

# **The Vegetable & Small Fruit Gazette**

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## Schedule for Articles

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### Problem Solving

[John Esslinger](#), Penn State Cooperative Extension Horticultural Educator, Lackawanna County

Sometimes we need to take a step back and evaluate a problem from a broader perspective. Here is an example. A grower was having problems with root diseases. His crop lacked vigor, yields were declining, and plant longevity was reduced. The presence of a pathogen on the roots was repeatedly confirmed. A recommended pesticide was applied, but little or no improvement was observed. Finally, after several years of frustration, the “root” of the problem was identified. An extension specialist, after looking at the field and talking to the grower, gave it some thought and realized the grower was using two herbicides that were both root inhibitors. One of the herbicides was eliminated from the weed control program, and the problem was solved. This disease problem was corrected by a change in the herbicide program. Often we need to change the way we look at problems.

Upstream management is another way of presenting this concept. The idea is that everything you do in your fields is interdependent and has an impact on the crop, either positive or negative. What can you do in the growing process that will reduce or eliminate problems later in the season?

Here are some suggestions that may help the next time you encounter a problem that won't go away.

- Is the problem accurately identified? If you are not sure what's going on, get help. Utilize extension educators, Penn State's identification clinics for diseases or insects, or another grower you trust. Use the internet only as a last resort.
- Where does the problem originate? Are you bringing it in with seed or plants? Moving it around with equipment? Bringing it in on tobacco products? Over-wintering it in the greenhouse?
- Do you have horticultural practices that aggravate the problem? Poor or unbalanced fertility, low pH, soil compaction, inconsistent irrigation, poor crop rotation, and low organic matter can all be contributors.
- Are you creating problems with pesticides? I have observed an increase in herbicide carryover problems over the last two years due to growers not being familiar with planting restrictions listed on the product label. Often, the damage is not obvious. You know something is holding the crop back, but you are just not sure what it is. Pesticide application/coverage is also critical. Even using the best product will give poor results if it is not applied properly. Spot treatments can make it challenging to apply the proper rate. Herbicides that are normally safe can result in damage if over applied in a spot application.

Now you may be thinking this is not difficult. You are right and that's the point. You don't have to be a rocket scientist to solve most of your problems in the field. Often the solution will come if time is

taken to step back and consider what you did or did not do. Consider now, while it is fresh in your mind, what upstream changes you can make in your management that will result in a less challenging and more prosperous 2008.

## **The Hardest Job!**

[John Berry](#), Penn State Cooperative Extension Educator

Good managers create, not consume, workplace energy. Remember the four "classic" functions of management – plan, organize, lead, and control – that you may have learned in school? Although these basic functions are fine for taking care of most of your day-to-day management duties, they fail to reflect the reality of the workplace and the new trend to a partnership of managers and workers.

Today's managers need a new set of management functions - based on forging a strong employee/employer relationship:

### **Energize**

Today's managers need to be masters of making things happen. You can be the best analyst in the world or the most highly organized executive on the planet, but if the level of excitement you generate can be likened more to a dish rag than to a spark plug, then you may never have what it takes to create a truly great environment. Great managers create far more energy than they consume. Instead of taking energy from the organization, the best managers channel and amplify energy to the organization.

### **Empower**

Great managers allow their employees to do great work – they empower them to excel. This is a vital function of management because even the greatest managers in the world cannot succeed all by themselves. To achieve the goals of the organization, managers depend on the skills that their employees offer. Effective management is the leveraging of the efforts of every member of a work group toward a common purpose. If you are constantly doing your employees' work for them, not only have you lost the advantage of leverage that your employees can provide, but you are also putting yourself on the path to stress.

### **Support**

The key to creating a supportive environment is establishing openness throughout an organization. In an open environment, employees can bring up questions and concerns – in fact, they are encouraged to do so. When employees see their managers are open to new ideas, they are more likely to offer suggestions and innovative ideas.

