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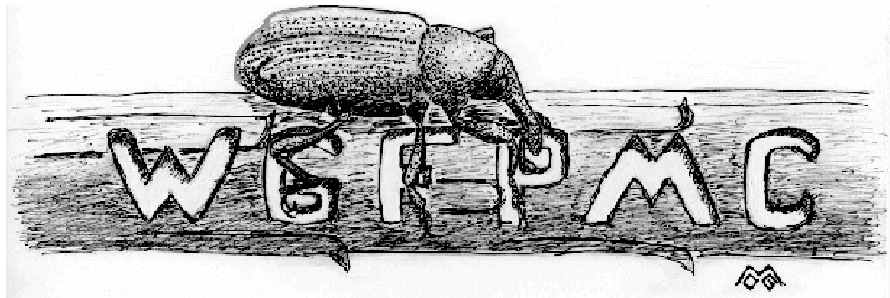
Quarterly Newsletter on Western Gulf Forest Pest Management Issues

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:

New Member - The WGFPMC welcomes Anthony Forest Products Company as its newest member. Anthony Forest Products manages 73 thousand acres in Texas, Louisiana and Arkansas and is headquartered in El Dorado, AR. They also operate several lumber producing and wood chip mills and engineered wood laminating plants in these states as well as Georgia. Buddy Rosser will serve on the Executive Committee and as Contact Representative.

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Systemic, Local Systemic, or Translaminar: What's the Difference?

Modified from an article by Raymond A. Cloyd, Illinois Pesticide Review, July 2002

Editor's Note: The WGFPMC has been evaluating several "systemic" insecticides during the past few years for control of cone and seed insects in pine seed orchards and more recently pine tip moth on pine seedling. This article provides a good overview of "systemic" and "translaminar" insecticides.

Many insecticides kill pests by contact activity. Insect or mite pests are either killed from direct contact during spray applications or by coming into contact with wet residues when moving around upon plant surfaces. Contact insecticides generally provide quick knockdown of target pests. Many insecticides from the older chemical classes—including the organophosphates (that is, chlorpyrifos and diazinon), carbamates (methiocarb), and pyrethroids (bifenthrin, cyfluthrin, fluvalinate, fenpropathrin, and permethrin) have contact activity. However, some insecticides have either *systemic* or *translaminar* (local) properties. In addition to insecticides, several fungicides are available with systemic activity, including mefenoxam (Subdue Maxx), propriconazole (Alamo and Banner Maxx) and fosetyl-aluminum (Aliette). In fact, Aliette is the only fungicide available that moves both up and down the plant's vascular system. However, this article primarily concentrates on the action and use of systemic insecticides.

Systemic insecticides are those in which the active ingredient is taken up, primarily by plant roots, and transported (translocated) to locations throughout the plant, such as growing points where it can affect plant-feeding pests. Systemics move within the vascular

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tissues, either through the xylem (water-conducting tissue) or the phloem (food-conducting tissue) depending on the characteristics of the material. However, most systemic insecticides move up the plant (water-conducting tissue) with the transpiration stream. Systemic insecticides are most effective on insects with piercing–sucking mouthparts, such as aphids, whiteflies, mealybugs, and soft scales, because these insects feed within the vascular plant tissues. Most of the newer systemic insecticides have minimal if any activity on spider mites because spider mites remove plant chlorophyll (green pigment) and don't feed within the vascular tissues.

Systemic insecticides may be applied directly to the growing medium, soil; or they can be sprayed onto plant leaves. Systemics applied to the growing medium and taken up by plant roots may in some cases provide up to 12 weeks of residual activity. However, they may take longer to be distributed throughout the plant. In contrast, systemics applied to plant foliage may provide up to 2 to 4 weeks of residual activity. Nonetheless, foliar-applied systemics provide quicker kill of target pests. In either case, systemics provide the plant with long-term protection from pest injury.

The water solubility of systemic insecticides determines their movement within plants. Systemic insecticides, in general, are very water soluble (an exception is imidacloprid), which allows them to be taken up by plant roots or leaves. In addition, plants do not readily metabolize them. However, due to their high water solubility, they are subject to leaching and may potentially contaminate groundwater.

