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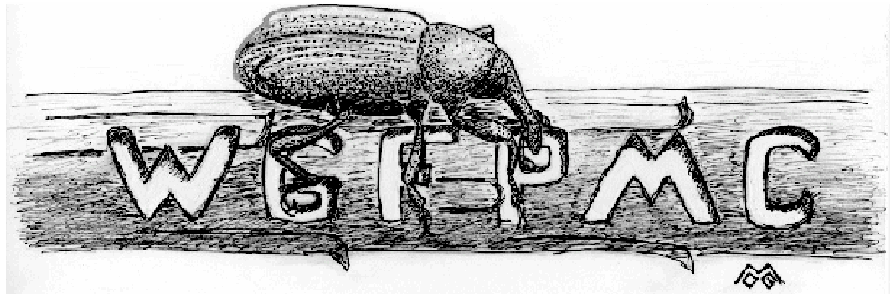
Quarterly Newsletter on Western Gulf Forest Pest Management Issues

Western Gulf Forest Pest Management Cooperative



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 in pine seed orchards and plantations. The newsletter focuses on, but is not limited to, issues occurring in the Western Gulf Region (including, Arkansas, Louisiana, Mississippi, Oklahoma, and Texas).

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Announcement:

2000 WGFPMC Contact Meeting Mark your calendars! All WGFPMC executive and contact representatives, industry, and TFS foresters are invited to attend the 2000 WGFPMC Contact Meeting scheduled for Tuesday, July 18, 2000. The meeting will be held at the Texas Forest Service Fire Control Training Room in Lufkin, TX and will begin at 9:00 AM. Drs. John Taylor, USFS, and Lynne Thompson, U. of AR, Monticello., have been invited to talk on FQPA and pine sawfly impact and control, respectively. Also, Dr. Ron Billings will speak on SPB biology and control. Finally, an overview of recent WGFPMC research will be presented, including a field trip to visit sites of recent tip moth impact/spray trials.

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Outlook for Southern Pine Beetle Activity in 2000

(by Ron Billings & Bill Upton, Texas Forest Service)

Results of the annual pheromone trapping survey to forecast trends for southern pine beetle (SPB) activity in 2000 indicate another year of very low SPB activity in the western Gulf states with increases to outbreak levels in several states east of the Mississippi River. The attached summary of the Southwide trapping program provides trap catch data for 1999 and 2000, together with trend predictions for 2000 for 156 locations within 14 southern states (Table 1).

Based on the early season pheromone survey, SPB activity in 2000 is expected to exhibit increases to high or outbreak levels in Alabama, Kentucky, Georgia, and Tennessee. Moderate increases in SPB activity also are expected in portions of Florida, Virginia, Mississippi, North and South Carolina. On the other hand, very low levels (none?) of SPB activity are expected in Texas, Louisiana, Arkansas, and Oklahoma. Out of 48 trapping locations in these four states, only five adult SPB were collected -- one each from Texas and Arkansas, three from Louisiana. In general, SPB activity in the southern and southeastern states is expected to be static/low in the West and increasing to high levels in the East.

Each spring, traps baited with the SPB attractant frontalin and southern pine turpentine are set out in pine forests when dogwoods begin to bloom. The traps are monitored weekly for a 4-6 week period by federal and state cooperators. Dogwood blooms mark the primary dispersal season for populations of the destructive SPB as well as certain beneficial insects. Of particular value for forecasting purposes are catches of clerids (also called checkered beetles), known predators of SPB. Using data on the average number of SPB captured per trap per day and the relative proportion of SPB to checkered beetles, infestation trends for the current year can be forecasted.

This survey system, developed by the Texas Forest Service, has been in use across the South since 1986. Annual predictions of

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SPB Prediction (continued from page 1)

infestation trends have proven to be 75-85% accurate. Collectively, trend predictions from numerous specific locations provide insight into SPB population shifts within a given state as well as across the South. Also, comparison of trapping results for the current year with those from the previous year for the same localities provides additional insight into SPB population changes.

In general, average trap catches that exceed 30 SPB per day, especially those in which SPB make up more than 35% of the total catch (of SPB and clerids), are indicative of increasing or continued high SPB infestation levels in the current year. Conversely, when catches of predators far outnumber those of SPB and fewer than 20 SPB adults are caught per day, infestation trends are likely to decline or remain at low levels. It is uncertain whether the predator population is directly responsible for declines in SPB outbreaks. Most likely, predators are just one of many contributing factors.

Of the 152 specific counties, parishes, or ranger districts surveyed in 1999, predictions proved correct for both trend and level of SPB activity in 121 cases (80%). The correct trend (decline, static, increase) was predicted in 86% of the cases and the correct level (low, moderate, high, outbreak) in 84%. In relatively few cases (10%) were prediction errors made in both infestation trend and level for a given locality.

Results of the SPB survey, including trend predictions for 2000 for over 150 locations within fourteen southern states, are posted on the Internet at http://www.fs.fed.us/research/4501/. For additional information, contact Dr. Ron Billings, Texas Forest Service at (936) 639-8170 or e-mail at r.billings@tfs.tamu.edu.

