

SWEET CORN HYBRID DISEASE NURSERY – 2002

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Stewart's bacterial wilt, northern leaf blight (NLB), and gray leaf spot (GLS) can reduce yields of susceptible and moderately susceptible sweet corn hybrids. These diseases can be managed more efficiently if reactions of hybrids are known.

Resistance and susceptibility are the two extremes of a continuum of host reactions to diseases. Resistance is a measure of the ability of the host to reduce the growth, reproduction, and/or disease-producing abilities of the pathogen, thus resulting in less severe symptoms of disease. Major genes for resistance, such as *Rp*, *Ht*, or *rhm*, can prevent or substantially limit disease development if specific virulence is not present in pathogen populations. Hybrids with major gene resistance usually have clearly distinguishable phenotypes. Major gene resistance may be ineffective when specific virulence occurs.

In the absence of effective major gene resistance, disease reactions often range from partially resistant to susceptible. Hybrids can be grouped into broad classes such as: resistant (R), moderately resistant (MR), moderate (M), moderately susceptible (MS), and susceptible (S) based on severity of disease symptoms. This procedure produces statistically “overlapping” groups without clear-cut differences between classes (e.g., the hybrid with least severe symptoms in the MR class does not differ significantly from the hybrid with the most severe symptoms in the R class). Nevertheless, a consistent response over several trials produces a reasonable estimate of the disease reaction of a hybrid relative to the response of other hybrids. These reactions can be used to assess the potential for diseases to become severe and affect yield (1).

Sweet corn hybrids also can be damaged by certain herbicides applied post-emergence. Reactions of hybrids to herbicides can be classified in manner similar to reactions to diseases. This information can be used to identify sweet corn hybrids that are at greatest risk of being damaged, and the use of specific herbicides can be avoided on susceptible hybrids.

This report summarizes the reactions of 274 sweet corn hybrids to Stewart's wilt, NLB and GLS based on their performance in the 2002 University of Illinois sweet corn disease nursery, and the reactions of these hybrids to post-emergence applications of Aim 1.9EW, Callisto 45C, and Permit herbicides.

Materials and Methods

Hybrids: Two hundred and seventy-four hybrids were evaluated in 2002. This included 127 *sh2* hybrids [66 yellow, 26 white, 34 bi-colored, 1 multi-colored], 82 *se* hybrids [25 yellow, 16 white, 41 bi-colored], 60 *su* [57 yellow, 2 white, 1 bi-colored] and 5 *bt1* hybrids [4 yellow, 1 bi-colored]. Hybrids with multiple endosperm mutations or heterozygous reactions were placed in the most appropriate of these three categories. Standard hybrids with relatively consistent reactions to Stewart's wilt and NLB (Table 2) were included to compare the results from the 2002 nursery to those from previous nurseries.

Experimental design and procedures: Each disease and herbicide was a separate trial with three replicates of hybrids arranged in randomized complete blocks. Each trial was split into two main blocks of *sh2* and *bt1* or *su* and *se* hybrids. Each experimental unit was one 12-ft. row with about 10 to 20 plants per row. Five trials (Stewart's wilt, NLB race 0 and three herbicide trials) were planted May 31 at Champaign, IL. The GLS trial was planted July 8 near Havana, IL. Disease development was inadequate in six other trials (Rp1-D-virulent and avirulent rust, SLB, southern rust, MDMV, and NLB race 1) primarily due to lack of rain from June 12 to July 19.

Inoculation and disease assessment: Trials planted May 31 were inoculated with *Erwinia stewartii* (Stewart's wilt) and *Exserohilum turcicum* race 0 (NLB). Plants were inoculated with *E. stewartii* on June 24 and 26 by wounding leaves in the whorl and introducing bacteria into wounds. Conidia of *E. turcicum* race 0 were sprayed

into plant whorls June 21, 25, and July 2. Plants were infected naturally by *Cercospora zeae-maydis* in the GLS trial planted July 8. In six other trials planted between May 23 and July 2, plants were inoculated three to five times with Rp1-D-virulent or Rp1-D-avirulent isolates of *Puccinia sorghi* (common rust), *Bipolaris maydis* (SLB), *E. turcicum* race 1 (NLB), and *Puccinia polysora* (southern rust). Plants were infected from initial inoculation, but the diseases did not develop adequately to differentiate reactions of hybrids primarily because of dry weather and/or poor plant growth.

Disease symptoms were rated on a plot basis. Stewart's wilt was rated on July 24-25 using a scale from 1 (*E. stewartii* within 2 cm of inoculation wounds) to 9 (severe systemic infection or dead plants). The percentage of the leaf area infected by NLB race 0 was rated from 0 to 100% on August 5-6. Hybrids also were scored qualitatively (yes or no) for expression of the *Ht1* gene in response to NLB race 0. Leaf area infected by GLS was rated on September 11.

Herbicide application and assessment: Post-emergence herbicides were applied 20 June when corn ranged from the 4- to 6-leaf stages and from about 4 to 10 inches in height (mean height approximately 7.5 in.). Herbicides were applied to half of each 12-ft row, thus leaving 6 ft of each row as a non-treated check. Aim 1.9 EW was applied at 0.008 lb ai/A with a 0.25% v/v nonionic surfactant (NIS). Callisto 45C was applied at 0.094 lb ai/A with 1% v/v crop oil concentrate (COC) and 2.5% v/v urea ammonium nitrate (UAN). Permit was applied at 0.032 lb ai/A with 0.25% v/v NIS and 2.5% v/v UAN. Environmental conditions at application were: clear sky, warm air temperature, humid, sunny, low wind, soil surface dry. The entire field had been treated pre-emergence with metachlor + atrazine.

Injury to corn leaves was rated visually 7 and 21 days after application (June 27 and July 11). Symptomatic leaf area (0 to 100%) was estimated for each treated plot (6-ft row). Height of 5 to 10 plants in each 6-ft half row (treated and non-treated) also was measured 7 and 21 days after application. Sample means were used to calculate plant height for treated plants as a percentage of non-treated plants.

Data analysis: Disease and herbicide ratings were analyzed by ANOVA. Hybrid reactions were classified according to standard deviations from the mean (z-scores), Bayesian least significant difference (BLSLSD) separations (k=100), and the FASTCLUS procedure of SAS using various groupings of 6 to 12 clusters.

