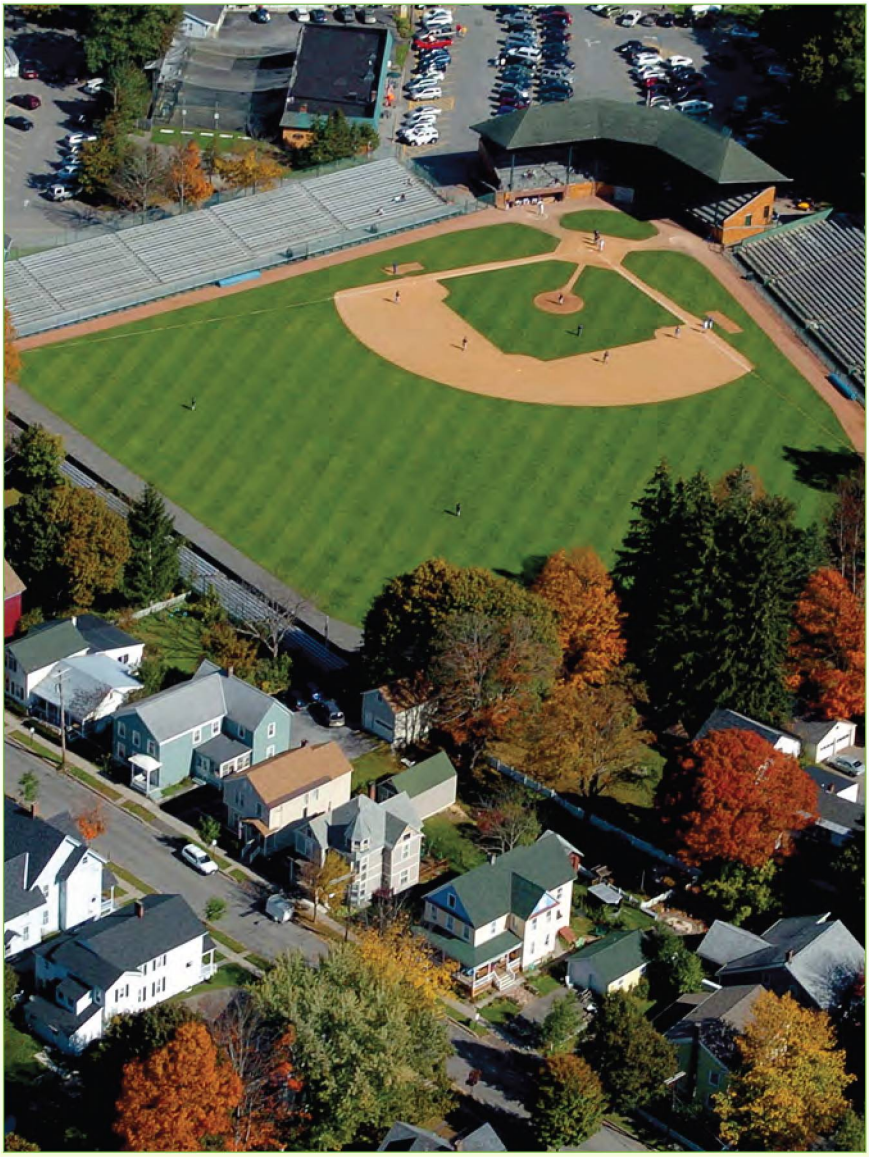
New York State
Integrated Pest Management
Program

The year in review

2012—2013



Cornell University
Cooperative Extension

IPM Integrated Pest Management

Directors' Message

Dear Friends,

Although we're still feeling the pain from state cuts to Agricultural IPM funds, 2012 was a good year. State funding for Community IPM went up, we restored some staff positions we had lost in the fiscal crisis of 2010, and we funded a number of extension and applied research projects for both agricultural and community IPM — projects that are critical links in supporting and fostering extension, research, and IPM implementation around New York.

We've featured a number of these projects here. Read about a SUNY entomologist who partnered with a school grounds manager to punch out grubs; Cornell researchers who crafted step-by-step protocols that farmers can follow to test how well fungicides work on their farms; and extension educators in Suffolk County who brought critically needed resources to workers in a county with strict pesticide laws in place but little fat in the budget to build pests out. And more.

