

**EFFECT OF ABAMECTIN ON FEEDING RESPONSE,
MORTALITY AND REPRODUCTION
OF ADULT BOLLWORM
J. D. Lopez, Jr. and M. A. Latheef
USDA-ARS, SPA, SPARC
Areawide Pest Management Research Unit
College Station, TX**

Abstract

Abamectin (Agri-Mek® or Zephyr® 0.15EC) was evaluated in the laboratory for its potential use as a toxicant or biologically-active material when combined with a feeding stimulant for adult control of bollworm, *Helicoverpa zea* (Boddie) using a feeding-based approach. Abamectin when mixed with 2.5 M sucrose (ppm ai wt:vol) was evaluated for effects on feeding response and mortality [lethal concentration (LC) and lethal time (LT)] of sex pheromone trap-captured males. Feeding responses and LTs were determined at 1, 2, 5, 10, 25, and 50 times the 48-h LC₅₀ and 1,000 ppm concentrations. Sublethal abamectin concentrations in 2.5 M sucrose of 0.05, 0.1, 0.25, 0.5 and 1.0 ppm were then fed to laboratory-reared females which were paired individually with untreated males and the effect on mating frequency, fecundity, larval hatch, and development of larvae to pupation was determined. LC₅₀s (95% Confidence Limits) after 24, 48, and 72 h were calculated to be 280.8 (97.8-5220), 14.8 (12.2-20.7), and 7.0 (5.5-9.8) ppm, respectively. Lack of overlap in the 95% CLs indicate that these values are significantly different, thus abamectin can be considered a relatively slow-acting, but highly effective adult toxicant when ingested. Toxicity of abamectin to males especially at 72 h was comparable to the most toxic insecticides that have been evaluated previously including methomyl, thiodicarb, cyfluthrin and lambda cyhalothrin. Compared to 2.5 M sucrose alone as a control, the percentage of males that extended their proboscis when the front tarsi contacted the insecticide solutions was greatly reduced at concentrations of 750 and 1000 ppm only. Males ingested similar amounts of abamectin at 15 ppm compared to control, but significant inhibition of gustation occurred at higher concentrations. Mean LTs in hours were 51.8, 35.8, 32.6, 18.5, 8.8, and 0.4 for 15, 30, 75, 150, 375 and 750 ppm concentrations, respectively. Compared to 2.5 M sucrose alone as a control, abamectin at sublethal concentrations did not significantly affect the amount ingested by laboratory-reared females, but significantly reduced mating frequency (number of spermatophores per female), number of eggs oviposited per female over a 3-day period and larval hatch per female in a concentration-dependent manner. At 0.25 ppm, mating frequency was reduced by 50%, fecundity by 79% and larval hatch by 75%. Abamectin had no effect on development of hatched larvae to the pupal stage (%). These results indicate that abamectin has high potential for use in adult bollworm control using feeding-based technology because it did not greatly inhibit feeding response at lethal concentrations, was highly toxic, and at sublethal concentrations, greatly reduced mating frequency, fecundity and larval hatch of eggs oviposited.

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