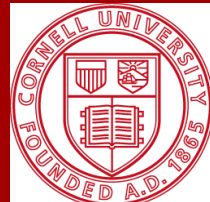




FRUIT NOTES

Lake Ontario Fruit Program



Volume 14 Issue 10

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How about those Berries?

D. Breth

Strawberries: If fields are staying wet for extended periods, 24-48 hours, and fields have a history of Phytophthora root rot, you might consider band applications of Ridomil Gold before bloom, or use Alliette or phosphorous acid (Phostrol) or potassium phosphate (Prophyt) when new leaves begin to grow this spring and repeated on a 30 day interval.

Weed control in established strawberry plantings:

- Some of you are concerned with weed control in strawberries, quack grass being one problem. This can be suppressed with a Poast application but you need to include crop oil concentrate (when there is no risk of frost) and you need 60^o temperatures for it to be effective. It will be a slow response. Use Poast at 1-2 pts/acre (1.5 pts for quackgrass) plus crop oil concentrate before grasses are 6 inches tall. But watch for frosts in the forecast because the oil can burn strawberry plants. You can apply a follow up Poast for quackgrass at 1 pt/acre (2.5 pts per acre seasonal limit). Poast has a 7 day PHI.
- Chateau can be applied to dormant strawberries if applied immediately after removing straw, but we are well past that window. Keep it in mind for next season. The rate is 3 ounces per acre. Devrinol is an alternative at the same time: it can be applied later but there will be no control of emerged weed seedlings.
- Stinger (1/3 pt./acre) can be used in early May for dandelion, oxeye daisy, curly dock, common groundsel, mayweed and pineapple weed, jimsonweed, red sorrel, sow thistle and Canada thistle. Do not use a surfactant with Stinger in strawberries. Do not mix Poast with Stinger. Stinger has a 30 day PHI.

Weed control in new strawberry planting sites:

- If perennial weeds, apply glyphosate, wait for 7 to 10 days, then rototill the soil.
- or rototill, apply Goal 2XL at 1-2 pints per acre. You must wait for 30 days before planting strawberries. Do not disrupt soil surface after the Goal application.
- At least one day before planting strawberries apply Prowl H2O at 1.5 to 3 pints per acre. Prowl must be incorporated by rainfall.
- Chateau can be applied to soil 30 days prior to transplanting if the strawberries are transplanted through plastic mulch.

Brambles: If you have not already completed your lime sulfur spray for anthracnose, spur blight and cane blight, now is the time to complete that anytime between dormant and ½ inch green.

Before weeds are too established, apply simazine (pre-fruit), Solicam (60 days PHI), Surflan (0 days PHI), or Sinbar (70 days PHI) for residual



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Building Strong and Vibrant New York Communities

Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.

Every effort has been made to provide correct, complete, and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are still possible. These recommendations are not a substitute for pesticide labeling. Please read the label before applying any pesticide.

weed control. Include a post-emergent herbicide such as glyphosate (14 days PHI) or paraquat. Aim can be used to target broadleaf weed seedlings only. For emerged perennial grasses, you can use Poast as above. There is also a SLN label for Dual Magnum, 1-2 pts per acre, applied to each side of the row before weeds emerge. There is a risk of crop injury if mixed with other products. Follow the label carefully. Dual Magnum will target ragweed, barnyardgrass, other annual grasses, carpetweed, nutsedge, pigweeds, and purslane.

Callisto is a post-emergent herbicide that must be applied **pre-bloom** at 3-6 oz./acre with 1% v/v COC. Do not mix with grass herbicides. Callisto will control smartweeds, ragweeds, pigweeds, nightshades, jimsonweed, lambsquarters, crabgrass, carpetweed, and chickweed if applied when weeds are 3-5 inches tall depending on the weed. Two applications are allowed at 3 oz./acre but 14 days apart.

Blueberries are at early green tip to budburst. Any wet weather will be conducive for mummyberry and Botrytis. Mummyberry will be an issue with rainy weather in plantings with a history of mummyberry. Lightly disking or raking

the groundcover under the bushes to stop the mummified fruits from producing spores, is practical in a small planting. Start with captan under light pressure but use Switch, Indar 2F, Quash, or PropiMax as disease pressure increases. For botrytis twig blight and blossom blight with cool, wet weather, Captan, CaptEvate, Quash or Ziram are labeled for control.

