

INTEGRATED PEST MANAGEMENT

# Insights

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**Contact Us**

607-255-8815  
northeastipm@cornell.edu

**Signature Programs**



## New Entry and Beginning Farmers

I recently came across a drugstore newsstand with an issue of a magazine called *New Pioneer*. The cover photograph showed a family standing in front of a tidy wooden shack with solar panels on the roof. The husband, wife, and children were surrounded by chickens, and nearby was a young calf. The headlines promised stories such as "Basketweave for profit," "Mini-farming," and "Raising livestock." One thing's for sure: the editors of *New Pioneer* have put their finger on the pulse of a new back-to-basics movement, one that would be understood by today's connected, savvy, environmentally-conscious, new and beginning farmer.

The USDA defines beginning farmers as those who have operated a farm for ten years or less. Unfortunately, this definition doesn't take us very far in understanding the beginning farmer.

Indeed, people who feel the allure and desire to become a farmer come from all walks of society, every education and income level. The back-to-the-land movement has deep roots, and persists even today. Of course, beginning farmers nowadays may look up information about weather and pest conditions on a smart phone and deliver their produce to a trendy farmer's market in the suburbs or city. Some aspects of being a beginning farmer are as innovative as Apple's latest iPhone. And some ideas are as old as the rain



New farmer, Renee Toll-DuBois, leads a field tour and discusses cover crops for soil fertility. Photo provided by Jennifer Hashley.

falling on the soil and nurturing seeds to grow into plants that bear fruit. For as long as humans live, we will need food grown from the land.

In this issue, we write about the theme "new entry and beginning farmers and IPM." We invited authors to contribute pieces related to this theme, their work and interest, and IPM development and adoption. We selected the authors because of their expertise and connection with the Northeastern IPM Center. We believe all who read this information-packed issue of *IPM Insights* will expand their understanding.

We selected pieces from the following four authors:

**Jennifer Hashley**, of Tufts University, is working on a Center grant on training diverse IPM practitioners, in her second year.

**Ana Legrand**, of the University of Connecticut, works with immigrants and has received funding to develop and conduct training programs.

**Yao Afantchao**, of the University of the District of Columbia, directs a sustainability research farm and serves on the Northeastern IPM Center Advisory Council.

**Rose Ogutu**, of Delaware State University, is a passionate advocate for IPM education and training and serves on our Advisory Council as well.



SARE trainees learning seedling production. Photo provided by Yao Afantchao.

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# Beginning Farmers

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The beginning farmer can find much good information that is freely available on the web. The Cornell Small Farms Program maintains a list of tutorials and worksheets to guide new farmers writing a business plan; videos of experienced farmers giving advice and up-close production techniques; and a map pointing to various farm service providers. (<http://neipmc.org/go/PWGe>).

The University of Maryland offers an entire guidebook and website on beginning farming. The guidebook contains various publications often requested by beginning farmers, covering farm establishment, equipment, enterprise selection, marketing, and business planning. (<http://neipmc.org/go/DhFh>).

Iowa State University has a Beginning Farmer Center. The Center transitions the operations of retiring farmers to the next generation of beginning farmers and provides advice to new farmers. (<http://neipmc.org/go/hEPf>).

All of this information, of course, will help you get your farming operation established. But what happens when another very old problem happens—the pests come? We dedicate this issue to beginning farmers and present articles from four experts to enlighten us. Read on.

— Chris Gonzales  
Northeastern IPM Center

## It's the Small Things that Add Up

“Wow, I didn't know such a small thing could do so much damage!” This is a common phrase heard in the field when working with new and beginning producers in their first season on our incubator training farms.

From flea beetles creating “buckshot” holes in all things brassicas, to cabbage root maggots burrowing maze-like tunnels into hakeurei turnips, and the infamous Colorado potato beetles and their voracious larvae taking down a potato crop practically overnight, there is a lot to learn about the pests, their life cycles, and the many control options available to diversified vegetable producers.

At the New Entry Sustainable Farming Project (<http://nesfp.org>), we introduce new and beginning farmers to IPM, the toolbox that contains many tools and techniques to manage pests. New Entry promotes sustainable, regenerative agricultural practices, such as IPM, which start with the soil. We train farmers on balancing nutrients in the soil, using cover crops, and adding compost to build the health, tilth, and resiliency of the soil that feeds their crops. If producers start with a solid foundation of good soil health, then plants are far more likely to be healthy and robust and less susceptible to pests and disease. This is the preventative part of IPM that many people fail to understand.

