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Heliothine Larval Behavior on Transgenic Cotton Expressing a *Bacillus thuringiensis* Insecticidal Exotoxin, Vip3A

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Field studies were performed during 2005 and 2006 to determine bollworm, *Helicoverpa zea* (Boddie), and tobacco budworm, *Heliothis virescens* (F.), larval behavior on conventional non-transgenic cotton plants (Coker 312), and on transgenic *Bacillus thuringiensis* Berliner (Bt) plants expressing the Vip3A protein or a combination of Vip3A + Cry 1Ab proteins (VipCot). Plants representing each of the three cotton lines were infested with a single, 2-d-old bollworm or tobacco budworm larva during pre-flowering and flowering stages of development. On pre-flowering cotton plants, significantly more bollworm and tobacco budworm larvae migrated from the site of infestation (terminal region of the plant) on Bt (Vip3A and VipCot) cotton plants than larvae placed on non-Bt Coker 312 cotton plants. Higher numbers of larvae for both species were recovered on traps beneath Bt cotton plants than on traps beneath non-Bt cotton plants. During the flowering stages of cotton plant development, similar numbers of both species were recovered from terminals of the non-Bt, Vip3A, and VipCot plants at 1 h and 3 h after infestation. Significantly more bollworm and tobacco budworm larvae were observed on flower buds (squares) of non-Bt cotton than on squares of Vip3A and VipCot at all evaluation intervals. Within 24 h, bollworm larvae moved 1.5, 2.8, and 0.8 main stem nodes below the terminal on Vip3A, VipCot, and Coker 312 cottons, respectively. At the same time interval, tobacco budworm larvae moved 2.0, 2.8, and 0.9 main stem nodes below the terminal on Vip3A, VipCot, and Coker 312 cottons, respectively. During the study, no significant differences in bollworm and tobacco budworm larval behavior were detected between the Vip3A and VipCot cotton lines. The results of this study are similar to those of previous studies that have recorded larval movement on Bt cotton plants expressing single or multiple cry proteins. It is likely that the current sampling protocols used to evaluate performance of commercial Bt cotton plants and supplemental IPM strategies for bollworm and tobacco budworm also can be eventually used for VipCot cultivars.