For weed control in blueberries: Chateau, Sandea, Velpar, Solicam, Dual Magnum, and Sinbar are residual herbicides dependent on planting age which target various weeds. You will need to include a post-emergent burndown if weed seedlings are already present such as paraquat, or Stinger for certain weeds, or careful shielded application of glyphosate. For nutsedge control, Sandea works better post-emergence at the 3-5 leaf stage. Callisto is also labeled in blueberries post-emergence pre-bloom. Read all the label precautions to prevent crop injury from these herbicide options.

Cathy Heidenreich, Berry specialist with Cornell, prepared an excellent weed-herbicide cross reference chart for the Berry Guidelines to help sort out your options.

Insect Management at Tight Cluster, 2014

Peter Jentsch, Cornell's Hudson Valley Lab (and D. Breth's 2 cents)

In terms of the weather, the Hudson Valley is at a very similar growth stage in tree phenology to that of 2013, with tight cluster occurring at nearly the same calendar date in Highland (27th of April). Forecasts for the next 3 days (NOAA) show daytime temperatures averaging in the lower 60s (51–70°F) and evening temperatures in the mid-40s (43–47°F). If we follow a predicted extended cooling trend with temperatures in the mid-60s, we will see McIntosh at bloom near the 9th of May with petal fall near 16–20 May, allowing for roughly 8–10 days of bloom (the average for McIntosh is 9.8 days). As for WNY, early apple varieties were at tight cluster around April 29 in 2013, but with the cool temperatures this spring are about 5-7 days behind last year given the continued forecast with below normal

temperatures based on Debbie Breth's observations. There is a lot of bud separation between orchards close to the lake and those in inland sites in WNY.

As we approach the pink period of tree phenology, the insect pest control options available to us are numerous. With more choices usually follows greater confusion. Although we have lost the use of azinphos-methyl (Guthion) and are noting increasing resistance of some insect pests such as obliquebanded leafroller, we are fortunate to have a number of insecticide options to contend with these issues. The petal fall (PF) application is likely to be the single most important application for insect pest management to pome and stone fruit in the

Hudson Valley. High-pressure orchards can experience nearly 100% crop loss from a complex of fruit damaging insect pests in a matter of a few days to a week or two. Needless to say, insect pest management is critical at this point in time. However, in orchards experiencing high pressure at PF, a pink application may be a wise choice if historical losses are experienced.

Most orchards have varying degrees of insect presence, and scouting for these insects based on their pest status will allow for greater economic benefits and productive management. As we have stated in earlier articles, San Jose scale found at harvest should, without question, be managed during prebloom to keep fruit from becoming infested a second year.

The Lorsban decision

Pre-bloom management will play an important role in petal fall decision-making. A single yearly application of Lorsban (chlorpyrifos) can still be made to tree fruit. If chlorpyrifos (Lorsban or similar generics) is used in a pre-bloom foliar application, then it cannot be used in a post-bloom foliar or trunk application. A pre-bloom chlorpyrifos application made at **early pink** will have a considerable impact on San Jose scale (SJS), rosy apple aphid (RAA), emerging obliquebanded leafroller larvae (OBLR), mullein and tarnished plant bug (MPB & TPB), European apple sawfly (EAS) and white apple leafhopper (WALH). Most importantly, if bees are brought into a block in a season of cooler temperatures and delayed petal fall of later varieties, a pink application provides increased management of migrating plum curculio, with less pressure to remove bees from a mixed block while active pollinators continue to work the king flowers. It also provides a bit of insurance if beekeepers are delayed in removing hives from mixed variety blocks.

Be aware that the active ingredient in Lorsban and the Lorsban generics is chlorpyrifos, which has a high bee-poisoning hazard. Judicious use of this product near bloom is essential to reduce the risk to active pollinators. Residual insecticide levels of foliar applications of chlorpyrifos during the delayed dormant period (dormant to 1/2"

green) will likely have little or no impact on the OBLR established in the orchard. We typically see the insect emerge from its overwintering hibernaculum to actively feed on foliage from late tight cluster through bloom. For this insect pest, bloom applications of Bt (e.g., Dipel, Agree, Javelin) at lower labeled rates using tight intervals and frequent applications, and/or a PF application of a specific OBLR insecticide such as Intrepid or Proclaim, will be required for management when OBLR populations are high. Scouting will easily determine the population at bloom to assist in decision making using the OBLR scouting threshold of 3% infested terminals found in the Cornell Guidelines (pg. 71).