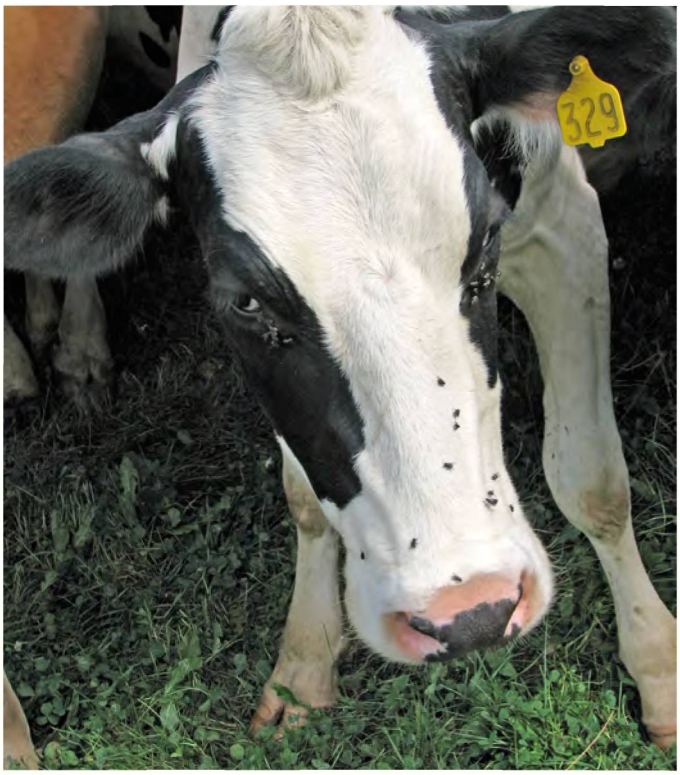
Meanwhile, growers greatly appreciate the work we do behind the scenes, such as NEWA's extensive weather monitoring and pest forecasting models or the sweet corn trap network. You'll find a list of these and many other projects at the back of this report — they're worth a look on our website. While you're online, check out our Facebook page. It's become a great spot to ask your pest questions — and get them answered.

Once again, the hardworking, creative IPM staff, CCE educators, and Cornell faculty have come up with new and better ways for New Yorkers to manage pests efficiently and with the least possible environmental impact. Their hard work makes our job a pleasure.

Curt Petzoldt and Jennifer Grant

Front cover: How can the historic Doubleday Field withstand the pressure of over 250 games a year — especially now that the village of Cooperstown is trying to manage the ballfield without pesticides? NYS IPM partners with them to find answers. *Special thanks to photographer Alan Lincourt, Pro Image Photo and Cooperstown Time Company.*

Highlights of 2012–2013



Take the *Ouch* Out of Being a Cow: Nationwide, pesky pests cause cumulative losses among dairy and beef cattle that cost at least two billion dollars each year. Many livestock farmers who attended our field meetings were up to speed on coping with barn flies. But none had used the traps that can dramatically cut back on flies when cattle are on pasture. Our post-meeting surveys suggest that's about to change.

Watch Cows at Work to Watch Pests at Work

Flies, mites, lice and other pesky pests — small as they are, pests that bug cattle can cost a bundle. Dairy cows give substantially less milk and calves just don't grow as big.

Some pests operate on the theory of "out of sight, out of mind." But you can watch bigger pests at work by watching cows at work. Each swish of the tail or toss of the head provides barely a few seconds of relief from face flies, stable flies, horn flies — even house flies. Multiply that by thousands of swishes and tosses day in and out, and you can see those dollar signs drifting into the debit column. In fact, stable flies alone could reduce weight gain in cattle by as much as 20 percent. Why? Because cows plagued by flies tend to bunch together, increasing heat stress and risk of injury as they jockey for position.

Since New York's livestock contribute close to $1.6 billion to the economy; since barn flies are increasingly resistant to sprays; since many farmers find that pasture flies are both hardest to control and costliest to their herd's health and wellbeing — and since farmers who learn with their hands as well as their heads have the highest rate of adoption — we brought hands-on demos to farm fields in 12 counties, reaching over 100 farmers who collectively manage 2,900 head on 2,300 acres.

Results? Here are two (and there were many): where before 81 percent of farmers hadn't used IPM thresholds — estimates of fly populations that help them decide, for instance, when to use biological controls — we saw a complete reversal, for 83 percent are converts now. And 100 percent of farmers attending our workshops are sold on using parasitoids to cope with barn flies.