### **Communicate**

Information is power, and as the speed of business continues to accelerate, information must be communicated to employees faster than ever before. Constant change and increasing turbulence in the business environment necessitate more communication, not less.

Management is not what you do to people, it's what you do for them. Managers who truly manage their employees – who energize them, empower them, support them, and communicate with them – will attract and retain key employees because they build trust and commitment.

## **New Fungicides for Berries**

[Kathy Demchak](#), Penn State University Horticulture

Last month we covered new berry crop insecticides. This month, there are two new fungicides to discuss, Orbit and Tilt.

Orbit and Tilt both have the same active ingredient, propiconazole. Both products are labeled for use on strawberries and on the berry crop group, which includes the caneberries (brambles) and bushberries (blueberries, elderberries, gooseberries, etc.). Propiconazole is in fungicide activity group 3, which includes the triazole fungicides such as Indar, Nova, and Procure, so none of these fungicides can be rotated with each other for resistance management purposes. For strawberries, Tilt and Orbit are labeled for control of anthracnose and powdery mildew. They are also labeled for a type of leaf spot and a rust that aren't usually a problem on strawberries in PA. In the berry crop group, Tilt and Orbit are especially useful for use in control of mummy berry on blueberries. Both can be used for leaf spots caused by *Septoria* spp. (usually only a problem on certain cultivars of blackberries), and for blueberry rust which is only occasionally a problem in PA. The re-entry interval is 12 hrs for Tilt and 24 hours for Orbit. With both Tilt and Orbit, the PHI is 0 days for strawberries and 30 days for caneberries and bushberries.

Consult the labels for additional precautions and changes. The label is the law concerning how the material in your possession can be used.

## **Bee Researchers Close in on Colony Collapse Disorder**

Contacts: [Andrea Messer](#) and [Vicki Fong](#), Penn State University, Science and Research Information Office

*Friday, September 7, 2007*

University Park, Pa. -- Across the nation, beekeepers have seen hive after hive succumb to Colony Collapse Disorder (CCD); a team of entomologists and infectious disease researchers now report a strong correlation between the occupancy of CCD and a virus, Israeli Acute Paralysis Virus (IAPV).

"We have not proven a causal relationship between any infectious agent and CCD," the researchers report in the Sept. 6 issue of Science Express online. However, they note that the prevalence of IAPV genetic material in bees suffering from CCD, the timing of the outbreaks and the geographical circumstances "indicate that IAPV is a significant marker for CCD."

Many researchers are investigating CCD because domestic honeybees are vital to a variety of agricultural crops in the United States. Beekeepers truck their hives cross country to pollinate almond groves in California, field crops and forages in the Midwest, apples and blueberries in the Northeast and citrus in Florida.

Unlike other diseases that have plagued bees in the past, CCD leaves a hive with a few newly hatched adults, a queen and plenty of food. Researchers suspect a pathogen because while bees will not recolonize a CCD hive, once the hive is irradiated and therefore sterile, bees are happy to live there.

The disease was recognized in 2006, but beekeepers reported hive declines similar to CCD as early as 2004. An estimated 23 percent of all beekeeping operations in the U.S. suffered from CCD during the winter of 2006-2007.

After looking at other methods of identifying the cause of the disease, the researchers decided to sequence the genetic material in bees to try to find a potential pathogen.

"The genome of the honeybee had just been completed," said Diana Cox-Foster, professor of entomology, Penn State. "So it was possible to do the sequencing and then eliminate the genetic material of the bees."

W. Ian Lipkin, M.D., professor of epidemiology, neurology and pathology at Columbia University and director of the Center for Infection and Immunity at Columbia University Mailman School of Public Health, and his team prepared samples for 454 Life Science -- the company that developed the array-based pyrosequencer -- to sequence cDNA from the RNA of the bees. Researchers analyzed data using a unique set of algorithms generated at Columbia, did a large amount of viral sequence comparison, developed real time PCR assays and cloned the full length IAPV genome, among other things.

