

## Appendix C

### RESEARCH WORK UNIT CHARTER

#### SRS-4552, Insects, Diseases, and Invasive Plants

**Unit Locations:** Pineville, LA; Starkville, MS; Athens, GA; Auburn, AL

**Project Leader:** Kier D. Klepzig

**Mission:** To provide the basic biological and ecological knowledge and innovative management strategies required for management and control of native and non-native insect pests (including bark beetles and termites), pathogens and invasive plants in changing forest ecosystems.

As part of the SRS “Threats to Forest Health” Science Area, contribute to generating, integrating, and applying knowledge to: 1. Predict, detect, assess, and prevent environmental threats to public and private forests of the east; 2. To develop silvicultural treatments to reduce the vulnerability of forests to threats; 3. To mitigate impacts, and, 4. To deliver this knowledge to managers in ways that are timely, useful, and user friendly.

#### **Problem 1. Wood destroying insects**

The U.S. is the world’s leading consumer of wood and wood products. It is imperative that we to protect wood in use from insect pests. Of the wood-destroying insects, termites pose the greatest threat to wood in use. Independent efficacy data are required for the registration of all termite control products containing insecticides.

Problem 1a. Independent efficacy data for termiticide registration.

Unit will conduct standard six year field evaluation of potential termiticides or baits.

Problem 1b. Treatment effects on pest biology, ecology, and behavior.

Unit will examine biological and toxicological effects of termiticides and alternatives.

Problem 1c. Biology and ecology of wood-decomposing insects in natural habitats.

Unit will investigate roles of termites in wood decomposition (including that associated with wood generated from severe weather events).

Problem 1d. Unit will define associated forest habitat characteristics and identify forest infestations of Formosan termites (including those in wildland-urban settings) and study their impacts.

#### **Problem 2. Native and non-native tree diseases**

Diseases have profound economic and ecological effects. The organisms that cause them are influenced by management practices and ecological conditions. Our mission is to

conduct the research necessary to provide the scientific basis for management of diseases in our forests to insure that we retain both their productivity and diversity.

Problem 2a. Ecological processes and interactions in disease susceptibility and severity under various management regimes

Unit will examine the *Leptographum/Ophiostoma* fungal complex associated with decline and mortality in pine stands after fire reintroduction and possibly other diseases.

Problem 2b. Association of exotic beetles and pathogenic fungi.

Unit will study an extremely destructive association between an Asian ambrosia beetle and an *Ophiostoma* sp fungus.

### **Problem 3. Bark beetles and invasive insects**

The southern pine beetle is the most destructive insect pest in southern forests. While at endemic levels, bark beetles serve as natural agents of tree mortality. At epidemic levels these, and other, bark beetles pose serious threats to forest ecosystem health. In addition, southern forests have undergone an onslaught of invasive species. Hemlock woolly adelgid is already established within the southern United States. Other non-native insects (the emerald ash borer, the Asian longhorned beetle, the pine shoot beetle, and especially the European wood wasp, *Sirex noctilio*) are already established in the northeastern and north central portions of our country. Insects and diseases are also major factors impacting production in seed orchards, nurseries and managed stands.

Problem 3a. -- Ecology and biology of bark beetles and invasive insects.

Unit will focus especially on native invasive insects such as southern pine beetle. The effects of inter-relationships among bark beetles, mites, and fungi will be examined.

Problem 3b. -- Management of bark beetles and invasive insects of southern conifers.

Unit will examine alternatives to licensed synthetic pesticides such as novel insecticides and semiochemicals.

Problem 3c. Detection and management of exotic invasive insects.

Unit will cooperate in foreign exploration for new predators, and assist in their release, for control of Hemlock Woolly Adelgid. Unit will also continue studies on detecting and monitoring exotic bark and wood boring beetles (including such interactions in urbanized or fragmented forest landscapes).

Problem 3d. Impacts of insects and diseases on seed orchards and nurseries.

Unit will continue to conduct the research necessary to reduce the impact of these pests on our forests through integrated management. Unit will develop spray timing models for key pest species and examine alternatives to methyl bromide.

Problem 3e. Effects of forest management on insect and fungal diversity.

Unit will examine effects of large dead wood on insect and fungal diversity. Unit will examine interactions of pollinators with plant diversity. Unit will study effects of stand conditions on arthropod prey of red cockaded woodpecker and other birds.

Problem 3f. Quantify and predict response of native and exotic invasive insects to severe weather events, fragmentation and global climate change.

#### **Problem 4. Invasive plants**

Forests in the southern US are is characterized by high productivity and diversity. Exotic plant invasions can dramatically alter these forests. By 2040 the acreage in pine plantations is projected to double, as will the expansion of non-native plants. Many forest management objectives are best accomplished with the use of herbicide. A lack of understanding of forest herbicides jeopardizes their continued availability to forest managers.

Problem 4a. Risks and benefits associated with the forest herbicides.  
Unit will compare environmental risks and benefits for vegetation management alternatives.

Problem 4b. Non-native invasive plant species control and management.  
Non-native and even some native invasive cause billions of dollars in lost forest productivity. Prevention, early control and containment, and monitoring techniques are needed. Unit will develop vegetation management treatments, prescriptions, and strategies for control of invasive plants (including contributions to studies on effects of severe weather events, forest landscape fragmentation, and global climate change). A key part of this problem is developing the tools to help scientists and managers prioritize the allocation of resources among multiple invasive plant threats.