Progress

Education

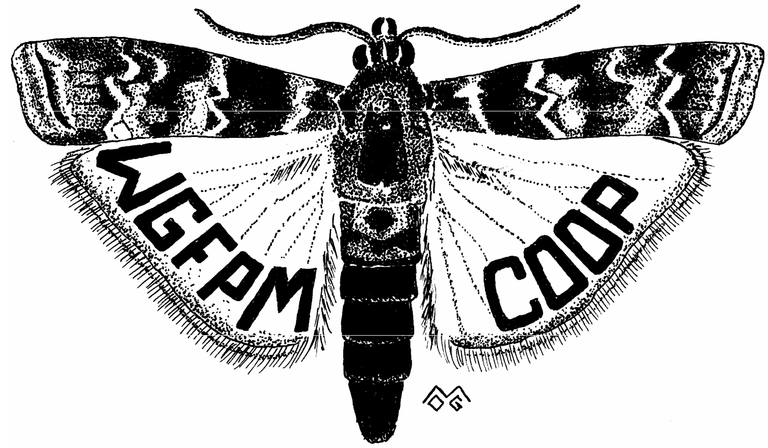
Science

Technology

Vol. 3 No. 2 June 1998

Quarterly Newsletter on Western Gulf Forest Pest Management Issues

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).



Southern Pine Coneworm, *Dioryctria amatella* (Hulst)

Texas Forest Service, Forest Pest Control Section,
P.O. Box 310, Lufkin, Texas 75902-0310

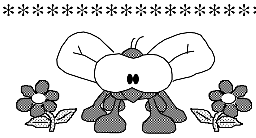
****

Announcements:

The WGFPMC welcomes **U.S. Forest Service, Forest Health Protection (R8)** as its newest member. The USFS, FHP serves the national forests and works with state and private agencies to maintain forest health. Dr. David Drummond will represent USFS, FHP on the executive committee and Drs. Stephen Clarke and Alex Mangini will serve as contact representatives.

Dr. Brett Runion (forest nutrition / pest management) has replaced Richard Smeltzer as the Executive Committee representative for International Paper. He can be reached at 912/246-3642 x-220 or by e-mail at brett.runion@ipaper.com

****



SPB Levels Expected to Decline in 1998

(from Ron Billings, Texas Forest Service, Pest Control Section)

Results of the southern pine beetle (SPB) pheromone trapping survey conducted in March - May 1998 in 13 southern states offer good news for forest managers. With the exception of Alabama and Florida and to a lesser extent Georgia, SPB infestation levels are expected to decline or remain at low levels for the remainder of the year (Table 1). Trapping results for 1997 and 1998 and 1998 SPB trend predictions for specific locations within each southern state are available on the internet at the USFS Southern Station web page (http://www.fs.fed.us/research/4501/no-graph.htm) or the VPI & SU SPB Info. Directory (http://www.ento.vt.edu/~salom/SPBinfodirect/spbinfodirect.html).

The prediction survey, developed by the Texas Forest Service, has been conducted annually across the South since 1986. Predictions are based on early season (March - May) responses of SPB and its major predator, the clerid or checkered beetle, *Thanasimus dubius*, to traps baited with the SPB aggregation pheromone "frontalin" and southern pine turpentine. Increasing SPB infestation trends for the current year can be expected when SPB/trap/day exceed ca. 30 SPB/day <u>and</u> % SPB (ratio of SPB to total catch of SPB + clerids) exceeds ca. 30%. Conversely, declining populations usually result when SPB/trap/day averages less than 20 per day and predators far outnumber SPB. The latter situation defined most locations surveyed in 1998, based on 1 - 3 traps per county, parish, or ranger district.

The few locations surveyed in which SPB infestation levels are expected to increase substantially from 1997 levels include East Feliciana and St. Tammany parishes in LA, Tishimingo County in MS, Lowndes and Tallapoosa counties in AL, Armuchee and Oconee Ranger Districts and Bryan, Cook, Hancock, Liberty, Lincoln, Lowndes, and Stewart counties in GA, and Alachua, Columbia, Jackson, Jefferson, Leon, Levy, Suwannee, and Walton counties in FL.