Table 1. Summary statistics for Stewart's wilt, NLB, and GLS ratings and for reactions to Callisto, Aim and Permit

Disease or herbicide	n	mean	std. dev.	Range	BLSLSD
Stewart's wilt (1 to 9 ratings)	274	3.2	0.81	1.6 - 6.7	0.72
NLB race 0 (% leaf area infected)	274	16 %	7.8 %	2 - 50 %	5.1 %
GLS (% leaf area infected)	272	46 %	9.8 %	21 - 75 %	10.0 %
Callisto 45C					
Rating (% leaf area affected) 7-day	274	7 %	8.9 %	0 - 55 %	7.9 %
Rating (% leaf area affected) 21-day	274	3 %	5.2 %	0 - 32 %	5.9 %
Plant height (% of non-treated) 7-day	274	98 %	5.2 %	67- 109 %	13.3 %
Plant height (% of non-treated) 21-day	274	98 %	4.0 %	77- 105 %	7.8 %
Aim 1.9 EW					
Rating (% leaf area affected) 7-day	274	0.3 %	1.3 %	0 - 13 %	5.6 %
Rating (% leaf area affected) 21-day	274	0.2 %	0.7 %	0 - 7 %	3.2 %
Plant height (% of non-treated) 7-day	274	99 %	2.1 %	88- 102 %	ns
Plant height (% of non-treated) 21-day	274	100 %	1.5 %	90- 100 %	ns
Permit					
Rating (% leaf area affected) 7-day	274	0.5 %	1.5 %	0 - 10 %	6.9 %
Rating (% leaf area affected) 21-day	274	0.2 %	0.7 %	0 - 7 %	3.6 %
Plant height (% of non-treated) 7-day	274	99 %	2.1 %	81- 101 %	18.5%
Plant height (% of non-treated) 21-day	274	98 %	4.0 %	82- 100 %	ns

Table 2. Reactions of sweet corn hybrids included as standards in the 2002 disease nursery

Hybrid	Stewart's wilt			NLB			GLS		
	Prior	02	Rating	Prior	02	Rating	Prior	02	Rating
Bonus	1	1	1.6	5	5	17 %	5	5	43 %
Day Star	3	3	2.8	1	1	3 %	4	3	26 %
DMC 20-38	9	9	6.5	9	9	35 %	7	5	45 %
Eliminator	2	3	2.3	6	7	28 %	6	5	46 %
Green Giant 27	2	1	2.0	3	2	9 %	4	5	44 %
Indian Summer	9	9	6.6	8	9	37 %	8	6	47%
Miracle	1	2	2.2	3	3	14 %	6	5	46 %
Phenomenal	5	5	3.1	5	3	16 %	5	6	47%
Snow White	7	7	4.2	7	7	24 %	7	7	53 %
Sum. Sweet 7630	2	1	1.9	2	2	8 %	5	7	53 %
Ultimate	2	3	2.4	2	1	5 %	5	4	34 %

Prior – mean reaction from previous trials (1984-2001).

02 - reaction in 2002: 1 - resistant, 3 - moderately resistant, 5 - moderate, 7 - moderately susceptible, 9 - susceptible.

Rating - mean rating in 2002: 1 to 9 for Stewart's wilt; 0 to 100% for severity of NLB and GLS.

Results and Discussion

Severity of symptoms ranged from very little disease to a moderate amount of Stewart's wilt and NLB, whereas symptoms of GLS were moderate to severe (Table 1). Reactions of standard hybrids to Stewart's wilt, and NLB were generally within expected ranges; while reactions of standard hybrids to GLS were a bit more variable (Table 2). Reactions to Callisto were severe on a few hybrids (Table 4), but reactions to Aim and Permit were relatively mild (Table 1). Height of some hybrids was reduced as much as 30% following application of Callisto, but height was not affected or affected very little by Aim and Permit.

The criteria for classifying hybrid disease and herbicide reactions are listed in Table 3. Table 5 includes reactions and actual ratings of the 274 hybrids **based solely on the 2002** trial. This is the only data we have for some of these hybrids. For hybrids that have been evaluated in previous years, a more complete assessment of disease reactions is presented in another report, "Reactions of sweet corn hybrids to prevalent diseases".

Stewart's wilt. Stewart's wilt ratings ranged from 1.6 to 6.7. Thirty-three hybrids with ratings below 2.3 were not different from two hybrids (Bonus, CsuWP1-7) with the lowest rating (1.6). Hybrids with ratings ≤ 2 were classified as resistant and those rated from 2 to 2.2 were classified as R/MR (resistant to moderately resistant). Seventy-four hybrids with ratings from 2.3 to 3 were classified as moderately resistant. One-hundred-and-twenty-nine hybrids with ratings from 3 to 4 were classified as moderate. Stewart's wilt was rated 4 or above for 38 hybrids classified as moderately susceptible or susceptible.

Table 3. Criteria for classifying hybrid reactions to diseases in the 2001 nursery

	Classification of reaction									
	0	Resistant 1	Moderately resistant 2	3	Moderate 4	5	Moderately susceptible 6	7	8	Susceptible 9
Stewart's wilt		≤ 2.0	< 2.3	≤ 3.0		< 4.0		< 5.0		≥ 5.0
NLB (%)		< 7	< 12	< 16		≤ 22		< 30		≥ 30
GLS (%)				≤ 31	≤ 41	≤ 46.5	< 51	< 57	< 61	≥ 61
Callisto ^a	0 %	$< 8\%^1$	$< 8\%^2$	$< 15\%^2$	$< 20\%^2$	$< 25\%^2$	$< 33\%^2$	$< 33\%^{2S}$	$< 33\%^{2S}$	$> 40\%^{2S}$
Aim	0 %	$< 4\%$	$< 8\%$	$< 10\%$	$< 15\%$					
Permit	0 %	$< 2\%$	$< 4\%$	$< 8\%$	$< 15\%$					

Classification: 0 – no symptoms, 1 - resistant, 3 - moderately resistant, 5 - moderate, 7 - moderately susceptible, 9 – susceptible

^a Classification of reactions to Callisto based on combination of ratings and stunting (% plant height) 7 and 21 days after application.

Values presented in table are based primarily on ratings done 7 days after application.

¹ symptoms observed at one rating only.

² symptoms observed at both ratings.

^S treated plants stunted compared to non-treated.