Older systemic insecticides/miticides that are no longer available include aldicarb (Temik) and oxamyl (Vydate). Currently available systemic insecticides include acephate (Orthene, Pinpoint), dimethoate (Cygon), oxydemeton-methyl (Metasystox-R), dysulfoton (Di-Syston), imidacloprid (Admire, Marathon, Merit), thiamethoxam (Actera), and pymetrozine (Endeavor).

Systemic insecticides should be applied when plants have an extensive, well-established root system and when they are actively growing. This leads to greater uptake of the active ingredient through the vascular tissues. Applying systemic insecticides during warm, sunny days also leads to increased uptake of the active ingredient through the transpiration stream. In contrast, uptake is less when plants don't have well-established root systems. In addition, high-humidity and low-light conditions can lead to reduced uptake of systemic insecticides. Any delayed uptake of the active ingredient may result in the material's taking longer to kill insect pests. Systemics are also more effective when plants are herbaceous rather than woody, particularly on stem-feeding insects such as aphids.

Some insecticides/miticides have translaminar, or local, systemic activity. These materials penetrate leaf tissues and form a reservoir of active ingredient within the leaf. This provides residual activity against certain foliar-feeding insects and mites. Insecticides/miticides with translaminar properties include abamectin (Avid), pyriproxyfen (Distance), chlorfenapyr (Pylon, Alert), spinosad (Conserve), emamectin benzoate (Proclaim, Denim), cyromazine (Larvadex) and acephate (Orthene). In general, these types of materials are active against spider mites, leafminers, and/or lepidopteran pests. Because the active ingredient can move through plant tissues (that is, leaves), thorough spray coverage is less critical when using these materials to control spider mites, which normally feed on leaf undersides.

The benefits of using systemic insecticides include (1) plants are continuously protected throughout most of the growing season without the need for repeat applications, (2) these insecticides are not susceptible to ultraviolet light degradation or "wash off" during watering, (3) there is less unsightly residue on foliage or flowers, and (4) harmful effects to workers, customers and the environment are minimal. A

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problem associated with systemic insecticides is that many have a single, or site-specific, mode of activity, which may lead to resistance. The selection pressure placed on pests from the continual use of systemic insecticides may result in the development of resistant genotypes. An exception to this situation is the insecticide Endeavor (pymetrozine), which has a broad, or physical mode, of activity. Endeavor kills aphids and whiteflies by blocking their stylet (feeding tube), thus preventing them from feeding. As a result, the insects starve.

Although systemic insecticides are generally considered less harmful to natural enemies, research has shown those specific predators such as minute pirate bugs (*Orius* spp.) that supplemental feed on plants may take up enough active ingredient to kill themselves.

Systemic insecticides can provide long-term control of insect pests without having to rely on regular spray applications. However, it is important to use proper insecticide stewardship to minimize the risk of insect populations' developing resistance to currently available systemic materials.

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Web-based Insect, Disease and Weed Information and Identification Sites

Adapted from an article by Fred Fishel, University of Missouri-Columbia, Integrated Pest & Crop Management Newsletter, June 7, 2002

As technology transfer continues to grow exponentially, informational weed-identification resources available over the World Wide Web are increasing tremendously in both quantity and quality. As an example, consultation of a major search engine to identify different pest-identification sites resulted in 52,800 sites for forest insects, 139,000 sites listed for weeds, and 142,000 sites for tree diseases. Of course, not all of these sites are necessarily useful for our purposes or pertain to this area of the United States. Below are several web-based resources that you may find particularly helpful, perhaps saving you some of the frustration of sorting through the myriad of links. For insect, weed and plant disease identification purposes on a practical basis, check out the following:

Insects

http://woodypest.ifas.ufl.edu/insect.htm. Woodybug - Insects and Mites.

http://www.ento.vt.edu/Facilities/OnCampus/IDInfo.html. Insect Identification Laboratory at Virginia Tech.

http://www.bug-net.co.uk. Bug-Net Online Insect Identification.

http://www.bugwood.caes.uga.edu. The Bugwood site provides excellent images and information on numerous insects and weeds.

http://fhpr8.srs.fs.fed.us/idotis/insects.html. Insects of the Southern Region

Weeds

http://ag.fmc.com/ag/weedbug/. FMC's site provides clear images of not only weeds, but other pests as well.

http://www.rce.rutgers.edu/weeds/. Rutgers University's site has a wide collection of weed images that may be sorted by common or scientific name.

http://www.ppws.vt.edu/weedindex.htm. Virginia Tech's weed identification site may be the most useful in the United States.

