Maine Board of Pesticides Control

Miscellaneous Pesticides Articles May–June 2012

(***identified by Google Alerts or submitted by individuals***)

Portland Press Herald

PRINTTHIS

June 5

Earth-friendly demo gardens to open on Back Cove

By Kelley Bouchardkbouchard@mainetoday.com
Staff Writer

PORTLAND — The Maine YardScaping Partnership will officially open its demonstration gardens on Back Cove next Tuesday.

The YardScaping Gardens at Back Cove showcase nearly 2,000 trees, shrubs and perennials that can help Maine gardeners reduce water use and reliance on fertilizers and pesticides.

The Maine Board of Pesticides Control and various dignitaries will mark the opening on June 12 with special events from noon to 2 p.m., including garden tours and instructional presentations.

The gardens are located on 2.5 acres of city-owned land near the Preble Street soccer fields.

The sustainable gardens were created with help from local volunteers and funded by government and nonprofit grants and private donations.

The gardens have already won awards from the Friends of Casco Bay and the International Society of Arboriculture.

Were you interviewed for this story? If so, please fill out our accuracy form

Send Question/Comment to the Publisher

Portland Press Herald

May 19

Lawn care company faces $37,000 fine

The firm's founder, saying it did nothing wrong, is upset that a proposed consent agreement was made public.

By Gillian Grahamggraham@mainetoday.com
Staff Writer

A lawn care company that is accused of applying chemical pesticides for customers who believed they were getting organic treatments faces as much as $37,000 in fines in a proposed consent agreement with the state pesticides board.

Related Documents

PDF: Proposed Administrative Consent Agreement

The state Board of Pesticides Control says Purely Organic Lawncare of York Harbor violated pesticides laws and regulations by applying chemical pesticides at Colby College in Waterville and the Wainwright Recreation Complex in South Portland.

The company's founder and chief operating officer says his employees applied chemical pesticides only for customers who agreed to the treatment. James Reinertson said his company did nothing wrong and he is upset that the consent agreement was released publicly before it was finalized.

On May 11, the board tabled consideration of the proposed agreement pending further discussion. Reinertson said he will meet with the board again in September to take up the issue.

The proposed agreement describes the company as "engaged in a pattern of fraudulent business practices involving both commercial and residential customers."

The board's investigator also reported that employees were not wearing the protective gear needed for the pesticide that was found in tests. The federal Environmental Protection Agency requires workers who handle that pesticide to wear long-sleeve shirts, long pants, shoes and socks, and chemical-resistant gloves.

"The violations were not isolated incidents, but ingrained operating practices of the company. The types of violations were extensive," reads the proposed settlement. "The company realized an economic benefit and competitive advantage from their practices."

Purely Organic would have to pay $18,000 of a $37,000 fine under the consent agreement.

Reinertson said he employs seven service people. The lawn care company is part of a family of companies owned by Reinertson that also manufactures organic lawn care products in Seabrook, N.H. The company sells those products retail and wholesale.

The state pesticides board says it began its investigation in 2010, when two incidents involving Purely Organic came to its attention.

According to the proposed consent agreement, a board inspector who was doing a routine inspection of a Purely Organic job site at Colby College got positive test results for chemical herbicides, even though company signs on the turf said it had been treated with organic fertilizer.

A Purely Organic foreman told the inspector that the application was organic, and a Colby grounds supervisor said he had ordered an organic weed management product, according to the proposed agreement.

Reinertson said Friday that the contract with Colby allowed Purely Organic to use both organic fertilizer and traditional -- non-organic -- herbicides.

A week after the inspection at Colby, the board says, it got a complaint from a parent in South Portland, who said he believed the Wainwright fields had been treated with an herbicide but no signs were posted to notify the public.

Purely Organic had treated the fields a week earlier under an agreement with the city that dated to 2008. The city paid Purely Organic about $10,000 per year for organic turf treatments.

Samples taken by an inspector from two locations at Wainwright tested positive for an herbicide not listed in any of the company's job proposals, product information sheets or invoices, according to the proposed consent agreement.

"Based on the above evidence," the proposed agreement says, "it was determined that Purely Organic engaged in fraudulent business practices in the application of pesticides at the South Portland Wainwright Recreation Complex."

Reinertson denied that Friday. He said his company applied only organic fertilizer at the field and his crews did not have weed control products with them. "Our view is that they tested a field we don't even treat at that property," he said.

In a letter to customers, included with the board's May 11 meeting agenda, the company said that at the time of the investigation in 2010, it had transitioned from using chemical applications, and chemical residues remained on trucks that were used to apply treatments.

"We believe that all of our products were safe and continue to be safe and what they are labeled as being," says the letter, which characterized the initiation of the investigation as a "witch hunt" started by competitors.

After the proposed agreement was released with the board's May 11 agenda, South Portland City Manager James Gailey said he felt "blindsided" by it, and decided to "step away" from using Purely Organic, which had continued to provide lawn care services for the city.

"We didn't even know there was an investigation going on," Gailey said.

The city received the results of the 2010 lab test, but didn't hear anything else from the board.

In Scarborough, Town Manager Tom Hall said Purely Organic recently submitted a bid to provide organic turf management services in town, but he decided to consider other bids after learning about the proposed consent agreement.

"That was reason enough for me to look elsewhere," he said. "There's nothing they can say or do to cause me to think differently."

Henry Jennings, director of the pesticides board, would answer questions only by email Friday.

He said the board investigates an average of 100 complaints each year and ratifies an average of 13 administrative consent agreements annually.

Under state law, a pesticide is "any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pests" and any substance or mixture that is used as a plant regulator, defoliant or desiccant.

Companies that apply pesticides must be licensed by the state. In his email, Jennings said about 300 companies are licensed in Maine, and the state does not differentiate between organic and non-organic application companies.

Staff Writer Gillian Graham can be contacted at 791-6315 or at:

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Lawn care company faces $37,000 fine

By **MCT**
May 19, 2012 8:19 AM

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South Portland seeks replacement for lawn-care company in dispute with state

By Mario Moretto

E-mail and share

May 17, 2012 11:10 am

SOUTH PORTLAND — The city is distancing itself from a lawn-care company that may have sprayed chemical pesticides on turf designated for organic care.

Purely Organic Lawn Care of York Harbor has been the city's pest-control provider for the Wainwright Recreation Complex and the high school fields since at least 2008. Now, because of an investigation by a state agency, the city is looking elsewhere.

"We are exploring an alternative method of spraying the fields that doesn't include Purely Organic," Gailey said Thursday.

The company is accused by the state of several pesticide law violations. According to **a recently released summary of a 2008-2010 investigation of the company** by the Maine Board of Pesticides Control, a state inspector found traces of a synthetic pesticide at Wainwright and on the company's equipment.

The city hired Purely Organic for chemical-free pesticide applications.

"The question is what was sprayed on the turf," Gailey said. "We thought we were heading in with some kind of organic fertilizer. We don't know what we got."

Jim Reinertson, founder of Purely Organic, this week denied his company sprayed chemical pesticides or fertilizer at Wainwright.

He claimed the sample taken from the turf was from a tract not handled by his company, and that the chemical traces were found on his equipment as his company transitioned from Turf Specialist LLC, a traditional turf management firm, to the organic model of Purely Organic.

"At the time of their investigation, there were still residues of these chemicals on our trucks that were designated for these applications and, as such, analyses showed up positive," he said in a letter to customers. "Our other trucks were designated strictly organic products."

On March 7, Reinertson signed a consent agreement with the state, in which he agreed to pay $18,000 in fines for engaging in fraudulent business practices in the application of pesticides, based on the results of lab tests on samples taken at Wainwright, Colby College and on company equipment, plus other alleged violations.

On May 11, the Board of Pesticides Control tabled approval of the consent agreement, "pending further research about its enforcement options," according to Henry Jennings, the board's director.

The agreement is not in effect until the board approves it.

Reintertson said he was upset the board released the consent agreement before it was approved, because it could unfairly damage his business before a final decision is made.

His company dealt with these allegations in 2010, he said, and has since entered an agreement with the board requiring annual check-ins and changed business practices.

"This has been going on for two years," he said. "This isn't something new. We've been running our business since 2011 exactly the way the Maine pesticides board wants us to run an outfit. ... We don't have a blip on our radar, in our residential business. If you look at what we do transitioning customers from synthetic to organics, our record speaks for itself."

But for Gailey, who admitted Wainwright "looks great," there was too much uncertainty.

"We just want to take a step back away from this company, look at what the facts are, whether we got what we think we got," he said. "We don't really know what was sprayed at Wainwright with the exception of the information that was in that consent agreement."

The city has no explicit contract with Purely Organic, so finding another turf care provider is simply a question of picking a new vendor, Gailey said.

Gailey was also upset that the state hadn't involved South Portland in any of its conversations. He said he knew that samples were taken at Wainwright two years ago, but had no idea the scope of the board's investigation.

"I feel as though we're caught a little off guard here," he said. "There should have been a little more communication in the state of Maine as they were building their case. If they were using us as an entity in this case, they should've had the courtesy to tell us."

Jennings, of the Board of Pesticides Control, said the board will reconsider the consent agreement at a future meeting.

But Gailey isn't waiting for a final decision. He said the city needs to "take a step back" and weigh its options.

"I'll never say we won't go with them again," he said. "But we also want to make sure we have figured out, on our side, whether they're the best vendor to go through."

*Mario Moretto can be reached at 781-3661 ext. 106 or **mmoretto@theforecaster.net**. Follow him on Twitter: **@riocarmine**.*

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Scarborough to examine councilor's ethics in pesticide decision

By Mario Moretto

E-mail and share

May 10, 2012 11:20 am

SCARBOROUGH — Town officials are preparing for an ethics hearing triggered by allegations against Councilor Richard Sullivan.

Town Manager Tom Hall said he is drafting a procedure for the hearing, the first since the town adopted new rules and regulations for town councilors in 2009. Those rules provide for a process that could result in the censure of a councilor, but don't outline that process.

"A hearing is to be convened," Hall said. "Then there's no rules."

During **a debate over the town's pest management policy**, Councilors Carol Rancourt and Karen D'Andrea accused Sullivan of failing to disclose a potential conflict of interest because the town hires Sullivan's brother, Dan Sullivan, for lawn mowing services.

Councilors are required to file disclosure statements about any family member who makes more than $1,000 via contracts with the town. Dan Sullivan was hired for $40,000.

Richard Sullivan admitted to never filing a disclosure, but said he never knew it was required. He also pointed out that no councilor has ever filed a disclosure, though all are required to do so every April.

Since then, each councilor has filed the documents.

If Sullivan's fellow councilors decide he violated council rules, he could be subject to censure. According to Hall, that would amount to a serious slap on the wrist. While Sullivan wouldn't face expulsion from the council or any fines, the censure could hang over his head if he seeks re-election.

"It's a comment collectively, on the part of the council, about a councilor's integrity," Hall said.

Questions surrounding Sullivan's effort to replace the town's organic pest management policy with a synthetic-friendly approach have left Hall wondering what to do this year. Procedural snafus abounded during the **April 18 Council meeting**, including two councilors "abstaining," despite rules requiring them to vote.

The vote itself has also been called into question. While the six councilors present on April 18 seemed to believe they had voted (or "abstained") on Sullivan's proposal, procedural rules suggest they may have actually voted simply to end debate.

Last week, councilors amended the April 18 minutes to show that no vote on Sullivan's proposal ever took place. That means the council could potentially hold another vote.

Family ties

SCARBOROUGH — For the first time since a rule requiring them to do so was enacted in 2009, town councilors have filed disclosure statements about relatives who draw income from town employment or contracts.

Councilors are required to disclose any family member who receives more than $1,000 per year, but are not required to disclose how much they earn. Most councilors had nothing to report, but these three made disclosures:

Richard Sullivan disclosed that his brother, Dan Sullivan, is hired by the town for lawn management services.

Jessica Holbrook disclosed that Ronald Ahlquist, her second-cousin, is a town councilor and draws more than $1,000 in his council stipend. She also disclosed that Ben Holbrook, her husband, is a foreman for Creative Office Pavilion, which periodically contracts with the town, although he is not personally involved in contracting.

Ronald Ahlquist disclosed that Judy Ahlquist, his sister-in-law, is a bus driver for the Scarborough School Department; Carl Ahlquist III, a second cousin, is a Scarborough firefighter; Eric Berry, another second cousin, is a Scarborough emergency dispatcher, and Jessica Holbrook, another second cousin, is a town councilor.

— Mario Moretto

For now, Hall said the policy on the books is the one requiring the use of organics. But he said he doesn't want to award a contract to a company for an organics-only strategy if the council is going to change its mind.

The contracting process became even hazier this week when Hall learned that one of the three companies in the running for the town's contract has been accused of fraudulent business practices before the Maine Board of Pesticide Control.

Purely Organics, which Hall said had been the favorite of town staff, allegedly applied synthetic products to public turf in South Portland and at Colby College, despite having agreed to an organic pest management plan.

Purely Organics made a $30,000 bid for the town's pest management contract.

Hall said he'd like to wait and see what the council does before awarding a contract.

"I can't wait forever," he said. "The grass is growing."

Neither Council Chairman Ron Ahlquist or Council Vice Chairwoman Judith Roy responded to calls for comment. Sullivan has asked that his ethics hearing be held as soon as possible.

*Mario Moretto can be reached at 781-3661 ext. 106 or **mmoretto@theforecaster.net**. Follow him on Twitter: **@riocarmine**.*

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Scarborough relaxes Haigis Parkway development rules, puts pesticide questions to rest

By Mario Moretto

E-mail and share

Jun 07, 2012 8:10 am

SCARBOROUGH — Town councilors on Wednesday enacted a slate of zoning amendments aimed at attracting businesses to Haigis Parkway, which the town still hopes will be a center of high-value development.

Councilors also put to rest questions about the process leading to the defeat of Councilor Richard Sullivan's effort to kill the town's organic pest management policy and allow use of synthetic pesticides.

The zoning changes relax rules around the Haigis Parkway intersections with U.S. Route 1 and Payne Road. They allow a wider array of development by taking those areas out of the more limited Haigis Parkway Zone and making them B3 business districts.

That opens the areas up for developments such as medium- and large-size retail operations. Amendments to B3 zoning standards allow for an even more uses, such as assisted living facilities, gas stations (only near Maine Turnpike Exit 42), boarding care facilities and nursing homes.

Haigis Parkway zoning rules were also amended to allow medical and diagnostic facilities, health clubs, personal services, places of worship, education, commercial recreation and research, development and light industry.

Town Manager Tom Hall, after the Town Council meeting, said the changes are a recognition of market demands. Because of the 2007-2009 recession and the ongoing sluggish recovery, Scarborough has seen less demand for Haigis Parkway real estate than it had hoped.

"These amendments modernize the zoning and create more flexibility," Town Planner Dan Bacon said.

Pesky policy

The debate over the pesticides policy had continued after questions were raised by councilors about whether an April 18 vote on Sullivan's proposal, which failed to gain the four votes necessary for passage, was valid under Roberts' Rules of Order, the baseline procedures that guide council meetings.

Robert Crawford, the town's attorney, recommended the town amend the April 18 meeting minutes to show that a true, valid vote took place. The amended minutes were accepted Wednesday 5-2, with Councilors Karen D'Andrea and Carol Rancourt opposed.

In response to Rancourt and D'Andrea's concerns that the amended minutes still were not accurate, Council Vice Chairwoman Judith Roy said she was eager to end the discussion and move on.

