Progress
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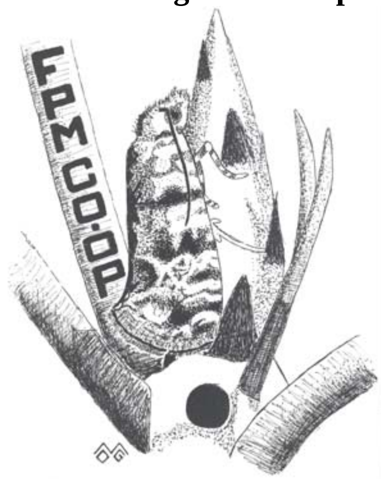
Vol. 14 No. 2 Aug. 2009

Quarterly Newsletter on Forest Pest Management Issues

Forest Pest Management Cooperative



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

Texas Forest Service, Forest Pest Management,
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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Announcements:

Tree Injection Training Sessions – All FPM Coop members, seed orchard managers and contractors are invited to attend one of four FPMC contact meetings scheduled for the end of October and early November 2009. In anticipation of the registration of TREE-age™ (emamectin benzoate) for seed orchard use, the meetings will focus on information related to the use of systemic products and provide hands-on training with tree injection equipment. The four meetings are tentatively scheduled for Oct. 27 (TFS Magnolia Springs SO, TX), Oct. 29 (Weyerhaeuser's Magnolia SO, AR), Nov. 3 (AL) and Nov.

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Summary of 2008 FPMC Research Projects (and a little bit from 2009)

In 2008, three research project areas – tip moth, leaf-cutting ant, and systemic injection - were continued from 2007. Results from systemic injection studies were presented in the last *PEST* newsletter (May 2009). Summaries of the results from the leaf-cutting ant and tip moth control studies are presented below. Results from tip moth impact and hazard-rating studies will be presented in the next *PEST* newsletter (Oct. 2009).

Leaf-cutting Ant Control

Amdro® Ant Block bait is the only product currently labeled for control of the Texas leaf-cutting ant (TLCA). The results of trials in 2005 and 2006 were less than satisfactory (see *PEST* 11.2 & 12.2). Data suggests that the bait is generally too small to be of interest to TLCA. In 2007, FPMC worked with DuPont to develop a new bait specifically design for TLCA using an indoxacarb solution. The results were good (see *PEST* 13.2) but DuPont elected not to pursue registration.

Two new options (modified [larger] Amdro™ Ant Block [Central Garden & Pets] and PTM™ soil injection [BASF]) were devised last fall. The modified bait was created by running the Ant Block bait with a small

amount of water through a pellet mill and then allowing it to dry over two days. An initial preference test showed that TLCA readily retrieved significantly more of the modified bait (see photo at left) and than they did Ant Block (Fig. 1). PTM™ Insecticide was recently

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Leaf-cutting Ant Control – Continued from Page 1

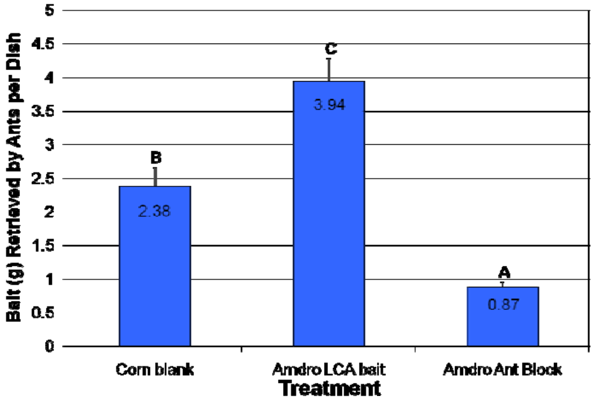

Figure 1. Attractiveness of the Texas leaf-cutting ant to modified (large) and unmodified (Ant Block) Amdro, East Texas, Winter 2008.

registered for use as a soil injection treatment to protect seedlings against pine tip moth. Based on prior experience with Blitz™ (see *PEST* 7.1) we know that fipronil is effective against TLCA. We surmised that PTM™ applied to entrance holes within the central nest area may be effective in reducing or halting ant activity (see right). These two products were tested for effectiveness in two trials during winter and spring 2009.

