

Progress
Education
Science
Technology
December 2015
 Quarterly Newsletter
 on
 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 related to seed orchards, forest plantations and urban trees. The newsletter focuses on, but is not limited to, issues occurring in the South (Texas to Florida to Virginia.).

**ISAT – First Supporting
 Member of FPMC**

The International Society of Arboriculture – Texas Chapter (ISAT) will be joining the Forest Pest Management Cooperative (FPMC) as the Coop's first Supporting Member. ISAT, formed in 1978, has a membership of 1,116, most of whom are certified arborists. The organization is dedicated to improving and promoting the practice of professional arboriculture through science, education, and public awareness. ISAT supports applied research in urban forests and values the contributions of the FPMC.

Welcome aboard.

Forest Pest Management Cooperative



Nantucket Pine Tip Moth, *Rhyacionia frustrana* (Comstock)

Texas A&M Forest Service
 200 Technology Way, Suite 1281, College Station, Texas 77845

Summary of 2015 FPMC Research Projects

In 2015, six primary research project areas – leaf-cutting ants, tip moths, conifer mites, hypoxylon canker, walnut twig beetle (vector of the thousand cankers disease fungus), and systemic injections for southern pine beetle and oak wilt – were continued from 2014. The FPMC also evaluated new control options for seed orchard insects and conducted a survey to determine the most important forest health issues affecting urban trees. Results of the conifer mite and hypoxylon canker studies, as well as the urban tree survey, are summarized in this issue. Other research results will be presented in the March 2016 issue of *PEST*.

Evaluation of Controls for Conifer Mites on Loblolly Pine



Spider mite (Photo courtesy of Wikipedia)

Conifer mites (family Tetranychidae) attack most species of trees (including conifers) and shrubs. Nursery seedlings and windbreak trees are particularly susceptible because they are often treated with

insecticides that kill predators of conifer mites. Pine, hemlock, spruce, juniper, fir, and white-cedar are often heavily attacked.

Heavy infestations of conifer mites cause reduced seedling and young tree growth, along with foliage yellowing or browning. Although most spider mite attacks do not cause mortality, they may predispose trees to attack by insects and diseases or to damage by adverse environmental conditions. Spider mite populations can explode after use of insecticides to control other insects when mite predators are killed as well.

Several miticides (insecticidal/miticidal oils and soaps, Dicofol™, Kelthane™, Avid™, Floramite™, Hexagon™, Sanmite™, and Forbid™) are available for control, but resistance can develop if the applicator relies too heavily on one product. Recently, Arborjet, Inc., (Woburn, MA) has developed a new formulation of botanical miticide called EcoMite Plus™.

In 2014, the FPMC initiated a study to evaluate the potential efficacy of tree injection of TREE-äge™ (emamectin benzoate) and spray applications of EcoMite Plus for control of secondary conifer mites at Campbell Global's Boyd Lake Seed Orchard near Jasper, Texas. Results were summarized in the June 2015 issue of *PEST*.

In late 2014, a second study was initiated with funding from Arborjet at Campbell Global's Boyd Lake Seed Orchard to evaluate two new products for control of conifer mites. There were four treatments with ten replicates per treatment: 1) TREE-äge (emamectin benzoate) tree injection; 2) Ima-jet™ – a micro-injectable systemic insecticide containing the active ingredient imidacloprid produced by Arborjet; 3) an experimental injectable product labelled AJT085, and 4) untreated check.

The TREE-äge treatment was injected at the labeled rate (2.5 ml per inch ground line diameter) after dilution in 1 part water with the Arborjet Tree IV™ microinfusion system. Treatments 2 and

3 were injected undiluted (2ml IMA-jet per inch GLD, 1.25 ml AJT-085 per inch GLD) with the Arborjet Tree IV™ system into three points (using #3 Arborplugs) at staggered heights up to 6 inches above the ground. Injections for treatments 1, 2 and 3 were applied on December 8, 2014, immediately following a pre-treatment sampling of conifer mites on all study trees.