Continued on Page 2

SPB Prediction (Continued from Page 2)

Table 1. Summary of Southwide Southern Pine Beetle Trend Predictions for 1998

State	No of infestations in 1997	No. of Locations Trapped	1997 % SPB	1997 # SPB	1998 % SPB	1998 # SPB	1998 Prediction Trend/Level	Most Likely Locations of SPB Activity
Oklahoma	---	1	37%	3.9	28%	1.7	Static/Low	---
Arkansas	292	9	27%	6.2	14%	1.3	Declining/Low	---
Texas	842	19	20%	9.8	8%	2.5	Declining/Low	Jasper, Newton, San Augustine Co., Sabine N.F.
Louisiana	824	23	30%	8.0	24%	4.3	Declining/Low-Moderate	E. Feliciana, Evangeline, St. Tammany Co.
Mississippi	1,999	9	19%	11.1	18%	7.2	Declining/Low	Tishimingo Co., Choctaw I.R.
Alabama	3,273	5	33%	13.3	37%	28.0	Increasing/Moderate	Lowndes, Tallapoosa Co., Talladega R.D.
Georgia	1,331	32	34%	5.5	37%	14.1	Increasing/Low-Moderate	Bryan, Cook, Hancock, Liberty, Lincoln, Lowndes, Stewart Co., Armuchee, Oconee R.D.
Tennessee	114	4	15%	0.2	35%	1.0	Static/Low	Nolichucky R.D.
Maryland	0	3	8%	0.3	30%	1.1	Static/Low	---
Virginia	77	3	10%	0.4	23%	0.7	Static/Low	New Castle R.D.
North Carolina	877	6	49%	3.7	28%	2.0	Declining/Low	Davidson Co.
South Carolina	1,990	31	41%	5.8	25%	1.3	Declining/Low	Lancaster, McCormick Co.
Florida	812	19	22%	0.6	59%	7.2	Increasing/Moderate	Columbia, Jackson, Jefferson, Leon, Levy, Marion, Suwannee, Walton Co.
Southern States	12,431	164	27%	5.3	28%	5.6	Declining/Low	Lousiana, Alabama, Georgia, Florida

During 1997, relatively few SPB infestations were detected in the Western Gulf region. The number of multiple-tree infestations (spots) reported by state were 292 in AR, 842 in TX, 824 in LA, and 1,999 in MS. The total number of SPB spots in these four states in 1997 (3957) represents a 48% reduction from 1996 (7562 spots) and an 82% reduction from the high populations experienced in 1995 (22,119 spots).

Although few SPB spots have been reported in the Western Gulf region to date in 1998, the hot dry weather may favor increased bark beetle activity as the summer progresses. Historically, however, severe drought conditions have predisposed plantations and natural stands more to attacks by engraver beetles (*Ips* spp.) than to SPB.

For more information on the SPB prediction system, contact Ron Billings at (409) 639-8170 or by e-mail at tfs.pcs@inu.net.

****

Summary of 1997 WGFPMC Research Projects

In 1997, three research projects were continued from 1996 including the reproduction weevil impact study, the leaf-cutting ant control study, and the systemic injection study. Results for the weevil study were presented in the last PEST newsletter (March 1998). A summary of the results for the leaf-cutting ant and systemic injection studies is presented below.

Texas Leaf-cutting Ant Control Study

The Texas leaf-cutting ant (TLCA), *Atta texana* (Buckley), is a serious pest in first- and second-year pine plantations in east Texas and west-central Louisiana. With the scheduled withdrawal of methyl bromide by 2001, a study was initiated in 1996 to re-evaluate Amdro® leaf-cutting ant bait (hydramethylnon) and evaluate several new options (i.e., resmethrin and sulfluramid) for their effectiveness in halting ant activity.

During the summer of 1996, only the four sulfluramid bait treatments halted ant activity in more than 60% of the treated colonies (PEST 2(1), Fig. 1). The study was continued during the winter and summer of 1997 to identify factors which may limit the effectiveness of hydramethylnon, evaluate the efficacy of resmethrin, hydramethylnon, and sulfluramid using different application rates and techniques on halting ant activity, and determine the effect of season on treatment efficacy.

Continued on Page 3

Research Projects (Continued from Page 2)

Forty-four (winter of 1996-97) and 91 TLCA colonies (summer of 1997) were treated and monitored in Jasper and Newton counties, TX on land owned by Temple-Inland, Louisiana-Pacific, and/or Champion. The level of TLCA activity was evaluated 2, 8, and 16 weeks post-treatment for each colony and compared to activity prior to treatment.

