Abstract

Insect movement inside a stored-grain bulk increases the chance for the pests to find biologically suitable locations for their development and multiplication. The movement of rusty grain beetle, *Cryptolestes ferrugineus,* adults was determined in a 0.1×1×1 m wooden box filled with wheat. There were 12 combinations of temperature (20, 25, 30, or 35 °C), number of adults (125, 250, or 500), moisture content (12.5, 14.5, or 16.5%), and time periods (3, 6, 12, 24 or 72 h) over which movement could occur. The diffusivities in each set of environmental conditions were calculated using a developed procedure (program) and experimental data. The diffusivity at 14.5% m.c. and 20 °C in the 24 h movement period was $2.5\pm0.3\times10^{-4}$ m^2/h. The diffusivity increased with increasing temperature, decreasing moisture contents, decreasing movement periods, and increasing insect numbers. Adult numbers in each section of the wooden box were predicted using an analytical model and calculated diffusivities. There were no significant differences between measured and predicted adult numbers. This research suggests that distribution and dispersal of the *C. ferrugineus* adults in stored wheat follow a diffusion pattern under constant environmental conditions.