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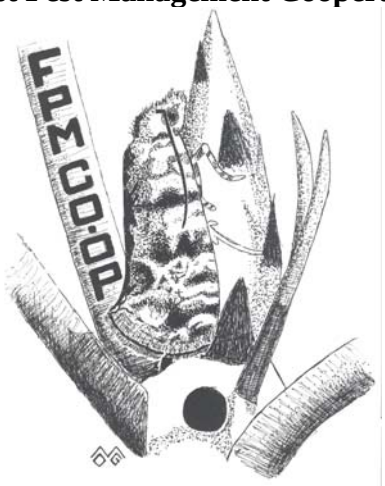
Quarterly Newsletter on Forest Pest Management Issues

Forest Pest Management Cooperative



Nantucket Pine Tip Moth, *Rhyacionia frustrana* (Comstock)

Texas Forest Service, Forest Health,
P.O. Box 310, Lufkin, Texas 75902-0310

PEST is a quarterly newsletter that provides up-to-date information on existing forest pest problems, exotic pests, new pest management technology, and current pesticide registrations related to seed orchards and plantations. The newsletter focuses on, but is not limited to, issues occurring in the South (Texas to Florida to Virginia,).

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Announcement:

Entomology Seminar - All FPMC executive and contact representatives, industry, and TFS foresters are invited to attend the spring session of the East Texas Forest Entomology Seminar scheduled for April 26-27, 2012. The meeting will begin at 1:00 PM on Thursday at Kurth Lake Lodge, north of Lufkin, and continue until noon on Friday at the Arthur Temple College of Forestry and Agriculture (Room 117) at SFASU in Nacogdoches. Registration is $35, which includes an evening meal. SAF CFE credits (3.5 + 4 = 7.5 total) can be earned for attending both half days. For additional information and/or an agenda, contact Ron Billings at 979/458-6665 or rbillings@tfs.tamu.edu.

Summary of 2011 FPMC Research Projects

In 2011, three primary research project areas – leaf-cutting ant, tip moth, and systemic injection - were continued from 2010. Summaries of the results from the leaf-cutting ant and a few systemic trials are presented below. Results from the remaining systemic injection and tip moth studies will be presented in the next two *PEST* newsletters (June and Sept. 2012).

Ant Control

Leaf-cutting Ants: In December 2009, PTM™ Insecticide (BASF) was approved by EPA for control of the Texas leaf-cutting ant (TLCA). This product has been shown in FPMC trials to be >90% effective with a single application. However, one limitation is that it is fairly labor intensive to apply; requiring nearly 60 minutes to treat an average-size colony. Historically, baits have been easier to apply. Unfortunately, Amdro® Ant Block, the only bait product currently labeled for TLCA, is really designed for smaller ants (e.g., fire ants). Thus, results are less than satisfactory, ~30% effective with a single application.

A new potential TLCA bait has been developed and evaluated by FPMC in cooperation with Central Garden & Pet. The new bait (Amdro™ LCA) is created by running the Amdro™ Ant Block bait with a small amount of water through a pellet mill and then allowing it to dry for two days. This new bait was tested for effectiveness in eight trials during winter, spring, summer, and fall of 2009 and 2010 (see PEST 16.1). Bait treatments were highly effective (80 – 100%) in halting ant activity after 16 weeks in the winter and spring trials for both years. However, similar treatments were less effective (0 - 67%) in the summer and fall when the bait was competing for the ant's attention with other plant sources and drought conditions reduced ant activity.

Continued on Page 2

Leaf-cutting Ant Control – Continued from Page 1

Two final trials were established during late fall 2010 and winter 2010/2011 and are reported here. During each season, 28 - 33 TLCA colonies were selected in east Texas on land owned by Hancock Forest Management, The Campbell Group, Rayonier and private landowners. Thirteen to seventeen colonies were treated with new LCA bait at 10g/ m^2 in each seasonal trial. Six were treated with Amdro® Ant Block (0.75 lbs for colonies of <600 ft^2 and 1.5 lbs for larger colonies). Five more colonies were treated with PTM™ at 40ml per entrance hole in the other seasons. Additional (6) colonies were monitored as untreated checks. All colonies were evaluated for ant activity at 0, 2, 4, 8 and 16 weeks post-treatment.

Amdro® LCA treatments were moderately effective (38% and 59%) in halting ant activity after 16 weeks in the fall and winter trials, respectively (Fig. 1). However, the Amdro Ant Block treatments were less effective (17% and 50%) during the same seasons. Mean efficacy of bait treatments tested between 2009 and 2011 is shown in Figure 2. LCA bait treatments were very effective (72% – 84%) in halting ant activity after 16 weeks in the winter and spring trials. However, similar treatments were less effective (32 - 46%) in the summer and fall when other plant sources were competing for the ant's attention and drought conditions reduced ant activity.

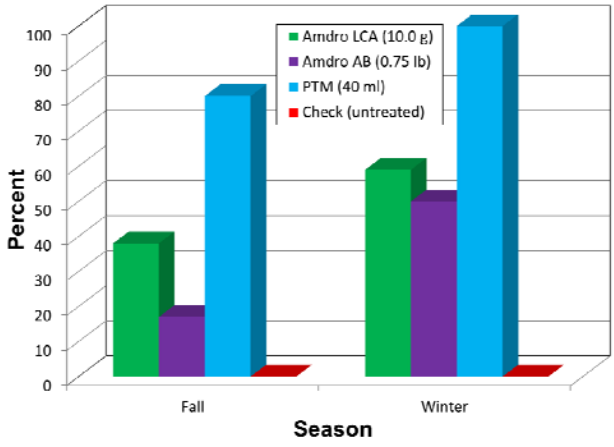

Figure 1. Seasonal efficacy (% colonies inactive) of modified (large), unmodified (Ant Block) Amdro™, and PTM™ soil injections for reducing and halting Texas leaf-cutting ant activity 16 weeks after treatment, East Texas, **Fall 2010 and Winter 2010/2011.**

The PTM™ treatment was more effective in halting ant activity during all seasons compared to the baits (Figures 1 & 2).

