Progress Education Science Technology

Vol. 11 No. 1 April 2006

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).

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Announcements:

North American Forest Insect Work Conference - All are invited to attend the 2006 North American Forest Insect Work Conference (NAFIWC) being held in Asheville, NC at the Renaissance Hotel from May 22 - 25, 2005. The NAFIWC draws together forest entomology professionals, practitioners, and students from the US, Canada, and Mexico for discussions of contemporary issues in forest entomology. The agenda is broad-based and includes topics relating to research, development, application, and education. More information about the NAFIWC can be found at http://kelab.tamu.edu/nafiwc06/.

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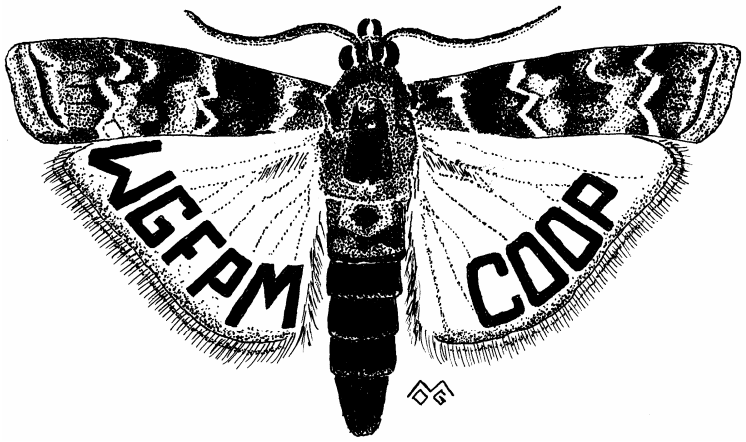
Western Gulf Forest Pest Management Cooperative



Southern Pine Coneworm, *Dioryctria amatella* (Hulst)

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

Summary of 2005 WGFPMC Research Projects

In 2005, three research project areas – tip moth, leaf-cutting ant, and systemic injection - were continued from 2004. Summaries of the results from the systemic injection studies are presented below. Results from leaf-cutting ant control and tip moth impact, hazard-rating and control studies will be presented in the next *PEST* newsletter (June 2006).

Systemic Injection

Since 1996, the WGFPMC has been evaluating the potential of using systemic insecticide injections to protect pine seed orchard crops from coneworms and seed bugs. Two active ingredients, emamectin benzoate (EB) (Syngenta/Arborjet) and fipronil (FIP) (BASF) have been shown in several injection trials to be highly effective in reducing coneworm damage for extended periods. The discovery in 2004 that these two chemicals also are highly effective in preventing the colonization and mortality of injected trees by *Ips* engraver beetles in two separate trials has lead to the development of two new formulations specifically designed for tree injection. Both companies asked the WGFPMC to test the efficacy of these new formulations against bark beetles and seed orchard pests in 2005.

Bark Beetle Trials

Six separate trials were established in 2005 to evaluate EB and FIP against:

1) ***Ips* engraver beetles** on **loblolly pine** in **Texas**,
2) **Southern pine beetle (SPB)** on **loblolly pine** in **Mississippi**,
3) **Western pine beetle (WPB)** on **ponderosa pine** in **California**,
4) **Mountain pine beetle (MPB)** on **lodgepole pine** in **Idaho**,
5) **Spruce beetle (SB)** on **Engelmann spruce** in **Utah**, and,
6) **MPB** on **lodgepole pine** in **British Columbia**.

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Systemic Injections – Continued from Page 1

The *Ips* trial evaluated four different fipronil formulations applied using different techniques (injections vs. basal bark spray) and/or at different rates and volumes and emamectin benzoate applied at two different rates. All injection treatments were highly effective in preventing the successful colonization of logs from treated trees 3 months after injection (Fig. 1).