During the winter trials, all seven of the treatments [sulfluramids (483 high, med., and low rates and 485 high and low rates) and hydramethylnon (Amdro® regular and big granule size)] significantly reduced ant activity after 2 weeks compared to the check colonies. However, only the sulfluramid baits applied at >3g/m^2 completely halted ant activity in more than 60% of the treated colonies after 16 weeks (Fig. 1). The effectiveness of Amdro® in halting ant activity was not improved by the application of large grit only.

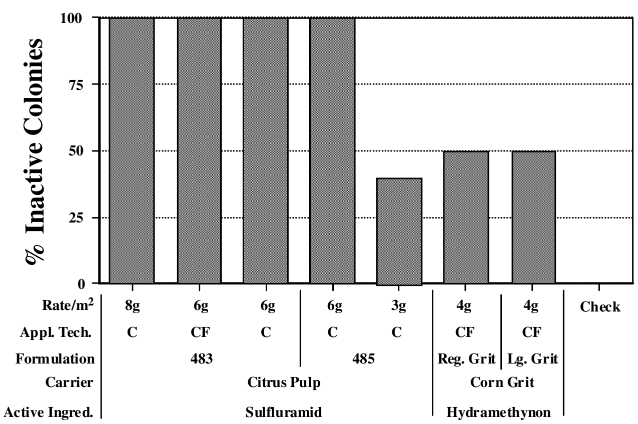


Figure 1. Percent of Texas leaf-cutting ant colonies inactive after 16 weeks post-treatment (winter 1996-97).

During the summer trials, all 13 insecticide treatments (4 sulfluramid, 3 hydramethylnon, 4 resmethrin, and 2 methyl bromide) significantly reduced ant activity after 2 weeks compared to the check colonies. However, only the four sulfluramid baits and the methyl bromide standard treatment completely halted ant activity in more than 60% of the treated colonies after 16 weeks (Fig. 2). Most colonies treated with hydramethylnon, resmethrin, and the low methyl bromide rate completely recovered in 16 weeks or less.

Over the past 18 months, tests performed on Amdro® (hydramethylnon) attempted to identify factors responsible for its recent reduced

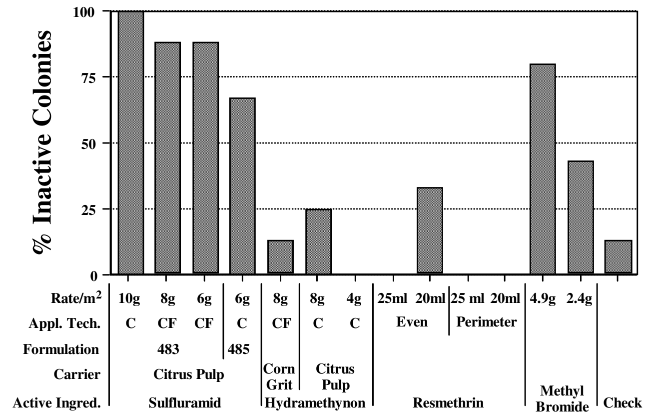


Figure 2. Percent of Texas leaf-cutting ant colonies inactive after 16 weeks post-treatment (summer 1997).

effectiveness (20-30%) compared to results of earlier efficacy trials (80%). Factors evaluated included the effects of application timing during the day (early vs. late), season (winter vs. summer), application technique (central nest only vs. central nest + foraging mounds), bait storage and/or freshness, application rate (high vs. low), bait carrier (corn grit vs. citrus pulp), and bait granular size (regular vs. big). Field data and observations suggest that the leading factor that has limited Amdro® effectiveness is small granular size. The majority (54%) of the Amdro® formulation is made up of granules having a diameter less than 1 mm. This grit size is considered too small to attract the ants and is most likely lost upon application. TLCA generally 'prefer' larger granules over small ones - up to a point. The optimal size range preference appears to be 3 - 5 mm dia. Larger granules (> 5 mm), which predominate in the citrus pulp bait, are generally too large for TLCA to pick up, let alone carry. The large size of the citrus pulp bait may have been the primary factor explaining its poor efficacy.

Although resmethrin was found to be 72% effective in halting ant activity using a prototype applicator in earlier studies, recent applications of this chemical using the Eradicator® applicator were far less effective (0-33%) (Fig. 2). The limiting factor appears to be the 'cooler' fog produced by the small Eradicator® applicator. Apparently the larger prototype applicator produced a hot fog capable of penetrating to the base of the ant colony where the queens reside. The 'cooler' fog produced by the Eradicator® presumably condenses onto the tunnel walls before it reaches the queens.