In the winter, forty-one (41) colonies were selected in east Texas on land owned by Hancock, Campbell Group and private landowners. Six to nine colonies were treated with bait at 0.75 or 2.0 lbs per colony (regardless of colony size), in January and February 2009. Eleven more were treated with PTM™ at 1 gal of insecticide solution per 300 ft^2 of central nest area. An additional 7 colonies were monitored as untreated checks. All colonies were evaluated for ant activity at 0, 2, 4, 8 and 16 weeks post-treatment.

The modified bait was quickly retrieved by the ants and reduced ant activity (89 -100%) on treated colonies compared to initial activity within 2 weeks after treatment (Table 1). It appeared that most of the treated colonies had become inactive (14 of 16 after 4 weeks). However, a reassessment 16 weeks post-treatment found that 4 of 16 treated colonies were still active, although at much reduced levels (5%) compared to initial levels. The PTM™ was little slower in halting ant activity compared to the baits, but ultimately was more effective after 16 weeks (Table 1).

In the spring, seventy-nine (79) colonies were selected in the same areas as before. Seven to ten colonies were treated with different rates of modified bait (2.5, 5.0, 10.0 or 20.0g/m^2) or PTM™ solution

Table 1. Efficacy of PTM™ soil injection and Amdro™ Ant Block applied to control the Texas leaf-cutting ant, *Atta texana* , in east Texas (Jan. - May 2009).

Treatment	No. of colonies treated	Mean central nest area (ft^2)	Mean # mounds at Trt	Mean % of initial activity[a] (% of colonies inactive after): 2 weeks		4 weeks		8 weeks		16 weeks	
Large Amdro (2.0 lb / colony)	9	802	226	0.1 **a**	(89)	0.2 **a**	(89)	1.0 **a**	(78)	5.4 **a**	(67)
Large Amdro (0.75 lb / colony	7	520	182	0.0 **a**	(100)	0.4 **a**	(86)	0.8 **a**	(86)	0.8 **a**	(86)
PTM™ Soil Injection (1 gal / 300 ft2)	11	539	134	0.9 **a**	(82)	1.4 **a**	(91)	4.5 **a**	(91)	2.2 **a**	(91)
Amdro™ Ant Block (0.75 lb / colony	6	520	182	1.6 **a**	(50)	1.4 **a**	(83)	2.4 **a**	(75)	3.9 **a**	(67)
Check (no treatment)	8	1061	199	85 **b**	(0)	83.5 **b**	(0)	97.4 **b**	(0)	91.2 **b**	(0)

[a] Means followed by the same letter within each column are not significantly different at the 5% level (Fisher's Protected LSD).

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Leaf-cutting Ant Control – Continued from Page 2

(10, 20, 40 or 80 ml/hole). An additional 7 colonies were monitored as untreated checks and all colonies were evaluated for ant activity at 0, 2, 4, 8 and 16 weeks post-treatment.

The modified bait was again quickly retrieved by the ants and ant activity was reduced (100%) on treated colonies compared to initial activity within 2 weeks after treatment (Table 2). It appeared that nearly all treated colonies had become inactive (27 of 28 after 4 weeks). A reassessment 16 weeks post- treatment found that 4 of 28 treated colonies were still active, although at much reduced levels (>4%) compared to initial levels. As in the first trial, the effects of the PTM™ treatment was a little slower in halting ant activity compared to the baits, but ultimately all four treatments shut down all colonies after 16 weeks (Table 2).

The FPMC is continuing to work with Central Garden & Pets and BASF to refine the new TLCA bait and soil injection treatment, respectively. As bait efficacy tends to vary with season (Grosman, personal observation), there is a need to determine to what extent the optimal application rate changes with season. A summer efficacy trial is currently underway and a fall trial is planned for later this year to evaluate different application rates.

BASF submitted a request to EPA on June 1, 2009 to include TLCA on the PTM Insecticide label. As the application technique (i.e., soil injection) and rates are similar for both TLCA and pine tip moth, we are hoping to receive approval from EPA by early October. Central Garden & Pets has recently informed FPMC that they intend to submit a registration package for the modified Amdro bait to EPA by September. The turn-around for EPA is expected to be 4 months and an additional 1-2 months to get approval by the states (TX and LA). Thus, we hope the bait will be available by March or April, 2010.

Table 2. Efficacy of modified (large) Amdro bait and Amdro Ant Block applied to control the Texas leaf-cutting ant, *Atta texana*, in East Texas (March - June 2009).

