Progress **E**ducation **S**cience **T**echnology

Vol. 7 No. 2 June 2002

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).

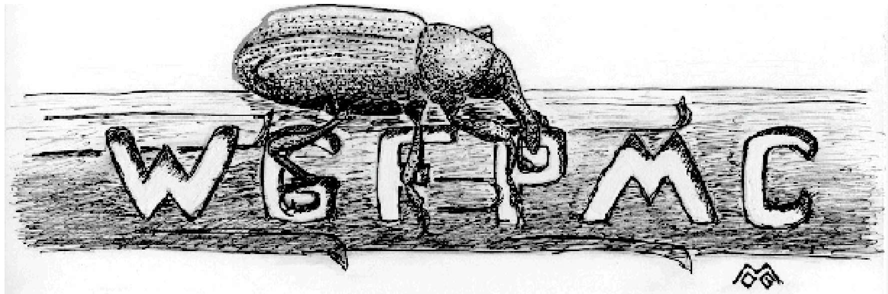
****

Announcement:

Contact Meeting - All WGFPMC executive and contact representatives, industry, and TFS foresters are invited to attend the 2001 WGFPMC Contact Meeting scheduled for Tuesday, July 9, 2002. The meeting will begin at 9:00 AM at the Texas Forest Service Training Building at the Cudlipp Forestry Center in Lufkin. Lunch will be provided. The tentative agenda is shown on page 7. RSVP by July 1 by contacting Martha Johnson at 936/639-8170 or Don Grosman at dgrosman@tfs.tamu.edu.

****

Western Gulf Forest Pest Management Cooperative



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

Summary of 2001 WGFPMC Research Projects

In 2001, two research projects - leaf-cutting ant control and systemic injection - were continued from 2000. Summaries of the results from these studies were presented in the last PEST newsletter (March 2002). Results of three new studies - tip moth impact, hazard rating and control - are presented below.

Pest surveys conducted by the WGFPMC from 1998–2000 determined that the Nantucket pine tip moth, *Rhyacionia frustrana*, was the most common biotic factor damaging loblolly pine plantations in Texas, Arkansas, and Louisiana. However, the true impact of tip moth on tree growth and yield has not been determined in the Western Gulf region. Similarly, we have an incomplete understanding of the factors that influence tip moth populations and severity. The WGFPMC established a new two-faceted study in 2001 in cooperation with the University of Georgia's Tip Moth Consortium to: 1) evaluate the impact of pine tip moth on tree height and diameter growth and 2) identify abiotic factors that influence the occurrence and severity of pine tip moth infestations.

Pine Tip Moth Impact

Eight plantations were selected in Texas (5), Louisiana (2) and Arkansas (1). In each plantation, two areas were selected and divided into two plots each; each plot contained 126 trees (9 rows X 14 trees). Treatments were randomly assigned to a plot in each area. The treatments included:

1) Mimic® 2F applied once per generation at 0.08 oz / gal.
2) Check (untreated)

Pesticides were applied by backpack sprayer to all trees within the plot (treatment area). Application dates were based on trap catches in each area and degree-day model calculations.

Continued on Page 2

Table 1. Mean percent of loblolly pine shoots (in top whorl) infested by pine tip moth on eight sites in TX, LA and AR following treatment with Mimic® after the each of 5 generations - 2001.

Treatment	Gen. 1	Gen. 2	Gen. 3	Gen. 4	Gen. 5
Mimic	0.28 **a** *	1.50 **a**	3.07 **a**	2.47 **a**	2.07 **a**
Check	4.51 **b**	23.60 **b**	22.49 **b**	36.32 **b**	25.11 **b**
% Reduction	94	94	86	93	92

* Means within a column with the same letter are not significantly different at the 5% level based on Fisher's Protected LSD

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, 2001. At this time, data also were collected on tree height and diameter.

Tip moth infestation levels were relatively low on check trees during the first generation but increased dramatically after mid-June when drought conditions prevailed (Table 1). The Mimic® treatments provided excellent control during all tip moth generations - reducing infestation levels by an average of 92% (Table 1). Nearly all Mimic®-treated plots showed markedly greater tree height and diameter growth compared to the neighboring untreated trees (Table 2). Overall, the exclusion of tip moth on treated trees improved tree height, diameter and volume index by 25%, 23% and 87%, respectively, compared to untreated trees. Treatments are being continued into 2002 to evaluate impact of pine tip moth through the second year.