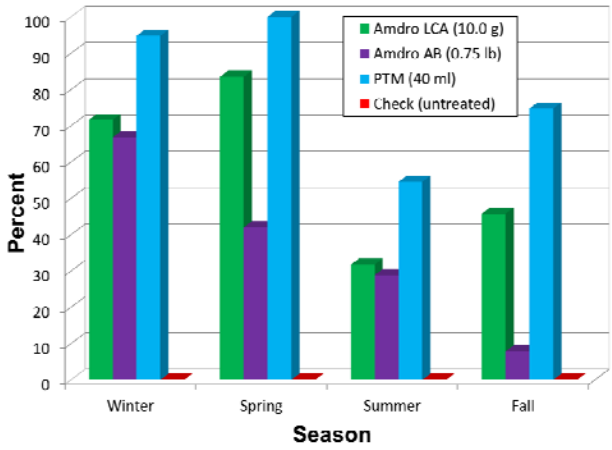

Figure 2. Mean seasonal efficacy (% colonies inactive) of modified (large), unmodified (Ant Block) Amdro™, and PTM™ soil injections for reducing and halting Texas leaf-cutting ant activity 16 weeks after treatment, East Texas, **2009 - 2011.**

Central Garden & Pet expects to submit a registration request to EPA for the modified Amdro® LCA bait in the near future. If and when a request is submitted, the turn-around time for EPA is expected to be 4 months and an additional 1-2 months to get approval by the states (TX and LA). Thus, the bait is expected to be available by fall 2012.

Note: Due to Forest Stewardship Council regulations, it is likely that use of several bait formulations (those containing fipronil, sulfluramid, and/or hydramethylnon) in forested areas of central and South America will be banned in the near future. Syngenta is planning to provide (ant-i-up) funding to the FPMC to evaluate several alternative bait formulations in 2012. Stay tuned.

Imported Fire Ants: FPMC trials conducted in 2010 showed that PTM eliminated >90% of fire ant colonies with a single treatment. BASF has submitted a request to EPA to add imported fire ant to the PTM™ Insecticide label. A decision by EPA is pending.

Systemic Pesticide Tree Injections

With the registration of TREE-äge® (emamectin benzoate) in December 2010, it is of interest to know if this product formulation is effective in preventing/reducing damage by new pests, such as an unnamed chalcid wasp on Afghan pine and the soapberry borer, a close relative of the emerald ash borer (EAB).

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Soapberry borer Control – Continued from Page 2

Soapberry borer: The soapberry borer (right), was found attacking and killing western soapberry in central Texas in 2003. TREE-äge® is known to be very effective against EAB, therefore it is expected that this product would be effective against the closely-related soapberry borer.

TREE-äge® was injected (using Arborjet's Quikjet™) at the rate of 5 ml per diameter inch into uninfested western soapberry trees or those in early stages of beetle attack. A total of 62 trees, ranging in diameter from 6 to 90 cm, were injected in June/July 2009 (17 trees) in Collin, Dallas and Fort Bend counties and June-September 2010 (45 trees) in Aransas, Bell, Grimes, Kaufman, Rockwall, and Tarrant counties. An additional 52 soapberry trees (22 in 2009 and 30 in 2010) distributed among the same study sites are being monitored as untreated controls. Tree health and survival was evaluated at the time of treatment application as well as periodically through 2011 using the following ranking criteria:

1 = Excellent - Full crown, good foliage, no epicormic branches, no apparent SBB attacks
2 = Good - Mostly full crown, a few SBB attacks, no epicormic branches
3 = Fair - Thinning crown; several SBB attacks, a few epicormic branches
4 = Poor - Moderately thin crown, many SBB attacks, several epicormic branches
5 = Near Death - Mostly dead crown; many epicormic branches; bark starting to flake
6 = Dead - No leaves, many areas of flaking bark

The western soapberry trees used in the systemic insecticide injection study are still being monitored (March 2012) but early results look favorable. Of the 22 control trees monitored since 2009, 6 (27%) have died from soapberry borer infestations and others continue to decline (Fig. 3), while none of the 17 trees injected with emamectin benzoate had died as of September, 2011. Similarly, the health of trees treated in 2010 are showing improvements, while the health of 2009 and 2010 untreated control trees continue to decline, though none had died as of September 2011.

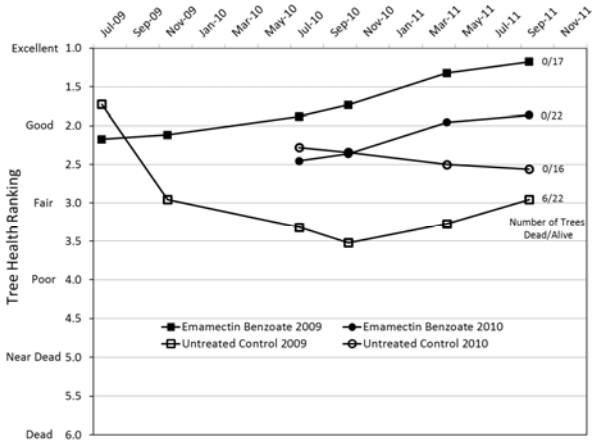

Figure 3: Tree health rankings for western soapberry trees with and without injections of emamectin benzoate in central Texas, July 2009 to September 2011. Numbers at end of data curves represent number of dead trees/total number of trees as of September 21, 2011.

Chalcid wasp: In the spring of 2008, Afghan pine in El Paso, TX was found to be dying. The branches on affected trees were gouty (A) and small pits containing larvae were found under the bark (B). Adult specimens (C) were collected and tentatively identified as an unknown species of chalcid.