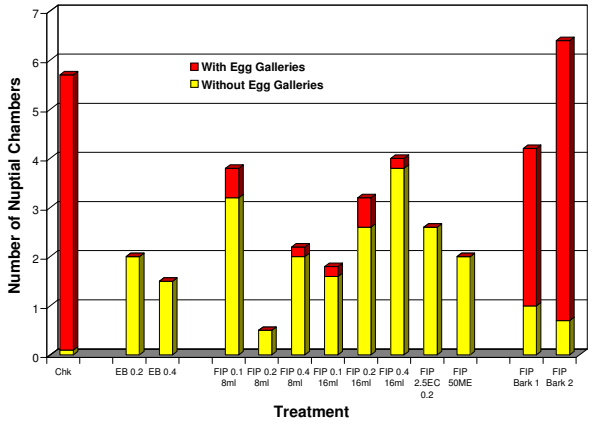

Figure 1. Effect of injection treatment in *Ips* engraver beetle attack success expressed as number of nuptial chambers with and without egg galleries. EB = emamectin benzoate; FIP = fipronil.

In each of the SPB, WPB, MPB and SB trials, 60 trees were injected, 30 with each chemical. At the CA and ID sites, an additional 30 trees were sprayed with bifenthrin or carbaryl, respectively. Four to six weeks later, all trees (treated and untreated) in the SPB, WPB and MPB (ID) trials were baited with species-specific pheromones to induce beetle attack. SPB populations were low so only a few check trees were killed. However, the beetle attack levels on injected trees were markedly lower than those on untreated checks (Fig. 2). A preliminary assessment of WPB attacks in CA indicates that 53% of the

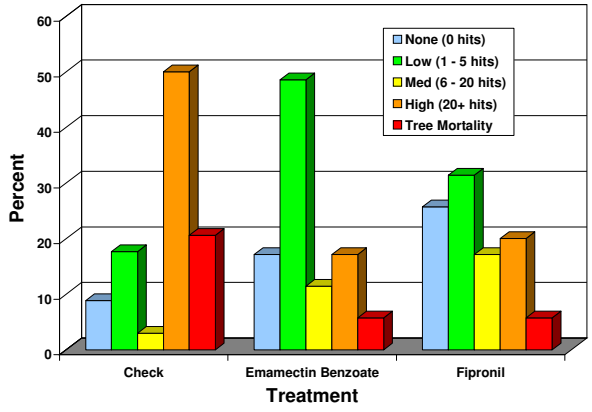

Figure 2. Effects of injection treatments on southern pine beetle attack levels on standing loblolly pine as of Sept. 2005, Chickasawhay, R.D., DeSoto N.F., MS.

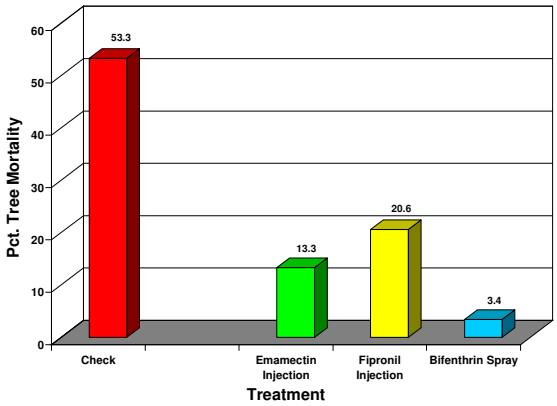

Figure 3. Preliminary effects of injection treatment ponderosa pine mortality by western pine beetle (*Dendroctonus brevicomis*) as of October 2005, Calaveras Co., CA.

untreated trees will likely die by 2006 (Fig. 3). In contrast, 21% of the FIP-treated trees, 13% of EB-treated trees, and 3% of bifenthrin-sprayed trees are likely to die. Final assessments will be made at the CA and ID sites in July 2006. Trees injected in UT and BC will be baited in 2006, but not evaluated until 2007.

