

Title Insecticidal effect of spinosad dust, in combination with diatomaceous earth, against two stored-grain beetle species

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Abstract

Laboratory bioassays were carried out to determine the efficacy of spinosad applied alone or combined with the diatomaceous earth (DE) SilicoSec against adult rice weevils, *Sitophilus oryzae* and confused flour beetles, *Tribolium confusum*. Efficacy was assessed on wheat and maize at three dosages of spinosad dust formulation (corresponding to 0.0625, 0.1875 and 0.625 ppm of active ingredient [AI] for *S. oryzae* and to 0.1875, 0.625 and 1.25 ppm of AI for *T. confusum*), alone or combined with SilicoSec at 150 ppm for *S. oryzae* and 250 ppm for *T. confusum*. The mortality of *S. oryzae* exposed for 14 d on wheat treated with spinosad ranged between 83% and 100%. Conversely, the mortality of *S. oryzae* on maize treated with DE or on maize treated with lower doses of spinosad dust did not exceed 19% and was only 59% on maize with the highest spinosad dust treatment. Generally, the presence of SilicoSec combined with spinosad did not significantly increase *S. oryzae* mortality compared with spinosad alone. For *T. confusum*, mortality on both commodities was lower than for *S. oryzae*. After 14 d of exposure on wheat, mortality was 14% at the highest dose of spinosad, but increased to 33% in the presence of DE. Similar results were also obtained for *T. confusum* exposed on treated maize, which indicated a joint action between spinosad and DE. In the case of *S. oryzae*, the inclusion of DE reduced progeny production in comparison with spinosad alone. Progeny production of *T. confusum* was relatively low in all treatments, compared to progeny production of *S. oryzae*. The results of the study show the potential of combination treatments of spinosad dust and DE, but efficacy varies with the target insect species and commodity.