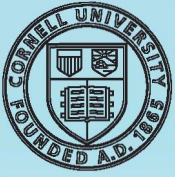




New York State

**Integrated
Pest
Management**
Program

The year in review 2006 – 2007



Cornell University
Cooperative Extension



Director's Message

As I look back on my first year as director of the NYS IPM Program, I am honored to be associated with such a great group of professionals—and extremely proud of our accomplishments. Our partnerships with innovators in the private sector and state agencies, among environmental and health advocates, and at Cornell University are undoubtedly making a difference in the health and safety of New Yorkers as we test and teach new ways to solve pest problems.

Following in the footsteps of founder Jim Tette and subsequent director Mike Hoffmann is daunting. But I, along with my assistant directors Curt Petzoldt and Jennifer Grant, welcome the challenge. Developing and extending IPM has been at the core of my career as a veterinary entomologist for 30 years, and I've been involved with the NYS program since its inception. Yet I didn't fully appreciate the depth and breadth of the program's impact until I came on board. Take a glimpse at a few highlights from 2006 and I think you'll agree.

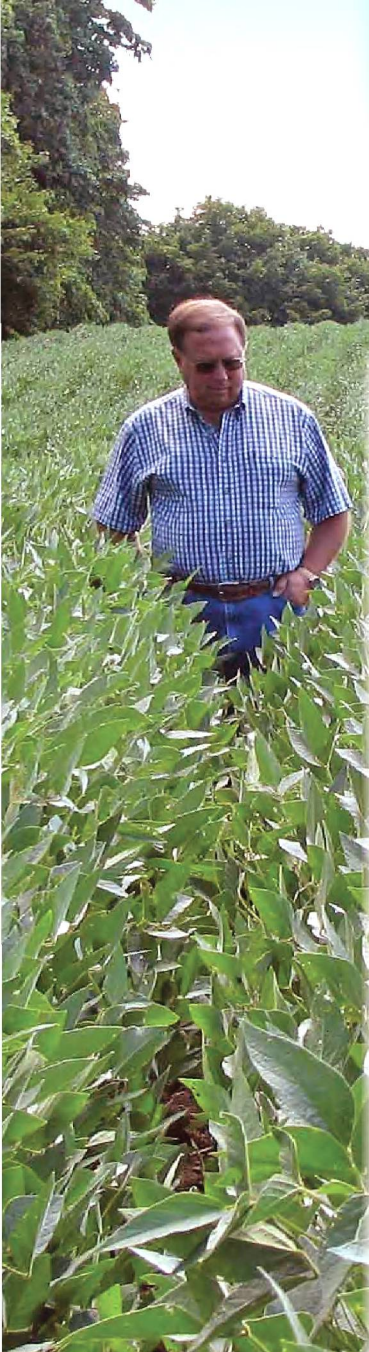
We're working on timely and urgent topics like:

- new invasive species—nearly every year, another comes to the fore
- the resurgence of pests like bed bugs, now making waves in both the urban and poultry pest management worlds
- fine-tuning biological approaches for organic growers, who lack effective ways of dealing with pests such as corn earworm and potato leafhopper
- helping golf courses maintain quality playing surfaces while minimizing their environmental impact

Wherever we go, we find growers and practitioners; local, state, and national regulators and legislators; public health and environmental advocacy groups; and outstanding CALS extension educators and researchers—all working hard to advocate and use IPM. For that's what ultimately drives our program.

We invite you to read on, to discover what we've done and where we're going. Enjoy!

Donald A. Rutz, Director
Jennifer Grant and Curt Petzoldt, Assistant Directors



Don Rutz



Jennifer Grant and Curt Petzoldt

Front cover: Using sustainable best management practices in the 10,000 acres of grape vineyards that surround the Finger Lakes promotes water quality and soil conservation.

Highlights of 2006–2007

Rooting out nematodes

Nematodes are microscopic worms in the soil. Most are beneficial, but a few are parasites that can seriously damage many crops. Often the symptoms aren't easy to see, and diagnostic tests for nematodes are complex and costly. Meanwhile, the chemical nematicides that kill these worms are toxic and expensive. There's little point in using them if you don't have a serious nematode infestation. But because the risks are substantial, using nematicides seems like good insurance to some growers.

Now Cornell researchers have developed a simple, on-farm assessment that growers can use to see for themselves if root-knot and lesion nematodes, the two primary nematode pathogens of vegetables, infest their fields. It's as simple as growing a pot of lettuce or soybeans—then washing and rating the roots for the clear diagnostic symptoms these tiny worms create. Fifty farmers learned the process during twilight meetings in 2006. Many are already confident enough to do the tests themselves and take the worry out of diagnosing and treating these damaging pests.

