Challenges in Sustainable Support of Hudson Valley Agriculture

Peter Jentsch
Hudson Valley Research Laboratory
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Background

Hudson Valley Research Laboratory

Grower Owned Laboratory

Cornell and SUNY Owned Orchard & Facilities

John Schadt
Entomology Technician
1940-1970
2 Faculty members:
- Plant pathology – Dr. Srdjan Acimovic
- Plant pathology – Dr. David Rosenberger
- Entomology – Peter Jentsch

Horticulture Scientists
- Dr. Gemma Reig (Post Doc) - Tree Fruit
- Dana Acimovic – Grape

Administrative Assistant (80%) – Donna Clark

Full Time Technical Staff (2-3)

Summer Technical Support (3-4)

Eastern NY Horticultural Program
- Teresa Rusnick – Vegetable Specialist
- Dan Donahue - Tree Fruit Specialist
- Jim O’Connell – Small Fruit & Grape Specialist
Hudson Valley Lab
Highland, NY

Laboratory: parking area, drive owned by the Hudson Valley Research Lab Inc.
• 5000 square foot single story laboratory
• 11 offices for regional extension agent & staff (5 full time & 5 seasonal staff)
• 6 laboratories, rearing room, insect pinning and taxonomy room
• Conference room with seating for 60 persons
• 4 Garage bays for vehicles & storage
• 2 Greenhouses with headhouse
• 2 cold room storage units, workshop

Experimental Orchard: presently owned by Cornell University
• 20 A Research orchard of pome fruit, stone fruit, & grape ≈ 100 experimental trmts / yr.
• Pesticide Facility: dry and liquid heated storage, waste containment
• Pole barn: 3 packtank high pressure handgun, 2 air assist sprayers,
  4 tractors, production implements, experimental and harvest storage
Ideally located in the heart of the fertile Hudson Valley growing region

Situated on the northern end of Illinois Mountain

Majority of pome fruit grown in Ulster County grown on the Marlboro / Illinois Mountain ridge & Clintondale hills.

Excellent air drainage
Deep alluvial loam soils
Abandoned orchards and woodlots provides high pest pressure for test plot research on tree fruit diseases and insects.
Program Report - Yearly

Covers activities under projects in Horticulture, Entomology that involved apples, pears, stone fruits, and grape.
Hudson Valley Research Laboratory
Yearly Annual Membership Meetings, Monthly BOD Mtgs

Board of Directors (11)

Brad Clarke, Sec.-Treasurer (2017)  Gary Samascott (2017)
Barth Davenport (2018)  

3-year terms
Past

- Land Grant Mission
- Cornell University
- NYS Ag. Experiment Stations – Ithaca & Geneva
- Hudson Valley Research Laboratory
  
  HVRL Development
  
  CALS Divestment
Overview: Land Grant Mission

**Land Grant University:** institution of higher education in the United States designated by a state to receive the benefits of the Morrill Acts of 1862 and 1890.

The Morrill Acts funded educational institutions by granting **federally controlled land to the states** for them **to sell to raise funds to establish and endow** "land-grant" colleges.

The mission of these institutions is to **focus on the teaching of practical agriculture, science, military science and engineering** "without excluding ... classical studies”, as a response to the industrial revolution and changing social class.

Land-grant colleges are both large **public** universities and **private** schools, including Cornell University.
Land Grant Mission

Cornell University - Private
- 7 colleges
- 4 Statutory Colleges
  - State Supported

College of Ag. & Life Sciences (CALS)
- Land Grant Mission
- Agricultural Education

- Relationship
  - Faculty to Student
    - 1868 – 2016 (150 years)
Hatch Act and Smith-Lever Act
The mission of the land-grant universities was expanded by the Hatch Act of 1887, which provided federal funds to states to establish a series of agricultural experiment stations under the direction of each state's land-grant college, as well as pass along new information, especially in the areas of soil minerals and plant growth.