"It's clear enough for me," Roy said. "I think we're making a mountain out of a molehill here. We've got it as straight as we can at this point."

Had a decision been made that the April 18 vote didn't pass parliamentary muster, Sullivan's proposal could have been brought before the council again.

The practical effect of the minutes vote is that the pesticides issue is, officially, decided. The organic pest management policy adopted in

September 2011 is the town's policy and will continue to be, barring any future attempt to overturn it.

In other business, councilors on Wednesday enacted a policy to relieve active military personnel from paying vehicle excise tax until the end of their service.

They also voted to give about 2,900 square feet of property to the Maine Department of Transportation to facilitate the widening of the Pine Point Road-U.S. Route 1 intersection.

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"If the world were to end tomorrow, I would still plant an apple tree today."
- Martin Luther

Over the last few months, the Maine Board of Pesticides Control (BPC) has chosen not to act on two items of interest. The first is the pesticide notification registry, which has been a roller coaster ride at the board and legislative level for a few years. After the comprehensive pesticide notification registry was repealed in the last session of the legislature, Representatives James Dill and Jeffrey Timberlake remained true to their word and approached the BPC to work out details of a new registry. At its February meeting, the BPC decided it had exhausted the registry issue and would not be able to reach a good solution near-term for everyone involved. The BPC decided to write letters to Dill and Timberlake to thank them for their interest and tell them it would not be working on pesticide notification in the coming months. This leaves open the possibility that the BPC will again have to implement pesticide notification rules resulting from legislation rather than developing its own rules and solutions to this ongoing debate.

Also in February, the BPC voted to put forward a policy regarding genetically engineered Bt corn products in Maine. It chose to work from a policy rather than initiate rulemaking to clarify issues related to refuge-in-the-bag corn approved at its prior meeting. (See the March-May *MOF&G*.) The policy allows neighbors of those growing Bt corn to request a 300-foot refuge of non-Bt corn planted so that it protects abutters from potential pollen drift. This policy interprets the board rule but is not in the rule.

Henry Jennings, BPC director, says, “Growers should not be shy about contacting the board for advice or mediation to deal with neighbors when issues arise concerning refuges and pollen drift.” It is not clear how the board will proceed concerning Bt corn. An April 9 meeting sponsored by the Biotechnology Industry Organization laid out plans for thousands of new acres of Bt corn to be grown in Maine as chicken feed for Land O’Lakes’ facility in central Maine – which could mean that more organic farms have neighbors growing Bt corn. Growers are encouraged to contact the BPC to discuss options for protection from pollen drift.

Product Registrations

In February the board approved a Special Local Need request by Syngenta for use of Callisto Herbicide on lowbush blueberries to control broadleaf weeds during a crop year. Callisto was already registered for such use during nonbearing years. According to BPC toxicologist LeBelle Hicks, “[Callisto’s] mechanism of toxicity in mammals is the inhibition of metabolism of the amino acid tyrosine, resulting in high tyrosine levels in the blood. In plants the mode of action is also inhibition of tyrosine catabolism resulting in depleted chlorophyll levels.” The board approved this request with a five-year expiration date so that the product can be reviewed again then.

At a special meeting in March, the board requested that the EPA allow use of Revus Fungicide on seed potato pieces in Maine, as late blight (Phytophthora infestans) has been detected in seed potato pieces this year, and growers of non-organic potatoes want to use the fungicide. The EPA is expected to respond by June.

Consent Agreements

Francis Pulsifer of Pulsifer Orchard in Cornish was fined $300 for pesticide drift onto a neighboring property on two occasions. On the first, a mix of Polyram 60 DF and Permethrin applied via airblast sprayer drifted onto an abutting property. About three weeks later, the same employee was applying a mix of Captec 4L, Imidan 70-W and Drexyl Carbaryl 4L with an airblast sprayer when, again, drift was confirmed on the abutting property, an orchard the landowner is trying to manage organically.

In February the board unanimously approved a consent agreement with Sullivan Properties in Lewiston. A citizen had alerted the BPC that an unlicensed employee of Sullivan Properties applied insecticides inside an apartment building in Lewiston. An investigation found that an employee had applied Hot Shot Bedbug & Flea Home Insect Killer in at least two apartments, the halls and cellar. Nobody at the company had the required license for such an application. Sullivan Properties was fined $500.

The BPC reached a consent agreement with Bruce Korhonen of Korhonen Land Care of Woodstock for a July 2011 incident at the Woodstock town ball field. Korhonen Land Care had won the bid to keep the infields there weed-free, but nobody at the company had the required commercial applicator’s license to treat the ball field. A citizen observed a Korhonen company employee applying a pesticide and alerted the board. An investigation revealed that glyphosate, the active ingredient in Roundup, was present at 2,139 ppm, far above a dose that will kill vegetation. A $600 fine was levied.

In February the board fined Lucas Tree Experts Company of Portland $500 for failing to notify a registrant on the current non-agricultural Pesticide Notification Registry. A Lucas Tree employee applied Astro Insecticide to a willow tree in a South Portland neighborhood to control aphids. A property within 250 feet of the application is listed on the notification registry, but the homeowner did not receive the required notification.

In an unusual case Christian Bulleman III of Dresden reached a consent agreement with the board that required him to perform public service work equivalent to his $350 proposed fine for a violation. Without the required commercial pesticide applicator’s license, Bulleman had applied Shockwave, a disinfectant and cleaner, for mold remediation at the Phippsburg Town Office. He claimed that he was unaware of the licensing requirement and promptly sought the license after this incident.

In March the board voted unanimously to send an unresolved case involving Hemingway Orchard in Hebron, owned by Dennis and Jan Barker, to the attorney general’s office. This case involves at least four alleged drift incidents since 2010. Two, according to BPC investigations, confirmed drift of Drexel Damoil, Imidan 70-W/BASF, Sovran Fungicide, Lorsban 75WG, Polyram 80DF and Captec 4L, with applications made by airblast sprayer. The Barkers refused to sign consent agreements for either violation.

– Katy Green

Schlein, Paul B

From: Fish, Gary
Sent: Monday, May 21, 2012 3:44 PM
To: gary.fish@maine.gov
Cc: Jennings, Henry; Schlein, Paul B (Paul.B.Schlein@maine.gov); Tomlinson, Mary E (Mary.E.Tomlinson@maine.gov); Hicks, Lebelle (Lebelle.Hicks@maine.gov); Bruce Flewelling; Carol Eckert; Charles Ravis; Clark Granger; Curtis Bohlen; John Jemison; Richard Stevenson
Subject: Changes to the Bt corn distribution and use rules (01-026 CMR Chapter 41)
Attachments: 2012_Bt_Corn_Rules_Update.docx; bt-corn-factsheet_5-12_final.doc

Categories: Red Category

May 21, 2012

To: *Bt* Corn Distributors and Growers

From: Gary Fish, Manager of Pesticide Programs

Subject: Changes to the *Bt* corn distribution and use rules (01-026 CMR Chapter 41)

The Board of Pesticides control adopted changes to the *Bt* corn distribution and use rules (01-026 CMR Chapter 41, Section 5, Plant Incorporated Protectants) at their December 2011 meeting. Those changes which relaxed some requirements for distributors and growers became law May 3, 2012, and are listed below. The Board also approved registration of additional *Bt* corn products and adopted a policy which applies the requirement for a 300 foot buffer when planting "refuge-in-the-bag" products.

- Under the amended rule, growers must attend a BPC-approved training session and possess a valid *Certificate to Use Bt Corn*, but only before they plant the corn. The certificate is no longer required to purchase the corn.

- Any new *Bt* corn certificates issued will expire on December 31 of the third year after they are issued. The new rule extends the certification period by one year.

- The 300 foot buffer zone requirement was applied to refuge-in-the-bag products since they do not require a separate and distinct spatial refuge area (like *Bt* sweet corn) that could be planted between the *Bt* corn field and any adjoining non-*Bt* corn fields to help prevent pollen drift onto those non-*Bt* corn crops. The buffer is only required when neighboring growers are unable to agree on a plan to prevent pollen drift and the non-*Bt* corn grower requests the additional buffer.

If you have any questions about these changes, please contact the Board staff at 207-287-2731.

Official copy attached along with the most current *Bt* corn fact sheet.

****

Gary Fish
Manager, Pesticide Programs
Maine Board of Pesticides Control

Maine Government News

Back to current news.

Maine Forest Service: Winter Moth Invasive Found in Harpswell

June 5, 2012
Conservation

Charlene Donahue, (207) 287-3244

AUGUSTA, Maine – A new invasive pest has been discovered in Harpswell, one that can damage Maine's hard wood, fruit trees and blueberry bushes and possibly affect the state's associated industries from wood products to agriculture to tourism, according to Maine Forest Service (MFS) entomologists.

An area of about 400 acres in the small coastal town was found last month to be infested with winter moth, a small tan moth that lays eggs that develop into a voracious caterpillar that causes the leaves on trees to look like Swiss cheese. The green inchworms can be seen in trees this time of year, according to the forestry entomologists. It is the first time that the insect infestation has been found in Maine.

While the state's entomologists have a plan to deal with the winter moth, this latest invasive find nonetheless brings home the same message surrounding all invasive species that threaten Maine's natural resources: Don't move it; whether it's firewood or landscape plants,

"Please leave your hostas at home – it's a really important message," warned Charlene Donahue, MFS entomologist under the Maine Department of Conservation, who discovered the winter moth infestation. "We're warning people not to move plants out of Harpswell or from Massachusetts to Maine, because you might bring the problem with you."

Winter moth, which is native to Europe, first arrived in North American in the 1930s in Nova Scotia, where it was a serious problem before being controlled by parasitic flies. More recently, it has been found in the eastern section of Massachusetts for the past 20 years, and it is spreading into Rhode Island and Connecticut.

The insect gets its name because the male moths appear in the late fall and early winter months. Female moths, which don't have wings, lay eggs on the trunks and branches of trees. Those eggs hatch in the springtime into hungry inchworms that feed on the buds and entire leaves of trees, Donahue explained. They also produce silken threads that can carry them on the wind, a dispersal method called "ballooning." After the inchworms get about an inch long, they pupate, or form a cocoon, in June and spend all summer and fall in the ground.

"That is why it important to not move plants from areas infested with winter moth," said Donahue.

The inchworms attach themselves to the leaves of a large number of tree species, including oaks, maples, elm, ash, birch, apple, crabapple, cherry and blueberry. The invasive insect can kill trees by causing defoliation and weakening over a number of years. Other stressors, such as another type of insect, a disease or a drought, then can add to tree mortality, Donahue said.

"In Massachusetts, they are now seeing a lot of tree mortality across tens of thousands of acres," she said.

Massachusetts had a "huge moth flight last winter," Donahue said. Last December, the MFS received a call from a landowner in Harpswell who "wondered what she was seeing." The landowner sent in moths to the MFS, which in turn sent them to Massachusetts for DNA testing. They came back as winter moth.

What wasn't certain, however, was whether there were any female moths around or these were just the male moths from the big moth

flight. Donahue went back to the town, and on May 18, she found the inchworms eating in the local trees, indicating there was a full infestation.

The MFS entomologist thinks the winter moths got to the area most likely on landscape plants moved from Massachusetts, as eggs on trees or as cocoons in soil around plants. The winter moth is not regulated in Massachusetts, and there currently is no quarantine in place in the area.

A parasitic fly that was released in Nova Scotia helps keep the winter moth population under control there. Researchers at the University of Massachusetts, Amherst, are rearing and releasing the same fly in Massachusetts and hope that it will soon be at high enough numbers to reduce the winter moth populations there to manageable levels.

The Maine Forest Service is working with the UMass researchers to establish the same control agents in the Maine infestation before it gets much bigger. As currently planned, Maine will be receiving parasitic flies from the UMass colony next year, Donahue said.

“We have found this invasive insect relatively quickly due to an alert landowner,” Donahue said. “Hopefully, by using the flies as bio-control agents, we will be able to get the problem under control quickly, and it will not spread further.”

For more information about the winter moth, go to: http://www.maine.gov/doc/mfs/InvasiveThreats.htm#wm

Or: http://www.mass.gov/dcr/news/winter_moth.pdf

For more information about the Maine Forest Service, go to: http://maineforestservice.org

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Related Documents

(photo courtesy of the Maine Forest Service) Hungry winter moth inchworms, an invasive insect, eat oak tree leaves in Harpswell. A 400-acre infested area was discovered last month in the coastal town. The insect threatens a wide range of hardwood trees, fruit trees and blueberry bushes in Maine and already has defoliated tens of thousands of acres in Massachusetts. The moth can be managed with bio-control, according to state entomologists.

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Control of invasive moth in Harpswell expected to take years

By Matt Hongoltz-Hetling

E-mail and share

Jun 06, 2012 11:30 am

HARPSWELL — Buckets of pesticides, home-grown parasitic flies, and DNA testing are all likely to be employed in the battle against the invasive winter moth, which was positively identified in town last month by dismayed state conservation officials.

The small brown moth, which has a wingspan of a little more than an inch, can ravage apple trees, blueberry bushes, and hardwoods, all of which adds up to bad news for the state's agriculture, forestry, and tourism industries.

Connie Sweetser owns an apple orchard that is uncomfortably close to the infested acreage – 400 acres of real estate spanning hundreds of private properties, including a chunk of Harpswell Neck and a section of Orr's Island.

Sweetser's Apple Barrel and Orchards, in Cumberland Center, is 35 miles away by car, but only 10 miles as the crow flies.

She said she was aware of the winter moths, but she's waiting to hear from the state before deciding what to do.

"We'll see what they have to say," she said.

Photo: Courtesy Maine Forest Service

The invasive winter moth caterpillar was discovered in Harpswell in late May. Scientists say the species, which was likely brought to Maine on a landscaping plant, is a threat to hardwoods, apples trees and blueberry bushes.

Charlene Donahue, a Maine Forest Service entomologist in the Maine Department of Conservation, documented the winter moth infestation after hearing from a concerned property owner late last year.

"She said there were just clouds of them," Donahue said.

Winter moths spend November and December as moths; their eggs hatch into hungry caterpillars in the springtime, and that's when the voracious pests do their damage, chewing their way through so many leaves and buds that the host tree can die.

One of the great mysteries surrounding the winter moth involves its closely related cousin, the native bruce spanworm.

Scientists have such a difficult time differentiating between the two species that, in order to positively identify the winter moth population in Harpswell, Donahue had to collect specimens and have them sent to the University of Massachusetts for DNA testing.

Therein lies the mystery: Why is it that the native spanworm is held in check by natural predators, while the virtually identical winter moth runs amok?

Both species are preyed upon by many natural predators. Moths and caterpillars are beset by a wide variety of birds. In between, as pupa, they are eaten in large numbers by oil beetles, ground beetles, moles and mice. In addition, they are a favorite host for parasitic wasps, which lay their eggs in the caterpillar, setting the stage for the young maggots to eat the caterpillar from the inside out.

But for some unknown reason, bruce spanworms rarely get out of hand, while winter moths frequently proliferate to the extent that they

destroy large numbers of oak, elm, maple, ash, and crabapple trees.

Donahue is studying the problem in the hope that she can unlock the difference. She is working with residents in the unorganized township T2 R8 NWP, near Lincoln, which has seen high numbers of bruce spanworms this year.

If she identifies the spanworm's hidden weak spot, it could give conservation officials in Maine and Massachusetts, which is overrun with the winter moth, a clue as to how to defeat the pest.