Project leaders: B. Gugino, G. Abawi, J. Ludwig



Scoring high: Why pay for expensive tests to assess nematode populations if you can do it yourself? Growers who learned this new method of rating nematode severity came to the same conclusion that the researchers did.

Our Partners



"IPM has made it possible to have the best of both worlds here in New York—fresh, locally produced crops that cost less to grow, and a healthy environment that experiences less negative impacts from the production of agriculture. IPM helps agriculture thrive through its efficient and economical methods, which has a ripple effect on New York State in its entirety."

**New York State Department of Agriculture and Markets
Commissioner Patrick Hooker**

"New Yorkers need sound, sensible solutions to plant and animal pest problems in their homes, workplaces, schools, gardens, and farms. The NYS IPM Program works diligently to combine science and nature for innovative solutions to pest management. DEC will continue collaborating with our IPM Program partners to develop sustainable pest management practices while protecting the environment."

**New York State Department of Environmental Conservation
Commissioner Pete Grannis**





You won't know if you don't look: Greenhouses provide nearly ideal growing conditions for plants—and pests. These big “sentinel plants” are eggplants, notoriously attractive to whiteflies, a tiny pest that’s easy to miss. The yellow “sticky cards” attached to each eggplant provide even more of an incentive for the whiteflies to show themselves—whiteflies love yellow. Once you find them, you know to look sharp. Such routine scouting, taught here in a workshop for greenhouse workers, holds the key to finding pest populations while they’re still small and you can prevent their spread.

Project leaders: E. Lamb, B. Eshenaur, G. Couch



What, blue feet?! Disease spores are notorious hitchhikers, often carried from one greenhouse to another on boots and shoes. Blue booties may be inconvenient, but you gotta consider what’s traveling with you. Keeping a pack handy helps cut down the environmental cost of sprays, not to mention the money.

Project leaders: E. Lamb, B. Eshenaur, G. Couch

Timing is everything for tree care

Spring and summer are the busiest times for landscapers and arborists. Many work 14-hour days, dealing with the diseases, insects, and “abiotic” conditions (like “edema,” below) that cause problems for trees and shrubs. Which means that just when they’ve got the least time, landscapers have the most need for concise, *precise* advice on what’s up with weeds, or how to identify that new pest, or which traps to use for monitoring.

Branching Out, a newsletter for tree care professionals, brings together features, scouting reports, the “growing degree day” charts that tell when pests are likely to appear, and much more for busy professionals—without the distraction of advertisements. This year it brought its 700 subscribers instructions on “power washing” away a tiny insect called prunicola scale. It told how edema, a water imbalance in a plant’s cells, can be confused with a “shot hole” fungus—but if you treat edema with a fungicide, you’ve cured nothing *and* wasted a spray. And it brought news of a new pest, a winter-flying moth named—you guessed it, *winter moth*. This moth’s larvae have already defoliated thousands of acres in Massachusetts and it is poised to move our way.

If timing is everything—and in pest management, it is—this newsletter’s timely advice and careful descriptions can mean the difference between health and disease, success and failure, in landscapes and parks across New York. This past year, the *Branching Out* web version received over 32,000 “page views”—averaging nearly 90 per day.

Project leader: G. Hudler

“Greenhouses are great places for things to grow, pests included. But growers who try IPM find they can often reduce costs. And it’s nice to be able to deal with a pest without getting suited up.”

Elise Schillo-Lobdell, an independent IPM scout, serves greenhouse growers across central New York

Winning combination

Each year, we give “Excellence in IPM” awards to advocates, farmers, educators, researchers, and more—people who do exceptional work in IPM. Meet our winners:

“Chuck goes out on a limb to make something work. He gets out and talks to growers—all of it pushing toward taking care of the soil,” a grower says of Extension educator Chuck Bornt.

“Whether Tom is in a vineyard off Lake Erie or in Washington, D.C., his contributions in finding bold new ways to bring sustainability to the farm and his industry can’t be overlooked,” says NYS IPM’s director regarding National Grape Cooperative’s Tom Davenport.

“Dan’s timely experiments provided some of the vital early information that the nation’s greenhouse industry is using to control a new and unusually resistant pest,” notes a Cornell University plant pathologist about Extension educator Dan Gilrein.