Seed Orchard Trials

Six separate trials also were installed in 2005 to evaluate the efficacy of EB and FIP against:

1) **Coneworms and seed bugs** on **loblolly pine** (Plum Creek's Hebron orchard, LA).
2) **Coneworms and seed bugs** on **loblolly pine** (International Paper's Bellamy orchard, FL).
3) **Coneworms and seed bugs** on **slash pine** (Temple-Inland's Forest Lake orchard, TX).
4) **Slash pine flower thrips, coneworms and seed bugs** on **slash pine** (Smurfit-Stone's Brewton orchard, AL).
5) **Cone gall midge, coneworms and seed bugs** on **Douglas-fir** (Plum Creek's Cottage Grove orchard, OR).
6) **Acorn weevil** on **cherrybark oak** (Texas Forest Service's Hudson orchard, TX)

In all pine seed orchard trials, 10 – 12 trees were injected with each chemical. At the TX and FL sites, an additional 10 trees were treated with a foliar spray. Survival was evaluated by counting cone and conelets first in April and again in August. All cones from each study tree were collected in the fall and evaluated for coneworm damage. Seeds were extracted from 10 cone samples and x-rayed to evaluate for seed bug damage. The cone crops were lost in OR and AL due to frost and hurricane winds, respectively. Conelet and cone survival was improved by EB injections only in LA. Both EB and FIP reduced coneworm damage (74 – 92%) at the TX and FL orchards (Fig. 4). In contrast, only EB

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Systemic Injections – Continued from Page 2

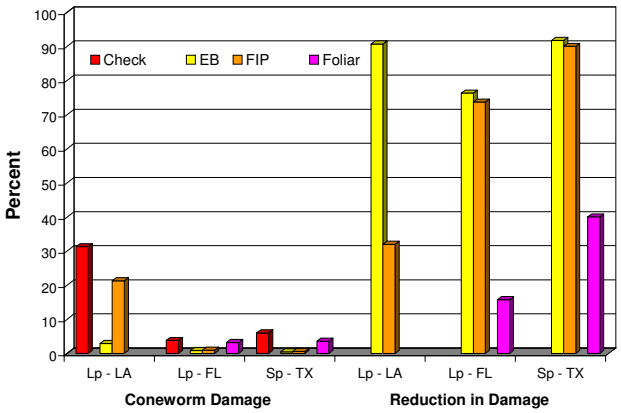

Figure 4. Percent coneworm (*Dioryctria* spp.) damage and reduction in damage on second-year loblolly pine (Lp) or slash pine (Sp) cones treated with injections of emamectin benzoate (EB) or fipronil (FIP) or foliar treatments in LA, FL or TX, 2005.

reduced damage at the LA orchard. Analysis of seed lots for seed bug damage is on going.

In the hardwood seed orchard trial, 10 cherrybark oak trees were injected with each chemical. The plan was to collect acorns periodically from September – December for evaluation of acorn weevil damage. Unfortunately, very few acorns were produced on the study trees, so an accurate determination of treatment effects could not made.

The WGFPMC is continuing to look at other potential markets including evaluating the potential of emamectin benzoate and fipronil for protection of wood against termites. Because the new formulations of EB and FIP appear to be effective against both bark beetles and cone and seed insects, the WGFPMC is asking Syngenta/Arborjet and BASF to also include conifer seed orchard use on any registration package submitted to EPA. Syngenta/Arborjet may be submitting its registration package to EPA by this fall. BASF has decided to reformulate its active (fipronil) so registration will likely be delayed at least one year. Stay tuned.