The samples sequenced included bees from four geographically separated CCD suffering operations, apparently healthy bees imported from Australia, non-diseased samples from Pennsylvania and Hawaii, and samples of royal jelly imported from China. Royal jelly is secreted by bees and used to feed all larvae, but those fed only with royal jelly become queens.

"We chose bees from Hawaii because at that time, those populations were free of varroa mites, a problem in all mainland hives," says Cox-Foster. "The royal jelly was not intended for bees, but for human consumption and cosmetics, but some beekeepers use it to create new queens."

The researchers grouped material for sequencing as presumed CCD positive, presumed CCD negative and royal jelly. The pooled RNA sequences were analyzed for bacteria, fungi, parasites and viruses matches.

Lipkin played a key role in the search for new or reemerging pathogens, contributing unique methods. The genetic sequences, minus that of the domestic honeybee, were eventually matched against GenBank, a database of genetic sequences maintained by the U.S. National Center for Biology Information, National Institutes of Health. Ninety-six percent of the genetic material matched that previously found in bees.

The bacterial sequences were those normally found in bees worldwide, analyzed by Nancy A. Moran, the Regents' professor of ecology and evolutionary biology, University of Arizona, and colleagues and Jay Evans, research entomologist, Bee Research Laboratory, U.S. Department of Agriculture, Agricultural Research Service and colleagues.

"The bacteria found were the same as those found in two previous studies from two different parts of the world at two different times," says Cox-Foster. "They represent mutualistic or symbiotic relationships with the bees, similar to those of humans and the bacteria found in the human gut."

Protozoans and fungi analyzed by Liwang Cui, associate professor of entomology, and David M. Geiser, associate professor of plant pathology, Penn State respectively, were associated with both CCD and non-CCD populations.

"We knew before we started that we would find a boatload of viruses in the bees given our preliminary research," says Cox-Foster. "Eighteen different types are known from serology and antibody work in England."

Cox-Foster's and Lipkin's groups analyzed the viruses. They found the expected viruses, and they found one that, while identified by researchers at Hebrew University in 2004, has just now appeared in scientific publication. This virus, IAPV, along with Kashmir bee virus (KBV), was found only in CCD populations. In the initial experiments, the researchers report that "IAPV was found in all four affected operations sampled, in two of four royal jelly samples and in the Australian sample. KBV was present in three of four CCD operations, but not in the royal jelly."

Other viruses and *Nosema* parasites had been suggested as the cause of CCD, but the researchers found that those pathogens appear in both CCD and non-CCD samples. Only KBV and IAPV correlated with CCD in the genetic survey. In a recently published study, Jeffery S. Pettis, research leader, Bee Research Laboratory, and colleagues reported that *Nosema ceranae* had been in the U.S. for at least 10 years, along with *Nosema apis*.

Researchers then analyzed samples collected for 30 CCD colonies and 21 healthy colonies in the past three years for four pathogens: KBV, IAPV and *Nosema apis* and *Nosema ceranae* -- both fungi that infect bees. They found that all samples that had IAPV had KBV, but KBV also occurred in both sick and healthy samples.

"IAPV was found to increase the risk of CCD with a trend for increased CCD risk in samples positive for *Nosema apis*," the researchers said. "Neither KBV nor *N. ceranae* contributed significantly to the risk for CCD nor did they alter the influence of IAPV on CCD."

However, while IAPV may be a marker for CCD, proving that any organism is the cause of IAPV is somewhat more difficult. The researchers will now try to infect bee colonies with CCD. Beside general health stress from the heavy load of pathogens normally carried by bees, other suggested contributors to CCD include pesticides, drought and nutritional stress.

Timing also may be the key to pinpointing the cause. The United States began allowing importation of bees from Australia in 2004, which coincides with early reports of CCD. The same year, IAPV, described by Israeli researchers with symptoms of shivering wings, progressed paralysis and bees dying outside the hive appeared. While CCD does not seem to have the same symptoms, this may reflect a different strain of the virus, co-infection with another pathogen or the presence of other stressors.