Prior to treatment in early December 2014 and at intervals of ca. 4, 8, 10 and 12 months following treatment, two lower branches were shaken over a white sheet of paper. The conifer mites found on the paper were counted and then sent for identification to Alex Mangini of the USFS, FHP, Region 8. The most common mites encountered were the pine spider mite *Oligonychus milleri* (Suborder Prostigmata, family Tetranychidae) and the mite *Neoseiulus arenillus* (Order Mesostigmata, family Phytoseiidae).

During the first four months following treatment, the numbers of mites found on the TREE-äge-, Ima-jet-, and AJT085-treated trees were not statistically different from one another or from the check (Table 1).

Table 1: Mean numbers of spider mites by treatment and date; Campbell Global's Boyd Lake Seed Orchard, Jasper, TX. Means within a column followed by the same letter are not significantly different ($P \leq 0.05$).

Treatment	Pre-treat 12/8/2014	Post Treatment 2015					
		15 Jan	9 Feb	24 Mar	23 Jun	2 Oct	2 Dec
TREE-äge™	6.2 a	1.9 a	2.3 a	5.2 a	9.8 b	1.8 b	2.8 b
Ima-jet™	5.9 a	3.5 a	21.2 a	14 a	20.1 a b	1.7 b	6.5 a b
AJT085	3.9 a	4.1 a	17.8 a	27.5 a	30.2 a	3 a b	5.4 a b
Check	4.3 a	5.6 a	16.4 a	18.7 a	22.1 a	3.8 a	8.6 a

Continued on next page.

By June 23, 2015, only the TREE-äge-treated trees showed significantly fewer mite numbers, compared to the check. After 12 months (December 2, 2015), there were no significant differences in mean numbers of spider mites among the three injection treatments, but only TREE-äge-treated trees exhibited numbers significantly different from check trees.

What are the Major Tree Health Concerns in Urban Forests?

In 2015, the FPMC distributed a questionnaire to urban foresters and arborists to identify those insects, diseases and other forest health concerns affecting urban trees in Texas. A 2-page survey consisting of 5 questions was distributed by internet to TFS urban foresters and members of the Texas Chapter, International Society of Arboriculture. A total of 64 responses were received. Of these, 37 (58%) were from workers in Central Texas and the remainder were from other regions of the state.

Of particular interest were the responses to question 1:

Please rank the following pest problems with regard to their relative importance as a pest of Texas trees in your region, where A = very important; B = occasionally important; C = seldom or never a problem; and D = I am unfamiliar with this one.

Eighteen forest health issues were provided for ranking. On each returned survey, a response of A was assigned a weight of 6 points, b = 4 points, C = 2 points, and D = 0 points. The issues were then ranked in importance, based on the totals in category A (very important).

Results (see Table 2 on page 12) reveal that the top three forest health issues in urban areas according to urban foresters and arborists are hypoxylon canker, oak wilt, and invasive plants. These were followed closely in rank by root and stem diseases, sucking insects, and wood borers.

Considered of least importance were conifer defoliating insects, bagworms, twig girdlers, and hardwood defoliators other than caterpillars or leaf rollers.

When asked to name the most important invasive plants affecting urban areas, the top responses among all regions combined were oriental privets, Chinaberry, and Chinese tallow. Other invasive plants were of concern in specific regions of the state, such as Brazilian peppertree along the coast and saltcedar in West Texas.

With regard to a question about research needs in urban forests, the most common responses were related to oak wilt, hypoxylon canker, *Phytophthora* root rots, and the emerald ash borer.

Can Hypoxylon–infected Oaks be Saved with Fungicide Injections?



Hypoxylon canker on post oak (Photo by R. Billings)

In a recent urban forest health survey (see previous article), urban foresters and professional arborists identified hypoxylon canker (HC) as the top tree health concern in urban areas of Texas. Many hardwood trees that died during or

following the unprecedented drought of 2011 in Texas showed signs and symptoms of HC.