Continued on Page 4

Research Projects (Continued from Page 3)

Although some reports had indicated that TLCA colonies can be controlled during the late fall or winter with less than the label recommended rate of methyl bromide (4.8 g/m^2), generally this is not the case for summer treatments (Table 3). Thus the label rate is recommend when treating TLCA colonies during the summer.

The sulfluramid (483) bait has been, by far, the most effective alternative to methyl bromide - completely halting ant activity on no less than 67% of the treated colonies (Figs. 1 & 2). The sulfluramid bait appears to have several characteristics which make it attractive to the ants and subsequently effective as a control option:

- Sulfluramid on a citrus pulp carrier appears to be highly attractive to the ants.
- The size of the sulfluramid bait granules appears to be optimal for the TLCA. The ants have little trouble finding and picking up the fairly uniform-sized (3 - 5 mm) granules.
- Sulfluramid is a slow-acting poison which takes several days to begin killing the ants. This provides time for worker ants to retrieve the impregnated carrier and, ideally, offer it to the queen.
- Unlike hydramethylnon, sulfluramid is not sensitive to ultraviolet light and so can be applied at any time of the day.

Winter applications of sulfluramid at less than 10 g/m^2 were more effective than summer applications; even the 6 g/m^2 application rate was 100% successful during the winter (Fig. 1). The better success of winter applications appears to be related to the lower availability of plant material. However, summer applications of sulfluramid were 100% successful at 10 g/m^2. This indicates the potential for year around control. Additional trials are/will be conducted in 1998 to confirm or establish the lowest application rate that provides 100% control for each season.

Systemic Injection Study

Several past studies have shown that injections or implants of Orthene (acephate) can provide fair to good full season control of cone-damaging pests of different conifer species. However, the Orthene trunk injection trials conducted by the WGFPMC in 1996 showed, at best, only half season control of coneworms. The uptake and translocation of Orthene may have been inhibited by the resin flow in response to drilling holes in the trees. Also of concern is the drill hole as a point of entry for fungal disease agents. A "new" injector system (Wedgle™ Tip, ArborSystem L.L.C.), uses a 1.5 mm dia. needle to penetrate through the bark and phloem to the xylem layer and causes little, if any, damage to the tree. Two new systemic insecticides, imidacloprid and abamectin, have shown promise for the control of Nantucket pine tip moth and hardwood pests.

Field trials were conducted in 1997 to evaluate the potential of the "new" Wedgle Tip™ injector for application of systemic insecticides into loblolly pine trees and efficacy of trunk injections of acephate, imidacloprid, and abamectin in reducing losses to coneworms and seed bugs.

Initial trials in February - March to inject water into pines were unsuccessful as the phloem layer did not separate from the xylem. Phloem separation was finally obtained just after leaf flush (April 1). Unfortunately, the rubber plugs inserted into the bark to prevent the injected fluid from leaking out were ineffective. A metal-sheathed plug was developed which prevented a 1 ml injected quantity from leaking out 70% of the time. Preliminary evaluations indicate that dyed water or acephate, injected to form a pocket between the phloem and xylem, was transported up the bole via conductive tissue in the xylem.

An efficacy trial was conducted in 1997 at the Texas Forest Service Magnolia Springs Seed Orchard in a block containing drought-hardy loblolly pine. Six ramets from each of 6 loblolly clones were selected. Injection treatments were applied in late May either by the Wedgle™ Tip Tree Injection System or by drilling 1.3 cm holes (13 cm deep) into the trunk of a sample tree at a 60-70 degree angle. Application spacing around the circumference of the tree was 10 cm. To protect the cones and conelets until the trees could be injected, Asana XL (AXL) was applied on May 1 to all but the check trees. The treatments consisted of:

1) 20 ml Orthene 75S applied to 4 in. deep drill holes + AXL
2) 2 ml Orthene 75S applied by Wedgle Tip™ + AXL
3) 2 ml 1.9% Abamectin applied by Wedgle Tip™ + AXL
4) 2 ml 5% Amidacloprid) applied by Wedgle Tip™ + AXL
5) Asana XL (AXL) only
6) Check

The effects of treatments were checked by evaluating survival of conelets and cones on 6-10 flagged

Continued on Page 5

Research Projects (Continued from Page 4)

branches and damage on picked cones from each tree. Seed lots, from a subsample of healthy cones, were radiographed to measure the extent of seed bug damage.

