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U.S. Department of Agriculture Accomplishments Report AD-421 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month, Day, Year) 03/19/2012
1. Accession 0222444	Agency Identification No. 2. NIFA 3. LA.B	5. Work Unit/Project No. LAB94047	6. Status Annual Report
7. Title Ecology and Management of European Corn Borer and Other Lepidopteran Pests of Corn			
12. Investigator Name(s) (Last Name and Initials) Huang, F.			
20. Termination Date 09/30/2015		40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011	
Outputs: The results of this project produced three refereed papers, two conference proceedings, and identification of several potential resistance strains of fall armyworm (FAW) to pyramided Bt corn. In addition, novel Bt corn technologies that can overcome Cry1F resistance in FAW have been characterized.			
Outcomes/Impacts: Laboratory bioassays determined the relative susceptibility of two sugarcane borer (SCB) populations collected from non-Bt and Bt corn plants containing SmartStax traits to five individual Cry proteins. The five Bt proteins included two proteins (Cry1A.105 and Cry2Ab2) that were expressed in SmartStax corn plants and three other common Bt proteins (Cry1Aa, Cry1Ab, and Cry1Ac) that were not expressed in SmartStax. Cry1A.105 and Cry2Ab2 LC50 values for the SCB population that originated from Bt plants were 3.55- and 1.34-fold greater, respectively, than those of the population collected from non-Bt plants. In contrast, relative to the SCB population from non-Bt plants, the LC50s of the population sampled from Bt plants were 3.85-, 2.5-, and 1.64-fold more sensitive to Cry1Aa, Cry1Ab, and Cry1Ac, respectively. The results did not provide clear evidence to conclude that the field survivorship of SCB on Bt plants was associated with resistance. Larval survival and plant injury of Cry1F-susceptible, -resistant, and -heterozygous FAW genotypes on seven commercial corn hybrids were evaluated in the greenhouse. These corn hybrids were two non-Bt and five Bt corn representing five transgenic technologies, Hercules I, Viptera, Genuity VT Double Pro, Triple Pro, and SmartStax. All pyramided Bt corn hybrids were excellent against FAW. Pyramided Bt traits can overcome Cry1F-resistance in FAW and thus offer a means for resistance management in this important corn pest. FAW is not considered a primary target of the first generation Bt corn for insect resistance management by the U.S. Environmental Protection Agency. These data suggest that novel pyramided Bt corn is an excellent tool for FAW control in the USA.			
Publications: Bai, Y., R. Yan, X. Ke, G. Ye, F. Huang, Y. Luo, J. Cheng. 2012. Effects of transgenic rice expressing <i>Bacillus thuringiensis</i> Cry1Ab protein on growth, reproduction, and superoxide dismutase activity of <i>Folsomia candida</i> (Collembola: Isotomidae). <i>J. Econ. Entom.</i> 104: 1892-1899. Tan, S.Y., B.F. Cayabyab, E.P. Alcantara, Y. Ibrahim, F. Huang, E. Blankenship, and B.D. Siegfried. 2011. Comparative susceptibility of <i>Ostrinia furnacalis</i> , <i>Ostrinia nubilalis</i> and <i>Diatraea saccharalis</i> (Lepidoptera: Crambidae) to <i>Bacillus thuringiensis</i> Cry1 toxins. <i>Crop Protection.</i> 30: 1184-1189. Li, W., X. Zhang, Z. Fan, B. Yue, F. Huang, E. King, and J. Ran. 2011. Structural characteristics and phylogenetic analysis of the mitochondrial genome of the sugarcane borer, <i>Diatraea saccharalis</i> (Lepidoptera: Crambidae). USDA NC-205 Annual Reports. (in CD). Huang, F., M.N. Ghimire, B.R. Leonard, J. Wang, C. Daves, R. Levy, D. Cook, G. P. Head, Y. Yang, J. Temple, and R. Ferguson. 2011. F2 screening for resistance to pyramided <i>Bacillus thuringiensis</i> maize in Louisiana and Mississippi populations of <i>Diatraea saccharalis</i> (Lepidoptera: Crambidae). USDA NC-205 Annual Reports. (in CD).			
Participants:			

Fangang Huang (PI), J. Baldwin, M. Ghimire, S.D. Wangila, Y. Yang, F. Yang, N. Yang, LSU AgCenter; R. Parker, Texas Agrilife Extension; D. Cook, Mississippi State University.

Target Audiences:

Crop production industry, agricultural consultants, seed company representatives, Extension specialists, research scientists and regulators

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date
		