The researchers note that "the varroa mite, for example, absent in Australia, immunosuppresses bees  
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The Pennsylvania State University

making them more susceptible to infection by other organisms." Beekeepers used mitocides, chemicals used to control varroa, on both CCD and healthy colonies.

Edward C. Holmes, professor of biology, Penn State and Gustavo Palacios, Columbia University, were instrumental in determining the evolutionary relationships of the viruses found in CCD colonies compared to previously known viruses and isolates from Australia.

While unquestionably it is important to identify the cause of CCD, this total genetic study of bees and their fellow travelers also may lead to a better understanding of other disease causing agents in the population and to an understanding of the beneficial organisms that reside within the bee.

Other researchers on the Penn State team include Dennis vanEngelsdorp, senior extension associate and State Apiarist for the Pennsylvania Department of Agriculture, and Abby Kalkstein, research technologist. Other researchers at Columbia University include Sean Conlan, Phenix-Lan Quan, Thomas Briese, Mady Hornig, Andrew Drysdale, Jeffrey Hui and Junhui Zhai. Vince Martinson, University of Arizona and Stephen K. Hutchison, Jan Fredrik Simons and Michael Eghom, at 454 Life Sciences, also contributed.

The National Institutes of Health, National Honey Board and the Pennsylvania Department of Agriculture supported this work.

A photo gallery of images from Cox-Foster's laboratory is available at <http://live.psu.edu/stilllife/1425> online.

## **Resources for Sustainable and Organic Production**

The University of Wisconsin's Center for Integrated Agricultural Systems has a large number of extension publications on different aspects of sustainable and organic dairy, livestock and field and edible crop production. They can be ordered by visiting <http://www.cias.wisc.edu/pdf/orderform206.pdf> or downloaded from <http://www.cias.wisc.edu/catalog.php>.

## **New Voices Contest Seeks Innovative Vision for Sustainable Agriculture**

Sean McGovern, SARE Outreach Specialist

How can we advance sustainable practices and innovations to the whole of American agriculture? What if you had just five minutes to share your vision with the leaders of the sustainable agriculture community?

Share your vision for advancing sustainable agriculture and win a free trip to SARE's 20th Anniversary New American Farm Conference!

SARE is proud to announce its New Voices contest, which will give "New Voices" in agriculture the opportunity to share their ideas with the leaders of the sustainable agriculture community at SARE's 20th Anniversary New American Farm Conference, to be held March 25-27, 2008 in Kansas City, Missouri.

SARE seeks written, audio, and/or video submissions that articulate emerging perspectives and illustrate an inspirational and pioneering vision for the advancement of sustainable agriculture over the next 20 years. The winning entry will be presented at the closing plenary session of the conference. Top finalists will also be invited to participate in leadership sessions at the conference at SARE's expense.

We particularly encourage submissions from:

- farmers or ranchers
- emerging leaders in the field of advocacy, education or research
- beginning farmers and ranchers
- students
- minorities and other under-represented audiences

Share your roadmap to a new, sustainable American agriculture and enter SARE's New Voices Contest today! For official rules and details, or visit <http://www.sare.org/2008Conference/newvoices.htm>.

The deadline is December 7, 2007.