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Table 1. Summary of Southwide Southern Pine Beetle Trend Predictions for 2000

	1999				2000					Most Likely
State	No. of Infestations	% SPB	SPB/ trap/day	Clerids trap/day	No. of Loc. Trapped	% SPB	SPB/ trap/day	Clerids trap/day	2000 Prediction Trend/Level	Locations of SPB Activity
Oklahoma	0	0%	0.0	4.0	1	0%	0.0	1.0	Static/Low	-----------
Arkansas	0	0.6%	0.04	4.2	7	0%	0.0	2.5	Static/Low	-----------
Texas	0	0%	0.0	2.8	18	0%	0.0	3.2	Static/Low	-----------
Louisiana	0	0%	0.0	2.2	22	0%	0.0	4.0	Static/Low	-----------
Mississippi	476	21%	5.8	17.8	10	31%	23.2	33.7	Increasing/Moderate	DeSoto N.F., Homochitto N.F., Noxubee Co., Winston Co.
Alabama	6,025	61%	71.8	27.0	6	70%	112.2	30.9	Increasing/Outbreak	All Areas Trapped
Kentucky	------	---	---	---	2	97%	197.6	7.0	Increasing/Outbreak	All Areas Trapped
Georgia	617	32%	8.2	10.6	13	54%	42.1	10.6	Increasing/High	Armuchee R.D., Tallula R.D., Fulton Co., Wilkes Co.
Tennessee	3,012	65%	12.3	3.9	6	80%	49.1	5.3	Increasing/High	Nolichucky R.D., Ocoee R.D., Unaka Area, Rhea Co., Scott Co.
Virginia	5	39%	4.1	3.8	4	50%	25.5	20.5	Increasing/Moderate	New Castle R.D., Cumberland Co.
Florida	220	38%	1.4	0.7	21	62%	13.2	1.6	Increasing/Moderate	Hernando Co., Madison Co., Marion Co., Suwanee Co., Walton Co.
South Carolina	3,840	37%	8.9	6.6	35	57%	25.5	8.9	Increasing/Moderate	Cherokee Co., Chesterfield Co., Edgefield Co., Lancaster Co., Laurens Co., McCormick Co., Oconee Co., Pickens Co., Saluda Co., Union Co., York Co.
North Carolina	1,540	60%	9.9	6.0	8	51%	81.8	9.1	Increasing/Moderate	Grandfather R.D.
Maryland	10	62%	9.1	4.7	3	16%	0.8	3.8	Declining/Low	-----------
Southern States	15,745	32%	10.1	7.3	156	41%	40.8	10.2	Increasing/Moderate - Outbreak (East) or Static/Low (West)	Alabama, Kentucky, Georgia, Tennessee, North Carolina, South Carolina, Virginia, Florida

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Summary of 1998 WGFPMC Research Projects

In 1999, three research projects - the leaf-cutting ant control study, pest survey, and systemic injection study - were continued from 1999. A fourth project, a tip moth pesticide evaluation study, was initiated in 1999. A summary of the results from the leaf-cutting ant and pest survey was presented in the last PEST newsletter (March 2000). Results from the systemic injection study and tip moth pesticide study are presented below.

Systemic Injection Study

Trials conducted by the WGFPMC in 1998 showed that injection of systemic insecticides using the Wedgle Tip™ injector (ArborSystem L.L.C.) could significantly reduce coneworm and seed bug damage compared to checks. However, problems with the plugs used to keep the insecticide in the trees may have reduced the potential success of several of the treatments. A new high volume injector, developed by Dr. Blair Helson, Canadian Forest Service, was tested in the fall of 1998 and showed promise in improving treatment success.

Field tests were continued in the fall of 1998 through 1999 to further evaluate the potential of the new high volume 'Helson" injector. In addition, field trials were conducted to 1) evaluate the efficacy of high volume trunk injections of emamectin benzoate, thiamethoxam, and imidacloprid in reducing losses to coneworms and seed bugs, 2) determine the effect of injection timing on treatment efficacy, and 3) evaluate the residual activity of several products applied in 1998 using the Wedgle Tip™ injector or drill hole technique.

The field trials were conducted at the Texas Forest Service Magnolia Springs Seed Orchard in a block containing drought-hardy loblolly pine. Seven to 15 ramets from four to ten loblolly clones were selected. The 15 treatments consisted of:

1) Check
2) Acephate 60% (20 ml/drill hole) in Apr & July '98
3) Emamectin benzoate (EB) 4% by Wedgle Tip™ (WT) in April & July '98
4-6) EB 4% by Helson Injector (HI) in October '98 and April '99, Group 1 & 2
7-8) EB 4% + Thiamethoxam (Thia.) 5%by HI in April, '99, Group 1 & 2
9) Thia. 5% by WT in April & July, '98
10) Imidacloprid (Imid.) 5% by WT in April & July, '98
11-12) Imid. 5% (wettable powder) or Imid. 5% (emulsifiable conc.) by HI in October, '98
13) Imid. 5% (EC) by HI in April, '99 (Group 1)
14) Imid. 5% (EC) by HI in April, '99 (Group 2)
15) Imid. (WP) applied to foliage 4X at 6 week intervals in '99

The effects of treatments on 2nd-year cones was checked by evaluating damage on picked cones from each tree. Seed lots, from a subsample of apparently healthy cones, were radiographed to measure the extent of seed bug damage.

