

Reducing adverse impacts of corn pests with conventional management practices and transgenic corn hybrids. Urbana, Illinois, 2004. Hager, Aaron G., Douglas J. Maxwell, and Jeremy T. Lake. The objective of this research was to compare the management of various corn pests using conventional pest management practices with corn hybrids genetically modified to be resistant to specific insect pests and glyphosate. Conventional pest management practices included a planting time application of a soil insecticide for control of corn rootworm larvae, preemergence herbicides metolachlor plus atrazine or acetochlor plus atrazine, and postemergence herbicides nicosulfuron plus rimsulfuron, atrazine, and mesotrione. Corn hybrids included conventional (nontransgenic), a transgenic hybrid with resistance to European corn borer, a transgenic hybrid with resistance to European corn borer and glyphosate, and a transgenic hybrid with resistance to corn rootworm larvae, European corn borer, and glyphosate. All treatments included an at-planting application of either metolachlor plus atrazine or acetochlor plus atrazine. The study was established at the Crop Sciences Research and Education Center, Urbana. The soil was a Drummer silty-clay loam with a pH of 6.4 and 5.3% organic matter. Dekalb DKC57-01 (no technology trait), DKC58-78 (glyphosate resistant trait), DKC58-80 (same plus corn borer trait), and DKC57-01 (same plus rootworm protection trait) corn was planted 2 inches deep on May 7 in 30 inch rows. Treatments were arranged in randomized complete blocks with four replications of plots 10 by 50 feet. Herbicides were applied with a CO<sub>2</sub> backpack sprayer delivering 20 gpa and equipped with 8003 flat fan nozzles. Label rate of Aztec insecticide was used on certain plots as marked. Application information is listed below:

Date	May 7	June 7
Application	pre	post
Temperature (F)		
Air	72	80
Soil	62	75
Soil Moisture	moist	moist
Wind (mph)	5-E	6-S
Sky Cover (%)	50	0
Precip. after application		
Week 1 (inch)	1.84	2.41
Week 2 (inch)	1.16	0.72
Relative humidity (%)	52	60
Corn		
Leaf no.	-	6
Height (inch)	-	16

By 30 days after planting, corn injury from soil-applied herbicides was minor, ranging from 4 to 10 percent. Control of giant foxtail, common lambsquarters, common waterhemp, and velvetleaf was excellent, ranging from 90 to 99 percent. Corn injury 30 days after application of postemergence herbicides ranged from 0 to 4 percent. Weed control was excellent, with all treatments providing 99 percent control of species except tall morningglory. Control of tall morningglory ranged from 89 to 97 percent, with no statistical differences among treatments. Crop injury from European corn borer was minimal, with all treatments except one demonstrating no evidence of damage from this insect pest. Corn rootworm pressure was medium to high, and corn roots were scored for damage on a 1 to 3 scale. Root damage ratings for treatments with no insecticide ranged from 1.3 to 2.42, while root damage ratings for treatments that included a soil insecticide averaged 0.35. Root damage ratings from the corn rootworm transgenic hybrid averaged 0.075. Corn yields closely followed corn root damage ratings, with treatments that included a soil insecticide consistently yielding more than treatments without soil insecticides. Corn yield from the corn rootworm resistant transgenic hybrid was equivalent to treatments that included a soil insecticide. (Dept. of Crop Sciences, University of Illinois, Urbana).

Table 1. Reducing adverse impacts of corn pests with conventional management practices and transgenic corn hybrids The effect of stress mitigation on corn yield. Urbana, Illinois, 2004. (Hager, Maxwell, and Lake).

Treatment	Appl Rate (lb/A)	Time	Zeamd 6-7	Setfa 6-7	Cheal 6-7	Amata 6-7	Abuth 6-7	Phbpu 6-7
			% inj					
DKC57-01 no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	10	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax <sup>1</sup> +28%N	1.0%+2.0%							
DKC57-01 with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	10	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-78YGCB no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	6	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-78YGCB with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	94
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	89
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	98	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR no insecticide	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	90	91
+glyphosate <sup>2</sup> +N-Pak AMS <sup>3</sup>	0.75+2.5%	post						
DKC58-80YGCBBR with insecticide	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	99	90
+glyphosate+N-Pak AMS	0.75+2.5%	post						
DKC57-01YGCBBRRW no insectic.	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	90	90
+glyphosate+N-Pak AMS	0.75+2.5%	post						
DKC57-01YGCBBRRW w/insectic.	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	91	89
+glyphosate+N-Pak AMS	0.75+2.5%	post						
LSD (0.05)			5	0	0	0	2	7

<sup>1</sup>Herbimax is an oil, emulsifier, and surfactant blend from Loveland Products, Inc. <sup>2</sup>Glyphosate was Roundup Weathermax from Monsanto. <sup>3</sup>N-Pak AMS is an ammonium sulfate solution from Agrilience LLC.

