Simulation Model of Red Flour Beetle Population Dynamics & the Reality in Mills

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A better understanding of population dynamics of insects infesting food processing facilities, including flour mills, is necessary to determine when control measures are needed, as well as the level of insect control achieved. Routine fumigations are commonly done without valid pre- and post-treatment insect density estimations. Therefore, the degree and duration of insect suppression obtained are often unknown. We developed a computer model for simulating the population dynamics of Red flour beetle, *Tribolium castaneum* (Herbst), an important stored product insect pest in food processing facilities. This distributed-delay simulation model incorporates previously published *T. castaneum* life history data on stored products, including stage-specific immature developmental time and survival and adult longevity and fecundity. We tested the validity of the model by using several pheromone trap catch data and tailings data from various food processing facilities. The model was useful for interpreting population dynamics observed in the food processing facilities and will be useful for optimizing pest management strategies.