Injury Potential with Herbicide Tank Mixes In XtendFlex® Cotton

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Abstract

Due to the continued spread of glyphosate resistant Palmer amaranth (*Amaranthus palmeri*), technologies have been developed allowing growers to apply auxin-type herbicides post emergence. The XtendFlex® technology from Monsanto will allow growers to apply glufosinate, and dicamba over the top of cotton (*Gossypium hirsutum L.*). Dicamba applied at 1.1 kg ae ha^{-1} provided up to 90 percent Palmer amaranth control. Dicamba tank mixed with glufosinate increased Palmer amaranth control over dicamba alone. Dicamba has also been observed to control other glyphosate resistant species 79 to 100 percent 14 days after application. Glufosinate is a helpful tool for controlling glyphosate resistant Palmer amaranth. Glufosinate has shown to increase control from 9 to 19 percent over glyphosate, also two POST applications of glufosinate have been shown to provide 96 percent Palmer amaranth control. Since the development of glyhosate resistance, early POST applications with several modes of actions have become common. XtendFlex® technology will allow growers to apply several different modes of action at once. However, the crop injury potential from these applications need to be further examined.

Experiments were conducted in Starkville, MS at the R. R. Foil Plant Science Research Center and in Brooksville, MS at the Black Belt Branch Experiment Station. Plots consisted of 4-1 m spaced rows that where 12.2 m in length. Each plot was replicated four times. DP 1522 B2XF was planted in Starkville and Brooksville. ST 4946 GLB2 was planted in a separate experiment in Starkville for comparison purposes. Applications were made on 2-4 leaf cotton with a CO_2-powered backpack sprayer calibrated to apply 140 L ha^{-1} @ 317 kpa while walking 4.8 kph. Treatments applied to DP 1522 B2XF included glyphosate @ 1.1 kg ae ha^{-1}, glufosinate @ 0.6 kg ai ha^{-1}, S-metolachlor @ 1.07 kg ai ha^{-1}, dicamba (Engenia) @ 0.6 kg ae ha^{-1}, dicamba (Clarity) @ 0.6 kg ae ha^{-1}, and dicamba (MON 119096) @ 0.6 kg ae ha^{-1} either alone or in combination. Treatments except those containing dicamba were applied to ST 4946 GLB2 for comparison purposes. Visual injury ratings were made 3, 7, 14, 21, and 28 days after applications. Other data collected included height at 1st bloom as well as the end of the season and lint yield. Data were analyzed using the PROC MIXED procedure in SAS version 9.4 and means were separated using Fisher's protected LSD at p=0.05.

Five of the seven highest injury levels 3 days after application on DP 1522 B2XF were from treatments containing glufosinate and S-metolachlor in which injury ranged from 33-43 percent. The highest level of injury came from treatments containing dicamba (Engenia) + glyphosate + glufosinate + S-metolachlor. There were no differences among treatments applied to ST 4946 3 days after applications with crop injury ranging from 3 to 10 percent depending on the treatment. Similar to 3 days after application, five of the seven treatments with the highest level of injury seven days after application contained glufosinate and S-metolachlor. There were no differences in injury to ST 4946 GLB2 with crop injury ranging from 3 to 7 percent. At 14 days after application injury to DP 1522 B2XF had dissipated and ranged from 1 - 8 percent depending on the treatment no differences due to herbicide treatment were observed. Injury to ST 4946 GLB2 due to herbicide treatment was not significantly different 14 days after application and ranged from 0- 2 percent. Cotton height of DP 1522 B2XF was found to be significantly affected by the herbicide(s) applied at 2-4 leaf cotton. Treatments that caused the greatest injury 3 and 7 days after application resulted in shorter cotton compared to the untreated control. However, no yield differences were in DP 1522 B2XF due to herbicide treatment with yields ranging from 1900-2150 kg lint ha^{-1}. There were no differences in yield due to herbicide treatments applied to ST 4946 GLB2 with yields ranging from 1800-2000 kg lint ha^{-1}.