No one knows for sure how the winter moth made its way to Maine. The caterpillar typically disperse by a process called ballooning, which sees them spinning strands of silk that pick up the wind and carry them away.

It's an effective method of travel, but Donahue said that it's not likely to have carried them the hundreds of miles from Massachusetts to Harpswell.

Instead, she said, the culprit is likely another species, a large primate that is known to summer in Maine before heading south for warmer climes in the winter.

Humans.

"The way they get around the most is in landscape plants and in moving trees," said Donahue. "You're moving the pupa with the plants in the soil. If people don't move landscape plants around, they won't get infested."

She said she suspects that several years ago, a few pesky winter moth pupa or caterpillars hitched a ride into Maine on a plant carried by a seasonal homeowner.

Those few invasive pioneers needed time and luck to survive and breed, but over several life cycles, they established themselves in Harpswell.

Donahue said it would have taken years for the pest to build up to the infestation level seen today.

Because of the winter moth's presence, Harpswell citizens are being asked not to take landscaping plants or firewood out of town, which could inadvertently spread the problem to other parts of Maine.

The problem took years to develop, and Donahue said that it will take years to fix.

"Life is not a microwave," she said.

The current plan is to release hundreds of parasitic flies, known as cyzenis albicans, into the environment, in the hope that they can reduce the number of winter moths.

It could take five years just for the flies to establish themselves, Donahue said, and years more before they catch up to the burgeoning population of winter moths.

Even if the program is wildly successful, it won't eliminate the invasive species altogether. But it will prevent them from thriving in such numbers that they can kill trees.

The European species first came to North America in the 1930s in Nova Scotia; 20 years ago, it flourished in eastern Massachusetts, and scientists say it is spreading into Rhode Island and Connecticut.

Control efforts involving the parasitic flies have been successful in other parts of the country, and Donahue said she hopes that success will be replicated in Maine.

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greenbay pressgazette.com

Consider growing organic trees rather than using pesticides

An apple a day keeps the doctor away, but maybe less so if you spray. That's why organic fruit management is becoming more common in commercial and home orchards, industry analysts say.

"The problem with using chemicals to fix problems is that the chemicals might provide a short-term solution but they actually create long-term problems," said Jeff Dinslage, president of Nature Hills Nursery in Omaha, Neb., the largest online seller of trees in the country. "More and more of our customers simply don't want to use chemicals in their backyards that could harm their children, their pets and themselves."

Organic produce is enriched through the use of organic matter and cover crops. No chemical pesticides, fungicides or fertilizer are applied.

Much commercially grown produce has chemical residues on it, even if you wash it, said Sonya Lunder, a senior analyst for the Environmental Working Group, a Washington-based nonprofit that examines toxins in foods. With apples, for instance, "there are a lots of pesticides and fungicides involved in their growth and storage," she said. "When looking at residue data, apples usually top the list. Be versatile in what you eat and where you shop."

Although U.S. apple production has declined in recent years, consumer demand has spurred a fast-growing organic apple industry, the U.S. Department of Agriculture says. Apples managed under organic farming systems now account for 6 percent of total U.S. apple acreage.

Gregory Peck, a horticulture professor at Virginia Tech, noted that "there are probably a dozen or so diseases that attack apples, and 60 or so insects."

If you must spray, Peck said, do it responsibly.

"Ask yourself if the problem is causing enough injury that you have to protect it," Peck said. "Time it properly. Spray when you're going to target the pests. Choose materials that will control the problem, but

won't be detrimental to beneficial insects or water quality."

If you opt to go organic, start with the right plant in the right place, he said. Hardier varieties generally perform better than others under organic management. With apples, that would include the Liberty, Enterprise and Gold Rush varieties, he said.

"For fruit production, also choose the most disease-resistant varieties you can," he said. "Look at natives that have proven reliable in your area."

Bob Sewall, owner of Sewall Organic Orchard in Lincolnville, Maine, says successful organic farming begins with the soil.

"A healthy soil makes for a healthy plant," he said. "That's the basis of organic management. I spent two years preparing the soils in our orchard."

Organic growers must be vigilant about spotting small problems before they become big ones, Dinslage said.

"You might also have to tolerate a less than photographically perfect apple," he said. "But the benefits of treating a healthy environment for all living things more than outweigh the slight hassles involved with organic growing."

The Apple Bites Back: Claiming Old Orchards for Residential Development

Ernie Hood

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As the U.S. population continues to grow, increasing demand for housing and related community resources means more land is being converted from agricultural uses to residential applications. According to the revised 1997 National Resources Inventory conducted by the USDA Natural Resources Conservation Service, more than 6 million acres of American farmland were converted to developed uses between 1992 and 1997. That is an annual conversion rate of roughly 1.2 million acres per year—a 51% increase over the average annual rate reported for the preceding decade.

Naturally, many of these areas were routinely treated with pesticides and other chemicals during their agricultural lifetimes. Although this legacy has been problematic in a wide variety of land conversion scenarios, one in particular seems to have attracted the attention and concern of environmental officials and property buyers in several states across the country: the residential development of historic orchard properties. In state after state, these old orchards (which most often produced apples, but also peaches, cherries, pears, and other tree crops) are metamorphosing into highly desirable subdivisions—desirable, that is, until it emerges that the soil beneath the feet of the proud new residents may be contaminated with lead and arsenic. These toxic by-products are left from the days before DDT and before organophosphates, when arsenical pesticides, particularly lead arsenate (LA), were the treatment of choice to prevent the ravages of insect damage.

They Loved LA

LA was introduced in 1892 in Massachusetts for use against the gypsy moth. Two other arsenical pesticides (copper acetoarsenite, known as “Paris green,” and calcium arsenate) also were in use, although LA largely replaced them in the 1930s due to lower cost, greater efficacy, and lower phytotoxicity. Even though arsenic residue was recognized as a problem as early as 1919, LA was the most widely used pesticide in the nation—recommended by the USDA and applied to millions of acres of crops—until the late 1940s, when DDT (considered at the time to be safer and more effective) became available. LA continued to be used in some locations into the 1970s, and was ultimately banned in 1988.

LA was perhaps most commonly applied in apple orchards, due to its excellent control of the codling moth, a major apple pest. Today, apple orchard properties that were in production during the heyday of LA use are the focal point of environmental concerns; given the nature of the pests peculiar to orchard crops, growers tended to apply the chemicals frequently and in high concentrations, often over many years. “In some cases, they

dusted the apple trees or peach trees every week, whereas most field crops may have had one or two applications during the growing season," says Kevin Schick, a bureau chief with the Site Remediation and Waste Management Program in the New Jersey Department of Environmental Protection.

LA and the other arsenical pesticides were designed to be persistent, and it is that persistence that is causing environmental contamination problems decades after their use ended. "These chemicals have just tremendously long half-lives in the ground," says North Carolina state toxicologist Ken Rudo. "They bind very tightly to the soil."

Once LA reached the soil through over-spray, spillage, rainfall wash-off, or simply fallen fruit and leaves, the lead arsenate underwent hydrolysis, separating into lead and arsenic bound to organic particles in the soil. The lead, being poorly soluble, was immobilized, typically within the top 12 to 18 inches of topsoil. The fate of the arsenic was similar, but a bit more complicated. "Arsenic, as arsenate, even though somewhat sparingly soluble, *is* soluble, and it will move in water," says Washington State University soil scientist Frank Peryea. "I've seen some sites where almost all of the arsenic is still in the topsoil, in the tillage zone, and I've seen sites where I've measured arsenic movement as deep as a meter or so."

Carl Renshaw, a hydrogeologist at Dartmouth College, published a study in the January/February 2006 issue of the *Journal of Environmental Quality* showing that arsenate in the soil can be remobilized by being disturbed. He compared two fields in the same historic New Hampshire orchard. One field had never been disturbed, whereas the other had been tilled and replanted in the early 1990s. "What we found was that in the field that had been replanted, there was somewhat less arsenic on it than in the undisturbed field," he says.

Given the assumption of virtually identical application rates over the years, the discrepancy apparently arose from a portion of the arsenic in the disturbed field having been mobilized and removed by surface water. Renshaw found arsenic in the sediment of a nearby stream in amounts that very closely matched the arsenic missing from the tilled field.

"The implication from our study," says Renshaw, "is that if you're not really careful about erosion, you're going to end up sending a lot of arsenic down into the stream channel." To date, researchers have seen no evidence of direct health effects in humans, animals, or plants exposed to this stream-bound arsenic. However, more study is needed to fully understand the ramifications—if any—of the mobilization.

How Dangerous?

The potential danger posed to human health by lead and arsenic contamination in historic orchards is a complex issue, fraught with scientific uncertainties and competing interests. Arsenic is a known human carcinogen. Exposure to lead, especially prenatally and in childhood, can lead to neurological damage. There is no doubt that excessive exposure to either substance can adversely impact health, but in this case any risks are almost exclusively long-term—virtually no instances of acute adverse health effects have been documented in people living on historic orchard properties.

Regulatory agencies such as the EPA and state health and environmental departments determine allowable levels of chemicals in soils and water based upon formulas that take into account criteria such as toxicity, exposure, and naturally occurring background concentrations of the chemicals. For carcinogens such as arsenic, the calculations are based upon the amount of a chemical that is predicted to result in 1 additional cancer case occurring in 1 million people exposed over their lifetimes. But there is some flexibility in the standards based on

local conditions and practical considerations. In New Jersey, for example, where background arsenic concentrations are often high, the criterion for residential soil cleanup is set at 20 ppm—50 times the EPA's level of 0.4 ppm.

In historic orchard properties, cleanup action is often triggered when a so-called "hot spot" is discovered—typically an area where the pesticides had been mixed and loaded or stored, and where repeated spills or disposal of excess materials may have occurred. The contaminant concentrations in those hot spots can be significantly higher than in the tree crop areas. But locating hot spots after many decades can be very difficult.

The ATSDR is often called in to analyze the health risks at contaminated historic orchard properties. "We look at the contaminants, the concentrations, the pathway, how long [residents] are exposed to it—all of the different aspects of an exposure," says Robert Safay, an environmental health scientist with the agency. "For example, when you're looking at lead contamination in the soil, you're primarily concerned about young children playing out in the soil."

In all but the most extreme cases, the health risks of living atop contaminated historic orchard soil are ultimately characterized as very low and manageable. Exposure is the critical element. "The real issue here is direct contact—you want to limit the direct contact," says Lori Bowman, director of the Agrichemical Management Bureau in the Wisconsin Department of Agriculture, Trade, and Consumer Protection. As Safay explains, there must be a completed exposure pathway for there to be even the potential for health effects. Ultimately, the amount of risk depends on the level of contamination and the use of the land.

For the most part, residents are advised to limit their direct exposure to the soil if it's unremediated and to take simple measures such as wearing gardening gloves and wiping their feet before entering the house. Peryea says there is little risk from eating plants grown in this type of soil, but advises that home gardeners rinse off produce before bringing it into the home, then wash it again with a detergent and scrub brush to remove any remaining soil particles, paying particular attention to rough vegetables like broccoli and leafy vegetables like lettuce, which can trap and retain dust. He also advises paring root and tuber crops such as potatoes, carrots, and radishes, and not composting the peelings or other unused plant parts.

The risks involved may be modest and long-term in most cases, but low risk is not the same as no risk, and regulatory agencies across the country are finding themselves in a thorny situation as more and more contaminated historic orchard properties are developed. They are caught between their duty to protect public health and the environment, and the fact that the risks presented by most of these properties pale in comparison to those associated with other, more acute contamination sites, such as lands near smelters or toxic waste dumps. Naturally, budgets are limited, and priorities must be set. Yet the orchard situation cannot be ignored, and several states have been wrestling with how to deal with this issue for several years.

The sheer scope of the phenomenon adds another layer to the challenge of how to most effectively deal with it. "The magnitude of the problem is just staggering," says Peryea. Millions of acres across the nation are involved. In the state of Washington alone, Peryea says, some 188,000 acres are affected. In Wisconsin, 50,000 acres may be affected, and in New Jersey, up to 5% of the state's acreage is estimated to be impacted by the historical use of arsenical pesticides. Both New Jersey and Washington have had multistakeholder task forces examine the problem and issue recommendations and guidelines.

Wisconsin is likely to convene a similar task force later in 2006, according to Bowman. "We want to develop a protective, economical, and practical strategy to address potential residues of lead and arsenic in soils related to

historic orchard use," she says. "The charge of the task force would be to evaluate the health and environmental impacts, and [also evaluate] what kind of alternatives and strategies we could put into place to limit exposure and to educate and provide outreach to homeowners and developers as to what types of precautions can be taken at these orchard sites to mitigate any risk."

What Can, Should, or Must Be Done

Because contamination can be spread over large areas, remediation measures vary widely, depending upon the level of contamination, the current or intended use of the property, and state or local regulations. Each method has its advantages and its drawbacks, and each site has its own unique circumstances that will often dictate how, when, and even if the situation will be dealt with.

Excavation is the quickest and most thorough remediation method. This involves scraping up the contaminated topsoil, hauling it away to an approved landfill, and replacing it with clean dirt. Realistically, says Peryea, removal is the only way to eliminate risk, "but it's very expensive." Such total remediation can cost $1 million per acre or more. And it's a huge undertaking. Peryea does the math for 1 acre: "If you have contamination down to three feet, you're looking at getting rid of three acre-feet of soil—that's twelve million pounds of soil."

Capping, which involves simply putting a 12- to 18-inch layer of clean soil over the contaminated soil, has been used in some locations. However, this requires enormous amounts of clean dirt. Further, capping cannot be considered a permanent solution—plants will grow on the soil caps, their roots will penetrate the contaminated soil, and the vegetation will eventually redistribute the lead and arsenic to the clean soil. Also, it is common for the soil caps to be disturbed by construction activities.

Soil blending is another alternative, and one that is growing in popularity, particularly when contaminant concentrations are only minimally in excess of actionable levels. This involves bringing clean soil to a site and mixing it with the existing topsoil, with the intent of reducing concentrations below levels that require health-protective actions. Although relatively effective, blending can be a hit-or-miss operation. The main reason is that operators can't always achieve 100% blending, and it very much matters where the subsequent samples are taken—even a few inches can make a difference. Sometimes it is necessary to repeat the procedure, which, of course, drives up costs. Also, disturbing the soil in this way could actually mobilize the arsenic, as Renshaw's research showed. Regardless of its shortcomings, however, blending is an option many states have chosen in recent years.

In some instances, a simple solution can be adequate. "What seems to do a good job of reducing exposure in areas where people aren't digging in the soil is just to keep turf on it, or keep it vegetated somehow," says Peryea. At some sites, simply moving the contaminated soil to another location on the site and capping it—for example, by burying it under a roadway—has been acceptable, although this option requires that a deed notice be executed, so that all of the records of the sampling and disposal of the contamination become part of the property's permanent title record.

Thus far, other remediation methods have proven to be ineffective, impractical, or counterproductive on these sites. Researchers such as David Butcher, a professor of analytical chemistry at Western Carolina University in Cullowhee, North Carolina, have explored the possibility of phytoremediation of these properties, in which plants are used to suck the contaminants out of the soil, after which the contaminated biomass is destroyed. But this method, though effective in certain remediation situations, doesn't appear to hold much promise in lead- and

arsenic-contaminated orchard soils. Phytoremediation is quite slow, potentially taking decades or longer to effectively remove contaminants. Butcher also was unable to discover a method of removing the lead from the soil without the addition of other chemicals (such as EDTA) to release the tightly bound element.