Evaluations of flagged branches showed low levels of damage on 1st-year conelets (14.1%) and high levels on 2nd-year cones (60.9%) on check trees. Overall damage on conelets due to coneworm and/or seed bug was not significantly reduced by any of treatments (Fig. 3A). Although overall damage on 2nd-year cones did not differ among treatments, significantly less cone damage occurred between treatment and harvest on imidacloprid + Asana XL-treated trees then on Asana XL only-treated trees (Fig. 3B).

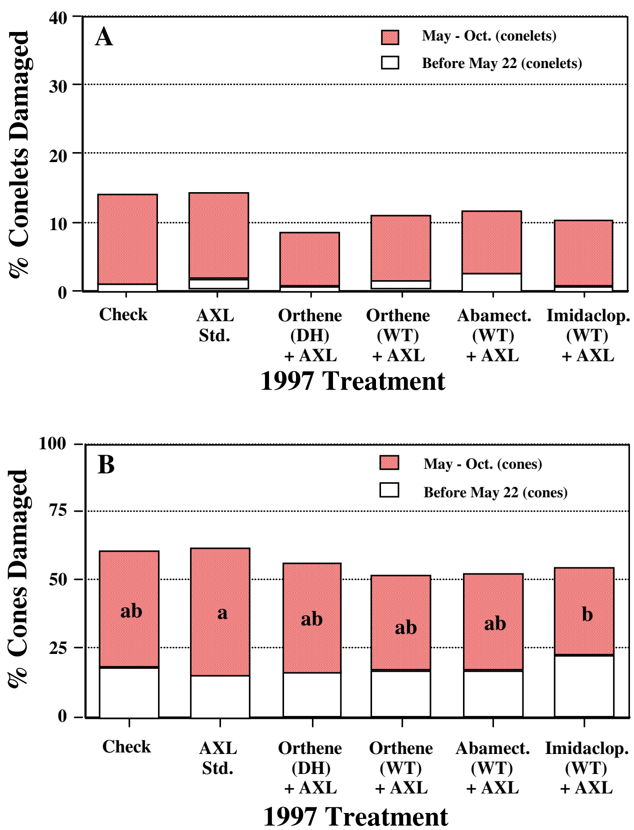


Figure 3. Damage to conelets (A) and cones (B) on flagged branches before and after treatment. Bars with the same letters or no letters are not significantly different at the 10% level (Fisher's Protected LSD).

Evaluations of picked cones for coneworm damage showed no significant differences among treatments (Fig. 4). However, the imidacloprid treatment did reduce early, late, and total coneworm damage by 27.6%, 24.0%, 25.5%, respectively, compared to the check. The acephate (drill hole) treatment was next best, reducing total damage by 16.1%.

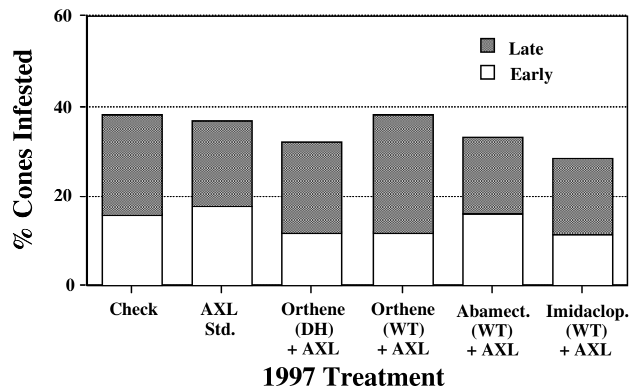


Figure 4. Early and late coneworm infestation in picked cones. Bars with the same letters or no letters are not significantly different at the 10% level (Fisher's Protected LSD).

Radiographic analysis of seed lots showed that all four injection treatments significantly reduced seed bug damage compared to the check (Fig. 5). Overall, the acephate (drill hole) and imidacloprid treatments provided the greatest reductions (75.7% and 63.3%, respectively).

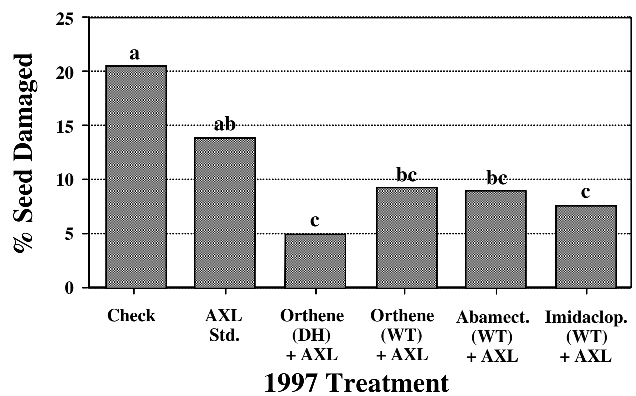


Figure 5. Loblolly pine seed damaged by seed bugs. Bars with the same letters are not significantly different at the 10% level (Fisher's Protected LSD).