Treatment	No. of colonies treated	Mean central nest area (ft^2)	Mean # mounds at Trt	Mean % of initial activity[a] (% of colonies inactive after): 2 weeks		4 weeks		8 weeks		16 weeks	
Large Amdro ($2.5 g/m^2$)	7	859	185	0.0 **a**	(100)	0.0 **a**	(100)	0.1 **a**	(86)	3.1 **a**	(86)
Large Amdro ($5.0 g/m^2$)	7	830	214	0.0 **a**	(100)	0.1 **a**	(86)	3.4 **a**	(71)	3.5 **a**	(71)
Large Amdro ($10.0 g/m^2$)	7	743	238	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)	0.5 **a**	(86)
Large Amdro ($20.0 g/m^2$)	7	702	196	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)
Amdro Ant Block (0.75 lb / colony	8	643	174	6.6 **ab**	(25)	13.1 **b**	(50)	22.2 **b**	(38)	21.6 **b**	(38)
PTM Soil Injection (10ml / hole)	10	550	164	1.0 **a**	(90)	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)
PTM Soil Injection (20ml / hole)	9	498	181	1.3 **a**	(78)	1.0 **a**	(89)	0.0 **a**	(100)	0.0 **a**	(100)
PTM Soil Injection (40ml / hole)	10	605	164	0.1 **a**	(90)	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)
PTM Soil Injection (80ml / hole)	7	481	128	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)	0.0 **a**	(100)
Check (no treatment)	7	565	222	96 **b**	(0)	93.4 **c**	(0)	97.6 **c**	(0)	86.3 **c**	(0)

[a] Means followed by the same letter within each column are not significantly different at the 5% level (Fisher's Protected LSD).

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Pine Tip Moth Control

<u>Fipronil Trials:</u> Several trials conducted by the FPMC from 2002 to 2007 have shown that fipronil is consistently effective in reducing pine tip moth damage on treated seedlings. Due to concerns about worker exposure, recent research has focused on the treatment of soil around seedlings at or after transplanting by hand or machine planter. The following is a brief overview of the results of trials established or continued in 2008.

Fipronil Applied by Hand vs. Machine Trial:
A trial was initiated in 2007 (and extended into 2008) to evaluate fipronil applied by machine at planting or by hand after planting. Research plots were established in three first-year plantations in Texas (2) and Arkansas (1) in 2007 and two more in Arkansas (1) and Louisiana (1) in 2008. In 2007, 4 replicates of three 0.5 acre plots (12 plots total) were established at each site. On four pre-selected plots, the fitted machine planter injected fipronil solution (0.3% ai in 37 ml volume) into the soil as each seedling was placed in the planting furrow. In all other plots, seedlings were machine planted at the same spacing. Afterward, in four plots, seedlings were treated with fipronil by hand using a Kioritz soil injector.

In 2008, we also evaluated the effects of treatment on tip moth damage levels over a large area. Each site was divided in half. One half was operationally machine planted without additional treatment. On the other half, the fitted machine planter was used to treat containerized seedlings with PTM™ as they were planted in furrows.

Tip moth damage was evaluated after each tip moth generation (3-4 weeks after peak moth flight) by determining the percent of infested shoots in the top whorl. Each tree was measured for diameter and height in December at the end of each growing season.

The fipronil treatments applied by machine provided good overall protection, reducing tip moth damage by 74% in 2007 and 33 to 45% in 2008 (Table 3 & 4). The hand treatment was generally less effective but both treatments resulted in significant gains in volume growth in 2007 and 2008. Further evaluations are planned for 2009.

Table 3. Effect of fipronil application technique on tip moth damage to loblolly pine shoots (top whorl) and volume growth during the first two growing seasons on three sites in East Texas and Arkansas - 2007 & 2008.

Treatment §	N	Pct. Shoots Infested **(Pct reduction compared to check)**						Volume Growth (cm^3) **(Growth diff. (cm^3) compared to check)**					
		2007			2008			2007			2008		
Machine FIP	550	3.6	**74**	*	23.4	**45**	*	50.9	**5.8**	*	1168	**242**	*
Machine + Hand FIP SI	550	7.9	**43**	*	25.4	**40**	*	53.5	**8.4**	*	1031	**105**	*
Machine Check	550	13.8			42.6			45.1			926		

§ SI = Kioritz Soil Injection Method [grey box] = treatment reduced damage by >75% compared to check
***** Means followed by an asterik are significantly different from checks at the 5% level based on Fisher's Protected LSD.