One way to release the lead is by adding phosphorus to the soil, but this also mobilizes the arsenic. “That creates an even bigger problem,” Peryea says. “If you get the arsenic moving, and it moves down into the ground-water, cleanup becomes much more difficult than trying to keep it in the topsoil.”

According to Peryea, you can scratch microbial volatization as well. In that method, native soil microorganisms are stimulated to volatilize arsenic. The gaseous arsenic can then be trapped. But for this method to be effective, soils must be kept quite wet. Many of the historic orchard properties are well-drained, sloping sites, where it would be difficult to keep the soil adequately flooded. Plus, of course, as Peryea points out, “if you are evolving arsenic off your soil, and it flows down and contaminates your neighbor’s property, that’s going to create some problems.”

Cleanup and real estate disclosure issues are usually handled at the state and local levels, where approaches vary considerably. As public awareness of the potential contamination of historic orchards increases in the affected areas, state agencies are fielding more and more calls from concerned property owners or prospective buyers. Chuck Warzecha, a risk assessor with the Wisconsin Department of Health and Family Services, fields 10 to 15 such calls a year. He tries to give concerned citizens a balanced message. “My first statement is that it’s not a real scary issue and doesn’t have to be a big problem on their property,” he says. “It’s something that now that they know about it, it’s worth doing something about, but they shouldn’t be concerned that past exposure is going to be a real serious issue for their families.”

If callers haven’t had their soil tested yet, Warzecha recommends that they do so. Then he advises them on how to manage the problem if there is one. If contamination hot spots are identified, cleanup may be required under Wisconsin’s Agricultural Chemical Cleanup Program. In such cases the property owner would pay a 25% deductible, with the rest of the costs covered by the state, according to Bowman.

In Washington, the Model Toxics Control Act requires the reporting, study, and cleanup of sites where hazardous substances are above state-set cleanup levels. In residential developments, the state is working to increase awareness of the potential for contamination on historic orchard lands, particularly among developers. The goal is to get developers to incorporate that consideration at the outset of projects, when there are opportunities to deal with problems more easily than could be done once housing is in place. As in other states, several departments are involved in providing consultation, health assessment, and technical assistance on a case-by-case basis.

Washington has also chosen to be proactive in its cleanup efforts at sites where children are especially likely to be affected. “We have elected to focus on schools, child care facilities, and parks where groups of young children might be present, trying to take steps to reduce exposures for kids,” says Dave Bradley, a toxicologist and risk assessor with the Toxics Cleanup Program in the Washington State Department of Ecology. “We’ve focused on a handful of counties, and have further focused on schools, trying to integrate with existing community processes such as school construction, and then trying to prioritize how we use either our authority or funds out of the state Superfund to actually perform some of the cleanup actions.”

In New Jersey, the recommendations and guidelines put forth in the 1999 report of the Historic Pesticide Contamination Task Force set the agenda. Schick, whose department handles historic orchard contamination

cases, says there's no excuse for ignorance on the part of New Jersey developers at this point, and it should be a standard element of their due diligence.

"It's common knowledge, the guidance is out there, it already involved the real estate agents, the bankers, the insurers, the farm bureau," Schick says. "It's been out there long enough that anyone making any kind of investment in developing farmland should have known about it, and they will be held at fault for not coming to the department or cleaning prior to development."

Paradise Lost, Paradise Regained?

Today, Barber Orchard, a 500-acre subdivision located a few miles west of Waynesville, North Carolina, is "not a place where it looks like there are any problems," says Butcher. "It's not a place like where there's been a lot of mining and it looks like a moonscape. It looks beautiful up there." It may look beautiful, but that doesn't change the fact that Barber Orchard has had a troubled history.

Barber Orchard was a commercial apple orchard from 1903 until the mid-1980s, when the operation went bankrupt and the land was parceled off for development. In 1999, a pregnant resident heard rumors of birth defects from neighbors and friends in the area. She contacted Rudo, who, with the county health department, initiated an extensive investigation that included soil and water sampling and a series of public meetings with residents. In late 1999 through mid-2000, the federal EPA conducted a $4 million emergency removal of a foot of topsoil from 28 residents' yards.

Reflecting the tremendous variation in contamination typical of historic orchard sites, the EPA found only trace amounts of lead and arsenic in some sampling locations, but several others were well in excess of the agency's cleanup goals of 40 ppm arsenic and 400 ppm lead. Samples came in as high as 400 ppm arsenic and 1,200 ppm lead. The highest levels were detected at spots where trees were still located, or had been cultivated in the past, reflecting the cumulative impact of long years of pesticide applications.

In 2001, the site was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), an unusual step for a historic orchard. "CERCLA authority is hobbled when it comes to normal use of pesticides," says James Bateson, branch head of the Superfund Site Evaluation and Removal Branch of the North Carolina Department of Environment and Natural Resources. "In cases where [a pesticide has] been spilled or dumped in large quantities or misused, that's when CERCLA can have some authority. At Barber Orchard, the case was made that there was enough spillage associated with the way they handled things up there that it wasn't normal application of pesticide."

"The way they handled things" was by distributing the pesticides through a unique underground high-pressure piping system, with aboveground nozzles at the tree sites where sprayers were hooked up. The system left pesticide hot spots at several locations throughout the orchard property. "If there was spillage at a particular location above-ground where that particular distribution pipe was located, or if there was a fracture in the pipe, or a joint in the pipe that got a crack or leak in it, then we may have contamination locally at that one particular site, or along the connections along the way," explains Haywood County Health Department director Carmine Rocco. According to Bateson, the EPA has in fact found several places where pesticides had leaked into the soil because of poor maintenance of the piping system.

In 2004 the EPA issued a record of decision (a document specifying how the agency planned to clean up the site) for the orchard's soil, calling for much more removal of contaminated dirt, mainly from vacant lots on the

property. “What we’re doing right now is waiting for funding to implement the cleanup for soil,” says Jon Bornholm, the EPA’s project manager for the Barber Orchard site. That phase of the cleanup, which should take less than a year, is projected to cost $20 million, and there’s no telling when the funds will be released by the EPA for it to take place.

The EPA is expected to render a record of decision for dealing with groundwater contamination on the site before the end of 2006. Bornholm expects that the agency will opt for “monitored natural attenuation”—in other words, let Mother Nature take care of the problem, and hope that contaminant concentrations will decrease over time through natural processes such as biodegradation and dispersion. He guesses that could take 30 to 50 years, with the EPA monitoring the situation continually. Residents have been advised to filter their well water since the problem was uncovered, and city water is now available to the site, although not all of the current homeowners have elected to hook up to the service.

Since the problem arose, the ATSDR has also been involved at Barber Orchard, evaluating the health situation. In April 2002, the agency released its official public health assessment for the site, which concluded that “current exposures to site contaminants are not likely to result in adverse health effects. . . . The exposure pathways for lead and arsenic were disrupted within a relatively short time frame, so past exposures are not likely to lead to health effects at this time.”

Meanwhile, Barber Orchard’s tax values have increased, and buying and selling of homes in the subdivision has not been hurt by the site’s Superfund status. “The heat of the moment has passed, and I think we’ve gotten over the panic mode,” says Ellis Morris, president of the Haywood County Board of Realtors. “Initially, people were tentative about buying in to that particular neighborhood, but that’s been resolved, there’s a comfort level now, and the real estate there is keeping pace with all of the other areas of Haywood County in terms of days on the market and selling price.”

David Miller would agree with that assessment. He and his wife retired to Barber Orchard from Florida in 1997, and his 1.4-acre lot was one of the properties cleaned up by the EPA. He is unconcerned about the contamination at the site and thinks the whole situation has been overblown. “I haven’t changed the way I live,” he says. “I work in the garden just about every day, I’ve planted a vegetable garden and eaten the vegetables, I’ve planted some fruit and eaten the fruit. So it has not affected me or my wife in any way.”

So it appears that Barber Orchard was paradise lost for a time, but is now paradise regained. Now, however, some neighbors just down the road may be facing a similar situation. In May 2006 residents of the Tan Woods and Orchard Estates subdivisions, built on what was once Francis Orchard, were notified that soil samples from a vacant lot at the site had tested positive for lead, arsenic, and other pesticides—a mix similar to that found at Barber Orchard. And like Barber Orchard, Francis Orchard was equipped with an underground pesticide piping system.

It’s still early in the process, and the results of more thorough sampling and testing are not yet available, so it’s too soon to predict whether Francis Orchard may eventually become a Superfund site. But this time around, according to Bateson, both residents and involved officials can benefit from the Barber Orchard experience. At Francis Orchard, he says, “the residents are well schooled after seeing what’s gone on at Barber Orchard, and of course the county and state people have been around the block now too.”

Questions Remain

Despite the large scale scope of the problem, it appears that living on a historic orchard property contaminated by lead and arsenic does not constitute an immediate threat to human health. So it is still an open question whether it's really necessary to spend huge amounts of money, often from tax dollars, to ameliorate these sites.

Peryea thinks that what is needed is a solid epidemiologic study to document whether there really is a problem with people living on these arsenical pesticide–contaminated soils. "If that sort of study was done," he says, "and it was to show that there's no problem, or that the problem is controllable by setting up some sort of engineering controls or behavioral controls, like they do with urban lead nowadays, that would probably take care of a lot of the problem. The response—rather than trying to force a cleanup that would probably be wildly impractical, very expensive, and potentially ruin property values—would be that people would change their behavior a bit and end up minimizing the risk."

Online Resources

New Jersey, Washington, and Wisconsin offer detailed advice to residents, developers, and other interested parties about what to do if they suspect or know their land is contaminated. Wisconsin has posted a variety of publications (**http://www.datcp.state.wi.us/arm/agriculture/pestfert/pesticides/accp/lead_arsen_resources.jsp**), including tips for safe gardening in lead- and arsenic-contaminated soil. Washington provides a comprehensive toolbox of resources stemming from its Area-Wide Soil Contamination Project, a task force that addressed not only historical orchard contamination, but also lead and arsenic contamination over widespread areas of the state from smelters and leaded gasoline combustion; see **http://www.ecy.wa.gov/programs/tcp/area_wide/area_wide_hp.html** . New Jersey offers the report of the Historic Pesticide Contamination Task Force (**http://www.state.nj.us/dep/special/hpctf/index.html**) and i-MapNJ, an environmental mapping tool that lets residents obtain detailed contamination information for specific locations (**http://www.state.nj.us/dep/gis/depsplash.htm**).

Figures and Tables

You spray, you pay?

Spraying of arsenical pesticides on apple orchards was routine from the late 1800s through the 1940s. Lead arsenate was not banned, however, until 1988.

A blooming problem?

Land that was once home to fruit orchards is now being turned into subdivisions, raising questions about pesticides that may still be present in the soil and the potential risks they pose to residents.

Soil survivors

Some experts recommend that homeowners have their soil tested for arsenic and lead, although no perfect method exists for remediating soil that is found to still be contaminated.

Landscraping

A bulldozer scrapes a layer of contaminated soil from a yard in the Barber Orchard subdivision in North Carolina, once the site of a large apple orchard. Due to contamination with former agricultural chemicals, the subdivision was designated a Superfund site in 2001. EPA-supervised cleanup, mainly by removing soil, is on hold pending further funding.

LOCAL

Fly Threatens New England Blueberry Crop

By Todd Gutner, WBZ-TV

May 4, 2012 11:29 PM

Reporting Todd Gutner

Filed Under

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BOSTON (CBS) – Plump juicy blueberries are a summer tradition here in New England, but this year, the crop is facing a severe threat.

A new pest is showing up here on the East Coast.

Last summer, the Drosophila Suzukii fly first showed up at Dole Orchards in Limington, Maine. This fruit fly is known for its spotted wings and its love of berries.

When asked if he had ever experienced a threat of this magnitude on his farm, Earl Bunting said, "No, It's something new that everyone is learning to deal with. We don't know what it is going to mean."

Jim Dill, Ph.D, is a pest management specialist with the University of Maine in Orono who is tracking the pest's movements. He assembles traps with vinegar, sticky tape, and red plastic cups to determine if even one fly has infested an area.

This spotted wing fly is so dangerous to the crop because it goes after fruit that is still ripening, not rotted fruit.

It also has a special tool which allows it to work with greater

efficiency, according to Dill. “It can saw into ripening fruit, so instead of overripe fruit, this particular insect will start in the process early on in the process of the fruit as its ripening, lay its eggs, and then the maggots develop inside the ripening fruit.”

Other soft skinned fruits, such as strawberries and raspberries, are also vulnerable.

The Drosophila Suzukii fly was first detected in the United States just four years ago in California. One theory is it took advantage of strong winds to make its cross country journey so quickly.

Specifically, it might have hitched a ride with Hurricane Irene or Tropical Storm Lee.

“A good gust of wind could very easily knock them 10-20 feet away, and if they actually get up in the wind currents, they might be able to travel miles,” explained Dill.

As the spring growing season gets underway, Earl will be keeping his eyes on the traps as the buds pop. He ponders his only remedy, pesticides, which he doesn’t like and which adds cost.

It will take the presence of just one tiny fly in a one of those red cups for him to know he has a big problem.

“This is new. This is unchartered territory I guess,” said Bunting.

The consequences could be severe. Maine harvested 80 million pounds of blueberries last year. That crop was worth almost $200 million.

The spotted wing fly isn’t just a problem in Maine. Scientists also found this fruit fly in Massachusetts, and will be monitoring fields here to see if it comes back.

WE RECOMMEND

Lottery Ticket Misprint Fools Man Into

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10 Things You Should Never Buy at Garage

(Reader's Digest)

Schlein, Paul B

From: Jennings, Henry
Sent: Tuesday, May 15, 2012 10:22 AM
To: Schlein, Paul B
Subject: FW: Bayer CropScience Seed Treatment Stewardship Brochure and Response to NBC News Segment on Bees
Attachments: Bayer post-email NBC response communication may 11 2012FINAL (2).docx; 1107242 _Trifold_R7_PQ.pdf

Categories: Red Category

From: Allan Hovis [mailto:allan.hovis@bayer.com]
Sent: Monday, May 14, 2012 3:20 PM
To: Allan Hovis
Cc: Pat Kwiatkowski; Alan Ayers
Subject: Bayer CropScience Seed Treatment Stewardship Brochure and Response to NBC News Segment on Bees

Dear State Regulator,

You should have recently received a communication from Pat Kwiatkowski, Director of Bayer CropScience State Regulatory Affairs and Documentation Services, concerning the recent public activity surrounding neonicotinoids. We are following up with a website display file of our recently released "Proper Seed Treatment & Sustaining Bee Health" tri-fold brochure. Please feel free to use and distribute as you would like. We will be providing printed copies of the tri-fold shortly by request, or will provide the print file directly to you for onsite printing.

Some of you may also have seen the May 10, 2012 NBC Nightly News story on bees and alleged links to pesticide seed treatments. We have also included a copy of Bayer CropScience' s May 11 update regarding the story. In addition to the broadcast report, NBC posted a 3-minute interview online with Dr. Fischer discussing in depth our opinion on bees, their health, recent studies and the importance of seed treatments to agriculture (link below).

- Dave Fischer interview: http://www.bing.com/videos/watch/video/were-very-confident-in-our-research/67h5912

We at Bayer CropScience are committed to responsible stewardship principles that result in minimal impact of our products on people, animals and our environment. If you would like additional information or wish not to receive these emails in the future, please don't hesitate to contact one of us or visit our bee health website at http://www.bayercropscience.us/our-commitment/bee-health .

