

U.S. Department of Agriculture Work Unit Description AD-416 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions				Date (Month/Day/Year)
1. Accession No.	Agency Identifiers		5. Work Unit/Project No.	6. Status
	2. NIFA	3. LA.B	LAB94132	A = New Project
7. Title <b>Management of Pecan Bacterial Leaf Scorch Disease and Pecan Scab Disease</b>				
8. Performing Organization 1136 - 2010 Pecan Res & Extension Station Agricultural Experiment Sta, Louisiana State Univ			9. Cooperating Departments within State Performing Institution	
10. Multistate Project No.			11. Cooperating States <small>sent via BITNET/INTERNET electronic mail systems</small>	
12. Investigator Name(s) Last Name and Initials)				Date: <u>12/23/11</u>
1. Sanderlin, R.S.				<b>POSTED</b>
13. Project Contact Last Name and Initials: Sanderlin, R. S.		Phone: 318-797-8034  x 2311 Fax:		
E-Mail: rsanderlin@agcenter.lsu.edu URL:				
14. Project Type Hatch	15. Contract/Grant/Agreement No.	16. Amount	17. FY	
18. Award Date (Month/Day/Year)	19. Start Date (Month/Day/Year)	20. Termination Date (Month/Day/Year)		
	01/01/2012	12/31/2016		
Goals/Objectives/Expected Outputs				
<p>Determine if the pecan strain of <i>Xylella fastidiosa</i> is able to infect other common hosts of this pathogen, by conducting controlled host range studies with in vitro cultures of the pathogen isolated from pecan. Determine by mechanical inoculation the relative susceptibility of new and popular pecan cultivars, and the rootstocks commonly used by the commercial pecan industry. Evaluate the effect of pecan bacterial leaf scorch on early crop potential by comparing infected and non-infected terminals for the number of nuts set in the spring. Evaluate the rate and pattern of spread of pecan bacterial leaf scorch in new orchards when infection originates from outside the orchard. For this objective several young orchards will be monitored over a period of several years and the patterns of disease increase analyzed by methods of spatio-temporal statistical analysis. Evaluate fungicides for efficacy to prevent pecan scab, and monitor for pathogen fungicide resistance and tree phytotoxicity by conducting annual screening tests of new fungicide products and maintaining awareness of efficacy of standard fungicide products used throughout Louisiana in pecan orchards. Progress on the objectives will be presented to commercial pecan growers, pecan scientists, and other professionals at annual field days, pecan grower association meetings, internet postings, and scientific meetings and journal publications.</p>				
Methods				
<p>Mechanical inoculation of plants known to be infected by the multiplex subspecies of <i>Xylella fastidiosa</i> will be used to determine if the strain of <i>Xylella</i> that occurs in pecan can infect other hosts. In vitro cultures of <i>X. fastidiosa</i> will be used for needle inoculation of test plants. The same inoculation procedure will be used to develop relative susceptibility data for new and popular pecan cultivars and for common rootstocks used by pecan nurseries. If the pecan strain has a limited host range, it should be possible for growers to avoid the presence of these species in the vicinity of an orchard that should slow the movement of the pathogen into newly planted orchards. The identification of cultivars that are susceptible to pecan leaf scorch disease will provide producers with more information to make decisions about cultivar selection for new orchards. The identification of rootstocks resistant to infection by the scorch pathogen would guide nurseries in their selection of seed to reduce the incidence of the disease in newly grafted trees prior to being sold. To determine the effects of pecan scorch disease on early season crop potential, nut set and early nut development will be compared between infected and non-infected terminals. The data on the early season effects of leaf scorch disease on crop potential will help complete our knowledge of the overall effect of the disease on yield. The disease reduces nut growth but there are no data on the effects on nut set. If the disease does have early season crop effects, growers will need to be aware of the annual effects on the crop have been underestimated. The spatial and</p>				

temporal patterns of pecan scorch disease spread will be monitored in young orchards that did not have the disease when planted. Infections will be identified by symptoms and confirmed by ELISA. Data documenting the spread of pecan leaf scorch will be analyzed using auto-logistic models of spatio-temporal analysis. Information on the rate and pattern of leaf scorch disease spread will help growers understand how the disease increases over time and may provide data on the usefulness of removing infected trees during the early stages of orchard establishment. Standard orchard based fungicide screening will be conducted annually to test fungicide products for their potential to prevent pecan scab disease. In addition to scab disease ratings, test trees will be examined for phytotoxicity effects. Reports from commercial pecan growers of poor fungicide control of scab disease will be investigated for possible pathogen resistance to fungicide through comparison of in vitro dosage response curves to that of known sensitive isolates. The primary method of controlling pecan scab disease is through fungicide application. It is necessary to maintain an arsenal of fungicides for effective disease control, and to reduce the selection pressure for pathogen development of fungicide resistance when only a few fungicides are available for control.

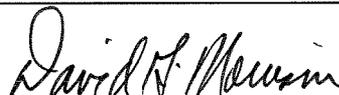
23. Non-Technical Summary

Pecan is an economically important crop in the United States with an annual producer value of about \$300 million. Pecan leaf scorch disease caused by a bacterium causes yield reduction in infected trees. Once established, infection is permanent and disease is chronic. In addition to reduced yield, the disease results in leaf loss and reduced stem growth and can make trees more susceptible to environmental stresses, such as freezes. There is no control for the disease after infection has occurred. Management efforts have to be placed on preventing infection. Because pecan bacterial leaf scorch is a relatively recently identified disease there are gaps in information about the other plants that may serve as reservoirs of the pathogen, the rate and pattern of disease spread in pecan orchards, and susceptibility of different pecan varieties to the disease. One phase of the project is to determine possible reservoirs of infection for young pecan orchards by trying to identify other plants that can be infected with the pecan strain of the pathogen. Popular pecan varieties and rootstocks used in grafting will be tested for susceptibility to infection to help producers make better decisions when selecting varieties for new orchards. These two objectives will use mechanical inoculation of plants with the pecan strain of the bacterium as the primary research procedure. The effect of leaf scorch on early season crop potential will be measured by comparing the number of nuts that form on infected limbs compared to non-infected limbs. Annual maps will be developed to illustrate the rate and pattern of leaf scorch spread in young orchards. This information may help producers design orchards to reduce the rate of disease movement and help to determine the value of removing recently infected trees. Pecan scab disease is a very economically important disease that can cause significant crop loss and requires multiple annual applications of fungicides for control. Because the disease is primarily controlled with fungicide applications, a diverse group of fungicides is needed for efficient disease control and to reduce the tendency of the pathogen to develop resistance to a fungicide when it is constantly exposed to the same fungicide. Testing of new fungicides is required to understand the variables associated with use of specific fungicides, such as the best concentration for efficient disease control and any potential damage of the fungicide to pecan trees. Independent university testing is needed for companies to obtain federal labeling for fungicides through the EPA.

24. Keywords

pecan; carya; xylella fastidiosa; pecan bacterial disease; pecan leaf scorch; pecan disease; pecan cultivars; pecan rootstocks; pecan scab; Fusicladium effusum; pecan fungicides

\*\*\*\* The Original signed document is on file at this institution. \*\*\*\*

Signature	Title	Date
Dept: Admin: 	Associate Director	12/21/11