A


B


C

A study was initiated in El Paso and Midland, TX in 2009. A number of Afghan pine (age and size unknown) at each location have been under attack by insect (chacid wasp?) pests for several years. Test trees (10 - 15) were selected at each loccation. Five (5) were injected with a standard rate (10 ml per inch diameter) of TREE-äge™ in March 2009. Five (5) trees were treated with imidacloprid via soil injection in El Paso only. Five trees serve as untreated controls at each location.

In April 2009 (just after treatment) and late September 2009 and 2010, 3-4' long branches were collected from three heights (low, middle and top

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Afghan Chalcid Control – Continued from Page 3

crown) on each study tree. In the laboratory, 2-3 inch sections were clipped off from each branch (12 inch total per branch). The bark was peeled from the branch sections and the number of live and dead larvae, live and dead adults, current and last year's adult emergence holes were recorded. The number of chalcids (larvae or adult) per 100 cm^2 of branch was calculated.

In untreated Afghan pines, chalcid infestation levels were significantly higher in the upper crown compared to lower crown levels. Emamectin benzoate significantly reduced the number of live chalcid larvae in branches at both sites compared to the checks (Fig. 4). Imidacloprid did not affect chalcid levels compared to checks in El Paso.

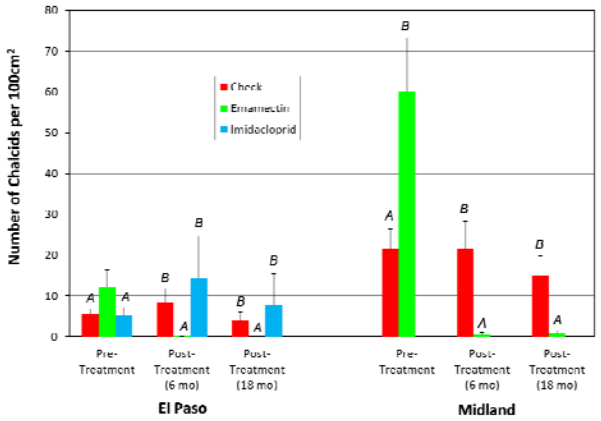

Figure 4: Pre- and post-treatment occurrence of chalcid wasp larvae on Afghan pine branches, El Paso and Midland, TX: 2009 & 2010.

Saltcedar Beetle: Athel, *Tamarix aphylla* (aka, Athel pine, Athel tamarisk, saltcedar), an evergreen tree that can grow to 60 feet, is valued as a windbreak and shade tree along the Rio Grande River of west Texas and Mexico. In the summers of 2009 and 2010, athel trees in Big Bend NP, Presidio and Ruidosa, TX were found to be turning brown due to defoliation by the saltcedar beetle, a biocontrol agent introduced to manage invasive saltcedar.

Seventeen to 28 athel trees (6"–50" DBH) were selected within Big Bend N.P., or near Presidio and Ruidosa, TX. In November 2010 or February 2011, trees were injected with emamectin benzoate or imidacloprid (both at 0.2g AI/ inch DBH) using Arborjet's QUIK-jet™. A number of trees were selected at each site and monitored as untreated controls.

Trees were evaluated in October, 2011 and ranked based on degree of defoliation:

0 = no defoliation;
1 = light defoliation, <20%;
2 = moderate defoliation, 20-80%;
3 = severe defoliation, >80%;
4 = complete defoliation, 100%.

The severity of saltcedar beetle defoliation was significantly lower on imidicloprid- and emamectin benzoate-treated athel trees compared to untreated trees (Fig. 5). Imidacloprid performed better than emamectin benzoate (Fig. 6).

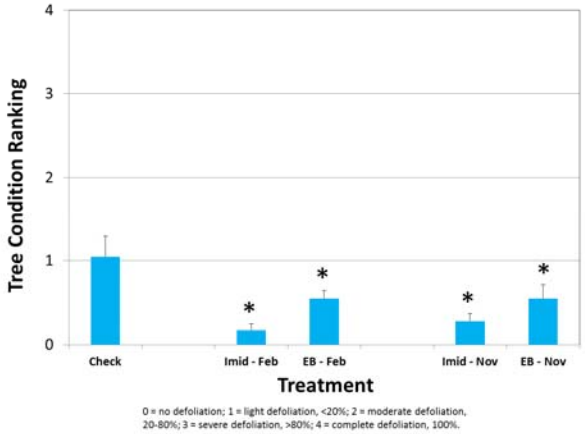

Figure 5: Condition of athel trees 11 months after treatment with imidacloprid or emamectin benzoate.

Figure 6: Athel trees treated with emamectin benzoate (left) and imidacloprid (right).

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Thought You Might Be Interested to Know . . .

Biopesticides are the Next Generation of Pest Control Products

(Marion Murray, IPM Project Leader,Utah Pest News, Fall 2011)

The answer to growing food sustainably to feed a world population of 9 billion by 2050 may be biopesticides. Demand for these safer, alternative pesticides has been on the rise in the last 5 years, even through the economic crises, and is projected to significantly increase in the coming years. Growth in biopesticide sales, which currently accounts for just 11% of the total pesticide market, increased by 13% in 2010 compared to a 2% increase in synthetic pesticides. The biopesticide market is expected to reach $3 billion by 2015.

Biopesticides include natural enemies, antagonistic microorganisms, and materials derived from living organisms or from natural products. Bt (*Bacillus thuringiensis*) and its subspecies is one of the most well-known products, but other examples include tea tree oil, corn earworm virus, and kaolin clay. Also called biorationals and biologicals, these products are not just for organic use. In conventional agriculture, research is focused on developing integrated plans, combining biopesticides with reduced risk products, ultimately leading to reduced pesticide use.

