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	2. NIFA	3. LA.B	LAB94105	A = New Project
7. Title Small Grain Breeding, Genetics, and Variety Testing				
8. Performing Organization 3780 - 2010 School of Plant, Environmental, and Soil Sciences Agricultural Experiment Sta, Louisiana State Univ			9. Cooperating Departments within State Performing Institution a. Northeast Research Station b. Rice Research Station	
10. Multistate Project No.			11. Cooperating States Sent via BITNET/INTERNET electronic mail systems Date: <u>6/13/11</u>	
12. Investigator Name(s) Last Name and Initials 1. Harrison, S.A.				
13. Project Contact Last Name and Initials: Harrison, S. A.			Phone: 225-578-1308 Fax:	
E-Mail: sharrison@agctr.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) 06/01/2011		20. Termination Date (Month/Day/Year) 05/31/2016	
Goals/Objectives/Expected Outputs The goal of the wheat and oat breeding program is to increase profitability and sustainability of wheat production in the Gulf Coast region. This is accomplished by developing superior varieties, improving knowledge of genetic control of traits of importance, and developing production practices that limit yield loss to biotic and abiotic stress factors. Specific objectives are: 1) to develop and release wheat varieties adapted to the Gulf Coast region that are high-yielding, resistant to disease and insect pests, and tolerant of abiotic stress; 2) to develop oat varieties for the southern US with emphasis on dual-purpose (forage and grain), wildlife foodplot, hull-less and specialty/high-value oat varieties; 3) to coordinate statewide performance trials for wheat and oat cultivars and breeding lines and provide useful data in a timely manner to clientele; 4) to coordinate activities of the SUNGRAINS (Southeastern University GRAINS) cooperative small grain breeding program and work regionally to enhance collaboration among public wheat and oat research scientists; 5) to develop molecular markers and introgress useful genes for resistance to abiotic and biotic stresses as a means of increasing efficiency of the breeding efforts; and 6) to collaborate with entomologists, pathologists, molecular geneticists, and agronomists to address issues that limit wheat production in Louisiana. Outputs include superior wheat and oat varieties, publications with results of statewide variety performance trials, and better molecular markers and selection tools.				
Methods The breeding program will utilize bi-parental and three-way crossing to generate segregating populations. Marker-assisted selection will be utilized to enrich populations with desired genes for disease and insect resistance, enhanced quality, and other desired traits in the F1 generation. Mass and pedigree selection will be practiced in early generations. Approximately 400 new crosses will be made each year to combine adaptation with high yield and pest resistance. Research will be conducted primarily at the Central Stations in south Louisiana (high disease pressure) and Macon Ridge Research Station in north Louisiana (high yield). A summer oat and wheat nursery will be grown in Idaho for rapid generation advancement. Approximately 5000 yield plots will be evaluated each year, with an augmented design in early generations and a randomized complete block design in later generations. Advanced yield testing will be conducted in six states under the SUNGRAINS agreement. Marker assisted selection will be carried out using USDA Eastern Wheat Genotyping Center in Raleigh, NC, to assist in selection for traits such as Fusarium headblight and to permit stacking of genes for resistance to diseases and insects. Variety trials will be conducted at seven locations each year.				
23. Non-Technical Summary				




The Gulf Coast Region is an atypical wheat environment because of high rainfall, heavy disease pressure, and lack of prolonged periods of cool weather. Most wheat varieties adapted to the Mid-south and lower Midwest perform poorly in Louisiana because of biotic and abiotic constraints. Wheat is an important rotation crop in Louisiana and occupies a substantial acreage across the region. This project develops locally adapted wheat and oat varieties, and assists growers in variety decisions, thereby increasing profitability of small grain production along the Gulf Coast. Diseases, such as stripe rust, leaf rust, and headblight, change over time, which requires ongoing development of resistant varieties. The LAES wheat breeding program is critical to sustaining wheat production as an agricultural enterprise in the Gulf Coast

24. Keywords

wheat breeding; oat breeding; genetics; selection; marker assisted selection; disease resistance; variety testing; cultivar development; leaf rust; stripe rust ; stem rust; susarium

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

Signature	Title	Date
Dept: Admin: 	Associate Director	6/8/11