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Southern Forest Health and Research Update

Sirex noctilio in North America

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Introduction

An exotic woodwasp from Europe and Asia was detected in a monitoring trap placed in Fulton, NY in September 2004. The woodwasp, *Sirex noctilio* (*S. noctilio*), is a highly invasive species and its introduction into North America could cause significant mortality in native and planted pine trees. In Australia, New Zealand, and Brazil, *S. noctilio* has caused widespread losses in plantations of North American pines (e.g., Monterey, loblolly, ponderosa pines). *S. noctilio* is a particular threat to pure, even-aged pine stands or other stressed pine trees. Most North American hard pines are likely susceptible to *S. noctilio* attack.

In countries where *S. noctilio* has been introduced, integrated pest management (IPM) plans have been developed and implemented for this pest. These programs use a combination of silvicultural treatments to reduce the susceptibility of pine stands and a highly specific biological control nematode to reduce the impact of *S. noctilio* on pine trees. Silvicultural treatments focused on increasing tree vigor through stand thinnings have been critical for maintaining trees more capable of defending against *S. noctilio*. The biological control agent is a parasitic nematode that is highly specific to *S. noctilio* and has helped keep populations below damaging levels where it has been implemented.

Response

A ground survey conducted during the spring 2005 discovered *S. noctilio*-infested Scots and red pines in Oswego, NY. Subsequent ground surveys also found infested white pines. During the summer 2005, a large scale *S. noctilio* detection trapping effort was undertaken in central NY. This delimitation survey found *S. noctilio* up to 46 miles away from Oswego. Surveys and observations in 2006 have found *S. noctilio* at several locations in north-central and western New York state. Currently, *S. noctilio* is known to be established in 18 counties in New York and 2 counties in Pennsylvania. Surveys in Canada have detected *S. noctilio* in or around Prescott, Cambridge, and Uxbridge, Ontario. As surveys continue throughout 2006, the known range of *S. noctilio* is likely to expand.

All indications point toward a large, well-established population in North America. In fact, *S. noctilio* may have been established in the United States for several years. Because North American pine ecosystems are more varied and complex than outplanted pine ecosystems in places like South America and Australia, it is difficult to predict exactly what impact *S. noctilio* will have in North American pine ecosystems. There is a chance that *S. noctilio* will not turn out to be the significant tree-killer in North America that it has been in other parts of the world where it has been introduced.

Currently, the USDA Forest Service, APHIS, and state agencies throughout New England and portions of the Mid-Atlantic and Midwest are working on *S. noctilio* survey plans for 2006. A large scale trapping grid will cover most of New York and parts of northern Vermont and northern Pennsylvania. Within this grid, a single trap will be placed in almost every 25 square miles. States outside of the grid survey will also deploy *S. noctilio* traps in high risk forests (all eastern states will deploy detection traps). With large numbers of traps covering a large area of the northeastern US, it is hoped that we will successfully delimit the population this year. The next step is to develop an IPM program that will use both silvicultural recommendations and the parasitic nematode. Consequently, the Forest Service is developing silvicultural guidelines for reducing the susceptibility of pine stands to *S. noctilio* attack. Southern Research Station scientists Nathan Schiff and Kier Klepzig are conducting studies on interactions of native fungi and nematodes with those associated with *S. noctilio*. Also, the Forest Service and APHIS are working on getting approval for release of the parasitic nematode into North America.

For more information, contact Don Duerr at 404-347-3541 or dduerr@fs.fed.us.

Southern Research Station funding of SPB research and development

SRS-4501 has overseen an extensive cooperative agreement program which has – via competitive, peer reviewed proposals – awarded and managed over 60 cooperative agreements totaling over \$3,000,000 in the past five years. Peer reviewers from numerous forestry entities have rated and assigned funding to the highest ranked proposals. Among the new research initiated under this program in 2006 are the following projects:

- Assessing the damages of SPB infestation to the viewsheds of South Carolina using modeling, GIS, and 3D visualization.
- Predicting forest succession in the wake of invasive species establishment.
- Development and validation of a gulf coast hazard/risk-rating model for SPB.
- SPB population/range expansion model based on climate and land use change.
- Systemic insecticide injections for protection of southeastern pines from SPB.
- Effect of habitat fragmentation on migration rates in SPB using genetic markers.
- Effects of interspecific competition and predation on the abundance of SPB in southwestern ponderosa pine forests.
- Genetic characterization of resin traits in loblolly pines selected for survival in SPB epidemics: development of high and low resin lines.
- Determination of stand susceptibility to SPB during endemic periods.
- Loblolly pine stand density and SPB damage: comparison of effects of thinning regimes and initial spacing using simulation modeling.
- Gasification of SPB killed and prevention wood.
- SPB: the community and spatial context of outbreaks.
- Validating a SPB phenology model, hypotheses of spot initiation and success.
- Development of silvicultural treatments to restore SPB affected forests.
- Interspecific competition in endemic populations of SPB: risk predictions for endemic populations.
- Functionality in the gut microbial community of SPB.

This year the unit, with the assistance of the Eastern Forest Environmental Threat Assessment Center, was able to fund over \$1.5 M in external and cooperative

research. This competitive grants program is expected to continue next year, if funding is available.

