This report summarizes the applied research and extension activities of the three scientists at Cornell's Hudson Valley Laboratory (HVL) during 2008. The report covers activities under 36 different projects that involved apples, pears, stone fruits, and grapes. We, the scientists at HVL, made a total of 66 presentations at various research and extension meetings in 2008, and we published 7 research abstracts, 27 articles in extension newsletters, 16 other extension articles, and 25 technical reports.

Our research/extension programs keep us busy during summer, and our time during winter is occupied by report writing, grant writing, and compiling presentations for meetings. Nevertheless, we always have time to answer questions from fruit growers, regardless of whether those questions arrive by phone or e-mail or via extension educators or private consultants. We still make farm visits to assess complex problems, set up field trials, and try to keep abreast of developments in commercial orchards. In fact, we welcome requests for farm visits when unusual situations create new problems or lead to new insights. We hope that you will not hesitate to call us if you have problems, complaints, new observations, or novel ideas for our program efforts.

The Hudson Valley Lab is a unique research/extension resource for the fruit industry of New York and surrounding states. As scientists, we know that any success that we achieve is largely due to the uniquely integrated support structure that we enjoy thanks to linkages with and support from the local fruit industry, private consultants, agrichemical companies, Cornell University in Ithaca, the N.Y. State Agricultural Experiment Station in Geneva, and Cornell’s extension educators. We also benefit from the dedicated work of a highly skilled group of technicians and support staff.

Thanks again for your support and interest.

Dave Rosenberger, Professor of Plant Pathology and Superintendent of Cornell’s Hudson Valley Lab
Steve Hoying, Senior Extension Associate in Horticulture, Cornell’s Hudson Valley Lab
Peter Jentsch, Extension Associate in Entomology, Cornell’s Hudson Valley Lab
SUMMARY OF HORTICULTURE PROJECTS FOR 2008
Steve Hoying, Henry Grimsland, Joe Whalen, and Jordan Gianforte

1. **Gala/Fuji Apple Planting Systems Trial**: This continuing project seeks to develop and test effective and profitable planting systems by establishing research and demonstration orchards with cooperating growers. I have taken responsibility for managing the high density planting systems trial established in 2006 at Dressel Farms in Ulster County. This trial has a wide variety of training schemes and rootstocks as well as a comparison between two different types of nursery trees. Establishment costs and yield and fruit quality data will continue to be collected for each of these plots for 10 years, and the economics of each combination will be analyzed and compared. Updated information will be provided to fruit growers through the life of these plantings. These sites will be used for Extension demonstrations for pruning, training, and management throughout the trial until the study concludes in 2017.


3. **Rootstock Testing**: CG rootstocks are being field tested on commercial farms in the Hudson Valley in a cooperative project with Dr. Terence Robinson and Mike Fargione. One of the sites involves a comparison of response to fumigation for 12 different rootstock genotypes and advanced CG selections are being evaluated in the other trial. The Doubrava Gala block was established in 2006 specifically to evaluate the effect of soil fumigation on the performance of M26, M9Pajam2, G41, M7, G11, CG6210, G30, B9, G4210, G5935, M9NAKB337. The rootstock test block at Crist Farms was established in 2005 by Robinson and Fargione to field-test the performance of candidate apple rootstocks from around the world. Fuji was used as the test variety. The Crist block has 54 rootstocks from which tree mortality, yield, fruit and tree size data was taken in 2008. With previous data from WNY, several of the semi-dwarf candidates from this list have been identified as potential candidates for introduction in New York, have been placed on the “watch” list, and will be released in the near future. This trial will continue until 2017. This block was featured as a stop on preconference fruit tour for the International Society of Horticultural Sciences in July 2008. Approximately 45 scientists from around the world visited this block.

4. **NY Apple Variety Testing**: Fifteen second-test selections of Dr. Susan Brown’s apple varieties were planted at the Hudson Valley Lab in spring of 2007. The planting also included one new strain of McIntosh and another test selection from International Plant Management. This trial had a few fruit in 2008, and the selections were evaluated for precocity and some aspects of fruit quality. Fruit samples were provided to Dr Brown for evaluation. We also grafted six other advanced selections into an existing orchard with a cooperator for future evaluation. We are cooperating with Mike Fargione and Dr. Susan Brown on eight other grower variety trials throughout the Hudson Valley. Fruit yield and quality measures were collected for promising selections in 2008.

5. **Fuji Strain Testing**: Six early strains of Fuji were grafted into existing trees at the Hudson Valley Lab to compare these strains for fruit quality and suitability under Hudson Valley conditions. Some fruit was harvested in 2008. This plot is also being used to investigate the best way to manage top-worked
orchards for early yield and optimum fruit quality. Mike Fargione and I used this opportunity to create a video for growers to help them sharpen their top-working skills.

6. **Top-working Apples with Bark Grafting**: Changing varieties or strains is an important way for fruit growers to stay current with the market. However, planting a new orchard is an expensive and time-consuming proposition, often costing more than $10,000 per acre. The process from harvesting the last full crop in an existing orchard to harvesting the first crop in the new orchard can take as much as 6-8 years. If the orchard planting system and spacing is appropriate, grafting over trees to new cultivars can be done faster and cheaper with no more risk involved than planting a new orchard. I established a demonstration block at the Hudson Valley Lab where an older apple block was converted to several newer strains of the popular Fuji variety. (See Point #5 above.) Grafting techniques and critical control points were videotaped during important stages of the process. These taped segments are being edited into a complete video for distribution to interested commercial fruit growers. We taught growers the technique at the Hudson Valley Summer Fruit Tour on August 7, 2007 and visited interested growers to advise them.

