Progress Report:

This report serves to document research conducted under a specific cooperative agreement between ARS and North Carolina State University. Additional details of the research can be found in the report of the parent 3625-21000-036-00D-Germplasm Enhancement of Maize project. Additional details will be reported at the December 2008 GEM cooperators meeting and the December TSG meeting. This subproject is concerned with eleven aspects of the overall GEM effort. (1) The development of GEM families from breeding crosses. (2) Making topcross seed of the families. (3) Setting up appropriate experiments to compare the topcross families with commercial and experimental checks. (4) Providing seed for these experiments to 13 additional GEM collaborators. (5) Growing the experiments ourselves at several locations. (6) Analyzing and summarizing our own and our collaborators data. (7) Selecting the better materials for subsequent-year trials. (8) Increasing seed of better families, providing it to Ames and other GEM cooperators and to the NCRPIS. (9) Sampling allelic diversity from representative races not encompassed by GEM yield-trial efforts. (10) Evaluating GLS resistance of families selected for second-year yield trials. (11) Identifying new, promising all-tropical lines and arranging with GEM collaborators to make new 50%-tropical breeding crosses.

31 entries (out of about 900 tested) were advanced from first year to second year trials in 2008, and 18 entries (out of 69 tested) were advanced from second year to third year testing. Matt Krakowsky will report the overall results for those trials, but Tables 1 and 2 present summary results the better lines for North Carolina, with supplemental information in Appendix Tables A1 - A3. In 2008, 14,763 plots were coordinated through Raleigh (7,159 planted at NC State locations). About 1650 nursery rows and 1200 isolation block rows were planted in 2008 at Raleigh. Nursery work involved 9 new breeding crosses. Disease evaluation continued in 2008 for GLS, where advanced materials were scored. Tables 3 and 4 report those results. We have continued routine screening of available tropical lines, as so little data are available to choose among them for use in GEM or other research. A summary of some of the most recent work in that area has been published in *Crop Science* (48: 85-92; attached as Appendix B); additional data are presented in Tables 5 - 7. The first breeding crosses from such materials are now being made in Puerto Rico.

In 2008, over 450 nursery rows were devoted to the Allelic Diversity study, which involves accessions that are outside the core plant breeding materials utilized by GEM and most plant breeding organizations. These represented new F1 hybrids from over 80 accessions. The F1s were produced last winter by Randy Holley of Pioneer and Jim Deutsch of Syngenta, using PHB47 and PHZ51 as ex-PVP parents. Backcrosses to the ex-PVP lines were made this summer; some of the F1 hybrids involving PHB47 are notably earlier than PHB47 itself. Many of the earlier PHZ51 backcrosses were made this summer by Sherry Flint-Garcia at Columbia, MO.

A large number of ex-PVP lines have become available for use in GEM; we have tested most of the ex-PVP lines, many with more than one tester; the most pertinent results are listed in Tables 8 - 12, with supplemental information in Appendix Tables A4 and A5, and line relationships are discussed in Nelson et al., 2008 (*Crop Science* 48:1673 - 1685; attached as Appendix C.). After eliminating lines which perform poorly per se (LH51, LH156, Seagull 17), only about 8 lines appear to have much attraction: DJ7, LH132, and NK794 (SS), LH60, LH150, PHG35, and PHN47 (NSS); DKHBA1 performs reasonably well in both directions.

DK697 and G8288 were checks common to all five trials; in two trials no ex-PVP topcross was closer than 19 bu/A. to their mean; in two more trials one ex-PVP line (PHN47) was within 10 bu/A. of their mean and DKHBA1 was within seven. In the fifth trial, a single-cross trial with NC368 as tester, DKHBA1 was actually 1 bu/A. higher than the mean of DK697 and G8288 (and several others were close: LH60, LH150, and PHG35 were within 5 bu/A). All in all, however, the ex-PVPs are not very promising.

We have also continued the development of three temperate-adapted, all-tropical synthetics; data from the one which underwent yield-testing this year is presented in Table 13. Several of the full-sib families tested were competitive with the better checks (and much better than the broad-base tester that was used, LH334.LH354). Of 90 families tested, the lowest yield was 109 bu/A., five bushels higher than the tester. Tables 14 - 16 present data on newly developed, temperate-adapted, all-tropical (TAAT) lines developed at NC State, comparing them with checks and more established TAAT lines. Those that survive local testing will be used for GEM.

For the past two years we have been comparing alternative testers; some of these were new (to us). Four from Pioneer, two from Holden's, one from IFSI (a check we have used since 1995), and one Holdens x IFSI are currently being considered for further use. Summary data are presented in Tables 17 and 18. Earlier data (Nelson and Goodman, 2008; *Crop Science* 48:85-92) eliminated FR992 x FR1064, on the basis of very high g x year interactions. We replaced it with FR1064 x LH132, and then replaced that with LH244 x LH245, but the latter performs rather poorly in Florida, appears to add no great advantage in yield, standability or moisture compared to FR1062 x LH132, and is composed of quite closely related lines. While LH283 x LH284 is a pleasure to work with in both summer and winter nurseries and adds some yield, its crosses have the highest lodging percentages of all testers being considered, a serious drawback for GEM, where lodging (especially in first-year trials) is critical. Our preferred choices among these would be SS1 x SS2 from Pioneer and NSS3 x NSS4 from Pioneer. We are making trial crosses with *bt*-derived relatives of these two testers in the winter nursery and would like to adopt non-*bt* versions as one set of testers, if Pioneer will make them available.

Collaborative work with other USDA-ARS scientists and other researchers includes fusarium molecular marker work with Drs. Holland (USDA-ARS, Raleigh) and Payne (NC State); racial classification and association analysis using molecular markers with Drs. Buckler (USDA-ARS, Cornell) and Doebley (U. WI); southern corn leaf blight resistance using molecular markers with Dr. Peter Balint-Kurti (USDA-ARS, Raleigh), and southern rust work with Mike Blanco (USDA-ARS, Ames) and Bill Dolezal (Pioneer). The quantity of work undertaken this year would not have been possible without the participation of Matthew Krakowsky, who began working as an ARS scientist at Raleigh in September 2007, after a successful stint in Tifton, GA (also with ARS). Matt brings with him much experience with CIMMYT's breeding materials, which should greatly help the overall GEM effort.

Table 1. NC summary of 3rd year trial of better DK888 N11 families
2008: Clayton, Sandhills, Kinston, and Lewiston, NC
2007: Clayton, Sandhills, Lewiston, NC
2006: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
1921-001/03	133	18.3	94	7451-27DK888 N11 F2S4 9375-1 XT8
1936-007/03	132	18.2	94	7451-27DK888 N11 F2S4 1778-1 XT8
DK697	141	18.4	87	DeKalb 697
G8288	138	18.8	98	Garst 8288
LH200.LH262	138	17.9	92	LH200 x LH262
P31G98	147	16.9	91	Pioneer 31G98
LSD .05	7	.6	6	LSD .05 (ENTRY x ENV)
CV	6	4.	7	C. V. % (ENTRY x ENV)

T8 = FR992 x FR1064

Table 2. NC summary of 2nd year trial of better GEM topcross families
2008: Clayton, Sandhills, Kinston, and Lewiston, NC
2007: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
4171-009/03	128	19.3	95	FS8B(T):N18 F1S1 x FR992.FR1064
1601-003/03	137	18.4	98	7258-3 SCR Gp3 N14 F2S3 XT8
861-001/04	129	17.3	97	9111-4 7258-3SCG3N14S4 3415-2XT11
4251-003/03	123	18.5	96	MD22:N21_F1S1 x FR992.FR1064
h7092-08/03	121	18.4	97	3607-021/00 DK888 N11 F1S3 XT8
891-001/04	129	18.7	95	7451-03DK888 N11F2S3 3291-1 XT8
DK697	142	18.1	94	DeKalb 697
G8288	138	19.2	99	Garst 8288
HC33.TR7322	122	16.1	95	HC33 x TR7322
LH200.LH262	137	18.0	95	LH200 x LH262
P31G98	150	17.2	92	Pioneer 31G98
LSD .05	8	.6	4	LSD .05 (ENTRY x ENV)
CV	7	4.	5	C. V. % (ENTRY x ENV)

T8 = FR992 x FR1064
T11 = LH132 x FR1064

Table 3. Analysis over locations for 2nd & 3rd year GEM topcrosses plus GLS data from Andrews, Laurel Springs, and Salisbury, NC 2008: Clayton, Lewiston, Plymouth, Sandhills, and Kinston, NC