Smith-Lever Act of 1914: included cooperative extension support to send CCE agents into rural areas to help bring the results of agricultural research to farmers.

Annual Federal appropriations distributed to land-grant colleges for research and extension work matched by state funds.
Agricultural Experiment Stations:

The United States of America has over 50 Ag. Research stations, with 13,000 scientists with programs related to specific disciplines and commodities.

Each state has at least one main station, usually located at and associated with a land-grant university. Many states have branch stations to meet the special needs of different climate and geographical zones in those states.
Agricultural Experiment Stations:

1880: New York State Agricultural Experiment Station (NYSAES-Geneva) was established by an act of the New York State Legislature on June 26, 1880, “for the purpose of promoting agriculture in its various branches by scientific investigation and experiment.”

At that time, agriculture employed over half of the labor force.

The focus for over 100 years has been scientific discovery and rapid communication of results to benefit the farmers and consumers of New York.
1880 Seven Station scientists—working in a single building that doubled as living quarters—conducted research on dairy products, horticultural production practices, and the evaluation of vegetable and field crop varieties for New York on 130 acres of farmland.

1887 Program expansion to include work on beef cattle, swine, and fruit varieties.

1923 Station becomes part of Cornell University in and diversified to include research on crops for canned goods, nursery plants, and raspberries.
Establishment of the Hudson Valley Research Laboratory

May 22, 1923: New York State Governor Alfred Emanuel "Al" Smith signed legislation enabling the New York State Agricultural Experiment Station (NYSAES) at Geneva to establish a field station for agricultural research in the Hudson Valley including support for staffing and operations.

“for the experimental study of the problems of increasing the production and controlling the diseases and injurious insects of the horticultural crops of the Hudson River Valley”.

Departments of Horticulture, Plant Pathology and Entomology
Hudson Valley Research Laboratory
Fulfilling the Land Grant Mission

- Relationship
  - Faculty to Farmer
    Hudson Valley Lab
    Regional Farmers
History of the Hudson Valley Research Laboratory

1923-62: Cornell Scientists working in the Hudson Valley are initially based in Highland, then on the campus of Vassar College, thereafter, at two locations in Poughkeepsie.

1942: The local fruit industry organizes the Horticultural Research Cooperative (later named the Hudson Valley Research Laboratory, Inc.) to provide assistance and leadership in finding appropriate facilities.
History of the Hudson Valley Research Laboratory

1962: After fire guts the Poughkeepsie laboratory, the Hudson Valley Research Laboratory Inc. arranges to purchase land and construct a new laboratory. Cornell University agrees to lease, equip, and staff the new buildings and to purchase additional acreage adjacent to the site for research plantings.

1963: Scientists move into the new facility at the current location in Highland, NY. A HVRL board of directors comprised of tree fruit growers formed. Annual meetings convene and membership fee.
History of the Hudson Valley Research Laboatory

1964: Experimental orchards are planted on the first 20 A. of land purchased by Cornell University and located on the hill behind the laboratory. operations of the Hudson Valley Lab

1974: The Hudson Valley Research Laboratory Inc. underwrites an addition to the original laboratory that nearly doubles available space for offices and laboratories.

1991: Cornell University constructs a modern facility to support pest management research in the research orchard. It provides heated pesticide storage for liquids, weighing room, metered fill and rinse station for tractors, lockers and office space.
History of the Hudson Valley Research Laboratory

2013 CALS Dean Boor announces measures to address budgetary shortfall since the recession. Includes the loss of the HVRL plant pathology position and 50% reduction of administrative assistant.

University wide: 2006 - Present
• Reorganization and consolidation of administrative functions
• Program cuts and department closures
• Department mergers and consolidations
• Downsizing operations to reduce overhead
• Outsource of operations
• Closures of field and laboratory facilities
• Transfer and sale of properties
Challenges Facing Regional Agriculture
History of the Hudson Valley Research Laboratory

2013 The Hudson Valley Research Laboratory board of directors agreed to take on a new partnership model. The facility would be fully funded by the agricultural community with faculty and staff funded by Cornell University College of Ag. & Life Science.