7. **Hudson Valley Temperature Sensor Project**: This project identifies the best sites for establishing tender grape varieties in the Hudson Valley. It was initially supported by Senator William Larkin and others and involved deploying temperature sensors throughout the Hudson Valley. Funding was withdrawn March 2008. We made two additional temperature collections in 2008 and amended the project to reduce the cost of collections. We intend to continue to collect temperature data as long as the sensors are viable and there are funds for the travel and labor required for data retrieval.

8. **Grape Winter Protection Project**: We continue to investigate the benefits of cane burial as a method for winter protection of tender varieties. After harvest in September 2008, we buried two canes of each vinifera vine at the HVL vineyard using soil, bark mulch, and straw. Temperature sensors were installed at ground level under each mulch to record temperature and measure the effect of each type of mulch on winter temperatures.

9. **Grape Variety Suitability for the Hudson Valley**: In 2007, we planted a vineyard at the Hudson Valley Lab that contains 12 important vinifera, 15 hybrid, and two native varieties. This vineyard was established in order to conduct in-depth viticultural research on site. In 2007/8 we conducted trials on the influence of nitrogen fertilization on new vine growth and on winter protection of vines comparing different insulation materials for two of the more sensitive varieties in the vineyard using four different materials: straw, wood mulch, biodegradable celluloid material, and soil. We also have purchased and set up equipment (Differential Thermal Analyzer, DTA) to monitor real-time cold hardiness of grape buds and wood. We will use this equipment to assess winter protection methods and provide information to growers about the hardiness of their plants and the advisability and level of pruning. This fall we harvested all fruiting vines primarily to check each variety’s trueness to name. In 2009 we expect to follow each variety’s maturity from veraison to harvest and extend that information to Valley growers through “Veraison to Harvest” Newsletter. As vines begin reaching maturity, we will work on cultural practices that contribute to wine quality.

10. **Gypsum as a Source of Calcium for Bitter Pit Control in apples**: In cooperation with a local grower, we are evaluating three rates of CaSO₄ applications and the effects on soil calcium improvement and physiological disease amelioration.
11. **Ca/Mg Spray Applications:** We applied combinations of Ca, Ca/Mg, and Mg foliarly to a block of Cortland apples to study the role of Ca and Mg foliar sprays for controlling bitter pit.

12. **Summer Pruning and Fruit Quality:** We established a study in the Champlain Valley and Western NY to look at the effect of time of summer pruning on fruit quality at harvest and out of storage. Replicates of McIntosh trees were summer pruned every two weeks starting in July until just prior to harvest. Fruit was harvested when ready and tested for several harvest maturity indices including color, firmness, soluble solids, starch index, and ethylene levels. Fruit samples were stored in a 32-degree cold room for 60 and 120 days and changes in firmness and SS were reassessed.

13. **Botryosphaeria Control with Fruit Thinning Chemical:** This year we cooperated with Kerik Cox and Nicole Russo, Department of Plant Pathology at Geneva, to see if fruit thinning chemicals (NAA, Maxcel, carbaryl, Lime-Sulfur) had any effect on the proportion of fruitlets that fail to abscise after thinning and then become infected with the black rot fungus. Infected fruitlet mummies provide inoculum that contributes to fruit rots later in the summer.

14. **Predictive Thinning Programs for the Hudson Valley:** We were funded by the NY Apple Research and Development Program to look at simplified methods for assessing the effects of thinning chemicals in time for additional chemicals to be applied. This year we looked at Gala, Empire and Honeycrisp, measured growth rates, fruit size and weights, yields for various thinning programs. We hope to continue this study to establish curves that can be used by growers to quickly assess the impact of thinning programs.

15. **Establishment of a Research and Demonstration Orchard for Horticulture at the Hudson Valley Lab:** We obtained the first year of funding to establish a modern high-density orchard for research trials at the Lab. This will also serve as a model for orchard systems and rootstocks for the Hudson Valley and be used extensively in Extension programs demonstrating materials and techniques available for orchard establishment.

16. **Harvista Compatibility:** I worked with Agrofresh to test various combinations of adjuvants and Captan with Harvista to determine which combinations might cause phytotoxicity to fruit and leaves.

17. **Retain, NAA, and Harvista for Fruit Drop Control:** In this project we studied the effect of timing and rate of Retain and Harvista combined with NAA for control of fruit drop of McIntosh.

18. **Apple Tree Quality and Growth:** A project was started to look at the effects of 1st year tree management on the effects on tree growth and fruit yield. The experiment was planted at the HVL and will continue for 3 more years. First year growth parameters were measured in September 2008.