Regards,

Allan Hovis
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Pat Kwiatkowski
Pat Kwiatkowski
Director State Regulatory Affairs and Documentation Services
Bayer CropScience LP
Telephone (919) 549 2480

Bayer CropScience

May 11, 2012

Bayer CropScience LP
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www.BayerCropScience.us

Last night NBC Nightly News broadcast a segment on honey bee health decline and the alleged link to neonicotinoid seed treatment products. The interview featured Dr. David Fischer, director of ecotoxicology for Bayer CropScience, who provided valuable information related to the safety of our products, particularly for honey bees.

In addition to the broadcast report, NBC posted a 3-minute interview online with Dr. Fischer discussing in depth our opinion on bees, their health, recent studies and the importance of seed treatments to agriculture. A positive takeaway from the interview was the need to work together to address the issues of bee health.

We ask you to consider sharing this link with your stakeholders who are interested in this topic as it sheds light on the discussion of honey bee health.

- Dave Fischer interview: http://www.bing.com/videos/watch/video/were-very-confident-in-our-research/67h5912

If you have a social tool (Twitter), you could share:

> More from the @**nbcnightlynews** segment on honey #bees & their importance to #ag: http://on.msnbc.com/JFoQvn

And if you need more information on Bayer's commitment to bee health in the US, visit

http://www.bayercropscience.us/our-commitment/bee-health.

If you have additional questions or concerns, please feel free to contact me.

Sincerely,

Iain Kelly, PhD
Head of the North American Bee Health
Bayer CropScience, LP
Iain.kelly@bayer.com

Proper Seed Treatment & Sustaining Bee Health

Minimizing Impact on the Environment and Beneficial Insects

In the event of suspected overexposure, call Bayer CropScience Product Emergency at 800-334-7577.

Bayer CropScience

Good Stewards for a Healthier World

Proper seed treatment and management of treated seed play an important role in sustaining our environment and maximizing the health of crops, our communities and your bottom line. That's why we strongly recommend responsible stewardship principles that result in minimal impact of neonicotinoid seed treatments on people, animals and our environment. Working side-by-side with growers and other stakeholders, we are committed to making sure our seed treatment solutions result in success for everyone involved.

Bee Health Is Beneficial

As our world population grows, so does the pressure to produce more food. Honey bees provide a vital benefit to agriculture through pollination of many food crops—a task only bees and a select few other insects can carry out.

That's why we all must support and collaborate with the agriculture, scientific and bee health communities to better understand the role of various pressures—including weather, disease and insecticides—on bee populations.

Bayer CropScience

Recommendations for Good Seed Treatment Management

As a grower, you play an important role in helping protect the health of our honey bee population as well. This guide provides recommendations for responsible stewardship practices and proper seed treatment management that can help you maximize the benefits to your operation by supporting bee health and ensure a healthy environment and abundant food supply for future generations.

Live by the Label

For seed handling best practices, follow label directions and recommendations. Additionally, these guidelines will help protect you and the environment:

- Do not use treated seed for human or animal consumption or for processing.
- Keep out of reach of children, livestock and wildlife.
- Store under appropriate conditions.
- Wear protective clothing and gloves when handling treated seed and cleaning equipment. Avoid contact with skin and respiratory tract.
- Do not reuse empty seed bags for purposes other than storing the original treated seed.
- Observe all plant-back intervals and grazing restrictions.

Preplanting

When preparing for planting, review this checklist:

- Eliminate or reduce flowering weeds in fields to be planted.
- When opening seed containers and when filling or emptying the planting equipment, avoid exposure to dust.
- Avoid adding excess dust from the bottom of the seed container to the planter.
- Follow planter manufacturer recommendations for use of talc or graphite (avoid using more than recommended).

Planting

When it's time for planting, consider these guidelines:

- Minimize off-site movement of dust from treated seeds during planting.
- Be aware of wind speed and direction, particularly in areas with flowering crops which could attract pollinators.
- To protect birds and mammals, treated seed must be incorporated into the soil at proper planting depth, in particular at row ends and field corners.

Storage, Disposal & Cleaning

After planting is completed, review this checklist:

- Ensure that any leftover treated seed is returned to the original containers and properly stored for future use.
- Do not reuse empty seed containers for purposes other than storing original treated seed.
- Dispose of empty bags or bulk seed boxes according to state or local regulations and container return policies.
- Clean planters and seed boxes away from sensitive environmental areas, especially those that are attractive to pollinators.
  - Use a broom or shop vacuum to minimize dust release.
  - If compressed air is used, take care to minimize dust drift.
- Dispose of unusable treated seed according to state or local regulations. Offer seed for ethanol conversion to a properly permitted facility if available.

Storage & Transport

Protect your treated seed by reviewing the following guidelines:

- Avoid mechanical damage to treated seed.
- Store under appropriate conditions. The storage area must:
  - Have sufficient lighting and ventilation.
  - Be dry and secure.
- Transport in a way that no seeds are spilled on the highway or ground.
- If a spill occurs, treated seed should be properly disposed of according to local regulations to prevent exposure to people or the environment.
- If you have questions, concerns, or a potential incident involving bees or bee health, please call 800-334-7577 at any time.

Bayer CropScience

GOVERNMENT AGENCIES

USDA Report Says Pesticide Residues Aren't a Food Safety Concern

BY **NEWS DESK** | MAY 26, 2012

After testing 12,845 samples of fresh produce and other foods, the U.S. Department of Agriculture once again says pesticide residues are not a safety issue.

That's according to the latest Pesticide Data Program Annual Summary released Friday by USDA's Agricultural Marketing Service. The report details the analysis of samples collected in 2010. The data program has been ongoing since 1991.

The conclusion: as in other years, overall pesticide residues found on the foods tested well below the tolerances levels set by the Environmental Protection Agency.

Only 0.25 percent of samples -- fresh and processed fruit and vegetables, meat and poultry, grains, eggs, catfish, rice, specialty products, and treated and untreated drinking water -- tested at levels exceeding EPA tolerances, according to the news release announcing the report.

No residues were found that exceeded tolerance levels for baby food (baby food was included for the first time in this report) and the EPA took some credit for that, issuing this statement: "The data confirms EPA's success in phasing- out pesticides used in children's food for safer pesticides and pest control techniques. The very small amounts of pesticide residues found in the baby food samples were well below levels that are harmful to children."

The report's release is sure to renew the long-standing debate between the Environmental Working Group, which uses information in the annual report to create its Shopper's Guide to Pesticides in Produce -- particularly its "Dirty Dozen" list -- and the produce industry group Alliance for Food and Farming. The alliance worries that the Dirty Dozen lists dissuade people from buying conventionally grown fruit and vegetables.

The USDA, for its part, said the "age-old advice remains the same: eat more fruits and vegetables and wash them before you do so. Health and nutrition experts encourage the consumption of fruits and vegetables in every meal as part of a healthy diet."

The full report, along with an explanatory guide, can be found here.

More Headlines from Government Agencies »

Tags: fruits and vegetables, pesticide residues, USDA

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Janet
05/26/2012

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Water systems to collect in settlement

By Jim Suhr
Associated Press Saturday May 26, 2012 9:21 AM

GEORGIOS KEFALAS | AP FILE PHOTO/KEYSTONE

Swiss chemical maker Syngenta is offering $105 million to settle a U.S. lawsuit over one of its herbicides entering water supplies.

EAST ST. LOUIS, Ill. — An agreement by a Swiss chemicals maker to pay $105 million to settle a lawsuit over its popular agricultural herbicide could help reimburse nearly 2,000 community water systems that have had to filter the chemical from drinking water, one of the plaintiffs' attorneys said yesterday.

The proposed deal, filed on Thursday and announced yesterday by the company, Syngenta, needs the approval of a federal judge in Illinois, where community water systems in Ohio and at least five other states have sought to have the company reimburse them for filtering weed-killing atrazine from their supplies.

As part of the deal, 1,887 community water systems serving more than 52 million Americans might be eligible to make a claim, said Stephen Tillery, the St. Louis attorney behind the class-action lawsuit.

The costs of filtering for atrazine led three Ohio communities — Monroeville, Upper Sandusky and Ottawa — to join with 16 other Midwestern towns in the lawsuit, which was filed in March against Syngenta. The plaintiffs include the Ohio division of the American Water Co.

American Water provides water to customers in 14 Ohio communities, including seven townships in Franklin County and the cities of Ashtabula, Mansfield and Marion.

Yesterday, Syngenta said it agreed to settle the matter “to end the business uncertainty” and avoid further legal costs. Under the settlement, the company will continue to sell atrazine to U.S. corn growers and denies any liability linked to the chemical, which Syngenta said is used in more than 60 countries and has been marketed in the U.S. since 1959.

“This settlement is good for Syngenta and the farmers who depend on atrazine, as well as Syngenta’s retailers, distributors, partners and others who have been inconvenienced by this ongoing and burdensome litigation for almost eight years,” Syngenta said, referring to state litigation as well.

Research has shown that runoff after rainstorms can wash the chemical — used for decades to kill grasses and broadleaf weeds — into streams and rivers, where it can enter drinking-water supplies.

The lawsuit claimed that atrazine in drinking water can cause low birth weights, birth defects and reproductive problems. The company has argued that no one has been or ever could be exposed to enough atrazine in water to harm his health.

The sums that eligible water systems may recover will depend on the levels and frequency of atrazine contamination they experienced, and on the number of people they serve, Tillery said. About 300 water systems with the highest contamination levels will be reimbursed for all their costs, he said.

Under the tentative deal, attorneys representing the water systems will share roughly $34.9 m illion in fees.

The federal suit includes water providers in Illinois, Missouri, Kansas, Indiana and Iowa as well as Ohio.

UC San Diego News Center

May 23, 2012 | By Kim McDonald

Science and Engineering

Commonly Used Pesticide Turns Honey Bees into 'Picky Eaters'

Biologists at UC San Diego have discovered that a small dose of a commonly used crop pesticide turns honey bees into "picky eaters" and affects their ability to recruit their nestmates to otherwise good sources of food.

Credit: James Nieh

The results of their experiments, detailed in this week's issue of the *Journal of Experimental Biology*, have implications for what pesticides should be applied to bee-pollinated crops and shed light on one of the main culprits suspected to be behind the recent declines in honey bee colonies.

Since 2006, beekeepers in North America and Europe have lost about one-third of their managed bee colonies each year due to "colony collapse disorder." While the exact cause is unknown, researchers believe pesticides have contributed to this decline. One group of crop pesticides, called "neonicotinoids," has received particular attention from beekeepers and researchers.

The UC San Diego biologists focused their study on a specific neonicotinoid known as "imidacloprid," which has been banned for use in certain crops in some European countries and is being increasingly scrutinized in the United States.

"In 2006, it was the sixth most commonly used pesticide in California and is sold for agricultural and home garden use," said James Nieh, a professor of biology at UC San Diego who headed the research project with graduate student Daren Eiri, the first author of the study. "It is known to affect bee learning and memory."

The two biologists found in their experiments that honey bees treated with a small, single dose of imidacloprid, comparable to what they would receive in nectar, became "picky eaters."

"In other words, the bees preferred to only feed on sweeter nectar and refused nectars of lower sweetness that they would normally feed on and that would have provided important sustenance for the colony," said Eiri. "In addition, bees typically recruit their nestmates to good food with waggle dances, and we discovered that the treated bees also danced less."

Using an ascending range of sugar water from 0 to 50 percent, the researchers touched the antennae of each bee to see if it

The two researchers point out that honey bees that prefer only very sweet foods can dramatically reduce the amount of resources brought back to the colony. Further reductions in their food stores can occur when bees no longer communicate to their kin the location of the food source.

"Exposure to amounts of pesticide formerly considered safe may negatively affect the health of honey bee colonies," said Nieh.

To test how the preference of sugary sources changed due to imidacloprid, the scientists individually harnessed the bees so only their heads could move. By stimulating the bees' antennae with sugar water, the researchers were able to determine at what concentrations the sugar water was rewarding enough to feed on. Using an ascending range of sugar water from 0 to 50 percent, the researchers touched the antennae of each bee to see if it extended its mouthparts. Bees that were treated with imidacloprid were less willing to feed on low concentrations of sugar water than those that were not treated.

The biologists also observed how the pesticide affected the bees' communication system. Bees communicate to each other the location of a food source by performing waggle dances. The number of waggle dances performed indicates the attractiveness of the reward and corresponds to the number of nestmates recruited to good food.

"Remarkably, bees that fed on the pesticide reduced the number of their waggle dances between fourfold and tenfold," said Eiri. "And in some cases, the affected bees stopped dancing completely."

The two scientists said their discoveries not only have implications for how pesticides are applied and used in bee-pollinated crops, but provide an additional chemical tool that can be used by other researchers studying the neural control of honey bee behavior.

The study was funded by the North American Pollinator Protection Campaign and the National Science Foundation.

extended its mouthparts. Credit: Daren Eiri

Media Contact
Kim McDonald, 858-534-7572, kmcdonald@ucsd.edu

The Salt

The Secret Life Of California's World-Class Strawberries

03:21 pm

May 17, 2012

by DAN CHARLES

iStockphoto.com

May is the month we see strawberries explode in the market. There are strawberry festivals in every corner of the nation celebrating the juicy ruby beauties, and Strawberry Queens crowned galore. Those traditional harvest time festivals make us think our strawberries are mostly grown on the farm just down the road.

But in fact, one state — California — supplies 80 percent of America's strawberries, and the percentage is growing.

The reason? California's fields are stunningly productive. They yield ten times more strawberries, per acre, than strawberry farms in Michigan; twenty times more than farms in the state of New York. And there's a complex web of reasons why.

It's a miracle of agricultural technology. But that technology is not as universally loved as the fruit.

It starts with the plants themselves. That strawberry you just bought at the supermarket traces its ancestry to a microscopic particle of plant tissue that somebody cut from the tip of a growing strawberry stem five years ago.

That tiny bit of strawberry stem went into a little glass petri dish and grew into a new plant. Then it sent out dozens of little daughter plants called "runners."

courtesy California Strawberry Commission

Strawberry research fields in Watsonville, Calif.

"Those runners are basically clones of the mother," explains Daren Gee, owner of Daren's Berries in Santa Maria, California, whom I caught in the middle of his peak harvest time. "And then they plant those, and take the daughters off of that one, and do it again and again and again."

The whole process takes years. The plants are multiplied first in carefully controlled greenhouses; then in fields in the heat of California's Central Valley. Finally, the plants are trucked up into the mountains along the California-Oregon border. It's cold up there, which is crucial. Somehow the cold gets these plants primed for maximum production.

"And then they'll dig up these mother plants, and all the daughters, and they'll throw the mothers away and they'll send me the daughters," says Gee. It's those daughters that produce California's monster strawberry crop.

And all along this chain of clones, from petri dish to final harvest, people are working obsessively, even fanatically, to protect these plants from disease.

Because California's strawberry growers don't want to take any risk that their crop will fail. They have too much money invested — especially in prime growing areas along the coast where land is most expensive. (That's because humans and strawberries are competitors. We both are drawn to a climate with mild days and cool nights.)

So every year, a month before planting time, fumigation machines move slowly across California's strawberry fields. They inject chemicals into the soil and seal the fumes into the soil with sheets of plastic.

The chemicals kill practically everything in the soil: Insects, weeds, and fungi like the fungus that strawberry grower Daren Gee has been fighting this year. That particular disease is called Fusarium Wilt.