Injections of emamectin benzoate went well in October, 1998 and April, 1999 - often 50ml could be injected in 4 minutes. However, injections of imidacloprid and thiamethoxam required 4-24 hours. Recent trials indicate that changing the solvent used to mix each chemical will improve uptake of both products.

Evaluations of picked cones showed moderate coneworm damage (over 21%) on check trees. Treatments that included emamectin benzoate consistently provided the best overall protection against coneworm attack (Fig. 1). The three best treatments applied by Helson injector included emamectin benzoate alone, emamectin benzoate + thiamethoxam, and imidacloprid April '99 Group 1; these treatments reduced overall coneworm damage by 94.1%, 80.6%, and 63.9%, respectively, compared to the check. All other imidacloprid treatments applied by the Helson injector were ineffective against coneworm.

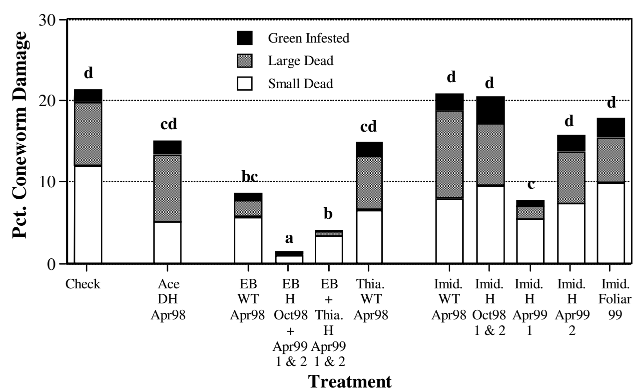

Figure 1. Coneworm infestation in picked cones. Ace = Acephate; EB = Emamectin benzoate; Thia = Thiamethoxam; Imid. = Imidacloprid; DH = Drill hole; WT = Wedgle Tip; H = Helson. Bars of total coneworm (small dead + large dead + green infested) with the same letter are not significantly different at the 5% level, based on Least square Means.

Of the four treatments applied by Wedgle Tip™ injector or in drill holes in April 1998, only emamectin benzoate alone significantly reduced coneworm damage in 1999. Surprisingly, the level of coneworm damage reduction in 1999 (59.2%) was nearly identical to the level of damage reduction observed in 1998 (59.8%).

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Research Projects (Continued from Page 3)

Treatments that included 5% imidacloprid (Helson or Wedgle Tip™) or thiamethoxam consistently provided the best overall protection against seed bug attack (Fig. 2a) and improved the yield of full seeds (Fig 2b). The three best treatments included imidacloprid (Helson, 5%, April '99), emamectin benzoate + thiamethoxam (Helson, 5%, April '99), and imidacloprid (Wedgle Tip, 5%, April & July '98); these treatments reduced overall seed bug damage by 81.9%, 52.9%, and 51.3%, respectively, compared to the check (Fig. 2a). The same treatments improved full seed yield by 325.1%, 259.8%, and 291.2%, respectively, compared to the check (Fig. 2b).

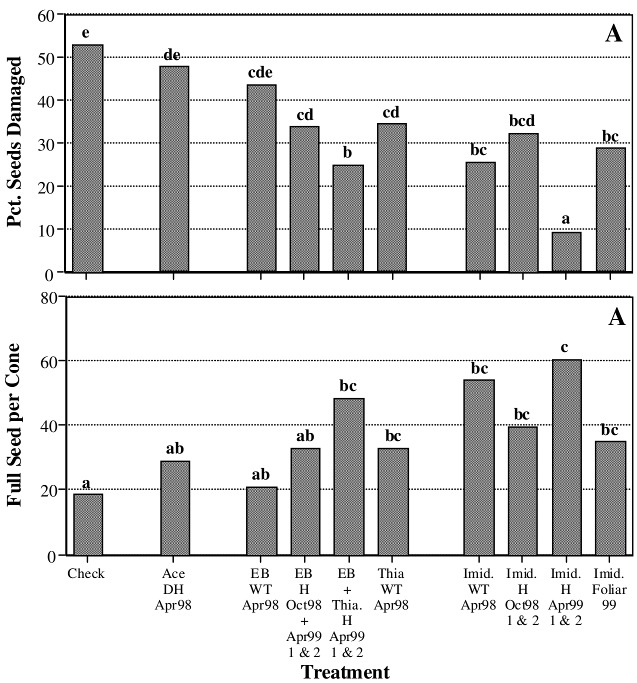

Figure 2. Seed bug damage (A) and full seed per cone (B) in loblolly pine cones from Magnolia Springs Seed Orchard, Texas in 1999. Ace = Acephate; EB = Emamectin benzoate; Thia = Thiamethoxam; Imid. = Imidacloprid; DH = Drill hole; WT = Wedgle Tip; H = Helson injector. Bars of percent seed damaged with the same letter are not significantly different at the 5% level, based on Least Square Means.