Project leader: K. Wise

When an Early Spring Busts Out All Over

Plants respond to an early spring rather like we do — by busting out their spring finery and setting aside their winter gear. And as with us, a sudden cold snap can blow them away.

The Lake Erie grape belt is the world's prime source for juice grapes. So when Mother Nature dishes out abnormally warm springs interlaced with painful cold snaps, as she did in 2012, the world can lose much of an entire year's-worth of vitamin-rich juice. Amidst the calamity, growers struggle to provide their crop insurance adjusters with solid estimates of vineyard damage — estimates that are also essential in knowing which customary IPM practices to maintain throughout the growing season and which to adjust or even abandon.

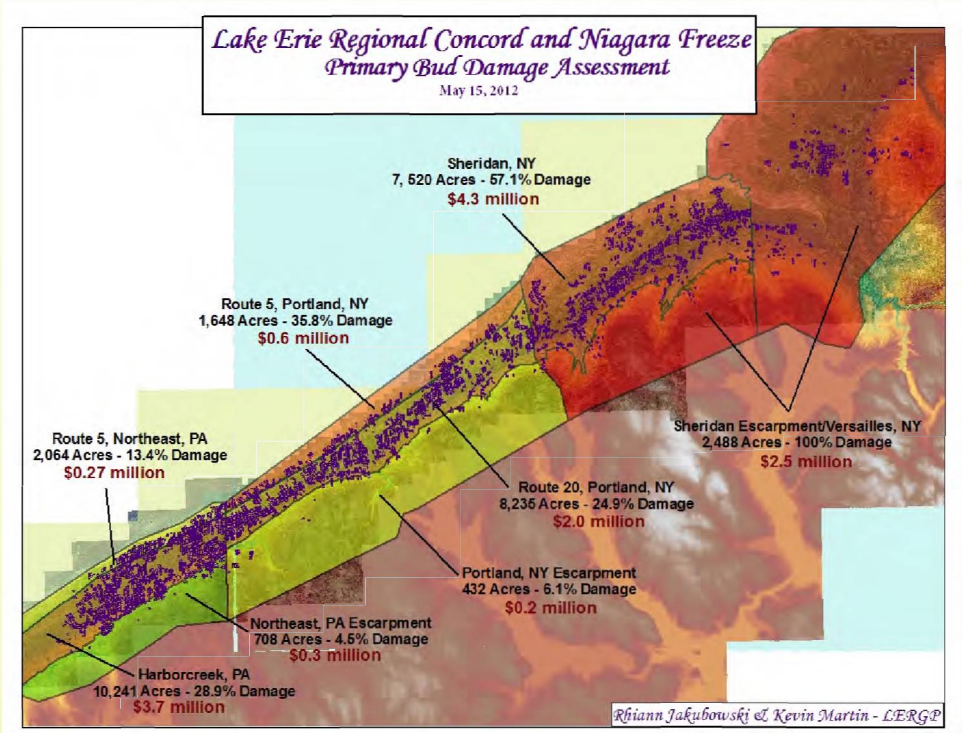
To solve this problem with the resources of a wired world, researchers with the Lake Erie Regional Grape Program beat the bushes in nine Lake Erie vineyards, each representative of nine grape-belt sub-regions. They gathered data across a range of soil types, elevations, and proximity to the lake, assessing damage as they went.

Back at the lab, they downloaded GIS maps of Lake Erie vineyards (think Google maps on steroids) and dumped in their data. Soon they had "living maps" linked to hourly weather info. These maps brought home the damage in ways that only a graphic can. And the usefulness of these data-rich maps went far beyond any given farm (and its insurers) — they provided legislators voting on disaster-relief bills and reporters on deadline with the most easily assimilated material yet.

Grape growers aren't the only farmers to benefit. Any grower near the digital weather stations deployed across the Lake Erie ag belt, stations that stream reports online via NEWA (Northeast Environment and Weather Applications), can tap into these maps for up-to-the-minute assessments.

Project leaders: T. Weigle, T. Bates, and K. A. Martin

A Picture Is Worth a Thousand Words: How to convey the degree of damage and loss from a walloping late-spring freeze when some vineyards get hammered while others mere miles away get off almost scot-free? Sometimes an image says it best. In the aftermath of 2012's record-breaking losses, IPM scientists developed a novel mapping method to help growers work with crop insurers. A side benefit: it helped communicate with the media too. Using these maps, one grape-belt extension educator said, "marked the first time I have not been misquoted when working with the media."