Northern leaf blight. Severity of NLB ranged from 2 to 50%. All NLB lesions were due to race 0 of *E. turcicum*. Thus, infection of hybrids with the *Ht1* gene (i.e., chlorotic-lesion resistance to race 0) was less severe than if race 1 was frequent. Severity of NLB averaged 10% for 84 hybrids with the *Ht1* or *HtN* genes and 19% for 190 hybrids without Ht-resistance (Fig. 1). Eighteen hybrids with less than 7% leaf area infected were considered resistant. These included: Accord, Crisp n Sweet 710 RR, CshWF1-23, Day Star, GG Code 106, GSS 8357, GSS 8388, GSS 9641, Morning Star, Shogun, Shooting Star, Summer Sweet 7630, Summer Sweet 7710, Taweesak, Twin Star, Ultimate, Waimanalo Supersweet, and WSS 0987. Forty-seven hybrids with *Ht-1*-reactions and less than 12% leaf area infected were classified R/MR. Thirty hybrids that had less than 12% leaf area infected but did not display chlorotic *Ht1*-reactions also were classified R/MR. Sixty-five hybrids with more than 22% leaf area infected were classified moderately susceptible or susceptible. Only one of these hybrids, PX 9375049, had *Ht-1*-chlorotic reactions. Only two hybrids, Insignia and GH 2041, had more than 40% leaf area infected

Gray leaf spot. Naturally-occurring gray leaf spot was very severe in the trial planted July 8 near Havana, IL. Severity of GLS ranged from 21 to 75% with a mean of about 46%. Twelve hybrids with less than 31% leaf area infected were not significantly different from Morning Star, the hybrid with the least amount of symptomatic leaf tissue (21%). These hybrids were classified as moderately resistant and included: Bon Appetit, Day Star, GH 0991, HMX 1364 S, HMX 1397 S, Luscious, MM 10820, Mystique, Sarah 1, Sensor, SVR 08709059, and Shooting Star. One-hundred-and-thirty-one hybrids with GLS severity between 31% and 46% were classified as MR/M or moderate. Forty hybrids with GLS severity > 58% were classified as MS/S or susceptible.

Reactions to herbicides. Most hybrids were not affected by post-emergence applications of Callisto, Aim, or Permit although some hybrids appeared to be relatively sensitive to Callisto.

Callisto 45C. For about four or five days after application, leaf tissue that emerged from the whorl of hybrids affected by Callisto appeared to be albino. Leaf area symptomatic of this damage ranged from 0 to 55% 7 days after application and from 0 to 32% 21 days after application. Height of Callisto-treated plants 7 days after application ranged from 67% to 109% of the height of non-treated plants. Twenty-one days after application, height of treated plants ranged from 77% to 105% of non-treated plants.

Callisto had no effect on 67 hybrids that were given a reaction of 0. A reaction of 1 was given to 53 hybrids that had mild symptoms on one of the two ratings (0 to 7% 7 days after application or 0 to 3% 21 days after application). Height was not affected for these hybrids nor for 97 hybrids assigned reactions of 2 or 3 for which symptoms that ranged from 2 to 28% 7 days after application or 1 to 10% 21 days after application.

Symptom severity ranged from 10 to 33% 7 days after application and from 0 to 15% 21 days after application for 31 hybrids assigned ratings of 4 and 17 hybrids assigned ratings of 5 or 6 (Table 4). Height of these hybrids with moderate reactions to Callisto ranged from 77 to 97% of non-treated plants 7 days after application and from 83 to 100% of non-treated plants 21 days after application. Nine hybrids with severe symptoms were assigned reactions from 7 to 9 (Table 4). For these hybrids, symptomatic leaf area ranged from 20% to 55% 7 days after application and from 15% to 33% 21 days after application. Plant height ranged from 67% to 90% of non-treated plants 7 days after application and from 77% to 90% 21 days after application. The association between reduced plant height and leaf area symptomatic of Callisto injury was variable but highly evident (Figs. 2 and 3).

Permit. Only 44 hybrid displayed any symptoms following post-emergence application of Permit. Thirty-one of these 44 hybrids were assigned reactions of 1 and 2 based on symptoms that covered < 4% and < 2% of the leaf area 7 and 21 days after treatment, respectively. Twelve hybrids with 4 to 8% leaf area affected 7 days after treatment and 0 to 5% leaf area affected 21 days after treatment were assigned a reaction of 3. One hybrid, Sak 00TC136, was assigned a reaction of 4 based on 10% leaf area affected 7 days after treatment and 7% leaf area affected 21 days after treatment.

Table 4. Hybrids affected moderately to severely by post-emergence applications of Callisto 45C in the University of Illinois sweet corn disease nursery

Hybrids assigned ratings of 7 to 9 (MS to S)									
sh2	W	Cr	CshWF1-21	7	sh2	Y	Cr	Shogun	9
sh2	Y	Cr	Gallant	9	sh2	W	Sem	SVR 98705770	9
sh2	W	Cr	How Sweet It Is	7	sh2	W	Sem	SVR 08705778	9
sh2	Y	SnR	HY 1734 NG	9	sh2	W	Sem	SVR 08715828	8
sh2	B	HM	Polaris	7					
Hybrids assigned reactions of 5 or 6 (M or M/MS)									
se	W	Cr	Argent	6	sh2	W	Sem	SVR 08705771	6
se	B	Cr	Mystique	5	sh2	Y	Sem	SVR 08709059	5
se	B	Sem	SVR 8472878	5	sh2	B	IFS	Xtra Tender 277A	5
sh2	B	SnR	HB 1800 NG	6	sh2	Y	IFS	XTH 1173	5
sh2	W	SnR	HW 1292 NF	6	su	Y	GG	GG Code 124	5
sh2	W	Sak	Millennium	5	su	W	GG	GG Code 61	5
sh2	Y	Cnt	Mirai 001	6	su	Y	Rog	GH 2041	5
sh2	Y	Cnt	Mirai 002	5	su	Y	SnR	UY 2503 NG	5
sh2	Y	Cnt	Mirai 003	5					

Aim 1.9EW. Only 16 hybrids displayed any symptoms following post-emergence applications of Aim. Symptoms were extremely mild (< 8% leaf area 7 days after treatment and < 4% 21 days after treatment) for 12 of these hybrids assigned reactions of 1 or 2. The hybrid CseBF1-11 was assigned a reaction of 3 based on 8% and 5% leaf area affected 7 and 21 days after treatment, respectively. The hybrid Shogun was assigned a reaction of 4 based on 13% and 7% leaf area affected 7 and 21 days after treatment, respectively.

References

1. Pataky, J. K., and D. M. Eastburn. 1993. Using hybrid disease nurseries and yield loss studies to evaluate levels of resistance in sweet corn. *Plant Disease* 77:760-765.