Together, coneworm and seed bug reduced the potential seed crop by 63%. Three treatments stand out with regards to their ability to reduce overall insect damage: imidacloprid (Helson, 5%, April '99), emamectin benzoate + thiamethoxam (Helson, 4% + 5%, April '99), and emamectin benzoate alone (Helson, 4%, April '98). These treatments reduced overall insect damage by 67.9%, 55.4%, and 44.9%, respectively.

The Helson injector was used successfully to inject high volumes of insecticide solutions into loblolly pine. Over the past two years, emamectin benzoate treatments have exhibited the best overall protection against coneworm, but had little effect on seed bug. Although emamectin benzoate treatment effects were good in 1998, use of higher injection volumes in 1999 improved protection of cones against coneworm by nearly 35%. In addition, the data suggest that a single injection of emamectin benzoate can protect trees against coneworm for 18 months or longer. The actual extent of this chemical's residual activity has yet to be determined.

In contrast, imidacloprid and thiamethoxam provided good protection against seed bug in 1999, but generally showed little effect against coneworm (one exception being the imidacloprid Helson April Group 1 treatment) (Fig. 1). Imidacloprid also provided extended protection (18 mo.), but not as extensive as was found for emamectin benzoate. The study is being continued in 2000 to further evaluate the residual activity of these products.

Tip Moth Spray Trial

Pest surveys conducted by the WGFPMC in 1998 indicated that populations of the Nantucket pine tip moth, *Rhyacionia frustrana*, were high and caused significant damage in young pine plantations. Spray trials were conducted in 1999 to 1) determine the effectiveness of Pounce® (permethrin) and Confirm® (tebufenozide) on reducing tip moth infestation levels, 2) determine the number of tip moth generations that occurred in 1999 in Angelina Co., TX, and 3) compare the effectiveness of using a degree day model and extrapolated spray intervals from Mississippi (Fettig et al, 2000) to predict optimal spray timing dates.

Three first year plantations in Angelina Co., Texas (owned and managed by Temple Inland) were used for the spray trials and for monitoring tip moth populations in 1999. An area of each plantation was selected and divided into 4 plots, each containing 126 trees (9 rows X 14 trees). Given that tip moth populations are generally higher in older (2-4 year old) plantations, moth populations also were monitored in two three-year-old plantations in Angelina Co. Tip moth populations were monitored by placing 2 - 4 Phericon 1C wing traps (with Trece septa lures) at least 50m apart at each site. Traps were checked weekly.

Treatments were randomly assigned to a plot at each site. The treatments included:

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Research Projects (Continued from Page 4)

1) Pounce® 3.2 EC (High) applied once for the first generation at 10.65 oz / gal on 3/24.
2) Pounce® 3.2 EC (Std) applied once per generation at 4.0 oz / gal.
3) Confirm® 2F (Std.) applied once per generation at 1.0 oz / gal.
4) Check

Pesticides were applied by backpack sprayer to all trees within the plot (treatment area) until runoff. Application dates were determined by degree day model calculations (Gargiullo et al. 1983) or extrapolated from Missisippi sites (Fettig et al. 2000)

Just prior to each spray date, the tip moth damage level was determined in each plot by surveying the internal 50 trees. Each tree was ranked on the extent of tip moth damage including: 1) tree identified as infested or not, 2) if infested, the proportion of tips infested on the top whorl and terminal was calculated, and 3) separately, the terminal was identified as infested or not. Trees also were surveyed a final time in November, 1999. At this time, data also were collected on tree height, form (forking), and percent tree mortality.

The distribution of tip moths captured in traps at the three one-year-old sites and two three-year-old sites in 1999 is shown in Figure 3. Although traps had not been deployed early enough in the year to catch the beginning of the first generation we estimated the optimal spray date based on Fettig et al. (2000). Given the latitude of Angelina Co., four tip moth generations were expected. However, the higher numbers of moths captured in the three-year-old sites indicate that a possible fifth generation occurred in mid- to late-September. A fifth generation in a normally four-generation area is apparently not unusual when extreme drought conditions and high temperatures favor population and larval development.

Based on trap catch numbers and degree day calculations, the optimal spray dates for the first four generations were estimated to be March 24, April 28, July 14, and August 30 (Fig. 3). The optimal spray intervals for five sites in Mississippi (latitudes similar to Angelina Co., TX) were averaged to extrapolate for Texas sites. The intervals were estimated to be March 17-21, May 21-25, July 10-14, and August 24-28. Three intervals (for generations 1, 3, and 4) were on target or within 3 days with those dates calculated using degree day models, whereas an interpretive mistake resulted in one interval (generation 2) being 24 days later than predicted.