We also promote heavy use of other types of cultural practices like carefully selecting disease-resistant crop varieties, active crop rotation among diverse crop families, good weed management, using floating row covers, introducing and protecting habitat for beneficial insects, avoiding overwatering through the use of drip irrigation and water conservation practices, planting trap crops, and learning about pest life cycles to potentially delay or alternate planting dates. We teach growers to manage risk by planting extra seeds to provide a “buffer,” to

have enough high-quality product to sell, even if some crops experience pest damage.

Many new and beginning farmers are eager to practice organic agriculture even if they do not pursue the USDA organic certification label. Sometimes this is incorrectly interpreted to mean “no spray”

and new producers are reticent to apply organic-approved pesticides or fungicides to protect their crops in the event of a significant disease or pest infestation. This is an opportunity for education. New Entry provides incubator farm space to multiple growers sharing a common field. We encourage producers to control pest populations for the sake of the multiple producers who share the land and who may have different approaches to managing their crops. If late blight is forecast or found to be infecting a tomato crop in one farmer's plot, then we make sure all producers are working together to provide coverage for the crops. Too often, one producer can be a vector for a disease that spreads to multiple other farms, even when those farmers are working hard to apply preventive controls.

Incubator farm support includes access to multiple trainings for practical skills. We host an annual pest management workshop. We train producers to calibrate backpack sprayers, to learn the control products and preventive sprays available for particular pests and crops, to understand how to read labels, as well as to keep records and watch for re-entry and days-to-harvest intervals. Our weekly field scouting support provides technical guidance to producers on implementing and monitoring cultural practices, advising on sprays when needed, and educating producers about alternative management practices. Together, New Entry producers understand that even the “small things” can add up.

— Jennifer Hashley  
Tufts University



Tomato hornworm. Photo provided by Jennifer Hashley.

# Pest Management in Alternative Crops: A New Learning Experience

As immigrant farmers embark on the adventure of food production, especially pertaining to ethnic specialty crops, they face many challenges including pest management issues. Because most of the plants they grow are varieties related to local specialty crops, insects and diseases adapt to these plants quickly. The farmers are usually taken by surprise when they discover this pest invasion.

## Identifying and monitoring for pests

The most commonly encountered pests include Colorado potato beetle, flea beetle, aphid whiteflies, harlequin beetles, cabbage moth, brown marmorated stink bug, Japanese beetles, and cucumber beetles. For example, sorrel (*Hibiscus sabdariffa*) and jute leaf (*Corchorus olitorius*) are greatly affected by Japanese beetle. Garden eggs (*Solanum aethiopicum*) and gboma (*Solanum macrocarpon*) are attacked by Colorado potato beetle. The amaranth varieties, garden eggs, huckleberry are threatened by flea beetles. Most specialty crops are vulnerable to aphids in their seedling stage.

## Some of the solutions applied at UDC Firebird Research

In our Urban Food Producer training program, sponsored by Northeast Sustainable Agriculture Research and Education, emphasis is placed on sustainability. Therefore we provide technical assistance to help new farmers understand the most natural ways to manage their production issues. Among others, we recommend biological, physical, ecological, and chemical solutions.

*Biological control solutions:* because not all insects are destructive and in fact, many of them are beneficial insects that help fight plant enemies, we highly discourage the use of harsh insecticides. Diversity and crop inter-planting increase the resistance of the farm against pest and disease. Other biological products such as compost tea and natural fertilizers are used for general plant health and disease resistance.

*Physical and ecological solutions:* in their attempt to manage pests, some of the farmers use traditional methods, such as physically removing insects from plants, which is rather tedious and time-consuming. We encourage the creation of a vegetation habitat that attracts beneficial insects, uses low-toxicity pest and weed control, and emphasizes the practice of good garden/farm sanitation (keeping the farm clean). Moreover, soil health is emphasized to produce vigorous plants that are better able to fight off attacks from predators.

*Chemical application:* knowing that some farmers may be looking for quick solutions which may lead to the use of toxic pesticides, we recom-

mend as an alternative, the use of the least-toxic methods such as soap solutions, and occasionally using organic and gentle substances such as Neem-Mix and others.