SOURCE	YLD B/A	% MOIS	% EP	GLS*	PEDIGREE
1921-001/03	114	18.2	94	7.0	7451-27DK888 N11 F2S4 9375-1 XT8
1936-007/03	117	18.2	96	7.3	7451-27DK888 N11 F2S4 1778-1 XT8
4171-009/03	111	18.9	93	6.3	FS8B(T):N18_F1S1 x FR992.FR1064
4251-003/03	108	18.2	91	6.8	MD22:N21_F1S1 x FR992.FR1064
1601-003/03	127	18.8	93	6.1	7258-3 SCR Gp3 N14 F2S3 XT8
3941-018/03	99	18.4	96	6.2	2347-21DK888 N11F1S2 2347-21 XT8
h7083-06/03	102	18.2	97	6.7	3607-002/00 DK888 N11 F1S3 XT8
h7092-08/03	109	18.3	96	6.9	3607-021/00 DK888 N11_F1S3 XT8
891-001/04	115	18.7	92	6.8	7451-03DK888 N11F2S3 3291-1 XT8
h7065-07/03	105	18.3	94	6.3	8446b-1/99 DK212T N11 F1S3 XT8
861-001/04	116	17.6	94	6.9	9111-4 7258-3SCG3N14S4 3415-2XT11
2445-002/04	119	18.4	88	6.8	1721-27 CHS775N19S4w2405-10 XT8
h7115-02/03	117	17.7	95	5.9	B2410-3/99 SCR Gp3 N14 F2S4 XT8
h7115-03/03	118	18.5	95	6.3	B2410-3/99 SCR Gp3 N14 F2S4 XT8
2204-003/04	111	17.3	84	.	Cr1-044PE1 N16 F2S4 3104-1 XT8
8076-002/04	112	17.0	89	6.5	PE1 N16F2S4 Cr1-341 3106-012 XT8
P3502-1	110	18.0	85	6.9	PE1F1S6-44C02:146-160Best-2 XT8
2259-001/04	109	18.1	93	5.2	7521-05 DK370AN11F2S4 1881-2 XT8
2289-001/04	118	17.8	85	5.1	7521-05 DK370AN11F2S4 1883-2 XT8
2301-002/04	111	18.9	90	5.5	7521-05 DK370AN11F2S4 1886-3 XT8
2311-001/04	111	17.8	86	5.3	7521-05 DK370AN11F2S4 1886-3 XT8
h7028-04/03	117	18.1	97	6.6	3485-002/00 DKXL380 N11 F2S4 XT8
911-002/04	127	18.2	94	6.4	B9527-01XL380N11 F2S4 XT8
DK697	136	18.1	88	6.7	DeKalb 697
G8288	123	19.0	99	6.3	Garst 8288
HC33.TR7322	107	16.6	91	6.6	HC33 x TR7322
LH200.LH262	131	18.2	89	6.6	LH200 x LH262
P31G66	129	18.4	90	7.1	Pioneer 31G66
P31G98	135	17.5	86	7.1	Pioneer 31G98
P33V15	115	17.5	93	7.6	Pioneer 33V15
LSD .05	11	.9	9	0.8	LSD .05 (ENTRY x ENV)
CV	8	4.	8	0.1	C. V. % (ENTRY x ENV)
F-ratio	5.	3.	1	5.4	F-ratio

* GLS data based on average of nine scorings (3 scores at each of 3 sites)
Rating scale: 9 = no disease; 1 = dead.
T8 = FR992 x FR1064
T11 = LH132 x FR1064

Table 4. Analysis over locations for 2nd year GEM topcrosses plus GLS data from Andrews, Laurel Springs, and Salisbury, NC 2008: Clayton, Lewiston, Plymouth, Sandhills, and Kinston, NC

SOURCE	YLD B/A	% MOIS	% EP	GLS*	PEDIGREE
751-006/02	116	18.0	96	7.8	7451-27 DK888 N11F2S3 9375-1 XT2
751-008/02	109	18.4	92	7.7	7451-27 DK888 N11F2S3 9375-1 XT2
751-027/02	103	18.8	92	7.9	7451-27 DK888 N11F2S3 9375-1 XT2
751-030/02	116	18.9	92	7.7	7451-27 DK888 N11F2S3 9375-1 XT2
751-032/02	104	18.3	96	7.6	7451-27 DK888 N11F2S3 9375-1 XT2
751-037/02	111	18.2	94	7.6	7451-27 DK888 N11F2S3 9375-1 XT2
771-007/02	118	18.9	94	7.5	7451-27 DK888 N11F2S3 1776-1 XT2
771-013/02	111	19.3	92	7.7	7451-27 DK888 N11F2S3 1776-1 XT2
2433-002/05	97	17.4	90	5.4	CML323 N15 F2S2 x FR1064.LH132
2478-001/05	97	17.5	94	5.6	CL-G1607 N11 F21 F2S2 XT11
2481-001/05	107	18.3	94	6.6	CL-G1607 N11 F21 F2S2 XT11
2481-003/05	95	17.5	96	6.6	CL-G1607 N11 F21 F2S2 XT11
2482-001/05	92	17.5	95	6.3	CL-G1607 N11 F21 F2S2 XT11
2484-003/05	94	17.6	97	5.8	CL-G1607 N11 F21 F2S2 XT11
2484-007/05	95	18.4	94	5.9	CL-G1607 N11 F21 F2S2 XT11
2491-007/05	117	18.1	94	6.8	CL-G1607 N11 F21 F2S2 XT11
2499-001/05	109	18.0	93	7.3	NEI9004 S28F1S3 x FR615.FR697
2504-002/05	101	17.1	92	7.6	NEI9004 S28F1S3 x FR615.FR697
2504-003/05	101	17.7	90	7.3	NEI9004 S28F1S3 x FR615.FR697
2504-005/05	99	17.9	87	7.2	NEI9004 S28F1S3 x FR615.FR697
2504-006/05	104	18.0	90	7.2	NEI9004 S28F1S3 x FR615.FR697
2504-009/05	104	17.9	90	7.3	NEI9004 S28F1S3 x FR615.FR697
2521-001/05	105	17.9	90	7.8	NS1 S08 F1S3 x FR615.FR697
2521-002/05	107	18.2	95	7.6	NS1 S08 F1S3 x FR615.FR697
DK697	131	18.4	90	6.9	DeKalb 697
HC33.TR7322	102	16.1	97	6.3	HC33 x TR7322
P31D58	132	18.5	98	7.6	Pioneer 31D58
P31G98	129	17.2	90	6.8	Pioneer 31G98
P31P41	129	18.5	96	7.3	Pioneer 31P41
P32D99	135	19.7	95	7.1	Pioneer 32D99
LSD .05	15	.9	7	0.6	LSD .05 (ENTRY x ENV)
CV	11	4.	6	6.9	C. V. % (ENTRY x ENV)

* GLS data based on average of nine ratings (3 scores at each of 3 sites)
Rating scale: 9 = no disease; 1 = dead.
T2 = LH244 x LH245
T11 = LH132 x FR1064

Table 5. Analysis over locations and years for better CIMMYT line topcrosses with LH132.LH51 as tester.

2006-2008: Clayton, Sandhills, Kinston, Lewiston, & Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
CML78	118	18.7	92	CML78 x LH132.LH51
CML195	116	21.2	88	CML195 x LH132.LH51
CML214	120	20.5	84	CML214 x LH132.LH51
CML298	119	22.2	94	CML298 x LH132.LH51
CML302	120	20.5	87	CML302 x LH132.LH51
CML308	118	20.4	91	CML308 x LH132.LH51
CML309	118	20.4	94	CML309 x LH132.LH51
CML312	120	20.9	95	CML312 x LH132.LH51
CML334	121	20.9	89	CML334 x LH132.LH51
CML342	126	20.5	96	CML342 x LH132.LH51
CML360	122	19.9	91	CML360 x LH132.LH51
CML362	118	19.5	85	CML362 x LH132.LH51
CML364	117	20.5	93	CML364 x LH132.LH51
CML370	121	20.3	88	CML370 x LH132.LH51
CML431	115	21.4	92	CML431 x LH132.LH51
CML497	119	20.4	88	CML497 x LH132.LH51
CA00370	120	20.7	94	CA00370 x LH132.LH51
CA34502	121	21.0	90	CA34502 x LH132.LH51
DK697	137	19.1	94	DeKalb 697
G8288	125	19.0	97	Garst 8288
LH132.LH51	115	17.0	98	LH132 x LH51
P31G98	142	17.6	97	Pioneer 31G98
LSD .05	8	.6	4	LSD .05 (ENTRY x ENV)
CV	10	4.	7	C. V. % (ENTRY x ENV)

Lines CML78and 395 were tested, but yielded less than LH132.LH51

Table 6. Analysis over locations and years for 100%-tropical line topcrosses with LH132.LH51 as tester.

