Corn Performance Trials in Quincy and Gainesville, Florida

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INTRODUCTION

Corn *(Zea mays* L.) is an important agronomic crop in Florida, being produced for use as grain and silage in livestock rations. From 1985 to 1995 corn acreage in Florida decreased from 240,000 to 60,000 a. Average yield during the same period increased from 65 to 90 bu/a In 1996, corn acreage increased to 100,000 a.

Commercial corn hybrids are evaluated at various University of Florida, Inst. Food & Agr. Sci. (IFAS) locations in the state to aid producers in selecting varieties to plant. A small effort has also been underway for *several* years by IFAS, to develop subtropical hybrids adapted to cropping systems and environmental conditions in Florida. This report summarizes some of the results of corn performance trials conducted at the North Florida Research and Education Center (NFREC), Quincy and on the Florida Experiment Station and commercial farms near Gainesville, Florida.

MATERIALS AND METHODS

Performance Trials at Quincy

The NFREC test site was turned with a moldboard plow in late February 1996. Immediately prior to planting 1000 lb/a of 5-10-15 (N-P_2O_5-K_2O) and Sutan:Aatrex at 3 lb/a a i : l lb/a a.i., were incorporated. Following planting Counter^R 15G was banded over the row at 15 lb/a. Additional nutrients were applied in 2 applications to give a total of 300-200-300 lb N-P_2O_5-K_2O/a. Plots were machine planted at about 1.5X the desired population in early April for spring plantings and hand thinned after emergence to a final population of 30,000 plants/a. Soil type was Norfolk loamy fine sand. Overhead sprinklers were used as needed to maintain optimum soil moisture conditions for corn production. Corn was harvested in early September with grain yields reported at 15.5% moisture. This same management is typical for other years for early planted corn experiments at Quincy.

Tropical corn tests were planted in early June each year with the same herbicide and insecticide practices. Total nutrients were 200-100-200 lb N-P_2O_5-K_2O/a applied half preplant and half when about knee high Corn was harvested in late October and grain yield reported at 15.5% moisture and forage yield reported at 70 % moisture.

Performance Trials at Gainesville

Commercial hybrids and IFAS experimental subtropical hybrids and open pollinated entries were tested from 1991 to 1996 at various dates and locations around Gainesville, Florida. Overhead sprinkler irrigated tests at the Green Acres Agronomy Field Laboratory were at 30,000 plants/a. Trials on farms were planted to 26,000 plants/a if irrigated and 22,000 plants/a if unirrigated. Fertility management was based on IFAS soil test recommendations. Early tests were planted in early to mid March, mid planting dates were late May and late planting dates were early to mid July. Labeled rates of Atrazine and Dual were used preemergence as well as cultivation when needed in conventional tillage plantings. Counter was used for May and July planted corn at labeled rates. Lannate was also used for foliar feeding insects in split applications at labeled rates for July planted corn and as needed for May planted corn. Some trials were planted by hand, but most were planted with John Deere Flexi 71 planters attached to a Brown-Harden row-till (strip-till) two row planter. Grain yields were adjusted to 15.5 % moisture and forage 70 % moisture.

RESULTS AND DISCUSSION

Performance Trials at Quincy

Table 1 shows performance of temperate hybrids at the NFREC test site. Average production for 2 and 3 yr is included for those that were tested in those years, since performance for more than one yr should be considered when selecting hybrids for planting. Grain quality rating and number of days from planting to silking are included in Table 1. Data are averages of four replications and no other ANOVA mean separation is given However, the average yield ranged from a high of almost 194 bu/a to a low of 124 bu/a. Most of these hybrids had very good to average grain quality. Good management and hybrid selection should make for reasonably good corn grain yields in north Florida.

The long growing season in Florida allows time to grow two or more crops on the same land in the same year (Bustillo and Gallaher, 1989; Edme, 1994; Overman

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and Gallaher, 1989). Many multiple cropping systems are possible which included corn as a second or summer crop. For example, thousands of acres of vegetables and small grain are grown each year in the late winter and early spring. If corn cultivars were available and adapted to late planting, there is plenty of frost free time to plant and grow corn as a second crop in these. double cropping systems (Edme, 1994). Since this potential exists, there is a need to evaluate available germplasm that may have some disease and insect resistance or tolerance that has limited photoperiod sensitivity and is competitive with other crops like soybean *(Glycine max* [L.] Merr) and grain sorghum *(Sorghum bicolor* [L.] Moench). Past history indicate that tropical/subtropical corn may be the proper choice for such late plantings. These tropical and subtropical corn hybrids can be planted later than temperate hybrids and fit better into some double cropping systems Table 2 shows performance of some tropical and subtropical hybrids at NFREC, Quincy, Florida. Pioneer brand hybrid X304C is the standard tropical corn hybrid from which all others can be judged. Data in 1995 from Quincy, revealed that Florida subtropical Experimental hybrid 'Howard IIIST was quite competitive not only with Pioneer Brand hybrid X304C but with all commercial and experimental hybrids tested (Stanley, 1996). Reasonable grain and forage yields can be expected with the proper choice and management of tropical/subtropical corn planted in the Quincy, Florida area in early June (Table 2). Highest average yield for corn for forage was with Florida Experimental subtropical hybrid Howard IIIST in 1995 at Quincy (Table 2) (Stanley, 1996).