Dogwood borer (DWB)

A directed, coarse trunk spray of Lorsban to control the trunk borers should be considered in orchards employing dwarfing rootstocks of apple such as M.9 that produce a high number of burrknots that are attractive to trunk borers. In recent surveys throughout New York, dogwood borer, especially in Macoun, have been implicated in tree decline, often associated with phytophthora root, crown and collar rots.

Pear psylla management

Continued applications of up to 1% oil to reduce pear psylla egg laying, nymph emergence and rust mite buildup is quite effective. Oil can be used at a 1% concentration at 14-day intervals for psylla nymph management throughout the season. However, higher rates will cause phytotoxicity. Oil for pear psylla control is NEVER CONCENTRATED. Use a 1 nymph per leaf threshold to help determine optimum timing to scout for egg-laying that gives rise to each generation of nymphs. It's important to note that if 1% oil is used for psylla management, it will have greater efficacy at application rates above 100 GPA. Larger droplet size and increased "dilute" application rates have been found to impose greater impact on egg hatch and early instar mortality.

The movement of nymphs into the developing flower buds will make applications of contact insecticides (OPs and pyrethroids) less effective for psylla control, even with excellent coverage. Insecticide options for nymph management

should consider the inclusion of neonicotinoids, the more effective products being Actara or Assail. Their use in combination with 0.25 to 1% oil will increase translocation into leaf tissue and insect cuticle to improve efficacy.

Plum curculios (PC) are not as attracted to pear as to apple; however, management should begin at petal fall or with the first oviposition scars. The use of OPs (primarily Imidan), pyrethroids, the neonicotinoids Actara or Calypso will control PC. As temperatures increase, the pyrethroids will become less effective on pear psylla populations. Actara or Calypso will have excellent efficacy against the 1st generation psylla nymphs when used at petal fall. Leverage (imidacloprid, the a.i.

in AdmirePro, + cyfluthrin, the a.i. in Baythroid) will have increased impact on adults and nymphs than either material alone .

Note from D. Breth: Order mating disruption pheromones for oriental fruit moth and codling moth now and plan to hang them at pink in orchards where you are having trouble controlling internal fruit worms. These products are essential in trees where spray coverage is questionable even if you are using all the new chemistry. The best experience is to hang 200/acre Isomate CM/OFM or Checkmate in smaller blocks of 10-20 acres and around the edges of disrupted orchards if using Puffers (1 per acre). Do not reduce rates if you experienced damage last year.

Precision Crop Load Management Training for NY Fruit Industry in Geneva (and via Polycom to 3 Satellite Sites) Tuesday May 6, 2:45-4:45pm

Mario Miranda Sazo

The CCE Lake Ontario Fruit Program and Dr. Robinson will be organizing the second Precision Thinning Workshop for NY growers and consultants in Geneva (**A137 Barton Lab**, Barton Hall, the only tall building at the Geneva Campus, park behind the library at Jordan Hall) between **2:45-4:45pm on Tuesday May 6**. It will also be offered via **Polycom at the CCE Orleans (Albion)**, CCE Clinton (Plattsburgh) County offices, and at the Hudson Valley Lab. Last year more than 30 people attended the first precision thinning workshop and learned about a new precision thinning program to manage apple crop load. More than 20 cooperating growers, consultants and extension staff implemented the precision thinning program on Gala and Honeycrisp cultivars in NY. This new method allowed growers to first determine a target fruit number and the initial fruit number per tree and then apply sequential thinning sprays. The program utilized the Cornell

Apple Carbohydrate Thinning model and the Fruit Growth Rate model to provide real time information to growers via the LOF Fruit Fax and LOF newsletter. The program gave growers confidence to thin when appropriate and was easily applied to more simple trees such as the Tall Spindle or Super Spindle where fruit counting of whole trees was easier than large trees.