Choices! Choices! On-Farm Research to the Rescue: After gray leaf spot wasted his crop in 2009, a Schoharie Valley farmer began routine sprays for the next three years, thinking higher yields would follow. Did they? Using the new tools (below), on-farm strip trials showed that in his case, *probably not*. Yes, fungicide-sprayed plots yielded 18.4 tons per acre, while unsprayed plots yielded 18 tons. But fungicide and application costs made that extra $^{4}/_{10}$ ton a pricey investment indeed.

Project leader: K. Ganoe

Side by Side: Farmers, Researchers Test DIY "Strip-Trial" Techniques for On-Farm Research

Field corn is the king of crops in New York. This highest net-value and most widely grown crop occupies more than a million acres statewide. Some years it's hammered by leaf blights that can cost considerably if not treated in time. Other years your crops get off almost unscathed. How to know which conditions tip the scales for health or disease *on your farm* — and thus whether you should spray or put that money to a different use?

Savvy farmers who know the risks and benefits of pesticides need ways to tell whether a given fungicide will provide higher yields and profits, and under what conditions. To help them, IPM researchers have taught and tested new materials that help growers set up side-by-side *strip trials* — three or more pairs of treated and untreated corn, each strip at least 10 feet wide, so growers can do their own on-farm research.

For if good judgment is the best tool farmers have, the best place to hone it is in their own fields, under their growing conditions. There's no better way to know which combination of pest-management tactics work best in the microcosm known as *your farm* — regardless of what a specialist or sales person might say. Growers can find these new protocols on our website.

Project leader: G. Bergstrom

When *Bad* Meets *Worse:* It's bad enough to find apple or pear branches struck dead, their growing tips bent like candy canes. Because then you know a known killer — fire blight — has found its way to your orchard. In a bad year, warm and damp, the consequences can be calamitous. And where a new strain of fire blight resistant to the only known cure has come to town, the news gets even worse. Scouting and quick intervention with a clean pair of pruning shears are simple tactics to slow the spread while researchers seek other, low-impact treatments.

Fight Fire With — Research, Scouting, Education, the Works

New York ranks second in the nation in apples and fourth in pears, with crops valued at $231 million. Young trees are profoundly susceptible to fire blight. In a normal year losses can be severe — and catastrophic in a year of balmy, damp days and damp, balmy nights.

Destroying all your trees after fire blight strikes is one sure cure — but not the one growers seek. Streptomycin, derived from a soil bacterium, is the other. So when a strain of fire blight becomes resistant to streptomycin, that's serious business.

When strep-resistant fire blight was confirmed in four orchard blocks in 2011, IPM scientists decided to sample orchards statewide for this strain. And though the weather in 2012 didn't favor disease — still, we found it in seven orchards scattered over five counties in western New York.

For us, this was a clear call to action:

- assess and adapt IPM protocols for high-risk areas
- teach preventive tactics and best practices for coping with new cases of probable strep-resistant strains
- develop guidelines for nurseries and new plantings

Project leaders: K. Cox, H. Aldwinckle, J. Carroll, and T. Burr

Of All the Gall: An accurate diagnosis pays dividends. How? As *step one* in coping with pests, it suggests proactive, preventive tactics that keep damage down. After all, the wrong spray at the wrong time is money down the drain. Case in point: this tricky little bacterium, Rhodococcus gall, mimics a range of pest and abiotic problems. Of all the gall!

You Can't Fix It if You Don't Know What It Is

Got Rhodococcus gall on your sweet potato vine? Dothistroma needle blight on Austrian pine? Zimmerman pine moth on Douglas fir? Good questions — because how would you know? And it's that *not-knowing* part that'll get you every time.

For growers who want to save money *and* sprays (not to mention their crops) an accurate diagnosis is simply essential. Plus with each diagnosis comes a teachable moment — an opportunity for a grower to learn not only which pest is what, but how to modify growing conditions so plants are less vulnerable to disease and insect pests.

Or say the problem turns out to be an *abiotic* condition, like herbicide spray injury — well, growers need to know that:

- one, it's not a disease, and …
- two, how to prevent it, perhaps by swapping out to a different, softer method of weed control.

This train runs both ways — solid diagnoses keep us current on real-time pest and production problems, serving as timely guides for planning workshops, research, and demonstration projects. Our IPM educators solve problems like these day in and out. In fact, it's what we do best.

