expensive quarantine process.

Nobody appreciates all this activity like New York grape growers, juice processors, and winery owners. Dave Peterson's family is a case in point. They have grown grapes since 1969, operated Swedish Hill Winery in the Finger Lakes since 1986, and opened a second winery, Goosewatch, in 1997. They produce 85,000 to 90,000 gallons of wine annually and sell two-thirds of it out of their tasting rooms.

"Ten years ago, we grew all our own grapes and employed three people part-time. Now we purchase 500 tons of grapes from other growers, grow 100-plus tons of our own grapes, and employ 15 people on a full-time and 20 on a part-time basis," says Peterson, who is definitely bullish on the future of the New York wine industry. "The challenge of the future is to establish ourselves in markets outside New York," he says.

Growers and winery owners in New York with acumen sharpened by Cornell research and extension are increasingly able to step up to the plate to meet that challenge.

Drink to Thine Health

The New York wine industry benefits from recent research on the health benefits of moderate wine consumption conducted by Leroy Creasy, professor of fruit and vegetable science on Cornell's Ithaca campus, and toxicologist Gil Stoewsand, emeritus professor of food science and technology in Geneva. In a seminar on "Wine and Health" at this summer's Finger Lakes Wine Festival in Watkins Glen, Creasy cited several studies that corroborate the evidence that a moderate amount of wine consumed daily has a healthful effect on the heart. By raising the level of HDL (known as the "good cholesterol") in humans, wine seems to help prevent coronary disease which is a factor in 40 percent of all deaths in the United States. Stoewsand has studied the positive effects of wine consumption on blood pressure and components of cancer.

Creasy is also studying the beneficial effects of "resveratrol," a compound found in grapes and wine that seems to help prevent cancerous tumors. "Grapes produce resveratrol in response to their environment," Creasy says, "particularly in response to attack by diseases such as mildew."

New York's mildew problem, which is made worse by rain and high humidity, could be a blessing in disguise. Resveratrol is produced in the skins of grapes to combat the fungus that causes mildew. Since red wines are produced by fermenting grapes still on the skin to extract color and tannins, red wines have a high level of this beneficial compound. Creasy's team has shown that the resveratrol content of New York wines, particularly the content of the red vinifera varieties like Pinot noir that are so prone to disease, measures five times higher than their California counterparts. Resveratrol is also present in purple grape juice and the grapes themselves.

The New York Grape and Wine Industry Facts

Number 1 state in grape juice production
Number 2 in total grape acreage
Number 2 wine producer
1,000 vineyards covering 33,000 acres
175,000 tons annual harvest worth $40 million
50% for grape juice, 45% for wine, 5% for fresh fruit
115 wineries, 96 established since 1976
4 regions: Lake Erie, Finger Lakes, Hudson River, Long Island
Table, sparkling, and dessert wines
100 million bottles produced annually
$500 million in gross sales
$85 million in state and local revenues
1 million tourists to wine country
18,000 jobs in direct employment

As of January 97; NYS Wine & Grape Foundation

Related stories and sites:

- Foreign Grapes to Grow in New REQ Block - foreign grapes to be evaluated at NYSAES
- New Vineyard Lab Research Associate Appointed at Geneva - Terry Bates to assume viticultural duties at the Vineyard Lab in Fredonia, NY
- New York Wine & Grape Foundation Funded Research Projects - 1996
- Grape Research News:
  Winter 1997
  Summer 1997

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