"Fusarium Wilt is like the Great White Shark of the soil," says Gee. "It's floating around in there, and then it just gobbles up your plants."

Why Are Strawberries Getting Bigger And Blander?

All Things Considered host Melissa Block asked Marvin Pritts, a horticulture

professor at Cornell University, about why it's happening.

Why the diminishing flavor?
"Over the last 100 or so years, people have been breeding strawberries for various important traits — size and yield ... maybe color, disease and insect resistance, flavor. And as you select and try to improve one, oftentimes one of the others has to be sacrificed slightly to make progress."

Is the bright red color natural?
"There's nothing chemically-induced, but a strawberry that's not quite fully red will turn red, even after sitting on the shelf. And that's why the color is sometimes deceiving; it doesn't necessarily mean it's fully ripe and fully flavorful."

Why are they so big?
"Americans just naturally think bigger is better. And the other factor, particularly with smaller-sized fruit like strawberries, is because of the labor situation being so expensive and difficult to obtain, it's a lot faster to pick a flat of strawberries when the strawberries are large, than it is when the strawberries are small."

— Listen to the whole interview here.

Organic strawberry growers don't fumigate. They stay a step ahead of diseases by moving from field to field. This also means that they only get to grow strawberries on a particular field once every three to five years, or sometimes even longer. Yet even California's organic strawberry growers buy their plants from nurseries that do use fumigation. Nobody wants to run the risk of bringing diseased plants into their fields.

This technology has done wonders for strawberry production. But it's under attack. And it may have to change.

The most powerful fumigant — methyl bromide — is supposed to be phased out gradually because it can eat away at Earth's ozone layer. It's still used under a "critical use exemption" that the Environmental Protection Agency has obtained each year.

Also, regulators are telling growers to move their fields and their fumes further away from homes and schools. Lea Brooks, a spokesperson for California's Department of Pesticide Regulation, says that's squeezing the strawberry fields. "People are moving closer to farmland, and hence the conflicts," she says. "It's important to find alternatives to fumigants because in the future there will be additional restrictions, not less."

Brooks and I are inspecting some of those possible alternatives in a research field that the California Strawberry Commission has set up near Watsonville, California.

Dan Legard, the commission's Director of Research and Education, is in charge of this work. "As you look at the field, it looks like a regular strawberry field. You don't see any difference," he points out.

This field has the same raised beds covered with black plastic, with strawberry plants poking out of holes in the plastic.

What you can't see, though, is the fact that these plants aren't actually rooted in soil at all. They're growing in a foot-wide trough that's been pressed into the top of each bed, lined with fabric, and filled with peat or something called coconut coir — the fibers from the outside of a coconut.

Legard walks over to one bed and pulls out a handful of coconut coir. It's black and sponge-like, a little bit like peat.

It mimics soil's ability to hold water, but it's not soil. Which is the point. There aren't any frightening fungi in there, so there's no need for fumigants drive those pathogens away.

There are other approaches as well. Some have used the heat of the sun to sterilize the soil. Others are experimenting with mixing ground-up seeds of canola plants into the soil. Those seeds release a chemical that suppresses harmful fungi for a while.

But commercial strawberry growers are skeptical about all of these methods. The ones that work reliably — like growing plants in coconut coir — are really expensive, and the ones that are cheap sometimes fail.

"It may work four out of five times, and that looks great to a researcher," says Dan Legard. "But that means twenty percent of the growers fail. And no grower's going to take that twenty percent chance when he's investing a million dollars."

So for now, most of California's strawberry growers are sticking with the chemicals. It's been a key to their success in producing more strawberries, for a lower cost, than anywhere else in the world.

Tags: fumigants, strawberries, agriculture

Ineffectiveness of Over-the-Counter Total-Release Foggers Against the Bed Bug (Heteroptera: Cimicidae)

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ABSTRACT Field-collected bed bugs (*Cimex lectularius* L.) showed little, if any, adverse effects after 2-h direct exposure to the aerosolized pyrethroid(s) from three over-the-counter total-release foggers ('bug bombs' or 'foggers'); Hotshot Bedbug and Flea Fogger, Spectracide Bug Stop Indoor Fogger, and Eliminator Indoor Fogger. One field-collected population, EPM, was an exception in that there was significant mortality at 5–7 d when bugs out in the open had been exposed to the Spectracide Fogger; mortality was low when these bugs had access to an optional harborage, a situation observed for all field-collected populations when exposed to the three foggers. Even the Harlan strain, the long-term laboratory population that is susceptible to pyrethroids and that served as an internal control in these experiments, was unaffected if the bugs were covered by a thin cloth layer that provided harborage. In residences and other settings, the majority of bed bugs hide in protected sites where they will not be directly contracted by the insecticide mist from foggers. This study provides the first scientific data supporting the position that total-release foggers should not be recommended for control of bed bugs, because 1) many field-collected bed bugs are resistant to pyrethroids, and they are not affected by brief exposure to low concentrations of pyrethrins and/or pyrethroids provided by foggers; and 2) there is minimal, if any, insecticide penetration into typical bed bug harborage sites. This study provides strong evidence that Hotshot Bedbug and Flea Fogger, Spectracide Bug Stop Indoor Fogger, and Eliminator Indoor Fogger were ineffective as bed bug control agents.

KEY WORDS bug bomb, *Cimex lectularius*, fogger, pyrethroid, resistance

During the past decade, bed bugs (*Cimex* spp.) have become increasingly commonplace worldwide (Harlan et al. 2008). The bed bug, *Cimex lectularius* L., is adapted for temperate climates and is the dominant species in the United States, whereas the tropical bed bug, *Cimex hemipterus* (F.), is adapted for semitropical to tropical climates (Usinger 1966). Bed bugs are temporary ectoparasites that feed exclusively on blood from humans and other warm-blooded animals. Bed bugs are recognized at the federal level as public health pests (EPA 2002, CDC and EPA 2010). They are largely nocturnal and spend most of their time hiding in cracks and crevices (Usinger 1966, Romero et al. 2010, Reis and Miller 2011).

Pyrethroid resistance is well documented and widespread in field-collected bed bugs and has been implicated in the resurgence and challenge of bed bug control (Romero et al. 2007, Zhu et al. 2010, Bai et al. 2011). Additionally, the re-emergence of bed bugs as human pests is associated with factors such as increased international travel and commerce, changes in pesticide availability and pest management practices, and the public's lack of awareness of bed bugs and the ease in which they are spread (Hwang et al. 2005, Eddy and Jones 2011).

A dramatic increase in consumer products marketed for bed bug control has accompanied the bed bug resurgence. Over-the-counter (OTC) total-release foggers, commonly known as 'bug bombs' or 'foggers,' are marketed as consumer products for the control of many types of crawling and flying household insects. Decades ago, annual sales of foggers amounted to more than one per household (Greenberg 1963). The most recent estimate from the U.S. Environmental Protection Agency (EPA) is that ≈50 million foggers are used annually (http://epa.gov/oppfead1/cb/csb_page/updates/2010/new-foggers.html). Foggers often are used by consumers as a low-cost alternative to professional pest control services; they typically are easy to use and require little effort.

Most foggers contain pyrethrins, pyrethroids, or both, as active ingredients. Foggers act by broadcasting an insecticide mist by way of an aerosol propellant. The directions typically indicate that the can is to be shaken well and positioned on a table or stand in the center of the room then activated by depressing or removing a tab at the top center of the can; people and pets are to vacate the area during the treatment period, usually 2 h. The can's contents are entirely de-

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pleted as aerosol insecticide droplets are rapidly released upwards into the airspace, where they remain suspended then gradually settle onto exposed surfaces.

Foggers generally are not recommended for control of household pests because of concerns that 1) there is minimal insecticide penetration into pest harborage sites, which renders them ineffective as control agents; 2) the broadcast insecticide application leaves pesticide residues on exposed surfaces and objects; and 3) the aerosol propellants may be highly flammable, capable of causing fires and explosions (Potter 1999). Foggers have been implicated in human injury and illnesses, often because of misuse of the products by consumers. The U.S. Centers for Disease Control and Prevention (CDC) reported a total of 466 cases of acute, pesticide-related illness or injury associated with exposure to total-release foggers in eight states between 2001 and 2006 (Wheeler et al. 2008). In terms of the severity of these cases, 80% were classified as low, 18% were moderate, and 2% were high; health effects typically were temporary and most commonly involved the respiratory system. Additionally, the Washington State Department of Health classified the death of a female infant as "suspicious," because she was found dead the morning after her apartment had been treated with three foggers. Another CDC report highlighted illnesses associated with bed bug treatments in seven states between 2003 and 2010; one fatality was associated with multiple factors including misuse of two fogger products (Jacobson et al. 2011).

The most common factors contributing to insecticide exposure from foggers include inability or failure to vacate before discharge of the fogger, unintentional fogger discharge, premature re-entry, excessive number of foggers, and failure to notify others nearby (Wheeler et al. 2008). In an effort to minimize misuse caused by failure to follow label instructions, EPA has required manufacturers to make a number of labeling changes by 30 September 2011, to enhance clarity and draw increased attention to critical information (http://epa.gov/oppfead1/cb/csb_page/updates/2010/new-foggers.html).

The few available peer review publications regarding the efficacy of foggers pertain to the German cockroach, *Blattella germanica* (L.), (Moore 1977, Kardatzke et al. 1982, Ballard et al. 1984) and the cat flea, *Ctenocephalides felis* (Bouché) (Osbrink et al. 1986). There are no published data regarding the efficacy of foggers against bed bugs. In this study, we evaluated three foggers against recently field-collected populations of bed bugs as well as a long-term laboratory strain to gain insights into the efficacy of these OTC products.

Materials and Methods

Insects. Five bed bug populations (EPM, King, Kingry, Marcia, and Pointe) were collected between July 2010 and March 2011 from residences in Columbus, OH, and they subsequently were maintained under ambient conditions in the laboratory (22 ± 2°C, 40 ± 15% RH). In addition, the Harlan strain, which is a pyrethroid-susceptible population (Zhu et al. 2010) initially collected in 1973 from Ft. Dix, NJ, and laboratory reared thereafter with no known insecticide exposure, was used as an internal control. Each bed bug population was housed in a glass jar (13 cm high × 7 cm dia; narrow-mouth Mason pint jar, Ball Corp., Broomfield, CO) containing filter paper strips for harborage, with an organza fabric and filter paper covering held in place with a screw-on metal ring.

Bed bugs were reared in situ on a diet of warmed sodium-heparinized chicken blood using the Hemotek 5W1 system (Discovery Workshops, Accrington, England) with Parafilm as the membrane. Approximately every 7–14 d, each bed bug population was offered a bloodmeal until a majority of the bugs were replete.

Study Site. All experiments were conducted in three rooms in a vacant office building on the Ohio State University campus, Columbus, OH. In each of the test rooms, 6 mil plastic sheeting (Blue Hawk, Grand Prairie, TX) was installed to cover the drop ceiling, outlets, and vents to prevent dispersion of the insecticide into adjacent areas. The volume of the two treatment rooms was 32.5 m^3 (1,190 ft^3) and 35.0 m^3 (1,280 ft^3), and the control room was 36.3 m^3 (1,330 ft^3).

Foggers. Three OTC indoor foggers, all obtained from a nationwide retailer, and all from United Industries Corp., St Louis, MO, were evaluated: Hotshot Bedbug and Flea Fogger (0.05% pyrethrins, 0.1% esfenvalerate, 0.1% piperonyl butoxide, 0.167% MGK 264, 0.1% nylar) (Spectrum Group, St. Louis, MO), Spectracide Bug Stop Indoor Fogger (0.1% tetramethrin, 0.6% cypermethrin) (Spectrum Group), and Eliminator Indoor Fogger (0.515% cypermethrin) (Chemisco, St. Louis, MO). A can of each fogger treats 54.6 m^3 (2,000 ft^3) of unobstructed area. Only Hotshot Fogger is specifically labeled for use against bed bugs; the other two foggers are labeled for use against flying and crawling pests in homes. However, the latter two products can be used against bed bugs in many states, whose regulatory requirements are that only the site (e.g., indoors) has to be specified by the label, not the particular pest.

Experimental Units. Test arenas consisted of petri dishes (100 × 15 mm; Fisherbrand, Pittsburgh, PA) or cylindrical plastic containers (50 × 37 mm; Pioneer Plastics Inc., North Dixon, KY) whose sides had been coated with Fluon (Insect-a-Slip Insect Barrier, Bio-Quip Products, Rancho Dominguez, CA) to prevent bed bug escape. After arenas were provisioned with bed bugs, replicates then were randomly distributed inside a 114-cm dia wading pool (General Foam Plastic Corp., Norfolk, VA) whose inner walls also had been coated with Fluon. Two pools were prepared per room so that two exposure conditions could be simultaneously evaluated for each fogger or its control. A fogger can was positioned on a crate between the two pools such that it was ≈30 cm above the floor and ≈30 cm from each pool edge. As specified by the directions, the fogger was activated for a 2-h treatment period, then the room was opened and allowed to ventilate for

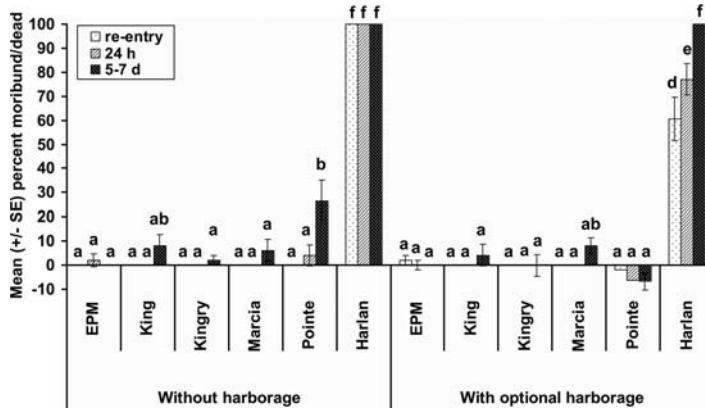

Fig. 1. Cumulative percentage corrected mortality (average ± SE) at re-entry (30 min), 24 h, and 5–7 d for bed bugs from six populations exposed to Hotshot Fogger in either an open petri dish or one containing a piece of paper that served as an optional harborage ($N = 10$ replicates per mean [5 replicates consisting of 5 mixed-sex adults and 5 consisting of 5 mixed-stage nymphs]). Bars with different letters are significantly different based on Tukey's HSD test ($P < 0.05$).

30 min. A control room was similarly configured but without the fogger.

The condition of bed bugs was assessed upon re-entry (30 min) and then again at 24 h and 5–7 d. Bed bugs were examined using a dissecting microscope as necessary. Each bug's condition was assessed based on its behavioral response when probed:

- Healthy: The bed bug moves quickly and in a coordinated manner to avoid stimulus.
- Sluggish: reacts slowly, but makes coordinated movements to avoid stimulus.
- Ataxic: unable to coordinate movements to avoid the stimulus. Ataxic bugs can right themselves after falling.
- Moribund: incapable of locomotion and exhibiting movement only of appendages or other body parts.
- Dead: no movement whatsoever.