The factors driving biopesticide demand range from political to environmental to the hidden costs of human health. Federal regulations have cancelled the use of many traditional products like azinphosmethyl, methyl bromide, and endosulfan. Municipalities are taking it a step further and creating a select list of allowable products in public spaces. These factors, along with others such as pest resistance, increased demand from organic farmers for more options, worker safety, and water quality, lead to the need for alternative, safe products that are effective and inexpensive.

Pesticide residue laws are also driving demand, and large food chains in the European Union are setting the trend in this regard. Some stores have implemented their own maximum residue levels (MRL) and food safety standards programs with names like “Nature’s Choice,” “Field to Fork” and “No Residue.” One food store program will only accept products that have 70% or less of the legal maximum residue limit while other stores are banning certain legal pesticide products on their produce. U.S. retailers such as Walmart are beginning to have an impact in this area, and it will only increase into the future.

Because of these and other national programs, Europe has become the largest user of biopesticides. France, for example, has launched “Ecophyto 2018,” where they hope to have a 50% reduction in pesticide use by 2018. The program will encourage growers to use biocontrol practices, promote innovation for safe and effective growing techniques, support marketing biopesticides, and educational outreach. Denmark has initiated “Green Growth” that provides financial support to developers of alternative plant protection products.

One of the factors that limits biopesticide production is that many companies that are producing biopesticides are smaller, and a large investment is required not only in registration but in demonstrating a new product to growers. To help with this, the IR-4 program in the U.S. has been instrumental in facilitating registration of sustainable pest management products for minor crops. Because of this program, the EPA approved more biopesticides than conventional products in 2010. In addition, larger companies such as Monsanto are now seeing the profits in biopesticides and investing in smaller companies to evaluate new products.

Lately, there has been plenty of research to back up efficacy claims that couldn’t be said 5 years ago. Successful products now have increased shelf life, increased residual activity, and treat a wider range of crops and pests. As a result, sales have tripled to quadrupled in the last decade. Growers, advisors, dealers, and buyers must be prepared to adjust to the changes coming down the pike, driven by world demand for larger quantities of safe, quality, residue-free food.

Pesticides – How Long Will They Keep?

(Illinois Pesticide Review, Jan/Feb 2012)

Frequent questions are "how long is a pesticide good for?" and "how long should I keep a pesticide?" Pesticides in general are manufactured, formulated, and packaged to specific standards. However, when stored improperly, they can break down in storage, especially under conditions of high temperature and humidity.

Some pesticides can lose their activity through chemical decomposition or volatilization. Dry formulations such as wettable powders (WP) or granular (G) can become caked and compacted; emulsifiable concentrates (EC) can lose their ability to form emulsions. Some pesticides can actually become more toxic, flammable, or explosive as they break down.

Pesticide formulations that contain low concentrations of active ingredients generally lose effectiveness faster than more concentrated forms. Sometimes a liquid pesticide develops a gas as it deteriorates, making opening and handling containers quite hazardous.

Certain pesticides have a characteristic odor. A strong odor in the storage area may indicate a leak, spill, or improperly sealed container. It may also be a clue that the pesticide is deteriorating, because the smell of some chemicals intensifies as they break down. If none of these problems are found, chemical odors can be reduced with exhaust fans, or by lowering the temperature of the storage area.

Pesticide containers (including fiber and metal drums, pails, cans, bottles, bags, boxes, overpacks and liners) have an important effect on storage and shelf life. If stored for long periods, these containers may eventually corrode, crack, break, tear, or fail to seal properly. Also the label may become illegible.

Pesticides, if stored in a cool, dry area that is out of direct sunlight, will generally have an extended shelf life. In general, properly stored pesticides will retain their effectiveness for at least three to five years. Biological pesticides, such as *Bacillus thuringiensis*, tend to have shorter shelf lives than chemical pesticides.

Protection from temperature extremes is important because heat or cold can shorten a pesticide's shelf life. At temperatures below freezing, some liquid formulations separate into their various components and lose their effectiveness. High temperatures cause many pesticides to volatize or break down more rapidly. Extreme heat may also cause glass bottles to break or explode. Storage temperatures should not exceed 100 degrees F frequently or for extended time periods.

One way to ensure you won't have shelf life or storage problems is to buy only what you think you will need for one season. So many times we buy the sale item because it's a 'deal'. What we find out is that we only needed a small portion and now we have to store the leftover chemical. A good tip is to write the date you purchased the product on the container itself or the label. There are no expiration dates on pesticides, so this will serve as a reminder regarding how old the product is.

If you have to store chemicals, read the label and follow any specific guidelines listed. Store different groups of pesticides, such as herbicides, insecticides, and fungicides in separate locations within a storage area to prevent cross-contamination from fumes, vapors, and accidental use of the wrong container. Never store chemicals near any type of animal feed. Always store out of the reach of children, preferably in a locked cabinet.

(Martha A. Smith, Horticulture Educator, University of Illinois Extension)

Proper Tank Mixing Using the Jar Test

(Utah Pest News, Winter 2012)

Tank mixing pesticides saves time and money, but if done incorrectly, can lead to plant injury, damaged spray equipment, or a useless mix. Typically, pesticide labels will provide information on pesticide mixtures that lead to phytotoxicity (plant injury). This type of mixture is chemically incompatible.

Some mixtures, however, may result in physical incompatibility, which is usually not mentioned on product labels. A physical incompatible mixture may lead to a foamy, flaky, gelatinous or sludge-like product that is ineffective on the target pests. A jar test can quickly determine physical compatibility.

STEP 1: Add one pint of water to a glass jar with a lid. (Use the same water source that will go in the tank.)

STEP 2: Check spray water pH and adjust if necessary. Often, the pesticide label will give the optimal pH range for best results.