“Farmers and dealers respect Russ’s straightforward manner, and many decide to attend winter crop meetings based on whether he will be on the program,” a colleague says of Professor Russ Hahn.

“Brian has dedicated countless hours to IPM in his role as chair of the Statewide IPM Grower Advisory Group, providing valuable advice and helping make our program relevant to farmers,” an IPM assistant director remarks about grower Brian Reeves.

“Elise’s passion for IPM ranges from the practical to the academic, allowing her to contribute at all levels,” says NYS IPM’s ornamentals coordinator of IPM scout Elise Schillo-Lobdell.

And then there’s the man who began it all: Jim Tette, founding director of the NYS IPM Program, who retired in 1999. As a colleague at the New York State Department of Agriculture and Markets put it, “Jim made everyone feel as though they were a contributor to the program. He held his position with dignity and earned respect through his actions and deeds. If New York State recognized an individual as the father of IPM, it would no doubt be Dr. Jim Tette.”

Please join us in honoring these extraordinary people.



National Grape Cooperative’s Tom Davenport, like most of our award winners, has spent decades promoting IPM.

“IPM methods help grape growers save money by targeting pest management only when needed. In recent years, these savings have amounted to about \$2.5 million per year for our growers, who routinely scout for dozens of pests including insects, diseases, and weeds.”

Tom Davenport is director of viticulture for the 1,300-member National Grape Cooperative

Gotta keep at it: New, alternative weed killers work fine on annual weed seedlings, rupturing the cells in their leaves so the sun can dry them to a crisp. But what about the big bruisers in the perennial bed—weeds that are perennials themselves, with root systems designed to cope with losing their leaves? Our side-by-side comparison of two least-toxic formulations and hand weeding have found all equally effective—if you keep at it.

Project leaders: E. Lamb, B. Eshenaur



Insect traps show blueberry growers they are not locked into spraying

Blueberry growers have three good reasons to reduce insecticide use: it's safer for them, it saves money, and many customers want it. The key is knowing when—let alone *if*—the target insects are active. A Cornell Cooperative Extension educator took insect traps to ten blueberry farms in five Southern Tier counties to show growers how to place and monitor traps. When a pest first showed up in a trap, a sample was taken to the other growers to show them what to look for.

What did they learn? Some growers found that they didn't need to spray because... *there were no pests*. They learned that monitoring for blueberry insects improved their ability to grow a pest-free crop. And all went on an end-of-season tour of two blueberry farms, summed up what they'd learned, shared their know-how, and brainstormed ideas for next year—a valuable opportunity to learn from each other.

Project leader: M. Shaw

Blueberries are a \$2.8 million crop in NY.



Just doin' its job: These sticky traps are laced with pheromones, or chemical signals, that attract male fruitworm moths, the signal for growers to start scouting for worm-damaged fruit.

Lowdown on high-fliers

Each time that worm damage in sweet corn goes up five percent, it costs New York's growers more than \$3.7 million, so it pays to be on top of these pests. Since 1993, IPM's "trap network" has brought the lowdown on high fliers—on moths of European corn borers, the number-one sweet corn pest, as well as other damaging insects—to growers every week in 29 counties in western New York. It's critical information. But are the growers tuned in?

To find out, we surveyed all 633 fresh-market sweet corn growers in western New York. Our results: 86 percent of growers who use the network are pleased with their at-harvest quality—20 points ahead of those who don't. But since 56 percent of growers weren't aware of the network, we've got a teachable moment: a great opportunity to bring better, more cost-effective solutions to pest problems to New York's farmers.

Project leader: A. Seaman

"We scout our sweet corn diligently every year, and every year we have a field or two that never needs to be sprayed. If we weren't out there scouting, we'd be out there spraying—needlessly."

Brian Reeves grows 200 acres of vegetables and berries on Reeves Farm in Baldwinsville, NY

Accept no substitute

New pests, new technology, new options—with each *new thing* that comes down the pike, farmers need to negotiate yet another learning curve. But often they're hard put just to cover the basics—tilling, planting, cultivating, milking, feeding, repairs, and much more.

That's where TAg—*Tactical Agriculture*—comes in. Since 1990, we've been bringing TAg teams to dairy and field crop farmers across New York. At meetings hosted by each farmer in turn, members learn up-to-date IPM methods that cut pest damage and boost profits. But farmers who specialize in crops like soybeans or wheat need TAg teams designed with them in mind. So do Amish, Mennonite, and organic growers. This year we rolled out programs for soybeans, wheat, and organic corn while expanding our base among Amish and Mennonite farmers. We even developed a module for Amish dairy farmers in southwestern New York who have branched out into vegetable production.