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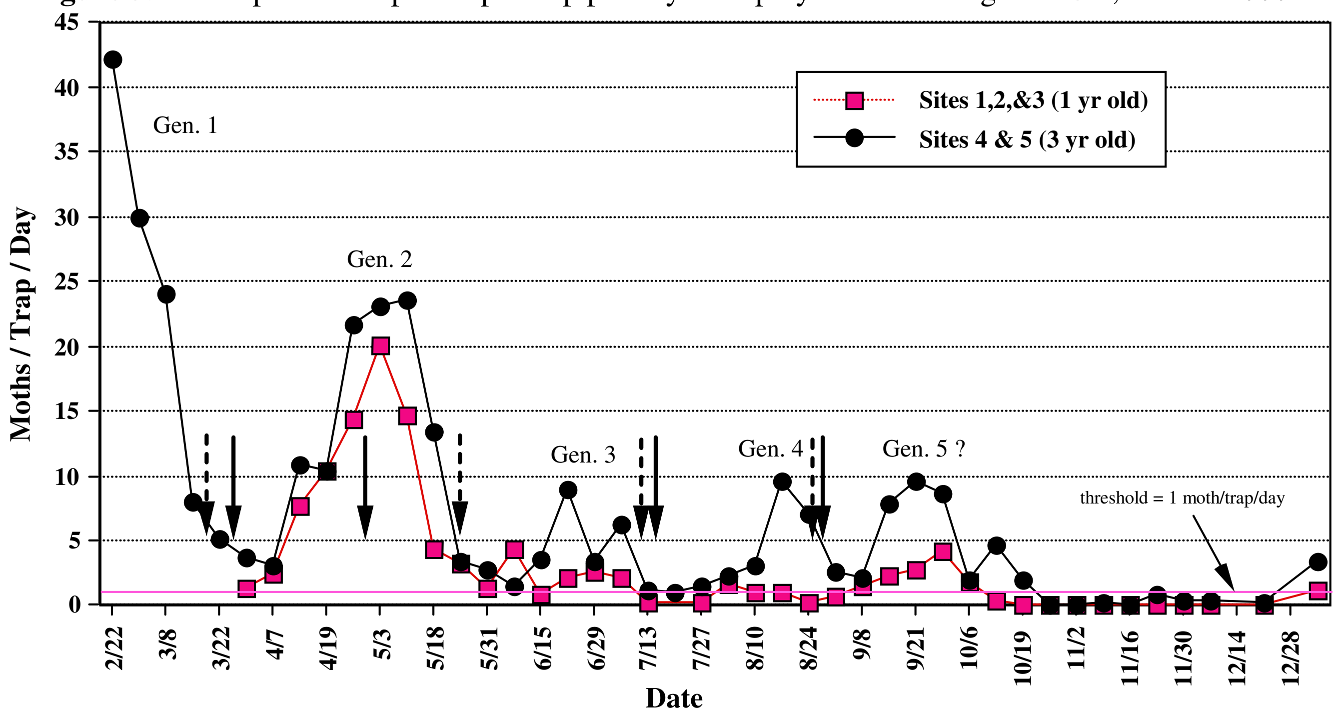
Figure 3. Pine tip moths captured per trap per day and spray dates* in Angelina Co., Texas - 1999.



* Vertical solid arrows indicate dates insecticides were applied based on degree day model predictions of optimal spray date for generations 1 - 4. Vertical dashed arrows indicate estimated optimal spray dates based on Fettig et al. 2000.

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Research Projects (Continued from Page 5)

Tip moth infestation levels were low to moderate on check plots (Fig. 4). The single high concentration Pounce® treatment provide good control during the first two tip moth generations, but did not protect the trees during later moth generations. The higher tip moth infestation levels that occurred during later generations in the single Pounce® treatment sites, compared to the check sites, was likely due to variability in

