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Combinations of Leaf Powders of *Ruta Graveolens* and *Azadirachta indica* to Enhance the Repellent Activity of *Sitophilus zeamais* (Motsch.) in Stored Maize in Sri Lanka

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Abstract

Maize weevil (*Sitophilus zeamais*, Motsch.) is an utterly ubiquitous and cosmopolitan field-to-store insect pest with an economic importance of stored maize in tropical and sub-tropical regions of the world. Current renewed interest in replacing the synthetic insecticides has served as the impetus for the evaluation and intensification of eco-friendly anti-weevil measures such as the use of plant based post-harvest bio-insecticides. This study was therefore, designed to investigate the repellent potency of the leaf powders of *Ruta graveolens* and *Azadirachta indica* individually and in combinations of various proportions under ambient laboratory conditions against *Sitophilus zeamais* in both contact and vapour forms. For both plants, 50 g each of maize grains were mixed with leaf powders at different doses of 1.0, 3.0, 5.0, 7.0 and 10.0 g and the repellent rate was recorded within an hour of weevil introduction. The repellent potency of three combination ratios of 1:1, 1:2 and 2:1 of *R. graveolens* and *A. indica* leaf powders incorporating into the dosage level of 10.0 g was evaluated at every 10 minute intervals up to an hour of weevil exposure. The highest contact repellent effect of leaf powders was produced by *R. graveolens* (97±2.74%) followed by *A. indica* (74±5.48%) whereas highest fumigation repellent effect of leaf powders was exhibiting by *R. graveolens* (96±2.24%) followed again by *A. indica* (47±2.74%) at the highest dosage of 10.0 g within an hour of weevil exposure when they were tested individually. All combinations repelled *S. zeamais* adults at a faster rate than when either powder was tested individually whilst the 2:1 combination of *R. graveolens* and *A. indica* exhibiting the highest repellent rates of 100% and 98% in both contact and vapor forms respectively within 50 minutes of post treatment thus increasing the repellent potential of the respective leaf powders to a great extent. The leaf powders of the two plants under present investigation revealed their improved grain protecting capability when used individually and in mixtures to be used as bio-rational and natural leads in large-scale protection of stored maize.

Keywords: *Sitophilus zeamais*, *Ruta graveolens*, *Azadirachta indica*, Repellency, Leaf powder