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Web Sites (continued from page 3)

Some plants that are known to be toxic to livestock and/or humans, so here are a couple of sites that may be very helpful:

http://www.ces.ncsu.edu/depts/hort/consumer/poison/poison.htm. N.C. State University has a comprehensive listing of toxic plants that may be sorted in several ways with information on the toxic chemicals found within the plant and symptoms that the animal may display.

http://www.vet.purdue.edu/depts/addl/toxic/cover1.htm. In addition to an alphabetical plant listing, Purdue University's site allows the user to sort plants by toxicity rating or animal species affected.

Tree Diseases

http://www.na.fs.fed.us/spo/fth_pub.htm. Forest and Tree Health Publications and Fact Sheets include Insect and Disease Leaflets, Pest Alerts, Silvics of North America, and HOW to publications.

http://www.ces.uga.edu/agriculture/plantpath/plantdis/Fungalidbook.html. Fungal Identification from Plant Material

http://fhpr8.srs.fs.fed.us/idotis/diseases.html. Diseases of the Southern Region

http://www.treelink.org/linx/?navSubCatRef=10. Disease: TreeLink: The Community Forest Resourse.

http://www.extension.umn.edu/projects/yardandgarden/diagnostics/relatedsites.html. Plant Pathology Reference and Links

There are too many excellent informational sites to list for the purposes of this article. The few that are listed I find to be valuable on a day-to-day basis and will hopefully provide answers to your daily activities.

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Pest Alert

A new exotic beetle from Asia was discovered feeding on ash (*Fraxinus* spp.) trees in southeastern Michigan. It was identified in July 2002 as the **emerald ash borer**, *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae). Larvae feed in the phloem and outer sapwood, producing galleries that eventually girdle and kill branches and entire trees. Evidence suggests that *A. planipennis* has been established in Michigan for at least five years. Surveys to determine the extent of the infested area are underway.

Identification. Adults are larger and a brighter green than any of the native North American species of *Agrilus*. The slender, elongate adults are 7.5 to 13.5 mm long, and females are larger than males. The adult body is brassy or golden green overall, with darker, metallic, emerald green wing covers, or elytra. The top of the abdomen under the elytra is metallic coppery red (seen only when the wings are spread). The prothorax, to which the first pair of legs is attached, is slightly wider than the head but the same width as the base of the elytra. The back edges of the covering on the prothorax are sinuate or wavy, and the top is sculptured with tiny, transverse wavy ridges. The surfaces of the elytra are granularly roughened. Tips of the elytra are rounded with small teeth along the edge.

Larvae reach a length of 26 to 32 mm, are cream-colored and dorso-ventrally flattened. The brown head is mostly retracted into the prothorax and only the mouth-parts are visible externally. The 10-segmented abdomen has a pair of brown, pincer-like appendages on the last segment.

Biology. The emerald ash borer appears to have a one year life cycle in southern Michigan but could require two years to complete a generation in colder regions. Adult emergence begins in mid to late May, peaks in early to mid June, and continues into late June. The adults are active

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during the day, particularly when conditions are warm and sunny. Most beetles remain in protected locations in bark crevices or on foliage during rain, heavy cloud cover, high winds or temperatures above 32°C (90°F). Chinese literature indicates that beetles usually fly within 2 meters of the ground. The likelihood of long distance flights is not known. Adults, which may be present into July, feed on up to 0.45 cm^2 of foliage per day, leaving irregularly-shaped patches of leaf tissue with jagged edges.

Information from China indicates that male adults live an average of 13 days and females live about 21 to 22 days. Females can mate multiple times and oviposition begins 7 to 9 days after the initial mating. Females lay 65 to 90 eggs during their lifetime. Eggs are deposited individually on the bark surface or in bark crevices on the trunk or branches. In southeastern Michigan, the oviposition period likely extends into mid to late July.