2014 A 5-year partnership agreement was signed between Cornell University and the Hudson Valley Research Laboratory, Inc. to promote continued funding, staffing, and operations of the Hudson Valley Research Laboratory. HVRL Inc. & CALS agree to fund a plant pathologist in place of a horticulturist.
Partnerships

- NYS Agricultural Industry - Farmers
- Cornell University CALS
- Cornell Cooperative Extension (Ulster+)
- Eastern NY Horticultural Program
- Agricultural Crop Protection Industry
- Local Economies Project – New World Foundation
- Poughkeepsie Farm Project
Partnerships

New York Apple Orchard - America's Heartland

Trapanni Farms Cooperator / Partner
Support to Regional Agriculture

Tree Fruit Industry

Vegetable Industry

Grape Industry

Small Fruit

Conventional / IPM, Organic Production Systems
Research

Horticulture, Entomology & Plant Pathology

Rootstock, Variety, Pruning, Training, Support Systems

Screening Studies

  Efficacy of Conventional & Organic Management

  Crop load reduction

Insect Pest and Beneficial Monitoring (Regional & State-Wide)

Pest Modeling & Threshold Development

Pest Biology & Evolution (Newly Invasive, Resistant Strains)

Exclusion, Attract and Kill, Biological Control (Entomology)

Hudson Valley Research Laboratory
2015 NY BMSB Trap Locations with late season adult captures
In 2014, we provided trap data threshold dates communicated to growers via Lab blog site.

http://blogs.cornell.edu/jentsch/
For each site we also provided scouting to determine if BMSB is present in the orchard AND provide spray timing recommendation.
Support to Community

Education

Ag. Producers

State & Regional Formal Presentations
Workshops, Field & Twilight Meetings
Webinars and On-Line Courses

Professional Associations – Regional and National Meetings
Horticulture (IFTA), Entomological (ESA), Plant Pathology (APS)
Support to Community

Education

Cornell Cooperative Extension Training
Elementary Education
Community Outreach (Broadcast Media, Phone)
Support to Community

Entomology Presentations to Elementary School Students

Bio-Control of Mite Workshop

Presentation to the Amish On Invasive Insects of Veg. Penn Yan, NY
Support to Community

Education

Citizen Science
  NYS Invasive Insect CS Project
  SWD & BMSB
Multi-state Collaborative Projects
  SWD & BMSB
Citizen Science Project 2011-2015
Multiple sources; HVRL + Individual CS input
- 800 specimens received
- 540 BMSB
- Live and digital submissions
- 87 distinct zip code locations
- 44 NYS counties.

http://imapinvasives.org/nyimi/map/

*Halyomorpha halys*
HVRL + CS
Horticulture, Entomology & Plant Pathology

Rootstock, Variety, Pruning, Training, Support Systems

Screening Studies

  Efficacy of Conventional & Organic Management

  Crop load reduction

Insect Pest and Beneficial Monitoring (Regional & State-Wide)

Pest Modeling & Threshold Development

Pest Biology & Evolution (Newly Invasive, Resistant Strains)

Exclusion, Attract and Kill, Biological Control (Entomology)
Attract and Kill for SWD in Small Fruit

- 3.5” substrate woven polypropylene netting
- Raspberry concentrate, cider vinegar, yeast, gelatin,
  - Super Absorbent Polymer (SAP) liquid holding (60:1 V/V)
- 1% A.I. solution of insecticide active ingredient @ 2 mL/disk

- SWD Monitoring
- Weather Resistant & PYO
Attract and Kill for SWD in Small Fruit Field Screening Studies: Entrust

Raspberry, Milton, NY
ATK: Honeysuckle 6 July; Raspberry 28 July

ATK Placement: Early (SWD Adults)
52.6% reduction in eggs/gram fruit
Brown marmorated stink bug
Golden Delicious Apple With BMSB Feeding Injury, Campbell Hall, NY October - 2012

