



# PESPWire

The Quarterly e-bulletin of EPA's Pesticide Environmental Stewardship Program

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## Happy Trails, Candy!

We'd like to say goodbye and send well wishes to Candace "Candy" Brassard, who retired from EPA's Office of Pesticide Programs on August 23rd. Candy, a biologist with 35 years of federal service, spent much of her career with EPA. She devoted her final two years to the Environmental Stewardship Branch in support of PESP and our IPM efforts.

In her early career, she focused on ecological risk assessments and ecological monitoring. Candy later shifted to efforts to evaluate prevention and control methods for vectors that pose risks to public health, including tick borne-diseases.

An especially notable accomplishment of Candy's impressive career was the 2014 Federal Initiative: [Tick-Borne Disease Integrated Pest Management White Paper](#). The document was the product of a two-year collaboration by the Federal Tick-Borne Disease IPM Workgroup, a group comprised of 14 agencies including EPA, Centers for Disease Control and Prevention, Department of Agriculture, Geological Survey, National Science Foundation, Department of Defense, National Institutes of Health, and National Park Service. Candy was instrumental in marshalling the production of this important document.



Left to Right: Candy Brassard, U.S. EPA; C. Ben Beard, CDC; and Pat Smith, Lyme Disease Association

Candy was a leader and incredibly dynamic force in promoting IPM tactics to reduce the risk from ticks and tick-borne diseases. She was unique in that her work intersected with her personal passion. We'll dearly miss her ever-present optimism and support for IPM!

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## Featured Member: The Lyme Disease Association

We sat down with Pat Smith, President of the Lyme Disease Association, Inc. (LDA), to discuss her organization's work preventing Lyme disease and how Integrated Pest Management (IPM) can be applied to reduce the incidence of this potentially debilitating disease. LDA is a longstanding Silver-level member of the Pesticide Environmental Stewardship Program.

*Can you give us some background on your organization's history and goals?*

LDA's mission is to promote awareness of and control the spread of Lyme and other tick-borne diseases (TBD) through education of health care professionals, the public, and government officials; raising and distributing funds for cutting edge research, external education initiatives, and other innovative projects; and assisting underprivileged patients.

LDA is a 501(c)(3) non-profit focused on research, education, prevention and patient support. LDA began as the Lyme Disease Association of Central Jersey in 1991, then became the Lyme Disease Association of New Jersey in 1993. Formed by patients and doctors who saw the need to organize to fund research and educate people on the many complex issues, by 1997, it had influence far beyond NJ borders. In 2000, it became the Lyme Disease Association, Inc. with a broader mission. LDA is volunteer-run and utilizes consultants for specific expertise as needed.

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## Strip Cultivation in Perennial Fruit Reduces Pesticide Use

In 2011, EPA awarded a grant of \$141,343 to Dr. Matthew Grieshop of Michigan State University for his project, "Demonstration of strip cultivation to reduce herbicide use in North-Central and Northeastern perennial fruit production." The goal of the project was to reduce or eliminate herbicide use on apple and grape farms in Michigan using strip cultivation systems.

Strip cultivation is a weed-management technique that uses a shallow tilling implement, such as a disk, tooth arrow tiller, rotary hoe, or rotating-tine cultivator to maintain a low- to no-weed strip on both sides of crop rows.



Cultivated apple row  
Photo: Brad Baughman

Herbicide-treated  
apple row  
Photo: Brad Baughman

Dr. Grieshop and his team envisioned that strip cultivation would transform "weeds" into dynamic, functional components of orchard and vineyard agroecosystems. Dr. Grieshop theorized that strip cultivation would contribute to soil fertility and beneficial arthropods, build organic matter, reduce herbicide run off, and save growers money. In addition, by using strip cultivation instead of herbicides, growers could avoid herbicide resistance.

Weed management in fruit crops often begins with either tillage or an herbicide application before trees or vines are planted. Although these techniques can give crops a head start on growth, weeds quickly return from the soil's seed bank. Therefore, repeated weed management is needed to keep weeds at bay. While managing weeds is necessary, relying on the use of herbicides poses some challenges.

For example, repeated use of the same herbicide may result in weed resistance to the herbicide. If an herbicide is not applied carefully, then herbicide injury to trees and vines may occur. There are four herbicides registered for use in certified organic production, that can pose the same hurdles.

Strip cultivation is one of many tools available to fruit crop growers to manage weeds. Herbicide application is the most commonly-used form of weed management. Growers who wish to reduce their use of herbicides can use flame weeders, cultivating implements, cover crops, and mulches. While past studies on strip cultivation compared it to other "alternative" ground cover management techniques, Dr. Grieshop's project compared strip cultivation and conventional herbicide strips. In addition, the research was conducted on the farms of volunteer growers. The on-farm demonstration of strip cultivation compared side to side with conventional weed control supported widespread distribution of the project's results.

The project was a success. Strip cultivation research and demonstration on Michigan apple and grape farms provided Dr. Grieshop and his team with the results they needed to support their theory. Weed control was comparable between the strip cultivation and the conventional pesticide plots, as was evidenced by the nitrogen/nutrient levels in the leaves and soil. In fact, the researchers observed an increase in the available nitrogen content of the soil 2-4 weeks after each pass with the wonder weeder or radius hoe. In addition, the data from apples showed no difference between the herbicide plots and the cultivated plots in apples harvested. Natural enemy data indicated that abundance was correlated to increased ground cover.

In apples this meant more natural enemies in cultivated pots, but in grapes this meant more natural enemies in herbicide plots.

In economic terms, whether strip cultivation is more or less expensive

than herbicide use depends on which herbicides and strip cultivating implements are used. Michigan apple growers participating in this project used an instrument called the Wonder-weeder for strip cultivation, while grape growers used the Clemens radius hoe. The above table illustrates the economic comparison.

Dr. Grieshop and his team are continuing their research through additional grants. They plan to conduct research on strip cultivation in juice grapes, explore the impacts of cultivation on key apple pests, research additional ground cover management options in apple scab management, and continue their work on organic apples. Throughout their projects, results are communicated to grower audiences in apples and wine grapes through webinars, talks, updates on the project website, and scholarly publications.

The team now is turning its attention towards expanding its efforts beyond apples and grapes into other perennial crops, such as cherries and stone fruit. William Baughman, a graduate student working on the project, successfully defended his thesis on this project, and took a position as a MSU extension educator specializing in grape production and pest management. He will help to ensure that the cultural weed management explored in this project will continue to be made directly available to grape and other perennial fruit growers in the region.