Project leaders: B. Eshenaur and E. Lamb

Efficacy Goes Organic

New York ranks fourth in the nation for number of organic vegetable farms and sixth in crop value, ringing the registers at more than $6.6 million.

Organic practices help healthy crops shrug off many insect pests. But take striped cucumber beetle — this bug is one tough cookie. And it's a tough job finding anything that'll keep it at bay.

Our organic pesticide trials pitted both old standards and new arrivals on the market against a foursome of vexing pests: squash vine borer, swede midge, flea beetle and (but of course) striped cucumber beetle. This foursome hammers some of the highest-value vegetables a farmer can grow.

Our results ran the gamut from *great* to — well, *not-so-great.* Good news first: on squash vine borer all treatments helped, and all equally well. And while flea beetles were relatively kind to our untreated controls in 2012, one of our treatments cut damage by nearly 50 percent (good!) — a result needing validation in a bad flea-beetle year.

But swede midge, a fairly recent arrival with an explosive growth cycle, proved nearly impossible to cope with — a record easily matched by striped cucumber beetle. For this duo, manufacturers, consultants, extension educators, and growers have one prescript: *keep plugging away.*

Project leaders: A. Seaman, C. Smart, H. Lange, and A. Shelton

Diseases on Trial: Just a mere week after you see downy mildew's first telltale spots, your whole cucumber field could look burnt and dead. Is it any wonder organic growers are anxious for a solution to this dread disease? Among the five organically approved fungicides we tested, one provided enough control to warrant optimism for the future.

Project leaders: H. Lange, C. Smart, and A. Seaman

Community

Direct Hit: Chemical and biological controls for grubs each comes with a price tag attached, whether to environment, your balance sheet — or both. How handy that the optimal time for aerating turf is just when grubs are biggest and easiest to impale with a sharp-tined aerator.

Punching Out Grubs

Cutting grass roots to the quick; that's a grub's stock in trade. But pesticides cost money and time — let alone potential health hazards, whether to ecosystems or us. Cutting grubs to the quick? Now, there's an idea.

Groundskeepers (and savvy homeowners) use aerators with their sharp tines to break up hard, compacted soil, letting life-giving oxygen and water deeper into the earth. But those tines have another function, though not by design. They're like tiny spears, meaning that a grub in the wrong place at the wrong time is a goner.

Four years of small-plot research at SUNY Delhi had shown that yes, turfgrass aerators could lower grub populations, sometimes as much as 90 percent — depending, of course, on conditions that vary from site to site and year to year. Next it was time for real-world tests pitting three different aerator designs against the common enemy to see which came up on top.

Results? All aerators can cut grub populations, though the old standard hollow-core aerators did best in these trials. It's an inexpensive tactic if you have the equipment — and a handy concept for school grounds managers who can't use pesticides. With this information in hand, groundskeepers can plan when they aerate with grub management in mind.

Project leader: B. A. McGraw

Iconic Cooperstown: Each year, nearly 300 thousand fans make the trek to the National Baseball Hall of Fame and Doubleday Field in Cooperstown, New York, *aka* the birthplace of baseball. Doubleday Field hosts ball teams from across the continent in an incredible 250-plus games a year. The stress of keeping turf healthy under all those pounding feet turns dealing with weeds into a world-class management challenge. Especially since Blackbird Bay in Otsego Lake is less than a half-mile away — spurring the residents to weigh the environmental costs of using synthetic pesticides and urge village officials to seek a better way. Now iconic Cooperstown is learning a new game: pesticide-free ballfield care based on new techniques, new reduced-risk products, biological controls, and other advanced IPM answers to environmental problems.

Project leaders: K. Trotta and J. Harris

IPM Focus

Temporary Fixes for Lasting Results

Back in 1999, Long Island's Suffolk County was among the first communities nationwide to mandate strong pesticide phase-out laws. But how to hew to the letter of the law, given budget cuts that make structural repairs — repairs that *build pests out* — a scarce commodity?

Cooperative extension scientists brought 30 IPM workshops and free, comprehensive resources to both county staff and the vendors who lease space incounty-owned properties such as schools, parks, libraries, police stations, office buildings, and more. Participants learned new ways to accurately measure threatening pests and IPM tactics that bridge the gap (often literally) until permanent repairs work their way back into budgets.

