

Efficacy and crop safety of trinexapac-ethyl to reduce plant height and improve straw strength in spring wheat in 2005 at Crookston, MN. Wiersma, Jochum J., Beverly R. Durgan, and James H. Cameron

The plant growth regulator trinexapac-ethyl (proposed) was evaluated for its efficacy to reduce plant height and improve straw strength and its potential to cause crop injury in spring wheat. A full factorial design with 4 replications was used. The experiment was conducted at the Northwest Research & Outreach Center in Crookston, MN on a Wheatville 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 an 80 bu/A yield goal. The hard red spring wheat cv. 'Walworth' planted in small plots measuring 5 ft by 20 ft. Treatments were applied to the whole plot using a CO₂ powered backpack sprayer equipped with 8002 flat-fan nozzles delivering 15 GPA at 30 psi. The applications were made at Zadoks GS 30, GS 32, and GS 37. The treatments at each timing were 0.059, 0.084, 0.112, and 0.223 lb ai/A trinexapac-ethyl and an untreated control. Crop injury was rated at 7, 14, 21, and 28 days after application. Tebuconazole (Folicur 3.6F) was applied at labeled rate at GS 60 to suppress Fusarium head blight. Plant height and lodging was measured just prior to harvest. Grain yield was estimated by harvesting each plot with a plot combine. Grain samples were dried and cleaned and grain yield was expressed as bu/A.

Date	Jun 09	Jun 15	Jun 22
Treatment	POST	POST	POST
Sprayer			
GPA	15	15	15
psi	30	30	30
Temperature (°F)			
air	66	74	82
soil (4 inches)	64	66	78
Soil Moisture	wet	wet	moist
Wind Speed (mph)	3.5	4.0	8.0
Sky	Sunny	Partially sunny	Partially sunny
Relative Humidity (%)	76	37	69
Wheat			
leaf no.	5.0	6.0	7.0
growth stage	GS 30	GS 32	GS 37

For the earliest timing, only the highest rate of trinexapac-ethyl caused any phytotoxicity (chlorosis). For the application at GS 32, all four rates of trinexapac-ethyl caused some phytotoxicity with a slight increase in the amount of phytotoxicity as the rate of trinexapac-ethyl increased. Trinexapac-ethyl did not cause any injury at GS 37 (Table 1). The crop injury was transient and could no longer be detected 14 days after application. The highest rate of trinexapac-ethyl reduced plant height at all three timings and delayed maturity at GS 32 (Table 1). No lodging was detected and straw strength did not improve (Table 1). Trinexapac-ethyl did not affect grain yield (Table 1).

Table 1 Efficacy and crop safety of trinexapac-ethyl to reduce plant height and improve straw strength in spring wheat in 2005 at Crookston, MN (Wiersma, Durgan and Cameron).

	Rate	Crop Injury - 7 DAT -	Days to Heading	Plant Height	Straw Strength	Grain Yield
	(lb/A)	(%)	(days)	(inches)	(lbs/ft)	(bu/A)
Timing 1 (GS 30)						
Control		0.0	54.3	33.3	1.29	76.5
Trinexapac-ethyl	0.056	0.0	54.8	34.0	1.27	82.1
Trinexapac-ethyl	0.084	0.0	54.3	32.3	1.60	79.7
Trinexapac-ethyl	0.112	0.0	55.0	30.3	1.59	77.8
Trinexapac-ethyl	0.223	3.8	55.0	30.5	1.57	79.0
Timing 2 (GS 32)						
Control		0.0	54.5	32.5	1.81	76.9
Trinexapac-ethyl	0.056	2.5	54.0	32.3	1.52	76.9
Trinexapac-ethyl	0.084	5.0	54.5	31.8	1.56	77.9
Trinexapac-ethyl	0.112	3.8	55.0	32.3	1.51	78.4
Trinexapac-ethyl	0.223	5.0	55.5	28.8	1.67	73.3
Timing 3 (GS 37)						
Control		0.0	54.5	33.0	1.66	78.2
Trinexapac-ethyl	0.056	0.0	54.3	31.3	1.40	76.6
Trinexapac-ethyl	0.084	0.0	54.8	30.5	1.64	77.5
Trinexapac-ethyl	0.112	0.0	54.3	31.0	1.49	75.4
Trinexapac-ethyl	0.223	0.0	55.0	28.5	1.67	72.6
LSD (0.05)		1.7	0.9	1.8	n.s	n.s