

Title Stored Grain Advisor Pro: Decision support system for insect management in commercial grain elevators

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Abstract

A decision support system, Stored Grain Advisor Pro (SGA Pro) was developed to provide insect pest management information for wheat stored at commercial elevators. The program uses a model to predict future risk based on current insect density, grain temperature and moisture. A rule-based system was used to provide advice and recommendations to grain managers. The software was tested in a research program conducted at commercial grain elevators in Kansas and Oklahoma, USA. A vacuum-probe sampler was used to take ten 3-kg grain samples in the top 12 m of each bin that contained wheat. After the insect species and numbers were determined for each sample, the data were entered into SGA Pro. A risk analysis and treatment recommendation report for all bins was presented to the grain managers every 6 weeks. SGA Pro correctly predicted for 71–80% of bins whether the grain was safe or at high risk of dense infestation and grain damage. SGA Pro failed to predict “unsafe” insect densities in only 2 out of 399 Kansas bins (0.5%) and in none of 114 bins in Oklahoma. Grain managers who followed SGA Pro's recommendations tended to fumigate only the bins with high insect densities instead of fumigating all bins at their facility. This resulted in more efficient insect pest management because fumigating bins only when insect densities exceeded economic thresholds and treating only the bins that required fumigation minimized the risk of economic losses from insects, reduced the cost of pest management, and reduced the use of grain fumigant.