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Insect Screening Results

Resistance to Multiple Ear-Feeding Insects in 56 Commercial Corn Hybrids – 2009

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During the 2009 growing season, 17 of the 56 hybrids included in the insect screening experiment had YieldGard VecTran Triple technology (abbreviated as VT or VT3), which stacks multiple traits for stalk protection, root protection and weed control in one transformation event. Five ear- and/or kernel-feeding insects and their damage were recorded in 2009. They are in the order of infestation severity: the corn earworm and the fall armyworm, the brown stink bug, the pink scavenger caterpillar, and the sap beetles. Although the brown stink bugs were abundant, few southern green and green stink bugs were detected throughout the season. In addition, no maize weevil infestation was detected on these entries at harvest with 18% kernel moisture in 2009. Disease surveys around flowering time showed minimal smut, southern rust, and southern and northern blight infections. However, low percentage of ear rots (e.g., infections by *Aspergillus* spp. and *Fusarium* spp.) were observed, although data will not be presented here.

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 stink bugs, the pink scavenger caterpillar, and the sap beetles. Multiple insect resistance was categorized in five groups according to the dendrogram generated by cluster analysis; they are very good (VG), good (G), fair (F), poor (P), and very poor (VP). VG represents the lowest amount of insect damage, and VP represents the greatest amount of insect damage. Losses to pink scavenger caterpillar and sap beetles were based on damage by 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 pink scavenger and sap beetles. Corn earworm and fall armyworm feeding penetration in corn ears on the 56 hybrids was between 0.7 and 3.5 cm, which was lower than what we observed in 2008 (1.6 - 6.4 cm). Stink bug damage in 2009 (0.5-5.6% discolored kernels) was higher than that in 2008 (0.3-4.6%), 2007 (0.02-2%), and 2006 (0-1.5%). A period of drought around the flowering time in this study possibly led to lower corn earworm damage on cobs, but greater stink bug damage on kernels. Pink scavenger caterpillar and sap beetle damage was 0.2-1.7%, which is lower than in 2008 (0.4-7.6%), and similar to 2007 (0.1-2.6%), and 2006 (0.1-3.2%). No 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. Some of the transgenic *Bt* hybrids showed poor insect resistance ratings (with deep ear penetration), which could be caused by the fact that transgenic events in these hybrids only confer resistance to one species or the other but

not to both species. Combined rankings of the 56 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 the yield data in other reports for specific information.

During the damage evaluation in 2009, husk tightness and husk extension of ears were also examined. 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 3.1 and 4.3, only loose (L), medium (M), and tight (T) ratings are given in the table. Husk extension was between 1.5 and 8.4 cm. Corn earworm damage was negatively correlated to husk tightness, but not to husk extension in 2009.

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 for aflatoxin contamination. Consult your local county agent and/or extension entomologists for additional control recommendations for a specific insect pest in your area.

All entries were planted at the UGA Lang-Rigdon Farm on April 22, 2009 and harvested on Aug. 10, 2009 at kernel moisture of 18%. Plots were thinned to 20,000 plants per acre. Plots were maintained and data were collected by J. C. Mullis, Penny Tapp, Anna Hammond, Joseph Lewis (USDA-ARS, Tifton, GA), and Benjamin Berry and Jordan Sparks (University of Georgia, Tifton, Georgia).

Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 56 Commercial Corn Hybrids, 2009