Hypoxyton canker is caused by a fungus (*Hypoxyton atropunctatum*) that produces cankers, often associated with the death of oak and other hardwood trees. The disease is common in East and Central Texas and all across the southern United States. Relatively healthy trees are not invaded by the fungus, but the hypoxyton fungus will readily infect the sapwood of a tree that has been damaged, stressed, or weakened. Natural and man-caused factors that can weaken a tree include defoliation by insects or leaf fungi, saturated soil, fill dirt, soil compaction, excavation in the root zone of the tree, removal of top soil under the tree, disease, herbicide injury, drought, heat, nutrient deficiencies, competition or overcrowding, and other factors.

HC activity usually increases during and shortly after prolonged droughts. When drought stresses trees, the fungus is able to take advantage of these weakened trees. The moisture content of living wood in live, healthy trees is typically 120% - 160%. It is difficult for HC to develop in wood that has a normal moisture content. However, any of the factors listed above could weaken or stress trees causing the moisture content of the wood to reach levels low enough for the hypoxyton fungus to develop. When this happens, the fungus becomes active in the tree and invades and decays the sapwood causing the tree to die. Once hypoxyton actively infects a tree, the tree often dies.

An early indication that HC may be invading a tree is a noticeable thinning of the crown. Also, the crown may exhibit branch dieback. As the fungus develops, small sections of bark will slough from the trunk and branches and collect at the base of the tree. Where the bark has sloughed off, tan, olive green, or reddish-brown, powdery spores can be seen. In four to eight weeks, these tan areas will turn dark brown to black and become hard. They have the appearance of solidified tar. After several months, the areas will become a silver-gray color.

Probably all oak trees are susceptible to HC. In addition, elm, pecan, hickory, sycamore, maple, beech, and other trees may be infected. The fungus spreads by airborne spores that apparently infect trees of any age by colonizing the inner bark. The fungus is known to be present in many healthy trees and can survive for long periods of time in the inner bark without invading the sapwood. As mentioned earlier, when a tree is weakened or stressed, the fungus may then invade the sapwood and become one of several factors that ultimately kill the tree.

Until recently, there was no known control for HC other than maintaining tree vigor. During drought periods, supplemental watering is recommended, if the tree is near a water source. However, some preliminary evidence suggested that oak trees exhibiting signs of HC may recover after injection with PHOSPHO-jet (salts of phosphorous acid, Arborjet, Inc.) (J B Toorish, personal communication).

In 2012, the FPMC initiated a study in Lufkin, Texas, to evaluate systemic injections of PHOSHO-jet as a therapeutic treatment of oaks against HC and determine the duration of treatment efficacy. Each of 60 red oaks randomly selected in a natural, wooded area was assigned to one of three health categories: **Healthy**; crown healthy or with < 20% dieback; **Moderate**; evidence of HC infection and 20-80% of crown showing dieback; **Severe**; obvious HC infection and > 80% of crown showing dieback.

Ten (10) red oaks from each of the healthy, moderate and severe health categories were randomly selected for PHOSPHO-jet treatment. Ten trees in each infection category were injected with PHOSPHO-jet in September 2012 and again in May 2014. The chemical was injected at the labeled rate (5.0 ml PHOSPHO-jet per inch DBH for trees < 24 inch DBH and 7.0 ml per inch DBH for trees $\geq$ 24 inch DBH) after dilution in 2 parts water with the Tree IV™ or QUIK-jet™ microinfusion system (Arborjet, Inc.). An additional ten trees from each category served as untreated checks. The study trees were monitored periodically up to June 15, 2015.