STEP 3: Add pesticides one at a time, and shake vigorously after each addition. The pesticides should be added in the following order:

water soluble pouches – 1 tbs
wettable powders – 1 tbs
dry flowables – 1 tbs
capsule suspensions – 1 tsp
emulsifiable concentrates – 1 tsp
soluble liquids – 1 tsp
soluble powders – 1 tsp
surfactants and other adjuvants – 1 tsp
fertilizers – use a scale to weigh out 1.1 grams

STEP 4: After all products have been added, shake again, let the solution stand for 15 minutes and then shake one last time and observe the results.

Compatible mixture

- Jar is cool to the touch, and mixture is smooth.

Incompatible mixture

- Layers form quickly after stirring
- Mixture is clumpy, grainy, or foamy, or becomes sludgy
- Jar is warm or hot to the touch

If the mixture is incompatible, do not use the mix of chemicals on your plants. You could re-do the jar test (with a clean jar) to see if changing some steps will improve the mix:

- change the order of mixing
- change the water supply
- change the pesticide brand and/or select a different formulation

If the mix is compatible, add pesticides to the spray tank in the same order as used in the jar test. Rinse all utensils and jars and pour the rinse water (rinsate) into the spray tank.

STEP 5: Triple rinse and discard the jar.

If you own an iPhone or Android phone, there are several free apps available that help with tank mixing: TankMix by DuPont, Mix Tank by Precision Laboratories, Mobile Ag Tank Mix by Marrone, and Syngenta TankCalk.

States Adopting Varying Approaches To Clean Water Act Pesticide Permits

(Source: Pesticide & Chemical Policy, December 9, 2011 via OK Coop Ext Serv Pesticide Reports, Jan. 2012)

States are adopting varying approaches to Clean Water Act pesticide permits, heightening concerns among farmers and other affected stakeholders that the diversity of rules will further complicate their understanding of application requirements.

In April 2009, when the 6th Circuit Court of Appeals vacated an EPA rule that would have kept regulation of aquatic pesticides under FIFRA, the agency began the process of writing a General Permit under the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) program. EPA's permit applies in six states, the remaining 44 have been delegated their own NPDES permitting authority. Some of those 44 states used the General Permit as their blueprint, while others wrote permits based on state laws or regulations already in place for pesticides applied to water, and still others are trying to keep NPDES permitting to a minimum.

But industry stakeholders remain exceedingly wary of any permitting requirement. "No matter how you look at it, this is going to be a train wreck," says Don Parrish, senior director of regulatory relations at the American Farm Bureau Federation. Parrish tells *Pesticide & Chemical Policy* most states "are pretty much just regurgitating what EPA has done and only applying permits to pesticides that are applied directly over water, or intended to be used in water." However, he says other states, such as Louisiana and South Carolina, are "including routine agricultural-type operations in their permits as well, and that's a little troubling." He believes some of the latter states came to the conclusion it would not be "a big deal" if agricultural activities were covered. "We're working with states and trying to make them understand where the liabilities are," Parrish says.

Lower thresholds

But Parrish notes other states have approved higher thresholds for permit coverage than those in EPA's General Permit, with the goal of minimizing the number of permits.

One of those states is Arkansas. It sets an annual treatment threshold for mosquitoes and other flying insects - below which permits are not required - of 6,400 acres, ten times that of EPA's General Permit.

Without the higher threshold, "we would potentially have 17,000 people applying for this General Permit," Arkansas Department of Environmental Quality Water Division Permits Director John Bailey tells *P&CP*. "In the Water Division right now, our permit universe is about 7,000 permits … I just don't have the staff to be able to write that many permits." Bailey said their reasoning was that no waters in the state are impaired as a result of pesticide application and if that changes, the threshold would be the first thing addressed.

He says he would have preferred to follow the same route as Louisiana, whose regulations "were adapted more for not having to get the permits than ours," and will attempt to do so if more permit requirements are implemented by EPA in the future.

In a press release, the Louisiana Department of Environmental Quality says its permit "incorporates existing pesticide control measures, which are currently being managed by the Louisiana Department of Agriculture and Forestry." This means no applicators will need to submit a Notice of Intent, because those requirements are already covered through the LDAF's certification and licensing process.

70 permits in Florida

Another state with less extensive permitting requirements than EPA is Florida. In an e-mailed response, Florida Department of Environmental Protection spokeswoman Dee Ann Miller tells *P&CP* only about 70 local government agencies, the majority of which are mosquito control districts, will require permits. Miller says, "DEP crafted a permit that provides automatic permit coverage without the need to submit permit application or permit fees for all pest control businesses and private citizens (approximately 18,000 statewide) who apply smaller amounts of pesticide to surface waters."

Florida's Generic Permit identifies specific government and government-authorized entities as operators required to submit Notices of Intent. They are authorized to discharge pesticides into surface waters upon receipt of the DEP coverage letter. All other entities are authorized to discharge "immediately."

EPA spokeswoman Enesta Jones says a cursory review by EPA has found "states have issued permits with different conditions than EPA's general permit in many instances."

While Jones notes that "EPA is not obligated to approve or even comment on those permits," Alexandra Dunn, executive director of the Association of Clean Water Administrators, tells *P&CP* she does not believe EPA has had any problems with any state program.

"The states try to mirror the federal program, and then of course they will tailor the program to something that they had implemented, or something that made sense for them," Dunn says. Among the variances, she says, are their approaches to implementing the Endangered Species Act. Dunn says, "Their permits will say things such as, 'Should this have an effect on an endangered or threatened species, we'll take the following steps,' and those steps may be different from state to state, but all states will have some sort of provision about endangered species."

CropLife America spokeswoman Mary Emma Young tells *P&CP* by email that some state laws require inclusion of all federal ESA requirements in their implementation of any federal law. "Further, some states have already decided to include some or all of [the National Marine Fisheries Service's] proposed Reasonable and Prudent Alternative (RPA) into their state permits," she says. "CLA believes that it is crucial that any potential ambiguities are answered prior to full permit implementation in January."