**Grant-Funded Projects in Horticulture**

- An Interactive Vineyard Site Evaluation and Selection System for New York (with Lakso), NY Wine and Grape Foundation.
- Develop a Protocol and a Database for Assessing Vineyard Soil Health to Improve Juice/Wine Quality and Vine Productivity (with Cheng), NY Wine and Grape Foundation – TQF.
- Developing a Simplified Method for Predicting Response to Apple Fruit Thinners, NY Apple Research and Development Program.
- Effects of Burying Canes and Vines on Bud and Cane Cold Tolerance, Tissue Composition, and Springtime Performance (with Goffinet and Martinson), Vit Consortium and Kaplan Funds.
- Establishing a new apple planting for horticultural research and demonstration at the Hudson Valley Lab, NY Apple Research and Development Program.
- Improved Chemical Thinning for Better Fruit Size, Fruit Quality and Return Bloom (with Robinson), NY Apple Research and Development Program.
• Orchard Management Systems for Improved Yield and Fruit Quality (with Robinson), NY Apple Research and Development Program.

• Support for Grape Research and Extension Program at the Hudson Valley Lab. Special Legislative Funding.

• Tall Spindle Video, NY Farm Viability grant to Mike Fargione.

• Veraison to Harvest Fruit Sampling in the Hudson Valley; Wine and Grape Foundations TQF

Extension Programming in Horticulture

1. Supporting the Tree Fruit and Grape Extension Programs in NY and the Hudson and Champlain Valleys: NY has some of the finest Extension fruit programs in the nation if not the world. They are supported by a variety of departments and administered and run by dedicated professionals. My goal has been to provide the very best support I can to further improve the program. I have participated in advisory meetings and other planning sessions, spoken at fruit schools, tours, workshops, twilight meetings, provided technical demonstrations, written regular articles for Scaffolds and regional newsletters, and provided direct extension educator support through specific information, farm calls and telephone support. I plan to continue intensive program support when and where needed.

2. Continuing and expanding Veraison to Harvest newsletter coverage of fruit ripening in New York: Tim Martinson (Hortic. Sci. Geneva), Chris Gerling, Ben Gavitt (Food Sci. Tech. Geneva), Jodi Creasap and Terry Bates (Lake Erie Grape Program), Hans Walter-Peterson (Finger Lakes Grape Program), Steve Hoying and Steve McKay (Hudson Valley Fruit Extension), Alice Wise, and Libby Tarleton (Long Island Grape Program). Eight (2007) to nine (2008) weekly newsletters were produced from September through October to highlight the ripening progress of key varieties throughout NY and provide harvest and winemaking information to NY vintners and grape growers. Each issue contained current analytical information on key fruit maturity indicators (brix, pH, titratable acidity) from 60 vineyards throughout NY. The newsletter was delivered electronically to a circulation of about 1000 industry e-mail addresses in Lake Erie, Finger Lakes, Hudson Valley, Long Island, and Northeast New York regions, as well as the statewide Enology Extension list. Newsletters were posted at: http://blogs.cce.cornell.edu/grapes/07-veraison-to-harvest-archive/ and at: http://blogs.cce.cornell.edu/grapes/08-veraison-to-harvest-newsletter/.

Horticulture Extension Presentations in 2008


Hoying, S.A. “Horticultural Notes”. In Fruit FAX - Horticultural and Pest Management Notes, Lake Ontario Fruit Program. April 15, 2008.


Professional Conferences, Tours, and Workshops Attended


Cornell Tree Fruit and Berry Program Work Team Tour of the Upper Champlain Fruit Region. Plattsburgh, NY. June 17-18, 2008.


NC 140 Regional Rootstock Annual Meeting: Improving Economic and Environmental Sustainability In Tree-Fruit Production Through Changes In Rootstock Use. Cuauhtémoc, Chihuahua, Mexico. November 15-18, 2008.

Committee Membership

National Clean Plan Network - Fruit Tree Commodity Committee (Tier 2). As a part of the most recent Farm Bill, the National Clean Plant Network (NCPN) was created to protect U.S. specialty crops, such as grapes, nuts, apples, peaches and other fruits, from the spread of economically harmful plant pests and diseases. The NCPN will ensure the global competitiveness of U.S. specialty crop producers by creating high standards for our clean plant programs. This is a cooperative project among 3 branches of USDA, State regulatory agencies, universities, and industry. I serve as an advisor to the network on Cooperative Extension issues.

Fruit Tree and Berry Program Work Team, Cornell University. A group of university and industry representatives that cross subject matter specialties to discuss the needs of the tree fruit industry and to develop practical and integrated research and educational programs for the tree fruit industry in New York.

Grape Program Work Team, Cornell University. A group of university and industry representatives that cross subject matter specialties to discuss the needs of the grape industry and to develop practical and integrated research and educational programs for the grape industry in New York.

Hudson Valley Regional Fruit Program Tree Fruit Advisory Committee and Fruit Program CCE Oversight Committee. These committees advise Mike Fargione on his program and Extension efforts in the Hudson Valley.

Good Fruit Grower Advisory Board. Advises the editor of the GFG and represents the eastern US for selection of Grower of the Year.

2009 Empire State Fruit and Vegetable EXPO Planning Committee. Plan the educational program for the annual EXPO and Becker Forum.
SUMMARY OF ENTOMOLOGY PROJECTS FOR 2008

Peter Jentsch, Henry Grimsland, Frank Zeoli

1. Using Predictive Insect Occurrence Modeling For Hudson Valley Pest Management Recommendations In Hudson Valley Apple Production. (Funding: NY Farm Viability Institute Grant) 20% Time commitment

The purpose of this project is to educate growers on insecticide modes of action for greater resistance management techniques, insecticide performance and proper application timing of new insecticide tools. We gather regional insect presence and temperature data from seven sites between Warwick and Saratoga and use this data in forecasting models to determine insect stages of development. We also employ this information to recommend timely application windows for each novel mode of action of the registered insecticides available to NY growers. By so doing we expect a decrease in commercial insect damage and an increase in the quality of production techniques when recommendations are applied to insect pest management programs.