The program was successful in guiding chemical thinning decisions in 2013. This year we again encourage you to consider the economic implications of optimum crop load and optimum fruit size for maximum profitability. The advantages of doing the right things at the right moment justify this more intensive management approach required by the Precision Thinning Program. Please consider attending the coming trainings in Geneva, Albion, Plattsburgh, or at the Hudson Valley Lab on May 6.

New BMSB Survey

Got stink bugs? We need your help! We're surveying growers to assess the impact of BMSB on crops and gather information that will help us

defeat this pest. Receive a free *Guide to Stink Bugs** if you **complete the 10-minute BMSB survey**

(https://cornell.qualtrics.com/SE/?SID=SV_5ssnjXLNhvp6v1H). Your participation will **help us to help you Stop BMSB!** The survey will be available until June 30th.

—The Outreach Team for "StopBMSB," a project

focused on the biology, ecology, and management of the brown marmorated stink bug.

For more info: StopBMSB.org

Four Simple Steps to Pruning Cherry Trees on Gisela and Other Rootstocks

Lynn E. Long – Oregon State University

Pruning and training trees on productive rootstocks, such as the Gisela® 5, 6, or 12, requires techniques that are completely counter to pruning trees on Mazzard rootstock. When producing cherries on Mazzard rootstock, cherry growers must constantly think about how to encourage precocity and productivity in the tree, whereas when producing cherries on productive rootstocks, they must focus on reducing crop load and increasing vigor.

Tree vigor is important because more leaves mean more carbohydrate production and **larger cherries**. The production of high-quality cherries requires a gross canopy leaf area-to-fruit (LA:F) ratio of at least 200 cm² of leaf area per fruit. Trees with a lower LA:F ratio are unable to manufacture enough carbohydrates to produce premium cherries.

Pruning strategies for trees on productive rootstocks should focus on the following: (1) thinning cuts to remove pendant (downward-hanging) and weak wood and to improve light penetration into the tree, (2) stub cuts to reduce crop load and renew spurs, and (3) heading cuts to encourage branching (leaf production) and reduce crop load.

Thinning cuts: Each year, begin by removing any pendant or small-diameter wood at the point of its origin. Typically, these branches overset and produce small cherries. Removing these branches in the dormant season can eliminate a significant amount of small cherries before they develop. Also reduce branches in the top of the tree and on the perimeter to a single shoot. The thinning cuts will allow light to reach the inner and lower portions of the tree. Only leaves in full sunlight can photosynthesize at maximum capacity.

Stub cuts: The current season's crop can be reduced by heading with stub cuts. Stub cuts also replace branches and renew old spurs. Leave 6-7 inch stubs. Leaving the stubs limits the expansion of the

bacterial canker into the main branches in the Northeast.

The highest quality cherries grow at the base of last year's growth and on young spurs. Therefore, no spur should be older than 5 years old. To keep spurs within this age range, stub back and renew 20% of all fruiting branches each year. Adequate light must reach the area around the cut in order for a new branch to form. For this reason, cut branches located near the tree base to a longer stub than those near the tree top. Stubs can range from 6-7 inches to 2 feet in length, depending on the position of the branch in the tree.

Heading cuts: Lateral branching is necessary to produce enough leaves to produce a crop of premium cherries. Because cherries are characterized by strong apical dominance, lateral branches will not form readily without grower intervention, although the degree of natural branching varies among varieties. Heading cuts are the most common technique used to overcome apical dominance and encourage branching. A heading cut does two things. First, it eliminates the source of auxins (natural plant hormones that inhibit branching) to the lateral shoot buds, encouraging multiple lateral breaks to arise immediately below the cut. These branches increase the number of leaves that produce carbohydrates for developing fruit lower on the branch. Often, new shoot leaves are at least 50% larger than spur leaves, thereby contributing significant photosynthetic potential. The second important function of a heading cut is to reduce the crop. A heading cut in 1-year-old wood reduces the future cropping potential of the branch. By removing one-third to one-half of last year's new growth from every shoot during the dormant season, a substantial portion of the future crop can be eliminated. In fact, since terminal spurs produce more flowers than basal spurs and are closer together, removing one-third of the new growth will

reduce a branch's fruiting potential by about one-half.

Note: This article is a Pacific Northwest Extension publication produced by Oregon State University,

University of Idaho, and Washington State University.

