Conventional and glufosinate tolerant sweet corn herbicide weed management trial at Waseca, MN - 1998. Becker, Roger L., Vincent A. Fritz, James B. Hebel, Douglas W. Miller, and Bradley D. Kinkaid. The objective of this experiment was to evaluate weed management systems with preemergence and postemergence herbicides in conventional sweet corn and glufosinate treatments in glufosinate tolerant sweet corn. This study was conducted on a Webster clay loam soil with pH 6.4. A randomized complete block design with three reps was utilized. Plots were 10 feet by 25 feet (4 rows). 'Jubilee' and 'Empire' sweet corn were seeded (two row subplots per plot) at 24,000 plants/A on May 12, 1998. Rogers "Attribute ™ Insect Protected Sweet Corn" (GH-0937) was planted adjacent to the conventional hybrids at the same seeding rate and planting date. Herbicide application data are provided below. Corn was harvested on August 13, from a 20 foot row within each plot/subplot. Total ear yield, husked ear yield, and kernel yield were determined. In addition, total ears, 'usable' ears, average ear length ,and average ear diameter were measured. Usable ears are defined as ears suitable for use as frozen corn-on-the-cob product. Weed control and yield data are provided in the tables below.

Application Data

Treatment	Preemergence	Postemergence	Late Postemergence
Date	5/13/98	5/29/98	6-17-98
Air Temp (°F)	78	72	65
Wind (mph)	SE 15	N 15	SW 5
Gift			
Size (inch)	--	0.5-3.5	1-3
Broadleaf weeds			
Size (inch)	--	2	1-3
Rainfall before Application			
Week 1 (inch)	0.83	1.40	0.55
Rainfall after Application			
Week 1 (inch)	1.53	0.67	1.02
Week 2 (inch)	1.40	0.61	2.05

Conventional Sweet Corn Management

Weed control ratings will be discussed for the June 9, 1998 rating as this rating best portrays herbicide differences. Cocklebur control was variable with the poorest performance provided by isoxaflutole. The best cocklebur control was obtained by the use of halosulfuron, carfentrazone-ethyl + atrazine + dicamba, CGA-248757 + atrazine, and the bentazon + atrazine package mix. Cocklebur control was improved for carfentrazone-ethyl with the addition of 0.5 lb ai of atrazine. Common lambsquarters control was the poorest with carfentrazone-ethyl and the low rate of halosulfuron. Common ragweed pressure was heavy in many plots. With this heavy pressure, carfentrazone-ethyl or carfentrazone-ethyl plus atrazine did not provide adequate control whether used in a tank mixed with nicosulfuron postemergence or as a postemergence sequential to metolachlor applications. Poor performance on common ragweed also was noted with the metolachlor + atrazine + cyanazine tank mix. The addition of dicamba to the atrazine + carfentrazone-ethyl tank mix greatly improved common ragweed control. Redroot pigweed control was excellent with all treatments including nicosulfuron used alone, with the exception of the low use rate of halosulfuron (0.016 lb ai). Velvetleaf control did not differ significantly by the July rating and generally was good with all treatments in the June rating except for that of nicosulfuron used alone and the metolachlor + atrazine + cyanazine tank mix.

Nicosulfuron provided excellent giant foxtail control. Control with pre-emergence applications of metolachlor were variable and likely influenced by rainfall following application. Metolachlor tank mixes with herbicides that did not have reasonably good grass activity resulted in the lowest control of giant foxtail. Giant foxtail control was good with isoxaflutole or isoxaflutole tank mixed with reduced rates of metolachlor. Halosulfuron treatments were misapplied resulting in discarding two replications. Therefore, treatment information for halosulfuron should be interpreted with caution as it reflects only one replication.