## Conclusion and recommendations

New farmers must be able to implement sustainable food production methods such as IPM. Early exposure to best pest management prac-



Hydroponics system demonstration at UDC Firebird Farm. Photo provided by Yao Afantchao.

tices through outreach programs such as the Northeastern IPM Center, local agricultural institutions, and extension programs, as well as personal relationships with existing local farmers, play an important role in their successful food production undertakings. By staying informed about issues related to pests and the importance of IPM, new farmers may share experiences and knowledge with members of their communities who may be interested in sustainable food production.

— Yao Afantchao  
University of the District of Columbia



Extension work with Virginia immigrant farmers on planting day. Photo provided by Yao Afantchao.



## All About Pests in High Tunnels for the Beginning Farmer

**M**any growers in Delaware who use high tunnels and small-acreage fields turn to cultural, mechanical, physical, and biologically-based methods of pest management first before they determine whether chemical control methods are needed, if at all. Growers are often very enthusiastic about high tunnels as tools that extend the season and confer better pest management compared to field production. The high tunnels managed by our Delaware small farmers are mainly acquired with the help of the Natural Resources Conservation Services Environmentally Quality Incentives Program (NRCS-EQIP). As per the program's requirement, beginning farmers start using high tunnels immediately, hence the need for IPM training.

Lately, the perspective on management of pests (insects, diseases, and weeds) by beginning farmers is laced with awareness and concerns about food safety and environmental issues. The major intent is to maintain an allowable threshold of pests hence the avoidance of harsh or excessive chemicals while getting ample production. Balancing the two scenarios is crucial and leaves our target group of beginning farmers clamoring for information on alternatives to pesticides. Extension literature lacks reports on multi-site, multi-year and multi-product tests for the products deemed to be safe for use, hence the need for IPM. The reality is that in instances of overwhelming occupancy of pests, growers resort to harsh chemicals to eliminate them, but this is not a sustainable approach.

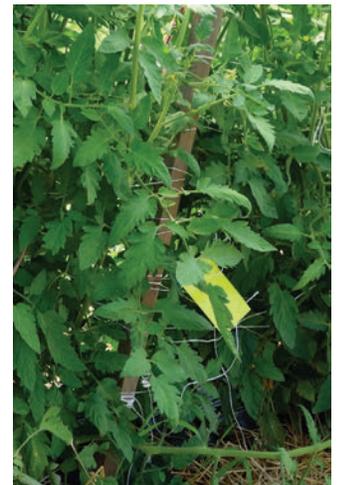
When growers begin to think at the systems level, they soon ask questions, like: "How do I efficiently manage pests in the high tunnel? How do I combine cultural, mechanical, biological and chemical ways in appropriate proportions to help manage pests in a high tunnel? Do the methods follow any order of priority or practice?"

The extended season of production in high tunnels presents a longer time of plant production thereby attracting pests over a longer

period necessitating the need for high-level IPM. Early detection is very important. Scouting is encouraged and growers ought to be able to identify most of the common high tunnel pests that include aphid, whitefly, mite, hornworm, cucumber beetle, flea beetle, slug, cabbage looper, as well as diseases such as powdery mildew, blight, and wilt. Insect monitoring includes the use of traps, and yellow and blue sticky cards. The design of the high tunnel and orientation of planting in high tunnels help eliminate high temperature and high humidity. It is generally helpful to monitor moisture levels in a high tunnel since the structure excludes rainfall and traps moisture inside.

Other critical practices for high tunnel growers using an IPM approach include:

*Cultural.* Incorporate varieties of disease-resistant plant types and maintain sanitation within and around the high tunnel. Schedule harvest of crops early enough before pest populations hit. Vertical plants use high tunnel space efficiently but need adequate trellising and timely pruning. Practice crop diversity, crop rotation, including banker plants, and keenly manage watering mainly through drip irrigation and fertigation. Conduct weed control using mulches—black plastic, straw, and landscape fabric.



Yellow sticky card. Photo provided by Rose Ogutu.

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## Expression “New Entry Farmers” Includes Students, Too

It was the best-tasting radish I had ever eaten. I had just bitten, with gusto, into this perfect radish—crisp, juicy and pungent. It was given to me by one of the urban agriculture students just as we were getting ready for the farmer’s market. I appreciated the gift because I knew how hard they had been working on their “huerto,” growing these vegetables as part of the UConn Extension Urban Agriculture Program led by Dr. German Cutz. Through this program, students learn organic vegetable production and agricultural entrepreneurship.