Eggs hatch in 7 to 10 days. After hatching, first instar larvae chew through the bark and into the cambial region. Larvae feed on phloem and the outer sapwood for several weeks. The S-shaped feeding gallery winds back and forth, becoming progressively wider as the larva grows. Galleries are packed with fine frass. Individual galleries usually extend over an area that is 20 to 30 cm in length, though the length of the affected area can range from 10 to 50 cm. In some areas, woodpeckers feed heavily on larvae.

The insect overwinters as a full-grown larva in a shallow chamber excavated in the sapwood. Pupation begins in late April or early May. Newly eclosed adults may remain in the pupal chamber for 1 to 2 weeks before emerging head-first through a D-shaped exit hole that is 3-4 mm in diameter.

Distribution and Hosts. The emerald ash borer is indigenous to Asia and is known to occur in China, Korea, Japan, Mongolia, the Russian Far East and Taiwan. A Chinese report indicates high populations of the borer occur primarily in *Fraxinus chinensis* and *F. rhynchophylla* forests. Other reported hosts in Asia include *F. mandshurica* var. *japonica, Ulmus davidiana* var. *japonica, Juglans mandshurica* var. *sieboldiana* and *Pterocarya rhoifolia*. In Michigan, this borer has been observed only on ash trees. It has killed green ash (*F. pennsylvanica*), white ash (*F. americana*) and black ash (*F. nigra*), as well as several horticultural varieties of ash.

Symptoms. Infestations of emerald ash borer can be difficult to detect until canopy dieback begins. Evidence of infestation includes D-shaped exit holes on branches and the trunk. Callus tissue produced by the tree in response to larval feeding may cause vertical splits 5-10 cm in length to occur in the bark above the gallery. Distinct, frass-filled larval tunnels etch the outer sapwood and phloem of the trunk and branches. An elliptical area of discolored sapwood, likely a result of secondary infection by fungal pathogens, sometimes surrounds larval feeding galleries in live trees.

Infested branches in the canopy die when they are girdled by the serpentine tunnels excavated by feeding larvae. Many trees appear to lose about 30 to 50 percent of the canopy in one year and the tree is often killed after 2-3 years of infestation. Frequently a profusion of epicormic shoots arises at the margin of live and dead tissue on the trunk. When trees die, dense root sprouting occurs.

Emerald ash borer killed trees of various size and condition in Michigan. Larvae successfully developed on trees as small as 5 cm in diameter, but pole-sized and sawtimber-sized trees were also killed. Stress likely contributes to vulnerability of ash trees and recent summer droughts may have contributed to high emerald ash borer populations in southeastern Michigan. However, emerald ash borer attacked and killed apparently vigorous trees in woodlots and urban trees under regular irrigation and fertilization regimes.

Source

McCullough, D.B. and D.L. Roberts. 2002. Emerald Ash Borer. Pest Alert. USDA Forest Service. St. & Pvt. For. NE Area. NA-PR-07-02. Aug. 2002.

Pesticide News

Memorandum of Agreement for azinphos-methyl (AZM). The EPA, Bayer and Makhteshim-Agan signed a Memorandum of Agreement for azinphos-methyl (AZM) to implement the conditions of reregistration set out in the Interim Reregistration Eligibility Document. Additional changes to the registration will be made according to stakeholder comments received during the post- Interim Reregistration Eligibility Decision (IRED) comment period. The registrations for these uses will expire in October 2005. However, the registrant can apply to continue particular uses. The EPA may grant a continuation based on a review of the pesticide's risks and benefits. You can find more information on the EPA web site, www.epa.gov/pesticides. (Georgia Pest Management Newsletter, June 2002)

Be sure of your alternatives as you make plans to move away from older pesticides. Current production of southeastern peaches requires the use of an organophosphate, such as phosmet. The peach industry has made plans to reduce or eliminate their need for an OP; the plan is partially based on the availability of neonicotinoid insecticides. However, it appears that the risk cup for this chemistry may be nearly full. It may not be possible to register neonicotinoids on peaches without reducing the risk cup in other areas. (Georgia Pest Management Newsletter, August 2002)

Editor: This is something to think about regarding OP use in seed orchards.

Change in uses for clopyralid. On July 26, Dow AgroSciences announced that the herbicide clopyralid will no longer be registered for use on U.S. residential lawns. However, it will be available for non-residential turf use with amended labels that direct property managers not to compost clippings from treated areas. Farm, ranch, and **forestry** uses will be unaffected. (Dow AgroSciences Release, 7/26/02 via Chemically Speaking, August 2002).