The data suggest that the Wedgle Tip™ injection system does have significant potential as an alternative to foliar or drill hole applications. However, the metal-sheathed plug had several limitations, including: 1) full installation required 24 hours (to allow silicone to dry); 2) due to the length of the metal sheath, it could not be installed in trees with bark less than 9 mm thick (on thinner-barked trees, the sheath would penetrate into the phloem region and cause a wound response); and 3) full or partial failure of the plug required reinstallation of the plug and an additional 24 hour wait. Although, imidacloprid (by Wedgle Tip™) and Orthene (by drill hole) were found to reduce coneworm and/or seed bug damage levels on pine seed orchard trees, several factors are believed to have reduced the

Continued on Page 6

Research Projects (continued from Page 5)

effectiveness of the injection treatments, particularly those which required the use of the Wedgle Tip™ injector. These factors may include:

1) Injections were performed in late May. Initial injections need to made in early April.
2) Insecticide concentrations were not sustained at high enough levels to kill or deter pests through the whole growing season. Multiple injections or injection of higher concentrations of insecticide may be required to get full season control of pests.
3) On thin-barked trees, the long, metal-sheathed plugs often penetrated and wounded the phloem layer preventing insecticide uptake.
4) The plugs often (~30%) failed (leaked) after first installment, decreasing the total volume of insecticide injected into each tree. Preliminary trials with shorter screw-type plugs show promise for reduced retention.

****

Thought You Might Be Interested to Know . . .

Key Pesticides Threatened by FQPA

(from PEP-TALK, Mar. 1998)

In August 1996, the President signed the Food Quality Protection Act (FQPA) into law. The FQPA is the most significant piece of pesticide and food safety legislation passed in many years. While agriculture prematurely celebrated the demise of the Delaney Clause, the new policies and procedures set in place by the law now threaten key groups of agricultural pesticides, notably the organophosphates (OP's) and the carbamates.

In recent months, EPA has made it clear that the potential exists to cancel many organophosphate uses in the near future. OP's include insecticides such as malathion, diazinon, Orthene*, Dursban*, Guthion*, Disyston*, Imidan*, and Dibrom*. Sevin* and Furadan* are examples of carbamate insecticides. These two groups represent a significant portion of pesticides available for forestry and agricultural use. As a result, minor crop producers face the loss of significant tools for their IPM programs and serious challenges in altering their production practices since, in many cases, replacements for these products do not exist. In the future, another group of pesticides that include the EBDC fungicides, such as Bravo and Dithane, face review as well.

FQPA requires EPA to evaluate groups of pesticides together with common modes of action as well as all sources of exposure, not just dietary. As a result, the "risk" cup for exposure is already overflowing for the OP's. EPA must decide on cancellations. In recent meetings, EPA has been vague in outlining their actual decision-making schedule. But, the clock is ticking on Congress's mandate to review and to take action by August 1999 on 33% of all pesticides of which the OP's are the first targeted group.

As grower groups and the chemical industry have come to realize that the OP's and other products are in serious danger of being lost, they have begun to challenge EPA's decision-making process and underlying assumptions. In the meantime, environmental groups have stepped up their efforts to push for discontinuing the OP's and other classes of pesticides. And some food processors are already requiring contract growers to restrict or eliminate some products from their spray programs this season. Pesticide manufacturer's may ultimately make the decision regarding what remains in the market based on economics. They may sacrifice minor uses to keep more profitable uses.

What EPA will do and when is anyone's guess. Industries and growers need to make their voices heard now on what uses are absolutely essential to them. Another need is accurate use data. Various organizations are surveying and working to find out actual use information so that EPA will not use default, worst-case assumptions in their decisions. Growers can help by taking the time to provide good, accurate information on how these pesticides are actually used in their production and how much is used.

Whether enough pressure can be placed on Congress to revisit the law they passed two years ago remains to be seen. One thing is certain, if the EPA continues on the path they are suggesting, FQPA will change the face of forestry and agricultural food production. (For more information, see the FQPA website at http://www.epa.gov/opppsps1/fqpa/)

* Registered in most Western Gulf States for use in forested areas, nurseries, and/or seed orchards.

