

Title The Fate and Efficacy of Spinosad for Insect Management in Farm-Stored Corn
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Abstract

This study examined the degradation and insecticide efficacy of Spinosad. Field tests were conducted at three farm sites in Indiana to assess the survival and proliferation of key stored grain insects (maize weevil, red flour beetle, lesser grain borer, and Indianmeal moth) in stored corn (4 bins each) against four treatments: (1) untreated grain (control), (2) 1 mg/kg Spinosad, (3) 4 mg/kg pirimiphos-mehtyl (Actellic), and (4) combination of 1-mg/kg Spinosad + 4 mg/kg pirimiphos-methyl. Field trials began when the bins were filled with (No. 1 and No. 2 US grade yellow corn) from the fall harvest (November 2002), and concluded in he spring of 2003. Two of the three sites had bins filled with approximately 3000 bu of corn, while the third site had bins filled with approximately 400 bu of corn. Representative grain samples were removed at monthly intervals using 8 ft triers, and prepared for use to conduct insect bioassays, Spinosad and Actellic residue analysis, as well as, grain quality changes following official Federal Grain Inspection Service (FGIS) procedures. The morality of key-stored grain insects was determined through laboratory bioassays. Adult beetles and weevils (50) and moth eggs (100) were exposed to grain (in all treatments) removed from the bins. All untreated sample bioassays showed adult beetle and weevil mortality ranging from 0 to 30%. At a rate of 1 mg/kg, Spinosad was more effective against the lesser grain borer, maize weevil, and Indianmeal moth than against the red flour beetle. Spinosad showed average mortality rates greater than 94% against he maize weevil and lesser grain borer for all 14-day bioassay trials, while the average number of adults emerged per bioassay was ≤ 2 adults in the 8-week bioassays. The untreated sample containing beetles and weevils showed egg-to-adult emergence varying between 10 and 525 adults. Egg-to-adult emergence was between 12 and 45 adults for Indianmeal moth during 8-week untreated bioassays. Kernel damage was significantly higher in untreated bioassay samples than for bioassay samples of other treatments. Residue analysis was conducted at the beginning, half way, and end of the experiment. Residue levels fluctuated from month to month, with minimum residue levels per site of 0.2 mg/kg Spinosad and maximum residue level per site did not exceed 0.7 mg/kg Spinosad either month.