Acknowledgements - We greatly appreciate the effort and support provided by:

International Paper (Tim Slichter)
Plum Creek (Gerry Watkins, Tim Smith (OR), Doug Sharp)
Temple-Inland (Jim Tule, Emily Goodwin)
Texas Forest Service (Joe Hernandez, Tom Byram, I.N. Brown)
U.S. Forest Service (Alex Mangini, Steve Clarke, Chris Fettig, Steve Munson, Carl Jorgensen)
Smurfit-Stone (Chris Rosier)

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Pest Spotlight: Texas Leaf-cutting Ant, *Atta texana*

The Texas leaf-cutting ant (TLCA), also called cutters, town ant, cut ant, parasol ant, fungus ant, and night ant, can be a significant pest in newly planted pine plantations or progeny test sites in east Texas and west-central Louisiana (Fig. 5). In areas where this insect is abundant young seedlings can be stripped of foliage and buds within a few days, making it is nearly impossible to regenerate pine. In addition to pine, the TLCA removes leaves and buds from a variety of other plants, including orchard trees, ornamental shrubs, and several cereal and forage crops. Ordinarily, little damage is done to pines when other green plants are available. However, during the winter months, when green foliage is scarce, young pines become the primary source of foliage. The plant foliage harvested by the ants is brought back to the central colony, cut into smaller pieces, and inoculated with fungus. The fungus is the only known food of the TLCA.

In early May, on a moonless night and after approximately a quarter inch of rain has fallen, the winged females and males perform their mating flight. The female then lands on the ground, clips off her wings, and begins to dig a tunnel and chamber. She may be joined by several other females during this initial stage of colony formation; together they will build a sizable colony in a short period of time. Each female carries with her a plug of fungus which will be used to inoculate and build fungal gardens.

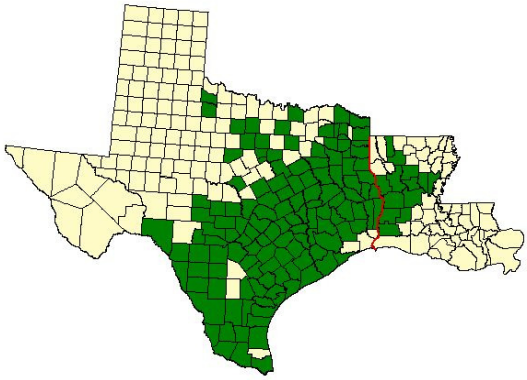

Figure 5. Distribution of the Texas Leaf-cutting Ant

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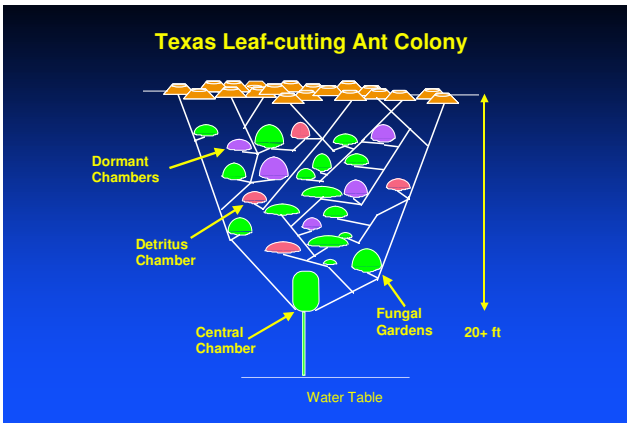
Leaf-cutting Ant – Continued from Page 3

Figure 6. Characteristic crescent-shaped mound.

An average sized TLCA colony consists of numerous holes (200+) at the soil surface from which worker ants carry particles of excavated soil. The soil is deposited around each hole, eventually forming a conical or crescent-shaped mound (Fig. 6). Below ground, workers excavate tunnels to three types of chambers: fungal garden chambers, dormant chambers, and waste chambers (Fig. 7). The workers also construct foraging tunnels that radiate out away from the central colony area. It is from these tunnels that workers emerge to search for plant material. The workers will often produce foraging trails that extend 300+ feet to the plant material being harvested.

In the past, foresters and private landowners have tried several control options in an attempt to eliminate TLCA from plantation sites. The standard option for many years was the fumigant, methyl bromide. This chemical is highly toxic to man and, unfortunately, its use was phased out in 2005.

Figure 7. Schematic showing the different below-ground chambers of a Texas leaf-cutting ant colony.