For more information: [opm.msu.edu/?tag=strip-cultivation](http://opm.msu.edu/?tag=strip-cultivation)

	Cultivation		Herbicide	
	Wonder weeder	Radius hoe	Post-emergent	Pre-emergent
Chemical inputs	0.00	0.00	9.00	48.00
Labor	12.00	60.00	4.50	3.00
Tractor deprec. + fuel	13.00	35.00	6.00	4.00
Implement deprec.	6.40	17.00	6.00	4.00
<b>Total</b>	<b>\$31.40</b>	<b>\$112.00</b>	<b>\$25.50</b>	<b>\$59.00</b>

Table 1. Cost estimates for weed management by several strategies, per acre per year. Assumes 100 acre orchard, 50hp tractor, and 5 year old sprayer or cultivating implement. Wonder-weeder estimates apply to any similarly-priced implement being run at 4mph; radius hoe estimates apply to any similarly-priced implement being run at 1.5mph.

# The Lyme Disease Association

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LDA presents fully accredited [annual scientific/medical conferences](#), [funds research nationally](#), provides monies for children without insurance coverage for Lyme, [provides free literature](#), has a free information line, hosts a [free online doctor referral](#) and heads [LDAnet](#), an association of 41 organizations that work together on national issues.

LDA collaborates with EPA on a federal/public tick IPM workgroup to reduce the risk from ticks and the pesticides associated with their prevention and control. To that end, LDA

contributed to EPA's 2011 Promoting Community IPM for Preventing Tick-Borne Diseases conference by providing speakers and co-hosting a session with the Centers for Disease Control (CDC). Pat Smith co-authored the article, You Can Make a Difference to a Child by Reducing the Risk of Lyme Disease, in the May 2010 journal of the National Association of School Nurses (NASN) in conjunction with the Network to Reduce Lyme Disease in School Aged Children developed with EPA, CDC, NASN, and LDA.

In its search for preventative measures and a cure for chronic Lyme disease, LDA has funded dozens of research projects, through some 95 grants, coast-to-coast. Much LDA-funded research has been featured in 35 peer-reviewed publications. A joint effort by LDA, Columbia University, and the Lyme Research Alliance, led to the 2007 opening of the endowed Lyme and Tick-Borne Diseases Research Center at Columbia University, the first in the world devoted to the study of chronic Lyme disease.

The LDA has presented 15 accredited scientific conferences for researchers, doctors, and health care providers, featuring international speakers on TBD, most jointly sponsored by Columbia University. LDA has also educated through public, school, corporate and government seminars. Annually, LDA awards education grants to Lyme groups, universities, and other organizations to further their TBD mission. To date, 94 such grants have been awarded.

Since children are at the highest risk of acquiring Lyme disease, in 2004 LDA created [LymeAid4Kids](#), a fund to help uninsured children. Initiated in conjunction with author Amy Tan LymeAid4Kids has awarded almost \$250,000 in grants.

LDA's website features a [Lyme: Kids & Schools](#) section with free information for teachers, parents, and the public. In addition to material directed at children, LDA also offers for free (after postage) the LymeR Primer brochure, Tickmark, and Tick Card; downloadable and printable copies of National Case Map, Case Number graphs, Personal & Property Prevention Posters, Symptoms Lists; and at cost materials including conference DVDs, and books. The site also houses an extensive collection of tick and rash pictures and tick-borne microbes. Finding doctors who are experienced in treating tick-borne diseases is difficult, thus LDA created an automatic doctor referral system to help people world-wide.

LDA representatives have testified in many state legislatures and participated in press conferences with congresspersons, governors and other elected officials. LDA had led the charge on the introduction and passage of federal and state Lyme-related legislation. The LDA President testified before the US House of Representatives Foreign Affairs Global Health & Human Rights Subcommittee (2012) and Energy & Commerce Health Subcommittee (2013).

*What is your organization's role in promoting IPM to help prevent Lyme disease?*

One of the goals of the LDA is to reduce the number of people exposed to ticks, thereby reducing the risk of the diseases they carry. LDA has always incorporated information about personal, domestic animal, and property protection related to ticks and TBDs into its educational seminars, presentations, published literature, and research agenda.

LDA does not advocate for the use of products, but rather, presents strategies for reducing TBDs, such as the avoidance of tick habitats, proper clothing, property maintenance, and, perhaps most importantly, tick checks. The realities of increasing tick populations, however, create a need for individuals to be aware of products that can be used on clothing, skin, and property to kill or repel ticks. Therefore, LDA has incorporated into its programs information on the availability of such products, their differing purposes, the need to know and comply with manufacturers' directions/recommendations, the risks/benefits of such uses, and where they can find more information on these types of products, such as EPA's [website](#).

Additionally, LDA has presented information on IPM tactics such as deer feeder stations to control ticks on large properties, bait boxes to control ticks on small mammals, and biological controls for ticks such as fungi and nematodes. It is LDA's philosophy that they have a responsibility to inform people of all prevention options, but that people are ultimately responsible for their choices.

*What techniques and messages have you found to be the most effective in preventing exposure to ticks?*

The most effective message in preventing exposure to ticks is immersion - saturating people with the facts about the diseases ticks cause.



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These facts include that: (1) Lyme disease is now found in 80 countries worldwide, (2) 15+ TBDs now affect people in the US, (3) one tick bite can transmit many diseases, (4) TBD diagnosis and treatment is challenging, (5) there is a lack of awareness of and medical knowledge about TBDs among physicians, and (6) children are at the highest risk. LDA has done hundreds of presentations over the years, and the feedback from audience members has been consistent - that they had no idea of the magnitude of the problem. LDA's awareness building has led people to take precautions and further spread the message directly and through support/advocacy groups.

*Tell us about a major success in using IPM to prevent Lyme disease.*

LDA's development and dissemination of free print materials on Lyme disease and its prevention has been a major success. These materials include the [LymeR Primer](#) (with information on 15 TBDs), tick identification and removal cards and bookmarks, and the [ABCs of Lyme Disease](#) pamphlet for parents and educators. To date, more than 2.2 million pieces of literature have been distributed to doctors, hospitals, health departments, government officials, military installations, veterinarians, parks, businesses, schools, Lyme groups, and the public. LDA has been fortunate to secure corporate sponsors, several of whom are involved with TBD prevention, to underwrite the production of these materials.