Chlorosis of sweet corn was visible at the June rating, but no chlorosis or growth reduction ratings were significant at the 0.05 LSD level. Sweet corn yield showed the effects of weed competition rather than crop injury.   The use of nicosulfuron did result in lower yield with Jubilee, a hybrid that is not labeled for use with nicosulfuron. This is likely due to increased weed competition due to the lack of broadleaf control with nicosulfuron used alone rather than crop injury when compared with the same rate of nicosulfuron tank mixed with atrazine that controlled broadleaf weeds. Similar comments can be made regarding the yield of Empire variety, a hybrid which is labeled for the use of nicosulfuron, when compared to tank mixes including nicosulfuron plus atrazine. The use of metolachlor with carfentrazone-ethyl resulted in reduced cut corn yield with both Empire and Jubilee and again is likely due to giant foxtail and common ragweed competition. Weedy checks resulted in negligible cut corn yield and are a good indicator of the severity of weed competition in these plots. This trial was not cultivated so weed competition reduction is based solely on the benefits of the use of herbicide. In general, Jubilee provided higher yields than Empire under the same herbicide weed management systems. However, the number of corn on the cob ears per acre was higher with Empire than with that obtained with Jubilee under identical weed management systems.

Glufosinate Tolerant Sweet Corn Management

By the July rating, the best giant foxtail control was achieved with sequential application of glufosinate or glufosinate applied a sequential to reduced rates of isoxaflutole or metolachlor soil residual herbicides. There was no significant improvement in giant foxtail control when 0.5, 0.75, or 1.0 lb ai of atrazine were added in a tank mix when compared with similar rates of glufosinate applied alone. Common cocklebur control was excellent, but lowest when the lower rate of glufosinate, 0.27 lb ai per acre, was used.   Control of common lambsquarters by the July rating was significantly lower when glufosinate was applied without a residual herbicide tank mix. Glufosinate + atrazine tank mixed, sequential glufosinate applications, and isoxaflutole at reduced rates applied preemergence to sequential glufosinate applications provided the best common lambsquarters control. Control of common ragweed was excellent with all treatments. Having said that, there still was significant improvement of common ragweed control when either soil or postemergence residual herbicides were tank mixed with glufosinate bearing in mind that the lowest control was still 93%. There was no difference in control of redroot pigweed or velvetleaf with any of treatments indicating excellent control with any of the glufosinate herbicides programs.

There was slight chlorosis of sweet corn visible on some treatments at the June ratings, but there was no significant differences between treatments in chlorosis or growth reduction of glufosinate tolerant sweet corn. All herbicide treatments provided excellent cut corn and corn on the cob yields differing only from yield of the weedy check. The weedy check resulted in no corn on the cob ears available per acre and only 0.1 ton per acre of cut corn yield. Glufosinate tolerant sweet corn management programs are a viable alternative to existing herbicide management systems for sweet corn production.

Table 1. Conventional sweet corn herbicide weed management trial at Waseca MN - 1998. Weed conctrol results (Becker et al.).

