



The Effect of Glyphosate Plus Dicamba Drift Rates on Commercial Processing Tomatoes.

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Introduction

The commercial processing tomato industry in Indiana is a \$20,000,000/year industry and account for 3,250 hectares of land use (USDA 2008). The use of glyphosate on many of the soybean and corn hectares in Indiana has lead to concern about drift issues on commercial processing tomatoes. Furthermore, when dicamba-resistant soybean are released, there will be further concern about drift issues from dicamba. The effects of both of these herbicides on tomato have been well documented, but no information exists on how drift from glyphosate and dicamba herbicides will injure tomato under mid-summer, Midwest environmental conditions.

Objective

The objective was to determine the joint activity from glyphosate and dicamba drift on commercial processing tomatoes.

Materials and Methods

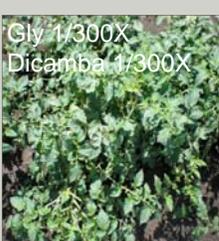
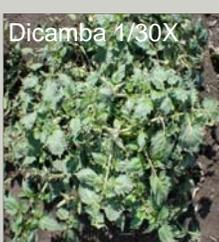
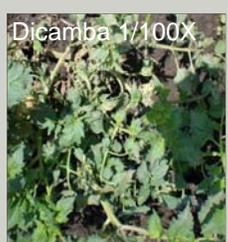
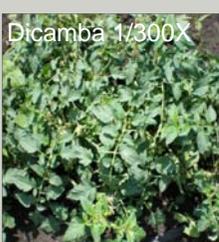
A randomized complete block factorial design experiment was conducted with four replications on 1.5 m x 6 m plots. Treatments included glyphosate at 0.002, 0.006, 0.021 kg ae/ha, dicamba at 0.002, 0.006, 0.019 kg ae/ha, tank mixes at 0.002:0.002, 0.006:0.006, 0.021:0.019 kg ae/ha of glyphosate: kg ae/ha of dicamba, and an untreated check. These rates are equal to a 1/300X, 1/100X, and 1/30X of the normal use rate of glyphosate (0.64 kg ae/ha) and dicamba (0.56 kg ae/ha). All herbicide applications were applied in 140 l/ha with 2.8 kg/ha AMS and 0.25% v/v NIS at 117 kPa. Two experiments were conducted with transplanting on July 2 and July 15 and spraying on: August 6 and August 11, respectively. Processing tomato cultivar 611 was used in both experiments. Visual injury (0-100%) was evaluated at 2 and 5 WAT, and data were subjected to Colby's analysis to determine joint activity. Transplanting was done late in the season, so yield data was not collected.

Results and Discussion

Glyphosate and dicamba alone caused injury at all rates, but our main objective was to determine if drift from a tank mix was more injurious than either herbicide applied alone. Tank-mixes of glyphosate and dicamba have a predominantly additive joint activity response on the commercial processing tomato cultivar evaluated. Tank-mixes of 1/30X of glyphosate plus 1/30X of dicamba caused greater than 90% injury based on visual ratings. This suggests that drift from tank mixtures can cause significant injury to processing tomatoes. Because of this, applicators need to be cognizant of nearby tomato fields when making applications to avoid drift. Tomato producers need to be aware of impact of drift and how to recognize drift symptoms and understand what the overall effect can be on their crop. Future studies will evaluate timing of drift in regard to tomato growth stage, injury, and yield.



Response of tomato to simulated drift of glyphosate, dicamba or tank mixtures of dicamba plus glyphosate at 21 DAT.



All glyphosate, dicamba, and tank mixes resulted in crop injury. Note comparisons of tank mixtures with herbicides applied alone.

Table 1. The effects of three different drift rates on commercial processing tomatoes.

Glyphosat e rate	Dicamba rate	Expected results ¹	Observed results ²	Difference in results	Joint activity
— kg ae/ha —		———— % Control —————			
2 WAT					
0.002	0.002	26	21	-5	Additive
0.006	0.006	61	74	13	Synergistic
0.021	0.019	95	94	-1	Additive
5 WAT					
0.002	0.002	40	32	-8	Additive
0.006	0.006	67	69	2	Additive
0.021	0.019	95	91	-4	Additive

¹Expected results were calculated using the formula for Colby's analysis: Expect = [Gly only + Dicamba only - ((Gly only * Dicamba only)/100)]. Mean ratings for Gly only and Dicamba only treatments were not included.

²Mean of the observed ratings from actual tank mixes.

Literature Cited

USDA-NASS. 2008. <http://usda.mannlib.cornell.edu/usda/ers/92010/Table025.xls>.

Acknowledgements

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