Resources came in the form of handy, easy-to-use toolkits and the factsheets to back them up:

- QuikPest reference cards, magnifiers, and fine tweezers for easier pest ID
- calibration cards for fertilizer spreaders
- 175 (count 'em) website factsheets

Those stopgap fixes? Well, that includes:

- fix leaky pipes (pests need water)
- caulk cracks that let the outside in ("outside," as in ants, cockroaches, wasps, and the like)
- block small holes or gaps (think mice hangouts — rat, chipmunk, and squirrel hangouts too)

How to turn a temporary fix into a lasting result? Education is key. Exit surveys found *93 percent* said that workshops exceeded their expectations. Based on what they learned, *94 percent* said they'd change their approach. And — it doesn't get much better than this — *100 percent* said that based on what they learned, they anticipated cutting back on pesticides.

Project leaders: T. Yeh and M. Camenares

Those Are Honking Big Owls: Geese are gorgeous, but that messy poo they leave behind day after day — sometimes at your doorstep — costs considerably in cleanup time. Sheet-metal owls that scare off geese by glittering in the sun and flexing in the wind are a low-cost alternative. But you have to remember to move them around — otherwise they just become part of the scenery.

When Being Half-Wrong Is Right-On

Conventional herbicides are on the outs for use on school lawns and athletic fields now that New York law prohibits them where schoolchildren play. How to keep the weeds down? Biochemicals in corn gluten meal (a byproduct from milling corn) can suppress some weeds if used in spring just as weed seedlings are trying to take root.

Corn gluten meal's high nitrogen content also works wonders for greening up grass. But — if you follow recommended application rates, you're adding nitrogen at four times the rate the Cornell Turfgrass Program recommends to help keep our watersheds safe. Does using corn gluten meal simply create new hazards in dealing with stormwater pollution? And does it suppress weeds merely by invigorating grass so well that the grass simply crowds out weeds? And if so — why not use a plain-vanilla nitrogen fertilizer, one with way less potential to pollute?

A Cornell scientist sought answers by setting up a series of "lysimeter plots" to capture runoff from early-spring applications of:

- corn gluten meal
- urea (a conventional quick-release nitrogen fertilizer)

— compared, of course, to untreated controls.

These research plots were prone to crabgrass, a nefarious annual that's notoriously hard to control. Corn gluten meal was applied at rates suggested for suppressing weeds, while applications of urea followed Cornell's recommended rates. If the hypotheses were correct — if nitrogen alone was responsible for the effects credited to corn gluten meal and the high-nitrogen levels in the meal leach readily into groundwater — those urea-treated plots would show less nitrogen down the drain and perhaps fewer weeds.

The hypotheses? Both were wrong — well, half wrong. Not that corn gluten meal did a great job of suppressing crabgrass; it didn't. But neither did urea; in fact, urea-treated plots had double the density of crabgrass noted in both the controls and the meal-treated plots. As for nitrogen leaching? Urea-treated plots leached at *roughly quadruple* compared to the corn gluten meal plots.

Project leader: J. Kao-Kniffin

Down the Drain: Researchers large — and small, when you've got a curious kid tagging along — use below-ground catchment basins (properly called *lysimeters,* a term coined in the late 1800s) to capture, then analyze, runoff from research plots.

Focus, continued

End Run Around Sports Injuries for Young Athletes

Sprains. Torn muscles. Dislocated knees. At least 20 percent of high-school sports injuries can be traced to poor turf quality. And about half of these injuries happen on practice fields, fields that don't get the TLC they need.

High-quality sports turf offers the right mix of traction, resiliency, and cushioning that helps prevent injuries. But turf needs protection from injury to do its job. Injury from what? The pounding feet that beat soil into a dense, almost bricklike mass. Compacted soil favors weeds and bare spots. Those patches of bare or weedy spots scattered throughout the turf means that players can't choose the right cleats for such changeable conditions — and the wrong cleats on weedy fields can lead to injury.

Limping Along: Sports fields that look fit and trim from afar show their true colors up close. Shifting field positions and rotating practice areas to give hardest-played areas a break; top-dressing, overseeding, and aerating fields; scheduling games and special events so each field has a chance for a well deserved rest — these and more IPM tactics help groundskeepers keep fields densely covered with turf.

Collegiate and professional teams can control who uses sports fields, and when. Plus they've got the budgets to keep sports fields shipshape. Not so with public schools. Come spring and the grass is still dormant — but teams are anxious to get on the field. Come summer and peak temperatures hit as sports camp and community teams take to the field — not the best time to repair worn turf. Come fall and the weather cools off — but practice and games don't.