Direct Exposure Versus Optional Harborage Experiments. All three foggers were evaluated against bed bugs in these bioassays. Bed bugs were either directly exposed in open, unprovisioned petri dishes, or they were placed in petri dishes provisioned with a 80 mm dia filter paper disc (Whatman no. 1, Whatman International Ltd., Maidstone, England) that bed bugs could hide underneath (optional harborage). The Hotshot Fogger was evaluated against all six populations of bed bugs, and both the Spectracide Fogger and Eliminator Fogger were evaluated against three bed bug populations (EPM, Marcia, and Harlan). For the Hotshot Fogger, 10 replicates, 5 consisting of 5 mixed-sex adults and 5 consisting of 5 mixed-stage nymphs, were established for each of 24 treatments: 6 bed bug populations × 2 harborage conditions × 2 treatments (fogger and control). Hence, a total of 1,200 bed bugs was used in this set of bioassays to evaluate the Hotshot Fogger. For both the Spectracide Fogger and the Eliminator Fogger, 10 replicates were similarly established for each of 12 treatment combinations (3 populations × 2 harborage conditions × fogger and control), providing a total of 600 bed bugs per product.

Direct Exposure Versus Forced Harborage Experiments. Only the Hotshot Fogger was evaluated in these bioassays, and two test conditions were compared. In direct exposure tests, each cylindrical plastic container with bed bugs was kept uncovered; in forced harborage tests, each container was covered with a single layer of light-weight cotton broadcloth fabric (Joann Fabrics, Columbus, OH) held in place by a rubber band. Two bed bug populations (EPM and Harlan) were exposed to the Hotshot Fogger; 10 replicates (5 consisting of 10 mixed-sex adults and 5 consisting of 10 mixed-stage nymphs) were established for each of eight treatment combinations (2 populations × 2 harborage conditions × fogger and control). Hence, 800 bed bugs in total were used in this set of bioassays.

Data Analysis. The numbers of moribund plus dead bed bugs were pooled for analysis of bed bug mortality. Treatment data were corrected for control mortality using Abbot's formula (Abbott 1925). Adults and nymphs were combined for analysis. Data were subjected to a repeated-measures analysis of variance (ANOVA) using Statistica 6.1 (StatSoft Inc. 2002), with observation time as the repeated-measures factor and population and harborage as categorical predictor variables. Tukey's honestly significant difference (HSD) test was used for post hoc comparison of means for significant main effects and interaction effects. When overall mean control mortality at an observation time exceeded 15%, all data for that observation were considered unreliable and were not analyzed.

Results

Hotshot Fogger. *Optional Harborage.* All five field-collected bed bug populations showed little, if any, adverse effects after 2 h of direct exposure to aerosolized pyrethroids from the Hotshot Fogger (Fig. 1). Significantly high mortality was observed consistently only for the Harlan strain, the long-term laboratory population that is susceptible to pyrethroids and that

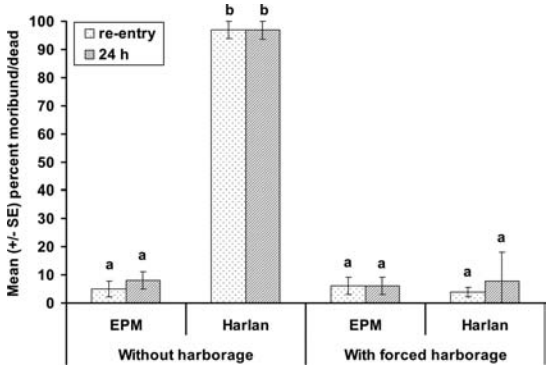

Fig. 2. Cumulative percentage corrected mortality (average ± SE) at re-entry and 24 h for bed bugs from two populations exposed to Hotshot Fogger either in an open container or in a forced harborage wherein each container was covered with thin cotton fabric ($N = 10$ replicates per mean [5 replicates consisting of 10 mixed-sex adults and 5 consisting of 10 mixed-stage nymphs]). Bars with different letters are significantly different based on Tukey's HSD test ($P < 0.05$).

served as an internal control in these experiments. When Harlan bed bugs were directly exposed in open containers, all bugs were moribund or dead at re-entry, but when this population was provided an optional harborage, mortality was significantly lower at re-entry but progressed over time (Fig. 1).

Population ($F = 625.31$; df = 5, 108; $P < 0.001$), harborage ($F = 28.38$; df = 1, 108; $P < 0.001$), and observation time ($F = 22.23$; df = 2, 216; $P < 0.001$) were significant main effects. The full interaction effect (population × harborage × observation time) was significant ($F = 8.19$; df = 10, 216; $P < 0.001$) primarily because of high, but variable, mortality in the susceptible Harlan strain (Fig. 1); field-collected bed bug strains typically exhibited low mortality regardless of observation time. When Harlan bed bugs were directly exposed in open containers, 100% mortality was evident at re-entry, but when they were provided an optional harborage, mortality was time dependent, with 62% mortality at re-entry, 78% at 24 h, and 100% at 5–7 d. In all other treatment and control groups, mortality averaged 2.1% and was nonsignificant, with two exceptions (at 5–7d, Pointe bugs without a harborage exhibited 28% mortality after exposure to the fogger and Harlan control bugs without a harborage had 24% mortality).

Forced Harborage. Figure 2 shows that the field-collected EPM population was unaffected by the Hotshot Fogger regardless of whether bugs were directly exposed or inside a harborage, but more importantly, the susceptible Harlan strain was unaffected if the bugs were covered by a thin cloth layer that provided harborage. The main effects of population ($F = 156.34$; df = 1, 36; $P < 0.001$) and harborage ($F = 166.66$; df = 1, 364; $P < 0.001$) were significant, but observation time (re-entry and 24 h) ($F = 0.36$; df = 1, 36; $P = 0.55$) was not. Because of high control mortality (16.5%), data for the 5–7 d observation were excluded from analysis. The two-way interaction, population × harborage, was significant ($F = 157.83$; df = 1, 36; $P < 0.001$) because only Harlan bugs exposed to the Hotshot Fogger without a harborage experienced significantly higher average mortality (97%) than controls (2.4%) and the EPM bugs (7.5%).

Spectracide Fogger. *Optional Harborage.* When exposed to the Spectracide Fogger, the mortality trend among populations was Harlan > EPM > Marcia (Fig. 3). The main effects of population ($F = 307.2$; df = 2, 54, $P < 0.001$), harborage ($F = 13.72$; df = 1, 54; $P < 0.001$), and observation time ($F = 30.10$; df = 2, 108; $P < 0.001$) were significant (Fig. 3).

The three-way interaction of population × harborage × observation ($F = 11.15$; df = 4, 108; $P < 0.001$) was significant, because at re-entry, Harlan bed bugs experienced significantly higher mortality in open dishes (100%) than when they had access to a harborage (69%); mean mortality further increased to

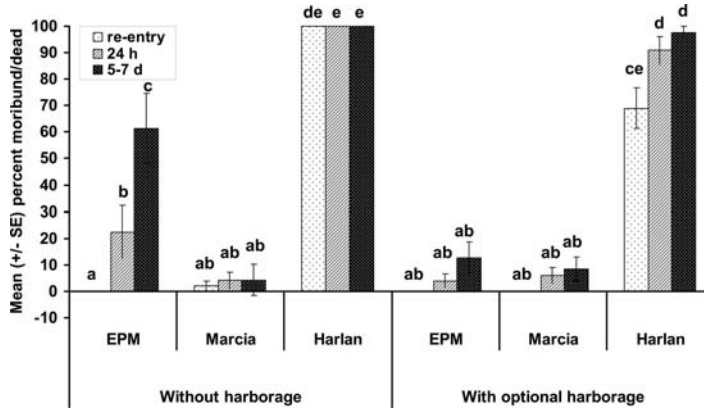

Fig. 3. Cumulative percentage corrected mortality (average ± SE) of bed bugs from three populations exposed to Spectracide Fogger in either an open petri dish or one containing a piece of paper that served as an optional harborage when observed at re-entry, 24 h, and 5–7 d ($N = 10$ replicates per mean [5 replicates consisting of 5 mixed-sex adults and 5 consisting of 5 mixed-stage nymphs]). Bars with different letters are significantly different based on Tukey's HSD test ($P < 0.05$).

91% at 24 h and to 98% at 5–7 d. Additionally, EPM bugs in open dishes had a significant increase in mortality from 0% (re-entry) to 24% (24 h) to 66% (5–7 d). However, when EPM bugs had access to a harborage, their mortality was very low, equivalent to controls.

Eliminator Fogger. *Optional Harborage.* In bioassays with the Eliminator Fogger, the paper harborage curled, resulting in partial or complete escape of bed bugs in some replicates, and thus harborage could not be evaluated as a main effect. Additionally, control mortality at 5–7 d was quite high (37.8%); hence, this observation time was omitted from analysis.

Bed bugs from two field-collected populations, EPM and Marcia, exhibited no significant adverse effects at re-entry and 24 h after being exposed in open containers to the Eliminator Fogger. Overall mortality was quite low for controls (6%) as well as for Marcia (8%) and EPM (3%) exposed to the fogger. Significantly high mortality was observed only for the susceptible Harlan strain. The main effect of population ($F = 564.5$; df = 2, 27; $P < 0.001$) was significant and affected bed bug mortality whereas observation time did not (re-entry and 24 h) ($F = 1.7$; df = 1, 27; $P = 0.2$). The population × observation interaction was significant ($F = 7.2$; df = 2, 27; $P = 0.003$) because Marcia mortality was significantly lower at re-entry (2%) than at 24 h (14%) whereas EPM was similar at re-entry (2%) and 24 h (8%). In contrast, the long-term laboratory population, Harlan, had consistently high mortality at re-entry (100%) and 24 h (100%).

Discussion

Field-collected bed bugs typically were not affected by direct exposure for 2 h to the aerosolized pyrethroid(s) emanating from any of the three total-release foggers (Figs. 1–3), with the exception of EPM, which experienced significantly high mortality at 5–7 d when bugs out in the open had been exposed to the Spectracide Fogger but not when these bugs had access to a harborage (Fig. 3). In contrast, the Harlan strain, the long-term laboratory population that is susceptible to pyrethroids, experienced significantly high mortality when directly exposed to any of the three foggers (Figs. 1–3). Hence, pyrethroid resistance appears to play a role in the foggers' failure to kill bed bugs.

Subsequent genotyping of bed bugs used in our study indicated that all five field-collected populations possessed both known kdr mutations for pyrethroid resistance, V419L and L925I (A.T.H., S.C.J., J.L.B., and O. M. unpublished data), but the Harlan strain possessed none, which is in agreement with the findings of Zhu et al. (2010). The dual compliment of kdr mutations is the most commonly encountered bed bug haplotype in Ohio (A.T.H., S.C.J., J.L.B., and O. M. unpublished data), and it appears to be very prevalent in Ohio as well as throughout much of the United States (Zhu et al. 2010). Furthermore, it is highly unlikely that any field population would be as susceptible as the Harlan strain. Because resistance is widespread in field-collected bed bug populations (Romero et al. 2007, Zhu et al. 2010, Bai et al. 2011), it is likely that pyrethrin- and pyrethroid-based foggers will have little, if any, impact on modern-day bed bug infestations. Note also that Hotshot Fogger was ineffective against field-collected bed bugs despite the presence of piperonyl butoxide, an insecticide synergist that has been shown to somewhat improve product efficacy in pyrethroid-resistant bed bugs (Romero et al. 2009a).

A very important finding was that a forced harborage negated any fogger effects on the susceptible Harlan strain (Fig. 2). Furthermore, having access to a paper harborage resulted in delayed mortality in pyrethroid-susceptible Harlan bugs (Figs. 1 and 3) and significantly reduced mortality for EPM bugs exposed to Spectracide (Fig. 3). Hence, our research supports the view that total-release foggers lack the ability to penetrate into typical harborages used by many household insects, therefore rendering these products ineffective as control agents. Our findings provide support for Osbrink's et al. (1986) suggestion that reduced mortality of cat fleas on disks of carpet versus filter paper was likely because of the carpet providing a refuge for cat fleas to avoid the mist from foggers.

In residences and other settings, the majority of bed bugs hide in protected sites during photophase. Reis and Miller (2011) observed that ≥80% of bed bugs remain in harborages during the day regardless of their feeding status. They found that unfed, rather than fed, bed bugs leave their harborages at night to search for a bloodmeal. It could be suggested that setting off foggers during nighttime rather than day, perhaps, would impact more bed bugs (e.g., hungry bugs searching for a host), but there would be no host cues to stimulate searching behavior because the area has to be vacated when the fogger is activated. The innate behavior of bed bugs to remain in tight, inaccessible harborages for a prolonged period of time has important implications for fogger efficacy against bed bug populations. Because of bed bugs' propensity for hiding sites, the majority of the population will not be directly contracted by the insecticide mist from total-release foggers, hence rendering these products ineffective.

Another serious concern is that fogging can actually acerbate problems with some insects. For example, German cockroaches prematurely released their oothecae, resulting in an increase in newly hatched nymphs, in response to fogging with pyrethrins (Kardatzke et al. 1982) or dichlorvos (Ballard et al. 1984). Furthermore, German cockroaches moved from fogged units to adjacent units in 50% of apartments, with increased catches of cockroaches the night after the fogger treatment (Ballard et al. 1984). In fact, pyrethroids, the active ingredients of foggers tested here, have been shown to increase locomotor activity of bed bugs upon contact with dry deposits (Romero et al. 2009b). This potential behavioral effect of foggers on bed bugs needs to be evaluated as it may increase the difficulties associated with bed bug control. Bed bugs are notoriously difficult to control in multi-unit buildings (Wang et al. 2009, Harlan et al.

2008, Eddy and Jones 2011), and any product that further disperses the bed bugs to adjacent units is of grave concern.

All three total-release foggers claim "kills on contact" yet all field-collected bed bugs were unaffected upon re-entry. Furthermore, 5–7 d later, most of these bugs remained unaffected, which suggests that these pyrethroid-based foggers lack delayed toxicity and have no long-term residual efficacy against field populations of bed bugs (Figs. 1 and 3).

The public is ill-served when products do not perform in accordance with labeling and use directions claims. The use of ineffective insecticide products means that people are wasting money, and they are delaying effective treatment of insect pests whose populations are ever increasing in their residence and likely spreading to others. Furthermore, insecticides are unnecessarily being introduced into the environment, and people (and insects) are being exposed to insecticide residues, while further reinforcing insecticide resistance in insects. Despite the widespread use of OTC foggers, there is only limited research on these products, and the data suggest that pyrethrin- and pyrethroid-based foggers are ineffective against diverse household insect pests. For example, Osbrink et al. (1986) found that foggers containing 0.5% pyrethrins failed to control cat fleas, but those containing an insect growth regulator (IGR) provided flea control for up to 60 d. Moore (1977) found that the least effective total-release aerosols for German cockroach control were 0.25% resmethrin-tetramethrin.

In conclusion, our study provides strong evidence that Hotshot Bedbug and Flea Fogger, Spectracide Bug Stop Indoor Fogger, and Eliminator Indoor Fogger were ineffective as bed bug control agents. The low concentrations of pyrethrins, pyrethroids, or both, and the brief exposure provided by these total-release foggers had little impact on modern-day bed bugs. Our data also support the position that currently marketed total-release foggers should not be recommended for treating bed bug infestations because these products provide no residual and they allow for minimal, if any, insecticide penetration into typical bed bug harborage sites.

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Lyme disease tick study stirs dispute

Maryland families not fully informed of pesticide risks, critics say

By Timothy B. Wheeler, The Baltimore Sun

11:01 AM EDT, May 29, 2012

Hundreds of Baltimore-area families have volunteered for a government study to spray their suburban yards with pesticide, which researchers hope can protect them from Lyme disease but that environmentalists warn is unsafe.