Focus on Food Safety Series – Part 3 Pathogens Causing Foodborne Illness in the US

Craig Kahlke & Betsy Bihn

In this installment (Part 3), we will examine the pathogens that most frequently cause foodborne illnesses associated with fresh produce.

Understanding a little bit about the microorganisms and what they need to survive and multiply is important to understanding how to assess and minimize risks on the farm.

Figure 1. Below shows the seven major pathogens that cause nearly all of the foodborne illnesses & outbreaks associated with fresh produce in the US. While bacterial causes such as *Salmonella spp.*, and pathogenic *E. coli* do cause the majority of the illnesses, the parasite *Cyclospora cayetanensis* causes over 10% of outbreaks and the virus Hepatitis A can be a threat as well. Though the data outlined in Figure 1. does not include the *Listeria monocytogenes* outbreak associated with cantaloupe, most fresh produce growers are keenly aware of that outbreak as it continues to be featured in the media as the legal ramifications continue to unfold.

Salmonella causes well over 50% of foodborne outbreaks in the US per year. Salmonellosis is the disease caused by ingestion of the *Salmonella* bacteria. On average across all foods every year, *Salmonella* is estimated to cause about 1.2 million illnesses in the US, with over 20,000 hospitalizations and 450 deaths¹. Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after ingestion of the contaminated food.

Since it is foods of animal origin that are most often contaminated with *Salmonella*, it is most prevalent in raw or undercooked poultry, meat, and eggs¹. *Salmonella* can also be found in raw or unpasteurized milk and other dairy products. *Salmonella* contamination of fresh fruits and vegetables can occur through cross-contamination on the farm as well as throughout the food

distribution system including transportation, retail stores and even in the home.

Pathogenic *Escherichia coli*. Nearly one-fourth of foodborne outbreaks across all food types in the US are caused by pathogenic (disease-causing) strains of *Escherichia coli*. *E. coli* are a big and diverse group of bacteria, with most strains being harmless. In fact, *E. coli* are a component of healthy intestinal tracts in humans and many other animals². Unfortunately, there are also pathogenic strains of *E. coli* that have caused many produce associated foodborne illness outbreaks. A well-known and studied strain is *E. coli* O157:H7. This strain of *E. coli* produces a shiga-toxin once ingested and so it is categorized as a Shiga Toxin-producing *E. coli* (STEC)². According to the Centers for Disease Control and Prevention (CDC), around 5–10% of those who are diagnosed with STEC infection develop a potentially life-threatening complication known as hemolytic uremic syndrome (HUS)². Most of these people will recover within a few weeks, but some, including young children and others who may be immune-compromised, can suffer permanent damage to their kidneys or other critical organs.

Pathogenic *E. coli* can be shed by animals including both domestic and wild animals in their feces. Ruminants, such as cows, can naturally shed pathogenic *E. coli* which can then introduce it into the growing environment through contaminated water sources, soil, and even wind. If this manure is used on production fields, fresh fruit and vegetable crops can become contaminated.

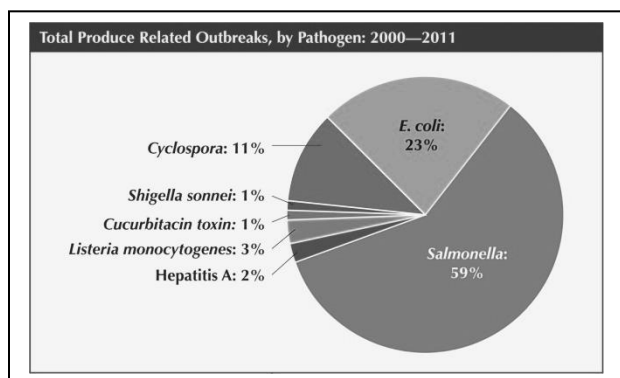
Cyclosporiasis is an intestinal illness caused by the microscopic parasite *Cyclospora cayetanensis*. *Cyclospora* is spread by people ingesting something, such as food or water that was contaminated with feces containing *Cyclospora oocysts*³. *Cyclospora* needs time (days to weeks) to become infectious after leaving the body in fecal material. Therefore, it is unusual for *Cyclospora* to pass directly from one

person to another. People living or traveling in tropical or subtropical regions of the world may be at increased risk for infection because *Cyclospora* is endemic in these areas³. Foodborne outbreaks of cyclosporiasis in the US have been linked to various types of imported fresh produce. The time between consumption and becoming sick is usually about 1 week. *Cyclospora* infects the small intestine (bowel) with many unpleasant symptoms, including things like explosive diarrhea³. Fruit and vegetable crops can become contaminated through overhead irrigation with contaminated water sources.