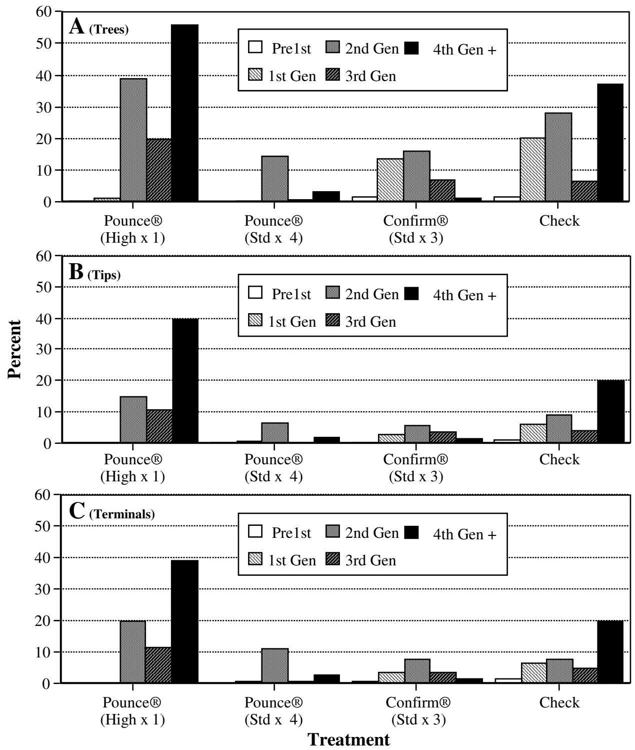

Figure 4. Nantucket pine tip moth infestation on loblolly pine trees (A), tips (B), and terminals (C) after applications of Pounce® or Confirm® at three sites in Angelina Co., TX - 1999.

the amount of weed vegetation in each plot. One Pounce® plot had virtually no weed vegetation in July, whereas the check plot at the same site was completely covered with shoulder-high goatweed. Except for the second generation, the multiple Pounce® treatment provided excellent protection against tip moth. This treatment significantly reduced late season infestation levels (percent trees and tips infested) compared to the check (Table 2). Even though the first generation application of Confirm® was missed, the treatment still provided good protection during the later generations. Tree height, form, and survival were not significantly affected by Pounce® or Confirm® treatments compared to the check in 1999 (Table 2).

A single application of high concentration Pounce® solution was not sufficient to protect seedlings from tip moth throughout the first growing season. However, multiple applications of standard concentrations of Pounce® did significantly reduce tip moth damage during most of the year. Confirm® also did well in protecting seedlings.

The effort required to predict optimal spray dates in a given year by means of degree day calculations is a significant deterrence toward establishment of tip moth control programs in plantations. Extrapolation of optimal spray intervals for Texas from Mississippi data was generally successful in 1999, but should be used with caution. Further development of Fettig's optimal spray intervals to include sites throughout the western gulf region should be one of the first steps in the development of a tip moth management program.

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Table 2. Pine tip moth infestation levels and effects after application of Pounce® and Confirm® in one-year-old loblolly pine plantations in Angelina Co., TX in 1999.

	Pct tip moth infestation on:			Effects on:		
Treatment [a]	Trees [b]	Tips	Terminals	Tree Height (cm)	Form (% w/ ≥1 fork)	Pct. Tree Mortality
Pounce® (High conc. X 1 appl.)	29.0 **c**	16.5 **c**	17.7 **b**	57.0 **a**	45.1 **a**	8.7 **a**
Pounce® (Std. conc. X 4 appl.)	5.0 **a**	2.4 **a**	3.8 **a**	48.0 **a**	36.2 **a**	20.7 **a**
Confirm® (Std. conc. X 3 appl.)	9.7 **ab**	3.4 **ab**	4.1 **a**	61.7 **a**	36.5 **a**	8.7 **a**
Check	23.2 **bc**	9.8 **bc**	9.7 **ab**	57.2 **a**	38.7 **a**	14.7 **a**

[a] High Pounce® applied once at 10.65 oz/gal on 3/24; Std. Pounce® applied 4 times at 4 oz/gal on 3/24, 4/26, 7/15, & 8/30; Std. Confirm® applied 3 times at 1 oz/gal on 4/26, 7/15, and 8/30.

[a] Treatments within columns with the same letters are not significantly different at the 5% level, based on Fisher's Protected LSD.

Pest Spotlight: Hypoxylon Canker

The effects of the severe droughts in 1998 and 1999 are still being felt in the East Texas area. One effect appears to be an increased incidence of *Hypoxlon* canker on hardwoods. This article summarizes the identification and management of this hardwood disease.

Hypoxylon cankers are common throughout the South on oaks and other hardwoods where they normally occur on stressed hosts. This disease should not be confused with *Hypoxylon* canker of aspen, which is caused by a different fungus. The canker is caused by one or more species of fungi in the genus *Hypoxylon*. Found in the outer-bark areas of living and healthy trees, the fungus is normally of little consequence. However, it can severely injure or kill trees weakened by factors such as drought, root disease, mechanical injury, logging, or construction activities. These agents of stress enable the fungus to move into the xylem and produce cankers on the branches and trunk. Apparently, the fungus is activated by reduced moisture in the xylem and bark. Once this low-moisture threshold is reached, the fungus quickly spreads. Especially in droughty areas, *Hypoxylon* fungi are closely associated with tree death. Other fungi found in weakened trees may also play a role.

Identification. Trees infected with *Hypoxylon* often develop severe injuries on the branches or trunk. They may also exhibit crown dieback. Large patches of bark often slough off along the trunk and major branches of infested trees, revealing the fungus fruiting bodies. As the infection progresses, the sapwood turns dull yellow, often with black zone lines. In spring and early summer, powdery greenish to brown or gray masses of the spores are produced on the surface of crusty, fungal tissue patches. These stromata are the most obvious signs of *Hypoxylon* canker. They vary from less than 1/4 inch to 3 feet long or more, running along the stem and main branches. In the summer or early fall, these stromata thicken, harden, and turn silver or bluish-gray, to brown or to black depending on the *Hypoxylon* species.