Once again, we saw that there's no substitute for teamwork—TAg teamwork—whether practicing to identify both pests and beneficials, learning how to test soil, or deciding among new pest management tactics. Post-tests showed that farmers with little exposure to IPM could double their scores, while those of high-level IPMers jumped from about 80 to as much as 92 percent.

Project leaders: J. Beckman, J. Dennis, M. Dennis, K. Ganoe, C. Kyle, J. Miller, A. Seaman, D. Sprague, M. Stanyard, K. Waldron, K. Wise

TAg teams brought least-toxic pest solutions to 59 farmers in 10 counties on 12,350 acres in 2006—bringing the cumulative total since 1990 to 957 farmers on 196,000 acres!



Helping unravel the mystery of disease transmission:

Recent occurrences in New York of Botrytis neck rot, a serious disease of stored onions, have caused concern among New York onion growers who had begun to rely on bare-root transplants from out of state sources. Now Cornell scientists have discovered that such transplants can bear latent infections of the neck rot pathogen and are developing procedures that should, eventually, help manage the problem.

*Project leaders:
C. Hoepfing, J. Lorbeer*



Hold your fire: Naturally-derived strobilurin fungicides work well against common rust, a disease that NY's sweet corn farmers spend \$170,000 each year trying to prevent. But these fungicides are too costly to apply more than once a season. Now 330,000 computer simulations have shown that it pays to wait until the disease reaches an "action threshold" of 15 percent severity before spraying.

Project leader: D. Shah

Patternator design reassigns spray drift

“We saved upward of \$8,000 on spray costs at Lamont Fruit Farm this past year after we tested Dr. Lander’s patternator on one of our sprayers. Correcting the spray pattern on the rest of our sprayers is likely to cut our annual pesticide bill by as much as \$30,000.”

Rod Farrow manages 430 acres of apples at Lamont Fruit Farms in Albion, NY

Airblast sprayers aim to spray only orchard and vineyard leaf canopies—and do when adjusted properly. But often a plume of spray arcs over the target canopy. The result: pesticide drift, poor deposition, and inadequate pest control. Yet until now, the only device that gave growers an accurate, visible record that they could use to adjust their sprayers’ patterns was made in Italy and cost \$4,000—plus shipping and import fees.

Now a Cornell University researcher and a colleague from the Universitat Politècnica de Catalunya in Spain have designed and developed two versions of build-it-yourself “patternators”: stationary devices that collect the sprayer’s spray pattern. This pattern shows growers how to better target their sprayers, cutting drift by up to 90 percent and reducing pesticide use by 20 percent or more. Over 400 growers across New York watched prototypes in action, and all received free plans for building their own.

Project leader: A. Landers



In sickness and in health... It may be luck that ordains whether (or when) an unsprayed Douglas fir succumbs to the dread disease, Rhabdocline. The trees to right and left show just why this “rhab decline” has Christmas tree farmers so worried. IPM has tested a wide range of conventional and alternative treatments and growing regimes, working to tease apart what works—or not—and why.

Project leader: G. Couch

Majority rule

Only 16 percent of New Yorkers have actually heard of IPM. But a rose by any other name would smell as sweet—and when we defined IPM for our “Empire State Poll” respondents, 76 percent said they would prefer IPM-grown produce and 62 percent said they would even pay more for it.

In earlier surveys we looked at what New York’s citizens think about IPM, food, and farming. This latest poll went a step beyond and is the first to track how New Yorkers feel about IPM in community settings. Sixty-nine percent preferred that their municipalities rely on IPM methods, while only 13 percent believed that pesticides should be the primary method of pest control. And 32 percent, once they knew what it meant, could identify having already used IPM in their own homes.

Project leaders: C. Petzoldt, J. Grant

Sentinel sites key to tracking, preventing soybean pests

Soybeans are usually a pest-free crop for New York farmers. No wonder then that the acres planted in soybeans have gone up 600 percent in New York in the past 16 years.

Now soybean rust, a new disease that's been found in the South, has growers worried. The rust can't overwinter here, but its spores can easily travel 1,000 miles or more on the wind, then quickly reproduce and infect new sites. This past year, Cornell scientists joined with researchers throughout North America to monitor "sentinel sites" in farmers' fields for rust and another recent arrival, the soybean aphid. New York's researchers scouted 19 soybean plots in 17 counties.

