PHOSPHINE TOXICOLOGY: CASE STUDIES AT USDA-ARS

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Abstract. Research is presented in the context of optimizing phosphine fumigation parameters to mitigate the development of resistance toward phosphine in stored product insects. Case studies are presented that provide quantitative insight on the parabolic relationship, or "curvature", between phosphine concentration and fumigation duration as related to toxicology. In addition, case studies will focus on correlating mortality levels obtained with varying doses over a constant duration, versus those obtained with constant doses applied for varying durations. Discussion will focus on species- and life stage-specific aspects of modeling phosphine toxicology as well as the implementation of an epidemiologic approach to establishing the mean resistance level for insect populations across the United States and beyond.