*What are your goals in the next five years?*

In the next several years, LDA hopes to be able to expand its research efforts. We also intend to work with other groups and federal agencies for a focused federal research agenda that will include developing a gold standard Lyme diagnostic test, developing safe and effective treatments for Lyme, and identifying effective approaches to reduce the size and spread of tick populations thereby reducing disease transmission.

[LymeDiseaseAssociation.org](http://LymeDiseaseAssociation.org)

[epa.gov/pesp](http://epa.gov/pesp)

## Five Common Myths about Ticks

People often make decisions that could lead to exposure to tick borne diseases because they are misinformed about the habits and biology of ticks. Here are some of the commonly held misconceptions about ticks.

### **Myth 1: Ticks die after the first frost.**

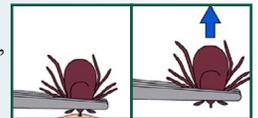
Facts: Unfortunately not! While some species, such as the Lone Star tick (*Amblyomma americanum*) and American dog tick (a.k.a. wood tick) (*Dermacentor variabilis*) tend to be less active during the winter when temperatures are under 10° C (50° F), other species, such as the blacklegged tick (a.k.a. deer tick) (*Ixodes scapularis* and *Ixodes pacificus*), remain active during the cold months. In fact, the adult blacklegged tick begins feeding activity around the time of the first frost! As long as the weather is above freezing, there could be ticks looking for hosts.

### **Myth 2: Large ticks don't carry disease and are no cause for concern.**

Facts: All ticks come in small, medium, and large sizes depending on their developmental stage. Even adult blacklegged ticks can be considered large. In the fall and winter months, they reach their adult stage, and are a serious concern. In the northeastern U.S., the most common large ticks found on humans and companion animals are blacklegged ticks (deer ticks), and it is estimated half of adult deer ticks carry Lyme disease.

### **Myth 3: There are multiple options for removing ticks that are equally effective.**

Facts: Avoid folklore remedies such as "painting" the tick with nail polish or petroleum jelly, or using heat to make the tick detach from the skin. No method is more effective for removing a tick than using fine-tipped tweezers to grasp the tick as close to the skin as possible, and pulling upward with steady, even pressure. Heat against a tick will not convince it to let go, but it could increase the risk of infection by potentially causing the tick to rupture. Ticks, when attached and feeding, only need to breathe approximately four times an hour – so attempting to smother it could take too long, increasing exposure to disease. Rubbing alcohol, while useful to preventing infection once the tick is removed, will not encourage a tick to detach. "Unscrewing" a tick only increases the likelihood that the head will detach from the body, thereby risking infection. Sticking with the tried and true method pictured (source, CDC) is the most effective way to detach a tick.



### **Myth 4: All tick bites result in disease transmission.**

Facts: Luckily, this is not the case! If a tick is removed within 24 hours of attachment, the risk of disease transmission drops dramatically. A tick must generally be attached for 36-48 hours to transmit Lyme disease. This is why it is extremely important to conduct a thorough tick-check following shortly after exiting from tick habitat, at any time of the year.

### **Myth 5: You will know if you have been bitten by a tick.**

Facts: Tick bites tend to be painless, so you are not likely to feel a bite. In addition, not all tick bites that transmit disease result in the rashes. A Lyme disease rash occurs in approximately 70-80% of infected individuals. However, there are more than a dozen diseases transmitted by ticks in the U.S., only some of which can cause skin rashes or lesions. Therefore, it is best to take preventative measures when entering into tick habitat ([using tick repellents or tick repellent embedded clothing](#), tuck your pants into your socks, and walk down the center of trails), do a tick-check before showering, and let your doctor know you could have been exposed to ticks if you develop flu-like or other symptoms.

Further information:

[cdc.gov/ticks/](http://cdc.gov/ticks/)

[epa.gov/insect-repellents](http://epa.gov/insect-repellents)

[tickcounter.org/prevention/top\\_ten\\_things\\_list](http://tickcounter.org/prevention/top_ten_things_list)

# Preventing Termites in New Construction



*Formosan subterranean termite soldier*  
Photo: Scott Bauer, USDA

Termites, sometimes called the “silent destroyers”, are known for their ability to chew through the walls, wooden support beams, and flooring in buildings undetected. These small, wood-destroying insects date back

more than 120 million years, and are estimated to cause more than \$5 billion in property damage annually (more than all natural disasters combined). The way in which a building is constructed can have a great impact on the likelihood of a termite invasion. There are a variety of options for architects, builders, and pest management professionals (PMPs) for reducing termite-conducive conditions and limiting their ability to enter the building unseen.

Termites often cause damage to buildings from the inside-out, and are difficult to treat as they can live deep within the ground or hidden within wooden structures. Therefore it is extremely important that all new construction in areas with termite activity take termite prevention into account. Ideally, a comprehensive approach to termite prevention is taken that impacts all stages of construction.

## Planning/Design

Often pest prevention is not considered during the planning phase for new developments, missing ample opportunity to design the pests out. Projects seeking LEED certification are often at the advantage when facing termites, as the criteria focused on water efficiency reduces moisture availability, and decreasing the attractiveness of a building to termites.

In addition, the recently published guidelines published by San Francisco Department of the Environment called *Pest Prevention by Design* (PPBD) give architects a fantastic starting point for building out pests.

The PPBD guidelines go step-by-step through the different aspects of building design and materials, explaining how specific approaches to the various aspects will discourage pests from infesting that building. Topics covered include foundations, siding, lighting, roofing, landscaping, flooring, utilities, windows, and specific room-types.



The guidelines offer detailed instruction based on ten general principles of pest prevention: (1) understand local pest pressures; (2) analyze the physical context for each building situation; (3) design for the necessary pest tolerance level; (4) use durable pest-resistant materials; (5) design for easy inspection; (6) minimize moisture; (7) seal off openings; (8) eliminate potential harborage; (9) engineer slaps and foundations to minimize pest entry; and (10) design buildings to be unattractive to pests. Each specific recommendation lists the pests most likely to be impacted by the modification – with many of them assisting in termite prevention.

## Construction

In areas of high termite activity, PMPs are often employed to treat a building during construction. Other prevention options, in addition to termiticides, include choosing termite-resistant building materials, installing physical barriers to termite infestations, and designing the landscaping to discourage termites from entering the building.