Results (see Table 3, page 12) showed that many of the PHOSPHO-jet trees appeared to recover from hypoxylon at a more rapid rate than did untreated trees during the first two years post-treatment. But, with the return of normal rainfall patterns in 2013-2015, not a single treated or check tree in this study succumbed to hypoxylon. Also, after almost three years, there were few differences in crown dieback among treated and check trees. All but two check trees appeared to have largely recovered (less than 20% crown dieback). It is amazing what normal rainfall will do for drought-stressed trees. Further studies are needed to ascertain if fungicide treatments can protect trees from mortality during a prolonged drought.



FPMC Staff Forester Bill Upton sweats it out while monitoring oaks in the hypoxylon canker study during the summer of 2015, Lufkin, TX. (Photo by R. Billings)

Southern Pine Beetle Outbreak in Honduras Worst in 50 Years

The current outbreak of southern pine beetle (*Dendroctonus frontalis*) in Honduras has increased alarmingly in recent months. As of December 1, forestry officials estimate that over 1 million acres have become infested to date, becoming the worst outbreak in this country since the early 1960s. This represents 14% of the entire pine resource in Honduras (6.9 million acres).

From 1962-1965, some 5 million acres of pines were killed by SPB, representing over 70% of the pine forests in Honduras. At its peak, this outbreak was estimated to be advancing at 370,000 acres per month and little control was applied.

The current outbreak, attributed to a 2-year, El Niño-induced drought, started in 2013. But control actions were delayed until this past fall by a presidential election and lack of funds. In August, 2015, the Honduran government, with donations from national and international stakeholders, appropriated the equivalent of \$11 million US to address the outbreak.



Forests of pine (*Pinus oocarpa*) killed by southern pine beetle (*Dendroctonus frontalis*) in Honduras (Photo by R. Billings).

FPMC Coordinator Dr. Ronald Billings and US Forest Service entomologist Dr. Stephen Clarke provided technical assistance to Honduras in November 2014. Billings returned in September 2015 to survey the current situation and provide guidance to Honduran forestry officials and the

President (see September 2015 issue of *PEST*). Billings' and Clark's recommendations were incorporated into an action plan that is now being implemented (better late than never, as the saying goes).

Based on specimens of adult beetles collected from the current outbreak, US Forest Service entomologist Dr. Brian Sullivan has confirmed the principal causal agent to be the southern pine beetle, *Dendroctonus frontalis*, and not the new species recently described as *D. mesoamericanus* (see March 2015 issue of *PEST*).

Cut-and-leave, a mechanical control method developed in East Texas in the 1970s, is being implemented to halt expanding infestations along the leading front of the outbreak, which is moving rapidly from central Honduras to western forest districts.

Two hundred forest technicians and two thousand chainsaw crews have been contracted to control active infestations, with assistance from the Honduran military and local communities.

Once the outbreak subsides, the country faces a massive restoration effort. Avoiding erosion on steep slopes until natural regeneration is established, coupled with wildfire prevention and planting of pine seedlings in areas lacking seed trees, will be needed to avoid the conversion of impacted areas to short-term agriculture.



A chainsaw operator in Honduras prepares to head for the field to control SPB infestations. (Photo by R. Billings)

Southern Pine Beetle Status in the South

The 2015 southern pine beetle (SPB) forecasts, based on a network of pheromone traps deployed last spring, called for continued low populations of SPB throughout the southeastern U.S., with the exception of local areas in Mississippi and Alabama (see *PEST*, June 2015). For the most part, this prediction held true. Most of the active SPB infestations were reported from the National Forests in Mississippi, particularly the Bienville N. F. (238 spots) and the Homochitto N. F. (91 spots). Some activity was also reported on federal lands in Alabama, specifically on the Oakmulgee Ranger District (10 spots).

The State of Alabama also detected numerous spots of bark beetle-caused mortality during early summer and fall aerial surveys, particularly in Choctaw, Marengo and Clarke counties in the southwestern part of the state. It is not known what portion of these spots was caused by SPB versus *Ips* engraver beetles. Overall, it was another year of relatively low SPB activity across the South. The South-wide SPB prediction survey will be repeated next spring.