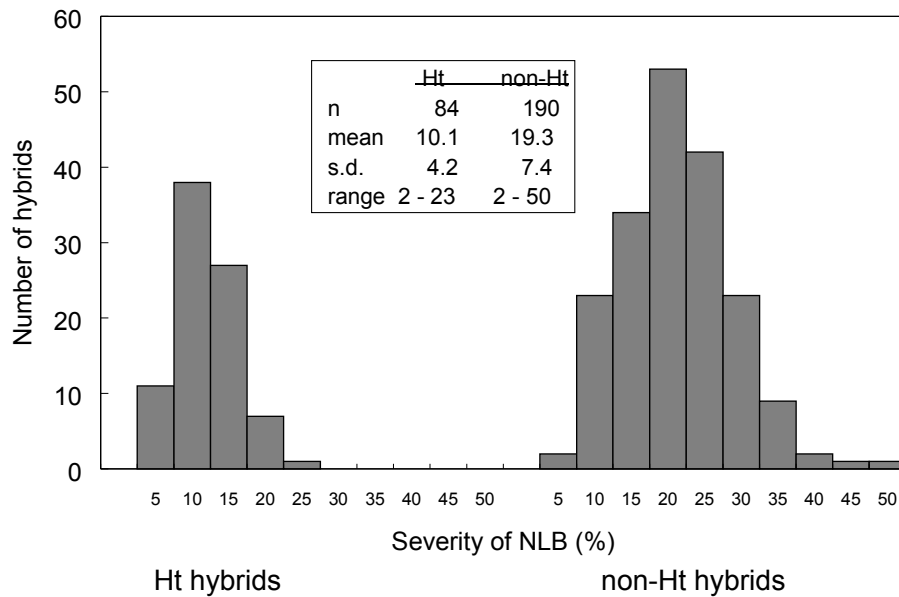


Fig. 1. Distributions of severity of northern leaf blight on Ht-resistant sweet corn hybrids and hybrids without Ht-resistance following inoculation with race 0 of *Exserohilum turcicum* in the University of Illinois disease nursery in 2002.

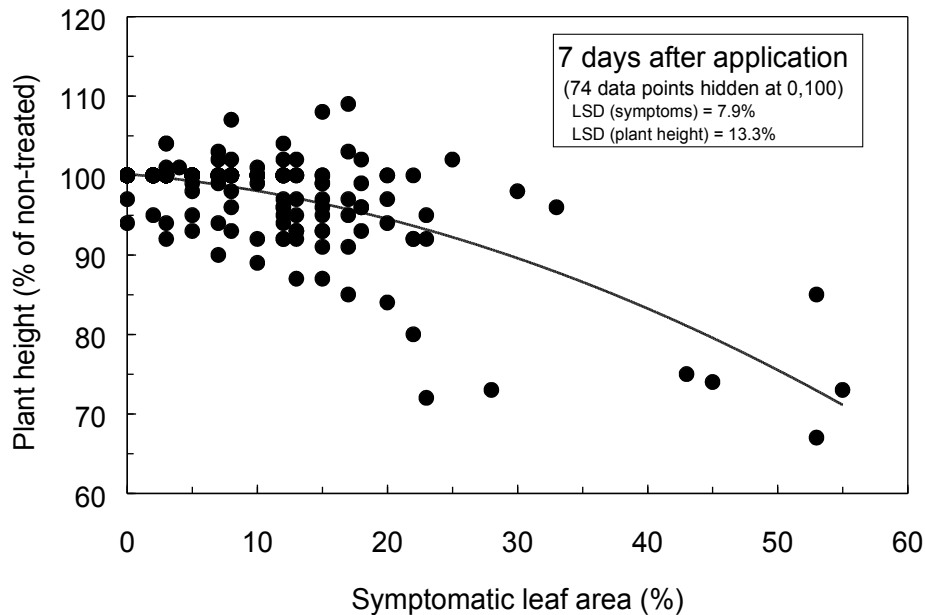


Fig. 2. Association between plant height (as a % of non-treated control) and % leaf area symptomatic of herbicide damage for 274 sweet corn hybrids rated 7 days after post-emergence application of Callisto 45C in the University of Illinois disease nursery in 2002. Relationship described by regression equation: $Y = 100.2 - 0.14X - 0.007 X^2$, $r^2 = 0.52$. Seventy four hybrids were not affected (data points at 0, 100).

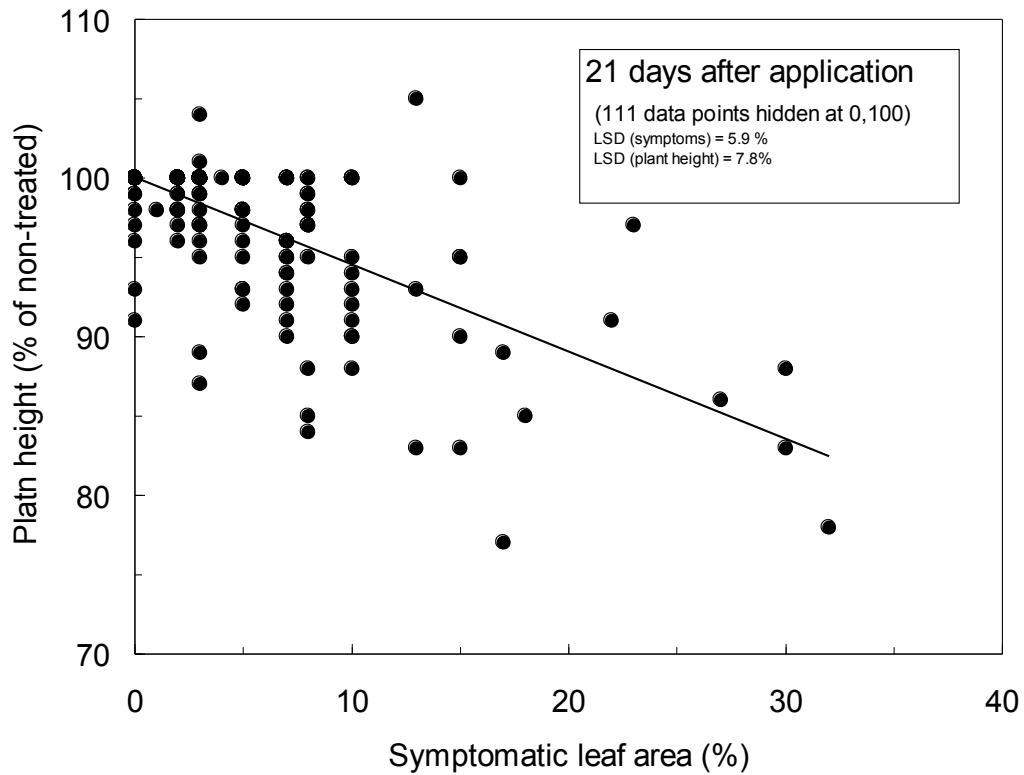


Fig. 3. Association between plant height (as a % of non-treated control) and % leaf area symptomatic of herbicide damage for 274 sweet corn hybrids rated 21 days after post-emergence application of Callisto 45C in the University of Illinois disease nursery in 2002. Relationship described by regression equation: $Y = 100 - 0.55X$, $r^2 = 0.50$. One hundred and eleven hybrids were not affected (data points at 0, 100).