## Liquid soil termiticides and borates

During pre-construction, horizontal applications of termiticide are made beneath foundational slabs, garages, patios, and other areas covered by concrete or asphalt. Vertical applications are made to high-termite risk areas and penetrate deeper into the soil in a narrower band of treatment, like around the perimeter of the foundation, piers and support posts, and dirt-filled porches.

Although post-construction liquid termiticide applications are more common, pre-construction treatments are preferred because it is easier to achieve uniform distribution of the termiticide in the soil. When a treatment is made, a band of treatment around and beneath the foundation of the structure is established.

Various types of borate compounds in a variety of formulations are available to PMPs as a method of pre-construction termite prevention. In the U.S., borates are often formulated as liquids and foams and applied either directly to exposed wood during the construction process, primarily areas close to floor level or below, areas in which subterranean termites are most likely to contact. A 2-foot treatment band around the perimeter is also often performed in structures with basements or crawlspaces. Foam applications are typically made into structural voids, behind facades and veneer, and into expansion joints, and utility penetrations.

## Termite-Resistant Building Material

Any material that comes into contact with soil or is close to the ground should not contain any food for termites. Treated wood, concrete, steel, various plastics and composites, fiber cement, brick, stone and glass are all materials that termites find sustenance in. However, termites can still tunnel through or around many resistant materials to find moisture and attractive materials, so while it is important to utilize such materials, they should not be the only line of defense.

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### Physical Barriers

Though not common in the U.S., a variety of methods can be used to physically prevent termites from reaching a structure. The installation of sand of a certain particle size can prevent termites from tunneling through it, while also not allowing them to squeeze by. Additional options include the installation of metal mesh into the soil to form a physical barrier that termites cannot penetrate.

Other less used options include plastic sheeting which may or may not be impregnated with insecticides and termite shields that push foraging termites into visible places. Often, a combination of techniques is the most effective way to employ physical barriers.

### Landscaping

Landscaping should not be forgotten in planning to exclude termites. Trees close to buildings can attract termites. Ensuring water flows away from the building decreases moisture that also attracts termites. In addition, all forms of mulch, especially wood chips, should never be allowed to contact or the framing of doors or windows, as they invite moisture and can allow termites cover to reach the structure. Plants should also be kept away from siding, and the soil next to the siding should not be disturbed or have topsoil put over it, as it's this soil that contains any termiticide. In addition, this blocks the foundation from being inspected for signs of termite activity.

### Post Construction

Although it is recommended that PMPs be involved during construction for the most effective termite prevention, they are not often hired until after construction. When this occurs, there are two main options available:



Eastern subterranean termites

### Liquid soil termiticides

The application of liquid soil termiticides is the dominant preventative termite treatment used in the U.S. and has been for many decades. During that time, active ingredients and modes of actions have changed, but application patterns largely have not. Termiticides are mixed with water and 'horizontal' and 'vertical' treatments are made to the soil. Post-construction liquid soil termiticides are the most common form of termite prevention.

### Baits

Termite baiting systems have been available for the last couple of decades and have been gaining in popularity since their introduction into the market. The installation of a termite baiting system is much different than making a soil termiticide treatment. Baits, or non-pesticidal monitoring devices, are housed inside stations and placed in the soil around the perimeter of a structure at a set interval (often every 10-20 feet). While installation of a baiting system is much less labor-intensive than a soil treatment, baits require greater follow-up as stations are periodically checked by a technician. When termite activity is detected in the monitoring station, and insecticide containing bait is installed. Baits, primarily chitin synthesis inhibitors, are formulated into a cellulose matrix and designed to be slow-acting. Foraging worker termites consume the bait and spread the active ingredient to colony-mates through trophallaxis, the sharing of food and fluids.

Prevention is essential to effectively tackling such a challenging and destructive pest as termites. The most effective combination of prevention techniques is impacted by the specific environmental factors of a region and the species of termite(s) present, so it is important to take those factors into account when looking at the options available to avoid termite infestations.

*We would like to thank Dr. Bennett Jordan and Dr. Jim Fredericks of the National Pest Management Association for their contributions to this article*

## School IPM in New England

*Robert Koethe*

*EPA Region 1 School IPM Coordinator*



EPA's Region 1 Office in Boston, Massachusetts serves the six New England states: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont and 10 tribal

nations. The Region 1 School Integrated Pest Management (IPM) program works closely with other EPA regional programs that provide outreach and support to schools including the Office of Children's Health Clean, Green Healthy Schools Program, the Indoor Air/Asthma program and others.

The Region 1 effort includes: meeting participation, educational material development, and supporting outreach opportunities arranged by cooperating programs. We also publicize school IPM-related activities sponsored by key cooperators and stakeholders.

New England has a history of supporting efforts to reduce chemical risks to children, including risks from pesticide exposures at schools. In the late 1990's former Connecticut Senator Joseph Lieberman requested a review of pesticide use and risks in schools. The findings of the study, "Pesticides: Use, Effects, and Alternatives to Pesticides in Schools", included the discovery that exposures by children to pesticides was unknown. Many states responded to the findings by developing their own policies and regulations to help assure stronger protections from pesticide exposures to children in school settings.

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As part of EPA's focus on children's health, the Office of Chemical Safety and Pollution Prevention (OCSPP) is promoting the expanded use of IPM in schools with the goal of implementing verifiable and sustainable IPM programs in all schools. OSCPP is tackling this initiative by: 1) using [Strategic and Implementation Plans for School IPM](#); 2) dedicating staff in all 10 regions to serve as coordinators for School IPM; 3) establishing a national Center of Expertise for School IPM located in Dallas, Texas; and 4) providing additional support by EPA's Office of Pesticides Programs through targeted grants and new partnerships and collaborations. The regional component is central to the success of the initiative because regions work directly with state and local stakeholders. Each region has tailored its school IPM efforts in ways that best meet the needs of their states to address the challenges of developing sustainable IPM programs.

Regional efforts include a combination of direct outreach and technical assistance to local, state, and regional stakeholders, with the exact balance depending on the dynamics in their states and region. New England is unusual among the regions because of the high level of state support for school IPM. Every New England state has laws or regulations that impact pesticide use in or around schools, and five of the six states have laws or rules specific to IPM in schools.



*School IPM turf workshop in Maine*

New Hampshire does not have a law or rule specific to School IPM; however, they manage an IPM grant program that supports IPM in all settings, including in schools. Currently, New Hampshire is supporting a non-government organization with a grant of \$22,000 to conduct school IPM trainings.

