INSECT PEST MANAGEMENT IN RICE MILLS

Frank H. Arthur*, L. Ted Wilson, Yubin Yang, James F. Campbell, Tanja McKay, Brian Adam, Thomas E. Reagan

Stored rice can be infested by a variety of primary and secondary insect pests that cause grain damage and reduce grain quality, which can decrease profitability. In 1999, a multi-state team was formed with the goal of improving post-harvest on-farm rice grain management. Our team initiated a detailed survey in the southern rice-growing region to determine the on-farm grain storage capabilities and practices of rice producers in the south-central United States. One of the outcomes of this project was the development of a web-based model incorporating climate data to provide practical guidelines for effectively using controlled aeration to manage post-harvest storage pests.

At the conclusion of the first project outlined above, we initiated a second project focusing on the management of post-harvest storage pests in rice mills. The objectives of relevance to the rice milling industry included determining the impact of infestations of the lesser grain borer on rice milling quality, examining seasonal prevalence of this pest, assessment of control through a combination of reduced risk insecticides and integrated pest management. A comprehensive cost-benefit analysis was conducted to link impacts of infestation with management and control. The results of this project are integrated into an expanded version of our web-based post-harvest grain management program that can be accessed at http://beaumont.tamu.edu/grainmanagement. Post-harvest workshops were conducted in Beaumont, Texas; Crowley, Louisiana; and Jonesboro, Arkansas in 2011 to provide interested millers, growers, and extension agents with up to day information on post-harvest rice insect management.

One result of this project was that insect pest populations are prevalent in and around milling facilities, with species diversification and structure depending on the specific mill and the climate around that mill. Seasonal patterns and variation are also distinctive. The red flour beetle, a cosmopolitan pest of the milling industry, appears to be a primary pest species that can be found inside and outside of rice mills and flour mills. Hence, we have proposed a new project, which will focus on control of the red flour beetle. Methyl bromide fumigations for rice mills allowed under continuing use exemptions (CUEs) are frequently targeted against this pest, but some results will be applicable to other pest species. Proposed objectives include developing integrated pest management programs to reduce reliance on methyl bromide fumigation for red flour beetle control in rice mills, examining distribution and movement patterns of red flour beetle populations in and around mills, and identification of entry pathways. Other proposed objectives include development of predictive models for red flour beetle population

development on various milling components, i.e. milled rice, husks and bran. At the same time, we would like to evaluate the effects of accumulations of these milled fractions on surfaces treated with residual insecticides, how these accumulations impact residual efficacy of the compound, and determine impacts of sanitation and cleaning on red flour beetle population development, in addition to conducting field assessments. Finally, economic analysis will be integrated into management plans, and the result will be a more comprehensive program for rice mill management that reduces reliance on methyl bromide fumigation.