		Weed Control											
		Gift		Cocb		Colq		Corw		Rrpw		Vele	
Treatment[1]	Rate[1]	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9
	(lb ai/A)	(%)											
Postemergence													
Nicosulfuron + COC[2] + 28%N[3]	0.031 + 1.25% + 2.5%	94	94	50	63	67	55	38	27	98	95	61	56
Nicosulfuron + atrazine + COC + 28%N	0.031 + 1.0 + 1.25% + 2.5%	96	91	85	83	99	98	85	63	99	98	91	90
Carfentrazone-ethyl + nicosulfuron + NIS[4]	0.008 + 0.031 + 0.25%	86	86	83	62	79	68	48	26	99	95	95	93
Carfentrazone-ethyl + atrazine + nicosulfuron + NIS	0.008 + 0.5 + 0.031 + 0.25%	91	88	77	82	84	68	70	44	99	96	86	93
(Preemergence) and Postemergence													
(Metolachlor)[5] + halosulfuron	(1.9) + 0.016	83	68	90	70	60	50	90	75	99	70	89	80
(Metolachlor) + halosulfuron	(1.9) + 0.032	89	93	99	95	99	95	90	83	99	95	90	89
(Metolachlor) + pyridate + atrazine + COC + 28%N	(1.9) + 0.47 + 0.5 + 1.25% + 2.5%	95	88	94	78	99	96	91	64	99	96	96	82
(Metolachlor) + pyridate + atrazine + CGA 248757 + COC + 28%N	(1.9) + 0.47 + 0.5 + 0.004 + 1.25% + 2.5%	93	81	94	90	99	96	95	83	99	96	99	96
(Metolachlor) + CGA 248757 + atrazine + COC + 28%N	(1.9) + 0.004 + 0.5 + 1.25% + 2.5%	89	68	91	78	99	95	89	58	99	95	99	90
(Metolachlor) + carfentrazone-ethyl + NIS	(1.9) + 0.008 + 0.25%	83	73	82	80	94	95	53	18	99	95	99	87
(Metolachlor) + carfentrazone-ethyl + atrazine + NIS	(1.9) + 0.008 + 0.5 + 0.25%	86	71	88	83	99	96	84	65	99	96	96	93
(Metolachlor) + carfentrazone-ethyl + atrazine + dicamba + NIS	(1.9) + 0.008 + 0.5 + 0.094 + 0.25%	86	69	96	94	99	98	96	94	99	98	99	96
(Metolachlor) + atrazine & bentazon + COC + 28%N	(1.9) + 0.625 & 0.625 + 1.25% + 2.5%	89	78	96	93	99	98	98	93	99	98	99	98
Premergence													
Metolachlor + isoxaflutole	0.95 + 0.07	87	88	32	33	98	75	94	93	98	97	99	96
Metolachlor + isoxaflutole	0.95 + 0.094	86	85	42	28	99	93	99	82	94	95	98	85
Isoxaflutole	0.094	97	98	61	55	99	98	99	98	99	98	99	98
Metolachlor + atrazine + cyanazine	1.9 + 0.9 + 2.0	87	84	78	66	99	96	88	45	95	97	75	67
Hand weeded check		99	99	99	99	99	99	99	93	99	99	99	95
Weedy check		--	--	--	--	--	--	--	--	--	--	--	–
LSD (0.05)		8	16	26	27	10	26	20	29	ns	3	12	ns

[1] Treatments and rates in parenthesis represent a separate application.
[2] COC = Class Crop Oil Concentrate.
[3] 28%N = 28% UAN fertilizer solution.
[4] NIS = Class Preference nonionic surfactant.
[5] Metolachlor Magnum II isomer.
[6] Premix= Laddok S-12.

Table 2. Glufosinate tolerant sweet corn herbicide weed management trial at Waseca MN - 1998. Weed control results (Becker et al.).

		Weed Control											
		Gift		Cocb		Colq		Corw		Rrpw		Vele	
Treatment[1]	Rate[1]	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9	6/15	7/9
	(lb ai/A)	(%)											
Postemergence													
Glufosinate + AMS[2]	0.27 + 3.0	96	85	90	82	66	54	98	93	99	90	96	90
Glufosinate + AMS	0.36 + 3.0	99	85	96	86	78	58	99	95	93	98	99	95
Glufosinate + atrazine + AMS	0.27 + 0.5 + 3.0	95	78	94	89	99	95	99	96	99	98	99	95
Glufosinate + atrazine + AMS	0.27 + 0.75 + 3.0	97	84	98	96	99	99	99	99	99	99	99	99
Glufosinate + atrazine + AMS	0.27 + 1.0 + 3.0	96	81	97	90	99	98	99	99	99	95	99	98
(Postemergence) + Late Postemergence													
(Glufosinate + AMS) + Glufosinate + AMS	(0.27 + 3.0) + 0.27 + 3.0	98	93	89	99	81	95	99	99	89	99	95	99
Preemergence + (Postemergence)													
Isoxaflutole + (Glufosinate + AMS)	(0.047) + (0.27 + 3.0)	99	97	98	98	99	99	99	99	99	99	99	96
Metolachlor[3] + (Glufosinate + AMS)	(0.95) + (0.27 + 3.0)	99	95	94	88	89	73	99	98	99	95	98	95
Weedy check		--	--	--	--	--	--	--	--	--	--	--	–
LSD (0.05)		ns	11	ns	10	17	12	ns	3	ns	ns	ns	ns

[1] Treatments and rates in parenthesis represent a separate application.
[2] AMS = Spray grade ammonium sulfate. Rate is in pounds per acre.
[3] Metolachlor Magnum II isomer.