Pine Tip Moth Hazard Rating

WGFPMC members selected from 1 to 12 first-year plantations (many were the same as those used in the impact study). A plot area within each plantation was selected; each plot contained 126 trees (9 rows X 14 trees). The 17 untreated plots were used to collect site characteristic data which included:

Table 2. Mean height, diameter, volume index and survival of Mimic®-treated and check seedlings after the 5th tip moth generation in TX, LA and AR - 2001.

Treatment	Height (cm)	Diameter (cm)	Volume Index ($H*D^2$)	Survival (%)
Mimic	58.0 **b** *	1.4 **b**	231.2 **b**	87.0 **b**
Check	46.5 **a**	1.1 **a**	123.4 **a**	83.8 **a**
% Gain	24.8	22.5	87.3	3.8

* Means within a column with the same letter are not significantly different at the 5% level based on Fisher's Protected LSD

Continued on Page 3

Tip Moth Projects (continued from page 2)

Soil -
- Texture and drainage
- Percent organic matter
- Soil description/profile: depth of 'A' and to 'B' horizons; color and texture of 'B' horizon
- Depth to hard-pan or plow-pan
- Depth to gleying
- Soil sample (standard analysis plus minor elements and pH)

Tree -
- Age (1-2)
- Percent tip moth infestation of terminal and top whorl shoots – 1st, 2nd, and last generation
- Height and diameter at 6 inches

Site -
- Previous stand history
- Site index (at 25 yrs)
- Silvicultural prescription (for 2-year monitoring period)
- Slope, aspect, and position
- Competing vegetation: proportion of bare ground, grasses, forbes and woody stems
- Rainfall (on site or from nearest weather station)
- Acreage of susceptible loblolly stands (< 20 ft tall) within 1/2 mile of study stand boundary

Tip moth infestation levels were determined in each plot by surveying the internal 50 trees during the pupal stage of each tip moth generation in the same manner as in the impact study. Tree height, diameter, and percent tree mortality data were collected in November.

All data have been collected from each of the 17 plots established in 2001. The data set will be given to Dr. Roy Hedden, Clemson University, who will develop a regression model to identify the most important abiotic factors influencing tip moth occurrence and severity. The initial 17 plots will be evaluated through 2002 and then phased out. Additional plots will be established yearly through 2004.

Pine Tip Moth Control

Control of tip moth damage usually involves foliar applications of insecticides. However, control is difficult due to the need for life stage monitoring and precise timing. Also, multiple applications during the first 2-3 years to control tip moth in pine plantations may be marginally economical over 20-30 year rotations. A study was initiated in 2001 to evaluate the potential of loading seedlings with one of two systemic chemicals prior to planting for control of tip moth for one or more years.

Three first-year plantations were selected in east Texas. A plot was established at each site. Each plot containing 350 trees (5 rows X 70 trees). A randomized complete block design was used at each site with beds or site areas serving as blocks, i.e., each treatment was randomly selected for placement along a bed. Ten seedlings from each treatment were planted on each of five beds. The treatments included:

1) Proclaim®(0.08% ai) - root soak of bare root seedlings for 2 hours prior to planting
2) Messenger® - root dip of bare root seedlings in solution for 15 seconds prior to planting
3) Water - root soak of bare root seedlings for 2 hours prior to planting
4) Proclaim® (0.08% ai) - soil drench of containerized seedlings with 30 ml prior to planting
5) Water - soil drench of containerized seedlings with 30 ml prior to planting
6) Proclaim® - Granular (1.5 g) in plant hole with bare root seedling
7) Check - Bare root seedling (lift and plant)

Loblolly pine, bare root seedlings from the Texas Forest Service nursery at Alto, TX and containerized seedlings from International Forestry, were used in this study. For bare root applications, 150 seedlings were lifted for each treatment. The seedlings were culled of small caliper (< 3 mm dia.) seedlings. The seedlings' roots were either soaked in insecticide solution or water for 2 hours (emamectin benzoate) or dipped for 15 seconds (Messenger®). After immersion, the seedlings were bagged and placed in cold storage until the following day. For containerized seedlings, root plugs were dipped into insecticide solution or water and planted immediately. Fifty seedlings from each treatment were planted (6 X 10 ft spacing) on each of the 3 sites.