The good news: no rust (yet) and few soybean aphids. But scouts found low-to-moderate instances of 10 other diseases, including three—frog-eye leaf spot, sudden death syndrome, and brown stem rot—that hadn't been seen here before. Not only that, but they found bean leaf beetle, a new-to-New York insect. Knowing a pest's history and tracking its movements can make a world of difference when unusual problems crop up elsewhere down the line.

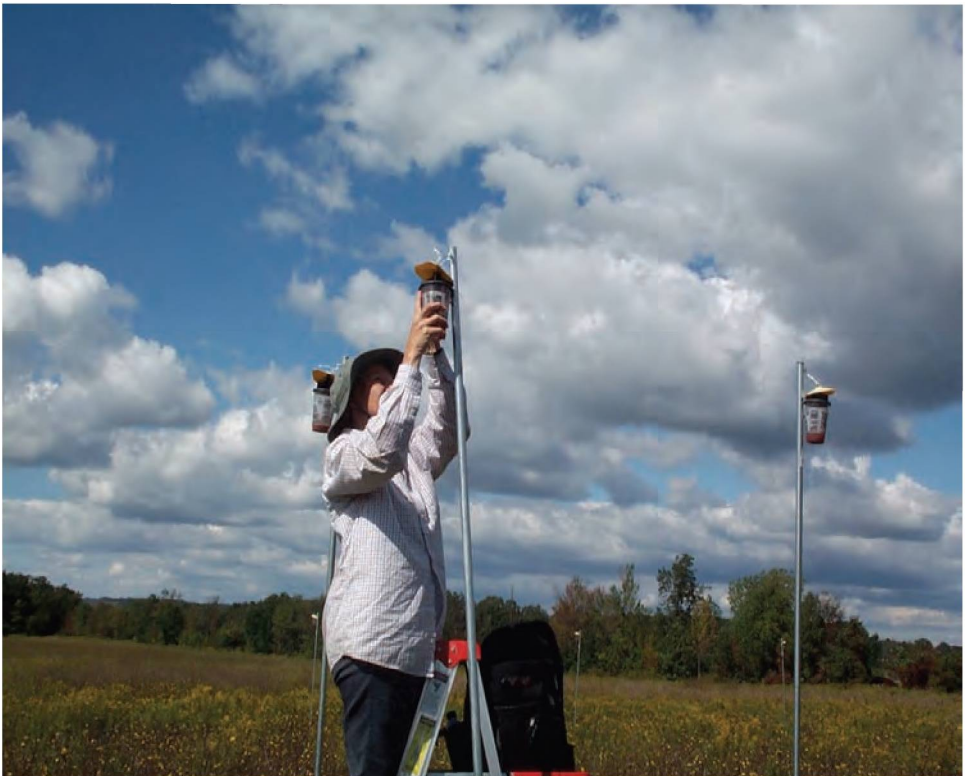
Project leaders: G. Bergstrom, M. McKellar, K. Waldron

Soybeans are a \$50 million crop in New York.



Ouch—nasty cut! Pruning away extra branches keeps fruit trees strong and healthy. But bacterial canker of cherry takes unfair advantage of every cut and scrape. Infected trees can die. What to do? Leaving half-foot-long pruning stubs may keep bacteria in a dead-end zone and protect the trunk and tree from a lethal infection.

Project leaders: J. Carroll, T. Robinson, T. Burr



Gotcha! Can you trap out yellowjackets and other stinging insects? It only makes sense to try if there's lots of food around—say, at a county fair or festival, since all that food pulls in yellowjackets from far and wide. *Don't* set up traps near playgrounds or ball fields with no concession stands. Traps in those places will pull in ones that might collide with you on their way to the trap, and why risk that?

Project leader: L. Braband



Going to school for IPM: School athletic fields get almost constant use, inviting weeds and making grass hard to grow. But moving the goalposts—literally!—shifts traffic patterns, giving turfgrass a rest and reducing herbicide use. These “learning community” team members are here to see how.

School staff learn IPM by doing

New York State laws on pesticide use in public spaces are among the most stringent in the nation. People want their schools, parks, and office buildings to cut down on pesticide use. But they also want these places to be pest-free.

These are typical IPM problems. The IPM solution: education. And what better place to go than school? Especially since schools, with their intensively used buildings and grounds, are perfect places to demonstrate the four core tenets of IPM: *build pests out, keep it clean, scout religiously, and think first—spray later (if at all).*

This year we developed a model “learning community” approach to school IPM. Employees from three school districts took the “learn by doing” approach, working with extension educators, peer mentors, and each other to develop proactive pest-management programs that work, often steeply reducing pesticide use. Each district worked toward meeting rigorous standards set by the IPM Institute of North America. One has since received the Institute’s “IPM STAR” certification and another is poised for accreditation.