Table 3. Sweet corn herbicide weed management trial at Waseca MN - 1998. Jubilee sweet corn injury and yield. (Becker et al.).

		Jubilee									
		Chlorosis	G.R.[1]		Total	Husked	Kernel	Total	Usable	Ear	Ear
Treatment[2]	Rate[2]	6/15	6/15	7/9	Yield	Yield	Yield	Ears	Ears	Length	Dia[3]
	(lb ai/A)	(%)			(ton/A)			(#/A)		(inch)	(cm)
Postemergence											
Nicosulfuron + COC[4] + 28%N[5]	0.031 + 1.25% + 2.5%	7	0	5	4.3	3.1	1.7	17133	1452	6.2	4.5
Nicosulfuron + atrazine + COC + 28%N	0.031 + 1.0 + 1.25% + 2.5%	10	2	0	7.9	5.7	3.6	24684	10454	7.3	4.8
Carfentrazone-ethyl + nicosulfuron + NIS[6]	0.008 + 0.031 + 0.25%	2	0	0	6.1	4.5	2.8	22941	3485	6.5	4.7
Carfentrazone-ethyl + atrazine + nicosulfuron + NIS	0.008 + 0.5 + 0.031 + 0.25%	0	0	0	6.5	4.4	2.8	23522	4066	6.8	4.6
(Preemergence) and Postemergence											
(Metolachlor)[7] + halosulfuron	(1.9) + 0.016	0	0	0	6.8	4.9	3.1	24394	7841	6.6	4.6
(Metolachlor) + halosulfuron	(1.9) + 0.032	0	0	0	10.8	7.9	5.4	33106	19166	5.8	4.8
(Metolachlor) + pyridate + atrazine + COC + 28%N	(1.9) + 0.47 + 0.5 + 1.25% + 2.5%	14	2	0	7.3	5.3	3.3	23522	7551	7.5	4.8
(Metolachlor) + pyridate + atrazine + CGA 248757 + COC + 28%N	(1.9) + 0.47 + 0.5 + 0.004 + 1.25% + 2.5%	8	3	0	7.2	5.1	3.3	21780	11907	7.5	4.8
(Metolachlor) + CGA 248757 + atrazine + COC + 28%N	(1.9) + 0.004 + 0.5 + 1.25% + 2.5%	2	0	0	7.6	5.7	3.8	24393	9003	7.3	4.9
(Metolachlor) + carfentrazone-ethyl + NIS	(1.9) + 0.008 + 0.25%	2	0	0	4.5	3.1	1.9	17715	1162	6.4	4.6
(Metolachlor) + carfentrazone-ethyl + atrazine + NIS	(1.9) + 0.008 + 0.5 + 0.25%	7	0	0	6.7	4.8	3.0	23232	5808	7.2	4.7
(Metolachlor) + carfentrazone-ethyl + atrazine + dicamba + NIS	(1.9) + 0.008 + 0.5 + 0.094 + 0.25%	7	0	0	6.3	4.5	2.8	22651	4937	7.2	4.8
(Metolachlor) + atrazine & bentazon[8] + COC + 28%N	(1.9) + 0.625 & 0.625 + 1.25% + 2.5%	20	3	0	7.4	5.2	3.1	23232	8712	7.4	4.9
Premergence											
Metolachlor + isoxaflutole	0.95 + 0.07	13	0	0	5.7	3.9	2.4	21199	4646	6.6	4.5
Metolachlor + isoxaflutole	0.95 + 0.094	3	0	0	6.2	4.4	2.9	20328	6389	7.0	4.7
Isoxaflutole	0.094	17	0	0	7.9	5.7	3.9	22651	11326	7.4	4.9
Metolachlor + atrazine + cyanazine	1.9 + 0.9 + 2.0	10	0	0	5.9	4.2	2.7	19457	5517	7.1	4.7
Handweeded check		3	0	0	8.1	5.9	3.9	23813	12487	7.4	4.9
Weedy check		0	0	0	0.4	0.3	0.1	3775	0	4.0	3.8
LSD (0.05)		ns	ns	ns	2.1	1.5	1.2	5864	4694	0.8	0.3