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

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				Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
Type	KC	Seed Source	Hybrid	Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
<i>Sugary hybrids</i>													
su	Y	Rog	Bonus	1	1.6	5	17	Ht	5	43	0	0	0
su	Y	Cr	Conquest	5	3.8	7	23		5	43	2	0	0
su	Y	Cr	CsuYP1-1	3	2.4	7	23		4	41	4	3	0
su	Y	Cr	CsuYP1-2	3	2.5	7	25		4	41	3	0	0
su	Y	Cr	CsuYP1-4	3	2.6	7	27		5	43	4	3	1
su	Y	Cr	CsuYP1-6	3	2.7	7	23		4	39	0	0	0
su	Y	DM	DMC 20-38	9	6.5	9	35		5	45	4	2	0
su	Y	Cr	Eliminator	3	2.3	7	28		5	46	4	0	0
su	Y	Sem	Esquire	3	3	7	26		6	49	4	2	1
su	Y	HM	FMX 516	3	2.8	9	33		4	38	0	0	0
su	Y	GG	GG Code 27	1	2	2	9		5	44	0	0	0
su	Y	GG	GG Code 62	1	2	2	11	Ht	6	48	0	0	0
su	Y	GG	GG Code 64	2	2.2	7	22		5	46	0	0	0
su	Y	GG	GG Code 67	3	2.4	5	22		7	56	1	0	0
su	Y	GG	GG Code 71	7	4.9	7	29		9	75	2	0	0
su	Y	GG	GG Code 74	1	1.9	2	12		5	43	0	0	0
su	Y	GG	GG Code 75	1	1.9	2	10		.	.	0	0	0
su	Y	GG	GG Code 77	3	2.9	7	26		8	58	2	0	0
su	Y	GG	GG Code 81	5	3.9	5	21		6	48	3	2	0
su	Y	GG	GG Code 83	5	3.4	5	18		9	62	3	0	0
su	Y	GG	GG Code 88	7	4.3	9	32		9	73	3	0	0
su	Y	GG	GG Code 92	3	2.3	5	19		5	45	1	0	0
su	Y	GG	GG Code 99	1	1.8	2	12	Ht	6	47	2	0	0
su	Y	GG	GG Code 106	2	2.2	1	7		4	40	0	0	0
su	Y	GG	GG Code 114	5	3.2	5	21		5	45	1	0	0
su	Y	GG	GG Code 122	5	3.8	5	21		9	64	2	0	0
su	Y	GG	GG Code 123	3	3	5	17		7	55	1	0	0
su	Y	GG	GG Code 124	5	3.9	5	19		7	57	5	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

				Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
Type	KC	Seed Source	Hybrid	Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
su	Y	GG	GG Code 125	5	3.3	7	22		8	58	1	0	0
su	Y	GG	GG Code 126	1	1.7	5	19		5	42	2	0	0
su	Y	GG	GG Code 127	1	2	5	21		5	42	1	0	0
su	Y	GG	GG Code 128	2	2.2	5	20		4	38	1	0	0
su	Y	GG	GG Code 130	2	2.1	2	9		8	58	2	0	0
su	Y	GG	GG Code 131	2	2.1	2	10		5	42	0	0	0
su	Y	Rog	GH 0991	3	2.9	7	27		3	29	2	0	0
su	Y	Rog	GH 2041	7	4.2	9	50		6	48	5	1	2
su	Y	Rog	GH 2298	7	4.8	9	32		5	43	4	2	0
su	Y	Rog	GH 2385	3	2.4	5	16	Ht	4	38	4	0	0
su	Y	Rog	GH 5703	5	3.7	3	14	Ht	4	38	0	0	0
su	Y	Rog	GH 7749	5	3.1	7	23		5	42	0	0	0
su	Y	Rog	GH 9589	3	2.9	7	26		4	38	2	0	0
su	Y	Rog	GH 9590	5	3.3	9	32		7	54	2	0	0
su	Y	Rog	GH 9595	1	2	3	14	Ht	9	71	0	0	0
su	Y	HM	HMX 0395	5	3.1	9	34		4	40	0	0	0
su	Y	HM	HMX 1383	1	2	2	9	Ht	6	48	0	0	0
su	Y	HM	HMX 7384	7	4	7	30		6	48	4	0	0
su	Y	HM	HMX 8389	3	2.3	3	13	Ht	4	37	2	0	1
su	Y	HM	Insignia	5	3.1	9	43		8	58	1	0	0
su	Y	SnR	Prelude	7	4	7	29		8	58	0	0	0
su	Y	Sem	RX 8490549	3	2.7	3	14	Ht	5	45	1	0	0
su	Y	Sem	SVR 08302415	3	2.6	2	12	Ht	6	49	2	0	0
su	Y	Sem	SVR 08302418	1	2	2	11	Ht	8	58	0	0	0
su	Y	Sem	SVR 08302422	1	2	2	8	Ht	7	56	1	0	0
su	Y	Sem	SVR 08302424	1	2	3	15	Ht	6	50	2	0	0
su	Y	Sem	SVR 08705760	5	3.7	7	30		5	46	4	0	0
su	Y	Sem	SVR 08716607	5	3.7	5	17		4	40	0	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

				Stewart's wilt	Northern leaf blight	Gray leaf spot	Rxn to post-emergence herbicides
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Type	KC	Seed Source	Hybrid	Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
su	Y	SnR	UY2503 NG	5	3.8	7	29		6	51	5	0	0
su	B	Cr	Honey n Cream	5	3.9	5	21		7	53	1	0	0
su	W	Cr	CsuWP1-7	1	1.6	3	13		5	41	3	0	0
su	W	GG	GG Code 61	5	3.4	5	20		5	44	5	0	0
<i>Sugary enhanced hybrids</i>													
se	Y	Cr	Blaze	5	3.1	5	16		6	50	1	0	0
se	Y	Cr	Bodacious	5	3.2	5	18		5	44	0	0	0
se	Y	Sem	Climax	3	2.3	5	22		5	45	3	3	0
se	Y	Cr	CseYP1-15	5	3.8	7	27		7	56	0	0	0
se	Y	Cr	CsyF1-15	5	3.8	5	20		6	48	1	0	0
se	Y	Sem	EX 08715864	7	4.3	5	17		8	58	0	0	0
se	Y	Sem	EX 8414247	3	2.4	2	11		9	68	2	0	0
se	Y	Sem	EX 8414907	5	3.9	7	23		9	63	2	0	0
se	Y	Sem	EX 8441107	5	3.9	5	19		5	45	2	0	0
se	Y	Sem	EX 8452067	3	2.7	9	31		7	55	4	0	0
se	Y	Sem	El Toro	3	2.6	7	22		5	45	3	1	0
se	Y	HM	Esteem	3	2.7	7	24		4	38	1	0	0
se	Y	Rog	GH 1829	5	3.2	5	18		4	35	2	0	0
se	Y	Rog	GH 6510	5	3.7	7	27		6	51	1	0	0
se	Y	Cr	Incredible	3	2.9	5	18		4	40	1	0	0
se	Y	Cr	Intrigue	5	3.4	7	23		7	53	0	3	0
se	Y	Mes	Merlin	3	2.4	3	14		5	46	1	0	0
se	Y	Cr	Miracle	2	2.2	3	14		5	46	1	0	0
se	Y	Sem	PX 9330109	5	3.4	3	14		5	43	1	2	0
se	Y	Mes	Promise	5	3.7	2	9		4	37	3	0	0
se	Y	Sem	SVR 8481708	2	2.2	7	23		6	48	3	1	0
se	Y	Sem	SVR 8482478	3	2.6	5	19		5	46	3	2	0
se	Y	Cr	Sugar Buns	5	3.6	3	15		8	59	2	1	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
se	Y	HM	Topacio	3	2.7	3	15	Ht	4	40	1	0	0