Come winter … well, forget winter.

The best fix for turf-related sports injuries? Prevent them in the first place. A school district south of Syracuse, New York, was a living lab for Cornell research — a place to test new IPM turf-care tactics on sports fields close to the max for unsafe play. Yes, an extra $3400 per field might look scary for school districts like this with no fat in the budget. Nor does it include the cost for new equipment to do the job right. True, solutions to vexing civic or budgetary problems are beyond the scope of research like this. But if knowledge is power, this work could help empower school communities to cope with potential injury to turf *or* kids: after all, injuries can be expensive, and they can *hurt.*

Project leaders: R. Portmess and F. Rossi

Aphid ABCs: Our demos and discussions lend themselves to just the kind of hands-on learning that's so effective for growers. This year our IPM In-depth workshops — almost double the number in prior years — reached 174 participants.

Workshops on Wheels

Greenhouse growers might get a jump on the season, but does it help even out the workload as summer rolls by? *Noooo.* Spring, summer, fall — busy times all. Which leaves winter for workshops; but the best learning opportunities happen right where the growers are: in their greenhouses surrounded by hundreds of flats, thousands of plants — and real-world problems and solutions everywhere you look.

So we did it again: loaded a van with dissecting microscopes, vials of problem bugs (and their predators), freshly picked disease samples, *you-name-it,* and hit the road six times over the course of the season. Each time, our destination was a county extension office for morning workshops, followed by a trek to the greenhouse workplace of a gracious host for several rounds of show and tell.

As always, the combination of equipment and plant specimens helped growers get hands-on experience tackling their problems. This first-hand experience with real problems makes it easy for participants to learn new concepts in pest management.

Project leaders: E. Lamb and B. Eshenaur

We're Happy, Too: Cooperative extension educators and volunteers enrolled 58 schoolkids in five hands-on, compost-making programs across Wayne County, programs that taught practical, ground-up environmental stewardship (and science, too). But — compost? Well, compost keeps kitchen scraps and even cardboard out of the waste stream; reduces polluting runoff; improves soil structure and retains nutrients — in turn making for healthier plants, less susceptible to insect and disease pests. *The kids loved making a mess,* their teacher says. *They asked tons of questions.* Now the teacher is happy, the tree is happy, and the kids are happy too.

Project leader: Elizabeth Claypoole

Do *Some*thing About the Weather — Use Late-Blight DSS

Cool, damp days are made to order for late blight. Once it has a toehold, its spores can travel many miles in a single bound. Wherever this devastating disease touches down — *if the weather favors it* — potato and tomato crops are sure goners.

Growers know the danger and have long been watchful. They tune into blight forecasts, scout relentlessly, and proactively apply fungicides at the first hint of disease. But in 2009 infected transplants sold all over the Northeast provided the fodder, damp cool days provided the fuel — and soon growers and gardeners had a pandemic on their hands.

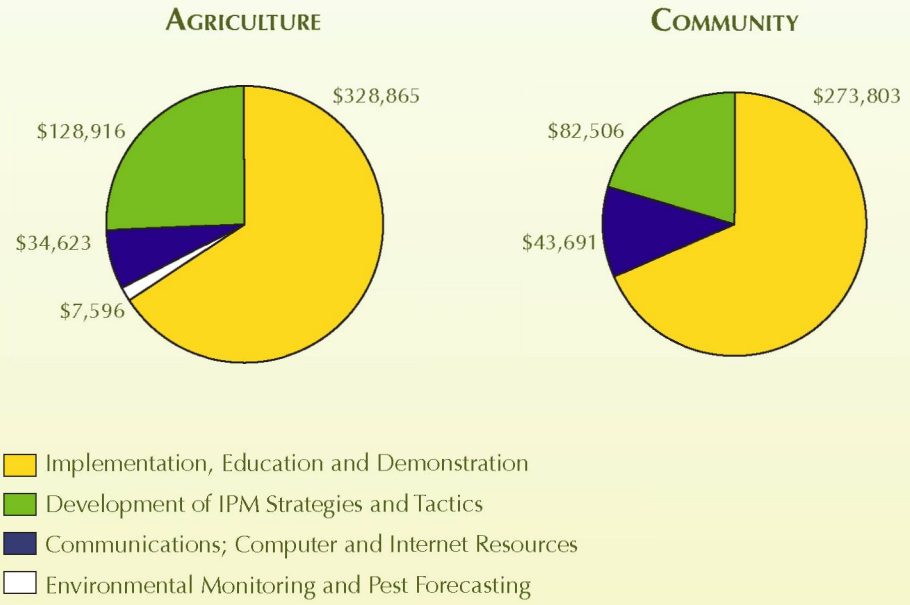
Since IPM is all about prevention and cutting back on sprays, Cornell scientists built a new, internet-based "decision support system," or DSS. DSS provides local, real-time blight forecasts, layered with data on which potato and tomato varieties resist blight (and to what degree) and what fungicides are best suited for them.