Performance Trials at Gainesville

The evaluation of several Florida subtropical experimental hybrids planted in mid-march, 1996 at Gainesville, Florida showed that both Howard IIIST and 'Howard IIST' would be very competitive for both grain and forage yield (Table 3). Both of these hybrids far surpassed the yield of Pioneer brand hybrid X304C. These data would indicate that Howard IIST and Howard IIIST subtropical corn hybrids produce yields that may be competitive with those often reported by temperate hybrids when planted in early spring. Several on-farm and experiment station experiments in the Gainesville, Florida area consistently show that the above mentioned Howard hybrids out yielded Pioneer brand hybrid X304C (data not shown). Several recent unreported experiments have shown that both Howard IIST and Howard IIIST have significantly less root-knot nematode infestation compared to Pioneer Brand hybrid X304C.

Both of the Howard hybrids are earlier maturing than Pioneer Brand hybrid X304C. Howard IIIST and Howard IIST are earlier to silking than Pioneer Brand hybrid X304C by 11 and 6 d, respectively (Table 3). Early maturity is an important consideration for late planted corn. Early maturity should speed up vegetative development and allow more time for development of grain during the fall when both light and heat units available for grain filling is steadily decreasing (Bustillo and Gallaher, 1989). Experiments have shown that, in general, temperate hybrids outyield tropical hybrids when planted early in the spring (Edme, 1994). This is not always the case (Table 4). Under good management both Pioneer Brand hybrid X304C and Florida Experimental hybrid Howard IIIST were among the top yielding hybrids in a mid-March planting (Table 4). Temperate hybrid Pioneer Brand 3320 had the greatest drop in yield due to planting date (Table 4) which has typically been found for most temperate hybrids tested over the years. The data in table 2 suggest that the hybrid of choice over all three planting dates of mid-March, mid-May and mid-July would be Florida experimental hybrid Howard IIIST when planted under high yielding irrigated conditions. Under good management but without irrigation, both Howard IIIST and Pioneer Brand hybrid X304C were equal in yield and both would be the choice to plant at any of the early to late planting dates among the hybrids tested.

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Table 1. Performance *of* corn hybrids at NFREC Quincy, Florida

Company or Brand Name	Variety	1996	2-Yr Avg.	3-Yr Avg.	Grain Quality	Days to Silking
		---------- Bu/a @ 15.5% Moisture ----------				
Pioneer	3146	193.7	179.8	156.9	2.00	64.7
Cargill	8325	193.1			2.25	64.0
Pioneer	3245	192.8	185.8	158.3	2.25	64.0
Pioneer	3163	191.2	163.3	152.7	3.00	64.2
Hyperformer	9919	184.2			3.00	64.5
Pioneer	3223	183.5			2.25	65.2
DeKalb	DK 714	178.1			2.00	63.5
Northrup King	N 7931	177.3			2.50	61.7
DeKalb	DK 706	176.0			2.00	63.7
Pioneer	3085	174.7	170.0	149.2	2.00	66.2
Cargill	X9513	171.5			2.50	65.0
Northrup King	N 8811	168.6	180.0	153.5	1.75	64.5
Cargill	8527A	168.3			2.00	64.5
Hyperformer	9845	167.2			2.00	63.7
DeKalb	DK 687	166.9			1.75	64.7
Pioneer	3154	163.6	164.8	144.1	2.00	62.7
DeKalb	DK 683	162.6	176.2	167.0	2.00	64.7
Hyperformer	9977	159.2			2.25	65.0
Northrup King	N 8655	158.5			2.00	64.7
AgraTech	AT 888	156.0			2.25	64.5
Pioneer	3167	152.5	148.6	137.7	2.00	66.5
Northrup King	McNair 508	141.5	133.4	124.7	1.75	72.0
FL *Exp*	Howard IIST	124.1			1.75	72.2
FL Exp	Howard IIIST	123.6			2.00	66.2

Grain Quality: 1 = Excellent, 5 - Poor; Days to silking is days from planting to 50 % showing; FL Exp = Florida Experimental subtropical hybrids 1996 information: Planted 9 April 1996; 30,000 plants/a in 36-in rows; Norfolk loamy fine sand; 300-200-300 lb N-P_2O_5-K_2O/a; optimum irrigation; harvested 9 September 1996.

