

Title Comparing insect infestation patterns in stored corn for three temperature management methods: summer 2001 pilot bin trials.

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Citation Advances in stored product protection. Proceedings of the 8th International Working Conference on Stored Product Protection, York, UK, 22-26 July 2002 (2003); 382-389

Abstract

The primary objective of this experiment was to evaluate the effectiveness of using three temperature management strategies (no aeration, ambient aeration and chilled aeration) to control insect pest densities in stored maize during the warm spring and hot summer months. From the spring through the summer of 2001, these three strategies were implemented in 11 pilot bins with approximately 9.1 tonnes (362 bushels) of shelled maize at the Purdue University Post-Harvest Education and Research Center (PHERC). Probe traps and pheromone-baited sticky flight traps were installed in the bins to monitor crawling insects in the grain bulk and flying insects (primarily the Indian meal moth) in the bin headspace, respectively. Temperatures in the bins with no aeration and ambient aeration were above 64 deg F (18 deg C) for most of the sampling period - the lower developmental threshold for most stored-product pests. However, the target temperature set at 60 deg F (15.6 deg C) for the bins with chilled aeration was maintained by the chiller for most of the storage period. The average moisture content of the stored maize bulk was within the safe storage limit to maintain quality and prevent moulding. A wide variety of insects in the order Coleoptera (beetles) were found in the probe traps. Insect density per day estimated from probe trap catch in the grain bulk indicated that insect density increased as temperature increased from spring into the summer months. Insect density in the bins with no aeration was significantly higher than in bins with ambient and chilled aeration between July and September. Chilled aeration indicated better control of insect pests than ambient aeration. Indian meal moth (*Plodia interpunctella*) density per day estimated from pheromone-baited sticky flight traps indicated an increase as a function of head-space air and grain surface temperatures in all three pest management strategies. The Indian meal moth population density was not significantly different between the three management strategies for most of the sampling periods. The radiation from the bin roof created similar headspace conditions, and hence dissipated the effects of any cooling of the grain mass. Nevertheless, the chilled aeration strategy provided the lowest Indian meal moth density overall.