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7. Title

Development of Improved Management Programs for Arthropod Pests of Rice (Oryza sativa L.) in Louisiana

12. Investigator Name(s) (Last Name and Initials)

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Outputs:

The goal of this project is the development of cost-effective and sustainable management programs for insect pests of Louisiana rice, primarily the rice water weevil, the rice stink bug, and stem boring lepidopterans. Dozens of small-plot and greenhouse experiments investigated various aspects of rice water weevil, rice stink bug, and stem borer management, including impact of low seeding rates on efficacy of seed treatment insecticides against weevils, combined use of giberellic acid and clothianidin against the rice water weevil, use of foliar and granular neonicotinoid insecticides in water-seeded rice against weevils, stimulation of rice germination and seedling growth by neonicotinoid seed treatments, combining use of seed treatments with cultural practices (shallow flooding) and varietal resistance, effects of insecticidal seed treatments on various life stages of the rice water weevil, efficacy and residual activity of neonicotinoid and pyrethroid insecticides against rice stink bugs, and varietal resistance to stem borers and stink bugs. A breeding program for the development of weevil-resistant lines was initiated. Results were conveyed to rice extension personnel, who in turn disseminated results and revised recommendations (e.g., about planting dates and insecticide use) to growers via oral presentations and articles in the trade journals, and newsletters. Four papers were published in refereed journals, technical reports were published in the Rice Research Station Annual Report, and one article was published in Louisiana Agriculture.

Outcomes/Impacts:

Results of small-plot and commercial evaluations of insecticidal seed treatments continued to show that these insecticides give adequate to excellent control of rice water weevils. The efficacy of seed treatments, particularly the neonicotinoids, was found to be adversely affected at low seeding rates. Greenhouse studies have shown that chlorantraniliprole and thiamethoxam seed treatments affect life stages of the rice water weevil differently; thiamethoxam but not chlorantraniliprole kills adult weevils feeding on leaves of treated plants, both compounds inhibit oviposition, and both products kill larvae feeding on roots of treated plants. Granular dinotefuran and foliar clothianidin were effective in water-seeded rice, and cooperation with industry and regulatory agencies will continue to register these active ingredients. Cruiser seed treatment stimulated germination and seedling growth of rice under stress conditions, and greenhouse studies of this phenomenon have been initiated. Early planting and shallow flooding were somewhat effective at reducing weevil populations, and these practices have been incorporated into grower recommendations. The insecticidal alternatives to pyrethroid insecticides for rice water weevil control have been found to be more compatible with crawfish production than pyrethroids. Continued progress in elucidating pathways of induced resistance in rice may lead to the development of strategies for enhancing rice resistance to weevils. A cooperative program for the development of weevil-resistant lines has been initiated; F2 lines will be phenotypes in 2012. Silica amendments increased the resistance of rice to sugarcane borers; this tactic will be tested in field plots in 2012. Dermacor X-100 seed treatments reduced survival of sugarcane borers on rice.

Publications:

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Stout M.J., D. Michael Jackson, Louis S. Hesler, Marion O. Harris, Lee French, Nora L.V. Lapitan, James A. Reinert, and

Anna-Maria Botha-Oberholster. 2009 (published in early 2011). International Plant Resistance to Insects (IPRI), Nineteenth Biennial Workshop, 28-31 March 2010, Charleston SC. J. Agric. Urban Entom. 26: 107-134.

Stout, M.J., N. Hummel, J. Hamm, and M.J. Frey. 2010. Rice insect control studies, 2010: Overview of program. Ann. Res. Rpt., Rice Res. Stn., LSU Agricultural Center 102: 263-264.

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Stout M.J., Hummel N.A., Frey M.J. and Rice W.C. 2011. The impacts of planting date on management of the rice water weevil in Louisiana rice. The Open Entomology Journal. 5: 1-9.

Stout, M.J., N.A. Hummel, S. Lanka, J.C. Hamm, A. Meszaros, W.R. McClain, and G.W. Barbee. 2011. New tactics for managing rice water weevils in Louisiana rice and making rice fields safe for crawfish. Louisiana Agriculture, Summer 2011, 11-13.

Participants:

Mike Stout (PI), Jason Hamm, Marty Frey, Srinivas Lanka, Bryce Blackman, Jaspreet Sidhu, Anna Meszaros, Ray McClain, X. Sha, Rogers Leonard and Natalie Hummel, LSU AgCenter; Bill Rice, USDA.

Target Audiences:

IPM practitioners, rice/crawfish producers and consultants, entomologists interested in areas of plant resistance, pest management, rice entomology, chemical ecology

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date