Evaluation of WGFPMC Progress in 1997

In order to identify ways to improve the productivity or quality of services provided by the WGFPMC for 1998, executive committee and contact representatives were asked to rate the following aspects of research and technology transfer performed in 1997 using the scale below:

Excellent (Yes)		Average		Poor (No)	Not Applicable
5	4	3	2	1	NA

1. How would you rate the overall accomplishments of the WGFPMC in 1997?
   Respondents: 3 — Mean Rank: 3.0 — Range: 3

2. How would you rate the progress of the three research projects?
   a. Systemic Injection
   Respondents: 3 — Mean Rank: 2.7 — Range: 2 - 3
   b. Leaf-cutting ant control
   Respondents: 3 — Mean Rank: 3.7 — Range: 3 - 4
   c. Weevil Impact
   Respondents: 3 — Mean Rank: 3.0 — Range: 3

3. How would you rate the overall transfer of information and technology via newsletters, meetings (including contactmen's and executive committee), reports, phone contacts, and demonstrations?
   Respondents: 3 — Mean Rank: 3.7 — Range: 3 - 4

4. Should there be an increase in the number of any of these mediums of transfer?
   Respondents: 3 — Mean Rank: 2.3

5. Was the information distributed in the PEST newsletters of use to you and your company?
   Respondents: 3 — Mean Rank: 3.7 — Range: 3 - 4

6. Would you like to receive a list of registered products and guidelines for:
   a. Hardwood pests
   Respondents: 3 — Mean Rank: 5.0
   b. Fungicides?
   Respondents: 3 — Mean Rank: 5.0
   c. Herbicides?
   Respondents: 3 — Mean Rank: 3.7

7. Were on-site evaluations of pest problems of benefit to you?
   Respondents: 3 — Mean Rank: 4.0 — Range: 3 - 5

8. How would you rate Don Grosman's overall performance as Coordinator of the WGFPMC?
   Respondents: 3 — Mean Rank: 2.7 — Range: 2 - 3

9. Would you be interested in participating in any of the proposed studies for 1998?
   a. Leaf-cutting ant
   Respondents: 2 — Mean Rank: 5.0
   b. Systemic injection of orchard trees
   Respondents: 2 — Mean Rank: 5.0
   c. Weevil impact
   Respondents: 2 — Mean Rank: 5.0

10. Would you be interested in participating in a coneworm monitoring program?
    Respondents: 3 — Mean Rank: 5.0

Which 3 pest species (or groups) deserve top priority with regards to research:

Responses included:

A.	B.	C.
leaf-cutting ants	seed & cone insects	tip moth
SPB	seed & cone insects	weevils
leaf-cutting ants	seed & cone insects	tip moth

The single WGFPMC contribution or activity you found to be <u>most</u> useful in 1997 was:
methyl bromide training, technology transfer

The single WGFPMC contribution or activity you found to be <u>least</u> useful in 1997 was:
executive meeting, weevil project

An Unannounced, Closed Book Quiz

(from The Georgia Pest Mgt. Newsletter, Feb./Mar. 1998; The Label, 1-98)

Here is a little quiz to test your pesticide knowledge. The answers are on page 9.

1. How many pesticides are available in the United States?
2. How much pesticide active ingredient was used last year in the United States? How much is it worth?
3. What single pesticide accounts for 50% of all the pesticide used in the United States? (Hint: not applied to plants or soil)
4. Name the top five agricultural pesticides (by total pounds applied). Consider yourself an expert if you can name three of them.
5. Name the most commonly used non-agricultural pesticide that is applied to plants or soil. (Kick yourself if you can't get this one)
6. How many pesticide manufacturers are there in the United States?
7. How many certified pesticide applicators are in the United States? (Bonus: How many commercial applicators and how many private?)

****

Thought You Also Might Be Interested to Know . . .

Verbenone Update

(from SPB Update, Apr. 1998)

Verbenone, a bark beetle antiaggregation pheromone, has proven effective in slowing or halting the growth of southern pine beetle (SPB) infestations. The USDA Forest Service helped fund and coordinate operational studies with the Texas Forest Service, University of Georgia, and Virginia Tech to test the "Verbenone Pouch" developed by Phero Tech, Delta, British Columia, Canada. These studies determined efficacy and refined deployment strategies.