Diazinon phase out and use changes. EPA will phase out and cancel certain crop uses and formulations of the insecticide diazinon to reduce risks to birds and other wildlife, agricultural workers, and the environment. These actions are part of a second agreement between EPA and diazinon technical registrants, reflected in the Diazinon IRED signed by the Agency on July 31, 2002. All indoor use product registrations must be canceled and retail sale must end by December 31, 2002 and all outdoor residential use product registrations must be canceled and retail sale must end by December 31, 2004. Other mitigation includes canceling nearly all granular uses, discontinuing all aerial applications, discontinuing foliar application to nearly all vegetable crops, reducing the number of applications per growing season for most uses, requiring engineering controls for mixers and loaders, and closed cabs for applicators, setting re-entry intervals at 2 to 18 days, and canceling certain crop uses. (EPA Pesticide Program Update, 8/5/02 via Chemically Speaking, August 2002)

The Canadian province of Quebec plans to ban the use of most nonfarm pesticides by 2005. The government will move to immediately ban the use of 30 highly noxious pesticides (I am not sure which ones) on public lands, including parks, schools, day-care centers, and hospitals. The ban will be extended to private lands by 2005. The sale of fertilizer/pesticide combination products will be banned as of next year and added that direct access to more noxious products used at home will be prohibited by 2004. Golf courses will also have to set up plans to cut the use of pesticides by 2005.

This regulation comes as a result of a decision in the Canadian Supreme Court that allows cities to ban the use of pesticides in residential areas. Pesticide companies in the United States dread a similar ruling in the United States because companies would have to deal with thousands of pesticide laws established by every city and town across the country. Currently, pesticide registrants have to comply with regulations established by EPA and by individual states. In

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Pesticide News (continued from page 6)

most situations, state and federal pesticide regulations are very similar. (Reuters, 7-5-02 via Georgia Pest Management Newsletter, July 2002)

Several new products will soon be on the market. Pesticide companies and EPA are working to fill market niches and production needs created by the Food Quality Protection Act and reregistration activities. Please keep in mind that the mention of these products is not an endorsement. You are strongly advised to contact your local extension office for specific pesticide recommendations.

Acetamiprid (Bayer CropScience) is a new active ingredient conditionally registered by EPA in March. The EPA classified acetamiprid as a "reduced-risk" pesticide (*find out all about the reduced risk program at* **http://www.epa.gov/oppfead1/trac/safero.htm**) . The products are marketed as OP-alternatives for insecticides like acephate on cotton and azinphos-methyl on apples. Acetamiprid was registered for control of sucking-type insects on leafy vegetables, fruiting vegetables, cole crops, citrus fruits, pome fruits, grapes, cotton, and ornamental plants and flowers.

Novaluron (Makhteshim-Agan) insecticide was granted OP Alternative Status for New (First Food) Uses on Pome Fruit and Cotton in March. Novaluron is a potential alternative for many pesticide uses on pome fruit and cotton, including organophosphates (azinphos methyl, dicrotophos, chlorpyrifos, and acephate); carbamates (carbaryl and oxamyl); pyrethroids (lambda-cyhalothrin, cypermethrin, zeta-cypermethrin, and esfenvalerate); and an organochlorine (endosulfan). Novaluron is an insect growth regulator that works by chitin inhibition; its broad-spectrum activity is unique among the growth regulators.

Pyriproxyfen (Valent) was granted conventional "Reduced-Risk" and OP Alternative Status for New Uses. EPA granted "reduced-risk" and OP alternative status for use on some 21 tropical fruits including avocado, papaya, mango, pineapple, bananas, and coffee. Pyriproxyfen, a growth hormone mimic, could be an organophosphate alternative to control scale insects. EPA has previously granted pyriproxyfen conventional "reduced-risk" status for numerous uses, and the Agency has already registered many of those uses.

Spinosad (Dow AgroSciences) was granted an Experimental Use Permit (EUP) for Conventional "Reduced-Risk" Insecticide on Stored Grains earlier this summer. The EUP will permit evaluation for control of multiple insect pests infesting grain during storage, including the lesser grain borer, red flour beetle, and rusty grain beetle in stored grains (wheat, barley, corn, oats, rice and sorghum/milo). We desperately need some new options for stored grains.