Weyerhaeuser and Plum Creek To Merge

(Extracted from *Forestry Source*, December 2015)

Weyerhaeuser Co. and Plum Creek Timber Co. – two full members of the FPMC – announced in November that they plan to merge, creating a timberland and forest products company with more than 13 million acres in the US. The combined company, a real estate investment trust (REIT), will retain the Weyerhaeuser name and is expected to have a value of \$23 billion.

Doyle Simons, current president and CEO of Weyerhaeuser, will serve as president and CEO of the combined company. Plum Creek CEO Rick Holley will serve as non-executive chairman of the new Weyerhaeuser board, to include 13 directors, eight from Weyerhaeuser and five from Plum Creek. This merger will create by far the largest timberland-owning company in the world.

What does this merger mean for the Forest Pest Management Cooperative? Only time will tell. Plum Creek Timber Company has been a valued member of the FPMC since 2000. The coop has benefited from the strong support and input of Plum Creek executive team member Marshall Jacobson (Athens, Georgia) and contact members Conner Fristoe and Jerry Watkins (Crossett, Arkansas). Marshall is now retired and his duties have been taken over by Terri Galinski.

In turn, Weyerhaeuser has been a full member since 2002 and the executive team member is Wilson Edward (Vanceboro, North Carolina). Hopefully, we can keep Terri, Conner, Jerry and Wilson involved with the FPMC.

Emerald Ash Borer – For the Birds

Ways to control the invasive emerald ash borer may be at hand – or at least in a hollow tree nearby. Woodpeckers find emerald ash borers a handy food source and may slow the spread of this noxious pest, even ultimately controlling it, suggest researchers from the University of Illinois at Chicago in an article in *Journal of Forest Ecology and Management*.

“We found we have a native predator that is able to detect and respond to this new rich food resource,” said Charles Flower, UIC postdoctoral research associate in biology and first author of the study.

Since the emerald ash borer was first found feeding on trees in southeastern Michigan in 2002, this Asian invader has been responsible for the death of 30 million trees in the northeastern U.S. and Canada. In Chicago, where the emerald ash borer is already destroying trees, 17 percent of the street trees are ash—85,000 trees, with an estimated 300,000 more ash trees on private property.

In this study the researchers wanted to see if native bark-foraging birds, including woodpeckers and nuthatches, were feeding on the emerald ash borer. They hoped that unlike other exotic invasive species which run amok in new regions

because of the lack of predators to keep them in check, the emerald ash borer might meet its match in native predators—bark foraging birds like the woodpecker and nuthatch.

One of the ways a predator can respond to a new abundant food source, according to Flower, is a functional response: the woodpeckers alter their behavior in a way that allows them to find emerald ash borers more efficiently and then consume them more than other prey. Their results proved that woodpeckers were indeed choosing to prey on emerald ash borers – eating 85 percent of the emerald ash borer in an infested tree.

In a related study, researchers at Cornell tracked the movement of emerald ash borer from Detroit and around the Great Lakes using a citizen scientist data base—the Project Feeder Watch—which showed that the numbers of three woodpecker species and the white-breasted nuthatch, the important bark foraging birds in this region, increased as the emerald ash borer increased.

“Woodpeckers won’t save a tree once it’s infested, but they may save the forest. Or at least save a nearby forest,” said Flower. See more at: <http://news.uic.edu/emerald-ash-borer-may-have-met-its-match#sthash.IxQbsfpA.dpuf>

Kissing Bugs May Deliver Kiss of Death

Once considered a problem restricted to Central and South America, Chagas disease, caused by the parasite *Trypanosoma cruzi*, has become a worldwide problem. Eight to 11 million people are infected worldwide, according to the Pan American Health Organization. Recently, cases have been reported in Florida and Texas.

According to an article in the *Dallas Morning News* on November 16, 2015, one in every 6,500 blood donors in Texas is infected with Chagas disease, compared with one in every 27,500 donors across the country. The parasite that causes Chagas disease is vectored by the so-called “kissing bug” (*Triatoma* spp.). This true bug (Order Hemiptera: Family Reduviidae) has this

name because the adult insects usually bite people near their mouth while they sleep (the people, not the bug). In this way, they may infect the blood with the parasite responsible for Chagas.