- Establish pome fruit phenology in historical and present day summaries.
- Provide growers with degree-day historical and present day summaries.
- Collaborate with two independent scouting firms to collect insect presence data.
- Establish biofix dates for key insect pests for use in regional recommendations and NEWA web based predictive modeling programs.
- Use ‘Skybit’ weather data to collect temperature ranges at each of seven sites to aid us in determining degree-day accumulations and forecasting weather conditions. Verify Skybit with ‘on the ground’ iButton temperature data.
- Distribute to the grower community both insect occurrence predictions and recommendations on optimum timing windows for insecticide applications.
- Web base information of insect occurrence at seven HV sites posted on the Hudson Valley Regional Fruit Web Site: http://hudsonvf.cce.cornell.edu/scoutingreport.html
- Weekly e-mail ‘Scouting Report’ to cooperators / participants and regional producers.

2. Baseline Codling Moth Monitoring For OP Resistance. (Funding: NY Apple Research Development Program) 10% Time commitment

In this project we proposed to study the CM populations in three distinct regions of New York: the lower Hudson Valley, the upper Hudson Valley including the Lake Champlain region and the Lake Ontario region focusing on processing orchards. The principal goal is to establish a baseline of susceptibility of the F₂ generation of the adult CM and F₃ larvae from these three sites to the organophosphate azinphos-methyl (Guthion) and newly developed insecticides. In so doing we hope to establish a method of bioassay to determine baseline OP resistance in commercial and abandoned orchards that we will use to inform the grower community of the efficacy of these products.

- CM collection and rearing from four Hudson Valley and three Western NY orchard sites.
- Adult and nymph bioassays.
- Collaboration with Penn State (Greg Krawczyk) for resistance determination of codling moth to new insecticide classes (Dow sponsored with spinetoram; Delegate).
3. Alternative Insect And Disease Control For Pear Production: 5% Time commitment

The purpose of this project is to determine the effectiveness of 1% horticultural mineral oil (HMO) applications timed specifically for the control of foliar and fruit feeding insect pests in three distinct production systems: Organic, IPM and conventionally managed orchards. Our objectives are to determine the timing windows of HMO’s for the optimal control of insects and foliar / fruit Fabraea infections; determine the number of applications of HMO’s required based on pear psylla generations and infection periods; determine the environmental conditions for using HMO’s so as to optimize weather predictions and drying time to decrease risks related to application of oils; and determine the economic factors that would improve profitability of using HMO’s.

- Field evaluations of two organically approved treatments with comparisons to commercial standards *(Seasonal applications of 1% Damoil & PureSpray oil)*.
- Conduct pear psylla nymph bioassays to determine degrees of toxicity of oil relative to droplet size.
- Collect field samples of all life stages of pear psylla and development of foliar and fruit Fabraea leaf spot in research plots to determine the efficacy of treatments.

4. Alternative Apple Maggot Management Trials: Using Baited Red Spheres As An Attract And Kill Strategy For Organic Apple Maggot Control. *(Future funding through USDA; 2009)* 10% Time commitment

This project employs odor-baited pesticide-treated spheres for direct control of AM in comparison with existing approaches to AM control based on calendar-driven sprays or monitoring-trap-capture–driven sprays. The pesticide-treated sphere approach had proved very effective in past evaluations with late season pesticide reductions observed. Trials were conducted in three Hudson Valley locations:

- Marlboro, NY
- Modena, NY
- Altamont, NY

5. Establishing Insecticide Effectiveness And Timing To Establish Protocols For N.Y. Apple Production Using Eco-Apple Marketing Parameters: *(Funding thru Reissig: RAMP / Eco-Apple)* 10% Time commitment

A project was conducted in New York as part of a multi-state marketing grant to evaluate ‘Eco-Apple’ pest management strategies. We evaluated the use of effective and economically viable options for reduced-risk pest management programs in apples, using provisional action thresholds for specific major pests. Our primary objective was to determine the effectiveness of whole-farm approaches for managing the arthropod pests of apple orchards that rely on reduced-risk insecticides employed by northeast growers using the guidelines of the Eco-Apple pest management protocols. Cooperator locations included:

- Burnt Hills, NY
- Altamont, NY
6. Video Extension Education And Recommendations For Hudson Valley Apple Production:
< 5% Time commitment

The purpose of this project is to establish an educational environment for regional fruit producers to enhance their knowledge in order to optimize the application of new reduced-risk insecticides. Seasonal 3-5 minute video based on specific pest related topics and recommendations will be made available to the grower community through computer internet access. Recommendations for insecticide rotation to reduce the resistance potential of insect pest species based on predictive modeling will be a central format of the video venue. Growers will be contacted through list serve e-mails and code-a phone call-in messages conducted by CCE staff to the registered grower community. Available in 2008 were the following educational video series:

- Pear post-bloom insect control - Psylla and plum curculio (7:06 min.)
- Apple post-bloom insect control - Obliquebanded leafroller (4:19 min.)
- Apple post-bloom insect control - Plum curculio, oriental fruit moth, mites and plant bug (7:16 min.)

