

**Title** Efficacy and adherence ratio of diatomaceous earth and spinosad in three wheat varieties against three stored-product insect pests

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**Citation** Journal of Stored Products Research, Volume 46, Issue 2, April 2010, Pages 73-80

**Keywords** Diatomaceous earth; Spinosad; Wheat; Varieties; Stored-product pests

### Abstract

Laboratory tests were carried out in order to evaluate the efficacy of three diatomaceous earth (DE) formulations; Protector, SilicoSec, and Insecto, and one spinosad dust formulation in three commercially available wheat (*Triticum durum*) varieties, Athos, Pontos, Sifnos, originating from Greek cultures. The efficacy of the above formulations was assessed against adults of *Rhyzopertha dominica*, *Sitophilus oryzae* and *Tribolium confusum*. The DE formulations were applied at three dose levels; 250, 500 and 1000 ppm, while spinosad was applied at 100, 500 and 1000 ppm of the formulation, corresponding to 0.125, 0.625 and 1.25 ppm active ingredient (a.i.), respectively. The adherence ratio of the DE and spinosad formulations to the kernels of the wheat varieties was assessed. Bioassays were carried out at 30°C and 60% r.h. Mortality was recorded after 7 and 14 d in the case of *R. dominica* and *S. oryzae*, and after 7 d, 14 d and 21 d of exposure in the case of *T. confusum*, on the treated varieties. Progeny production of the individuals exposed on the treated varieties was also assessed. Even the lowest dose of spinosad was highly effective (>90%) against *R. dominica* and *S. oryzae*. In the case of *T. confusum* a combination of longer exposures with higher doses was required for each formulation to be effective. Generally, the performance of all formulations was greater in Athos or Sifnos compared to the Pontos. Progeny production of *S. oryzae* and *R. dominica* was significantly higher in untreated Pontos than in the other varieties. Progeny production was always greater in untreated than treated substrates. Although adherence ratios for the tested DE and spinosad formulations were generally high (>90%), significant variations in adherence levels among the wheat varieties were recorded.