Hazard rating stands and trees. Many species of oak, including post, southern red, white, water, and blackjack (and, to a lesser extent, hickory) throughout the South are hosts to *Hypoxylon* canker. Trees growing on clay, sandy, rocky, or other poor soils are highly susceptible to this disease, particularly during extended drought. Other factors that can reduce vigor and predispose trees to *Hypoxlon* canker include:

Site changes - including flooding, erosion, etc.
Tree age - All ages are susceptible, but older trees are more so.
Tree injury - Logging injury, root injury, soil compaction, lightning strikes, insect defoliation, and spring frosts.
Tree exposure - Trees suddenly exposed to intense sunlight or site changes often undergo physiological changes which may reduce vigor.

Disease management in forested areas. The key is prevention. Forest management practices such as thinning are very beneficial and increase tree vigor, but if improperly applied, these practices can worsen *Hypoxylon* infection through injury, exposure, and site changes. Basically, forestry practices that increase stand vigor are encouraged. Conversely, practices that stress trees must be evaluated carefully. It is advisable to delay stand disturbances during drought. When *Hypoxylon* canker is present in a forested stand, evaluate it from the aspect of trees species and number of trees affected. If practical, salvage infected trees before they die. Proceed carefully, because logging may aggravate stand stresses. If removal of infected trees may result in an understocked stand, consider a final harvest cut. Then regenerate with tree species that are immune or resistant to *Hypoxylon* canker. An option for large forests is to set aside infected timber stands for other objectives such as wildlife.

Disease management in urban areas. The key again is prevention. Minimize injury to trees during construction (especially trenching). Avoid herbicide injury and minimize site changes. These steps will help maintain tree vigor. Fertilization, watering during droughts, and mulching will help ward off losses due to *Hypoxylon* canker. For high-value trees, consider lightning protection. When planting trees be sure to select the appropriate species, the proper site, and use good planting techniques.

Trees showing fruiting structures of *Hypoxylon* usually will not survive, regardless of treatment. Carefully prune branches that have a local infection to help slow the advance of the fungus.

Reference: Anderson, R.L., et al. 1995. How to identify and control Hypoxylon canker of oaks and other hardwoods. Protection Rep. R8-PR 29. USDA For. Serv. So. Reg.

Thought You Might Be Interested to Know . . .

EPA Action and Rationale on Dursban® / Lorsban® Insecticide Labels

Earlier this month the Environmental Protection Agency released its risk assessment on the active ingredient chlorpyrifos. This insecticide is known on the market as Lorsban®, Dursban® and other trade names. They also announced an agreement with the manufacturers of the product. Certain uses of the product will be eliminated and, in some cases, tighter restrictions will be in place.

Chlorpyrifos is one of most widely used organophosphate insecticides in the United States. It is available in about 825 pesticide labels and used in agriculture and in and around the home. Chlorpyrifos is labeled for about 40 different agricultural crops, fruits and vegetables. It is commonly found in many home-and-garden insect sprays and used in many treatments for termites. EPA estimates that approximately 50% of the use of chlorpyrifos is in agricultural settings. An estimated 24% of all use is as a termiticide. Chlorpyrifos is not currently a restricted use pesticide. The announced changes will include some of its uses being reclassified as restricted use.

This action is a result of EPA's re-registration process. EPA is re-evaluating existing pesticide active ingredients to determine if they meet the new safety standards established by the 1996 Food Quality Protection Act. Through this review, EPA has determined that chlorpyrifos, as currently used, does not provide an adequate margin of protection for children. This action added a greater measure of protection for children by reducing or eliminated the primary sources of exposure to the product.

According to an Washington Post article (June 1, 2000) just prior to EPA's announcement about chlorpyrifos, the EPA sets a safe exposure level for a pesticide at one-hundredth of the maximal concentration at which there are no detectable effects on an adult animal. Under the 1999 FQPA law, that hundred-fold safety margin is increased tenfold more if there is any evidence that infants or children are especially vulnerable to a pesticide. The level of chlorpyrifos that will now be deemed safe for children will be one one-thousandth of the "no-effect level." Hence, the product is effectively ruled out of home uses because consumers couldn't use the chemical without bumping up against that very low ceiling.

The Environmental Protection Agency and the registrants of chlorpyrifos have agreed to several modifications. Certain uses are ending or are more restrictive. Major changes are outlined below. The effective dates of each action are also given.