Listeriosis is the illness caused by the bacteria *Listeria monocytogenes*⁴. Like *E. coli*, *Listeria* can be ubiquitous in the environment. *Listeria* contamination is usually associated with processed meats and cheeses made from unpasteurized milk. Immuno-compromised individuals such as children under 5, pregnant women, and those over the age of 65, are particularly susceptible to developing Listeriosis⁴. Usually *Listeria* infection causes influenza-like symptoms including a fever, but the time from ingestion of the contaminated food to onset of the illness can be anywhere from 3-70 days!

Sadly, the deadliest foodborne outbreak in the US in nearly 100 years occurred when cantaloupe were contaminated with *Listeria* in 2011⁴. This case will be discussed in more detail in the next part of the series. Since *Listeria* is often associated with wet, cool environments, it is recommended that standing water be eliminated from packing areas and that all packing equipment be cleaned and sanitized (when possible) and allowed to dry at the end of each day. This helps to prevent *Listeria* from persisting in the farm environment and removes opportunities for it to grow.

Figure 1



Center for Disease Control, CDC Estimates of Foodborne Illness in the United States, 2011

Hepatitis A is caused by hepatitis A virus (HAV). It is transferred from person to person through the fecal-oral route (yes, you read that correctly, someone eats someone else's poop), either by direct contact with the infected person or by ingestion of food or water contaminated by the infected person⁵. Symptoms include fatigue, nausea, vomiting, and jaundice (yellowing of the skin and eyes) with onset occurring 15-50 days after exposure to contamination. In the US, foodborne illness outbreaks caused by hepatitis A are often linked to food handlers who contaminate the food through poor personal hygiene⁵. This is why worker training and providing well stocked toilet and hand washing facilities are so important to produce safety. Workers who practice proper hand washing are less likely to spread contamination should they be infected with HAV. This is particularly important because individuals can spread HAV in their feces before they know they are sick.

This overview of a few of the pathogens that cause produce-associated foodborne illness hopefully has given you an idea of the diversity of organisms that can cause illness. More detailed information about each of these pathogens, as well as others, can be found on the Center for Disease Control's (CDC) website at <http://www.cdc.gov/>. Simply enter the pathogen in the search field in the top right corner of the home page to find extensive information about each one.

In the next installment of this series (part 4), you will be presented with a few "case studies" of major outbreaks associated with fresh fruits and vegetables. Remember, there are many things you can do to reduce risks on the farm, including the use of Good Agricultural Practices (GAPs). Please keep the suggestions for topics in this series coming and we hope to catch your eye in the next installment.

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Reissig Retirement Party – May 17

Harvey Reissig has recently retired after 40 years as a Fruit Entomologist at Cornell's NYS Agricultural Experiment Station in Geneva. Those of us who work with tree fruit insects have come to regard Harvey as one of the gurus of the field, someone who is not only aware of all of the complex interactions taking place in the orchard, but who can keep a handle on the practical aspects of what the insects are doing out there. During his time at Cornell, Harvey mentored and collaborated with a long line of colleagues, students, visiting scientists, fruit industry leaders & insiders and the general public. We cordially invite you to join us in celebrating his retirement, along with that of his wife, Nancy, who has been an Administrative Assistant in the Entomology Dept. for 23 years, by attending a dinner at Geneva Country Club on Saturday, May 17, 2014.

The buffet menu includes Pasta with Tomato Sauce, Mixed Vegetable Medley, Eggplant Parmesan, Rice Pilaf, Broiled Haddock with Butter Crumb Topping, Baked Chicken, and Beef Top Round; Finger Lakes wines will be donated by area wineries; cash bar available. Cost per person: \$30.00 (checks only, payable to "Cornell University"). For registration and payment, please respond to Kate VanHouter (kev35@cornell.edu; tel: 315-787-2331), NYSAES, Dept. of PPPMB, 630 W. North Street, Geneva, NY 14456. Registration & payment deadline: May 2.