Tip moth damage was evaluated after each tip moth generation (3-4 weeks after peak moth flight) in the same manner as in the impact and hazard rating studies. Observations also were made as to the occurrence and extent of damage caused by other insects, i.e., coneworm, aphids, sawfly, etc. Each tree was measured for diameter and height in the fall (November) following planting.

All chemical treatments showed significantly lower tip moth damage levels after the first tip moth generation compared to check trees (Table 3). However, reduced damage continued into the 2nd generation only for the emamectin benzoate bare root

Continued on Page 4

Tip Moth Projects (continued from page 3)

Table 3. Mean percent of loblolly pine shoots (in top whorl) infested by pine tip moth after the each of 5 generations in east Texas - 2001.

Treatment †	Gen 1	Gen 2	Gen 3	Gen 4	Gen 5
EB BR Soak	1.13 ***	18.03 ***	26.34	45.43	42.01
EB BR Plant Hole	3.22 ***	27.75	24.41	39.30	38.42
H^2O BR Soak	2.78 ***	27.22	23.07	38.91	49.28
EB Cont. Drench	0.00 ***	14.65 ***	21.66	28.33 ***	27.73 ***
H^2O Cont. Drench	0.63 ***	13.83 ***	16.88 *	29.84 **	35.13 *
Messenger BR	4.24 **	24.36 *	25.65	49.91	44.03
Check BR	9.72	32.18	26.06	44.79	48.36

† EB = emamectin benzoate; BR = bare root; Cont. = containerized
Treatment significantly different compared to check: * = P < 0.05; ** = P <0.001; *** = P < 0.0001 (Fisher's Protected LSD)

soak, containerized seedling treatments (EB and water drench) and Messenger® dip treatments. The containerized seedling treatments even showed significantly reduced tip moth damage levels after the 4th and 5th generations, but it is believed that this is a result of the seedlings' significantly smaller size and poorer health, i.e., lower survival rate (Table 4). None of the treatments significantly improved tree height or diameter growth compared to check trees.

A second trial was initiated in 2002 to evaluate the potential of several other systemic chemicals (fipronil, imidacloprid, thiamethoxam and azadirachtin) for extended control of pine tip moth.

Table 4. Mean height, diameter, volume index and survival of first year loblolly pine seedlings after the 5th tip moth generation in east Texas - 2001.

Treatment †	Height (cm)	Diameter (cm)	Volume Index (H*D2)	Survival (%)
EB BR Soak	54.41	1.01	73.07	92.7
EB BR Plant Hole	54.22	1.10	84.09	93.3
H^2O BR Soak	49.71	0.99	69.09	88.0 *
EB Cont. Drench	35.93 ***	0.62 ***	19.25 ***	81.3 **
H^2O Cont. Drench	34.71 ***	0.57 ***	15.76 ***	75.3 ***
Messenger BR	55.17	1.08	85.69	93.3
Check BR	52.59	1.05	81.71	95.3

Treatment significantly different compared to check: * = P < 0.05; ** = P <0.001; *** = P < 0.0001 (Fisher's Protected LSD)
† EB = emamectin benzoate; BR = bare root; Cont. = containerized

SPB Predictions for 2002: Good News: Bad News!

The results of the Southwide southern pine beetle survey for 2002 are finally available. Results indicate increasing or continued high populations in South Carolina, Georgia, Florida, and certain counties or ranger districts in Virginia and North Carolina. Some of the highest trap catches ever recorded (since the SPB prediction system was begun in 1986) were turned in by South Carolina, particularly in Piedmont counties, where many SPB infestations already have been detected. Beetle activity is predicted to be declining from last year's high levels in most areas surveyed in Kentucky, Tennessee, and Alabama, but considerable SPB activity should still be expected in these states. Mississippi, eastern Louisiana and New Jersey may see SPB increases from the low levels experienced last year. Very few or no SPB infestations are expected again this year in Texas, Arkansas, Oklahoma, western parishes of Louisiana, and in Delaware, and Maryland. I thank all the federal and state cooperators who provided trap catch data for this annual survey. Ron Billings

Table 5. Summary of southwide southern pine beetle trend predictions for 2002.