[1] G.R. = Growth reduction.
[2] Treatments and rates in parenthesis represent a separate application.
[3] Dia. = Diameter
[4] COC = Class Crop Oil Concentrate.
[5] 28%N = 28% UAN fertilizer solution.
[6] NIS = Class Preference nonionic surfactant.
[7] Metolachlor Magnum II isomer.
[8] Premix= Laddok S-12.

Table 4. Sweet corn herbicide weed management trial at Waseca MN - 1998. Empire sweet corn injury and yield. (Becker et al.).

		Empire									
		Chlorosis	G.R.[1]		Total	Husked	Kernel	Total	Usable	Ear	Ear
Treatment[2]	Rate[2]	6/15	6/15	7/9	Yield	Yield	Yield	Ears	Ears	Length	Dia[3]
	(lb ai/A)	-------- (%) -------			--------- (ton/A) ---------			----- (#/A) -----		(inch)	(cm)
Postemergence											
Nicosulfuron + COC[4] + 28%N[5]	0.031 + 1.25% + 2.5%	2	0	7	4.7	3.4	2.2	21199	7841	5.9	4.1
Nicosulfuron + atrazine + COC + 28%N	0.031 + 1.0 + 1.25% + 2.5%	7	2	0	8.2	6.1	3.9	28169	14230	6.9	4.5
Carfentrazone-ethyl + nicosulfuron + NIS[6]	0.008 + 0.031 + 0.25%	0	0	0	5.8	4.1	2.3	22651	9874	6.7	4.3
Carfentrazone-ethyl + atrazine + nicosulfuron + NIS	0.008 + 0.5 + 0.031 + 0.25%	3	0	0	6.6	4.8	2.7	26426	11906	6.5	4.3
(Preemergence) and Postemergence											
(Metolachlor)[7] + halosulfuron	(1.9) + 0.016	5	0	0	6.1	4.8	3.1	25265	18295	6.4	4.3
(Metolachlor) + halosulfuron	(1.9) + 0.032	0	0	0	8.2	6.0	4.0	22651	21780	7.3	4.5
(Metolachlor) + pyridate + atrazine + COC + 28%N	(1.9) + 0.47 + 0.5 + 1.25% + 2.5%	10	3	0	7.8	5.9	3.5	29040	18005	6.8	4.4
(Metolachlor) + pyridate + atrazine + CGA 248757 + COC + 28%N	(1.9) + 0.47 + 0.5 + 0.004 + 1.25% + 2.5%	8	0	0	8.2	6.4	3.9	30782	18586	7.2	4.5
(Metolachlor) + CGA 248757 + atrazine + COC + 28%N	(1.9) + 0.004 + 0.5 + 1.25% + 2.5%	2	0	0	7.0	5.5	3.3	26427	15101	6.7	4.4
(Metolachlor) + carfentrazone-ethyl + NIS	(1.9) + 0.008 + 0.25%	3	0	0	4.9	3.0	1.7	19457	3775	5.7	4.2
(Metolachlor) + carfentrazone-ethyl + atrazine + NIS	(1.9) + 0.008 + 0.5 + 0.25%	12	0	0	6.7	5.0	3.1	26717	10454	6.8	4.3
(Metolachlor) + carfentrazone-ethyl + atrazine + dicamba + NIS	(1.9) + 0.008 + 0.5 + 0.094 + 0.25%	7	0	0	7.3	5.6	3.5	27878	15101	6.9	4.5
(Metolachlor) + atrazine & bentazon[8] + COC + 28%N	(1.9) + 0.625 & 0.625 + 1.25% + 2.5%	18	1	0	7.0	5.3	3.1	29621	13649	6.8	4.4
Premergence											
Metolachlor + isoxaflutole	0.95 + 0.07	3	2	0	5.6	4.2	2.5	21490	11906	6.7	4.3
Metolachlor + isoxaflutole	0.95 + 0.094	17	0	0	6.2	4.6	2.8	24103	13068	6.4	4.4
Isoxaflutole	0.094	16	0	0	7.8	5.9	3.8	27007	15391	7.1	4.4
Metolachlor + atrazine + cyanazine	1.9 + 0.9 + 2.0	8	0	0	6.8	5.0	3.1	24394	12778	6.6	4.4
Handweeded check		0	0	0	8.6	6.5	4.2	28750	17424	7.3	4.7
Weedy check		0	0	0	0.2	0.1	0.1	1162	0	3.4	2.6
LSD (0.05)		ns	ns	ns	2.0	1.5	1.2	5057	7923	1.5	ns

