Abstract

Spatial and temporal distributions of adults of *Cryptolestes ferrugineus* in stored wheat were determined in a 1.5 t bin of wheat held at 20, 25 and 30 °C and 11%, 13% and 15% grain moisture contents (wet basis). The introduced insect densities were 0.1 (low), 1.0 (medium), and 10.0 (high) adults/kg wheat and the 1.5 t of wheat was sampled at 5 locations with 45 kg in a sample unit (referred to as primary unit, about 15% of the wheat was sampled). At each location, the 45 kg sample unit was separated into three 15 kg vertical layers (referred to as subunits).

Geostatistical analysis showed that: 1) insect numbers at medium or high density and in the vertical direction were better correlated than that at low insect density and in the horizontal direction, respectively; 2) this correlation decreased with increasing grain temperatures; and 3) the temporal continuous property might not exist or there was a weak temporal continuity. Aggregation was the highest at the low insect density and then decreased with the increase of insect density due to a repelling effect amongst adults at high insect density. The normal distribution model was appropriate for the description of the count frequency in 32 out of 36 sampling sets (88.9%) when 15 kg subunit data were used. In addition, adults of *C. ferrugineus* had clumped distribution about 95% of the time and uniform dispersion about 5% of the time. This is the first research illustrating the spatial and temporal distributions of adult *C. ferrugineus* using large sample units and known insect densities.