PALMER AMARANTH (*AMARANTHUS PALMERI*) AND THRIPS (*THRIPS SP.*) CONTROL WITH VARIOUS DICAMBA + INSECTICIDE TANK-MIXES IN COTTON (*GOSSYPIUM HIRSUTUM*)

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Abstract

From 2018 - 2020, a field experiment was conducted to evaluate the effect of carrier volume and spray droplet size on the efficacy of dicamba + insecticide tank mixtures to control both Palmer amaranth (*Amaranthus palmeri*) and thrips (*Thrips sp.*) in XtendFlex™ cotton production systems. Two experimental locations were utilized: the Delta Research and Extension Center in Stoneville, Mississippi, and Hood Farms in Dundee, Mississippi. Four row plots were planted with a single cotton variety: DP 1646 B2XF, and plot dimensions were 3.9m x 14.2m. Applications were initiated when cotton reached the 4-leaf growth stage.

Applications were made with a Capstan Pinpoint Pulse-Width Modulation (PWM) sprayer on a high-clearance Bowman Mudmaster at a speed of 14.5 km hour^{-1}. A single formulation of dicamba: (XtendiMax™ with VaporGrip™) applied at 1.5 kg ha^{-1}, and two insecticides: acephate (Acephate 97UP) applied at 0.2 kg ha^{-1} and dimethoate (Dimethoate 4EC) applied at 0.4 kg ha^{-1} were utilized. This experiment utilized two carrier volumes: 140 and 280 L ha^{-1} and two droplet sizes: 200µm and 800µm.

Pesticide - Carrier Volume - Droplet Size treatment combinations included [1] dicamba-141 L ha^{-1}-800 µm, [2] dicamba + acephate-141 L ha^{-1}-800 µm, [3] dicamba + dimethoate-141 L ha^{-1}-800 µm, [4] dicamba + acephate-280 L ha^{-1}-800 µm, [5] dicamba + acephate-280 L ha^{-1}-800 µm, [6] acephate-141 L ha^{-1}-200 µm, [7] acephate-141 L ha^{-1}-800 µm, [8] dimethoate-141 L ha^{-1}-200 µm, [9] dimethoate-141 L ha^{-1}-800 µm. Each replication contained both a weed/pest free check in addition to a non-treated control.

Visual Palmer amaranth control (0-100) was evaluated at 7, 14, 21, and 28 DAT, and visual cotton injury (0-100) was rated at 7, 14, and 21 DAT. Visual thrips damage ratings (1-5) and thrips counts (immatures) were taken at 1, 3, and 7 days after treatment (DAT). Seedcotton yield was collected using a spindle picker modified for plot research. Additionally, 25 boll -samples were collected prior to mechanical harvest and ginned on a laboratory micro-gin to determine lint turnout.

The experimental design was a randomized complete block and data were analyzed using PROC GLIMMIX in SAS v. 9.4. Means were separated using Fisher's Protected LSD at an alpha level of 0.05. Our results show Palmer amaranth control and seedcotton yield were both negatively impacted with the addition of dimethoate to the spray application. As such, early post-emergent applications of dicamba to control Palmer amaranth should not include dimethoate. For Thrips control, we conclude that acephate is a superior dicamba tank-mix partner than dimethoate, and that higher carrier volumes should be considered. However, no impact on seedcotton yield was observed for these treatments. Therefore, we conclude that dicamba + insecticide tank-mixes have utility in XtendFlex™ cotton production systems to control both thrips and tarnished plan bugs when the appropriate insecticide tank mix partner and carrier volume are utilized.