State	No. of Infestations in 2001	No. of Locations Trapped	2001 % SPB	2001 SPB/ trap/day	2001 Clerids/ trap/day	2002 % SPB	2002 SPB/ trap/day	2002 Clerids/ trap/day	2002 Prediction Trend/Level	Most Likely Locations of SPB Activity
Oklahoma	0	2	0%	0.0	1.0	1%	0.1	72.9	Static/Low	-----------
Arkansas	0	7	0%	0.0	5.3	0%	0.0	27.2	Static/Low	-----------
Texas	0	20	0%	0.0	8.1	0%	0.0	10.8	Static/Low	-----------
Louisiana	0	23	0%	0.0	7.5	1%	0.1	6.4	Increasing/Low	E. Feliciana, St. Helena Pa.
Mississippi	143	10	18%	4.0	14.8	24%	13.0	47.1	Increasing/Moderate	Homochitto and Desoto N.F.
Alabama	11,849	6	56%	74.2	50.4	41%	38.8	54.4	Declining/Moderate-High	Talladega and Shoal Creek R.D. Lowndes and Tallaposa counties
Kentucky	3,456	5	35%	34.3	37.9	29%	16.4	25.2	Declining/Moderate	Somerset and Stearns R. D.
Georgia	4,938	11	46%	36.3	30.1	54%	48.0	28.6	Increasing/High	All Nat. Forest, Dawson and Franklin counties
Tennessee	12,746	6	35%	25.8	17.6	31%	16.1	26.4	Declining/Low-Moderate	Nolichucky and Ocoee R.D.
Virginia	763	4	33%	3.8	18.8	49%	16.8	11.8	Increasing/Low-Moderate	Cumberland Co.
Florida	2,892	26	68%	45.0	1.7	81%	24.6	5.5	Increasing/Moderate-High	Baker, Duval, Hernando, Levy, Madison, Marion, Nassua, Okaloosa, Orange, Putnam, Seminole, St. John, and Suwannee counties
South Carolina	22,270	34	43%	23.8	19.6	69%	45.8	14.9	Increasing/High-Outbreak	Long Cane and Enoree R.D., Abbeyville, Anderson, Cherokee, Chester, Edgefield, Fairfield, Georgetown, Greenville, Greenwood, Horry, Lancaster, Laurens, Lexington, McCormick, Newberry, Oconee, Pickens, Richland, Saluda, Union, and York counties
North Carolina	3,871	15	26%	12.6	14.0	47%	18.5	17.4	Increasing/Moderate	Grandfather and Tusquitee R.D., Cleveland and Wilkes counties
Maryland	0	3	7%	0.3	3.1	14%	0.1	0.5	Static/Low	-----------
New Jersey	-----	3	-----	-----	-----	52%	4.7	7.1	Increasing/Low	Cape May Co.
Delaware	-----	1	13%	0.3	2.1	14%	0.1	0.5	Static/Low	-----------
Southern States	62,928	176	25%	17.4	15.5	32%	15.2	22.3	Static/Moderate (East) with localized High/Outbreak areas and Static/Low (West)	South Carolina, Georgia, Florida, Alabama, Tennessee, Kentucky, North Carolina, Mississippi

Thought You Might Be Interested to Know . . .

Tackling Tallow Trees in Texas
(Source: The Forestry Source, April 2002)

The Chinese tallow tree—once brought to Texas's gulf coast with the hope that its wax-covered seeds would become an agricultural commodity—has overstayed its welcome. The tree has turned grasslands into single-species forests and dominated forest understories, and its proliferation has prompted scientists such as Evan Siemann, assistant professor of ecology and evolutionary biology at Rice University, and his colleague William Rogers, to find out how the tree's numbers have exploded and how to stop it.