Table 4. Effect of PTM applied by machine on tip moth damage to loblolly pine shoots (top whorl) and volume growth during the first growing season on two sites in louisiana and Arkansas - 2008.

Treatment §	N	Pct. Shoots Infested **(Pct reduction compared to check)**			Volume Growth (cm^3) **(Growth diff. (cm^3) compared to check)**		
Machine FIP	200	11.4	**33**	*	38.9	**11.4**	*
Machine Check	200	17.1			27.5		

[grey box] = treatment reduced damage by >75% compared to check
***** Means followed by an asterik are significantly different from checks at the 5% level based on Fisher's Protected LSD.

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PTM™ Applied to One-year Old Trees Trial: A trial was initiated in 2008 to evaluate the efficacy of single or double applications of PTM™ at different soil depths for protecting one-year old loblolly pine from tip moth.

A one-year-old plantation was selected in East Texas. A randomized block design (with rows as blocks) was established in two separate areas of the plantation in February. Each treatment was randomly selected for placement in a plot. The treatments included:

1) PTM™ (single injection [12 ml] into soil 4" deep)
2) PTM™ (double injection [6 ml] into soil 4" deep)
3) PTM™ (single injection [12 ml] into soil 8" deep)
4) PTM™ (double injection [6 ml] into soil 8" deep)
5) Mimic® foliar - Mimic® applied 5X /year
6) Bare root check (untreated)

Tip moth damage was evaluated on 50 internal seedlings within each plot after each of five tip moth generations in the same manner as in other control studies. Each tree was measured for diameter and height at the end of the growing season (December).

All PTM™ treatments, regardless of depth or placement, provided good protection from tip moth during the 2nd through 5th generations. Overall, reduction in damage compared to checks ranged from 45% to 51% (Table 5). However, only shallow (4") PTM™ and Mimic® treatments resulted in significant gains in volume growth (34 – 116%) compared to the checks (Table 5).

Other PTM™ News: EPA approved the registration of PTM Insecticide in June 2007 (see *PEST* 12.2 and 12.4). The FPMC was hoping to expand the label to allow application of PTM™ to containerized seedlings grown in nurseries. In 2007, we obtained very good results from fipronil applied to containerized seedlings seven months prior to planting (see PEST 13.2). Unfortunately, BASF has decided not to pursue a label extension to allow application of PTM™ to containerized seedlings in the nursery. According to BASF, EPA has concerns about fipronil, particularly about the potential amount of active ingredient that may leach through the media after watering. An alternative technique was suggested; treat containerized seedlings in the nursery just prior to shipment to planting sites. However, because of EPA concerns about fipronil, BASF is reluctant to push forward a request for this use at this time.

Table 5. Effect of PTM™ application depth and placement on tip moth damage to one-year-old loblolly pine shoots (top whorl) and height growth 8 months after treatment on two plots in East Texas - 2008.

Treatment §	N	Pct. Shoots Infested **(Pct reduction compared to check)**			Volume Growth (cm^3) **(Growth diff. (cm^3) compared to check)**		
Single 12 ml SI @ 4" depth	100	24.4	**51**	*	833.0	**210.0**	*
Single 12 ml SI @ 8" depth	100	27.2	**45**	*	666.0	**43.0**	
Double 6 ml SI @ 4" depth	100	24.0	**51**		887.0	**264.0**	*
Double 6 ml SI @ 8" depth	100	27.2	**45**	*	654.0	**31.0**	
Mimic spray	100	8.0	**84**	*	1349.0	**726.0**	*
Untreated Check	100	49.4			623.0		

§ SI = soil injection (shaded) = treatment reduced damage by >75% compared to check

***** Means followed by an asterik are significantly different from checks at the 5% level based on Fisher's Protected LSD.