In 2014, part of Region 1's School IPM program emphasized improving efficiencies of existing state School IPM programs, and assuring sustainability through strong partnerships. Our technical support activities included participation in school inspections, supporting School IPM outreach meetings, assisting with internal assessments of state School IPM programs, and providing as-needed support on specific issues. Through this active engagement we have observed that laws, rules and policies can make it easier to produce verifiable and sustainability IPM programs, but challenges remain.

Each state program is unique and knowledge from one state can be useful to stakeholders from other states. For example, the Massachusetts School IPM program includes a mainstay of sustainable IPM programs; features that are able to be documented and verified.

The heart of the Massachusetts School IPM program is the [Children and Families Protection Act of 2000](#), and it requires administrators of daycares, schools and other child care programs

to have an updated IPM plan [on file](#) with the Department of Agricultural Resources. Schools are also required to provide a written notification whenever a pesticide application is made outdoors on school property and there are restrictions on the types of pesticides that may be used.

Pesticides that may be used indoors include baits, gels, and dusts; and outdoor pesticides cannot include products that have probable or likely carcinogens in them or have inert ingredients of toxicological concern. Emergency exemptions may be granted for special circumstances.

Massachusetts sustains its program through staffing and outreach which include a School IPM Program Coordinator and other state program specialists, who address questions and provide technical support. The Pesticide Bureau's enforcement [staff](#) also conduct targeted school inspections. In Massachusetts school IPM inspections include a meeting with the school/district IPM Coordinator to review the IPM plans, policies, pest monitoring, and pesticide application record.

A description of School IPM activities is included in the End of Year narrative Cooperative Agreement report to EPA. Massachusetts' multi-faceted, effective approach to pest control in schools is one example of a strong school IPM program in New England which could be considered by other states interested in strengthening their school IPM programs.

### *Maine Workshop Grows School IPM*

Maine's strong school IPM program is implemented through the Maine Department of Agriculture and the Maine Board of Pesticides Control. Dr. Kathy Murray, Entomologist and School IPM Program Coordinator, provides training and outreach to school staff and other stakeholders, while the pesticide enforcement staff evaluates compliance with state school IPM [regulations](#). When evaluating schools for compliance, all inspectors use a compliance [checklist](#) developed by the Board.



*Former Maine school IPM Coordinator Andre Baillargeon (left) and President of the IPM Institute of North America Tom Green (right) inspecting a school chemical storage cabinet.*

Maine hosted a workshop this past July to train new inspectors, identify ways to improve the quality of school inspections and assure consistency by inspectors. This workshop was attended by the Maine School IPM Coordinator, all six of the state's pesticide inspectors and the EPA Region 1 School IPM Coordinator. The workshop consisted of an inspection at a nearby school and a follow-up meeting held off-site to discuss the inspection and criteria used to evaluate compliance. All inspectors agreed that outreach and coordination with the state's School IPM Program Coordinator and a visible presence by the enforcement staff improves implementation of IPM. Suggestions on how to improve the level of adoption of IPM by schools and the quality and consistency of inspections were made and are currently under consideration.

## Canada Geese: the ultimate bird control challenge of this decade



Canada geese (*Branta canadensis*) flying south in their “V” formation are one of the first signals of the onset of cooler weather. They also pose some of the ultimate bird control challenges of this decade.

Canada geese adapt readily to urban and suburban habitats. Although a few geese may be desirable in a park, pond or backyard, a small gaggle can increase rapidly and become difficult to manage.

### The Problem

Conflicts between Canada geese and humans in the urban environment have increased as goose populations have grown. Geese are a nuisance owing to their droppings, aggressive behavior, and noise. At times, they can represent a serious risk to human health and safety. Heavy concentrations of goose droppings contain nitrogen, which can lead to excessive algal growth, closure of public swimming areas, and reduced water quality.



In addition, geese trample grass in medium-heavy soils, creating a surface “hard pan” that prevents vegetative growth. This promotes erosion and loss of habitat for other species. Geese in high concentrations or even a smaller flock that remains in the same place for an extended period of time may overgraze the grass, creating large dead spots on lawns.

Adult geese are also aggressive around their nests and goslings and may attack or threaten pets, children, and adults.

### Proactive Goose Management

There is no one strategy that can be used everywhere to reduce these environmental and human goose conflicts. Integrated pest management (IPM), using several techniques in combination, is a smart, sensible, and sustainable approach that is much more likely to succeed. Successful and cost-effective management of Canada geese often depends on identifying the site characteristics that are most attractive to the geese and altering the habitat.

Canada geese prefer to nest within 150 feet of water. Most urban sites with goose problems have a large, unobstructed lawn next to a body of water that provides geese with everything they need to thrive - access to food, water, and an avenue of escape from predators.

It is easier and less expensive to consider problems that attract waterfowl when new projects are being developed, than to retrofit an existing site. Place open grassy areas away from water, ideally by at least 450 feet. In a problem area with an open lawn adjacent to a pond, a cost effective solution for reducing geese may be to modify the habitat by reducing the lawn, or adding impediments at the shoreline.

In pedestrian parks, place the jogging or walking paths by water. If jogging or walking paths are placed along a shoreline, geese may be less likely to use the immediate area for feeding, nesting, or socializing. In extensive plantings, serpentine footpaths prevent the geese from having a direct line of sight through the planted area, yet still provide shoreline access for humans.

If fields must be near the water’s edge, create vegetative barriers such as shrubs or hedges to obstruct the goose’s line of sight. Plants should be at least 3 feet tall to prevent adult geese from seeing through or over them, and dense enough to prevent the geese from walking through gaps between the plants or stems.



Photo: Eric Vance, EPA

The shrubs can be intermittently planted with tall grasses such as *Pennisetum*, *Miscanthus*, prairie grasses or even wildflowers for visual effect, and to help fill in plantings gaps while young shrubs are still maturing. A low-maintenance natural meadow or wildflower area may also be used as a plant barrier to deter the geese.

Fence barriers can prevent geese from walking from water to grazing areas. Regardless of the fencing material, openings should be no larger than 3 inches and the fence should be at least 3 feet tall. It should also be long enough to discourage the geese from walking around the ends.

Modifying shorelines with boulders every few yards may reduce an area’s attractiveness to geese. These large rocks create modest barriers to landing and taking off. The boulders or rock piles should be at least 2 feet in diameter to hinder geese when they are exiting the water.