Company or Brand Name	Hybrid Name[1]	Maturity[2]	Days to Antheses	Husk Extension	Husk Tightness[3]	Overall Resistance to Insect Damage[2]	
				cm		2009	2 or more years
AgraTech	**1777**	**S**	**57**	**5.1**	**M**	**VG**	**G**
Unity Seed	4116 VT3	M	54	4.3	T	VG	.
DynaGro	58V69	M	57	3.7	M	VG	.
AgraTech	825RR	M	55	6.7	L	VG	.
DeKalb	**DKC67-87(RR2/YGCB)**	**M**	**57**	**2.7**	**M**	**VG**	**G**
DeKalb	DKC68-06(RR2/YGCB)	M	55	4.2	M	VG	.
DeKalb	**DKC69-71(RR2/YGCB)**	**M**	**57**	**1.8**	**T**	**VG**	**VG**
NK Brand	N 78B CB/LL	S	55	3.9	T	VG	.
NK Brand	N 82V 3000 GT	M	55	3.2	M	VG	.
Terral-REV™	RV2670HR	M	57	4.0	T	VG	.
DynaGro	**V5373VT3**	**S**	**56**	**5.7**	**M**	**VG**	**VG**
AgraTech	X 9910	M	55	5.7	M	VG	.
Golden Acres	28Y97	M	56	2.0	T	G	.
Golden Acres	**28Z89**	**M**	**57**	**3.6**	**M**	**G**	**VG-**
Pioneer	**33M57(HX1/LL/RR2)**	**S**	**56**	**5.6**	**M**	**G**	**G**
DynaGro	57N73	S	57	5.5	M	G	.
Croplan Genetics	6986 VT3	S	56	3.1	T	G	.
Croplan Genetics	7131 VT3	S	56	8.4	L	G	.
DeKalb	DKC62-54(VT3)	S	54	7.6	L	G	.
DeKalb	**DKC69-40(VT3)**	**M**	**55**	**4.7**	**T**	**G**	**G-**
Greenwood	**EX 3103 RR**	**M**	**56**	**4.0**	**M**	**G**	**G**
NK Brand	N 73y CB/LL	S	55	1.8	T	G	.
NK Brand	N 77P 3000 GT	S	55	3.9	M	G	.
NK Brand	N 78N 3000 GT	S	55	4.5	T	G	.
AgraTech	X9690	S	55	3.2	M	G	.
Pioneer	**31D58**	**M**	**56**	**5.1**	**L**	**F**	**F**
Unity Seed	4416 VT3P	M	55	7.6	M	F	.
Croplan Genetics	**7505 VT3**	**S**	**55**	**4.8**	**M**	**F**	**G-**
Croplan Genetics	**851 VT3**	**M**	**57**	**3.0**	**M**	**F**	**G-**
Croplan Genetics	**8756 VT3**	**M**	**57**	**2.0**	**M**	**F**	**G-**
DeKalb	DKC61-04(VT3)	S	56	3.3	M	F	.
Greenwood	EX 3113 RR	M	56	3.9	M	F	.
Pioneer	P1615HR	M	56	5.55	M	F	.
Terral-REV™	RV2549HR	S	56	4.1	T	F	.
Terral-REV™	RV2650HR	M	57	4.0	M	F	.
DynaGro	V6083VT3	M	57	2.1	T	F	.
DynaGro	V6263VT3	M	57	3.9	T	F	.
AgraTech	X9769	M	57	3.7	M	F	.
AgraTech	1801	S	56	4.1	T	P	.
DynaGro	**58K02**	**M**	**57**	**2.5**	**M**	**P**	**P**

Tifton, Georgia:
Evaluation of Ear-Feeding Insect Resistance
in 56 Commercial Corn Hybrids, 2009 (Continued)

Company or Brand Name	Hybrid Name[1]	Maturity[2]	Days to Antheses	Husk Extension	Husk Tightness[3]	Overall Resistance to Insect Damage[2]	
				cm		2009	2 or more years
DynaGro	58V24	M	57	2.5	M	P	.
AgraTech	645RR	S	56	3.4	M	P	.
DeKalb	**DKC67-23(RR2/YGCB)**	**M**	**56**	**3.8**	**M**	**P**	**F**
Greenwood	**EX 3280 RR**	**M**	**57**	**3.1**	**T**	**P**	**F-**
Terral-REV™	RV2660R	M	56	5.1	L	P	.
Terral-REV™	RV2820HR	M	56	3.8	L	P	.
Terral-REV™	RV2830R	M	56	2.5	M	P	.
Pioneer	**31N28(YGCB)**	**M**	**57**	**2.0**	**M**	**VP**	**F**
Pioneer	**31P41**	**M**	**57**	**3.8**	**M**	**VP**	**F**
Croplan Genetics	**8221 VT3**	**M**	**57**	**1.5**	**T**	**VP**	**VP**
DeKalb	**DKC61-69(VT3)**	**S**	**55**	**4.6**	**M**	**VP**	**P-**
DeKalb	DKC63-84(VT3)	S	55	3.6	M	VP	.
Masters Choice	MC 590	M	57	3.6	T	VP	.
Terral-REV™	RV2539HR	S	56	3.0	M	VP	.
Southern States	**SS 731 CL**	**S**	**56**	**2.5**	**T**	**VP**	**P-**
Southern States	**SS 746 VT3**	**S**	**57**	**2.1**	**T**	**VP**	**P-**

1. The bolded entries have been examined for insect resistance at Tifton, GA, for two or more years.
2. Maturity of hybrids were categoried as short (S) or medium (M) season maturity, however, the Days of Anthesis (or flowering) data at Tifton, GA did not always support the categorization.
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. 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 inconsistency across years.