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SPB Prevention and Restoration Program

In 2001, the National Association of State Foresters issued a policy statement entitled “Southern Pine Beetle: A Time for Action to Protect the South’s Forests.” In this statement a proposal by the USDA Forest Service for a comprehensive strategy to deal with current and future southern pine beetle (SPB) infestations was discussed. The strategy consisted of seven components: 1) continued suppression using current methods, 2) reduction in future epidemics by making existing forests more resistant, 3) prevention through restoration of forests impacted by SPB, 4) assistance to communities affected by SPB epidemics to protect jobs and to develop the infrastructure necessary to employ effective SPB control and prevention techniques, 5) funding for implementing the program, 6) funding for education of landowner and the public, and 7) conducting research to support suppression, prevention, and restoration activities.

Five years later, the USDA Forest Service and the Southern Group of State Foresters, have implemented a program that very closely follows the recommendations given in 2001. Currently, 12 National Forests and all 13 states in the Southern Region participate in the Southern Pine Beetle Prevention and Restoration Program, administered by Forest Health Protection (FHP). This program is a welcome shift in dealing with the SPB, putting increased emphasis on preventive forest management practices rather than just reacting to SPB outbreaks.

Funding for this program has been substantial and has increased yearly (**Table 1**). The emphasis for program funding has been for on-the-ground accomplishments. Since 2003, over 235,000 acres have been treated on federal, state, and private lands with an additional 150,000+ acres targeted in 2006 (**Table 1**). Treatments include precommercial and first thinning stands to create healthier conditions and restoring forests recently impacted by SPB. Ten states have used cost-share programs to directly reach over 4,000 landowners. These cost-share programs provide incentives for landowners to thin stands that are in need of a thinning, but that the landowner is reluctant to treat due to lack of markets and contractors to accomplish the work. A 10-year target of 2 million acres treated has been set. Conducting this program over a 15-year period will minimize the impacts of future beetle outbreaks.

Table 1: Funding and the number of acres treated on NFS and State & Private land for the SPB Prevention and Restoration Program

	FY 2003	FY 2004	FY 2005	FY 2006*
Funding (1,000s)	\$3,700	\$10,000	\$14,000	\$17,000
NFS (acres)	N/A	24,000	17,597	23,018
State (acres)	10,000	49,000	134,680	133,000
Total (acres)	10,000	73,000	152,277	156,018

* Acres for FY 2006 are a conservative estimate of the number of acres targeted for completion.



Landowner education is another key component of the Cooperative state programs. The North Carolina Division of Forest Resources has developed television and radio public service announcements to increase awareness about SPB and other risks to the forests, such as wildfire, and to better target under-served landowners. Other states have held workshops and designed demonstration projects to teach landowners about SPB and healthy forest management activities. They have also advertised by using billboards, newspaper and magazine articles, web-based products, and posters.

As part of the success of this program, FHP is working closely with the Southern Group of State Foresters, FS Research, R8 Forest Management, R8 Cooperative Forestry, Universities, and the Forest Health Technology Enterprise Team to enhance the effectiveness of the program. Funding on national forests has also been used in stewardship contracting projects working with organizations such as the Wild Turkey Federation. SPB hazard rating maps specific for each of the 13 Southern States are being developed to more efficiently and effectively target areas of highest priority to increase the landscape level impact of the program. Other enhancements include work on economic analysis of the cost-share programs and projects looking at the most effective thinning and planting density strategies (funded by Southern Research Station, *see page 2 for section on Southern Research Station funding of SPB research and development*).

For additional information please contact John Nowak at jnowak@fs.fed.us (on the web at <http://www.fs.fed.us/r8/foresthealth/>) or your state forestry organization.



Developed by the USDA Forest Service Southern Center for Wild-land-Urban Interface Research and Information.

New Research Work Unit: SRS-4552 – Insects, Diseases and Invasive Plants

The Southern Research Station decided this year that it needed to develop an organizational model that was highly efficient (able to maximize scientific efforts given budgets, business processes, and external environments), highly effective (able to define the best questions and deploy resources to answer them in a timely fashion), and flexible (able to adapt to changing conditions in the future). As a part of this major reorganization, three research work units and a portion of a fourth are being combined into one. The new unit, tentatively titled “SRS-4552 – Insects, Diseases and Invasive Plants,” is a result of the merger of the former termite unit in Starkville, MS, the insect and disease unit in Athens, GA, the southern pine beetle unit in Pineville, LA, and two scientists from the silviculture unit in Auburn, AL. The new unit will be led by Project Leader Kier Klepzig located in Pineville, LA. The research of this new, broadly based unit will be organized into three teams: Termites (led by Terry Wagner), Southern Pine Beetle and Invasive Insects (led by Brian Strom), and Diseases and Invasive Plants (led by Bill Orosina). This combination will allow for more multidisciplinary research regarding bark beetles, invasive insects, diseases, invasive plants and other threats to forests. Much of the traditional research of the scientists will be maintained – to continue to serve our customers’ needs. However, the unit looks forward to an increased ability to address emerging and complex issues, utilizing the new organization. This unit is also a part of a new Science Area within the Station titled “Threats to Forest Health,” which also contains the Center for Forest Disturbance Science (led by John Stanturf) and the Eastern Forest Environmental Threat Assessment Center (led by Danny Lee).

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