Food Uses. The agreement addresses food uses posing the greatest risk to children.

a. Apples - production of chlorpyrifos products labeled for post-bloom application is prohibited (only production for pre-bloom, dormant application is allowed (August - September 2000). Post-bloom use is prohibited (Dec. 31, 2000).

b. Tomatoes - production of products for tomato use is prohibited (Aug. - Sep 2000)

c. All agricultural uses - classify new end-use products for restricted use or package in large containers (Dec. 1, 2000). End use products must have a revised Restricted Entry Interval (Dec. 1, 2000)

Home Uses. The agreement will cancel and phase out nearly all indoor and outdoor uses by homeowners, limiting use to certified applicators.

a. Home lawn and most other outdoor uses - classify new end-use products for restricted use or package in large containers, except baits in child resistant packaging (Dec. 1, 2000). Retailers to stop sale as of Dec. 31, 2001.

b. Crack & crevice and most other indoor uses - classify new end-use products for restricted use or package in large containers (Dec. 1, 2000). Retailers to stop sale as of Dec. 31, 2001.

c. Termiticides - classify new products for restricted use or package in large containers (Dec. 1, 2000). Limit use to 0.5% solution in label directions by Dec. 1, 2000.

- Full barrier (whole house) post-construction use - use will be canceled. Retailers to stop sale by Dec. 31, 2001
- Spot and local post-construction use - use will be canceled. Stop use by Dec. 31, 2002.
- Pre-construction use - use will be canceled. Stop use by Dec. 31, 2005.

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Thought You Might Be Interested to Know . . . (continued from page 8)

Non-residential Uses. Uses on sites where children could be exposed will be phased out.

a. Indoor areas, such as schools - uses will be canceled. Retailers to stop sale by Dec. 31, 2001.

b. Outdoor areas, such as parks - uses will be canceled. Retailers to stop sale by Dec. 31, 2001

Other non-agricultural uses. Some non-agricultural uses will remain. In some cases, application rates may be adjusted. They include outdoors uses where children will not be exposed - golf courses, road medians, industrial plant sites, nonstructural wood treatments (fenceposts, poles, railroad ties, landscape timbers, pallets, etc.). The public health uses for mosquito control and fire ant mounds will be allowed for professional use only.

The Environmental Protection Agency has a series of documents available on the chlorpyrifos decisions on its web site. They include questions/answers for consumers, registered chlorpyrifos alternatives, a risk assessment summary and a fact sheet registrant agreement summary.

EPA advises consumers that short-term use of any existing products consumers may have on hand does not pose an imminent risk. Use of these products according to label directions does not pose a health concern. The best disposal of the product is its use according to the label. (Source: The Label, 6-00)

(Editor's Note: Cyren® 4E is currently the only known chlorpyrifos formulation registered for use against southern pine bark beetles in forest plantations; time will tell if we lose this one also. However, research is being conducted by scientists with the USFS and U. of Georgia to find alternatives to chlorpyrifos and lindane to protect trees against southern pine bark beetles.)

To make bad news worse, the EPA is also concerned about residential/occupational risks of diazinon, another organophosphate. The Agency has released its preliminary assessment of risks. The comment period will close July 18. If you care about diazinon, you should take the time to review the assessment. You can find it at http://www.epa.gov/pesticides/op/diazinon.htm (Source: Georgia Pest Management Newsletter, 6-00).

New Tools

The EPA has granted a two-year registration for a new biochemical pesticide that triggers a plant's natural defenses against bacteria, fungi, and viruses. A protein called Harpin induces systematic acquired resistance when it is applied to plants. It can be used on a wide variety of crops and ornamentals. The Harpin product (Messenger®) is produced with a modified form of *Escherichia coli*, but the *E. coli* is eliminated from the product before it is applied. The EPA reports that the new pesticide has little or no toxicological risks for man or the environment. The agency also reports that the protein reduced the use of conventional pesticides 70 percent in a tomato IPM experiment while outperforming conventional products. For more information, go to www.epa.gov/pesticides/ and search for 'harpin.' (Source: Georgia Pest Management Newsletter, 6-00)

EPA also has registered a new, biochemical insect repellent derived from *Eucalyptus* plants. The first end-use product, OFF! Botanicals 1 Insect Repellent, is a spray applied to human skin or clothing to provide protection from annoying mosquitoes, biting flies, gnats and no-see-ums. This new insect repellent is effective for up to two hours. The registrations were issued under a "conditional" status because the Agency is awaiting the results of a field test on the effectiveness of this bio-pesticide in repelling biting flies, gnats and no-see-ums. For more information, contact Jim Downing in EPA/OPP's Biopesticides and Pollution Prevention Division at (703) 308-9071. (Source: EPA OPP Update, 4-00 via The Label, 5-00)

A Japanese company is examining methyl iodide as a potential replacement for methyl bromide. According to researchers, methyl iodide is just as effective as methyl bromide, and it fits into current systems of production. Methyl iodide does not deplete the ozone layer, and it does not persist in the atmosphere. (Chemical Regulation Reporter, 2-7-00 via Kansas Pesticide Newsletter, 5-00 via Georgia Pest Management Newsletter, 6-00). Don't clap for joy yet. To produce registration data will require 3-5 years and \$10 million to \$20 million. Additionally, methyl iodide is highly toxic even if it is not an ozone depleter. Thus, it seems unlikely that methyl iodide will ever be registered for use in the United States.