2007-2008: Clayton, Sandhills, Kinston, Lewiston, & Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
CML231	107	20.1	95	CML231 XT7
CML394	106	22.1	95	CML394 XT7
CML491	107	22.6	95	CML491 XT7
88069	112	20.8	93	88069 XT7
89260	107	22.0	93	89260 XT7
CA03116	105	19.0	97	CA03116 XT7
3925-001/05	122	20.0	96	2301.296*4 XT7
2150-001/05	121	18.7	97	I137TN.NC296 F3S4 XT7
2043-002/05	114	19.4	98	Pioneer_3044WxNC300_^2^F3S4__XT7
DK697	135	19.2	96	DeKalb 697
G8288	119	19.4	99	Garst 8288
LH132.LH51	105	17.3	99	LH132 x LH51
P31G66	135	18.3	97	Pioneer 31G66
P31G98	133	17.9	97	Pioneer 31G98
P31R88	116	19.3	98	Pioneer 31R88
LSD .05	9	.9	4	LSD .05 (ENTRY x ENV)
CV	9	5.	5	C. V. % (ENTRY x ENV)

T7 = LH132 x LH51

Lines CML264Q, 89293, and 90183 were tested, but yielded less than LH132.LH51

Table 7. Analysis over NC locations for 100%-tropical line topcrosses with LH132.LH51 or P33M54 as tester
2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
CML231	94	20.4	93	CML231	XT7
CML394	97	21.8	95	CML394	XT7
CML491	97	22.6	92	CML491	XT7
CA03116	94	19.1	95	CA03116	XT7
TZMI712	103	21.7	95	TZMI712 x P33M54	
TZMI715	103	21.9	89	TZMI715 x P33M54	
TZMI720	105	22.7	88	TZMI720 x P33M54	
88069	102	20.9	90	88069	XT7
89260	96	21.6	92	89260	XT7
89293	94	20.5	94	89293	XT7
90147	95	21.1	90	90147	XT7
90188	97	21.0	94	90188	XT7
2150-001/05	110	18.9	97	I137TN.NC296	XT7
2043-002/05	105	19.7	95	Pioneer 3044WxNC300 ^2^F3S4	XT7
2137-002/05	102	19.9	93	Pioneer 3002W F3S4 x P33M54	
2220-001/05	101	19.4	93	6959-2.3564-2 F1S5 x P33M54	
DK697	126	19.7	92	DeKalb 697	
G8288	109	19.8	98	Garst 8288	
LH132.LH51	94	17.5	100	LH132 x LH51	
NC296 x T9	112	19.8	89	NC296 x P33M54	
NC446 x T7	116	20.5	96	NC446 x LH132.LH51	
P31G66	120	19.0	94	Pioneer 31G66	
P31G98	125	18.5	94	Pioneer 31G98	
P31R88	106	19.8	97	Pioneer 31R88	
P33M54	101	18.8	98	Pioneer 33M54	
LSD .05	13	.8	8	LSD .05 (ENTRY x ENV)	
CV	11	3.	7	C. V. % (ENTRY x ENV)	

T7 = LH132 x LH51
T9 = Pioneer 33M54
Lines CML264Q, TZMI711, TZI714, TZMI717, TZMI718, TZMI722, TZMI727, TZMI729, and 90183 were tested, but yielded less than did their testers.

Table 8. Two year summary for ex-PVP topcrosses
2008: Clayton, Sandhills, Kinston, and Lewiston, NC
2007: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
AS5707	120	17.7	98	AS5707 x FR992.FR1064
AS5707	108	16.3	96	AS5707 x FR615.FR697
AS6103	107	15.9	96	AS6103 x FR615.FR697
DJ7	133	16.3	98	DJ7 x FR615.FR697
DKFAPW	114	14.9	93	DKFAPW x FR615.FR697
DKHBA1	117	17.1	98	DKHBA1 x FR1064.FR992
DKHBA1	126	16.4	95	DKHBA1 x FR615.FR697
DKIB014	120	15.6	98	DKIB014 x FR615.FR697
DKMBNA	120	15.6	96	DKMBNA x FR992.FR1064
DKMDF-13D	121	15.9	94	DKMDF-13D x FR992.FR1064
DK78002A	112	14.9	99	DK78002A x FR615.FR697
DK78004	121	15.5	98	DK78004 x FR615.FR697
DK78010	121	14.9	98	DK78010 x FR615.FR697
F42	122	16.6	98	F42 x FR615.FR697
FR19	119	14.9	96	FR19 x FR615.FR697
LH1	124	16.4	98	LH1 x FR615.FR697
LH38	115	15.6	98	LH38 x FR992.FR1064
LH39	114	15.2	98	LH39 x FR992.FR1064
LH51	126	16.1	98	LH51 x FR992.FR1064
LH74	110	15.0	97	LH74 x FR615.FR697
LH82	114	15.5	97	LH82 x FR992.FR1064
LH93	119	15.0	98	LH93 x FR992.FR1064
LH93	122	15.2	95	LH93 x FR615.FR697
LH119	121	16.7	97	LH119 x FR615.FR697
LH123Ht	118	16.6	98	LH123Ht x FR992.FR1064
LH132	126	16.4	98	LH132 x FR615.FR697
LH143	106	14.5	96	LH143 x FR615.FR697
LH145	96	14.7	93	LH145 x FR615.FR697
LP1 CMSHt	112	14.6	96	LP1 CMS Ht x FR615.FR697
LP1 NRHt	110	14.7	96	LP1 NR Ht x FR615.FR697
PHB09	112	15.0	96	PHB09 x FR615.FR697
PHB47	123	14.7	94	PHB47 x FR615.FR697
PHG29	112	14.6	95	PHG29 x FR615xFR697
PHG35	122	16.5	98	PHG35 x FR992.FR1064
PHG39	124	16.0	97	PHG39 x FR615.FR697
PHG50	109	15.6	99	PHG50 x FR992.FR1064
PHG71	110	14.0	99	PHG71 x FR615xFR697
PHG72	107	15.6	95	PHG72 x FR1064.FR992
PHG72	113	15.1	94	PHG72 x FR615.FR697
PHG80	108	15.9	98	PHG80 x FR615.FR697
PHG83	122	14.8	96	PHG83 x FR615xFR697
PHJ40	93	15.2	98	PHJ40 x FR992.FR1064
PHJ40	89	14.5	98	PHJ40 x FR615.FR697
PHZ51	118	15.8	97	PHZ51 x FR1064.FR992
PHZ51	117	15.4	98	PHZ51 x FR615.FR697
PH207	98	15.0	99	PH207 x FR992.FR1064
Q381	107	14.4	98	Q381 x FR615.FR697
Seagull 17	132	15.4	97	Seagull Seventeen x FR992.FR1064
DK697	157	18.2	91	DeKalb 697
G8288	149	18.8	97	Garst 8288
LH310.LH256	134	19.3	98	LH310 x LH256
NC328 x T10	125	16.9	98	NC328 x FR615.FR697
NC346 x T7	132	17.9	96	NC346 x LH132.LH51
NC492 x T8	141	18.3	94	NC492 x FR992.FR1064
P31G98	162	16.8	98	Pioneer 31G98
P32D99	163	19.0	97	Pioneer 32D99
LSD .05	9	.6	4	LSD .05 (ENTRY x ENV)
CV	8	4.	4	C. V. % (ENTRY x ENV)