[1] G.R. = Growth reduction.
[2] Treatments and rates in parenthesis represent a separate application.
[3] Dia. = Diameter
[4] COC = Class Crop Oil Concentrate.
[5] 28%N = 28% UAN fertilizer solution.
[6] NIS = Class Preference nonionic surfactant.
[7] Metolachlor Magnum II isomer.
[8] Premix= Laddok S-12.

Table 5. Glufosinate tolerant sweet corn herbicide weed management trial at Waseca MN - 1998. GH-0937 sweet corn injury and yield. (Becker et al.).

		GH-0937									
		Chlorosis	G.R.[1]		Total	Husked	Kernel	Total	Usable	Ear	Ear
Treatment[2]	Rate[2]	6/15	6/15	7/9	Yield	Yield	Yield	Ears	Ears	Length	Dia[3]
	(lb ai/A)	-------- (%) -------			--------- (ton/A) ---------			----- (#/A) -----		(inch)	(cm)
Postemergence											
Glufosinate + AMS[4]	0.27 + 3.0	0	0	0	7.5	5.7	3.3	28750	22070	6.7	4.0
Glufosinate + AMS	0.36 + 3.0	8	0	0	8.1	6.1	3.5	29040	25265	6.9	4.2
Glufosinate + atrazine + AMS	0.27 + 0.5 + 3.0	5	0	0	8.1	6.3	3.7	28459	25846	6.9	4.3
Glufosinate + atrazine + AMS	0.27 + 0.75 + 3.0	0	0	0	8.2	6.2	3.6	29040	25555	7.0	4.1
Glufosinate + atrazine + AMS	0.27 + 1.0 + 3.0	6	0	0	8.0	6.1	3.6	27878	25846	6.9	4.3
(Postemergence) + Late Postemergence											
(Glufosinate + AMS) + Glufosinate + AMS	(0.27 + 3.0) + 0.27 + 3.0	0	0	0	7.9	5.9	3.4	29040	25846	6.9	4.2
Preemergence + (Postemergence)											
Isoxaflutole + (Glufosinate + AMS)	(0.047) + (0.27 + 3.0)	0	0	0	8.0	6.2	3.6	27878	25846	7.0	4.3
Metolachlor[5] + (Glufosinate + AMS)	(0.95) + (0.27 + 3.0)	0	0	0	8.3	6.1	3.5	29621	25265	6.9	4.2
Weedy check		0	0	0	0.3	0.2	0.1	3485	0	1.2	1.2
LSD (0.05)		ns	ns	ns	1.0	0.7	0.6	3662	4231	1.2	1.2

[1] G.R. = Growth reduction.
[2] Treatments and rates in parenthesis represent a separate application.
[3] Dia. = Diameter
[4] AMS = Spray grade ammonium sulfate. Rate is in pounds per acre.
[5] Metolachlor Magnum II isomer.