Volcano® leaf-cutter ant bait (Griffin LLC) was a very effective bait registered in TX and LA from 1999 – 2003. The bait's carrier, citrus pulp, was very attractive to the ants and readily retrieved. Unfortunately, EPA had concerns about the active ingredient, sulfluramid. Subsequently, an agreement was made to phase out the bait in 2003.

Amdro® Ant Block (Ambrands) was registered throughout the U.S. in 2004. Recent trials indicate that this bait can be effective in halting TLCA colony activity, but only when applied as the label dictates. Deviations from label instructions often result in significant reductions in efficacy. It is important that this bait be fresh and applied when the ants are actively foraging. However, Amdro® should not be applied when rain is expected within 24 hours or when the soil or vegetation is wet. During the summer, late afternoon applications are recommended. During the winter, ants are more likely to be active around noon, so the bait should be applied at this time.

The amount of Amdro® to be applied is dependent on the area covered by the central colony (a dense concentration of entrance and exit holes). Determine the nest area by multiplying the length times the width of the area with ant mounds. Using a cyclone spreader, evenly apply 0.75 lb. (12 oz.) per 1000 sq. ft. of nest area. Additional amounts can be distributed outside the central colony area to treat isolated mounds and along active foraging trails. However, keep in mind that you cannot exceed 2.0 lb. of bait per acre. Check treated colonies for ant activity at 30-day intervals for three months. Repeat application if necessary.

Due to the phase out of methyl bromide and Volcano® from the market and the inconsistent control provided by Amdro®, WGFPMC personnel are testing additional control options. They currently include two indoxacarb bait formulations (Advion® fire ant bait and an experimental formulation (DuPont)), and Archaea (a microbe that disrupts an ant's digestive tract). Both options are reported to be effective in the treatment of fire ant mounds. However, to treat TLCA colonies, these control options need to be modified to take into account the size and depth of the colonies. We are also looking into the prospects of developing a new bait that combines the attractiveness of citrus pulp with a slow-acting poison like hydramethylnon or indoxacarb.

Western Gulf Forest Pest Management Cooperative: 1996 - 2005

10 Year Summary of Accomplishments

The Texas Forest Service (TFS) established the Western Gulf Forest Pest Management Cooperative (WGFPMC) in March 1996, to address pest problems in pine seed orchards and young pine plantations. Under the direction of Research Coordinator Dr. Donald Grosman, and with the assistance of a small permanent staff, a number of seasonal employees, and contributions from members, the WGFPMC has completed 10 years of service. During this decade, major accomplishments have been achieved and several new chemical insecticides have been registered to improve forest pest management. A summary of these accomplishments follows.

Major Accomplishments 1996 - 2005

When WGFPMC was established in March, 1996, there were five charter members: Boise Cascade Corporation, The Bosch Nursery, Champion International Corporation, Temple Inland Forest Products Corporation , and the Texas Forest Service In 2005, membership consisted of nine members: Anthony Forest Products Company, Forest Investment Associates, International Paper Company, Plum Creek Timber Company, Potlatch Corporation, Temple-Inland Forest Products Corporation, Texas Forest Service, USDA Forest Service (Forest Health Protection), and Weyerhaeuser Company. Dr. Don Grosman has served as Research Coordinator and Dr. Ronald Billings as Administrative Coordinator, while numerous TFS staff persons and seasonal employees have assisted with Coop activities since the WGFPMC began. During the first decade of operation, significant progress has been made in relation to the following forest pests:

Regeneration Weevils

- Pales and pitch-eating weevils were found to be causing significant losses of pine seedlings on certain sites.
- A hazard rating table was developed to predict where losses to regeneration weevils are most likely to occur, based on date of harvest and other factors.
- Based on WGFPMC field trials, the insecticide Pounce® was registered by the Environmental Protection Agency for preventing weevil damage to newly-planted seedlings on high hazard sites.
- In 2005, the insecticide Waylay™ was registered in TX, LA, AR, MS, AL, GA, and VA for weevil control, based largely on WGFPMC efforts.
- The efficacy of fipronil for weevil control was evaluated.