Project leader: L. Braband

“Thousands of people use our school’s athletic fields week in and out, all year long. This heavy foot traffic favors weeds. But using IPM has helped us cut way back on herbicides, and now we spray only once every few years.”

Gina Gatto is the grounds department supervisor at 7,500-student Monroe-Woodbury Central School District, which earned the IPM Institute of North America’s IPM STAR Award in 2006

Stand up and be counted: Should soybean growers use fungicides to improve plant health and boost yields? Not under last year’s growing conditions—though weather conditions in future years might yield different results. Stay tuned....

Project leaders: J. Dennis, M. Dennis

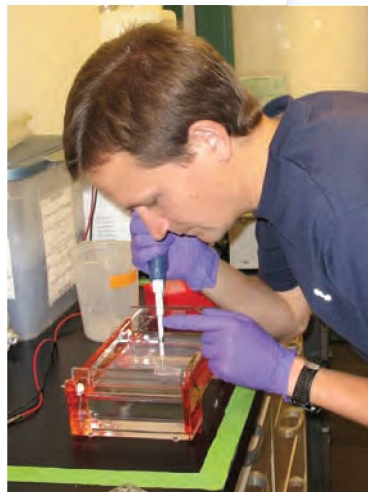


VineBalance— toward sustainable viticulture

The sweeping vineyards that frame Lake Erie, the Finger Lakes, Hudson Valley, and Long Island Sound are ideal settings for growing New York's quality grapes. As the grape industry gains national and international recognition, vineyard growers want to show policy-makers, regulators, and especially their neighbors that they are dealing proactively with potential environmental risks. That's why a broad coalition of industry leaders, growers, extension programs, and state agencies developed a sustainable viticulture program, one with statewide appeal and adapted to growing conditions across New York and the Northeast.

Together, this coalition has created a self-assessment workbook for growers to evaluate sustainable practices on their farms. One hundred thirty-nine questions in eight sections address the totality of vineyard practices. From managing weeds, diseases, and insects to nutrient management, this workbook addresses the three E's of sustainability—environment, economics and equity. All fifteen growers who road-tested the workbook have found it a confidence-boosting, money-saving resource that helps them advance sustainability in their vineyards.

Project leaders: T. Martinson, A. Wise, T. Weigle



Keeping an eye on disease DNA: The symptoms of trefoil wilt, a disease of forage crops, mimics other crop problems. Worse yet, the fungus that causes it can't be told apart from a nonpathogenic strain of the same fungus. But now that researchers have sequenced this disease's DNA, a simpler, more reliable diagnostic test is only a couple of years away.

Project leader: G. Bergstrom

Grapes are a \$37 million crop in NY, third in the nation.

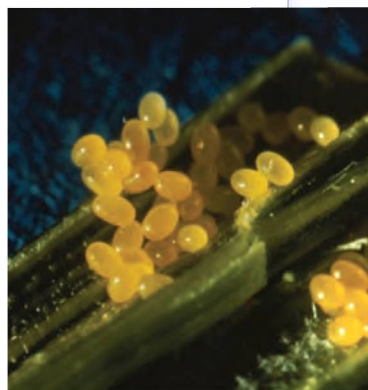
Holistic approach to invasive pest

Swede midge, a new pest of New York's \$80-million cabbage, broccoli, and cauliflower crops, has been found in at least 19 counties in New York since arriving in 2004. Because swede midge has devastated cabbage-family crops in Ontario, Canada, for about 10 years, dealing with it is a must-solve problem.

The midge's larvae feed inside the plant, meaning that once you see the problem it's too late to spray. So Cornell researchers and extension educators have taken a holistic approach. They're asking if some soil and weed management practices can slow down the midge—and whether carefully timed sprays can kill larvae before they burrow inside young transplants.

The answers: *yes* and *yes*. Next steps are to fine-tune tillage techniques and get the word out about spray recommendations that can help slow down this pest's spread on transplants that are shipped from one region to another.

Project leaders: A. Shelton, M. Chen, C. Hoefting



Egg them on—no, out: Alfalfa weevil eggs portend alfalfa woes later on. TAG team members learn to scout for these and other early signs that tell whether harvesting sooner rather than later makes sense to keep this pest under control.

Cabbage is a \$71 million crop in NY, second in the nation.