"Often when a species is introduced to an area, it persists for a while and then explodes as a result of compound population growth," says Siemann. "Another possibility is that something in the tree changed while it persisted at a low density, and then its population grew as it became better adapted."

While Siemann is unsure as to which scenario best explains the tallow tree's explosive growth, he says that, over the years, the variety of the tallow tree growing in Texas has developed some curious traits.

"One of the reasons the tallow tree has proliferated in Texas is that insects leave it alone," says Siemann. "This is rather peculiar, because unlike its slow-growing cousins found in China, the American variety apparently puts few resources into defending itself from insect attack."

Siemann says the trees growing on Chinese soil produce chemicals called tannins that make its leaves difficult for defoliating insects to digest. However, the variety of the tallow tree growing in the coastal regions of Texas does not, thereby allowing it to put more energy into growth.

Hence the researcher's multifaceted investigations into various methods of controlling the trees in the lab, on grasslands and wetlands, and in forests. "We're studying the growth of Chinese tallow tree seedlings by manipulating insect populations, nutrient levels, and other biotic factors to see if we can alter the pace of its invasion and figure out how the tree breaks the rules," says Siemann.

For example, in prairies, Siemann and his colleagues are examining the effects of flooding and drying pieces of land to discern whether wet or dry conditions make land more vulnerable to invasion. They are also investigating the effect of nitrogen fertilization, the relationship between insect density and invasion of the tallow tree and other woody plants into grasslands, and the frequency with which land can be burned to keep tallow trees out. In the forest, Siemann and Rogers have been performing seed suppression experiments to determine whether the tree's success in the forest understories is the result of seed abundance or its being better suited to understory conditions than the types of trees growing nearby.

Such information, says Siemann, may help land managers respond to tallow tree invasions before they take over, he says. Siemann may be right. Experiments conducted by the US Geological Survey in 1999 demonstrated that controlled burning is more effective at different times. "Burns conducted during the growing season are more effective than traditional dormant-season burns," said Jim Grace, a research ecologist with the USGS's National Wetlands Research Center. "Fire will hold the tallow at bay. It won't completely eradicate it, but we now know that we have some tools to work with."

For information, contact Evan Siemann, Department of Ecology and Evolutionary Biology, MS 170, Rice University, 6100 Main Street, Houston, TX 77005-1892; (713 348-5954; fax (713) 348-5232; email siemann@rice.edu.

More Things You Might Be Interested to Know . . .

Catalog of Herbicide Resistance

(Source: IPMnet News, May 2002)

It's no secret that weeds around the world have begun developing resistance to herbicides. To help answer the questions about which species, in what locations, and to which herbicides, an international group of weed scientists undertook an ambitious project of producing an *International Survey of Herbicide Resistant Weeds* and arranging the results on a lively and informative website (http://www.weedscience.org/in.asp). The data -- 258 biotypes, 156 species (94 dicots and 62 monocots), and more than 210,000 fields -- can be checked by user-friendly methods (nomenclature, both common and scientific, location, or herbicide mode of action). The data tables are easily read and informative. Other features on the site include recent publications on the topic, plus links and access to other materials. The collaborative project was organized by I. Heap, P.O. Box 1365, Corvallis, OR 97339, USA, e-mail: IanHeap@WeedSmart.com, in tandem with several committees and the Weed Science Society of America, and drew upon information from scientists in more than 80 countries.

Spray Weeds with Vinegar?

(Source: Food Industry Environmental Network, May 18, 2002 via Pesticide Reports, June 2002)