Imidacloprid Tablet Trials: Bayer Environmental Science registered SilvaShield™ Forestry Tablets with EPA in fall 2006 to protect young seedlings against insects. The FPMC continued cooperative efforts with Bayer in 2008 to evaluate these tablets in research and operational trials. One trial evaluated this product at several rates and two different depths. Two new plantations were selected in TX. A randomized block design (with rows as blocks) was established at each site in February. Ten seedlings from each treatment were planted on each of five beds. Tip moth damage was evaluated and trees were measured as described before. The treatments included:

1) SilvaShield (SS) tablet - 1 tablet next to transplant at 4" depth
2) 20% SS tablet - 2 tablets next to transplant at 4" depth
3) 20% SS tablet - 3 tablets next to transplant at 4" depth
4) 20% SS tablet - 1 tablet next to transplant at 8" depth
5) 20% SS tablet - 2 tablets next to transplant at 8" depth

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6) 20% SS tablet - 3 tablets next to transplant at 8” depth
7) Bare Root Check (untreated)

Tip moth populations were high at both sites, particularly during the 4th and 5th generations (mean percent shoots infested were 43% and 46%). The tablet treatment placed adjacent to transplanted seedlings was very effective in reducing tip moth damage throughout most of the year. There was no trend for rate or depth. Overall, damage was reduced by 62% to 99% (Table 6). Tablet treatments significantly improved volume growth compared to checks, with gains of 45% to 88%.

Table 6. Effect of SilvaShield tablet number and application depth on tip moth damage to first-year loblolly pine shoots (top whorl) and height growth 8 months after treatment on two plots in East Texas - 2008.

Treatment §	N	Pct. Shoots Infested	**(Pct reduction compared to check)**		Volume Growth (cm^3)	**(Growth diff. (cm^3) compared to check)**	
1 SS tablet @ 4" depth	100	3.1	**86**	*	33.4	**14.7**	*
2 SS tablet @ 4" depth	100	2.2	**90**	*	27.6	**8.9**	*
3 SS tablet @ 4" depth	100	3.2	**86**	*	32.8	**32.8**	*
1 SS tablet @ 8" depth	100	2.8	**87**	*	27.2	**8.5**	*
2 SS tablet @ 8" depth	100	5.3	**76**	*	33.3	**14.6**	*
3 SS tablet @ 8" depth	100	1.9	**91**	*	35.2	**35.2**	*
Untreated Check	100	22.0			18.7		

§ SS = SilvaShield Tablets [shaded] = treatment reduced damage by >75% compared to check
***** Means followed by an asterik are significantly different from checks at the 5% level based on Fisher's Protected LSD.

A second trial evaluated the effects of treatment on tip moth damage levels over a large area. One site was newly planted and the other a one-year-old plantation. Each site was divided in half. One half was left unprotected. On the other half, tablets were deposited into plant holes as seedlings were planted (new site) or pushed into the soil to an 8” depth (one YO site). Ten 10 tree plots were established in each plantation half. Tip moth damage was evaluated and trees were measured as described above. The treatments included:

1) 20% SilvaShield (SS) tablet - 1 tablet in plant hole or next to 1YO tree.
2) Bare Root Check (untreated)

As expected, tip moth populations were variable at the two sites with mean percent shoots infested on checks ranging from 3% after the first generation on the new site to 78% during the 4th generation on the older site. The tablet treatment was highly effective in reducing tip moth damage throughout the year on the newly-planted site, but generally less effective on the older site. Overall, damage was reduced by an average of 77% and 38%, respectively (Table 7). Tablet treatments significantly improved volume growth compared to checks on both sites, with gains of 146% for 1st-year trees and 42% for 2nd-year trees (Table 7).

Table 7. Effect of SilvaShield (SS) tablets on areawide tip moth damage to loblolly pine shoots (top whorl) and volume growth on two sites in East Texas - 2008.

Site	Treatment §	N	Pct. Shoots Infested	**(Pct reduction compared to check)**		Volume Growth (cm^3)	**(Growth diff. (cm^3) compared to check)**	
Moffet 1st Yr	1 SS tablet @ 8" depth	100	3.1	**77**	*	69.9	**41.6**	*
	Check	100	13.6			28.3		
Peavy 2nd Yr	1 SS tablet @ 8" depth	100	30.2	**38**	*	1724	**512**	*
	Check	100	48.4			1212		

[shaded] = treatment reduced damage by >75% compared to check
***** Means followed by an asterik are significantly different from checks at the 5% level based on Fisher's Protected LSD.

Announcements – Continued from Page 1

5 (GA), 2009. Registration is $10, which includes a lunch. For additional information, contact Don Grosman at 936-639-8170 or dgrosman@tfs.tamu.edu.