Already on the books

Several states already had regulations addressing pesticide discharges into water, including Washington, which developed NPDES permits in response to the 9th Circuit Court of Appeals' 2001 ruling in *Headwaters v Talent Irrigation District*. The court found the district's adherence to FIFRA labels did not preclude its obligation to obtain an NPDES permit.

Because their permits were already more stringent than EPA's General Permit, all Washington added was EPA's requirement for a pesticide discharge management plan to its aquatic plants and algae management permit.

Kathy Hamel, aquatic plant specialist for the Washington State Department of Ecology, says the department has eight separate aquatic pesticide permits, requires applicators to post and notify the public of spraying, and maintains lower thresholds for coverage than EPA. "We say anybody that is going to use an aquatic pesticide needs to get coverage under the permit, so they have to file a Notice of Intent with us," she says. "We do have a few areas where we feel that the uses are kind of *de minimis* and we don't really want them to have to get

coverage, but they're pretty restrictive compared to EPA permits."

California has also had an NPDES program in place since the *Talent* ruling. California Water Resources Board public information office Kathie Smith tells *P&CP* via e-mail that California has no threshold for coverage under the permit. "Anyone applying pesticides at, near, or over water must get permit coverage before applying," she says. The state also requires a Pesticide Application Plan in addition to a Notice of Intent, and requires chemical and physical monitoring as well as the visual monitoring required in the EPA General Permit of those applicators required to submit NOIs."

Side by Side Systems

Other states, like New York with its Article 15, already had state laws on the books requiring aquatic pesticide application permits prior to the NPDES requirement, and intend to keep the state requirements.

Martin Williams, a New York Department of Environmental Conservation pesticide control specialist, says Article 15 requires a permit for the discharge of pesticides into any body of water more than an acre in size. The agency decided against seeking a repeal of Article 15 and was unable to tie it into the NPDES permits, so applicators covered under the requirements will have to seek both.

Williams tells *P&CP* their NPDES permit is patterned after EPA's General Permit. "Our existing Article 15 permittees are already collecting a lot of the similar information and documenting that in how they draw up their [state] permit applications, so we're just making the analogy that if you're already collecting that kind of information, then we'd accept that as equivalent to NPDES requirements," he says.

Jeff Brauer, environmental engineer with the Wisconsin Dept of Natural Resources, says the state's aquatic pesticide permits have been in place for twenty years. "I would say that our permit just layers on the Integrated Pest Management concept from the federal permit," he tells *P&CP*. "I found it somewhat confusing the way [EPA] described it, and we worked with our aquatic plant application to have the permit specify the management practices that made sense for their operations."

Wisconsin also used its existing state thresholds in the NPDES permit, which are stricter than EPA's. After January 1, 2013, treatment operations affecting greater than 20 acres or 20 shoreline linear miles of waters of the state in a calendar year will be required to document the integrated pest management decisions for each pest treatment project, and submit an annual monitoring report. EPA only requires annual reports of "large entities" as defined by the Small Business Administration, or those that serve populations of greater than 10,000.

Variations in state permitting requirements can cause difficulties for potential permitees. At a meeting this week of the Association of American Pesticide Control Officials' State FIFRA Issues Research and Evaluation Group (SFIREG), some participants suggested SFIREG consider working with EPA regional water and pesticide personnel, who would be familiar with the variations in the states they serve.

Penetrating Wood-Treatment Research

(*Nanoscaleblog*, 1/4/12 via Chemically Speaking, Jan. 2012)

Termites pose a significant threat to the timber industry throughout the tropics and subtropics and long-lived synthetic chemicals have been used historically to slow the rate of termite infestation.

To address this problem, scientists at the University of Queensland in Australia have found that microporous silica nanoparticles (MSNs) can store and deliver pesticides in a controlled fashion over time, which could be beneficial to the timber industry with regards to termites. This slow-release process is important as the termites will feed on and transfer the particles to other termites, eventually leading to colony destruction.

The team chose four different types of nanoparticles to test, using imidacloprid as the model termiticide. They found that MCM-48 particles had the highest adsorption capacity and could release the material over a 48-hour period. To effectively deliver the biocide over a period of about seven days, the MSNs need to be coated with other chemicals. Right now,

the team is investigating a biodegradable polymer coating.

Andrea O'Connor, an expert in nano- and biomolecular engineering at the University of Melbourne, Australia, notes that more control over release rates is needed. This would "minimize the early burst release and extend biocide delivery over biologically relevant time periods and dose rates," she says. However, she adds that the system is simple and delivers the nanoparticles in a suspension into the site of an infestation rather than relying on diffusion of released material through the environment, where it may be degraded or have undesirable adverse effects.

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Pest Spotlight: Sirex Woodwasp - *Sirex noctilio* F. (Hymenoptera: Siricidae)

(Source: DA Haugen and ER Hoebeke, Pest Alert, USDA Forest Service, Northeastern Area State and Private Forestry, NA-PR-07-05 http://www.na.fs.fed.us/spfo/pubs/pest_al/sirex_woodwasp/sirex_woodwasp.htm)

Sirex woodwasp has been the most common species of exotic woodwasp detected at United States ports-of-entry associated with solid wood packing materials. Recent detections of sirex woodwasp outside of port areas in the United States have raised concerns because this insect has the potential to cause significant mortality of pines. Awareness of the symptoms and signs of a sirex woodwasp infestation increases the chance of early detection, and thus, the rapid response needed to contain and manage this exotic forest pest.