7. Industry Efficacy Trials: *(Funded through Agrichemical Industry)* 25% Time commitment

- Determining the insecticidal and miticidal efficacy of 15 experimental and commercially used N.Y. State registered insecticides for use on apple.
- Determining the insecticidal and miticidal efficacy of 7 experimental and commercially used N.Y. State registered insecticides for use on pear.


- Determining the insecticidal efficacy of 24 onion seed treatments of experimental and commercially used N.Y. State registered insecticides.

9. Hudson Valley Regional Grower Trials. Apple & Grape

- New Paltz, NY: Determining the efficacy of Delegate WG (Dow: spinetoram) on apple; 2008 24C label for use against CM And OFM.
- Marlboro, NY: Determining the efficacy of Movento (Bayer: spirotetromat), Assail 30SG (UPI: acetamiprid), Provado 1.6F (Bayer: imidacloprid), on Seyval grape to control foliar grape phyloxera: replacing the chlorinated hydrocarbon insecticide Thiodan WP with user-friendly management alternatives.
ENTOMOLOGY EXTENSION PRESENTATIONS IN 2008

Out-of-state Fruit Grower Meetings:

  Apple Pest Mgt, Using Precision Application Timings of Reduced Risk Insecticides.
  12-Dec-08       New England Vegetable and Fruit Conf., NH

  Pear Psylla Management Alternatives in Northeast Orchards.
  12-Dec-08       New England Vegetable and Fruit Conf., NH

Educational events within New York State:

  Using Degree-Day Insect Developmental Models to Effectively Use Reduced Risk Insecticide Management Strategies
  11-Jan-08       Long Island Agricultural Forum, Riverhead, NY

  Pest and Disease Management for Organic Apple
  26-Jan-08       NOFA – 26th Annual Organic Farming & Gardening Conference, Saratoga, NY

  Tree Fruit Insect Round-Up. Using Reduced Risk Insecticides in NY State
  26-Feb-08       Hudson Valley Fruit School, Kingston, NY

  Web Links and Video Clips: New Tools for Teaching Fruit IPM
  27-Feb-08       Hudson Valley Fruit School, Kingston, NY

  Grape Entomology in the Hudson Valley
  29-Feb-08       Hudson Valley Fruit School, Kingston, NY

  Grape Berry Moth Management in the Hudson Valley: Sprayer Demonstrations & Polycom video conference: Q & A with Andrew Landers and Greg Loeb.
  29-Feb-08       Hudson Valley Laboratory, Highland, NY

  Increasing Precision Application of FQPA-Inspired Pest Management of Hudson Valley Pome Fruit.
  9-11-Mar-08     79th Annual Meeting of the Eastern Branch Entomological Society of America

  Management of Insect Pests & Iris Yellow Spot Virus in NY Onion.
  19-Mar-08       CCE Orange & Ulster County Onion & Vegetable School, Middletown, NY

  Trends in Lepidopteran Emergence and Migration Patterns Influenced by ‘Global Warming’.
  19-Mar-08       CCE Orange & Ulster County Onion & Vegetable School, Middletown, NY
SUMMARY OF PLANT PATHOLOGY PROJECTS FOR 2008

Dave Rosenberger, Fritz Meyer, and Anne Rugh

1. Will Phosphite Fungicides Control Apple Scab, Mildew, and Rust Diseases?
   Project title: Feasibility of Managing Apple Scab, Rust Diseases, and Powdery Mildew with Trunk Applications of Phosphite Fungicides
   Funding source: USDA Pesticide Management Alternatives Program, (2007-08, with Kerik Cox)
   Objectives/accomplishments:
   Phosphite fungicides (same class as Aliette) were used for many years to control Phytophthora diseases, but scientists in Ohio and North Carolina recently reported that one of these fungicides, when applied to apple tree trunks at green tip, controlled apple scab through petal fall. Effectiveness of phosphite fungicides for controlling apple scab, cedar apple rust, and quince rust was evaluated during 2007 and 2008 in six field trials at the Hudson Valley Lab that involved a total of 39 separate phosphite treatments and 19 different apple cultivars. Phosphite products evaluated included Phostrol, Agri-Fos, and ProPhyt, but most of the work was done with ProPhyt. Phosphite fungicides were applied using all of the following methods: weekly foliar sprays; a single, high-rate foliar spray applied at green tip in combination with oil; weekly foliar sprays in combination with captan; weekly foliar sprays in combination with mancozeb; trunk sprays at green tip; crown drenches at green-tip; crown drenches at tight cluster; herbicide strip applications at green-tip; herbicide strip applications at tight cluster. Phosphite treatments sometimes suppressed scab and rust diseases slightly, but none of the treatments provided adequate control of these diseases. There was no consistent benefit from adding phosphite fungicides to captan or mancozeb. We concluded that phosphites have no value for controlling early-season diseases in apples.