Table 2. Reducing adverse impacts of corn pests with conventional management practices and transgenic corn hybrids. Urbana, Illinois, 2004. (Hager, Maxwell, and Lake).

Treatment	Appl Rate (lb/A)	Time	Zeamd 6-18	Setfa 6-18	Cheal 6-18	Amata 6-18	Abuth 6-18	Phbpu 6-18
			% inj					
DKC57-01 no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	9	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax <sup>1</sup> +28%N	1.0%+2.0%							
DKC57-01 with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	10	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-78YGCB no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	6	99	99	99	99	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-78YGCB with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	94
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR no insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	94
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR with insecticide	-	-						
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	98	95
+nicosulfuron&rimsulfuron	0.023+0.012	post						
+mesotrione+atrazine	0.047+0.25							
+Herbimax+28%N	1.0%+2.0%							
DKC58-80YGCBBR no insecticide	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	90	91
+glyphosate <sup>2</sup> +N-Pak AMS <sup>3</sup>	0.75+2.5%	post						
DKC58-80YGCBBR with insecticide	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	99	93
+glyphosate+N-Pak AMS	0.75+2.5%	post						
DKC57-01YGCBBRRW no insectic.	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	90	90
+glyphosate+N-Pak AMS	0.75+2.5%	post						
DKC57-01YGCBBRRW w/insectic.	-	-						
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	91	89
+glyphosate+N-Pak AMS	0.75+2.5%	post						
LSD (0.05)			4	0	0	0	2	3

<sup>1</sup>Herbimax is an oil, emulsifier, and surfactant blend from Loveland Products, Inc. <sup>2</sup>Glyphosate was Roundup Weathermax from Monsanto. <sup>3</sup>N-Pak AMS is an ammonium sulfate solution from Agrilience LLC.

Table 3. Reducing adverse impacts of corn pests with conventional management practices and transgenic corn hybrids. Urbana, Illinois, 2004. (Hager, Maxwell, and Lake).

Treatment	Appl Rate (lb/A)	Time	Zeamd 7-9	Setfa 7-9	Cheal 7-9	Amata 7-9	Abuth 7-9	Phbpu 7-9	Yield 9-24 Bu/A
DKC57-01 no insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	3	99	99	99	99	91	143.1
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax <sup>1</sup> +28%N	1.0%+2.0%								
DKC57-01 with insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	96	195.4
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax+28%N	1.0%+2.0%								
DKC58-78YGCB no insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	3	99	99	99	99	95	163.7
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax+28%N	1.0%+2.0%								
DKC58-78YGCB with insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	1	99	99	99	99	96	201.8
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax+28%N	1.0%+2.0%								
DKC58-80YGCBBR no insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	2	99	99	99	99	96	162.4
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax+28%N	1.0%+2.0%								
DKC58-80YGCBBR with insecticide	-	-							
S-metolachlor&CGA 154281	0.63+0.81	pre	4	99	99	99	99	97	199.5
+nicosulfuron&rimsulfuron	0.023+0.012	post							
+mesotrione+atrazine	0.047+0.25								
+Herbimax+28%N	1.0%+2.0%								
DKC58-80YGCBBR no insecticide	-	-							
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	98	89	158.2
+glyphosate <sup>2</sup> +N-Pak AMS <sup>3</sup>	0.75+2.5%	post							
DKC58-80YGCBBR with insecticide	-	-							
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	99	91	208.4
+glyphosate+N-Pak AMS	0.75+2.5%	post							
DKC57-01YGCBBRRW no insectic.	-	-							
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	98	91	216.1
+glyphosate+N-Pak AMS	0.75+2.5%	post							
DKC57-01YGCBBRRW w/insectic.	-	-							
Acetochlor&Atrazine&MON4660	1.06+0.83	pre	0	99	99	99	99	93	222.0
+glyphosate+N-Pak AMS	0.75+2.5%	post							
LSD (0.05)			2	0	0	0	1	5	19

<sup>1</sup>Herbimax is an oil, emulsifier, and surfactant blend from Loveland Products, Inc. <sup>2</sup>Glyphosate was Roundup Weathermax from Monsanto. <sup>3</sup>N-Pak AMS is an ammonium sulfate solution from Agrilience LLC.