Distribution

Sirex woodwasp is native to Europe, Asia, and northern Africa, where it is generally considered to be a secondary pest. In its native range, it attacks pines almost exclusively, e.g., Scotch, Austrian, and maritime pines. This woodwasp was introduced inadvertently into New Zealand, Australia, Uruguay, Argentina, Brazil, Chile, South Africa, and most recently (2004) in the United States. As of 2011, this wood wasp has been found in NY, PA, VT, MI, CT and OH. In the Southern Hemisphere countries, sirex woodwasp attacks exotic pine plantations, and it has caused up to 80 percent tree mortality. Most of the plantations are planted with North American pine species, especially Monterey pine and loblolly pine. Other known susceptible pines include slash, shortleaf, ponderosa, lodgepole, and jack.

Identification

Woodwasps (or horntails) are large, robust insects, usually 1.0 to 1.5 inches long (Figures 7 and 8). Adults have a spear-shaped plate (cornus) at the tail end; in addition females have a long ovipositor under this plate. Larvae are creamy white, legless, and have a distinctive dark spine at the rear of the abdomen (Figure 9). More than a dozen species of native horntails occur in North America. No keys to identify woodwasp larvae to the species level have been developed; however, adult specimens have features to distinguish sirex woodwasp from native horntails. Key characteristics of the sirex woodwasp include these:

- Body dark metallic blue or black; abdomen of males black at base and tail end, with middle segments orange.
- Legs reddish-yellow; feet (tarsi) black; males with black hind legs.
- Antennae entirely black.

Positive identification of *S. noctilio* needs to be confirmed by an insect taxonomist. Therefore, collect and submit any suspect woodwasps to your county extension or state Department of Agriculture office.

Figure 7. *Sirex noctilio*—adult female.

Figure 8. *Sirex noctilio*—adult male.

Figure 9. *Sirex noctilio*—larva and close-up of posterior spine.

Figure 10. Green needles wilt and point straight down.

Figure 11. Needles eventually turn red.

Figure 12. Resin beads and dribbles at egg-laying site.

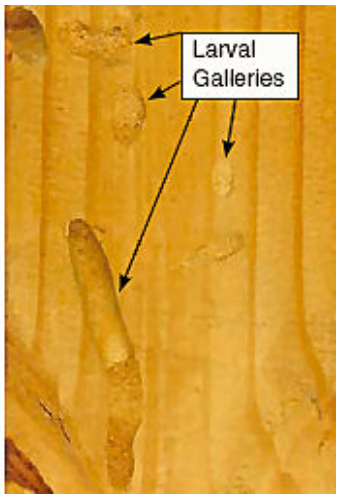


Figure 13. Larval galleries with tightly packed frass.

Figure 14. Round exit holes.

Symptoms

Sirex woodwasp can attack living pines, while native woodwasps attack only dead and dying trees. At low populations, sirex woodwasp selects suppressed, stressed, and injured trees for egg laying. Foliage of infested trees initially wilts (Figure 10), and then changes color from dark green to light green, to yellow, and finally to red (Figure 11), during the 3-6 months following attack. Infested trees may have resin beads or dribbles at the egg laying sites (Figure 12), which are more common at the mid-bole level. Larval galleries are tightly packed with very fine sawdust (Figure 13). As adults emerge, they chew round exit holes that vary from 1/8 to 3/8 inch in diameter (Figure 14).

Biology

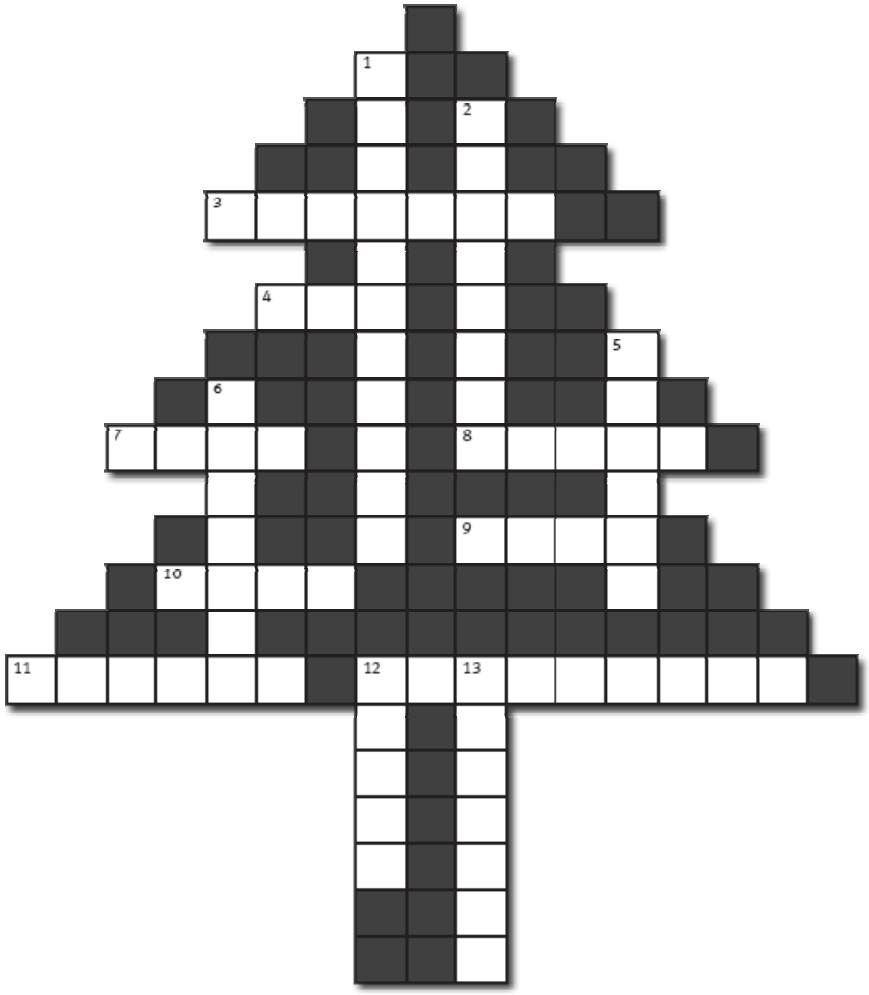
Sirex woodwasp is expected to complete one generation per year throughout most of the United States. Adult emergence is likely to occur from July through September, with peak emergence during August. Females are attracted to stressed trees after an initial flight. They insert their ovipositors into the outer sapwood to inject a symbiotic fungus (*Amylostereum areolatum*), toxic mucus, and eggs. The fungus and mucus act together to kill the tree and create a suitable environment for larval development. Females lay from 25 to 450 eggs, depending upon size of the female. Unfertilized eggs develop into males, while fertilized eggs produce females. All larval instars feed on the fungus as they tunnel through the wood. The number of instars varies from 6 to 12, and the larval stage generally takes 10-11 months. Mature larvae pupate close to the bark surface. Adults emerge about 3 weeks later.