In southern Arizona, kissing bugs often are found in packrat nests. Packrat nests provide the kissing bugs with a readily available supply of blood and a safe haven from insect-eating predators.

However, the packrat also is a predator of the kissing bug, so safety is not guaranteed in those nests. After the 5th nymphal instar stage, the kissing bug will molt into an adult with the ability to fly.

At this point the adults will leave the packrat nest in search of other blood sources. During these flights, kissing bugs are attracted to light and host odor. Your porch light or lights from your windows will be attractive to kissing bugs flying nearby.

After reaching your house, they will look for a way to enter the house and feed on your pets or you. The carbon dioxide that you exhale, as well as the heat from your body, is attractive to kissing bugs.

Many people have moderate to severe allergic reactions to the kissing bug bite. Reactions from the bite range from skin irritation and redness to anaphalitic shock requiring immediately medical attention.

The parasite that causes Chagas disease lives in the digestive system of the kissing bug and is excreted during defecation of the kissing bug after feeding.

If this parasite enters your blood stream through the bite site or an open wound, you might become infected with the disease, which can lead to death if not treated. For more information on Chagas disease, see the *Dallas Morning News* article at <http://interactives.dallasnews.com/2015/tropical-diseases/>.



Kissing bug, potential vector of Chagas disease (Photo courtesy www.travelerstoday.com)

Migration to Mexico Expected to Quadruple

(From *Morning Ag Clips*, November 17, 2015)

No, Donald Trump has nothing to do with the exodus of a multitude of individuals from the U.S. into Mexico. Here, we are talking about monarch butterflies, the state insect of Texas. Between September and November, North American monarch butterflies make a staggering fall migration that may cover up to 3,000 miles. Many pass through Texas each year, but their numbers in recent years have dwindled alarmingly. This decline to historic low numbers has been blamed on illegal logging in their Mexican wintering grounds and the drop in milkweed on which they feed due to the use of herbicides in the United States and Canada.

After years of sharp decline in numbers of adult butterflies overwintering in the mountains west of Mexico City, the United States, Canada and Mexico agreed to a summit in February 2014 to foster the insect's survival. In less than two years, the measures are having a positive effect Mexican Environment Minister Rafael Pacchiano said at a news conference at the Piedra Herrada Monarch Reserve. Pacchiano said authorities hope the orange and black butterfly will occupy between three and four hectares (7.4 and 9.9 acres) of the mountain forest, located in central Mexico, this season." This is almost four times (the population) that arrived in the previous season," Pacchiano said.

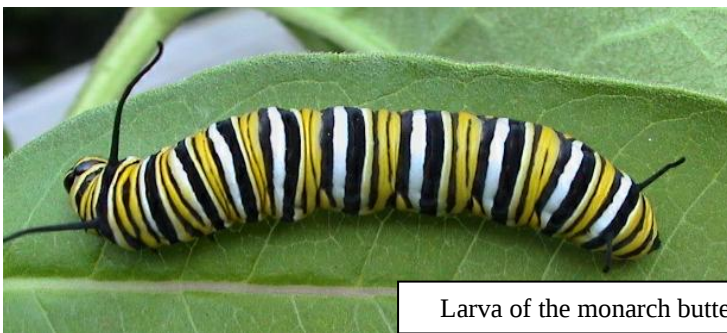
The insect occupied 1.13 hectares of forest in the past season, better than in 2013-2014, when the population hit an all-time low of 0.67 hectares. The goal is to reach six hectares by 2020. This compares to a high of nearly 19 hectares in 1996-1997.



Monarch butterflies at a fuel stop (Photo courtesy modernfarmer.com)

Pacchiano said Mexican authorities have launched "important" operations to combat illegal logging while U. S. Secretary of the Interior Sally Jewell said the United States is working on replanting milkweed in three million hectares of land and designating pesticide-free areas.

