

Insect Screening Results

Resistance to Multiple Ear-Feeding Insects in 65 Commercial Corn Hybrids – 2011

Xinzhi Ni and G. David Buntin

Sixteen of the 65 hybrids examined in 2011 have shown the best in ear-and kernel-feeding insect resistance (as indicated in the following table). Thirteen of the hybrids 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.

Insect damage was relatively low in 2011, and 5 ear- and/or kernel-feeding insects in the order of infestation severity are: corn earworm and fall armyworm, sap beetles, pink scavenger caterpillar, and low level of maize weevil infestation. Multiple species of sap beetles were also recorded in 2011. Also, stink bug damage in 2011 was lowest in five years, which was lower than 1% (ranging between 0 and 0.8%) of the kernels per ear. The highest percentage of stink bug-discolored kernels in the previous five years ranged between 1.5 and 5.6%.

The combined insect resistance rating shown in the following table reflected cob damage by the corn earworm and the fall armyworm, as well as kernel damage by the sap beetles and the pink scavenger caterpillar. The number of maize weevils on each sampled ear was also recorded. 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 matures 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 was between 0 and 1.7 cm, which was lower than what we observed in 2010 (0.1 - 3.2 cm). Such low level of damage might be related to dry weather conditions with frequent irrigations, as shown in 2006 and 2007. Sap beetle damage was 0.1-1.9%, and pink scavenger caterpillar damage was 0-0.4% of the kernels in 2011. Maize weevil infestation at harvest with 16% kernel moisture was very low (0-2 weevils per ear). The most important insects were lepidopteran pests (that is, the corn earworm and the fall armyworm), which caused the greatest cob damage and kernel loss among all ear-feeding insects examined. Thus, the rankings of the 65 hybrids for their resistance to the key pests - corn earworm and fall armyworm 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.

Because husk tightness and husk extension are considered important traits for ear- and kernel-feeding insect resistance, the husk features of the sampled ears were also examined in 2011. Husk tightness was assigned using a scale of 1 to 5, in which 1 = very loose and 5 = very tight. Because average rating for husk tightness was between 2.8 and 4.1, only loose (L), medium (M = 2.8-3.4), and tight (T>3.5) ratings are given in the table. Husk extension was between 0.5 and 5.7 cm. Corn earworm

damage was negatively correlated to husk extension, but not husk tightness in 2011. Some of the transgenic corn hybrids showed poor overall insect resistance ratings with multiple insect damage ratings (such as, corn earworm, 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. This should be further examined.

Hybrids resistant to multiple insects are highly recommended for planting and are the most economical means, especially in late plantings, for reducing yield loss, as well as quality loss related to 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 Gibbs Research Farm on April 7, 2011 and harvested on August 9 and 10, 2011, at kernel moisture of 16%. Plots were thinned to 20,000 plants per acre. Plots were maintained (that is, fertilization, herbicide application, and request of irrigations) by Penny Tapp and Trevor Perla (USDA-ARS, Tifton, GA). The data were collected by Penny Tapp and Blake Edore (USDA-ARS, Tifton, GA), and Breanna Coursey and Jonathan Roberts (University of Georgia, Tifton, GA).

Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 65 Commercial Hybrids, 2011