Prior to 1998, the U.S. Environmental Protection Agency has allowed verbenone field testing under the auspices of an Experimental Use Permit. This year Phero Tech is optimistic that the verbenone pouch will receive a conditional registration. This will allow use of verbenone for other than experimental purposes. The conditional registration will progress to full registration after data deficiencies are addressed.

Phero Tech will use a conservative marketing strategy upon issuance of the conditional registration. "Verbenone pouches will only be available to those demonstrating a proficient understanding of SPB and the complications associated with managing them with verbenone." For additional information, contact Steve Burke (Phero Tech), (800) 665-0076, Ron Billings (TX Forest Service), (409) 639-8170, or the SPB Technology Transfer website at http://www.ento.vt.edu/~salom/Workshop/workshop.html.

Nonchemical Seed Tree Orchard Sanitation

(from Short Subjects and Timely Tips, Apr./May 1998, Tech. and Dev. News, Mar./Apr. 1998)

The USDA forest Service is investigating two new methods of killing seed and cone insects in seed orchards without using insecticides. One method uses a modified agricultural propane flamer to kill white pine cone beetles while they overwinter in cones on the orchard floor. During a test conducted at an orchard in Wisconsin, this modified flamer killed 87% of the beetles in the cones. A second method uses a commercial turf vacuum to remove cones and duff from the orchard floor. In tests, the vacuum removed 95 to 100% of the cones in an open area and 83% in the rows between the trees. A third machine, which combines the vacuum with a power brush attachment, collected 97.5% of the cones in the rows between the trees. With all three machines, there are problems reaching cones at the base of trees and all three became less efficient when the pickup surface was uneven. A turf sweeper is being modified to continue the investigation. The development and testing work is summarized in *Nonchemical Seed Tree Orchard Sanitation*, 9724-2828. To obtain a copy, contact Publications Distribution, (406) 329-3978. For additional information, contact Keith Windell, (406) 329-3956.

Continued on Page 9

More Problems with Bug Zappers

(from Chemically Speaking, June 1998; Reuters; May 25, via FSnet; May 26, 1998

When a common house fly gets zapped by an electronic bug zapper, millions of bacteria on the surface of the insects are scattered into the air, as far as six feet when the zapper causes the insects to explode. Because the bacteria covering the legs and bodies of house flies are obtained from human or animal wastes, bug zappers may be spreading more disease than they prevent. Anyone who uses the electronic devices should keep themselves and food at least six feet from the devices, and keep the zappers where they won't be exposed to air currents from fans, vents, or open windows.

Bacteria That Make Bugs That Go - Boom!

(from The Label, May 1998; UPI; Dec. 17, 1997)

University of Wisconsin toxicologists have been studying a strain of bacteria that kills pests by exploding their bodies. The bacteria's actions were described as "making 'Alien' look like a cakewalk." As the bacterium, *Photorhabdus luminescens*, invades an insect, the pest begins to die. It then starts glowing with blue light and then explodes, releasing hundreds of thousands of parasites that continue to eat the insect's tissue. *Photorhabdus luminescens* is incubated in a nematode, which latches onto a victim and gnaws a hole. Once inside an insect's bloodstream, it begins to release the bacterium, which then starts destroying cells on the lining of the insect's gut. Dow AgroSciences and the Wisconsin Alumni Research Foundation have a joint patent on the bacterium's toxin and the genes, and they plan to start selling field corn capable of producing the toxin within five years.

****

Quiz Answers (from page 8)

1. About 875 active ingredients. Approximately 21,000 registered pesticide products.
2. Approximately 4.5 billion pounds, worth about $11 billion in sales.
3. Chlorine, used for water treatment.
4. Atrazine, metolachlor, metam sodium, methyl bromide, and dichloropropene.
5. 2,4-D
6. 18 major operations and approx. 100 others.
7. Approximately 1.3 million. About 380,000 commercial applicators and 960,000 private applicators.

If you answered more than three questions correctly, you deserve a day off from work.

****

More Announcements

WGFPMC Contact Meeting: All WGFPMC Executive Committee and Contact representatives, industry, and TFS foresters are invited to attend the 1998 WGFPMC Contact Meeting scheduled for Tuesday, June 30th. The meeting will begin at 9:00 AM at the Ramada Inn in Jasper, TX. The meeting will cover the status of WGFPMC research projects, provide training for the identification of insects and diseases of pine, and demonstrate new treatments for leaf-cutting ant and seed and cone insect control.. For more information, to RSVP, or to request a seminar agenda and map to the meeting location, call Martha Johnson or Don Grosman, TFS, at 409/639-8170.