You can do your part to boost survival of monarch butterflies by planting milkweed for the larvae and butterfly-friendly flowering plants for the adult butterflies in your back yard or in city parks.



Larva of the monarch butterfly (www.learner.org)

Chinese Manufacturer Drones On!

(From *Wall Street Journal*, November 27, 2015)

China's SZ DJI Technology Company, the world's top maker of unmanned aerial vehicles (drones) for private consumers, is setting its sights on the agriculture industry with the launch of a crop sprayer that will test whether farming is fertile ground for drone technology. DJI recently unveiled an eight-rotor drone priced at roughly \$15,000 that is designed to spray pesticides on crops, a spokesman said. DJI said the drone, which has a 2.6-gallon spray tank and a typical takeoff weight of 49 pounds, can fly for about 12 minutes.

It can spray pesticides on seven to 10 acres of farmland per hour, depending on how much it needs to climb, descend or turn to follow the terrain. The battery-powered DJI Agras MG-1 will be available first in China and South Korea, though the company didn't specify exactly when it would go on sale. In China, DJI is taking preorders starting on Friday. The drone is expected to be available in other markets later.



Spray tank-equipped drone manufactured by China's SZ DJI Technology Company (Photo courtesy *Wall Street Journal*)

Yikes – The Mosquito-Borne Zika Virus May be Headed Our Way

(by Gretchen Vogel, *Science Magazine*, December 3, 2015)

An emerging virus that is causing an unprecedented epidemic in Brazil and is quickly spreading through Latin America may be responsible for a spike in severe birth defects. The Zika virus, a little-known pathogen that until 2007 hadn't been seen outside of Africa and Asia, [spread earlier this year to South America](#) and has infected more than 84,000 people in Brazil. Zika usually causes relatively mild symptoms, including fever and rashes. Many infected people do not get sick at all. But the Brazilian government is now warning that the virus may be responsible for a dramatic increase in cases of microcephaly, a severe birth defect in which the brain fails to develop properly and the head is much smaller than normal. Children with microcephaly frequently have developmental delays, learning disabilities, impaired motor function, and seizures.

The connection is not yet proven, but if Zika virus is causing birth defects, it would be a serious public health issue. Transmitted by mosquitoes, the pathogen is rapidly expanding its range. In October and November, cases were identified in Colombia, Suriname, Guatemala, El Salvador, and Mexico. There is no vaccine or

treatment for the little-studied virus, and its mosquito hosts are common as far north as the southern United States.

Microcephaly can be caused by genetic factors, infections, or injuries. In recent years, there have been between 150 and 200 cases in Brazil per year. As of 30 November, more than 1200 cases had been reported in 10 Brazilian states, all of which have also reported Zika virus infections. (Thanks to TFS-retired entomologist Joe Pase for bringing this and the previous article on Chagas disease to our attention.)



On a more positive note, scientists at the University of California have created a strain of mosquitoes capable of rapidly introducing malaria-blocking genes in a mosquito population through their progeny, ultimately eliminating the insect's ability to transmit the disease to humans. This new model represents a notable advance in the effort to establish an antimalarial mosquito population, which with further development could help eradicate a disease that sickens millions worldwide each year (See *Science News*, November 23, 2015 for more details). Hopefully, the same eventually can be done to eliminate Zika virus and other mosquito-borne diseases.

Glyphosate Unlikely to Cause Cancer

(by Barbara Lewis, *Reuters*, November 12, 2015)

Glyphosate is unlikely to cause cancer in humans, according to the European Food Safety Authority (EFSA), which nevertheless proposed limits on Thursday on the amount of residue of the weed killer widely used by farmers deemed safe to consume.

