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Insecticidal effect of phosphine on eggs of the khapra beetle

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ABSTRACT

Trogoderma granarium Everts (Coleoptera: Dermestidae) is one of the most important quarantine pests of stored grains. Control of this insect species can be achieved through a gaseous insecticide, phosphine. Many studies focus on the effect of phosphine on different developmental stages of insects, with most of them highlighting eggs as the most tolerant stage. Our data showed that 2 d-old eggs of *T. granarium* were more susceptible than 1 d-old eggs. Faster hatching was observed in eggs exposed to phosphine for 2 d compared to controls and the result was more pronounced for 1 d-old than 2 d-old eggs. In contrast to the 2 d exposure, hatching rates of eggs exposed to 4- and 6-d were notably reduced, while there was a delay in egg hatching compared to controls. Moreover, larval development from untreated eggs was faster than the larvae from treated eggs, regardless of the exposure time. These dissimilar patterns in larval growth may suggest certain delayed effects of phosphine fumigation. The results of the present work can be further utilized for the development of phosphine-based quarantine and pre-shipment treatments (QPS) for the control of *T. granarium*.

Keywords: *Trogoderma granarium*, Egg age, Phosphine, Egg hatching, Larval growth, Fumigation, Quarantine