Tall trees with a dense canopy may also prevent geese from landing if located in flight paths between water and grassy areas. The trees must be tall enough to increase the angle of the goose take-off, or ascent over 13 degrees.

Decrease the attractiveness of the lawn as a food source. Canada geese prefer to eat young Kentucky bluegrass shoots, found in abundance on mowed lawns. Plant grass species that are less palatable to geese, such as tall fescue, to lessen the lawn’s appeal. In some areas allowing the grass to grow to 6 inches tall will reduce the abundance of young, tender shoots and make it more difficult for the geese to find them. Geese prefer fertilized plants, so reducing fertilizer may also decrease the lawn’s attractiveness.

Reducing the size of mowed grassy areas also minimizes foraging sites for geese. Where possible plant edgings that Canada geese tend to avoid, such as periwinkle, myrtle, pachysandra, hosta, euonymus, or ground junipers.

### Discouraging Geese

The most effective way to remove geese from one area is to provide alternate feeding grounds. Create an area that has better forage than the site where damage is occurring. For best results, the geese must be hazed from the problem area and should easily

find the alternative feeding sites with ample food. This goes hand in hand with discontinuance of feeding the geese. Feeding waterfowl is a major cause of high urban bird populations, especially during harsh winters when natural food sources are in short supply.

Canada geese are grazers and **do not need** handouts to exist. Feeding waterfowl encourages them to congregate in an area and may make geese more aggressive toward people. Discourage nesting by removing nesting materials and structures.

Nonlethal hazing and scaring devices are designed to frighten geese away from problem sites and can be effective in the short term. Recorded distress calls can scare geese from landing temporarily, or mingling in an area for a period of two to three weeks. Distress calls tend to be species-specific, so only Canada goose distress calls will be effective on Canada geese.

Be forewarned that urban geese quickly become accustomed to noise and quickly become habituated to most noisemaking devices such as sirens, air horns, whistles, firecrackers, and ultrasonic devices. They may move only a short distance then return immediately after the calls stopped.

### Visual Frightening Devices

These techniques are quiet so they can be used in most urban situations, but again, geese may become habituated to these devices, and are unlikely to disperse far from them. Scarecrows are one option that may scare geese from specific areas. Movement has been shown to enhance the effectiveness of scarecrows. A human scarecrow (a mannequin with orange overalls and yellow plastic overcoat) in a boat has also been shown to reduce waterfowl use of a pond by 75 percent. Radio-



Photo: Alan D. Wilson, naturepicsonline.com

controlled (RC) aircraft have been used successfully, mainly over airports but they are both labor intensive and expensive.

Dogs, especially border collies, or sheep dogs, have been effective in keeping golf courses and other large properties free of geese when directed by a handler. It is important to note that federal wildlife law states that the geese are not touched, harmed or handled by a person or a trained dog and once goose harassment has ended, the geese may quickly reestablish themselves.

### Chemical Repellents

Chemical repellents are an attractive tool because they are visually and acoustically unobtrusive, may be applied directly to the problem area, do not harm the geese permanently, and are generally accepted by the public. There are only a few repellent products for turf areas registered by the U.S. Environmental Protection Agency. These repellents are made from a naturally occurring, nontoxic, biodegradable food ingredient called methyl anthranilate (MA) which makes grass unpalatable to Canada geese. MA does not persist and accumulate and according to label directions, MA should only be applied to areas away from fish bearing waters.

### Tactics Requiring a Permit

There are several effective methods of goose control that require federal, state, and/or local permits. Replacing eggs with dummy wood or plastic, unfertilized, or hard-boiled eggs requires permitting, and is a labor intensive but effective way of reducing population growth. Hunting is effective, however, all hunting requires a valid state hunting license and many states require a federal waterfowl hunting stamp or special-purpose kill permits. Hunting may only occur in areas open to waterfowl hunting during prescribed seasons. Many states have implemented early goose hunting seasons in an attempt to harvest more resident Canada geese.

### Ineffective Controls

Relocating geese from urban environments is expensive and often ineffective because they have strong homing instincts and tend to return to their former nesting. Capturing and transporting Canada geese requires federal and state permits, trained personnel, and specialized equipment.

### Conclusion

In summary, geese are extremely adaptable so it will take an integrated approach combining several techniques to successfully manage them. Balancing the biological and social dimensions of urban goose issues will require persistence and close work with professional landscape architects, wildlife agency staff, and pest management professionals.



Photo: Stephen St. John

## New Pest Control Calculator Available for School Maintenance Professionals

*Reprinted with permission from Texas A&M*

School maintenance professionals have a new tool to help defend students from the inevitable influx of undesirables roaming the halls.

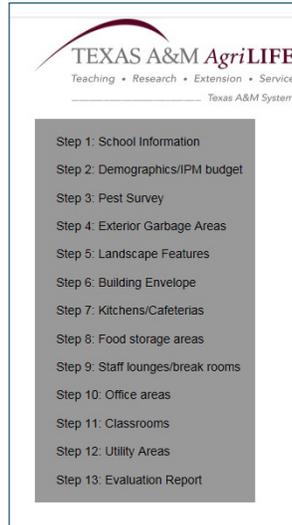
The Texas A&M AgriLife Extension Service's new IPM website, [ipmcalculator.com](http://ipmcalculator.com), offers school staff in charge of pest control a wealth of practical information on managing rodents, birds, cockroaches, ants and a plethora of other unwelcome denizens, said AgriLife Extension's Janet Hurley.

The cost calculator, available free on the website, allows the user to assess various pest risks on their school and district levels. "The resulting information will be a big help for those responsible for developing a budget for a school integrated pest management program", said Hurley.

Funding for the IPM Cost Calculator came from a combination of grants from USDA National Institute of Food and Agriculture and the Southern IPM Center.

Hurley said using the calculator is as simple as entering the school's location, presence of pests and the facility's condition. The calculator then gives an overall pest risk estimate for the school.

"The calculator also has features that allow you to create your own budget to see how improving certain features will affect the overall pest risk," she said. "The cost calculator doubles as an excellent teaching tool because many aspects of general building maintenance also relate to pest issues."



"The bottom line with this calculator is that it allows the user to see the impact different building budgeting plans, past, present or future, have had or will have on the facility's pest risk profile," Hurley said.

"Just as investors use spreadsheets to study the impact of various investment strategies, the pest calculator helps pest management coordinators maximize the most 'bang for their buck' of currently budgeted dollars, or in some cases, helps them to justify requests for adding to those budgets."