The goal, federal and state health officials say, is to find a new way to prevent the widespread illness, which is spread by tick bites and can cause fever, headaches and fatigue — and, if untreated, may even affect joints, nerves and the heart.

Half of the 185 families who've signed up this year in Baltimore, Carroll, Harford and Howard counties are having the edges of their yards sprayed with bifenthrin, a chemical pesticide commonly applied around homes to fight ticks, fleas and mosquitoes. The others, without knowing it, are getting their property sprayed with water so officials can judge the effectiveness of the treatment.

"The question is, does it actually prevent a common, sometimes severe disease — and second, what's the lowest dose you can do?" said Dr. Clifford S. Mitchell, assistant director for environmental health and food protection in the state Department of Health and Mental Hygiene.

Environmental activists, though, contend that the study itself is putting the families at risk. Adults and children alike are being exposed to a pesticide that is classified by the Environmental Protection Agency as a possible carcinogen, critics say, and that is being studied by the EPA for possible harm to reproductive and immune systems, among other things.

"It's improper to be conducting a human experiment like this," said Jay Feldman, executive director of Beyond Pesticides, a national group based in Washington. He and other activists contend federal and state health officials have not adequately informed volunteers about all the potential health risks.

The study, now in its second year, was underwritten by the U.S. Centers for Disease Control and Prevention. The pesticide also is being tested on yards in Connecticut and New York. Last year, 440 other Maryland families participated.

Lyme disease, so named because it was first reported in Lyme, Conn., is a bacterial illness transmitted when people are bitten by blacklegged ticks, more commonly known as deer ticks. It has become a major health concern in the Northeast and Mid-Atlantic, where a burgeoning population of deer have helped spread the disease beyond forests into suburbia.

There were 30,000 cases reported in 2010, according to the CDC, with the vast majority in those two regions. Maryland had 1,600 cases that year, well below the peak of more than 2,500 cases reported in 2007. But health officials believe that doctors often miss or don't report cases, and the actual number could be 10 times higher.

Many people living in the most affected states already have resorted to spraying their yards with pesticides to get rid of ticks, said Katherine Feldman, the state public health veterinarian. A survey in Connecticut found that 29 percent of homeowners contacted already pay a pest-control company to treat their properties, she said.

Health officials said it appears that a significant number of people do get bitten by infected ticks around their homes, not just when they go hiking through tall grass or a forest.

There's also evidence, they say, that the number of ticks in a yard can be reduced significantly by applying bifenthrin, a synthetic chemical similar to the natural insecticides produced by flowers like chrysanthemums.

"We know that pesticides are extraordinarily effective against ticks," Mitchell said. "We don't know if they result in a decrease in human disease."

Feldman, the state health veterinarian, said volunteers were recruited for the study by mailing fliers to residents in ZIP codes that have had a high incidence of Lyme disease.

The fliers sought single-family households with at least two people who were willing to have a "single, no-cost, commonly used pesticide application" to their yard and answer "short surveys" about ticks and their yards. For their trouble last year, they were offered $40 gift cards to a local grocery store, paid for by the CDC, according to the state veterinarian. The reward for this year's recruits has been scaled back to $25 gift cards.

Veronika Carella, who lives in western Howard County, was among those invited to participate last year. She said she was appalled because her two children, now in college, have been registered for years on the state's list of chemically sensitive people. Though their 3.5-acre yard has woods and five resident deer — and her elderly mother contracted Lyme disease, most likely elsewhere — Carella said she believes the disease can be prevented without resorting to pesticide use.

Carella and others contend that prospective volunteers weren't informed clearly enough about the potential long-term health risks from being exposed to the pesticide.

"When you get a prescription, you're told all the things that can happen to you, including perhaps dying," said Ruth Berlin, executive director of the Maryland Pesticide Network, a coalition that seeks to limit pesticide use. She said the basic message given to prospective volunteers was that the pesticide is safe, which she disputes.

An EPA analysis of bifenthrin notes that there were nearly 1,300 incidents involving the pesticide from 2002 to 2009, and that while most were of "low severity," it appeared that even low amounts of the chemical can cause skin and respiratory irritation and dizziness.

The agency classifies it as a possible carcinogen based on rat exposure studies. It also has listed bifenthrin among a group of pesticides to be tested for their potential to act as "endocrine disruptors," which may affect humans or wildlife, even at low doses.

Health officials point out that the pesticide is currently registered by the EPA for use in controlling ticks. Participants are advised not to walk in the sprayed area for 24 hours and to keep pets away. Since the chemical is highly toxic to aquatic life, they've ruled out testing it on any yard that's within 100 feet of water.

And they say the study, as well as the information given to volunteers, was approved by both state and federal agency institutional review boards, which are set up to safeguard people participating in research.

"I won't say they're not putting themselves at any risk, because I never say that about anything," Mitchell said. But he added, "I believe the risks have been adequately conveyed."

Dr. Robert S. Lawrence, director of the Johns Hopkins University's Center for a Livable Future, disagreed after reviewing the packet of information supplied to prospective volunteers. Lawrence said the fact-sheet should have spelled out more clearly that, while nothing's been proven, questions have been raised about the long-term safety and potential impact on humans of bifenthrin.

Preliminary results for all three states from the first year of the study indicate that the yards treated with pesticide had 62 percent fewer ticks overall than the "control" yards sprayed with water, according to officials.

But the people in the treated households reported finding just as many ticks on their bodies as the residents of untreated properties, and there were basically the same number of Lyme disease cases reported in both groups.

Federal and state health officials say that if after a second year and more analysis there's no difference in tick bites or infection among the two groups, then they'll advise the public that spraying yards with pesticide really doesn't help prevent Lyme disease. Mitchell said he, for one, sees a certain irony in that, given the criticism the study has received from pesticide opponents.

But critics say such an outcome — discouraging more pesticide use — would not justify the risks to which they believe the study has exposed human subjects.

"We have no idea if we've caused more harm than good," Carella said.

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An earlier version misstated the goals of the Maryland Pesticide Network. The Sun regrets the error.

Preventing Lyme disease:

•Apply tick repellants to skin or clothing

•After being outdoors, check your body for ticks

•Take a shower promptly to wash off any insects that haven't yet attached themselves

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White House Blocking EPA Efforts to Issue Rules on Nanomaterials, Advocates Say

Thursday, May 24, 2012

from Chemical Regulation Reporter ®

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By Patrick Ambrosio and Pat Rizzuto

The White House appears to be blocking Environmental Protection Agency efforts to tighten oversight of engineered nanoscale pesticides and other chemicals, according to environmental and safety advocates.

Richard Denison, a senior scientist with the Environmental Defense Fund, told BNA May 23 that he has spoken with EPA officials who have told him they do not expect any regulations for engineered nanoscale pesticides or chemicals to be approved by the White House Office of Management and Budget.

“My understanding is that there is a view in some circles in the White House that they do not want to stigmatize nanomaterials nor stifle the technology even by requiring the reporting of information that EPA needs to make judgments as to whether there are risks,” Denison said.

Jaydee Hanson, senior policy analyst at the Center for Food Safety, said he believes OMB will not approve the agency's preferred approach to collect data on nanoscale pesticide ingredients under Section 6(a)(2) of the Federal Insecticide, Fungicide, and Rodenticide Act.

“I am of the opinion that OMB has basically told the EPA, 'Don't bother' ” with a final rule, Hanson said.

Lynn Bergeson, an attorney with Bergeson and Campbell PC, told BNA she has heard that EPA's progress on an information collection policy for nanoscale pesticides has stalled. “That whole approach has died on the vine,” she said.

FIFRA Proposal.

Denison and Hanson referred to two rulemakings.

EPA published a proposed rule in June 2011 that would allow the agency to obtain information on engineered nanoscale pesticide ingredients under either Section 6(a)(2) of FIFRA or through data call-in notices authorized under Section 3(c)(2)(B) of FIFRA (35 CRR 588, 6/13/11).

In the proposal, EPA said it would prefer to collect information under Section 6(a)(2), which requires registrants to inform the agency of

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additional information related to “unreasonable adverse effects on the environment,” because it is “the most efficient and expedient administrative approach.”

Hanson said he has attempted to speak with OMB and EPA officials on the status of the rule, but has been unable to obtain any official comment on it.

Neither EPA nor OMB responded to requests May 23 for information on the status of the 2011 EPA proposal on nanoscale pesticide ingredients.

TSCA Proposal.

Denison also discussed a proposed rule EPA's Office of Pollution Prevention and Toxics has developed to obtain information on engineered nanoscale chemicals after it was unable to secure information through a voluntary program. In 2009, EPA said it would be developing regulations for engineered nanoscale chemicals because industry had failed to provide information voluntarily (33 CRR 355, 4/13/09).

OPPT submitted its regulatory proposal--which combined a data collection rule authorized by Section 8(a) of the Toxic Substances Control Act with a significant new use rule (SNUR) authorized by TSCA Section 5(a)(2) for engineered nanoscale chemicals--to OMB on Nov. 22, 2010 (36 CRR 409, 4/9/12).

That proposed rule has neither been approved nor withdrawn, and OMB has remained publicly silent on its position on the rulemaking.

OMB Said to Avoid 'Stigmatizing' New Technologies.

On March 11, 2011, OMB issued guidance to federal agencies that said, “regulation and oversight should avoid unjustifiably inhibiting innovation, stigmatizing new technologies, or creating trade barriers” (35 CRR 313, 3/21/11).

Subsequently, on June 9, 2011, the White House issued a memo encouraging federal agencies to base their decisions on nanomaterials using “the best available scientific evidence” (35 CRR 582, 6/13/11).

Denison said EPA has been trying to obtain such evidence, but its efforts have been blocked for years by some industry groups.

EPA May Move Ahead With Alternative Approach.

Hanson said EPA may move forward with an alternative approach of voluntarily asking registrants to submit data on nanoscale ingredients.

EPA has already requested additional data from the registrants of pesticide products containing nanosilver, according to Hanson.

Rosalind Volpe, executive director of the Silver Nanotechnology Working Group, an industry group, declined to comment on EPA's proposal to collect information on nanoscale ingredients in pesticides.

Hanson said voluntary data requests are unlikely to be successful because registrants are not under any legal obligation to respond.

He said businesses will be unlikely to “report on the problems of their chemical” if their competitors are not required to do the same. EPA's initial

approach, to gather information under Section 6(a)(2) of FIFRA, was better because all pesticide registrants would be on the "same playing field," Hanson said.

Denison also was skeptical of the effectiveness of any voluntary approach for pesticides, citing OPPT's failure to obtain information voluntarily.

Bergeson said she had not heard about a voluntary data call-in, but unless that is backed up with the regulation allowed under FIFRA Section 3(c)(2)(B), she is skeptical that EPA will obtain the information it is seeking.

Bergeson and the Nanobusiness Alliance, a trade association representing companies working with nanotechnologies, have consistently urged manufacturers to cooperate with EPA in its efforts to obtain information on engineered nanoscale materials to inform its regulations.

Group Weighing Legal Options.

Hanson said the Center for Food Safety is weighing its legal options related to a May 2008 petition on the use of nanosilver in consumer products.

The petition, filed by the Center for Food Safety, Beyond Pesticides, Greenpeace, Friends of the Earth, and the International Center for Technology Assessment, requested that EPA classify nanoscale silver as a pesticide, require nanosilver products to be regulated as pesticides, and take steps to ensure that retailers stop selling nanosilver products that have not been registered as pesticides (32 CRR 438, 5/5/08).

EPA has not issued a formal response to the petition, which Hanson said is "verging on an unreasonable delay." The coalition did not file lawsuits over the EPA's failure to respond because it appeared the agency was making "good progress" by issuing proposed regulations, Hanson said.

The Center for Food Safety will have to reconsider its legal options if EPA does not proceed with formal regulation of nanoscale materials in pesticides, Hanson said.

In a separate but related development, the International Center for Technology Assessment, which works with the Center for Food Safety, is weighing its legal options to prod the Food and Drug Administration to issue regulations for engineered nanoscale ingredients in cosmetics and food (see related story).

Pesticide blunders that won't make you laugh

June 01, 2012 6:00 AM

THE RECORDER
recorder@portervillerecorder.com

SACRAMENTO — In San Diego County in March 2011, three teenagers watched YouTube videos that prompted them to combine pool chlorine tablets with vinegar, baking soda and hydrogen peroxide in plastic bottles to cause explosions.

One boy threw some of the bottles onto rocks and breathed the toxic gas formed by mixing the chemicals. After experiencing shortness of breath, the teen called his mother, who called 911. Fire department paramedics responded and treated the boy. The sheriff's department's bomb squad vented the remaining bottles and environmental health officials neutralized the chemicals.

This incident is one of the California Department of Pesticide Regulation's (DPR) "Top Pesticide Blunders by Consumers" released Thursday. They remind consumers to follow the label instructions of household cleaning and gardening products to avoid illness and injury.

"I cannot emphasize enough the importance of following the label instructions of all pesticide products, including those consumers use to kill ants, spiders, weeds and other pests in and around their homes," DPR Director Brian R. Leahy said. "Selecting a product that specifically targets the pest or a method that poses less risk will reduce your chances of getting sick or hurt."

Leahy also recommended that consumers consider an integrated pest management approach to reducing or eliminating the need for pesticides. This strategy includes removing crumbs and other food sources, fixing leaky plumbing, and sealing cracks and crevices with caulk so pests can't get into the home.

He suggested these extra precautions to prevent pesticide exposure in and around the home:

- Store pesticides properly to keep them away from children and adults who are unable to recognize pesticide containers.

- Keep pesticides in their original containers so no one mistakes them for food or drink. Never put pesticides in food or drink containers.

- Do not mix bleach with ammonia or other cleansers because the combination can form a toxic gas.

The San Diego County incident and blunders below in alphabetical order by county were drawn from 2011 illnesses and injuries reported to DPR by the California Poison Control System. State privacy law protects the identities of the individuals, who all sought medical treatment.

In Contra Costa County, a woman hurried to address an infestation of fleas and lice while she had dogs and children out of the home. She was steam cleaning the carpet with dog flea shampoo while she had lice shampoo on her own head when something got in her eye. She didn't know whether the eye irritant was the dog shampoo (a registered pesticide) or the lice shampoo (a pharmaceutical, outside DPR jurisdiction).

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In Kern County, a man saturated soil with insecticide before planting marijuana in his yard.

He sprayed the soil around the plants as they grew. The man became nauseated after smoking his homegrown marijuana.

No pesticides are registered for use on marijuana by the U.S. Environmental Protection Agency because marijuana is considered an illegal crop by the federal government. In California, a pesticide cannot be registered unless it is registered by U.S. EPA. As a result, no analysis has been done by the state or federal governments to determine potential health and environmental risks posed by pesticide applications on marijuana.

In Los Angeles County, a 4-year-old boy ate an unknown amount of roach gel mixed with peanut butter. That afternoon, he began vomiting and was found to have a low-grade fever.

In Yolo County, a woman set off a fogger and left her apartment, but immediately re-entered to turn off the smoke alarm. The fogger sprayed her in the face, and she developed burning and watery eyes, runny nose, coughing, shortness of breath and sensation of throat swelling. She re-entered again to get her car keys, which exacerbated the symptoms.

Safety precautions for foggers are posted on DPR's website in English and in Spanish. The U.S. Environmental Protection Agency has several videos about how to reduce potential hazards associated with foggers.

For more information about home and garden pesticide safety, see DPR consumer fact sheets at www.cdpr.ca.gov..

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