Table 9. Analysis over NC locations for ex-PVP line topcrosses
Year 2008: Clayton, Sandhills, Kinston, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
CR1Ht	66	13.1	92	CR1Ht	XT10
DKFBHJ	83	14.7	97	DKFBHJ	XT10
DK4676A	89	16.4	100	DK4676A	XT8
DK4676A	107	15.6	93	DK4676A	XT10
LH52	84	14.9	97	LH52	XT8
LH54	93	16.4	97	LH54	XT8
LH57	105	15.6	99	LH57	XT8
LH59	99	16.1	97	LH59	XT8
LH60	109	17.9	98	LH60	XT8
LH61	92	15.8	93	LH61	XT8
LH85	89	16.2	92	LH85	XT8
LH85	78	14.8	82	LH85	XT10
LH146Ht	83	14.5	99	LH146Ht	XT10
LH156	96	20.1	98	LH156	XT10
NK778	94	14.3	96	NK778	XT10
NK779	55	15.4	76	NK779	XT8
NK779	62	15.6	87	NK779	XT10
NK792	62	16.3	98	NK792	XT8
NK794	112	16.0	99	NK794	XT10
NK807	80	15.9	97	NK807	XT10
PHG47	91	15.4	100	PHG47	XT8
PHG86	103	17.1	95	PHG86	XT10
PHR36	96	17.1	99	PHR36	XT8
PHR36	106	16.2	97	PHR36	XT10
PHW17	105	17.3	98	PHW17	XT10
DK697	143	19.1	92	DeKalb 697	
G8288	119	19.6	98	Garst 8288	
P31D58	134	19.1	99	Pioneer 31D58	
P31G98	138	17.9	96	Pioneer 31G98	
P32D99	148	20.3	95	Pioneer 32D99	
LSD .05	14	1.2	9	LSD .05 (ENTRY x ENV)	
CV	10	5.0	7	C. V. % (ENTRY x ENV)	
F-ratio	21	18	3	F-ratio	

T8 = FR992 x FR1064
T10 = FR615 X FR697

Table 10. Analysis over NC locations for ex-PVP line topcrosses
2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
Carg2369	91	16.5	97	Carg2369	XT10
Carg11430	85	15.2	95	Carg11430	XT8
DKFBHJ	57	15.6	98	DKFBHJ	XT10
DKIB02	72	15.4	90	DKIB02	XT8
DKMBPM	91	18.0	96	DKMBPM	XT8
DKMBPM	102	17.0	97	DKMBPM	XT10
DKMBST	104	17.5	95	DKMBST	XT8
DKPB80	103	16.4	98	DKPB80	XT10
DKFBHJ	78	14.8	97	DKFBHJ	XT10
DK2MA22	90	16.1	99	DK2MA22	XT10
DK78371A	94	18.0	96	DK78371A	XT8
DK78371A	72	16.6	94	DK78371A	XT10
DK87916W	107	18.1	98	DK87916W	XT10
LH65	96	15.7	99	LH65	XT8
LH149	86	14.9	94	LH149	XT10
LH150	108	17.8	98	LH150	XT8
LH150	102	17.9	94	LH150	XT10
ML606	81	17.3	95	ML606	XT8
ML606	87	17.5	95	ML606	XT10
NK740	89	15.7	98	NK740	XT8
NK787	105	18.4	95	NK787	XT8
NK790	94	15.2	95	NK790	XT10
NK792	74	16.5	98	NK792	XT8
NK792	104	16.2	97	NK792	XT10
NK793	94	15.5	97	NK793	XT10
NKW8304	98	17.1	97	NKW8304	XT10
NKS8324	104	16.1	99	NKS8324	XT10
NKS8326	94	15.9	98	NKS8326	XT8
NKH8431	80	15.1	98	NKH8431	XT10
NQ508	81	15.5	99	NQ508	XT8
NQ508	72	15.0	98	NQ508	XT10
NS501	70	15.5	96	NS501	XT10
NS701	98	15.9	94	NS701	XT10
PHG84	102	18.2	100	PHG84	XT8
PHG84	98	17.4	97	PHG84	XT10
PHH93	79	15.0	97	PHH93	XT10
PHK42	69	15.8	99	PHK42	XT8
PHK42	74	16.1	97	PHK42	XT10
PHK76	79	16.2	95	PHK76	XT8
PHK76	77	16.3	98	PHK76	XT10
PHM49	84	16.8	99	PHM49	XT8
PHM49	93	17.1	97	PHM49	XT10
PHN11	72	15.7	100	PHN11	XT8
PHN11	75	15.0	95	PHN11	XT10
PHN47	115	18.6	97	PHN47	XT8
PHN47	111	17.7	97	PHN47	XT10
PHR32	108	17.7	98	PHR32	XT8
PHR32	108	17.8	98	PHR32	XT10
PHR47	89	16.7	97	PHR47	XT10
PHT10	99	15.9	98	PHT10	XT10
PHT55	95	16.8	97	PHT55	XT10
PHT60	96	17.2	99	PHT60	XT8
PHT60	87	17.7	100	PHT60	XT10
PHT77	83	16.0	98	PHT77	XT8
PHT77	79	16.0	95	PHT77	XT10
PHV63	90	17.3	98	PHV63	XT8
PHV63	82	16.4	97	PHV63	XT10
PHW52	103	17.7	98	PHW52	XT10
PHW65	94	17.1	97	PHW65	XT8
PHW65	93	16.9	98	PHW65	XT10
PHW79	95	17.3	97	PHW79	XT8
PHW79	105	17.4	98	PHW79	XT10
DK697	134	18.4	95	DeKalb 697	
G8288	108	18.5	98	Garst 8288	
P31G66	129	18.4	97	Pioneer 31G66	
P31P41	106	18.4	99	Pioneer 31P41	
P33M54	120	18.2	99	Pioneer 33M54	
P33V15	112	17.7	95	Pioneer 33V15	
LSD .05	15	1.2	4	LSD .05 (ENTRY x ENV)	
CV	13	6	3	C. V. % (ENTRY x ENV)	
F-ratio	7	6	2	F-ratio	

T8 = FR992 x FR1064; T10 = FR615 x FR697

Table 11. Analysis over NC Locations for ex-PVP line topcrosses
Year 2008: Clayton, Lewiston, Sandhills, and Kinston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
AS5707	111	19.6	96	AS5707	XT2
DKHBA1	122	18.6	99	DKHBA1	XT2
DKIB014	97	16.5	97	DKIB014	XT2
DKMDF-13D	103	17.7	94	DKMDF-13D	XT2
DK4676A	91	16.2	99	DK4676A	XT2
DK78371A	108	19.9	97	DK78371A	XT2
LH38	106	17.8	99	LH38	XT2
LH51	111	17.8	99	LH51	XT2
LH52	98	16.4	98	LH52	XT2
LH54	101	17.4	98	LH54	XT2
LH57	113	16.9	95	LH57	XT2
LH59	115	17.6	94	LH59	XT2
LH60	118	18.8	98	LH60	XT2
LH61	110	16.3	98	LH61	XT2
LH82	105	17.3	97	LH82	XT2
LH85	89	16.5	98	LH85	XT2
LH93	112	17.4	96	LH93	XT2
LH123Ht	116	17.9	97	LH123Ht	XT2
LH150	107	18.7	98	LH150	XT2
LH156	121	20.7	99	LH156	XT2
ML606	111	18.3	96	ML606	XT2
NK740	121	17.3	92	NK740	XT2
NK792	82	18.0	99	NK792	XT2
NQ508	93	16.8	98	NQ508	XT2
PHG29	108	17.2	99	PHG29	XT2
PHG35	111	17.9	99	PHG35	XT2
PHG47	108	15.6	98	PHG47	XT2
PHG50	101	17.7	97	PHG50	XT2
PHG72	100	16.7	98	PHG72	XT2
PHG83	109	16.8	98	PHG83	XT2
PHK42	99	16.3	99	PHK42	XT2
PHK76	105	17.5	99	PHK76	XT2
PHR36	105	17.8	97	PHR36	XT2
PHT77	113	17.0	95	PHT77	XT2
PHV63	99	18.9	99	PHV63	XT2
PHW65	117	18.5	100	PHW65	XT2
PHZ51	108	17.5	99	PHZ51	XT2
PH207	97	16.5	98	PH207	XT2
Seagull 17	124	16.8	97	Seagull Seventeen	XT2
DK697	141	19.3	91	DeKalb 697	
G8288	117	20.2	98	Garst 8288	
LH132.LH51	126	17.6	98	LH132 x LH51	
LH200.LH262	137	18.5	98	LH200 x LH262	
LH310.LH256	128	20.7	98	LH310 x LH256	
NC320xT2	143	19.2	96	NC320 x LH244.LH245	
NC492xT2	119	20.2	98	NC492 x LH244.LH245	
P31G66	146	20.2	99	Pioneer 31G66	
P31P41	148	19.2	98	Pioneer 31P41	
P33M54	125	19.2	99	Pioneer 33M54	
LSD.05	14	1.3	4	LSD .05 (ENTRY x ENV)	
CV	9	5.	3	C. V. % (ENTRY x ENV)	