2. Field Evaluations of Fungicides for Apples
   Funding source: Agrichemical companies, USDA-Hatch funds
   Accomplishments:
   At the Hudson Valley Lab, we have optimized facilities, equipment and research orchards for efficient evaluation of pesticides. In 2008, our total complement of field trials on apples included 9 separate field trials aimed at understanding options for disease control that involved --
   • 25 different products,
   • 99 replicated treatments,
   • 420 treatment sprays to replicated plots.
   Trials included second generation SI fungicides (e.g., Indar, Inspire), phosphite fungicides, summer disease fungicides, and fungicides to control black knot on plums. Ten reports covering 2008 trials are being published in Plant Disease Management Reports. Results from these trials are used to compile disease control strategies presented at winter fruit schools and in extension articles.
4. New Approaches for Controlling Spread of Fire Blight During Summer

Funding source: NY ARDP

Objectives/accomplishments:
The spread of fire blight during bloom is well known and can be forecast with several models. Very little is known about factors that enhance spread of fire blight during summer. A meadow orchard of 'Lady Apple' trees on MM.111 rootstock was established with the specific objective of studying the spread of fire blight to shoots during summer and the role of potato leafhoppers (PLH) in facilitating shoot blight. Eight different treatments that might impact either the pathogen or PLH populations were evaluated by applying them weekly in replicated plots. Trees were misted with *Erwinia amylovora* on 4 June and again on 31 July, and incidence of fire blight infections was enumerated by counting and removing infected shoots every two or three days throughout summer. None of the treatments (including sulfur, copper, or imidicloprid used alone or in combinations) had any affect on the incidence of shoot blight except that the non-inoculated control plots had significantly fewer blight infections than inoculated plots. The fact that we were unable to detect any effects of treatments on spread of shoot blight despite having significant differences in PLH populations in our test plots suggests that PLH may not be very important in spread of shoot blight during summer.

5. Using Foliar Applications of Phosphite Fungicides to Control Summer Diseases on Apples

Funding source: Agrichemical companies, USDA-Hatch funds

Accomplishments:
Phosphite fungicides were applied to control sooty blotch and flyspeck (SBFS) in three field trials during the 2008 growing season. Results confirmed that combination of ProPhyt plus Captan controlled flyspeck significantly better than Captan alone and usually provided results comparable to those provided by a combination of Topsin M plus Captan. Even low rates of ProPhyt (8 fl oz/100 gal or 1.5 pints/A) significantly improved flyspeck activity of Captan (and sometimes of Topsin M and Pristine as well), but the addition of ProPhyt had little benefit for controlling fruit decays. In contrast to our results from 2007, ProPhyt frequently boosted flyspeck control achieved with both Topsin M and Pristine, and in 50 percent of the comparisons, the high rate of ProPhyt (16 fl oz/100 or 3 pt/A) was significantly better than the low rate in these combinations.

6. Determining If and How Tomato Ringspot Virus and X-disease Impact New Stone Fruit Cultivars and Rootstocks

Project title: Determining Susceptibilities of New Cherry, Plum and Apricot Cultivars and Rootstocks to X-Disease Phytoplasma and Tomato Ringspot Virus

Funding source: Competitive Hatch Funds via NYSAES-Geneva (3 yr, with Steve Hoying and Mark Fuchs)
Objectives/Accomplishments:

Nursery stock orders for this experiment were finalized and detailed plot maps were created to accommodate the 1,116 stone fruit trees that will be planted specifically for this trial. Trees will be planted in spring of 2009 and inoculated with either the X-disease phytoplasma or tomato ringspot virus later in the summer using bark chips from infected trees. Plantings will be established using a modified randomized block design with single-tree replicates. Trees will be inoculated with X-disease phytoplasma or tomato ringspot virus or left as non-inoculated controls. Most inoculations will be replicated on five to seven trees, but smaller numbers of replications will be used where only limited numbers of trees were available from nurseries. Cherry cultivars that will be assessed for susceptibility to X-disease and tomato ringspot virus include Attika, Balaton, Black Gold, Danube, Emperor Francis, Hedelfingen, Hudson, Kristen, Lapins, Montmorency, Rainier, Regina, Royalton, Sam, Summit, Sweetheart, Tieton, Ulster, Van, and White Gold. These cultivars were ordered on as many different rootstocks as could be accessed from nurseries, but not all cultivars were available on all rootstocks. Rootstocks included in the trial include Mahaleb, Mazzard, Gisela 5, Gisela 6, Gisela 12, MxM 14, and MxM 60. A total of 670 cherry trees will be included in the test plantings. For other stone fruit species, Hargrand apricot, Orangered apricot, Stanley plum, Shiro plum, and Redhaven peach were all ordered on five new rootstocks to assess susceptibility of these new rootstocks to tomato ringspot virus. The new rootstocks to be tested are Cadaman, Controller 5, HBOK 10, Ishtara, and Krymsk 1. Redhaven on Lovell rootstock and Stanley on Myrobalan rootstocks will be included as standards for comparison. In addition, sufficient trees were located to test the following combinations for susceptibility to X-disease: Hargrand/Ishtara, Orangered/Cadaman, Orangered/Ishtara, Orangered/Krymsk 1, Shiro/Controller, Shiro/Ishtara, Redhaven/Cadaman, and Redhaven/Ishtara. In addition, several plum cultivars on Myrobalan rootstock will be planted and inoculated with X-disease to determine if any of these cultivars can act as symptomless carriers of X-disease and/or if they will develop any visible symptoms following inoculation.