Biological Control

Sirex woodwasp has been successfully managed using biological control agents. The key agent is a parasitic nematode, *Deladenus siricidicola*, which infects sirex woodwasp larvae, and ultimately sterilizes the adult females. These infected females emerge and lay infertile eggs that are filled with nematodes, which sustain and spread the nematode population. The nematodes effectively regulate the woodwasp population below damaging levels. As sirex woodwasp establishes in new areas, this nematode can be easily mass-reared in the laboratory and introduced by inoculating it into infested trees. In addition to the nematode, hymenopteran parasitoids have been introduced into sirex woodwasp populations in the southern hemisphere, and most of them are native to North America (e.g., *Megarhyssa nortoni, Rhyssa persuasoria, Rhyssa hoferi, Schlettererius cinctipes,* and *Ibalia leucospoides*).

****

'All About Trees' Crossword from Down Under
(Source: http://www.pir.sa.gov.au/forestrymatters/primary_section/all_about_trees_crossword)



Crossword Questions

Across

3. The environment in which a plant or animal lives.

4. A kangaroo is sometimes called this for short.

7. There are lots of these found in a forest, and some are good to climb.

8. The crop of trees in a forest is called a _____.

9. In some forests you can set up a tent and _____.

10. The skin-like outer covering of a tree trunk.

11. Most of these are green; they come in all shapes and sizes, and are found on the branches of trees.

12. The indigenous meaning of the name of this forest is 'Amongst the Trees'.

Down

1. Learning about forests is part of Studies of Society and the _____?

2. The limbs of a tree are called?

5. The top part, or crowns of trees, including branches and foliage.

6. The unit of measurement used to describe the area of forests.

12. Forests provide homes to animals, including _____.

13. In forests there can be two categories of features. One is built and the other is _____.

Answers are found on the bottom of page 13

A Story from the Woods: A Turkey Hunting Trip

(Source: http://www.forestryforum.com/board/index.php?topic=27755.0)

When I was about 16 and attending Military School, a friend came home with me for Thanksgiving. The men in the family would spend 3 or 4 days in the "old" tomato fields between YeeHaw Junction and Fort Drum on US-441 west of Ft. Pierce and Vero. There was no turnpike then and YeeHaw was composed of a filling station and a restaurant. Fort Drum was a ghost town. There was not much civilization west of US-1 which ran up the coast.

We were to get turkey, deer, quail, catfish or anything else we could find in quantity that would suffice for a good Thanksgiving dinner.

My uncle put us boys in the Jeep to take us each to our own private hunting hammock. Granddad walked to his because he would return early and fix us breakfast and lots of boiled coffee.

I was placed in my hammock and sat at the base of a big cypress. It was still dark and I knew I would need a little light so I sat as still as I could.

Just as the sky started to lighten there was a shot from the direction of my Uncle's hammock. BOOM! Then a few moments later another BOOM! Then a few moments later, BOOM, BOOM! What in the world could Uncle Pete have found?

The sky lightened up some and I could see that the birds normally in the roost in this hammock weren't there. I waited patiently for an hour or so when shooting began to come from my friends hammock. Figuring it was late and I had missed my turkeys I got up and started to walk out of the swamp.

Gobbling was coming from outside of the hammock. I had to duck to get under the outside limbs of a water oak and there, not 30 yards out in the plain was a lone cabbage palm tree. Out of the tree flew a turkey, laboriously flying right over my head. I put my hand-me-down model 11 Remington to my shoulder, pulled the trigger and nothing happened. The bolt had not been fully closed. I closed it and aggravatingly put the butt on the ground, when out of the same tree, came another turkey. It flew right over my head as well and there was no chance to get the gun up in time.

Thoroughly frustrated, I walked to my friends hammock to see what he had gotten. "Oh, I got bored and was just shooting at some crows."

I couldn't believe it, every bird in woods had probably left.

Returning to camp we entered to the smell of fresh coffee and fried bacon. A big pot of grits and a platter of scrambled eggs were on the table. Granddaddy had done good, my brother, cousins, friend and I were starved but ....no Uncle Pete.

Before the eggs could cool he stepped through the door and said "You're not going to believe what I've done." Here's his story.

With first light he saw a turkey roosting on a limb high in an oak tree and shot it. It didn't fall so he shot it again to knock it out of the tree. It still didn't fall so, knowing better, he shot again. When the bird stayed in the tree he decided he would come back later when there was more light, climb up there and get it.

When he returned to the tree, there against the trunk, was a large burl with a stick sticking out of it that looked just like a turkey with its head under its wing.

He laughed....."and there wasn't any bark on anything up there."

****

Answers to Crossword Puzzle on page 12.

Across

3. Habitat
4. Roo
7. Tree
8. Stand
9. Camp
10. Bark
11. Leaves
12. Bundaleer

Down

1. Environment
2. Branches
5. Canopy
6. Hectare
12. Birds
13. Natural

Forest Pest Management Cooperative's

P.E.S.T. Newsletter

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