T2 = LH244 x LH245

Table 12. Analysis over locations for ex-PVP line single-crosses
Year 2008: Clayton, Lewiston, Sandhills, and Kinston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
AS5707	125	20.4	98	AS5707 x NC368
DKHBA1	136	19.5	99	DKHBA1 x NC368
DKIB014	106	18.1	98	DKIB014 x NC368
DKMDF-13D	111	17.9	91	DKMDF-13D x NC368
DK4676A	103	17.2	97	DK4676A x NC368
DK78371A	115	20.5	97	DK78371A x NC368
LH38	119	19.3	99	LH38 x NC368
LH39	109	17.7	99	LH39 x NC368
LH51	128	18.8	99	LH51 x NC368
LH52	116	16.7	99	LH52 x NC368
LH54	120	18.4	99	LH54 x NC368
LH57	118	17.3	96	LH57 x NC368
LH59	125	18.3	97	LH59 x NC368
LH60	131	19.2	99	LH60 x NC368
LH61	106	18.0	99	LH61 x NC368
LH82	104	17.6	97	LH82 x NC368
LH85	105	17.1	98	LH85 x NC368
LH93	110	17.2	98	LH93 x NC368
LH123Ht	116	19.6	98	LH123Ht x NC368
LH150	130	20.0	99	LH150 x NC368
LH156	121	22.7	99	LH156 x NC368
ML606	119	19.3	90	ML606 x NC368
NK740	120	18.0	98	NK740 x NC368
NK779	60	16.3	84	NK779 x NC368
NK792	101	17.9	100	NK792 x NC368
NQ508	107	17.8	100	NQ508 x NC368
PHG29	100	17.5	99	PHG29 x NC368
PHG35	130	18.7	99	PHG35 x NC368
PHG47	118	16.7	97	PHG47 x NC368
PHG50	96	17.7	99	PHG50 x NC368
PHG72	106	17.7	98	PHG72 x NC368
PHG83	95	17.7	97	PHG83 x NC368
PHG84	123	20.1	99	PHG84 x NC368
PHK42	104	18.0	100	PHK42 x NC368
PHK76	120	19.1	99	PHK76 x NC368
PHN11	101	17.8	100	PHN11 x NC368
PHR36	114	18.2	99	PHR36 x NC368
PHT77	112	18.2	97	PHT77 x NC368
PHV63	109	18.9	99	PHV63 x NC368
PHW65	123	19.1	99	PHW65 x NC368
PHZ51	111	18.7	100	PHZ51 x NC368
PH207	96	17.1	99	PH207 x NC368
Seagull 17	110	17.8	99	Seagull Seventeen x NC368
DK697	146	19.9	98	DeKalb 697
G8288	124	20.3	99	Garst 8288
LH200.LH262	140	19.4	98	LH200 x LH262
NC368 x T6	122	19.3	98	NC368 x LH283.LH287
P31G66	146	19.5	99	Pioneer 31G66
P31D58	143	19.6	99	Pioneer 31D58
LSD .05	15	1.0	4	LSD .05 (ENTRY x ENV)
CV	9	4.	3	C. V. % (ENTRY x ENV)

Table 13. Analysis over NC locations for the better TROPHY Elite Line C6 topcrosses

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
2217-002/07	125	18.5	91	TROPHY EL.L.C6 S1 Sel.	XT12
2217-006/07	127	19.3	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-008/07	128	18.8	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-009/07	125	19.5	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-011/07	128	19.9	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-012/07	123	19.5	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-015/07	130	19.3	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-016/07	134	20.0	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-019/07	122	18.2	96	TROPHY EL.L.C6 S1 Sel.	XT12
2217-022/07	128	19.5	91	TROPHY EL.L.C6 S1 Sel.	XT12
2217-023/07	122	18.8	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-025/07	124	19.3	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-026/07	128	18.6	96	TROPHY EL.L.C6 S1 Sel.	XT12
2217-028/07	128	19.0	98	TROPHY EL.L.C6 S1 Sel.	XT12
2217-029/07	126	18.6	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-030/07	128	19.7	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-031/07	128	19.9	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-034/07	122	18.3	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-036/07	127	19.5	90	TROPHY EL.L.C6 S1 Sel.	XT12
2217-039/07	122	19.5	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-040/07	123	19.9	90	TROPHY EL.L.C6 S1 Sel.	XT12
2217-041/07	127	19.5	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-042/07	134	19.1	90	TROPHY EL.L.C6 S1 Sel.	XT12
2217-043/07	123	20.2	91	TROPHY EL.L.C6 S1 Sel.	XT12
2217-044/07	127	18.3	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-047/07	129	19.9	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-048/07	133	19.2	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-049/07	136	19.5	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-052/07	122	20.6	90	TROPHY EL.L.C6 S1 Sel.	XT12
2217-055/07	127	18.9	91	TROPHY EL.L.C6 S1 Sel.	XT12
2217-056/07	125	18.4	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-058/07	131	18.8	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-060/07	132	19.4	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-062/07	130	18.9	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-064/07	122	19.5	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-067/07	128	19.2	88	TROPHY EL.L.C6 S1 Sel.	XT12
2217-069/07	135	19.1	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-070/07	124	19.9	89	TROPHY EL.L.C6 S1 Sel.	XT12
2217-071/07	131	19.4	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-072/07	123	19.7	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-073/07	125	19.1	93	TROPHY EL.L.C6 S1 Sel.	XT12
2217-075/07	123	19.9	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-077/07	124	19.7	92	TROPHY EL.L.C6 S1 Sel.	XT12
2217-079/07	124	20.2	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-080/07	125	18.2	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-081/07	125	20.1	94	TROPHY EL.L.C6 S1 Sel.	XT12
2217-082/07	124	19.8	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-084/07	126	18.5	89	TROPHY EL.L.C6 S1 Sel.	XT12
2217-085/07	124	20.1	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-086/07	123	19.6	91	TROPHY EL.L.C6 S1 Sel.	XT12
2217-088/07	124	20.0	95	TROPHY EL.L.C6 S1 Sel.	XT12
2217-090/07	124	18.8	93	TROPHY EL.L.C6 S1 Sel.	XT12
DK697	135	18.7	92	DeKalb 697	
G8288	109	19.4	99	Garst 8288	
LH334.LH354	104	16.7	99	LH334 x LH354	
P31G66	119	18.9	97	Pioneer 31G66	
P31G98	133	17.4	94	Pioneer 31G98	
P31P41	143	18.9	98	Pioneer 31P41	
P31R88	121	19.3	96	Pioneer 31R88	
P33M54	121	18.5	98	Pioneer 33M54	
P33V15	117	17.8	97	Pioneer 33V15	
T175	116	18.2	93	T175 x LH334.LH354	
LSD .05	13	.8	5	LSD .05 (ENTRY x ENV)	
CV	8	3.	4	C. V. % (ENTRY x ENV)	

T12 = LH334 x LH354

Table 14. Summary over locations and years for better all-tropical line topcrosses with LH132.LH51

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2007: Clayton, Sandhills, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
566-001/04	121	19.3	95	CML277 43 x NC354 F6S2	XT7
2041-001/05	126	18.9	95	7995-1.7969-1.NC356 F1S5	XT7
2043-001/05	119	18.2	97	Pioneer 3044W.NC300 ^2^F3S4	XT7
2044-003/05	119	18.9	94	Pioneer 3044W.NC300 ^2^F3S4	XT7
2120-001/05	121	18.4	94	NC356 x 105.155/105.306F2S4	XT7
2125-001/05	127	19.5	94	NC356 x DKB-806.PM212GaF2S4	XT7
2127-001/05	124	20.1	92	NC298xAsg.775 4X, trop F4S3	XT7
2138-001/05	117	18.6	95	P3020W wh F4S3 x LH132.LH51	
DK697	128	18.4	91	DeKalb 697	
G8288	125	18.7	99	Garst 8288	
LH132.LH51	116	17.0	98	LH132 x LH51	
P31G98	134	16.4	96	Pioneer 31G98	
P32D99	139	18.6	97	Pioneer 32D99	
LSD .05	8	.6	4	LSD .05 (ENTRY x ENV)	
CV	6	3.	4	C. V. % (ENTRY x ENV)	