se	Y	Mes	Tuxedo	3	2.9	2	8	6	47	2	0	0
se	B	Sem	Absolute	3	2.7	5	17	7	57	2	0	0
se	B	Mes	Accord	3	2.3	1	5	4	33	2	0	0
se	B	Cr	Ambrosia	1	2	5	22	4	38	0	0	0
se	B	Cr	Bojangles	7	4.2	3	16	4	39	0	0	0
se	B	Mes	Bon Appetit	7	4	3	14	3	30	2	0	0
se	B	Cr	Bravado	3	2.9	3	15	8	59	1	0	0
se	B	Mes	Brocade	5	3.3	2	8	5	43	0	0	0
se	B	Mes	Buckeye	3	2.4	2	10	4	38	0	0	0
se	B	Rog	Colonial	5	3.5	2	9	9	65	2	0	0
se	B	Cr	CseBF1-11	5	3.7	5	19	7	56	2	0	3
se	B	Cr	CsyBF1-24	5	3.4	2	11	7	53	0	0	0
se	B	Sem	EX 08705482	5	3.8	7	24	5	41	0	3	0
se	B	Sem	EX 8414787	3	2.8	5	21	5	46	0	0	0
se	B	Sem	EX 8415097	5	3.4	3	14	4	40	1	0	0
se	B	Cr	Early Ambrosia	5	3.9	9	35	8	59	2	0	0
se	B	Mes	Encore	1	1.7	5	16	5	44	1	0	0
se	B	Cr	Fleet	7	4.6	9	36	9	71	0	1	0
se	B	Mes	Lancelot	3	2.7	3	15	5	42	2	0	0
se	B	Mes	Luscious	5	3.4	3	15	3	31	0	0	0
se	B	Mes	MM 10524	3	3	2	12	5	46	0	0	2
se	B	Mes	MM 10525	7	4.3	5	20	5	43	0	0	0
se	B	Mes	MM 10820	5	3.6	3	13	3	26	2	0	0
se	B	Cr	Mystique	2	2.1	2	10	3	28	5	2	0
se	B	Sem	PX9367069	5	3.8	7	26	9	66	2	1	0
se	B	Mes	Precious Gem	5	3.8	2	7	5	43	1	0	0
se	B	Rog	Providence	5	3.2	7	24	8	60	1	0	0
se	B	Mes	Rapport	5	3.3	2	9	4	34	2	0	1
se	B	Sem	SVR 08401837	5	3.7	5	17	4	32	0	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002													
Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	<i>Ht1 gene</i>	Rxn	Rate (%)	Callisto	Permit	Aim
se	B	Sem	SVR 08705488	5	3.4	5	17		7	53	0	0	0
se	B	Sem	SVR 08705519	7	4.4	7	23		4	32	1	3	0
se	B	Sem	SVR 08705526	7	4.9	7	27		4	40	2	1	0
se	B	Sem	SVR 08705682	5	3.7	5	17		7	53	3	0	0
se	B	Sem	SVR 8312047	3	2.3	5	17		5	43	4	0	0
se	B	Sem	SVR 8472878	7	4	7	29		4	40	5	0	0
se	B	Sem	SVR 8487249	5	3.6	7	23		6	47	4	0	0
se	B	Sem	Seneca Dancer	5	3.1	3	13		7	54	3	1	0
se	B	Sem	Seneca Nation	1	2	3	15		6	48	2	0	0
se	B	Sem	Seneca Spring	5	3.9	5	17		9	71	0	1	0
se	B	Sem	Seneca Tomahawk	5	3.4	2	11		9	66	0	0	0
se	B	Sem	Sensor	5	3.8	3	13		3	31	2	0	0
se	B	Cr	Trinity	7	4.3	9	30		9	63	1	0	0
se	W	Cr	Alexis	5	3.6	3	12		9	63	1	0	0
se	W	Cr	Argent	3	2.3	3	14		6	47	6	0	0
se	W	Cr	Cinderella	5	3.3	5	16		7	53	1	0	0
se	W	Mes	Cloud Nine	5	3.3	2	10		8	58	3	0	0
se	W	Cr	CseWF1-13	5	3.9	5	21		6	50	2	0	0
se	W	Cr	CseWF1-22	5	3.9	5	16		8	61	1	0	0
se	W	Sem	EX 8414877	5	3.9	9	32		5	45	3	0	0
se	W	Sem	EX 8415187	5	3.1	7	25		6	50	3	0	0
se	W	Cr	Frosty	5	3.9	5	17		9	74	2	0	0
se	W	Mes	Imaculata	3	2.8	2	12		5	43	0	0	0
se	W	Mes	MM 20392	5	3.8	5	16		4	37	2	1	0
se	W	Sem	SVR 08716630	5	3.6	3	14		6	47	0	0	0
se	W	Sem	SVR 8444677	5	3.9	5	18		4	37	2	0	0
se	W	Sem	SVR 8487439	5	3.9	7	23		4	39	4	0	1

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002													
				Stewart's wilt	Northern leaf blight			Gray leaf spot	Rxn to post-emergence herbicides				