5 bins: Range from 38 – 57% damage
BMSB in Jalapeno Pepper

15% feeding injury
**Procedure:**

- Nets were of Blockade™ Insect Screen 36 x 25 mils PAK Unlimited, INC.
- Single trap was added a 500W light.
- On day 0 (7 September), each net were sprayed with 0.75 gal. of Bifenthrin 10DF solution using 3.0 oz./gal.
- On days 0-1, nets were monitored with no captures of BMSB observed.
- On day 2 (9 September), lures and 500w Halogen light were added.
- Sampling of netted traps were made through October.
Procedures Con’t

• Generator + 500W Halogen light directed toward the field population of BMSB.
• Plastic sheets to define location and number of BMSB trap and kill data.
• Study was designed to:
  1. Determine the attractiveness of lights with net relative to net alone
  2. Determine the number of BMSB observed coming from field versus forest sides of trap
Studies of the Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål), in New York State

Combined Seasonal Trap Captures Using Pheromone and Pheromone + Light

Total BMSB = 12,894
Communications Technologies

Modeling for prediction of biological events
Horticultural, Insect and Disease Recommendations for Management

Computer & Internet Outreach
Email, Blog and Website Communication

Cornell Guidelines
Presentation Web Archiving
RIMpro, A Useful Apple Scab Model for 2016

RIMpro contains a proprietary apple scab model that is useful for (i) identifying the start of the scab season, (ii) quantifying risks associated with key infection periods between green tip and first cover, and (iii) determining the end of the primary scab season. RIMpro will provide more accurate information on apple scab infection risk than the traditional pseudothecial squash mounts that have been used for many years to assess apple scab ascospore maturity in spring. I’ve been working with RIMpro on a trial basis for the past two seasons, and I’m very impressed with the apple scab model. I suspect that over the next few years it will become as important for apple scab management as MaryBlyt has become from fire blight management.

More information about RIMpro is available in this PDF file.

For information about a meeting to introduce RIMpro and a special RIMpro subscription offer for 2016, go to http://www.redtomato.org/summit/.
A Threshold Based Management Tool for Brown Marmorated Stink Bug
Halyomorpha halys (Stål) in New York State Apple

Subscriber: Email
Searchable
A Threshold Based Management Tool for Brown Marmorated Stink Bug
*Halyomorpha halys* (Stål) in New York State Apple

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- Timely
- Video
- Expandable imagery
- Web Links
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- Timely
- Video
- Expandable imagery
- Web Links
• Presence / absence
• Population Threshold + Damage Levels

http://www.eddmaps.org/bmsbny/
15 NYS counties / 44 Sites

- Absence (Green)
  Monitoring but no adults caught

- Presence (Yellow)
  Under 10, no damage

- Presence + Damage Levels
  Under 10, <1% damage

- Presence + Damage Levels
  Under 10, ≥1% damage

- BMSB Threshold + Damage Levels
  10 or more, no injury

- BMSB Threshold + Damage Levels
  10 or more, <1% damage

- BMSB Threshold + Damage Levels
  10 or more, ≥1% damage
Bitter Pit in Jonagold  
Stink Bug Injury
HVRL Membership – Ag Industry (Growers)

Yearly maintenance and operations costs
2014-16: $80,000 ($125,000 budgeted)

2014: 56 contributors
12 mo. $99,343

2015: 52 contributors
12 mo. $25,900

2016: 52 contributors
2.5 mo. $28,550

Partnerships

CALS $250,000 / year (Staffing)
LEP $100,000 / year for 3-years
Vision for the Future: Funding

Where there is no vision, the people perish. Proverbs 29:18

Update Facilities
  dPCR (Plant Disease Diagnostics)
  Support technologies
  Insect Rearing Chambers

Vegetable Pathologist

Develop Endowed Positions
Vision for the Future