Texas Leaf-cutting Ants (TLCA)

- Various baits were evaluated for control of TLCA.
- Sulfluramid bait proved to be very effective for control.
- A sulfluramid bait having the trade name Volcano® was registered in TX and LA for controlling TLCA, based on WGFPMC studies. Although very effective, production and sale of Volcano® was discontinued in 2003.
- A second bait containing fipronil, known as BES-100®, was also shown to be attractive to the ants and effective for eliminating TLCA colonies. Unfortunately, the producer of BES-100 will not seek EPA registration for this product in the U.S.
- Other baits, including Grant's Total Ant Killer bait and Amdro® Ant Block (hydramethylnon), were tested for attractiveness and control efficacy.

Seed Orchard Insects (Coneworms and Seed Bugs)

- Various approaches for injecting systemic insecticides into seed orchard trees were evaluated. Two chemicals, emamectin benzoate and fipronil, proved effective for significantly reducing coneworm damage.
- Emamectic benzoate, in particular, provided extended protection from coneworms - up to six years with a single injection.
- The WGFPMC assisted the Seed Orchard Pest Management Committee in the evaluation of Asana®, Imidan® and Capture® for control of seed orchard pests.
- Injections of imidacloprid, and thiamethoxam reduced damage by seed bugs in loblolly pine seed orchards, but the effects did not persist for more than one year.

Nantucket Pine Tip Moth

- Forty-four plots on 29 sites were established in TX, LA, and AR to assess the impact of tip moths on the growth of pine seedlings. Seedlings protected from tip moth damage with insecticide sprays for 2 years showed significant increases in height, diameter, and volume growth, compared to unprotected seedlings.
- A hazard rating model for tip moths was developed, based on site factors from 76 sites.
- Multiple trials were conducted to evaluate fipronil, imidacloprid, and other chemicals, applied in the nursery and the field, for protecting pine seedlings from tip moths. Different application rates and techniques for applying insecticides for tip moth control were compared.
- Seedlings treated with a single application of fipronil grew at an accelerated rate through three growing seasons compared to seedlings unprotected from tip moth damage.
- Based on positive results from WGFPMC field trials, both fipronil and imidacloprid are expected to be registered with EPA in 2006 for protecting pine seedlings from tip moths.

Bark Beetles

- Several systemic chemicals were tested as a means to prevent attack and/or brood production of southern pine engraver beetles (*Ips* spp.).
- Emamectin benzoate and fipronil proved especially effective in preventing *Ips* attacks on standing, weakened pines as well as on pine logs.
- In conjunction with cooperators, the WGFPMC has implemented studies to evaluate the efficacy of emamectin benzoate and fipronil for protection of trees from *Dendroctonus* bark beetles, including the southern pine beetle in MS, the western pine beetle in CA, the mountain pine beetle in ID and British Columbia, and the spruce beetle in UT.

Other Accomplishments

- Systemic insecticides are being evaluated for prevention of acorn weevils in live oak and for termites in pine.
- Sporax™ (Borax fungicide) was reregistered in Texas for prevention of annosus root disease.
- A "Forestry Pesticides" web page was developed to provide information on pesticides registered for use in forestry.
- The newsletter *PEST* (*Progress, Education, Science and Technology*) has been prepared and distributed quarterly to WGFPMC members.
- Annual reports of accomplishments have been prepared and presented to members of the WGFPMC Executive Committee.
- A meeting has been held annually for Contact Members to discuss accomplishments and future plans. A field trip and/or demonstration of new technology are highlights of this meeting.
- Numerous publications have been prepared to document WGFPMC accomplishments (see list below).
- Technical assistance and information on forest pests were provided upon request to members.
- In the last 10 years, the WGFPMC has generated a total of **$291,817** in federal research grants and donations from chemical companies to supplement its research projects. These donations, coupled with staff support from the Texas Forest Service, have allowed the WGFPMC to maintain membership dues at a low level.
- Membership in the WGFPMC has grown from five charter members in 1996 to nine members in 2005, despite forest industry mergers, industrial land divestments, tight budgets, and other limiting factors.