Type	KC	Seed Source	Hybrid	Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
se	W	Rog	WH 7349	5	3.6	3	15		7	56	2	0	0
se	W	Mes	White Out	3	2.8	5	18		7	57	0	3	0
<i>shrunkn-2 hybrids</i>													
sh2	Y	AC	ACX 844	2	2.2	2	9	Ht	4	39	3	0	0
sh2	Y	AC	ACX 945	5	3.7	5	17	Ht	7	53	1	1	0
sh2	Y	Cr	Assure	7	4	3	12	Ht	5	44	0	0	0
sh2	Y	Cr	Crisp n Sweet 710	3	2.7	2	10	Ht	6	47	0	0	0
sh2	Y	Cr	Crisp n Sweet 710 A	3	2.9	2	7	Ht	6	49	0	1	0
sh2	Y	Cr	Crisp n Sweet 710 RR	3	2.8	1	6	Ht	6	50	1	2	0
sh2	Y	Cr	Crisp n Sweet 710A RR	3	2.8	2	8	Ht	7	53	0	0	0
sh2	Y	Cr	CshYP1-19	3	2.3	2	8	Ht	4	35	2	0	0
sh2	Y	HM	Day Star	3	2.8	1	3		3	26	1	0	0
sh2	Y	Sem	EX 08716636	5	3.4	2	8	Ht	4	39	4	0	0
sh2	Y	Sem	EX 8415037	3	2.8	2	9	Ht	4	38	4	0	2
sh2	Y	Sem	EX 8462518	5	3.1	2	11	Ht	4	40	3	0	0
sh2	Y	Sem	EX 8492829	5	3.8	7	25		5	43	3	0	0
sh2	Y	GG	GG Code 107	3	2.9	3	15		6	48	3	0	0
sh2	Y	GG	GG Code 109	5	3.3	7	24		9	70	1	0	0
sh2	Y	Rog	GSS 5771	3	3	2	8	Ht	4	39	3	3	0
sh2	Y	Rog	GSS 8357	5	3.1	1	4	Ht	4	32	0	0	0
sh2	Y	Rog	GSS 8388	1	1.9	1	5	Ht	4	35	4	0	0
sh2	Y	Rog	GSS 8713	3	2.6	2	9	Ht	5	42	1	0	0
sh2	Y	Rog	GSS 9522	5	3.8	2	11	Ht	6	48	0	0	0
sh2	Y	Rog	GSS 9525	7	4.2	2	10	Ht	5	42	1	0	0
sh2	Y	Rog	GSS 9631	5	3.6	2	9	Ht	4	35	0	0	0
sh2	Y	Rog	GSS 9641	1	1.9	1	6	Ht	4	40	3	0	0
sh2	Y	Cr	Gallant	2	2.2	3	13	Ht	5	46	9	3	1
sh2	Y	HM	HMX 0355 S	3	2.7	3	14		5	42	1	0	0
sh2	Y	HM	HMX 0393 S	5	3.9	3	14	Ht	6	48	0	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
sh2	Y	HM	HMX 0394 S	5	3.7	2	11	Ht	4	41	4	0	0

sh2	Y	HM	HMX 1363 S	5	3.4	7	23		4	34	1	0	0
sh2	Y	HM	HMX 1364 S	5	3.9	5	17		3	30	1	0	0
sh2	Y	HM	HMX 1397 S	7	4.7	5	19		3	24	2	1	0
sh2	Y	HM	HMX 8392 S	3	2.3	2	11		4	35	3	0	0
sh2	Y	SnR	HY 1116 NF	7	4.1	3	15		7	52	4	1	0
sh2	Y	SnR	HY 1558 NG	7	4.1	7	24		9	63	0	0	0
sh2	Y	SnR	HY 1734 NG	5	3.2	2	11		7	52	9	3	0
sh2	Y	Cr	Marvel	5	3.8	3	15		6	48	2	0	0
sh2	Y	Cnt	Mirai 001	5	3.8	5	21		6	47	6	0	0
sh2	Y	Cnt	Mirai 002	5	3.3	5	21		4	39	5	0	0
sh2	Y	Cnt	Mirai 003	5	3.6	7	22		4	32	5	1	0
sh2	Y	Cnt	Mirai 005	7	4	5	18	Ht	4	35	2	0	1
sh2	Y	Cr	Missouri	3	2.9	2	11	Ht	7	53	3	0	0
sh2	Y	HM	Morning Star	3	2.9	1	3		3	21	0	0	0
sh2	Y	Sem	PX 9381169	3	2.9	2	8	Ht	5	46	1	1	0
sh2	Y	Sem	PX 9381178	5	3.3	2	8	Ht	7	54	0	0	0
sh2	Y	Sem	Punchline	5	3.3	2	8	Ht	6	48	2	1	0
sh2	Y	Sem	SVR 08705755	5	3.6	7	26		4	41	3	0	0
sh2	Y	Sem	SVR 08709059	3	2.3	2	10	Ht	3	28	5	0	0
sh2	Y	Sem	SVR 08715812	5	3.3	7	26		5	42	4	0	0
sh2	Y	Sem	SVR 08716613	5	3.1	2	8	Ht	4	41	3	0	0
sh2	Y	Sem	SVR 8410047	3	2.6	5	17		4	41	1	0	0
sh2	Y	Sem	SVR 8460758	7	4	2	10		6	50	3	3	0
sh2	Y	Sem	SVR 8461358	9	5.5	5	17		4	39	1	1	0
sh2	Y	Sem	SVR 8481428	7	4.1	5	19		7	54	0	0	0
sh2	Y	Sem	SVR 8482428	5	3.2	2	8	Ht	7	51	0	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
sh2	Y	Cr	Samson	5	3.3	5	18		6	48	2	0	0
sh2	Y	Cr	Shogun	1	1.9	1	6	Ht	4	35	9	3	4
sh2	Y	Sem	Stetson	5	3.6	5	17		8	58	1	0	0
sh2	Y	AC	Summer Sweet 7630	1	1.9	2	8	Ht	7	53	2	0	0

sh2	Y	AC	Summer Sweet 7710	3	2.3	1	4	Ht	7	55	1	0	0
sh2	Y	HM	Ultimate	3	2.4	1	5	Ht	4	34	0	0	0
sh2	Y	Sem	XP 8414737	5	3.1	2	10		6	49	2	0	0
sh2	Y	IFS	XT 175RR	5	3.2	3	15	Ht	4	39	3	0	0
sh2	Y	IFS	XTH 1170	7	4.1	7	26		4	37	4	0	0
sh2	Y	IFS	XTH 1173	5	3.4	7	25		7	52	5	0	0
sh2	Y	IFS	XTH 1176	5	3.7	5	17	Ht	5	45	4	0	0
sh2	Y	IFS	XTH 1177	5	3.7	3	16		7	54	2	0	0
sh2	Y	Sak	Yumeno Corn	5	3.6	2	9	Ht	6	51	4	0	0
sh2	B	Rog	BSS 9686	3	2.9	2	7	Ht	5	46	3	0	1
sh2	B	Cr	CshBP1-20	5	3.4	2	9		7	57	3	0	0
sh2	B	SnR	HB 1435 NF	5	3.4	3	15	Ht	7	53	3	0	0
sh2	B	SnR	HB 1800 NG	5	3.3	3	12	Ht	7	53	6	0	0
sh2	B	SnR	HB 2488 OH	5	3.6	5	19		4	39	3	0	0
sh2	B	SnR	HB 2572 OH	5	4	7	26		5	46	2	0	0
sh2	B	Sem	Hollywood	5	3.4	5	16		5	42	4	0	0
sh2	B	Cnt	Mirai XP302	5	3.1	7	29		5	43	4	0	1
sh2	B	Sem	Obsession	3	2.4	2	9	Ht	8	59	0	1	0
sh2	B	Sem	PX 9362379	3	2.3	2	10	Ht	6	51	0	0	0
sh2	B	Sem	PX 9362439	9	5.1	2	11	Ht	4	40	1	0	0
sh2	B	Sem	PX 9375049	9	5	7	23	Ht	9	70	2	1	0
sh2	B	Cr	Phenomenal	5	3.1	3	16		6	47	4	0	0
sh2	B	HM	Polaris	3	3	5	21		4	38	7	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
sh2	B	Sem	Princeton	7	4.2	5	20		9	71	0	0	0
sh2	B	IFS	SCH 15001	3	2.4	3	14		4	34	3	0	0
sh2	B	IFS	SCH 96872	5	3.6	2	12		4	39	4	0	0
sh2	B	IFS	SCH 96991	5	3.5	3	15	Ht	6	49	4	0	0
sh2	B	Sem	SVR 08705788	5	3.9	5	18		7	54	4	0	0
sh2	B	Sem	SVR 08715815	5	4	5	18		5	41	3	0	0