Tentative 2009 Contact Meeting Agenda

October & November, 2009

8:00 AM	Welcome and introductions,
8:15 AM	Forest Pest Management Cooperative research update (Don Grosman)
10:00 AM	Break
10:30 AM	General overview of tree physiology, systemics and injection systems
12:00	Lunch
1:00 PM	Introduction to Tree IV, Quik-jet and other (?) systems
2:30 AM	Break
3:00 AM	Hands-on use of injection systems
5:00 PM	Meeting adjourned

Entomology Seminar - All WGFPMC executive and contact representatives, industry, and TFS foresters are also invited to attend the fall session of the East Texas Forest Entomology Seminar scheduled for October 22 & 23, 2009. The meeting will be held from 1:00 PM until 8:00 PM on Thursday at Kurth Lake Lodge, north of Lufkin, and continue from 8:00 AM until noon on Friday at the College of Forestry and Agriculture, SFASU in Nacogdoches. The agenda will be available in early October. Registration is $30, which includes an evening meal. For additional information, contact Ron Billings at 979/458-6650 or rbillings@tfs.tamu.edu.

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Thought You Might Be Interested to Know . . .

EPA Final Work Plan for Imidacloprid

(Source: NC Pest News 24 (14) July 17, 2009.)

The U. S. Environmental Protection Agency (EPA) issued a Final Work Plan for the registration review of imidacloprid (Merit, Marathon plus generics). A neonicotinoid insecticide, imidacloprid is highly toxic to honeybees on direct exposure, but is most often used as a systemic. Potential chronic effects on nectar and pollen collecting honeybee colonies are uncertain. As part of the registration review process, EPA is requiring field-based data on imidacloprid to better understand its potential impact on pollinators. The Agency also will be working with Federal and State officials, as well as the international community and other stakeholders, to develop data and help us understand the potential impact of the neonicotinoid insecticides on pollinators. For additional information about the Agency's pollinator protections, see http://www.epa.gov/pesticides/ecosystem/pollinator-protection.html. And for information regarding the registration review of imidacloprid, please see the following web site: http://www.epa.gov/oppsrrd1/registration_review/imidacloprid/index.htm.

Imidacloprid is used on ornamentals, turf, food crops, seed treatments, domestic pets, and structural pests. During the public comment period on the Agency's Imidacloprid Summary Document and Preliminary Work Plan (PWP), issued in December 2008, EPA received over 12,000 comments voicing concern over imidacloprid's potential effects on pollinators. The comments highlighted points to be considered during registration review, but did not change the timeline or data requirements set forth in the PWP. The Agency has addressed the comments in three separate Responses to Comments memos. The PWP, response to comments documents, and FWP can be found in the imidacloprid registration review docket, EPA-HQ-OPP-2008-0844, at http://www.regulations.gov. Please see the Imidacloprid Summary Document/Preliminary Work Plan (EPA-HQ-OPP-2008-0844-0002) and Imidacloprid Final Work Plan (EPA-HQ-OPP-2008-0844-0116).

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Permethrin RED Changes

(Source: Federal Register, June 10, 2009 and EPA e-mail June 19, 2009 via OK CES Pesticide Reports, July 2009)

EPA announced its decision to modify the 2006 Reregistration Eligibility Decision (RED) for permethrin based on revised occupational and residential risk assessment. One major revision was the reduction of the dermal absorption factor relied upon in the cancer portion of the occupational and residential exposure risk assessment from 15% to 5.7%. Some of the changes will be that all products used for wide area outdoor broadcast application including agricultural crops, golf courses, nurseries, and sod farms will be Restricted Use. The PPE requirements will be strengthened. Regarding the proposed wording not allowing application when precipitation was forecast now reads "Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area." EPA retained their wording for termite pretreatment regarding the contractor and application within 10 feet of a storm drain.

For agricultural uses the label will require Vegetative Buffer Strips. The wording for Vegetative Buffer Strips is "Construct and maintain a minimum 10-foot-wide vegetative filter strip of grass or other permanent vegetation between the field edge and down gradient aquatic habitat (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or natural ponds; estuaries; and commercial fish ponds)." "Only apply products containing permethrin onto fields where a maintained vegetative buffer strip of at least 10 feet exists between the field and down gradient aquatic habitat." The wording goes on to recommend using NRCS's buffer strip guidelines.

An interesting item is that 70% of permethrin's 1.5 million pounds is used on non-agricultural settings. Of this 70%, 55% is used by professionals; 41% by homeowners; and 4% in mosquito abatement districts. Agriculture accounts for 600,000 pounds. EPA did not find a connection between permethrin/pyrethrin exposure and allergies/ asthma.