7. Feasibility of Using Preharvest Sprays to Control Postharvest Diseases of Apples

Funding source: BASF Chemical company; USDA-CREES Multi-State Project NE-1018

Accomplishments:

For the past 40 years, apple storage decays caused by Botrytis cinerea and Penicillium species have been controlled by drenching fruit with fungicides immediately after harvest. The postharvest drench usually contains both a fungicide and diphenylamine (DPA), an antioxidant that is used to control the physiological disorder known as superficial scald. However, the recycling drenches accumulate and recycle inoculum for apple decay pathogens and raise concerns about cross-contaminating huge quantities of fruit with human pathogens. Pending registrations for foggable formulations of DPA may eventually negate the need for postharvest drenching. Field trials were conducted both at the Hudson Valley Lab and in a commercial orchard in western NY to determine if fungicides (especially Pristine) applied within several weeks of harvest could be used to control postharvest apple decays. Although Pristine suppressed postharvest decays caused by Penicillium and Botrytis, it generally failed to provide control equivalent to that obtained with postharvest drenching. One previous trial suggested that a combination of Taptin M plus Captan applied 10 days prior to harvest suppressed external carbon dioxide injury during long-term CA storage whereas Pristine applied at the same time did not. However, when this test was repeated in 2007-08, none of the preharvest fungicide
sprays showed any benefit for suppressing carbon dioxide injury during CA storage. Under NY conditions, the value of preharvest sprays for controlling postharvest decays remains questionable.

8. Postharvest fungicide evaluations, 2007-08

Funding source: Agrichemical companies, USDA-CREES Multi-State Project NE-1018

Accomplishments:
Two large postharvest trials were initiated in fall of 2008 to further evaluate effectiveness of Captan, Scholar, and Penbotec for controlling apple decays during storage. Objectives of the 2008-09 trials were to determine how these products hold up over time in drench tanks when drencher solutions become contaminated with soil and organic debris. These trials will be evaluated and summarized in spring of 2009.

9. Controlling Fabraea Leaf Spot on Pears:

Funding source: Agrichemical companies, Toward Sustainability Foundation, USDA Hatch Funds

Accomplishments:
In southeastern New York and Connecticut, *Fabraea maculata* causes fruit blemishes and premature defoliation of pears. Field trials were conducted to determine if petroleum-based horticultural oils would control Fabraea. In 2007, a highly refined petroleum oil (1% solution) was applied to Bosc pear trees on 22 May, 6, 26 June, and 13 July. Compared to trees sprayed with mancozeb on 1 May, 6, 26 June, the oil-treated trees had more infected leaves on 16 August (34% vs. 16%), similar levels of defoliation in mid-September, but fewer infected fruit (22% vs. 52%). In 2008, trees receiving oil sprays (1% solution) applied seven times between petal fall and 8 August were compared with trees receiving four applications of mancozeb followed by two applications of kresoxim-methyl during that same period. On 22 August, trees treated only with oil had a higher incidence of leaf infection (88% vs. 53%) but similar levels of defoliation (ca. 9%). Leaf disks (4-mm diam.) containing Fabraea lesions were removed from oil-sprayed and from unsprayed leaves on 7 August, 14 days after the preceding oil spray, were suspended in distilled water, and were vortexed for 30 sec to remove mature spores from lesion surfaces. Hemacytometer counts of the resulting spore suspensions showed that spore release from oil-treated leaves was reduced by 94% compared to control leaves. Spore germination as assessed 24 hr after spores were streaked on potato dextrose agar was also 63% lower for spores from oil-treated leaves. This is the first report that oil alone can provide commercial control of Fabraea leaf spot.
PLANT PATHOLOGY EXTENSION PRESENTATIONS IN 2008

In-State presentations at fruit grower meetings:

*Postharvest Pathology of Apples: A Story of Empire and Things that Happen Behind Closed Doors.*
  23-Jan-08 Dept. Seminar, Department of Plant Pathology, Geneva, NY

*Best Management Practices for Apple Fungicides*
  13-Feb-08 2008 Empire State Fruit & Vegetable Expo, Syracuse, NY.

*Tree Fruit Disease Round-up*
  26-Feb-08 2008 Hudson Valley Commercial Fruit Grower's School, Kingston, NY

*Cornell Fruit Research Update*
  27-Feb-08 2008 Hudson Valley Commercial Fruit Grower's School, Kingston, NY

*Effects of Pre-harvest & Post-harvest Factors on Storage Decay in Apples*
  27-Feb-08 2008 Hudson Valley Commercial Fruit Grower's School, Kingston, NY

*Apple Disease Control: Mistakes to Avoid in 2008*
  28-Feb-08 2008 Northeastern NY Fruit School, Lake George, NY

*Disease Control Issues at Petal Fall*
  20-May-08 Petal Fall Field Meeting, 11 AM, Fix Brothers Orchard, Hudson, NY

*Disease Control Issues at Petal Fall*
  20-May-08 Petal Fall Field Meeting, 3:30 PM, Crist Brothers Orchard, Milton, NY

*Disease Control Issues at Petal Fall*
  29-May-08 Petal Fall Field Meeting, Hart Orchard, Peru NY

*Results using ProPhyt to Control Apple Scab*
  22-Jul-08 Tour of Plots at the Hudson Valley Lab for companies interested in ProPhyt

