Soybean tolerance to pendimethalin at Lamberton, MN in 2003. Getting, Jodie K. and Bruce D. Potter. The objective of this study was to evaluate crop tolerance to two formulations of pendimethalin in glyphosate-resistant soybeans. This study was conducted on a Normania loam soil containing 4.9% organic matter, pH 5.1 and soil test P and K levels of 32 and 272 lb/A, respectively. A randomized complete block design with four replications and a plot size of 10 by 30 ft was used. The site was planted to oats in 2002 and was fall chiseled. On May 15, 2003 Asgrow 'AG 2201' glyphosate-resistant soybeans were planted in 30-inch rows at a seeding rate of 160,000 seeds/A. All treatments were applied with a tractor-mounted sprayer delivering 20 gpa at a pressure of 40 psi. All of treatments, except the weedy check, were sprayed with glyphosate on August 7 to remove any remaining weeds. In August, all plots were treated with esfenvalerate (Asana) for soybean aphid control. The sprayer was equipped with 8002 flat-fan nozzles spaced 15 inches apart on the boom. Application dates, environmental conditions, plant sizes and rainfall data are listed below:

Date Treatment	May 16 PRE	May 23 Cracking (20% emerge)	June 12 POST I	June 30 POST II
Temperature (F)				
air	55	57	77	72
soil (4 inch)	56	64	78	68
Relative humidity (%)	88	67	57	60
Wind (mph)	calm	NE 5	calm	calm
Sky	clear	clear	p. cloudy	clear
Soil moisture	dry	dry	dry	dry
Soybean				
leaf no.	-	VE	V1	V3
height (inch)	-	-	4	9
Yellow foxtail				
leaf no.	-	-	2 to 4	1 to 3
height (inch)	-	-	2 to 4	1 to 3
no./ft^2	-	-	50	15
Common lambsquarters				
leaf no.	-	-	2 to 5	2 to 3
height (inch)	-	-	2 to 3	1 to 2
no./ft^2	-	-	4	<1
Redroot pigweed				
leaf no.	-	-	2 to 4	1 to 2
height (inch)	-	-	1 to 3	1 to 2
no./ft^2	-	-	3	<1
Rainfall after application (inch)				
1 week	0.50	0.14	0.01	0.03
2 week	0.14	0.60	3.43	0.64
3 week	0.60	0.81	0.50	0.63

Early season crop development and crop canopy was delayed due to a June 23 hailstorm, which resulted in 43% defoliation of soybean leaves. The precipitation received in July and August was below average with a total of 2.96 inches compared to the historical average of 7.07 inches. None of the herbicide treatments caused visible crop injury when evaluated on June 10. On June 25, pendimethalin EC at two times the labeled rate + glyphosate applied to 4-inch soybean reduced soybean height by 40%. Pendimethalin H_2O applied at two times the labeled rate + glyphosate reduced soybean height by 4%. In August, no visible height reduction was apparent in any of the herbicide treatments. Soybean stem brittleness was confounded from the June 23 hailstorm. Stem brittleness ratings were taken by pushing the soybeans to a 45^o angle. The amount of plants broken at a hail scar and the amount of plants broken at ground level were recorded. There were no differences among treatments from the hail scars. Either formulation of pendimethalin applied PRE at two times the labeled rate resulted in 19 to 21% broken plants, applied at cracking 10 to 13%, and applied at 4-inch 4 to 6%. Either formulation of pendimethalin applied at the labeled rate resulted in 0 to 3% broken plants. (Southwest Research and Outreach Center, University of Minnesota, Lamberton).

Table. Soybean tolerance to pendimethalin at Lamberton, MN in 2003 (Getting and Potter).

Treatment[a]	Rate	Height reduction[b] 6/25	Stem brittleness stem[c]	Stem brittleness scar[d]	SETLU 6/10	SETLU 6/25	CHEAL 6/10	CHEAL 6/25	AMARE 6/10	AMARE 6/25	Yield
	(lb/A or %)	----------(%)----------			----------(% control)----------						(bu/A)[e]
Glyphosate+AMS	0.75+2.5	0	0	3	-	98	-	98	-	98	32.6
Preemergence/POST I(4-inch weeds)											
Pendimethalin/glyphosate+AMS	1.03/0.75+2.5	0	0	13	73	98	83	98	74	98	33.5
Pendimethalin[1]/glyphosate+AMS	1.03/0.75+2.5	0	3	8	63	98	76	98	76	98	34.4
Pendimethalin/glyphosate+AMS	2.06/0.75+2.5	0	21	0	85	98	88	98	89	98	38.7
Pendimethalin[1]/glyphosate+AMS	2.06/0.75+2.5	0	19	9	79	98	93	98	88	98	36.2
Cracking/POST I(4-inch weeds)											
Pendimethalin/glyphosate+AMS	2.06/0.75+2.5	0	13	6	81	98	94	98	94	98	34.5
Pendimethalin[1]/glyphosate+AMS	2.06/0.75+2.5	0	10	10	80	98	93	98	91	98	32.8
POST I(4-inch weeds)											
Pendimethalin+glyphosate+AMS	2.06/0.75+2.5	4	6	13	-	98	-	-	-	-	35.1
Pendimethalin[1]+glyphosate+AMS	2.06/0.75+2.5	40	4	9	-	98	-	-	-	-	32.3
POST I(4-inch weeds)/POST II (regrowth)											
Glyphosate+AMS/glyphosate+AMS	0.75+2.5/0.75+2.5	0	6	9	-	98	-	-	-	-	39.2
Checks											
Weedy Check	-	0	0	3	0	0	0	0	0	0	8.0
Weed-free check		0	3	1	100	100	100	100	100	100	37.9
	LSD (0.10)	3.0	8.8	ns	3.3	ns	5.1	ns	9.4	ns	4.65

[a] Glyphosate = Roundup Weathermax 4.5L; pendamethalin = Prowl H_20 3.8; pendamethalin[1] = Prowl 3.3EC; AMS = spray grade ammonium sulfate.
[b] % visual height reduction of soybean.
[c] % soybean plants broken at ground level when pushed to a 45^o angle on August 26.
[d] % soybean plants broken at scar created by hailstorm when pushed to a 45^o angle on August 26.
[e] Yield adjusted to 13% moisture.