

Potential for crop injury in spring wheat when tank mixing several fungicides with several common grass and broadleaf herbicides in 2005 at Crookston, MN. Wiersma, Jochum J., Beverly R. Durgan, and James H. Cameron

A full factorial treatment design consisting of individual and tank mixtures of the postemergence grass herbicides clodinafop & cloquintocet, fenoxaprop-P, and AEF 103060 and the broadleaf herbicide bromoxynil & MCPA applied at labeled rates, and the fungicides trifloxystrobin & propiconazole (Stratego) and azoxystrobin & propiconazole (Quilt) applied at half the labeled rate were evaluated for their potential to cause crop injury in spring wheat. The experiment was conducted at the Northwest Research & Outreach Center in Crookston, MN on a Wheatville sandy loam (coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls). The plot area was chisel plowed the previous fall and a seed bed was prepared in the spring using a field cultivator. Fertilizer was applied according to soil test recommendations for a 60 bu/A yield goal. The hard red spring wheat cv. 'Alsen' was solid seeded to a 1.5 inch depth in three 16 ft strips using a double-disk press drill. The strips were separated by an 8 ft alley. Within each strip, 8 ft wide plots were marked. Treatments were applied to the center 6 ft of the plot using a CO₂ powered backpack sprayer equipped with 80015 flat-fan nozzles delivering 10 GPA at 35 psi. The three solid-seeded strips of Alsen formed the 3 replicates. The application was made at the 4.0 leaf stage of wheat on June 6. Crop injury was rated at 7, 14, 21, and 28 days after application. Tebuconazole (Folicur 3.6F) was applied at labeled rate at Feekes 10.51 to suppress Fusarium head blight. Grain yield was estimated by harvesting the center 5 ft from each plot with a plot combine. Grain samples were dried and cleaned and grain yield was expressed as bu/A.

Date	Jun 6
Treatment	POST
Sprayer	
GPA	10
psi	35
Temperature (°F)	
air	63
soil (4 inches)	73
Soil Moisture	wet
Wind Speed (mph)	3.5
Sky	Overcast
Relative Humidity (%)	65
Wheat	
leaf no.	4.0

In the analysis of variance the 2-way interactions between the factors grass herbicides and the bromoxynil & MCPA and the factors bromoxynil & MCPA and fungicides were significant (data not shown). Thus, only the means of these 2-way interactions are presented in Tables 1 and 2. Bromoxynil & MCPA in combination with either fenoxaprop-P or clodinafop & cloquintocet did not result in more crop injury than when the grass herbicides were applied separately, whereas bromoxynil & MCPA in combination with AE F103060 & adjuvant caused significantly more crop injury at 7 days after application than the grass herbicides applied separately (Table 1). Similarly, bromoxynil & MCPA in combination with either fungicide caused approximately double the amount of crop injury at 7 days after application than either bromoxynil & MCPA or the fungicides applied alone (Table 2). The crop injury was localized to the fourth and fifth leaves and new growth did not show any injury symptoms. At 14 days after application crop injury had decreased and no crop injury was found at 21 and 28 days after application. The observed phytotoxicity (necrosis) indicated bromoxynil & MCPA as the cause of the injury rather than any of the three grass herbicides or two fungicides evaluated. Thus, the addition of AE F103060 & adjuvant or either fungicide to the tank mix caused the additional crop injury of the bromoxynil & MCPA. In contrast, the tank mixes of either fenoxaprop-P or clodinafop & cloquintocet in combination with bromoxynil & MCPA interacted such that no additional crop injury was observed. The crop injury at 7 and 14 days after application had no effect on final grain yield.

Table 1 Crop injury at 7 days after application and grain yield of three post emergence grass herbicides and bromoxynil & MCPA and the respective tank mixtures in 2005 at Crookston, MN (Wiersma, Durgan and Cameron).

	Rate	Crop Injury	Grain Yield
	(lb/A)	(%)	(bu/A)
Control		2.2	56.4
Bromoxynil & MCPA ¹	0.5	6.9	59.6
Clodinafop & cloquintocet ²	0.05	4.4	57.7
Clodinafop & cloquintocet + bromoxynil & MCPA	0.05 + 0.5	9.4	57.8
AE F103060 & adjuvant ³	0.0156 + 1.9%	6.7	55.8
AE F103060 & adjuvant + bromoxynil & MCPA	0.0156 + 1.9% + 0.5	15.0	57.2
Fenoxaprop-P ⁴	0.075	7.8	59.5
Fenoxaprop-P + bromoxynil & MCPA	0.075 + 0.5	9.4	58.8
LSD (0.05)		5.3	n.s

¹ Bronate Advanced

² Discover 60 EC

³ Silverado

⁴ Puma E

Table 2 Crop injury at 7 days after application and grain yield of bromoxynil & MCPA and the fungicides trifloxystrobin & propiconazole (Stratego) and azoxystrobin & propiconazole (Quilt) and the respective tank mixtures in 2005 at Crookston, MN (Wiersma, Durgan and Cameron).

	Rate	Crop Injury	Grain Yield
	(lb/A)	(%)	(bu/A)
Control		5.0	57.0
Bromoxynil & MCPA ¹	0.5	6.7	59.3
Trifloxystrobin & propiconazole ²	0.041 + 0.041	4.6	56.0
Azoxystrobin & propiconazole ³	0.034 + 0.056	6.3	59.0
Bromoxynil & MCPA + trifloxystrobin & propiconazole	0.5 + 0.041 + 0.041	10.7	57.3
Bromoxynil & MCPA + azoxystrobin & propiconazole	0.5 + 0.034 + 0.056	13.2	58.5
LSD (0.05)		5.3	n.s

¹ Bronate Advanced

² Stratego

³ Quilt