*Postharvest Disease Control for 2008*
  19-Aug-08 Preharvest Meeting for Apple Growers, Highland, NY

*Results using Omega to Control Apple Diseases*
  27-Aug-08 Tour of Plots at the Hudson Valley Lab for companies interested in Omega

*Fungicide Field Trials in the Hudson Valley*
  04-Sep-08 Field Tour of Agrichemical Trials at the Hudson Valley Lab, Highland, NY

Presentations for consultants, agribusiness, or tree fruit research/extension professionals:

*Arresting the Spread of Fire Blight During Summer*
  12-Nov-08 CCE In-Service Training, Ithaca, NY

*Phosphite Fungicides for Apple Disease Control*
  12-Nov-08 CCE In-Service Training, Ithaca, NY

*Effects of Bactericide and insecticide Sprays on Spread of Fire Blight During summer*
  04-Dec-08 NY Apple Research & Development Program Research Review, Geneva, NY

*Oil Sprays Control Fabraea Leaf Spot on Pears*
  09-Oct-08 Annual Meeting of the Northeastern Division of the Am. Phytopathological Soc., Newport, RI

*Using Phosphite Fungicides to Control Sooty Blotch and Flyspeck on Apples*
  09-Oct-08 Annual Meeting of the Northeastern Division of the Am. Phytopathological Soc., Newport, RI

*Brief History of Flyspeck Model Development in the Hudson Valley*
  20-Oct-08 Sooty Blotch and Flyspeck Conference sponsored by a NE-IPM planning grant,
Burlington, VT

Evaluating Spray Programs Aimed at Reducing Spread of Fire Blight During Summer
22-Oct-08 New England, New York, and Canadian Fruit Workers Conference, Burlington, VT

How Much Goes Into the Tank: A Discussion on Rate Calculations for Pesticide Trials
22-Oct-08 New England, New York, and Canadian Fruit Workers Conference, Burlington, VT

Effects of Bactericide and insecticide Sprays on Spread of Fire Blight During summer
06-Nov-08 Great Lakes Fruit Workers Meeting, Holland, MI

Phosphite Fungicides Have Limited Benefits in Apple Fungicide Programs
06-Nov-08 Great Lakes Fruit Workers Meeting, Holland, MI

Invited presentations at out-of-state fruit grower or university meetings:

Experience with Inspire and Inspire-Super in NY
30-Jan-08 Syngenta Product Kickoff, Las Vegas, NV

Tips on Controlling Flyspeck and Sooty Botch
05-Feb-08 Ohio Fruit Packers Association (via telephone)

Key Issues for Controlling Apple Scab in 2008
20-Feb-08 2008 Ontario Fruit and Vegetable Conference, St. Catherines, Ontario, Canada

A Time-Line for Fire Blight Management with Action Cues from Prediction Models
21-Feb-08 2008 Ontario Fruit and Vegetable Conference, St. Catherines, Ontario, Canada

Fire Blight in Apple Orchards
21-Mar-08 New Hampshire Fruit Grower’s Annual Mtg, Boscawen, NH

Stone Fruit Diseases
21-Mar-08 New Hampshire Fruit Grower’s Annual Mtg, Boscawen, NH

Results with Flutriafol in Field Trials and How This Fungicide May Fit into Seasonal Spray Programs for Apples
09-Dec-08 Cheminova Seminar for Topguard Apple Fungicide, Gettysburg, PA
Refereed Journal Articles

Abstracts of Papers Presented at Scientific Meetings


University Publications


Extension Newsletter Articles: Many of the following articles can be accessed on line as follows:

Scaffolds Fruit Journal: http://www.nysaes.cornell.edu/ent/scaffolds/
Cornell Fruit Handling and Storage Newsletter: http://www.fruit.cornell.edu/cfhsnews.html


Extension publications other than newsletters:


Reports of field trials published in Plant Disease Management Reports (PDMR)


Changes in Facilities and Equipment, 2008

Maintenance, upgrades, and changes funded by the Hudson Valley Research Laboratory, Inc.

- Driveway, parking areas, and orchard roadway were completely resealed.
- Roof of the lab building was repainted to protect the rubberized roofing material and to reflect sunlight and reduce summer cooling costs.
- Conference room completely renovated, 2008.
- Continued payments on mortgage from the 1974 building expansion. Mortgage will be paid off in 2014.
- The lean-to roof over the lab building oil tank was rebuilt.

Changes funded by Cornell University and HVL scientist's research programs:

- Major orchard renovations are underway to make room for a stone fruit virus trial, an organic orchard trial, new horticultural plantings, and an entomology vineyard for insect control studies.
- Polycom system and overhead digital projector were installed in the conference room. The Polycom system allows us to receive seminars and participate interactively in educational events at Cornell, Geneva, county extensions offices, and other locations that have Polycom facilities.
- Purchased 20 HP New Holland lawn tractor for mowing tight orchard spacings and for applying herbicides.
- Purchased New Holland skid steer with lift forks and bucket with funding from Geneva for use in moving fruit bins and orchard renovation projects.
- Airblast mist sprayer (3-pt hitch) purchased for applying plot maintenance sprays.
- Controlled environment chamber purchased and installed in Entomology lab for insect rearing and studies.