Table 2. Yield of tropical/subtropical hybrids at NFREC, Quincy, Florida

Company or Brand Name	Variety	1996	2-Yr Avg.	3-47 Avg.	Forage 1995	Forage 2-47 Avg.
		---------- Bu/a @ 15.5% Moisture ----------			- Ton/a @ 70 % Moisture -	
Zeneca	8452	105.8	92.0	92.2	16.7	16.7
Pioneer	X304C	92.6	89.5	74.6	16.6	17.5
FL Exp	16-91XF21	92.1				
FL Exp	Howard IIIST	88.4	85.4		17.6	
Zeneca	8392	87.1	99.2	92.9	15.9	15.5
Zeneca	8455	87.1	84.5		16.6	
FL Exp	BM33X5Y53	87.1				
FL Exp	SY20XBY31	86.0				
Zeneca	8501	85.0	82.1		15.6	
Pioneer	3098	80.9	75.0	69.1	15.3	15.8
FL Exp	Howard IIST	79.2				
Zeneca	8568	76.4	84.6	89.4	14.5	15.3
FL Exp	BM4XSW41	76.1				
Zeneca	8202	75.6	71.9	67.5	16.6	
FL Exp	BY12X5Y20	73.7				
FL Exp	FLSTOP	70.3	56.8		16.6	
FL Exp	BM5XSY56	69.0	60.8			

19% information: Planted 6 June 19%; 22,000 plants/a in 36-in rows; Norfolk loamy fine sand; 200-100-200 lb/a N-P_2O_5-K_2O/a; **partial** irrigation; Harvested 25 October 1996.

Table 3. Yield and other variables for subtropical/tropical exoerimental corn test. Gainesville. Florida, 1996.

Hybrid/ Cultivar	Grain	Forage	Plant	Ear	Stalk	Final Plants	Final Ears	Initial Flower
	bu/a 15.5%DM	Ton/a 30% DM	Lb/a DM	Lb/a DM	Lb/a DM	Per 50 sq ft	Per 50 sq ft	Days
Howard IIST	193	38.6	23171	11895	11276	34.8	34.2	79
Howard IIIST	188	29.7	17844	10589	7254	38.0	39.8	74
SY20 X BY31	178	29.6	17756	10408	7348	37.6	38.2	75
BY32 X SW3	168	28.9	17347	10197	7150	30.8	33.0	79
BY8 X SM2	167	29.7	17790	9880	7910	39.0	36.8	71
16(91) X F21	158	26.0	15578	9349	6228	34.2	36.2	85
K61 X 29	156	27.4	16466	9569	6897	29.8	29.6	79
BM4 X SW41	154	29.2	17518	9469	8049	37.2	38.2	78
44(92) X 16(91)	150	31.7	19004	9474	9530	34.8	34.4	80
20 X 8(95)	147	24.6	14736	8489	6247	32.4	33.8	76
BY12 X SW20	147	24.5	14680	8381	6299	30.8	29.0	78
BM33 X SY53	146	26.9	16139	8741	7398	36.4	35.4	86
BM5 X SY56	145	27.7	16620	8705	7915	32.8	32.0	80
SY43 X BM4	142	31.0	18619	8753	9866	36.4	35.2	74
Pioneer X304C	138	23.9	14321	8188	6134	31.4	30.8	85
FLASTOP	113	23.1	13893	7243	6650	27.0	24.6	78
LSD =	29	5.3	3184	1738	2332	4.3	3.8	
CV =	14.7	14.8	14.8	14.7	24.1	9.9	8.8	

1996information: Green Acres Agronomy Research Field Laboratory; randomized complete block-5 replications; planted 21 March 1996; 34,500 plants/a in 30-in rows; Kendrick sand; 280-20-140 lb/a N-P_2O_5-K_2O/a; optimum irrigation; Harvested 15 July 1996.

Table 4. Planting date and water management on yield of temperate and tropical corn hybrids, Gainesville, FL

Hybrid	Hybrid Type	Planting Period	Yield		Yield Loss	
			Irrigated	Nonirrigated	Irrigated	Nonirrigated
			bu/a		%	
Pioneer 3165	Temperate	Mid March	188.6 a	136.2 a	100	100
Howard IIIST	Sub Tropical	Mid March	176.7 ab	140.4 a	100	100
Pioneer X304C	Tropical	Mid March	175.5 ab	140.3 a	100	100
Pioneer 3320	Temperate	Mid March	171.7 b	130.2 a	100	100
Pioneer 3394	Temperate	Mid March	169.2 b	139.9 a	100	100
Pioneer 3165	Temperate	Mid May	131.8 a	101.3 b	70	74
Howard IIIST	Sub Tropical	Mid May	120.4 ab	116.0 a	68	83
Pioneer X304C	Tropical	Mid May	101.4 bc	119.0 a	58	85
Pioneer 3320	Temperate	Mid May	93.4 c	97.0 c	54	75
Pioneer 3394	Temperate	Mid May	113.0 b	110.8 ab	67	79
Pioneer 3165	Temperate	Mid July	59.5 c	54.6 b	32	40
Howard IIIST	Sub Tropical	Mid July	101.0 a	80.2 a	57	57
Pioneer X304C	Tropical	Mid July	84.5 b	83.1 a	48	59
Pioneer 3320	Temperate	Mid July	36.5 d	41.1 c	21	32
Pioneer 3394	Temperate	Mid July	68.3 c	63.4 b	40	45

Values in columns among the five hybrids within a irrigation treatment and date not followed by the same letter are significantly different at the 0.05 level of probability according to Duncan's New Multiple Range Test.