Acknowledgments

As the Cooperative enters its eleventh year, appreciation is extended to our dedicated staff, as well as to current and past WGFPMC members, for their many contributions and support that have made this effort a success.

Ron Billings and Don Grosman

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Announcements: continued from Page 1

New Seasonal Technician – We would like to welcome Mr. Vladimir Cizek to the WGFPMC. He is a visiting forester from the Czech Republic. He was hired March 23 by the Texas Forest Service to provide assistance with some of the many WGFPMC research projects and to provide him with an opportunity to improve his English. Vladimir can be contacted by phone: (936)-639-8170 or by e-mail vcizek@tfs.tamu.edu. He will be with TFS until June 30, 2006.

Thought You Might Be Interested to Know . . .

Guthion® Cancellation. EPA has issued a Federal Register notice that officially cancels the use of azinphos-methyl (Guthion®) in pine seed orchards. The cancellation became effective on March 29, 2006. The distribution or sale of azinphos-methyl products for these uses is allowed until March 31, 2006, and use of these products is allowed until September 30, 2006. (Federal Register March 29, 2006).

Editor's Note: We commend a number of individuals and organizations (Dr. Tom Byram, WGTIP; Steve McKeand, NCSTIP, and John Taylor, USFS and others) for their efforts to retain the use of Guthion® for use in southern pine seed orchards for as long as it was.

Several Companies Contributing to WGFPMC Research. BASF Corporation, Research Triangle Park, NC, recently provided $26,000 in research funds to the WGFPMC. The funds are to cover costs incurred as part of several fipronil-related research projects. In particular, the research is evaluating tree injections of fipronil for protection of pines against southern pine bark beetles and soil injection volumes for protection of pine seedlings against pine tip moth.

Bayer Environmental Science, Kansas City, MO, has contributed $3,000 toward the evaluation of imidacloprid tablets also for protection of pine seedlings against pine tip moth.

Fort Dodge Animal Health, Princeton, NJ, has tentatively agreed to contribute $3,000 / year over the next 3 years toward the evaluation of nemadectin (an avermectin derivative) tree injections for protection of pines against southern pine bark beetles.

In 2005, Syngenta Crop Protection, Greensboro, NC, provided $10,000 to support our industry cooperators for the evaluation of emamectin benzoate for protection of seed crops from different insect pests in conifer and hardwood seed orchards.

Editor's Note: We thank all for their support of our projects.

Several Points to Ponder

- What do you do when you see an endangered animal eating an endangered plant?
- How do they get deer to cross at those yellow road signs?
- When you choke a smurf, what color does it turn?
- If a book about failures doesn't sell, is it a success?
- Do cemetery workers prefer the graveyard shift?
- Is it possible to be totally partial?
- What's another word for thesaurus?
- If a parsley farmer is sued, can they garnish his wages?
- Would a fly without wings be called a walk?
- Why do steam irons have a permanent press setting?
- Can you be a closet claustrophobic?
- Why do they lock gas station bathrooms? Are they afraid someone will clean them?
- Why do people who know the least know it the loudest?
- If the funeral procession is at night, do folks drive with their lights off?
- If a stealth bomber crashes in a forest, will it make a sound?
- If a turtle doesn't have a shell, is he homeless or naked?
- When it rains, why don't sheep shrink?
- Should vegetarians eat animal crackers?
- If the cops arrest a mime, do they tell him he has the right to remain silent?
- Why is the word abbreviation so long?
- When companies ship Styrofoam, what do they pack it in?

Bumper Stickers

- Forget about world peace . . . visualize using your turn signal.
- I get enough exercise just pushing my luck.