

## INTEGRATED PEST MANAGEMENT FOR STORED GRAIN

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Insect pest management in stored grain is usually considered to a multi-component strategy that involves different approaches or a combination of these approaches. The difficulty of sampling a bulk storage grain mass to accurately determine the scope and extent of pest populations, the diversity of species that can be encountered, the time required to process and analyze these samples, and the human risks involved have always been issues that limit physical grain sampling as part of a decision-making process. The use of insecticide, in particular the use of phosphine as a grain fumigant, has always been an integral component for management of stored grain in the United States. The current OSHA regulations regarding documentation and training required for confined space entry and the safety considerations are contributing to new policies being enacted by major companies in the grain storage industry to adopt a policy of zero entry of a grain bin or silo after it is filled.

Several recent studies have documented increased insect resistance to phosphine in several countries, including the United States. Strategies and methods for assessing levels of resistance, methodologies for mitigating resistance, and ensuring the long term viability of phosphine are among many topics that will be examined in a special session at the 2013 Methyl Bromide Alternatives and Emissions Reduction. Included is this discussion on integrated pest management (IPM) as it applies to stored bulk grain. Components of an IPM program for stored grain include but are not limited to pre-binning sanitation and residual treatment with a contact insecticide, application of a grain protectant at the time grain is loaded into a bin, aeration with low-volume ambient air to cool the stored grain mass to temperatures that limit population development, and fumigation during those time periods where temperatures within the grain mass are conducive to insect growth and development. When monitoring of insect populations in a grain mass is permitted, it can provide valuable information that can help evaluate these various components. In addition, research data will be used to illustrate how various factors can influence the individual control strategies. The adoption of a more integrated approach to stored grain management may be necessary to ensure long-term viability of phosphine.