

Insect Screening Results

Resistance to Multiple Ear-Feeding Insects in 59 Commercial Corn Hybrids – 2010

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Twelve of the 59 hybrids examined in 2010 (as indicated in the following table) have been developed utilizing YieldGard VecTran Triple technology (abbreviated as VT3 or VT3P). The hybrids with VT3 only contain the YieldGard-corn borer gene, while the hybrids with VT3PRO contain a stack of YGCB and the new Cry2A gene. In addition, 22 hybrids have transgenic weed-control (RR=Roundup ready), and 6 have a glyphosate tolerance (GT) gene as shown in the table.

Five ear- and/or kernel-feeding insects and their damage were recorded in 2010. In the order of infestation severity, they are: sap beetles, corn earworm and fall armyworm, the brown stink bug, and pink scavenger caterpillar. Multiple species of sap beetles and stink bugs were also recorded in 2010. In addition, maize weevil infestation was very low on these entries at harvest with 18% kernel moisture in 2010. Disease surveys around flowering time showed minimal smut, southern rust, and southern and northern blight infections. Very few ears with ear rot were recorded this year.

The combined insect damage rating shown in the table reflected cob damage by the corn earworm and the fall armyworm, as well as kernel damage by the sap beetles, the stink bugs, and the pink scavenger caterpillar. Multiple insect resistance was categorized in five groups according to the insect damage ratings on corn cobs and kernels; they are very good (VG), good (G), fair (F), poor (P), and very poor (VP). VG represents the lowest amount of insect damage, while VP represents the greatest amount of insect damage. Losses to pink scavenger caterpillar and sap beetles were based on damage by possibly multiple generations of these insects as the crop matured in the field. Corn earworm and fall armyworm damage was combined because the damage was difficult to separate, as was damage by sap beetles and pink scavenger caterpillars. Corn earworm and fall armyworm feeding penetration in corn ears on the 59 hybrids was between 0.1 and 3.2 cm, which was lower than what we observed in 2009 (0.7-3.5 cm). Stink bug damage in 2010 (0.05-2.9% discolored kernels) was lower than that in 2009 (0.5-5.6%) and 2008 (0.3-4.6%), but higher than that in 2007 (0.02-2%), and 2006 (0-1.5%). Sap beetle damage ranged from 0.2-2.8% in 2010. Very low maize weevil infestation at harvest with 18% kernel moisture this year confirmed that timely harvest at maturity could be an effective management tool to reduce maize weevil infestation. The most important insects were the corn earworm and the fall armyworm, which caused the greatest kernel loss among all ear-feeding insects examined. Combined rankings of the 59 hybrids for their resistance to the major ear-feeding insects are given in the following table. The lettered ratings in the table refer only to relative resistance to insects and are not indicative of yield. Please refer to other reports for yield data.

Husk tightness and husk extension of ears were also examined in 2010. Husk tightness was assigned using a scale of 1 to 5, in which 1 = very loose and 5 = very tight. Because the average rating for husk tightness was between 2.5 and 4.4, only loose (L), medium (M), and tight (T) ratings are given in the table. Husk extension was between 0 and 8.1 cm. Corn earworm damage was negatively correlated to husk tightness and husk extension in 2010. Some of the transgenic corn hybrids showed poor overall insect resistance ratings with multiple insect damage ratings (such as corn earworm, stink bugs, and sap beetles), which could be caused by the fact that transgenic events in these hybrids only confer resistance to one species but not to all species of the ear-feeding insects.

Hybrids resistant to ear-feeding insects are highly recommended for planting and are presently the most economical means, especially in late plantings, for the reduction of ear-feeding insect damage and for reduction of aflatoxin contamination. Consult with your county agent and/or Extension entomologists for additional control recommendations for a specific pest in your area.

All entries were planted at the UGA Lang-Rigdon Farm on April 7, 2010 and harvested on July 29, 2010 at kernel moisture of 18%. Plots were thinned to 20,000 plants per acre. Plots were maintained and data were collected by Penny Tapp (USDA-ARS, Tifton, GA), and Blake Edore, Kimberly Goodman, Breanna Coursey, and Jonathan Roberts (University of Georgia, Tifton, GA).

Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 59 Commercial Corn Hybrids, 2010