Rust, anyone? Scouting these sentinel sites scattered across NY's 198,000 acres of soybeans serves as a warning network for pests new and old, especially soybean rust, a devastating new disease that threatens the nation's soybean crop.



For sod farms and golf courses, what's old is new again

New York's golf courses spend \$17 million per year on fungicides. In fact, disease is the greatest pest challenge that this industry faces. Now a turfgrass that faded from use 50 years ago is getting a new look. Naturally disease-resistant, velvet bentgrass, when given the conditions it likes best, shrugs off nasty diseases such as dollar spot and take-all patch.

During 2006, one of the wettest years on record (and *wet* usually means *disease-prone*), a new type of velvet bentgrass grown on high-acid soil, the kind that blueberries like, didn't get any disease at all—despite using a simulator that mimicked the wear and tear of 30,000 rounds of golf a year. Yet the same cultivar grown on a nearly neutral soil was 20 percent diseased. This is good news for sod farms because it gives them more marketing options for golf course customers who want to go low-spray. It also highlights a basic tenet of IPM: meet a plant's needs, ensure its health, and you can dramatically decrease pesticide use.

Project leader: F. Rossi

New York has 860 golf courses, about 3 percent of its turfgrass area.

Go green! Fifty-thousand rounds a year. Mowing to a tenth of an inch. Rolling, topdressing, brushing. *Wear and tear.* Golf courses are intensively managed to maintain superb playing quality. Until recently, that meant routine use of pesticides. Now six years of research have demonstrated that IPM can reduce the environmental impact of pesticide use on golf courses by up to 85 percent.





Getting the hang of it: Hanging pheromone traps on apple trees takes only a little practice. These “sex-scent” traps lure male moths, letting growers know whether they have a problem on their hands. Traps like these helped to limit a regional disaster that could have cost NY growers hundreds of thousands of dollars in rejected loads, and helped keep 30,000 acres of fruit worm-free.

Project leaders: D. Breth, E. Tee

Apples are a \$265 million crop in NY, second in the nation.

Bed bugs—they’re back!

Bed bugs, an age-old problem that had nearly vanished in North America by 1945, are once again a household word—not to mention a media craze. They’re turning up even in the best hotels, and complaints to New York City housing agencies skyrocketed from 1,800 in 2005 to more than 4,600 in 2006.

It’s a scary issue for pest management professionals. Some bed bugs are becoming resistant to sprays and dealing with the critters requires *absolute* cooperation from clients. Yet if control fails, it’s these professionals’ reputations and finances that are on the line.

We’re looking at it from several angles. We’ve surveyed the pest management industry to see how its members deal with bed bugs and where the gaps are. We’ve organized training sessions for about 225 pest professionals, demonstrating how to identify, evaluate, and treat bed bug problems. We’ve drafted plans that agencies and school districts can use in dealing with bed bugs. We’ve consulted with people who face the daunting task of controlling bed bugs, not to mention the legal issues. And we’re helping Cornell researchers who are characterizing the bed bug’s “aggregation pheromone”—the chemical signal that impels bed bugs to come together in groups, thereby holding the potential to attract them to one place where they can be dealt with more easily.

Project leader: J. Gangloff-Kaufmann



Wow! Cool bugs, bigger than life! IPM outreach brings hands-on learning to venues around the state, including this teachable moment at NY’s Empire Farm Days.