Juan Guallpa, a student in the 2014 class, said, “We have learned to work as a team, to grow organic vegetables. We learned to cultivate vegetables the right way.”

This training is very much needed to address local food security needs and to provide income-generating opportunities for urban residents. Students joining this program have a strong interest in producing their own food but are also interested in the commercial or work opportunities they may find in the future. This is not a surprise. In most countries, urban agriculture is dominated by small producers achieving food security and income for their families (Smit et al. 2001).

While the benefits of urban agriculture range from the tangible produce to the social well-being aspects, there are challenges that need to be met. Urban agriculture systems have to be sustainable in every sense of the word. In this case, integrated pest management (IPM) practitioners contribute to the sustainability of these systems by applying knowledge of agroecosystem processes and by using environmentally-sound pest management solutions. Thus, with funding from a Northeastern IPM Center Partnership Grant, an Urban Ag and IPM training program was developed to foster IPM in urban ag systems. The objectives of the project were to promote the use of IPM with its lower-risk tactics, to increase locally-produced food to supply food desert areas in Connecticut and to engage Latinos living in urban cities in agribusiness opportunities.



Learning the insect orders: Urban Ag and IPM Training Project students in entomology lab session. Photo provided by Ana Legrand.



Looking for pests: Urban Ag and IPM Training Project students in field pest identification session. Photo provided by Ana Legrand.

For the most part, participating students had little or no agricultural experience. The program emphasized training in botany, vegetable production, entomology, crop risk management, and IPM. Instruction was provided in a bilingual format with classes taught in Spanish but also included English terms as well. At the end of the two-year project, twenty-one out of twenty-four students completed a year-round training that included 180 hours of classroom instruction, and the production and selling of over 7,000 pounds of organic vegetables through the Danbury’s Farmer’s Market. Each year, students produced more than ten different vegetables and herbs. With this diversity of crops they also learned about all of the different pest problems and IPM tactics available to them.

The program teaches IPM, including pest identification and the role of natural enemies. Pest monitoring was discussed and routinely practiced. On one weekend class, while the adult students reviewed scouting forms, the young students on their own initiative cleaned up all the flea beetles from eggplants using aspirators. Students learned about and employed biological, cultural, mechanical, and physical control tactics. They also used OMRI-approved pesticides when necessary. In all, it was a comprehensive exercise.

Students learned a wealth of IPM techniques—and 7,000 pounds of organic vegetables isn’t child’s play, either.

— Ana Legrand and German Cutz  
University of Connecticut

### Reference

Smit, J., J. Nasr, and A. Ratta. 2001. Urban agriculture: food, jobs and sustainable cities. Published by the Urban Agriculture Network, Inc. with permission from the United Nations Development Programme.

# High Tunnels

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Blue sticky card. Photo provided by Rose Ogutu.

*Mechanical/Physical.* Manage and scout spaces under high tunnels. Sizable pests can be squashed by the grower. Orient the plants and spaces to create an environment unfavorable to disease development through ventilation for temperature and humidity regulation. Use shading nets for heat management and netting materials and screen doors for pest exclusion. Exposing the high tunnel to the very low temperatures in the winter helps slow down pest outbreaks at the

beginning of the planting season.

*Biological.* The release of bio-agents in high tunnels helps manage pests. The environment in the high tunnel should support the prevalence of the bio-agent. Use cover crops (flax, marigold, pearl millet) as bio-fumigants. Banker plants encourage the presence of beneficial predatory insects.

*Chemical.* In most cases, growers may use chemicals recommended for the greenhouse, as high tunnels are also enclosures. Always read

the label and follow instructions. Treatment of localized pest outbreaks helps avoid unnecessary use of chemicals elsewhere in the high tunnel. Keep spray records to help gauge effectiveness.

High tunnels create an environment that is a hybrid between the field (environmentally uncontrolled) and a functional greenhouse (controlled environment). More research on biological and chemical pest control is needed. Holistic IPM regimes need to be developed for beginning and established farmers who are growing popular high tunnel crops.

— Rose Ogutu  
Delaware State University

## Credits

Northeastern IPM Center—Writer/Editor: Chris Gonzales, Director: Steve Young, Staff: Phil Coles, Nancy Cusumano, Jana Hexter, Kevin Judd, Yifen Liu, Martin Murillo, Susannah Reese.



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340 Tower Road  
Cornell University  
Ithaca, NY 14853