Company or Brand Name	Hybrid Name ¹	Weed Control ²	Maturity ³	Days to Antheses	Husk Extension	Husk Tightness ⁴	Overall Resistance to Insect Damage ⁵	
							2010	2 or more years
					cm			
Dyna-Gro	58V69	0	M	61	4.0	M	VG	VG
NK	N78N 3000GT	GT	S	58	5.9	M	VG	G+
Greenwood	GW 3451 RR	RR	M	62	3.2	M	VG	.
Mycogen	TMF 2H918RR	RR	M	62	5.3	M	VG	.
Mycogen	TMF2L831	0	M	61	6.1	T	VG	.
DEKALB	DKC68-05 (GENVT3P)	0	M	57	2.2	M	VG	.
Pioneer	P2023HR	RR	M	62	3.9	M	VG	.
Pioneer	P1456HR	RR	S	59	2.5	M	VG	.
Dyna-Gro	58VP99	0	M	57	5.9	M	VG	.
Terral-REV™	25R29™	RR	S	58	4.2	L	VG	.
Terral-REV™	28HR30™	RR	M	63	0.7	L	VG	.
Terral-REV™	28R10™	RR	M	62	3.4	L	VG	.
Dyna-Gro	V5683VT3	RR	M	62	5.9	T	VG	.
Croplan Genetics	8505 VT3 PRO	0	M	59	6.8	M	VG	.
Agratech	X925RR	RR	M	57	5.6	T	VG	.
Masters Choice	MC-630	0	S	61	4.4	M	VG	.
Croplan Genetics	9009 RH	0	M	63	4.1	M	VG	.
Agratech	1777	0	S	61	1.5	M	G	G+
DEKALB	DKC69-71 (RR2/YGCB)	RR	M	62	0.8	M	G	G
Croplan Genetics	8756 VT3	RR	M	64	0.9	M	G	G
NK	N77P 3000GT	GT	S	61	3.6	M	G	G
Croplan Genetics	7131 VT3	RR	S	60	7.7	M	G	G
Pioneer	31D58	0	M	62	3.7	M	G	F
Terral-REV™	26R60™	RR	M	59	8.1	L	G	F
Terral-REV™	28HR20™	RR	M	62	3.2	L	G	F
DEKALB	DKC67-21 (GENVT3P)	0	M	59	1.5	M	G	.
DEKALB	DKC66-96 (GENVT3P)	0	M	59	5.6	M	G	.
Golden Acres	28V81	0	M	59	6.9	M	G	.
Terral-REV™	25R19 TM	RR	S	61	3.3	M	G	.
Agratech	EXP 1709 GT	GT	M	61	1.2	L	G	.
Dyna-Gro	57GT60	GT	M	59	3.5	M	G	.
Dyna-Gro	D55Q80	0	S	60	1.2	M	G	.
DEKALB	DKC63-84 (VT3)	RR	S	58	0.7	M	F	P
Terral-REV™	25HR39™	RR	S	61	1.5	M	F	P
Dyna-Gro	57N73	0	S	62	1.4	M	F	G-
Dyna-Gro	V5373VT3	0	S	60	4.1	M	F	G
NK	N82V 3000GT	GT	M	59	3.6	M	F	G
Terral-REV™	26HR70™	RR	M	60	3.9	M	F	G
Agratech	825RR	RR	M	60	7.7	M	F	G
Terral-REV™	28R30™	RR	M	62	0.7	L	F	F-

Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 59 Commercial Corn Hybrids, 2010 (Continued)

Company or Brand Name	Hybrid Name ¹	Weed Control ²	Maturity ³	Days to Antheses	Husk Extension	Husk Tightness ⁴	Overall Resistance to Insect Damage ⁵	
							2010	2 or more years
					cm			
Croplan Genetics	851 VT3 PRO	0	M	63	0.0	M	F	F
Terral-REV™	26HR50™	RR	M	59	1.3	L	F	F
Terral-REV™	25HR49™	RR	S	59	1.5	L	F	F
DEKALB	DKC64-69 (GENVT3P)	0	S	59	0.6	M	F	.
Pioneer	31P42 (HX1,LL,RR2)	0	M	62	3.1	M	F	.
Golden Acres	27V01	0	M	63	1.8	M	F	.
Terral-REV™	28HR29™	RR	M	63	0.9	L	F	.
Dyna-Gro	57V59	0	S	58	1.8	M	F	.
Croplan Genetics	6725 VT3 PRO	0	S	60	3.2	M	F	.
Agratech	815CBLL	0	M	59	3.7	M	F	.
NK	N78B GT	GT	S	59	4.8	M	F	.
NK	N78S CB/LL	0	M	59	3.0	M	F	.
Greenwood	GW 3515 RR	RR	M	62	1.0	T	F	.
Pioneer	P1615HR	RR	M	62	1.1	M	P	F-
DEKALB	DKC62-54 (VT3)	RR	S	57	6.1	M	P	F
DEKALB	DKC62-97 (GENVT3P)	0	S	57	2.3	M	P	.
Dyna-Gro	D56VP24	0	M	62	0.5	M	P	.
Greenwood	GW 3280 RR	RR	M	63	3.1	M	VP	P
Masters Choice	MC-590	0	M	62	0.7	M	VP	P

1. The bolded entries have shown good insect resistance at Tifton, GA for two or more years.
2. For weed control technology, RR = Roundup Ready, GT = glyphosate tolerance, 0 = no herbicide resistance.
3. Maturity of the hybrids were categorized as short (S) or medium (M) season maturity. Please note the Days of Anthesis (or flowering) data at Tifton, GA did not always support the categorization though.
4. L = loose husks, M = medium-tight husks, T = tight husks.
5. Categorization of insect resistance to key ear-feeding insects (i.e., the corn earworm and the fall armyworm, the stink bugs, and the pink scavenger caterpillars) was based on cluster analysis. The data were collected from 20 ears (five ears per replication with four replications) per hybrid, where VG = very good, G = good, F = fair, P = poor, and VP = very poor. The + and - signs for the average rating represent the inconsistency among years.