Funded Projects – Agriculture

RESEARCH AND DEVELOPMENT

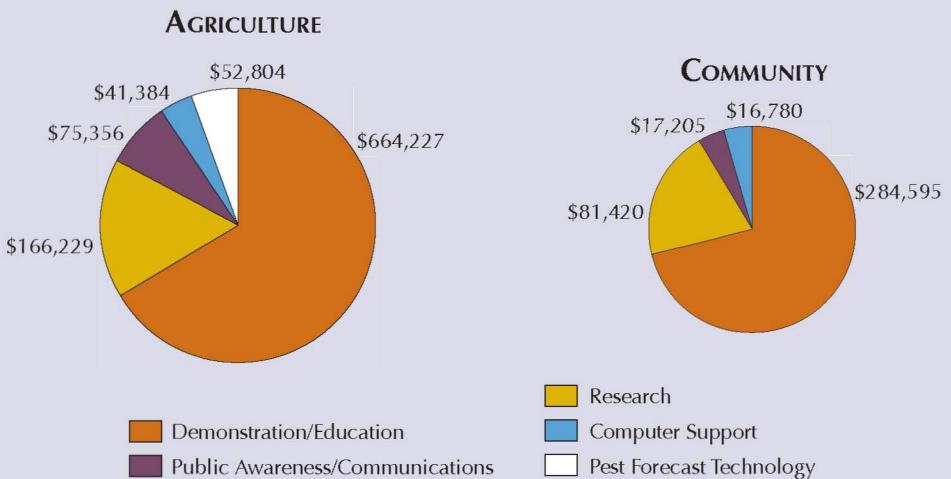
- Agnello A., Entomology, Geneva, H. Reissig, Entomology, Geneva. Management programs for internal lepidoptera in apples using pheromone mating disruption and in-season fruit inspection.
- Aldwinckle, H., and N. Werner, Plant Pathology, Geneva. Measuring applied antagonistic bacterial populations for management of fire blight within the State of New York.
- Bellinder, R., Horticulture, Ithaca. Integrating weed management options in strawberries.
- Bergstrom, G., and M. Wunsch, Plant Pathology, Ithaca. Host range and molecular diagnostics of fusarium wilt of birdsfoot trefoil.
- Bjorkman, T., Horticulture, Geneva. Encouraging the use of buckwheat cover crops for weed control by reducing the risk of volunteer seedlings.
- Brainard, D., Horticulture, Ithaca. Estimating weed seed banks for improved monitoring and management of weeds.
- Carroll, J., NYS IPM Program, Geneva, T. Robinson, Horticultural Science, Geneva, T. Burr, Plant Pathology, Geneva. Importance of early-spring-pruning copper sprays and training systems in managing bacterial canker of sweet cherry.
- Dennis, M., CCE Seneca County, J. Dennis, NYS IPM Program, Wayne County. Measuring the economic and agronomic benefit of timed, preventative fungicide applications to soybean.
- Gadoury, D., R. Seem, W. Wilcox, and M. Moyer, Plant Pathology, Geneva. A practical model for control of grapevine powdery mildew in the Northeast region.
- Grant, J., and D. Marvin, NYS IPM Program, Geneva. Trac Turf: software for documentation of pest management practices for sod farms in New York State.
- Gugino, B., G. Abawi, and J. Ludwig, Plant Pathology, Geneva. Development of on-farm protocols for assessing soil nematode infestation levels in vegetable fields and making the appropriate management decision.
- Hansen, J., Plant Breeding and Genetics, Ithaca, K. Waldron, NYS IPM Program, Geneva, J. Losey, Entomology, Ithaca, D. Viands, Plant Breeding and Genetics, Ithaca, J. Hanchar, Animal Science, Ithaca. Agronomics and economics of potato leafhopper (PLH)-resistant alfalfa intercropped with perennial forage grass for PLH control.
- Kain, D., and A. Agnello, Entomology, Geneva, M. Hoffmann, and J. Gardner, Entomology, Ithaca. Use of physical barriers to prevent borer infestation of apple burrknots.
- Landers, A., Entomology, Geneva. Putting the spray onto the target—the development and demonstration of a vineyard patternator for growers to reduce their spray bill by 30%.
- Loeb, G., and D. Cha, Entomology, Geneva, J. Carroll, NYS IPM Program, Geneva. Understanding habitat colonization by tarnished plant bug as basis for developing an attraction-based management system for berry crops.
- Lorbeer, J., Plant Pathology, Ithaca, C. Hoepting, CCE Lake Plains Vegetable Program. Detection of systemic and latent presence of *Botrytis allii* in onion transplants.
- Nault, B., and J. Nyrop, Entomology, Geneva. Developing a biocompatible management strategy for onion maggot flies.
- Rosenberger, D., Plant Pathology, Hudson Valley Laboratory, P. Jentsch, Entomology, Hudson Valley Laboratory. Effectiveness of lime-sulfur and phosphorous acid for controlling summer diseases on apples.
- Rosenberger, D., Plant Pathology, Hudson Valley Laboratory, P. Jentsch, Entomology, Hudson Valley Laboratory. Evaluation of organic pest controls and fruit thinning on multiple apple cultivars.
- Rossi, F., Horticulture, Ithaca. Development of velvet bentgrass sod as an environmentally compatible turfgrass less reliant on fertilizers and pesticides.
- Rutz, D. A., Entomology, Ithaca, K. Waldron, NYS IPM Program, Geneva. Identification of the dung beetle complex associated with New York pastured cattle.
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Please see www.nysipm.cornell.edu/grantspgm/projects/proj06 for abstracts of these projects.

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