T7 = LH132 x LH51

Table 15. Analysis over NC locations for all-tropical line topcrosses

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
566-001/04	121	19.6	94	CML277 43 x NC354 F6S2	XT7
2041-001/05	126	19.1	93	7995-1.7969-1.NC356 F1S5	XT7
2043-001/05	118	18.4	96	Pioneer 3044W.NC300 ^2^F3S4	XT7
2043-002/05	115	18.4	96	Pioneer 3044W.NC300 ^2^F3S4	XT7
2044-003/05	115	19.2	93	Pioneer 3044W.NC300 ^2^F3S4	XT7
2120-001/05	119	18.6	94	NC356 x 105.155/105.306F2S4	XT7
2125-001/05	125	20.0	91	NC356 x DKB-806.PM212GaF2S4	XT7
2127-001/05	122	20.3	90	NC298xAsg.775 4X, trop F4S3	XT7
2138-001/05	114	18.6	93	P3020W wh F4S3	XT7
381-002/04	115	17.0	90	C606 50%CB.xNC296 ^2^ F3S5 w	XT7
3912-001/05	116	20.1	94	K2301.PM703 F6S7 3564-2	XT7
3913-001/05	120	20.0	94	K2301.PM703 F6S7 3564-2	XT7
DK697	124	18.7	89	DeKalb 697	
G8288	118	19.0	99	Garst 8288	
LH132.LH51	113	17.0	97	LH132 x LH51	
NC300 x T7	117	19.1	97	NC300 x LH132.LH51	
NC320 x T7	123	17.4	95	NC320 x LH132.LH51	
NC346 x T7	118	18.3	90	NC346 x LH132.LH51	
NC492 x T8	111	18.8	94	NC492 x FR992.FR1064	
P31G66	127	17.9	97	Pioneer 31G66	
P31G98	133	16.7	94	Pioneer 31G98	
P32D99	138	19.3	96	Pioneer 32D99	
LSD .05	11	.8	6	LSD .05 (ENTRY x ENV)	
CV	7	3.	5	C. V. % (ENTRY x ENV)	

T7 = LH132 x LH51
T8 = FR992 x FR1064
T10 = FR615 X FR697
T11 = LH132 x FR1064

Table 16. Summary over NC locations for better all-tropical line topcrosses
2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE	
3458-001/05	120	20.0	95	3564-2.6959-2 F1S5 x P33M54	
8331-001/06	126	18.4	92	4013-1/99 7798.296	XT2
NC296	120	17.2	90	NC296 x LH245.LH244	
NC296A	151	17.9	90	NC296A x LH245.LH244	
NC298	118	18.7	95	NC298 x LH245.LH244	
NC300	110	18.6	97	NC300 x LH244.LH245	
NC302	121	19.6	96	NC302 x LH245.LH244	
NC304	132	18.8	92	NC304 x LH245.LH244	
NC338	116	17.9	93	NC338 x LH244.LH245	
NC340	120	18.6	96	NC340 x LH244.LH245	
NC346	117	17.4	92	NC346 x LH245.LH244	
NC348	127	18.7	96	NC348 x LH245.LH244	
NC350	126	19.0	91	NC350 x LH244.LH245	
NC354	111	19.3	90	NC354 x LH245.LH244	
NC394	114	19.1	98	NC394 x LH244.LH245	
NC396	115	18.9	93	NC396 x LH245.LH244	
NC398	121	18.5	96	NC398 x LH244.LH245	
NC400	113	18.4	93	NC400 x LH244.LH245	
NC446	120	19.2	92	NC446 x LH244.LH245	
NC446	123	18.5	91	NC446	XT7
NC448	113	18.4	95	NC448 x LH244.LH245	
NC450	118	17.8	88	NC450 x LH244.LH245	
NC452	124	17.4	89	NC452 x LH244.LH245	
NC456	112	19.3	94	NC456 x LH244.LH245	
NC458	120	19.8	94	NC458 x LH244.LH245	
NC460	115	18.3	96	NC460 x LH245.LH244	
NC460	113	18.0	99	NC460	XT11
NC462	119	18.3	98	NC462 x LH245.LH244	
NC464	117	17.9	86	NC464 x LH245.LH244	
NC508	114	18.7	96	NC508 x LH244.LH245	
NC510	115	19.0	93	NC510 x LH244.LH245	
NC512	122	17.9	92	NC512	XT2
NC512	121	17.7	91	NC512	XT10
DK697	132	17.9	92	DeKalb 697	
G8288	109	18.1	97	Garst 8288	
LH200.LH262	128	17.7	96	LH200 x LH262	
NC320xT2	121	18.2	92	NC320 x LH244.LH245	
NC368xT6	109	16.9	94	NC368 x LH283.LH287	
NC492xT2	118	18.8	89	NC492 x LH244.LH245	
P31G66	133	17.7	99	Pioneer 31G66	
P31G98	130	16.8	97	Pioneer 31G98	
P31D58	136	17.9	98	Pioneer 31D58	
P31P41	136	17.8	98	Pioneer 31P41	
P32D99	124	18.7	94	Pioneer 32D99	
P33M54	123	17.7	94	Pioneer 33M54	
LSD .05	15	.9	7	LSD .05 (ENTRY x ENV)	
CV	10	4.	6	C. V. % (ENTRY x ENV)	

T2 = LH244 x LH245
T6 = LH283 x LH287
T7 = LH132 x LH51
T10 = FR615 X FR697
T11 = LH132 x FR1064

Table 17. Comparison of 6 potential testers across 13 tropical lines; 2 years; 10 total NC locations

	FR615.FR697			NSS1.NSS2			NSS3.NSS4			LH132.FR1064			SS1.SS2			SS3.SS4			Inbred Means		
	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%
89291	117	20.2	85	124	20.2	80	130	20.0	86	124	19.8	86	122	20.8	90	126	19.6	85	123.8	20.1	85.3
BO46W	103	21.4	95	123	20.9	90	120	20.3	94	112	20.3	96	113	21.8	96	108	20.3	97	113.2	20.8	94.7
CML10	106	22.2	89	123	21.4	88	128	20.7	85	123	20.8	89	118	23.1	91	115	21.6	93	118.8	21.6	89.2
CML108	119	19.3	95	127	19.6	94	120	19.3	92	117	18.5	96	121	20.3	97	119	19.4	96	120.5	19.4	95.0
CML157Q	120	20.2	94	128	20.4	91	117	19.8	95	116	19.9	97	120	20.6	97	115	20.1	98	119.3	20.2	95.3
CML258	114	22.2	91	119	21.6	92	118	20.5	94	121	20.4	94	126	23.3	97	118	21.5	97	119.3	21.6	94.2
CML274	121	20.2	96	133	19.9	91	126	19.7	93	126	19.3	97	129	21.5	96	122	19.3	96	126.2	20.0	94.8
CML277	125	21.2	92	122	21.8	91	131	20.9	94	120	21.5	95	126	22.7	96	126	21.5	96	125.0	21.6	94.0
CML341	127	21.0	96	127	21.2	92	131	20.2	96	131	19.6	94	136	21.7	97	130	20.3	96	130.3	20.7	95.2
CML343	128	20.8	93	140	20.7	91	136	20.0	95	129	20.0	96	128	22.1	96	128	20.6	96	131.5	20.7	94.5
CML373	118	21.5	95	127	21.4	97	127	20.7	94	121	20.6	98	119	22.4	98	120	20.9	97	122.0	21.3	96.5
Tzi8	112	21.0	96	121	22.8	93	122	21.6	94	120	21.8	96	127	23.1	95	122	21.1	95	120.7	21.9	94.8
Tzi9	122	20.6	86	118	20.9	85	118	20.7	90	113	19.9	92	120	20.7	93	122	19.7	95	118.8	20.4	90.2
MEANS	118	20.9	93	126	21.0	90	125	20.3	93	121	20.2	94	124	21.9	95	121	20.5	95	122.3	20.8	93.4
LSDs	3.2	0.3	1.2	(for testers)													For inbreds>		4.7	0.5	1.8
CVs	3.3	1.9	1.7																3.3	1.9	1.7

F-Tests (all with Prob<0.0001; F-tests CVs and LSDs all based on Inbred x Tester Mean Square):

Inbreds	9.3	22.7	24.3
Testers	6.7	31.3	19.1

Table 18. Comparison of 8 potential testers across 7 temperate-adapted, all-tropical lines, plus 1 southern (NC320) line; 2 years; 10 total NC locations

