A MODEL SIMULATING STORED PRODUCT INSECT PEST POPULATION DYNAMICS AND INSECTICIDE RESISTANCE POTENTIAL IN FOOD PROCESSING PLANTS

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This paper will discuss two computer models targeting: 1) population dynamics of stored product insect pests, and 2) insecticide resistance development potential for sulfuryl fluoride, a gas fumigant being developed by Dow AgroSciences, LLC for post harvest fumigation

Routine chemical applications especially with fumigants are commonly done without valid pre and post treatment insect density estimations. Therefore, the degree and duration of insect suppression obtained are often unknown. The result is unnecessary treatments or commodity damage due to delayed treatments. A computer model was developed for simulating stored product insect pest population dynamics to predict when future fumigations will be required and whether previous fumigations were successful. This model integrates insect monitoring data, an insect growth model based on life history, and a pragmatic pest control threshold. This model will be useful in developing efficient stored product pest management programs and testing alternative control methods.

With a very limited number of stored product protection agents available today, the need to evaluate the potential for insecticide resistance development to a fumigant is important. Therefore, this section of the paper will discuss the potential for insecticide resistance development to sulfuryl fluoride using the Sequential Quantitative Insecticide Resistance Model. This model integrates probable stored product insect exposure scenarios for sulfuryl fluoride gas fumigant with several key factors that influence resistance development, such as biology, genetics and operational considerations in predicting probability of insecticide resistance