The EFSA advises EU policymakers and its conclusion could lead the 28-member European Union to renew approval for glyphosate, which was brought into use by Monsanto in the 1970s and is used in its top selling product Roundup as well as in many other herbicides around the world. Environmental groups have been calling for a ban after the International Agency for Research on Cancer (IARC), part of the World Health Organization, said in March that glyphosate was "probably carcinogenic to humans".

A campaign group said that 1.4 million people had signed a petition calling on the European Union to suspend glyphosate approval pending further assessment. The EFSA said it carried out a thorough analysis and took account of the IARC's findings.

"This has been an exhaustive process – a full assessment that has taken into account a wealth of new studies and data," said Jose Tarazona, head of the pesticides unit at the EFSA, based in Parma, Italy. "Regarding carcinogenicity, it is unlikely that this substance is carcinogenic." (Continued on next page)

The EFSA is proposing a limit on the maximum safe daily dose over a period of time, of 0.5 milligrams per kilogram (kg) of body weight. It is also proposing a new acute limit, of the same level, for a single intake of glyphosate over a short period, for instance in one meal. The scientists say an 80 kg person could eat food containing a residue of 40 milligrams of glyphosate per day for the rest of their life. Monsanto said that was the equivalent of eating 400 kg of fruit or vegetables a day.

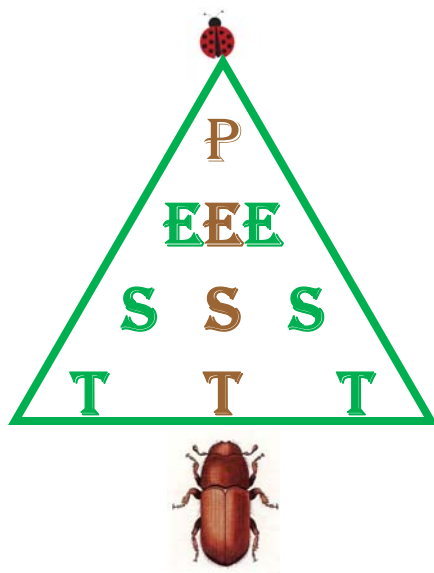
APPENDIX TABLES

Table 2: Urban forest health issues in Texas, based on rank, where A = very important; B = occasionally important; C = seldom or never a problem; and D) = responder was unfamiliar with this pest. Weights of 6, 4, 2 and 0 points were assigned to categories A, B, C, and D, respectively.

Forest Health Issues	A	B	C	D	Total Points
Hypoxylon Canker	39	13	11	1	308
Oak Wilt	34	9	20	1	280
Invasive Plants	30	21	13	0	290
Root & Stem Diseases	29	20	14	1	282
Sucking Insects	28	23	13	0	286
Wood Borers	18	31	14	1	260
Foliar Diseases	17	28	19	0	252
Deer	15	11	36	2	206
Conifer Bark Beetles	12	13	33	6	190
Foliar & Stem Galls	11	28	23	2	224
Hardwood Caterpillars	10	40	13	1	242
Texas leafcutting Ant	9	15	38	2	192
Herbicide damage	9	23	32	0	210
Conifer Defoliators	6	7	47	4	158
Bagworms	5	32	27	0	164
Twig Girdlers	4	22	35	3	212
Other Hardwood Defoliators	3	21	38	2	178

Table 3: Final condition of PHOSOHO-jet injected and check trees when monitored on June 23, 2015 at Kit McConnico Park, Lufkin, Texas; 0 = no dieback; 1 = 1% -19%; 2 = 20-80%; and 3 = >80% or dead. Numbers in columns are numbers of trees in each category for a specific date.

Treatment	Condition	Sept 2012	May 2013	June 2014	June 2015
Phosphojet	0	11	11	16	24
	1	9	16	11	6
	2	10	3	3	0
	3	0	0	0	0
Untreated	0	9	11	16	15
	1	11	13	9	13
	2	10	6	5	2
	3	0	0	0	0



PEST WISHES
FOR THE
HOLIDAY SEASON



Photo by R. Billings

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