

Title Effect of Temperature Management on Confined Populations of Maize Weevil and Red Flour Beetle in Stored Corn - Summer 2004 Pilot Bin Trials

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### **Abstract**

Confined populations of maize weevil (MW) and red flour beetle (RFB) were investigated for survival and progeny development under three temperature strategies in corn stored in 500 bu pilot bins. The three temperature strategies were: chilled aeration ( $\leq 18.0^{\circ}\text{C}$ ), and two ambient aeration strategies ( $\leq 23.5^{\circ}\text{C}$  and  $\leq 28.0^{\circ}\text{C}$ ). A computer automatically controlled temperature thresholds with the fans set to turn on and off at set maximum and temperatures. In each bin, 26 sensors logged grain temperatures spatially, at the center and four cardinal directions. There were three treatments with 3 bins (replicates) for each treatment with a total of 9 bins. Confined populations included adults of single species introduced in cylindrical PVC cages (10.2 cm ht and 5.1 cm dia) filled with corn and sealed at both ends with fine mesh. Each single-species PVC cage had an initial RFB and MW adult population of 25 and 12, respectively. A set of five single-species insect cages for each of two insect species were embedded 0.6 m below the grain surface and placed one at the center and in four cardinal directions. A cage of each insect species was removed monthly (June to October 2004) for insect counts and incubated in the laboratory for progeny development. Temperature inside the cages was recorded using a sensor and a data logger. The results demonstrated that chilled aeration effectively suppressed MW reproduction compared to ambient aeration. Low RFB populations were attributed to dietary habit of RFB. Chilled aeration and ambient aeration at cool temperatures proved effective in suppressing insect populations and reduce spoilage.