The IPM Cost Calculator is part of a website developed by the Southwest Technical Resource Center for School IPM, and cooperating states with financial support from the Southern IPM Center ([sripmc.org](http://sripmc.org)).

Hurley and Texas A&M are also the recipient of a 2014 School IPM grant from EPA to create an online repository for School IPM materials. Stay tuned for more news as the project is completed.

For more information: [ipm.tamu.edu/](http://ipm.tamu.edu/)



*Janet Hurley, Extension Program Specialist - School IPM*

## EPA Launches a Voluntary Program to Reduce Pesticide Drift and Protect People, Wildlife and the Environment

EPA has announced a new voluntary Drift Reduction Technology (DRT) program to encourage the use of verified, safer pesticide spray products to reduce exposure and pesticide movement while saving farmers money in pesticide loss.

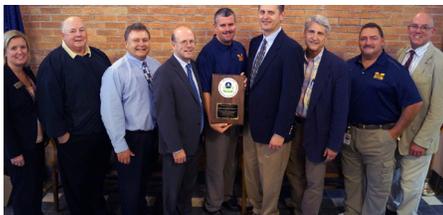
DRT is a voluntary program that encourages manufacturers to test their technologies (such as nozzles, spray shields and drift reduction chemicals) for drift reduction potential. EPA encourages pesticide manufacturers to label their products for use with DRT technologies. The four DRT ratings represented by one, two, three or four stars are awarded for technologies that demonstrate at least 25 percent reduction in potential spray drift compared to the standard.

Spray technology manufacturers interested in participating in EPA's DRT program may now submit data verifying their technology reduces pesticide movement. EPA will evaluate each data submission and, if appropriate, assign a drift-reduction star rating to the product based on its ability to reduce spray drift. When available, EPA will post these ratings on [go.usa.gov/fzKh](http://go.usa.gov/fzKh). A pesticide manufacturer can choose to label a product for use with a DRT of a particular rating after receiving approval from EPA.

Drift-reduction ratings could appear on pesticide labels as early as fall 2015. Additional information on EPA's DRT Program, including how to test technologies, is available at [go.usa.gov/fzkP](http://go.usa.gov/fzkP).

## EPA Recognizes Model School IPM Programs in Indiana

On October 9, 2014, Jim Jones, EPA's Assistant Administrator for the Office of Chemical Safety and Pollution Prevention, along with other EPA staff, traveled to Indianapolis, Indiana, to meet with and recognize school officials for their successful Integrated Pest Management (IPM) programs. The trip was arranged by school IPM advocate, Dr. Marc Lame of Indiana University.



*From left: Northwood Principal Erin Bechtold, Mooresville School Safety Coordinator Rex Cook, Mooresville Asst. Superintendent Randy Taylor, EPA's Jim Jones, Mooresville Lead Facilities Technician Jeff Williams, EPA's Frank Ellis, Indiana University's Marc Lame, Mooresville Pest Management Specialist Dan Nauert, and EPA Region 5's Seth Dibblee.*

Representatives of the Mooresville Consolidated School Corporation gathered with EPA at Northwood Elementary School to provide a program overview, their motivations for changing from a reactive to an IPM-based pest management program, and the positive impacts of that change. The upsides include 90% fewer pest complaints, 90% less pesticide use, increased staff and student pride in their facilities, and improved overall environmental health in their schools.



*While touring a classroom, Lame (right) talks with (from left) Dibblee, Taylor, Jones, Nauert, Williams, Ellis and Bechtold about the school's ipm program and the results the school has seen.*

The afternoon was spent with the Metropolitan School District of Pike Township. Raul Rivas, Director of Facilities and Security for the 11,000+ student district, gave a tour of Pike High School. The district was impressive for its academic standards, educational programs, state-of-the-art facilities, and comprehensive environmental programs, including IPM.



Superintendent Nathaniel Jones expressed appreciation for EPA's visit, reinforced his commitment to IPM and further greening the district's schools, and offered to personally assist in pitching IPM to his peers in neighboring districts. At the evening school board meeting, Assistant Administrator Jones recognized Mr. Rivas for his leadership in providing a safe learning environment by reducing risks from pests and pesticides through the implementation of IPM.



*EPA's Jim Jones recognizes Raul Rivas, Facilities Director for Pike Township Schools, for implementing a model school IPM program.*

Indianapolis' WISH Channel 8 provided coverage of the [Pike Township event](#) and the Mooresville School Corporation [issued a press release](#) on their award. EPA school IPM grant funding was responsible for starting both of these model IPM programs. The recognition awards provided to both districts are one way the Agency is reinforcing the positive IPM message and promoting these as model districts from which others can learn and be inspired.

## Upcoming Events

[IPM and Pollinators Web Broadcast](#)  
November 12, 10:30 am EST

[Advanced Topics in Biocontrol](#)  
November 13-14, 2014  
Lancaster, PA

[Entomological Society of America National Meeting](#)  
November 16-19, 2014  
Portland, OR

### [EPA School IPM Webinars](#)

- Bed Bugs in Schools - December 16, 2014, 2 PM EST
- Keeping Rodents Out of Your School - January 27, 2015, Noon EST
- Dealing with Nuisance Birds Around Schools - February 24, 2015, 2 PM EST

[Association of Applied IPM Ecologists Annual Conference](#)  
Jan 30-Feb 3, 2015  
Napa, CA

[Association of American Pesticide Control Officials Annual Meeting](#)  
March 9-11, 2015  
Alexandria, VA

[8th International IPM Symposium](#)  
March 24-26, 2015  
Salt Lake City, UT

### [Hands-on IPM workshops in Western WA](#)

- Pesticide Management and Water Quality Jan 21-22, 2015, Puyallup, WA
- Pruning for Plant Health and Plant Problem Diagnosis & IPM Feb 11-12, 2015, Seattle, WA

## News In Brief

### ***EPA Finds Neonicotinoid Seed Treatments of Little or No Benefit to U.S. Soybean Production***

The U.S. Environmental Protection Agency (EPA) has released an analysis of [the benefits of neonicotinoid seed treatments for insect control in soybeans](#). A Federal Register notice inviting the public to comment on the analysis will publish in the near future.