SAFARI® (Dinotefuran)= New Armored Scale Control

(Source: Rutgers Plant & Pest Advisory, July 7, 1009)

Unlike Merit®, the relatively new neonicotinoid insecticide named Safari® (dinotefuran) has shown promise as an effective control against armored scales. Although both Safari® and Merit® (imidacloprid) have systemic capabilities with the same general mode of action, Safari® is significantly more water-soluble. The high water solubility is thought to be the reason for the increased armored scale controls. Armored scales primarily feed by inserting their piercing-sucking mouthparts into parenchyma cells containing chlorophyll. Since Merit® predominately moves through plants by vascular tissues (phloem and xylem), it does not readily enter into cells where armored scales feed. Consequently, Merit® has not shown good efficacy against pests that feed within plant cells (typically less than 30-40% control). Recent University efficacy trials have shown dramatically improved results against armored scales with soil injection or drench applications of Safari® insecticide. Although this material continues to be translocated by vascular tissues, it also appears to have the ability to permeate through cell walls and membranes. Some efficacy trials have shown controls exceeding 80%!

Mid-Season Leaf Drop

(Source: Rutgers Plant & Pest Advisory, July 7, 1009)

When the leaves of large shade trees drop during mid-season, it typically causes alarm to concerned homeowners/clients. With the ground littered with spent foliage, the conclusion often is that "their favorite shade tree is dying!" Linden, birch, and sycamore trees are often most susceptible to mid-season leaf drop. In a majority of cases, this is a normal physiological growth habit for these species. The trees commonly drop foliage in mid-season in order to reduce leaf surface area and subsequent water loss. This leaf shedding ability is especially important during typical summer droughts or when water availability in soils is limited. Neither tree health nor tree growth is usually affected.

Pest Spotlight: Black Turpentine Beetle

Forest Pest Management has received several calls recently from homeowners and forest industries regarding bark beetles attacking pine. A closer look often reveals that the trees had been or were being attacked by the black turpentine beetle, *Dendroctonus terebrans*.

The black turpentine beetle, a close cousin of the southern pine beetle (*Dendroctonus frontalis*), is found from New Hampshire south to Florida and west to east Texas. Attacks have been observed on all species of pine native to the South. This beetle is most common in pine naval stores, pines stressed for lighterwood production, and damaged pines in urban areas. **Note:** I suspect that many of the trees being attacked recently have been stressed by severe drought conditions occurring over the past few years.

The adult insect is dark brown to black in color and 3/8 inch in length. The posterior end is rounded (this contrasts with the concave posteriors of the *Ips* engraver beetles). Full grown larvae are white with a reddish brown head and about 1/3 inch long. Pupae are about ¼ inch in length and yellowish white.

Black turpentine beetles attack fresh stumps and the lower trunk of living pines. Initial attacks are generally within 2 feet of the ground. Attacks are identified by white to reddish-brown pitch tubes about the size of a half dollar. The pitch tubes are located in bark crevices on the lower tree bole, usually below a height of 10 feet. Infested pines are often attacked by other bark beetles (i.e., southern pine beetle and *Ips* engraver beetles).

Adult beetles bore into the cambium and construct galleries which usually extend downward. Eggs are laid in clusters and hatch in 10 to 14 days. Larvae feed side by side, excavating a large continuous area. The life cycle takes from 2 ½ to 4 months, depending on the season. There are two to four generations per year.

Natural enemies and good tree vigor generally keep black turpentine beetle populations at low levels. Newly attacked trees can often be saved by spraying the base to the highest pitch tube on the trunk with an approved insecticide. Preventative sprays also are effective for high value trees. The following insecticide formulations are suggested to be used by licensed certified pesticide applicators to control black turpentine beetle: permethrin (Astro® and Dragnet® SFR) or bifenthrin (Onyx® and OnyxPro™). Thoroughly drench the lower 10 feet of the trunk and buttress roots with a forceful spray in mid-April. Reapply in the summer if adults are still present. The prompt removal of infested trees also helps to control outbreaks. Forest management practices which promote tree vigor and minimize root and trunk damage help prevent infestations.

Reference: USDA Forest Service. 1997. Insect and Diseases of Trees of the South.. Protection Rep. R8-PR 16. p. 98