sh2	B	Sem	SVR 08715818	5	3.3	2	10		6	48	0	0	0
sh2	B	Sem	SVR 08716390	3	2.7	2	7	Ht	8	59	1	1	0
sh2	B	Sak	Sak 00TC136	3	2.4	3	14		4	36	3	4	0
sh2	B	Sak	Sak K0-305	5	3.6	7	24		8	61	0	0	0
sh2	B	HM	Shooting Star	3	2.3	1	2		4	31	0	0	0
sh2	B	AC	Summer Sweet 8102	5	3.4	2	10	Ht	4	36	0	0	0
sh2	B	Cr	Tango	3	2.8	5	17		6	50	3	0	0
sh2	B	HM	Twin Star	3	2.4	1	2		4	34	2	0	0
sh2	B	IFS	XT 273A	5	3.9	7	25		5	44	4	0	0
sh2	B	IFS	XT 275RR	5	3.4	5	18	Ht	7	52	3	0	0
sh2	B	IFS	XT 276RR	7	4.1	5	19	Ht	6	51	2	0	0
sh2	B	IFS	XT 277A	5	3.3	5	16		7	52	5	0	0
sh2	B	IFS	XTH 2181	5	3.2	2	11	Ht	4	40	1	0	0
sh2	B	IFS	XTH 2276	5	3.2	5	20		8	58	4	0	0
sh2	W	Cr	CshWF1-21	1	2	2	8		5	46	7	0	0
sh2	W	Cr	CshWF1-23	5	3.4	1	7		9	62	3	0	0
sh2	W	HM	HMX 1367 WS	5	3.6	2	10		4	38	4	0	0
sh2	W	HM	HMX 1369 WS	7	4.2	2	8	Ht	5	46	2	0	0
sh2	W	SnR	HW 1287 NF	5	3.8	7	26		6	49	3	0	0
sh2	W	SnR	HW 1292 NF	7	4.1	7	24		4	39	6	0	0
sh2	W	Cr	How Sweet It Is	5	3.4	3	12		5	45	7	0	0

Table 5. Reactions of sweet corn hybrids in the University of Illinois disease nursery in 2002

Type	KC	Seed Source	Hybrid	Stewart's wilt		Northern leaf blight			Gray leaf spot		Rxn to post-emergence herbicides		
				Rxn	Rate (1 to 9)	Rxn	Rate (%)	Ht1 gene	Rxn	Rate (%)	Callisto	Permit	Aim
sh2	W	Cr	How Sweet It Is	5	3.4	3	12		5	45	7	0	0
sh2	W	Sak	Millennium	1	1.8	2	8	Ht	7	52	5	0	0
sh2	W	Sem	PX 9375029	7	4.2	3	15	Ht	7	54	0	0	0
sh2	W	IFS	SCH 98041	3	2.9	2	8	Ht	5	44	2	0	0
sh2	W	IFS	SCH 98146	5	3.6	2	11	Ht	4	41	1	0	0
sh2	W	IFS	SCH 98990	5	3.7	3	14	Ht	8	60	3	0	0
sh2	W	Sem	SVR 08705770	5	3.6	5	19		6	48	9	0	1
sh2	W	Sem	SVR 08705771	3	2.9	2	8		6	49	6	0	0

sh2	W	Sem	SVR 08705778	5	3.7	5	17		6	48	9	0	1
sh2	W	Sem	SVR 08715828	5	3.4	5	18		5	41	8	0	0
sh2	W	Sak	Sak 00TC139	5	3.7	5	22		9	68	0	0	0
sh2	W	HM	Snow White	7	4.2	7	24		7	53	1	0	0
sh2	W	AC	Summer Sweet 7631	3	2.3	1	3	Ht	7	54	2	0	0
sh2	W	AC	Summer Sweet 781 Ultra	3	2.8	2	10		7	54	3	1	0
sh2	W	Rog	Tahoe	5	3.4	2	8	Ht	6	49	0	0	0
sh2	W	Rog	WSS 0984	3	2.7	2	8	Ht	5	45	2	0	0
sh2	W	Rog	WSS 0987	3	2.8	1	5	Ht	5	46	2	0	0
sh2	W	Rog	WSS 9842	5	3.1	2	9	Ht	.	.	3	0	0
sh2	W	Rog	WSS 9870	3	2.8	2	8	Ht	4	40	1	0	0
sh2	W	IFS	XT 376A	5	3.7	5	18		6	49	2	0	0
sh2	O	HM	Indian Summer	9	6.6	9	37		6	47	0	0	0
bt1	Y	UHA	Sarah 1	9	5.1	2	9	Ht	3	31	0	0	0
bt1	Y	UHA	Sarah 6	5	3.9	2	11	Ht	4	32	1	0	0
bt1	Y	UHA	Taweesak	5	3.6	1	2		5	41	0	0	0
bt1	Y	UHA	Waimanalo Super Sweet	7	4.7	1	5	Ht	4	40	1	2	0
bt1	B	UHA	Hawaiian Supersweet #10	9	5.4	2	9	Ht	4	38	1	0	0

Rating Scale:

1 - resistant, 3 - moderately resistant, 5 - moderate, 7 - moderately susceptible, 9 - susceptible

Rxn - classification of hybrid disease reaction:

Post-plant herbicides:

0 - no symptoms

1 to 3 - a few symptoms, no difference in height of treated and non-treated plants

4 to 6 - mild symptoms, little if any difference in height of treated and non-treated plants;

7 to 9 - distinct symptoms and/or reduced height of treated plants