Company or Brand Name	Hybrid Name ¹	Maturity ²	Days to Anthesis	Husk Extension	Husk Tightness ³	Overall Resistance to Insect Damage ⁴	
						2011	2 or more years
				cm			
Southern States	SS 787 GENVT3PRO	M	53	4	M	VG	VG-
NK Brand	N77P 3111	S	56	2	M	VG	.
T. A. Seeds	TA778-28	M	55	3	M	VG	.
Croplan Genetics	8505 VT3 PRO	M	55	5	M	VG	VG-
AgraTech	825 VT3 PRO	M	55	6	M	VG	.
Southern States	SS 684 GENSS	S	54	3	T	VG	.
Dyna-Gro	D58VP30	M	55	6	M	VG	.
Dyna-Gro	D56VP10	M	53	3	T	VG	.
Dyna-Gro	D56VP69	M	55	2	M	VG	.
Southern States	SS 851 GENVT3PRO	M	54	5	T	VG	.
DeKalb	DKC66-96(GENVT3P)	M	54	3	M	VG	VG-
NK Brand	N82V 3000GT	M	54	3	M	VG	.
Mycogen	2V738	S	55	1	M	VG	.
DeKalb	DKC67-57	M	53	1	T	VG	.
T. A. Seeds	TA717-20	S	55	2	T	VG	.
Southern States	SS 788 GENVT3PRO	M	54	3	T	VG	.
Terral-REV™	25HR39™	S	57	3	M	G	F
Pioneer	P2088HR	M	56	2	M	G	G
AgraTech	815CBLL	M	55	2	T	G	G-
Croplan Genetics	8410 VT3 PRO	M	55	2	M	G	.
Mycogen	2T784	S	55	3	T	G	.
T. A. Seeds	TA780-13V	S	56	3	T	G	.
DeKalb	DKC69-29	M	53	4	T	G	.
Croplan Genetics	8756 VT3	M	59	2	M	G	G
Terral-REV™	27HR52™	M	56	1	M	G	.
Pioneer	31P42(HX1 LL RR2)	M	56	3	M	G	G-
Dyna-Gro	57V59	S	53	2	M	G	G-
Terral-REV™	25R19™	S	57	3	M	G	G
DeKalb	DKC65-19	S	53	1	M	G	.
NK Brand	N78S 3111	M	55	1	M	G	.
Croplan Genetics	7131 VT3	S	54	5	T	G	G
Terral-REV™	28HR29™	M	59	4	M	G	G-
Mycogen	2T832	S	57	3	M	G	.
AgraTech	1777	S	57	1	M	F	G
Terral-REV™	28HR30™	M	58	2	M	F	G
NK Brand	N79Z GTCBLL	S	54	1	M	F	.
DeKalb	DKC68-05(GENVT3P)	M	54	1	M	F	G
MC	MCT-6751	M	54	2	M	F	.
Terral-REV™	28HR20™	M	59	3	M	F	F+
Dyna-Gro	D56VP24	M	58	1	T	F	F-

**Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 65 Commercial Hybrids, 2011 (Continued)**

Company or Brand Name	Hybrid Name ¹	Maturity ²	Days to Anthesis	Husk Extension cm	Husk Tightness ³	Overall Resistance to Insect Damage ⁴	
						2011	2 or more years
T. A. Seeds	TA790-19	M	55	1	T	F	.
Pioneer	P2023HR	M	57	3	M	F	G
Pioneer	31D58	M	59	4	M	F	G-
Dyna-Gro	D55Q80	S	55	1	T	F	G-
Pioneer	P1814HR	M	56	1	M	F	G
T. A. Seeds	TA765-00	S	57	2	M	F	.
Pioneer	P1456HR	S	55	2	M	F	G
Terral-REV™	28R10™	M	56	3	M	F	G
Mycogen	2A787	S	54	3	T	F	.
Dyna-Gro	57N73	S	58	2	M	F	F+
Dyna-Gro	D57GT60	M	54	2	M	P	F
AgraTech	X793	M	56	2	M	P	.
Mycogen	2V715	S	55	1	T	P	.
Croplan Genetics	851 VT3 PRO	M	56	0	T	P	F-
Terral-REV™	27HR32™	M	57	2	M	P	.
Terral-REV™	26HR50™	M	57	2	M	P	F-
Terral-REV™	26HR22™	M	58	3	T	P	.
Golden Acres	27V01	M	58	1	M	P	F-
Greenwood	GW 3515 RR	M	58	2	T	P	F-
AgraTech	1801	M	56	2	T	P	P-
Southern States	SS 818 GENVT3PRO	M	55	3	M	P	.
NK Brand	N72F 3000GT	S	55	1	M	P	.
DeKalb	DKC64-69(GENVT3P)	S	53	1	M	P	P
Terral-REV™	25HR49™	S	56	2	M	P	F-
Terral-REV™	26HR82™	M	56	3	M	P	.

All data in this table were collected from four replications.

1. The bolded entries have been examined for insect resistance at Tifton, GA, for two or more years.
2. Maturity represent the hybrids were categorized as short (S) or medium (M) season maturity. Please note the Days to Anthesis (or flowering) data at Tifton, GA did not always support the categorization though.
3. L = loose husks, M = medium-tight husks, T = tight husks.
4. 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 results. 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.