Growers who follow these late-blight protocols can save 15 to 20 percent on sprays — meaning that if DSS is widely adopted, savings could translate into many tons of fungicide and tens of thousands of dollars.

Project leader: W. E. Fry

Pandemic on the Loose? Plant-disease pandemics can lay waste to miles of crops across entire ecosystems. Each pandemic's root cause? A pathogen. But pathogens have enablers. First among them is the weather. Though the weather is entirely outside our control, still — we can do something about it. Cornell's new late-blight DSS, or Decision Support System, enables growers to choose the right fungicide in the right amount at the right time so they don't waste sprays — let alone lose their crop.

Distribution of State Funds for the NYS IPM Program, 2012–2013



2012 Projects

All projects were partially or fully funded by the New York State IPM Program. We leveraged additional funds from outside sources. Unless otherwise noted, departments listed are part of Cornell University. **www.nysipm.cornell.edu/grantspgm/projects/proj12**

Bornt, C., Capital District Vegetable and Small Fruit Program. *The Impact of Flooding on the Movement and Management of* Phytophthora capsici *on Vegetable Farms in Eastern New York.*

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Claypool, E., CCE Wayne County. *Community Compost Education Project 2012.*

Cox, K., Aldwinckle, H., and Burr, T., Plant Pathology and Plant Microbe Biology, and Carroll, J., NYS IPM. *Statewide Survey for Streptomycin-resistant Fire Blight in Orchards.*

English, K., NYS IPM. *Status of the NYS IPM Program Website, www.nysipm.cornell.edu, for 2012.*

Eshenaur, B., NYS IPM. *Root Rot Studies of Fir Species in NY Christmas Tree Production.*

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Ganoe, K. H., CCE Central NY Dairy and Field Crops, and Wilkinson, G., CCE Herkimer County. *Evaluation of Foliar Fungicide Use to Improve Yield and Quality of BMR Corn Silage.*

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Hudler, G., Plant Pathology and Plant Microbe Biology. *Etiological Investigations into Chronic Dieback of Fraser Fir in New York State Christmas Tree Farms: Site Characteristics and the Involvement of Phytophthora Species.*

Kao-Kniffin, J., Horticulture. *Quantifying Nitrogen Leaching from an Organic Herbicide (Corn Gluten Meal).*

Lamb, E., and Eshenaur, B., NYS IPM. *Improving Crop Management in NY Greenhouses through Local Hands-on Workshops.*

Lamb, E., NYS IPM, Mattson, N. S., Horticulture, Sanderson, J.P., Entomology, and Eshenaur, B., NYS IPM. *Biocontrol in Energy-saving Cool Temperature Greenhouse Production.*

Lamb, E., NYS IPM. *Increasing Utilization of IPM Tools in the NYS Christmas Tree Industry.*

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Mattson, N., Horticulture, and Daughtrey, M., Plant Pathology and Plant-Microbe Biology. *Biological Control of Pythium Root Rot in Container Flower Production Using Microbial Inoculants.*

McDermott, L., and Stewart, C., CCE Eastern New York Commercial Horticulture Program. *Targeted Outreach to Growers and Service Providers dealing with Disease Introduced by 2011 Flooding.*

McGraw, B. A., State University of New York, Delhi. *Assessment of Non-Chemical White Grub Control in Turf through Mechanical and Injection Cultivation Methods.*

McKellar, M. E., Crop and Soil Sciences, Bergstrom, G. and Cummings, J., Plant Pathology and Plant Microbe Biology. *Tools and Training to Assess Profitability of Foliar Fungicide Use in Corn.*

Nelson, W., CCE Monroe County. *Sports Turf TAG (Turf, Athletic and Grounds) Team.*

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