Some home gardeners already use vinegar as a herbicide, and some garden stores sell vinegar pesticides. But no one has tested it scientifically until now. Agriculture Research Service (ARS) offer the first scientific evidence that it may be a potent weedkiller that is inexpensive and environmentally safe. ARS researchers Jay Radhakrishnan, John Teasdale and Ben Coffman in Beltsville, MD tested vinegar on major weeds – common lamb's-quarter, giant foxtail, velvetleaf, sooth pigweed and Canada thistle – in greenhouse and field studies. They hand-sprayed the weeds with various solutions of vinegar, uniformly coating the leaves. The researchers found that 5 – 10% concentrations killed the weeds during their first two weeks of life. A bottle of household vinegar is about 5% concentration. Older plants required higher concentrations of vinegar to kill them. At higher concentrations, vinegar had an 85 – 100% kill rate at all growth stages. Canada thistle, one of the most tenacious weeds in the world, proved the most susceptible: the 5% concentration had a 100% kill rate of the perennial's top growth. The 20% concentration can do this in about 2 hours. Spot spraying of cornfields with 20% vinegar killed 80 – 100% of the weeds without harming the corn, but the scientists stress the need for more research. If the vinegar was sprayed over an entire field, it would cost about $65 per acre. If applied to local weed infestations only, such as may occur in the crop row after cultivation, it may cost only about $20 or $30.

Foal Abortion Linked to Caterpillars

(Source: Georgia Pest Management Newsletter, May 2002)

Scientists have found a strong link between eastern tent caterpillars and an epidemic of foal abortions in Kentucky last year. Thousands of foals were aborted, and hundreds more died shortly after birth. Needless to say, this epidemic caused tremendous anxiety in Kentucky; scientists and veterinarians began to look for the cause. They tested the link between the abortions and the caterpillars by exposing pregnant mares to large numbers of eastern tent caterpillars and/or their frass (that's *poop* to you non-entomologist types). Twice as many mares aborted when they were exposed to the caterpillars or the frass. No one knows how the caterpillars or the frass could have this effect, but the evidence of a link is pretty strong. Additionally, the mind immediately leaps to possible effects on other pregnant mammals. The results are still preliminary, but clearly this avenue of research demands more attention. (http://www.kentucky.com/mld/kentucky/business/3179356.htm). Kentucky scientists are continuing the investigation, and they are asking for help from other states. Many parts of Georgia have had abnormally high populations of eastern tent caterpillars this year. If anyone has noticed unexplained foal abortions, they should e-mail Dan Potter at dapotter@uky.edu.

More Things You Might Be Interested to Know . . .

Fipronil Divestiture

(Source: *CropLife*, April, 2002 via Chemically Speakin, May 2002).

Before the European Union will sign off on the proposed Bayer acquisition of Aventis CropScience, Aventis must divest itself of the insecticide fipronil. Fipronil is one of Aventis' major products, recording sales of over $200 million in 2000 (**Note:** fipronil is the active ingredient in the experimental leaf-cutting ant bait tested by the WGFPMC as an alternative to Volcano and in Over and Out, the new fire ant bait). BASF has supposedly shown interest in purchasing the compound.

A New Organophosphate Alternative

(Source: USDA Release, 4/16/02 via Chemically Speaking, May 2002)

On April 9, EPA granted organophosphate (OP) alternative status to ISK Biosciences and FMC's insecticide, flonicamid (F 1785 GH), for use on ornamentals grown in indoor greenhouses. Flonicamid is an alternative to the OP's chlorpyrifos, acephate, dimethoate, and oxydemeton methyl; the carbamate, fenoxycarb; and the pyrethroids, bifenthrin and fluvalinate, for use on indoor greenhouse ornamentals to control sucking insects (e.g. aphids, thrips, and whiteflies). Flonicamid is a systemic insecticide that immediately suppresses the feeding of sucking insects. It's mode of action, although unknown, appears to be unique and should help with pest resistance management.

New Pesticide Registrations and Uses

(Source: Agr. Chem. News, Jan. - Apr. 2002 via Illinois Pesticide Review, Mar. & May 2002.)

TALSTAR F (bifenthrin)—FMC—This is the new name for Talstar Lawn & Tree Flowable Insecticide/Miticide. It is now available in pints, quarts, and gallons.

MIDAS (iodomethane)-Aventis-A soil fumigant being developed as a re-placement for methyl bromide.

METGARD 6ODF (metsulfuron-methyl)-Makhteshim-Agan-A new formulation available for use in noncrop-area forests, rangelands, and pastures. [herbicide]

VELPAR (hexozinone)-DuPont-Added to their label chemigation on dormant alfalfa and to impregnate on dry-bulb fertilizers for use on forestry sites. [herbicide]

****