PERFORMANCE OF EARLY VS. LATE MATURING CORN HYBRIDS IN MICHIGAN

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INTRODUCTION

The planting of full-season, or late maturing hybrids in Michigan is encouraged by their tendency to produce higher yields. Full-season hybrids can take advantage of the entire growing season available at a particular location. Shorter season hybrids reach physiological maturity sooner and generally yield less. Recent experience with cool, wet springs resulting in delayed planting, and growing seasons that provided less growing degree days (GDD) than normal has caused corn producers to question the strategy of routinely planting full-season hybrids. While the full-season hybrids may yield more under these adverse conditions, they may have higher kernel moisture at harvest, which increases drying costs. Also, there may be a delay in getting the crop harvested, there may be quality losses, and the increased possibility of frost damage if the hybrid has failed to reach physiological maturity.

OBJECTIVES

The purpose of this analysis is to determine differences in grain yield, percent moisture at harvest, and net return (as affected by drying costs) between "early", "mid", and "late" maturing hybrids under growing conditions within four zones in Michigan. This will enable us to determine if higher yielding, full-season hybrids consistently produce higher net returns than earlier-maturing hybrids that tend to have lower percent moisture at harvest.

METHODS AND MATERIALS

Data from Michigan corn hybrid performance trials conducted from 1992-1996 was compiled to produce three maturity groups for analysis of grain yield, percent moisture at harvest, and net return. Over many years of hybrid testing in Michigan, four zones containing three locations each have been well established. These zones are based on GDD requirements gathered from long-term weather data. Zone 1 expands across the southwest and southeast corners of the state and GDD accumulations are highest in this zone. Early planted, full-season hybrids have high yield potential in this part of the state. As the zones move north, GDD accumulations rapidly decline, with Zone 4 having the least amount of GDD accumulation. Designations of early, mid, and late-maturing hybrids were based on ratings from seed companies and from input by extension agents and specialists familiar with production practices within each zone. Table 1 lists the relative maturity ratings within each zone.

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Table 1. Relative maturity ratings of early, mid, and late-maturing hybrids within four zones in MI.

	Early	Mid	Late
Zone 1	96-104	105-108	109-113
Zone 2	90-100	101-105	106-111
Zone 3	85-95	96-100	101-107
Zone 4	79-89	90-95	96-103

At each site, all hybrids were randomized, with four replications. Four-row plots were planted at all sites, with the center two rows being harvested for grain yield. Plots were 22 feet long with 30 inch rows. All plots were chisel-plowed. Plots were planted at 26,000 to 28,000 seeds per acre and grown under similar conditions in all locations with respect to planting date, fertilizer, and other management practices.

Net returns were calculated based on the corn price average of $2.50/bu across all years. Net return = grain yield (bu/a adjusted to 15.5% moisture) minus drying costs (2.5 cents per point above 15%). For the purposes of this analysis, no other costs were determined. Analysis of variance was conducted on the means from combined locations comprising the four zones.

RESULTS

In growing seasons that were ideal for high yields, late-maturing hybrids produced higher yields and higher net returns, even though they also had higher percent moisture at harvest. This is shown in Table 2, which is data from 1994. The data also show that in cooler Zone 4, the late-maturing hybrids lose the advantage seen in the other three zones (Table 2).

Table 2. Yield, moisture, and net returns of early, mid, and late maturing hybrids in 1994.

		Zone 1	Zone 2	Zone 3	Zone 4
Yield bu/A	Maturity group				
	Early	188A*	182A	158A	163
	Mid	199B	191B	169B	168
	Late	205B	200C	178C	161
Percent Moisture	Maturity group				
	Early	19.2A	20.7A	19.6A	25.0A
	Mid	21.8B	25.7B	21.4B	27.4B
	Late	24.0C	27.3C	24.4C	31.2C
Net @ $2.50	Maturity group				
	Early	451.29A	429.80	376.22A	365.85
	Mid	463.40A	426.59	395.28A	368.17
	Late	466.05B	439.54	403.35B	338.10

*Within each zone, letters different from each other are significant at P = 0.05.

In 1992, a year characterized by cool, wet springs, and less GDD accumulation than normal, late maturing hybrids did not fare well. Within each zone, not only did the later hybrids yield less, but the harvest percent moisture was much higher, greatly increasing drying costs (Table 3).

Table 3. Yield, moisture, and net returns of early, mid, and late maturing hybrids in 1992.

		Zone 1	Zone 2	Zone 3	Zone 4
Yield bu/A	Maturity group				
	Early	189	158	136A*	109
	Mid	190	162	142B	116
	Late	185	158	136A	112
Percent Moisture	Maturity group				
	Early	25.4A	23.6A	28.8A	29.4A
	Mid	28.1B	27.9B	32.0B	34.2B
	Late	32.7C	33.3C	37.9C	36.8C
Net @ $2.50	Maturity group				
	Early	423.50A	360.10A	293.83A	232.92
	Mid	411.84B	352.74A	294.23A	233.96
	Late	380.75B	322.08B	261.86B	218.80

*Within each zone, letters different from each other are significant at P = 0.05.

Across all years, from 1992 to 1996, even though later-maturing hybrids yielded higher, they had significantly higher moisture. In three out of four zones, they produced significantly less net return than the early-maturing hybrids (Table 4).

Table 4. Yield, moisture, and net returns of early, mid, and late maturing hybrids in 1992-1996.

		Zone 1	Zone 2	Zone 3	Zone 4
Yield bu/A	Maturity group				
	Early	168A*	163A	147A	121A
	Mid	177B	172B	153B	128B
	Late	181C	170B	152B	108AB
Percent Moisture	Maturity group				
	Early	19.8A	21.3A	21.9A	27.4A
	Mid	22.6B	25.7B	24.6B	29.9B
	Late	25.6C	28.7C	29.9B	36.6C
Net @ $2.50	Maturity group				
	Early	399.24	380.87A	343.44A	267.33A
	Mid	407.14	382.83B	347.35A	274.54A
	Late	404.42	367.88B	326.33B	213.99B

*Within each zone, letters different from each other are significant at P = 0.05.

A key tool in reducing losses due to immature grain crops is the selection of the proper hybrid for a particular growing area. High yielding, later maturing hybrids that were developed for longer growing seasons than those experienced in Michigan may not be the best choice. Based on the results from this data, producers are encouraged to consult with seed companies before selecting hybrids for a particular growing area of the state. More information is also available in the Corn Hybrids Compared bulletin (E-431), published each year by Michigan State University. This analysis will be expended in the future, to provide information on the performance of hybrids of differing maturities.

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