	FR615.FR697			LH283.LH287			NSS1.NSS2			NSS3.NSS4			LH132.FR1064			LH244.LH245			SS1.SS2			SS3.SS4			Inbred Means		
	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%	YLD	H2O%	EP%
NC296	115	18.3	92	120	18.5	88	132	19.1	86	127	18.1	91	127	17.1	94	123	17.8	92	138	18.8	94	128	17.7	93	126.3	18.2	91.3
NC298	118	19.0	93	115	18.7	95	118	19.2	92	116	18.6	96	120	18.9	96	115	19.2	96	120	19.6	95	108	18.6	97	116.3	19.0	95.0
NC300	118	18.9	97	116	19.2	92	123	19.6	92	127	19.0	94	116	18.6	97	120	18.7	97	121	19.5	97	111	18.4	97	119.0	19.0	95.4
NC320	124	17.0	96	131	17.4	91	136	18.1	90	131	17.3	95	119	17.7	96	123	17.2	93	131	18.2	93	126	17.3	97	127.6	17.5	93.9
NC346	112	18.5	94	122	18.7	90	136	19.2	87	129	18.2	92	127	17.8	95	128	17.9	93	133	19.4	98	129	17.7	96	127.0	18.4	93.1
NC350	111	19.1	88	113	18.2	81	115	20.0	84	125	18.9	83	123	18.7	92	123	19.2	88	126	19.1	91	122	18.8	94	119.8	19.0	87.6
NC400	121	18.6	87	123	18.9	84	134	19.6	89	126	18.2	91	121	18.2	92	123	18.4	92	131	18.7	94	121	18.0	97	125.0	18.6	90.8
NC464	113	17.9	89	122	18.5	82	124	18.6	89	121	18.3	92	118	17.9	94	112	18.2	91	120	19.0	95	114	17.8	96	118.0	18.3	91.0
MEANS	117	18.4	92	120	18.5	88	127	19.2	89	125	18.3	92	121	18.1	95	121	18.3	93	128	19.0	95	120	18.0	96	122.4	18.5	92.3
LSDs	4.3	0.3	2.0																						4.3	0.3	2.0
CVs	3.5	1.7	2.2																						3.5	1.7	2.2

F-Tests (all with Prob<0.0001; F-tests CVs and LSDs all based on Inbred x Tester Mean Square):

Inbreds	8.9	22.0	13.3
Testers	6.5	14.2	16.1

Appendix Table A1. Summary for better GEM lines tested for 3 years

2006-2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
4171-009/03	123	18.4	91	FS8B(T):N18 F1S1 x FR992.FR1064
1601-003/03	134	17.9	93	7258-3 SCR Gp3 N14 F2S3 XT8
DK697	137	17.7	89	DeKalb 697
G8288	132	18.1	98	Garst 8288
HC33.TR7322	118	15.8	89	HC33 x TR7322
LH200.LH262	134	17.4	88	LH200 x LH262
P31G98	147	16.5	92	Pioneer 31G98
LSD .05	7	.6	6	LSD .05 (ENTRY x ENV)
CV	7	4.	10	C. V. % (ENTRY x ENV)

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2007: Clayton, Sandhills, and Lewiston, NC
2006: Clayton, Sandhills, Kinston, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
2445-002/04	133	17.5	94	1721-27 CHS775N19S4w2405-10 XT8
h7115-02/03	131	17.3	95	B2410-3/99 SCR Gp3 N14 F2S4 XT8
h7115-03/03	130	18.1	97	B2410-3/99 SCR Gp3 N14 F2S4 XT8
2204-003/04	129	16.7	89	Cr1-044PE1 N16 F2S4 3104-1 XT8
8076-002/04	133	16.9	89	PE1 N16F2S4 Cr1-341 3106-012 XT8
DK697	143	18.1	92	DeKalb 697
G8288	137	18.5	97	Garst 8288
P31G98	149	16.7	92	Pioneer 31G98
LSD .05	8	.7	5	LSD .05 (ENTRY x ENV)
CV	7	5.	7	C. V. % (ENTRY x ENV)

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2006-2007: Clayton, Sandhills, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
546-001/04	113	19.0	92	TROP S1Sel C6#S4 6141-20/96 XT7
559-001/04	112	18.0	93	TR S1SelC6#S4 6141-184/96red XT7
409-001/04	111	18.3	92	TROP El.L.C2 S5 6341-15 8/ XT7
538-001/04	112	17.5	95	TROPHY El.L.C2 $#$ 6341-78S4 XT7
541-001/04	115	18.2	94	TROPHY El.L.C2$#$6341-138 S4 XT7
542-002/04	113	18.9	96	TROPHY El.L.C2$#$6341-140 S4 XT7
542-003/04	115	19.2	97	TROPHY El.L.C2$#$6341-140 S4 XT7
G8288	118	18.3	97	Garst 8288
LH132.LH51	109	16.6	99	LH132 x LH51
LH200.LH262	122	17.7	94	LH200 x LH262
P31G98	129	16.9	96	Pioneer 31G98
P32W86	120	16.8	97	Pioneer 32W86
LSD .05	7	.6	3	LSD .05 (ENTRY x ENV)
CV	8	4.	4	C. V. % (ENTRY x ENV)

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2007: Clayton, Sandhills, and Lewiston, NC
2006: Clayton, Sandhills, Kinston, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
2259-001/04	121	17.5	93	7521-05 DK370AN11F2S4 1881-2 XT8
2289-001/04	125	17.3	89	7521-05 DK370AN11F2S4 1883-2 XT8
2301-002/04	123	18.3	92	7521-05 DK370AN11F2S4 1886-3 XT8
2311-001/04	125	17.3	88	7521-05 DK370AN11F2S4 1886-3 XT8
DK697	140	18.0	90	DeKalb 697
G8288	133	18.4	97	Garst 8288
LH200.LH262	136	17.5	90	LH200 x LH262
P31G98	141	16.7	90	Pioneer 31G98
LSD .05	9	.5	7	LSD .05 (ENTRY x ENV)
CV	9	3.	9	C. V. % (ENTRY x ENV)

2006 & 2008: Clayton, Sandhills, Kinston, Lewiston, & Plymouth, NC
2007: Clayton, Sandhills, and Lewiston, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
h7028-04/03	126	17.6	93	3485-002/00 DKXL380 N11 F2S4 XT8
911-002/04	131	17.8	91	B9527-01XL380N11 F2S4 XT8
DK697	139	18.1	88	DeKalb 697
G8288	134	18.4	97	Garst 8288
P31G98	145	17.0	89	Pioneer 31G98
LSD .05	7	.5	6	LSD .05 (ENTRY x ENV)
CV	6	3.	8	C. V. % (ENTRY x ENV)

T7 = LH132 x LH51; T8 = FR992 x FR1064

Appendix Table A2. Summaries of new 3rd year GEM trials

2008: Clayton, Sandhills, Kinston, and Lewiston, NC
2007: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2006: Kinston, N.C.

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
891-001/04	130	18.7	93	7451-03DK888 N11F2S3 3291-1 XT8
DK697	146	18.2	94	DeKalb 697
G8288	138	19.1	98	Garst 8288
HC33.TR7322	123	16.1	95	HC33 x TR7322
LH200.LH262	136	18.1	94	LH200 x LH262
P31G98	152	17.2	92	Pioneer 31G98
LSD .05	9	.6	6	LSD .05 (ENTRY x ENV)
CV	7	4.	7	C. V. % (ENTRY x ENV)

T8 = FR992 x FR1064

Appendix Table A3. Summaries of new 2nd year GEM trials
2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2007: Kinston, N.C.

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
751-006/02	121	18.6	96	7451-27 DK888 N11F2S3 9375-1 XT2
751-008/02	114	19.0	93	7451-27 DK888 N11F2S3 9375-1 XT2
751-027/02	115	19.1	93	7451-27 DK888 N11F2S3 9375-1 XT2
751-030/02	123	19.4	94	7451-27 DK888 N11F2S3 9375-1 XT2
751-032/02	113	18.8	96	7451-27 DK888 N11F2S3 9375-1 XT2
751-037/02	117	18.6	95	7451-27 DK888 N11F2S3 9375-1 XT2
771-007/02	124	19.4	95	7451-27 DK888 N11F2S3 1776-1 XT2
771-013/02	120	19.8	93	7451-27 DK888 N11F2S3 1776-1 XT2
DK697	138	18.8	91	DeKalb 697
HC33.TR7322	109	16.7	97	HC33 x TR7322
P31G98	134	17.7	92	Pioneer 31G98
P32D99	143	20.1	96	Pioneer 32D99
LSD .05	13	.7	5	LSD .05 (ENTRY x ENV)
CV	9	3.	5	C. V. % (ENTRY x ENV)

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
2007: Plymouth, N.C.

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
2481-001/05	110	18.2	95	CL-G1607 N11 F21 F2S2 XT11
2491-007/05	117	18.1	95	CL-G1607 N11 F21 F2S2 XT11
DK697	135	18.4	92	DeKalb 697
HC33.TR7322	105	16.1	97	HC33 x TR7322
P31G98	131	17.1	92	Pioneer 31G98
P32D99	140	19.8	96	Pioneer 32D99
LSD .05	14	.8	6	LSD .05 (ENTRY x ENV)
CV	11	4.	6	C. V. % (ENTRY x ENV)

2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC
Kinston, N.C.