## Growing Lettuce in High Tunnels

Mike Orzolek, Penn State University Horticulture

Many producers in the Mid-Atlantic and Northeast regions are growing lettuce in their high tunnels either as a major crop or mixed in with other vegetable crops. The majority of high tunnel producers are growing lettuce in soil either on raised beds or as flat culture. Recently on the HIGHTUNNELS@LISTSERV.KSU.EDU, many growers have reported problems of gray mold on lettuce because of the cool, wet soil conditions. The organism causing gray mold, *Botrytis cinerea*, can remain in the soil for many years. Since June 1, 2007, Dr. Bernie Kratky from the University of Hawaii has been on sabbatical leave here at the Penn State Center for Plasticulture. One of Bernie's objectives here at Penn State was the production of lettuce in a non-circulating hydroponic system. The two tanks for the hydroponic system were constructed in the high tunnel and lined with 6 mil greenhouse-grade plastic. Each tank was 4' x 24' and 5" deep. When filled with water, each tank held 300 gallons of water. Blue, Styrofoam insulation board floats on top of the water and comes to rest on 2 plastic pipes supported by the tank floor when the nutrient solution level decreases as the crop grows. Holes are cut into the insulation board such that lettuce plants are spaced 8" x 12" – each tank will then grow 144 lettuce plants. Plastic net pots are filled with the lettuce transplants grown in soilless media and then placed into the holes cut into the Styrofoam board. Fertilizer is added to the water before the lettuce plants are placed into the Styrofoam boards and no additional water or fertilizer is added to the crop. To date, Bernie has grown 4 lettuce crops which required 28 to 39 days from transplanting. Bibb, romaine and leafy lettuce types have been grown successfully in this hydroponic system without any disease problems and a minor insect problem – grasshoppers. At the High Tunnel Research and Education Center at Rock Springs, there must have been 100 grasshoppers per square yard at the peak of their population this summer, but screening the sides of the tunnel moderated the problem. This large grasshopper population ate everything from lettuce to cucumber and broccoli transplants. When harvested, the lettuce heads have averaged about 0.5 pounds in weight and had excellent quality.

## **Pennsylvania Environmental Quality Incentives Program Sign Up Now Underway**

Contact: [Kristie Auman-Bauer](#), PA IPM Program

UNIVERSITY PARK, Pa. -- An incentive program aimed at supporting environmentally friendly pest management and conservation projects is now available for Pennsylvania growers.

Conservation cost share applications for the popular Environmental Quality Incentives Program (EQIP) are being accepted now through Oct. 30, 2007 at USDA Natural Resources Conservation Service (NRCS) offices throughout Pennsylvania. If funding is still available, a second signup period at lower priority is available after that until Nov. 30th. The program provides financial and technical assistance to growers interested in making voluntary improvements to natural resources on land they own or manage.

According to Barry Frantz, assistant state conservationist for programs with NRCS in Pennsylvania, the program offers a unique opportunity for Pennsylvania growers to obtain Federal cost share funding for conservation related projects, including IPM.

IPM, or integrated pest management, aims to manage pests -- such as insects, diseases, weeds and animals -- by combining physical, biological and chemical tactics that are safe, profitable and environmentally compatible.

During the years 2004-2006, IPM practices were covered under another program called the Agricultural Management Assistance (AMA). "Since the inception of AMA three years ago, over \$1.2 million in IPM contracts for specialty crops including tree fruit, covering hundreds of acres have been awarded to fund IPM conservation practices. Funding for IPM transitioned to EQIP in 2007 with \$146,000 being awarded for tree fruit, Christmas trees and fresh market sweet corn," says Frantz.

Sign ups for the 2008 EQIP season will be similar to 2007. A grower will submit a CC-1200 form available online at <http://www.nrcs.usda.gov/PROGRAMS/EQIP> or at a local NRCS office. "At this stage, submitting a form establishes interest in the program and the status of the applicant, but does not include the details of the specific practices a grower is interested," Frantz explains. "Growers that pass an initial screening will be invited to participate in more detailed discussions on the specific programs for a ranking of resource concerns early in 2008. Funding levels and relative ranking of all applicants determines who is funded for the 2008 season."

Frantz stresses the importance of having a conservation plan when applying for EQIP. "A conservation plan -- which NRCS staff and Penn State can assist with -- helps growers assess the needs of the resources and schedule the best remedies on a timetable that makes sense for the landowner and for the land."

