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ADJUVANT AND NOZZLE EFFECTS ON INSECTICIDE EFFICACY IN COTTON

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Abstract

Hollow cone nozzles are often used for ground application of late-season insecticides in cotton due to the smaller droplet size and higher pressures they are used at. The higher spray pressure can help to improve penetration of the spray into the canopy but can also lead to increased off-target spray drift. Venturi-type nozzles are used at higher spray pressures, have a lower drift potential, and can improve spray deposition within the cotton canopy. The large droplets produced by these nozzles may be a negative, as deposit size and structure can be critical to insecticide efficacy. Deposition of pesticide sprays into the cotton canopy can also be increased through the addition of adjuvants to the spray mixture. This research was conducted to determine the efficacy of Avaunt or SpinTor as influenced by adjuvants, spray nozzles, or spray systems. Research was conducted at Memphis, TN in September 2002. Individual plot size was 4 rows in width by 30 ft in length. Treatments for each trial were arranged in a randomized, complete block design with 4 replications. Six nozzles and seven different adjuvants were used. A novel spraying system designed to apply pesticides over the top and between the rows was also utilized in this research (DropSpray®, Micron Sprayers Ltd.). Avaunt and SpinTor efficacy were evaluated in separate trials. The Avaunt formulation of indoxacarb was used to eliminate any potential deposition effects of the formulants of the Steward formulation. Avaunt was applied at 4.4 oz/ac and SpinTor was applied at 4 oz/ac. For both insecticides, leaves were sampled at the top of the canopy and 30 inches below the canopy from each plot. One-inch leaf disks were obtained from each leaf and placed in a petri dish on moistened paper. Two larvae (beet armyworm for Avaunt, cotton bollworm for SpinTor) were placed in each disk and percent defoliation of leaf disk was determined 24 hours after treatment. Beet armyworm damage was low on leaves sampled from the top portion of the cotton canopy in both trials. The highest leaf damage on leaves from the midportions occurred when hollow cone nozzles were used. Both HM8802-A (methylated seed oil/organosilicone blend) and AB0202 (low weigh polyacrylamide) tended to decrease leaf damage from beet armyworm. Leaf damage tended to be lower when AB0201 (EO/PO block copolymer) was added to the spray mix when applied through ID120-015 nozzles. There was less leaf damage when Avaunt was applied through the various venturi-type nozzles than through TXVS10 hollow cone nozzles and there was little difference between the various venturi-type nozzles. The DropSpray® spray system was as effective in reducing beet armyworm damage as the venturi-type nozzles. Cotton bollworm damage was very low on leaves sampled from the midportion of the cotton canopy when SpinTor was applied. There were fewer differences noted among the various application systems when SpinTor was applied versus Avaunt. However, the highest leaf damage on leaves sampled from the midportion occurred when SpinTor was applied through hollow cone nozzles. Damage tended to be less when SpinTor was applied through ID120-015 or AM120-015 nozzles. Leaf damage tended to decrease when HM8802-A or AB0202 were added to the spray mixture with SpinTor. The lowest leaf damage occurred when SpinTor was applied using the OT/BR spraying system with TXVS6 nozzles.