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
2499-001/05	113	18.3	95	NEI9004 S28F1S3 x FR615.FR697
2521-001/05	112	18.5	91	NS1 S08 F1S3 x FR615.FR697
2521-002/05	113	18.4	96	NS1 S08 F1S3 x FR615.FR697
DK697	135	18.7	91	DeKalb 697
HC33.TR7322	109	16.2	97	HC33 x TR7322
P31G98	133	17.4	92	Pioneer 31G98
LSD .05	13	.8	6	LSD .05 (ENTRY x ENV)
CV	10	4.	6	C. V. % (ENTRY x ENV)

T2 = LH244 x LH245
T11 = LH132 x FR1064

Appendix Table A4. Three year summary of ex-PVP line topcrosses with FR615.FR697 and FR992.FR1064
2008: Clayton, Sandhills, Kinston, and Lewiston, NC
2006-2007: Clayton, Sandhills, Kinston, Lewiston, & Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
AS6103	95	15.8	96	AS6103 x FR615.FR697
DJ7	127	16.3	96	DJ7 x FR615.FR697
DKFAPW	112	15.0	92	DKFAPW x FR615.FR697
DKHBA1	120	17.1	97	DKHBA1 x FR1064.FR992
DKHBA1	121	16.4	94	DKHBA1 x FR615.FR697
DKMBNA	119	15.5	95	DKMBNA x FR992.FR1064
DKMDF-13D	120	16.0	92	DKMDF-13D x FR992.FR1064
DK78010	117	15.0	98	DK78010 x FR615.FR697
F42	118	16.6	97	F42 x FR615.FR697
FR19	116	15.0	96	FR19 x FR615.FR697
LH1	119	16.3	94	LH1 x FR615.FR697
LH38	112	15.7	98	LH38 x FR992.FR1064
LH39	110	15.2	97	LH39 x FR992.FR1064
LH51	122	16.0	97	LH51 x FR992.FR1064
LH74	108	15.1	96	LH74 x FR615.FR697
LH82	112	15.6	97	LH82 x FR992.FR1064
LH93	115	15.0	96	LH93 x FR992.FR1064
LH93	117	15.1	93	LH93 x FR615.FR697
LH119	120	16.6	96	LH119 x FR615.FR697
LH123Ht	115	16.6	97	LH123Ht x FR992.FR1064
LH132	122	16.2	97	LH132 x FR615.FR697
LH143	102	14.7	94	LH143 x FR615.FR697
LH145	90	14.9	93	LH145 x FR615.FR697
LP1 CMSHt	110	14.6	95	LP1 CMS Ht x FR615.FR697
LP1 NRHt	106	14.8	96	LP1 NR Ht x FR615.FR697
PHB09	108	15.1	93	PHB09 x FR615.FR697
PHB47	118	14.9	94	PHB47 x FR615.FR697
PHG35	121	16.4	96	PHG35 x FR992.FR1064
PHG39	123	16.1	98	PHG39 x FR615.FR697
PHG50	108	15.8	98	PHG50 x FR992.FR1064
PHG72	106	15.6	94	PHG72 x FR1064.FR992
PHG72	109	15.2	93	PHG72 x FR615.FR697
PHG80	100	16.0	98	PHG80 x FR615.FR697
PHZ51	115	15.9	96	PHZ51 x FR1064.FR992
PHZ51	113	15.4	98	PHZ51 x FR615.FR697
PH207	97	15.2	99	PH207 x FR992.FR1064
Seagull 17	129	15.5	96	Seagull Seventeen x FR992.FR1064
DK697	159	18.1	91	DeKalb 697
LH310.LH256	130	18.9	97	LH310 x LH256
G8288	143	18.3	93	Garst 8288
NC328 x T10	121	16.7	98	NC328 x FR615.FR697
NC346 x T7	129	17.8	95	NC346 x LH132.LH51
P31G98	160	16.5	97	Pioneer 31G98
P32D99	162	18.9	94	Pioneer 32D99
LSD .05	8	.4	4	LSD .05 (ENTRY x ENV)
CV	9	4.	5	C. V. % (ENTRY x ENV)

Appendix Table A5. One year summary of ex-PVP line topcrosses 2008: Clayton, Sandhills, Kinston, Lewiston, and Plymouth, NC

SOURCE	YLD B/A	% MOIS	% EP	PEDIGREE
AS5707	118	18.3	96	AS5707 x FR992.FR1064
AS5707	102	17.2	94	AS5707 x FR615.FR697
AS6103	106	16.7	94	AS6103 x FR615.FR697
DJ7	135	16.9	97	DJ7 x FR615.FR697
DKFAPW	107	16.1	88	DKFAPW x FR615.FR697
DKHBA1	115	18.3	97	DKHBA1 x FR1064.FR992
DKHBA1	128	17.5	92	DKHBA1 x FR615.FR697
DKIB014	113	16.9	96	DKIB014 x FR615.FR697
DKMBNA	111	16.3	94	DKMBNA x FR992.FR1064
DKMDF-13D	119	16.9	91	DKMDF-13D x FR992.FR1064
DK78002A	104	16.1	98	DK78002A x FR615.FR697
DK78004	116	16.6	97	DK78004 x FR615.FR697
DK78010	116	16.0	98	DK78010 x FR615.FR697
F42	119	17.4	96	F42 x FR615.FR697
FR19	113	15.9	94	FR19 x FR615.FR697
LH1	124	17.2	96	LH1 x FR615.FR697
LH38	114	16.7	97	LH38 x FR992.FR1064
LH39	107	16.3	97	LH39 x FR992.FR1064
LH51	120	17.1	96	LH51 x FR992.FR1064
LH74	111	16.1	96	LH74 x FR615.FR697
LH82	104	16.7	95	LH82 x FR992.FR1064
LH93	109	16.1	96	LH93 x FR992.FR1064
LH93	115	16.3	91	LH93 x FR615.FR697
LH119	116	17.4	95	LH119 x FR615.FR697
LH123Ht	114	17.3	96	LH123Ht x FR992.FR1064
LH132	130	16.9	97	LH132 x FR615.FR697
LH143	99	15.2	94	LH143 x FR615.FR697
LH145	86	15.4	87	LH145 x FR615.FR697
LP1 CMSHt	114	15.6	95	LP1 CMS Ht x FR615.FR697
LP1 NRHt	118	15.5	95	LP1 NR Ht x FR615.FR697
PH207	94	16.2	99	PH207 x FR992.FR1064
PHB09	104	16.2	95	PHB09 x FR615.FR697
PHB47	122	15.6	91	PHB47 x FR615.FR697
PHG29	109	15.6	93	PHG29 x FR615xFR697
PHG35	115	17.2	97	PHG35 x FR992.FR1064
PHG39	116	17.5	97	PHG39 x FR615.FR697
PHG50	106	16.8	98	PHG50 x FR992.FR1064
PHG71	97	15.0	99	PHG71 x FR615xFR697
PHG72	106	16.7	89	PHG72 x FR1064.FR992
PHG72	110	16.1	87	PHG72 x FR615.FR697
PHG80	105	16.8	96	PHG80 x FR615.FR697
PHG83	116	16.0	96	PHG83 x FR615xFR697
PHJ40	86	16.1	96	PHJ40 x FR992.FR1064
PHJ40	81	15.5	98	PHJ40 x FR615.FR697
PHZ51	111	16.7	95	PHZ51 x FR1064.FR992
PHZ51	110	16.6	97	PHZ51 x FR615.FR697
Q381	97	15.2	97	Q381 x FR615.FR697
Seagull 17	116	16.4	97	Seagull Seventeen x FR992.FR1064
DK697	156	19.0	84	DeKalb 697
G8288	144	19.5	98	Garst 8288
LH310.LH256	137	19.9	98	LH310 x LH256
NC328 x T10	128	17.8	99	NC328 x FR615.FR697
NC346 x T7	125	18.8	97	NC346 x LH132.LH51
NC492 x T8	134	19.7	93	NC492 x FR992.FR1064
P31G98	160	17.9	97	Pioneer 31G98
P32D99	163	20.3	96	Pioneer 32D99
LSD .05	14	.7	8	LSD .05 (ENTRY x ENV)
CV	8	3.	6	C. V. % (ENTRY x ENV)

T7 = LH132 x LH51
T8 = FR992 x FR1064
T10 = FR615 X FR697