EQIP assistance can be in the form of structures and conservation "hardware" such as irrigation or manure management facilities as well as incentives payments for proper management to achieve environmental benefits. Applications are ranked based on scores reflecting their environmental benefit to national, statewide and locally identified resource priorities as well as a cost efficiency calculation. Priorities for EQIP funding in 2008 include reductions of nonpoint source pollution, including

pollution from pesticides, conservation of ground and surface water resource, and reduction of emissions and soil erosion.

According to Dr. David Biddinger, biological control specialist at Penn State's Fruit Research and Extension Center in Biglerville, by incorporating IPM techniques into their operations, growers of tree fruit, grapes, sweet corn and Christmas trees can reduce energy use and environmental risk while maintaining the quality of their agricultural products. "IPM practices eligible for EQIP reimbursement include biological mite control, reduced risk IPM, pheromone mating disruption, IPM scouting, precision application technology, and remote weather sensors to improve spray timing," he explains.

Biddinger encourages all growers to look into this worthwhile program. "For producers that are willing to work with NRCS staff and find common ground, the rewards can be significant," he says.

For more information on EQIP and other NRCS programs, including a step-by-step guide on how growers can benefit from these conservation programs, visit Web site <http://paipm.cas.psu.edu/nrcs.html>.

The Pennsylvania IPM program is a collaboration between the Pennsylvania State University and the Pennsylvania Department of Agriculture aimed at promoting integrated pest management in both agricultural and urban settings. For more information, contact the program at (814) 865-2839, or Web site <http://www.paipm.org>.

## **Ecological Farming Conference**

The 28<sup>th</sup> Annual Ecological Farming Conference at Asilomar, Pacific Grove, CA is one of the largest and longest running gatherings of organic farmers, marketers, activists and sustainable consumers. The theme for 2008 is "Root Values: Connecting Ecology, Community and the Land." Participants enjoy more than 50 exciting workshops, organic meals, regional farm tours, seed swapping, organic wine tasting, exhibitors and special events. Contact Ecological Farming Association at (831) 763-2111, or [www.eco-farm.org](http://www.eco-farm.org).

## Upcoming Meetings

If you have a meeting you would like to announce, please send the meeting title, date, location and contact information to [esanchez@psu.edu](mailto:esanchez@psu.edu).

### Local

- ✓ Oct 3, 2007. **PASA Field Day – The Nuts and Bolts of Organizing and Packing a Choice CSA.** Red Earth Farm, Schuylkill County. For More information call (814) 349-9856 or visit [www.pasafarming.org](http://www.pasafarming.org).
- ✓ Oct 8, 2007. **PASA Field Day – New and Beginning Farmers: Small Group Tour with the Nordells.** For More information call (814) 349-9856 or visit [www.pasafarming.org](http://www.pasafarming.org).

### Regional

- ✓ Nov 8-11, 2007. **Farm Education Symposium.** Shelburne Farms, Shelburne, VT. For more information visit [www.farmbasededucation.org](http://www.farmbasededucation.org) or call Brooke Redmond at (617) 306-0090.
- ✓ Jan 15 – 17, 2008. **NJ Annual Vegetable Meeting** at the Taj Mahal in Atlantic City. For more information contact Mel Henninger at [henninger@aesop.rutgers.edu](mailto:henninger@aesop.rutgers.edu).
- ✓ Feb 7-9, 2008. **Pennsylvania Association for Sustainable Agriculture (PASA) 17<sup>th</sup> Annual Farming for the Future Conference.** Penn Stater Conference Center, State College, PA. For more information visit [www.pasafarming.org](http://www.pasafarming.org).

### National

- ✓ Jan 23-26, 2008. **Ecological Farming Conference.** Asilomar Conference Grounds, Pacific Grove, CA. For more information visit [www.eco-farm.org](http://www.eco-farm.org) or call (813) 763-2111.

### International

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The newsletter is also posted within three days on the Department of Horticulture Vegetable program website at: <http://hortweb.cas.psu.edu/extension/veg crops/newsletterlist.html>.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.

Penn State is committed to affirmative action, equal opportunity, and the diversity of its workforce.