“We have made the review of neonicotinoid pesticides a high priority. During the review, we found that many scientific publications claim that treating soybean seeds has little value,” said Jim Jones, Assistant Administrator for the Office of Chemical Safety and Pollution Prevention. “This propelled the agency to evaluate the economic benefits of this use. “We found that the benefits to U.S. soybean farmers on a national scale were just not there.”

The EPA assessment examined the effectiveness of these seed treatments for pest control and estimated the impacts on crop yields and quality, as well as financial losses and gains

The analysis concluded that:

- There is no increase in soybean yield using most neonicotinoid seed treatments when compared to using no pest control at all;
- Alternative insecticides applied as sprays are available and effective;
- All major alternatives are comparable in cost; and,
- Neonicotinoid seed treatment could provide an insurance benefit against sporadic and unpredictable insect pests, but this potential benefit is not likely to be large or widespread throughout the United States.

This analysis is an important part of the science EPA will use to move forward with the assessment of the risks and benefits under registration review for the neonicotinoid pesticides. Registration review, the periodic re-evaluation of pesticides to determine if they continue to meet the safety standard, can result in EPA discontinuing certain uses, placing limits on the pesticide registration, and requiring other label changes.

[Sign up for Pesticide Program Updates](#) to be notified by email when the EPA opens the docket and invites comment on its analysis of the benefits of neonicotinoid seed treatments on soybeans.

### ***Sysco Suppliers Report over 4 Million Pounds of Pesticides Avoided through IPM in 2013***

In 2004, Sysco Corporation launched their Sustainable/IPM Initiative to promote environmental stewardship in partnership with their canned and frozen fruit and vegetable suppliers. Every year, their suppliers estimate the amount of active ingredient avoided by utilizing IPM practices, and noted which strategies they employed. An estimated 4 million pounds of active ingredient were not applied in 2013 due to farmers turning to IPM techniques over conventional pesticide application. Of that, over 25,000 pounds were avoided due to pheromone mating disruption. Other widely-used techniques included crop rotation, scouting and thresholds, and weather monitoring.

### ***EPA Registers New Nematicide Alternative to Restricted-Use Soil Fumigants, Including Methyl Bromide***

The U.S. Environmental Protection Agency is registering a new active ingredient, fluensulfone, a non-fumigant nematicide that provides lower-risk chemical control of nematodes than methyl bromide and other Restricted Use soil fumigants. Under the Montreal Protocol, EPA has phased out methyl bromide because its use depletes the ozone layer.

Nematodes are difficult to control and can cause significant economic damage by reducing crop yield and quality. Fluensulfone is a nematicide for pre-plant, bare-soil application on fruiting vegetables and cucurbits – cucumbers, melons, squash, tomatoes, okra, eggplant and peppers.

Of the seven main alternatives to fluensulfone used in the last five years, six (including methyl bromide) are soil fumigants and the seventh is a carbamate. All seven are Restricted Use Pesticides, which may pose a greater risk to human health than fluensulfone. Restricted Use Pesticides require special applicator training and certification, reporting and record-keeping and additional restrictive labeling to protect against human exposure. Soil fumigants can be labor intensive, requiring tarping and posting of fields. With its evaluation, EPA confirms that when used in accordance with the newly approved label, fluensulfone meets the safety requirements in the law.

The EPA’s final regulatory decision document is available in EPA docket EPA-HQ-OPP-2012-0629 at [regulations.gov](#).

## Grant Opportunities

### *Up to \$400,000 Available for IPM Grants from the Northeastern IPM Center*

The Northeastern IPM Center has released its RFA for the 2015 Partnership Grants Program! Up to \$400,000 is available, with a maximum of \$50,000 per award. Projects should foster the development and adoption of integrated pest management (IPM) methods under three types of grants: IPM Working Groups, IPM Issues, and Regional IPM Communications. Please see [northeastipm.org/rfa/partnership](http://northeastipm.org/rfa/partnership) for details and a link to the complete RFA.

Applications must be submitted online by **5:00 p.m. Eastern Time on Thursday, November 20**.

Public and private institutions, organizations, businesses, commodity groups, and individuals may apply. Projects must involve multiple states and should be of benefit to the region at large or a significant portion of it. Project Directors must reside in the Northeast or provide sufficient justification for seeking funds from outside their own region. Co-PDs may be from outside the region.

### *Western IPM Center Begins Second Decade of Grantmaking with \$300,000 in New Grants*

To help address important pest issues in Western agriculture, communities and natural areas, the Western Integrated Pest Management Center is making \$300,000 in grants available to individuals and organizations developing IPM resources. Eligible applicants include private individuals and institutions, faculty and qualified staff of four year universities, businesses, commodity organizations, and governmental and non governmental organizations. The primary project director (PD) must be in the Western Region, but co-project directors may be from outside the region. The Western Region is the following states and territories: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, American Samoa, the Federated States of Micronesia, Guam, and the Northern Mariana Islands.

The request for applications is posted on the Center's website at [westernipm.org](http://westernipm.org).

Proposals will be accepted until **5 p.m. December 3**. This year, grant dollars are available in four categories:

- Project Initiation Grants, which begin new IPM research; \$30,000 maximum
- Work Group Grants, which bring collaborators together; \$30,000 maximum
- Outreach and Implementation Grants, which directly promote IPM adoption; \$30,000 maximum
- IPM Planning Documents, which create crop profiles and pest management strategic plans; \$15,000 maximum
- Special Issues Grants, which address time-sensitive issues, \$5,000 maximum

### *Up to \$300,000 Available from the Northcentral IPM Center for Working Groups*

The Northcentral IPM Center has released its RFA for Working Groups that support the NCIPMC and regional IPM priorities. The lead project investigator submitting the proposal must reside in the North Central region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin). Working Group participants may reside outside the region, though review points will be awarded for Working Groups that have strong North Central representation. Desired outcomes for the NCIPMC's Working Groups program include, but are not limited to:

- Increased IPM knowledge
- Improved understanding of IPM issues across disciplines, crops and states
- Increased collaboration across diverse scientific and extension communities in IPM challenges/priorities
- Increased adoption of IPM practices
- Improved economic efficiencies of information exchange and knowledge sharing
- Improved economic impacts
- Improved environmental impacts
- Improved human health

Proposals may request funding up to \$20,000 annually for a term of 12 months.

Proposals will be accepted until **midnight, Friday December 12**.

Please see [projects.ipmcenters.org/northcentral/public/viewRFA.cfm](http://projects.ipmcenters.org/northcentral/public/viewRFA.cfm) for more information.