Indoxacarb (DuPont) was granted "reduced-risk" /OP alternative status in support of new uses on alfalfa, peanuts, lettuce, potatoes, and soybeans. Western grower interest for this chemical has been intense, and registration of indoxacarb on alfalfa prevented an Emergency Exemption (Section 18) request on behalf of the California Alfalfa & Forage Association. The Washington and Oregon potato growers, as well as the California alfalfa growers, have been informed of the registration of these new uses. (Georgia Pest Management Newsletter, August 2002)

Taegro® (B. subtilis *var.* amyloiquefaciens *strain FZB 24*)—Taensa—A new biofungicide (rhizobacteria) that colonizes plant roots, protecting the plant from infection by disease organisms. Taegro® is used for plant strengthening, enhancing growth, increasing yields, and for suppressing selected soil-born diseases such as *Rhizoctonia* and *Fusarium* on ornamentals, shrubs, and forest and shade tree seedlings. It is applied as a dip treatment before planting seedlings. (Illinois Pesticide Review, Jan. 2002 and Chemically Speaking, July 2002)

Thought You Might Be Interested To Know . . .

USDA Agricultural Research Service (ARS) cooperators have recently elucidated a scenario in which caterpillar-infested tobacco plants released compounds during the day and night. Those released at night were repellent to female moths, who are looking for sites to deposit eggs. This information is in addition to that which demonstrated corn seedlings released chemicals that attract parasitic wasps when fed upon by caterpillars. (USDA ARS News Service, www.ars.usda.gov via Arkansas Pesticide News June 2001)

Mosquito Traps. Recently, there has been a number of products advertised as mosquito traps. One type generates carbon dioxide to lure the mosquito and then sucks it into a bag. Other derivations use octenol as an attractant. The devices range from a few hundred to fifteen hundred dollars in cost. CO_2 and octenol must be replaced at various intervals. Researchers are currently investigating the efficacy of these units. However, one might want to keep in mind that there are 77 different species of mosquito in Florida, and each of these varies in what host they bite, the time of day they feed, and how far they can fly. One of the species which is a primary biting pest for homeowners is the Asian tiger mosquito. This species is not attracted by carbon dioxide or octenol. At this point, no evidence exists that these traps can play a noticeable role in the decline of mosquito populations. For more information call Dr. Roxanne Rutledge at 772 778-7200 x 158. (IFAS/FMEL release, 6/13/02 via Chemically Speaking, July 2002)

The repellent DEET (N, N-diethyl-3-methylbenzamide) provides greater protection against biting, stinging insects and ticks than herbal oils, according to a study in the July 4 issue of the New England Journal of Medicine. University of Florida researchers tested 17 repellents on volunteers and found DEET, marketed since the 1950's, to be the best choice for reliable protection from mosquito- or tick-borne infections such as West Nile virus, malaria or Lyme disease. Access the abstract at http://content.nejm.org/ (CropLife America Spotlight, 7/12/02 via Chemically Speaking, August 2002)

IPM even works on elephants. Growers in Indonesia have a problem with elephants raiding crops (and you thought armyworms were bad). Elephanticides are largely non-existent, and there are always concerns about resistance. Scientists have devised a system of guard towers, tripwires, and ropes impregnated with hot sauce. The hot sauce is a powerful irritant to the elephants if they get a snoot full. Additionally, the tripwires alert the field guards. The elephants are chased away with lights, sirens, and firecrackers. (From the Wildlife Conservation Society's website **http://wcs.org/7411/?art=57518** via *IPM News,* June 2002)

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Announcement:

Entomology Seminar - All WGFPMC executive and contact representative and industry and TFS foresters are invited to attend the fall session of the East Texas Forest Entomology Seminar scheduled for Oct 24-25, 2001. The meeting will begin at 1:00 PM on Thursday at Kurth Lake Lodge, north of Lufkin, and continue until noon on Friday at the Arthur Temple College of Forestry (Room 117) at SFASU in Nacogdoches. Registration is $20, which includes an evening meal. For additional information and/or an agenda, contact Ron Billings at 979/458-6665 or rbillings@tfs.tamu.edu.