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How Planting Date and Maturing Time Influence Losses of Irrigated Corn to Southwestern Corn Borers¹

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INTRODUCTION

Southwestern corn borers caused so much corn to lodge on sandy soils south of the great bend of the Arkansas River in southcentral Kansas during the 1940's that corn was abandoned as a major crop in that area. Corn borer larva girdle stalks after corn is mature enough to ensile in late August and early September but before its moisture content drops to at least 25% so operators of commercial driers will accept it.

As irrigation developed in the area during the 1960's, so did interest in producing corn as a grain crop. Acreages of corn produced for grain have increased in the area each year since 1970, and yields approaching 200 bushels an acre are rather common.

Lodging caused by southwestern corn borers was minimal until 1974 when four factors combined for heavy losses: the volume of corn produced, lack of drying capacity, unfavorable weather, and borers.

Because no other crop approaches irrigated corn's economic potential in the area, farmers need ways to control southwestern corn borers.

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AGRICULTURAL EXPERIMENT STATION

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RESEARCH STUDIES

Studies on southwestern corn borer problems have been conducted and are continuing at the Sandyland Experiment Field.

Data collected from 1968 to 1972 on five planting dates and three corn hybrids are presented in Table 1.

Yield data from a 1974 study including three planting dates, 16 hybrids, and corn borer infestations are presented in Table 2. Data on moisture contents of selected hybrids related to

Table 1. Yields¹ of indicated corn hybrids related to planting dates and southwestern corn borer infestations,^{1, 2} irrigated corn, Sandyland Experiment Field.

Planting date and hybrid	5-yr. avg. yield bu/a	5-yr. avg. harvestable yield bu/a	5-yr. avg. lodging loss bu/a	4-yr. avg. corn borer infestation %
April 5				
Pioneer 3306	145	139	6	45
Pioneer 321	131	124	7	42
DeKalb XL390	144	134	10	57
Avg.	140	132	8	48
April 15				
Pioneer 3306	153	148	5	53
Pioneer 321	129	124	5	46
DeKalb XL390	138	132	6	47
Avg.	140	135	5	49
April 25				
Pioneer 3306	151	145	6	44
Pioneer 321	134	127	7	50
DeKalb XL390	137	127	10	46
Avg.	141	133	8	47
May 5				
Pioneer 3306	154	126	28	59 ²
Pioneer 321	148	113	35	58 ²
DeKalb XL390	140	110	30	62 ²
Avg.	147	116	31	60 ²
May 15				
Pioneer 3306	136	102	34	55
Pioneer 321	142	104	38	64
DeKalb XL390	124	85	39	56
Avg.	134	97	37	58

¹ 5-year yield.

planting and moisture content at harvest are presented in Table 3.

For both studies corn was planted in 30-inch rows and thinned to 24,000 plants per acre. A tank mixture of Lasso + Atrazine herbicide to control weeds was broadcast as corn was planted. Irrigation water was applied as needed in furrows 60 inches apart when moisture in the top foot of soil dropped to 80 percent of the soil's water-holding capacity. An insecticide was banded over rows in 1970, 1971, 1972, and 1974. Other weed control measures were one rotary hoeing, one cultivation, and furrowing for irrigation.

DISCUSSION

Harvestable yields from April plantings were at least 16 bushels an acre higher than from May plantings (Table 1). Harvestable yields did not include corn from stalks broken off. Harvesting all corn planted three different dates in April at once, and three weeks later harvesting all planted in May likely favored the later plantings each month.

Harvesting all hybrids at the same moisture content would have given more girdled stalks of hybrids planted at later dates. Also longer season hybrids would be subjected to delayed harvest and to more lodging than shorter season hybrids.

Our harvesting losses from May plantings far exceeded those from April plantings, but infestation by borers was not related to planting date. Therefore, it is **harvesting** date, not **planting** date that is related to lodged stalks. We did not count standing girdled stalks, only those lodged at harvest time.

Hybrids with relative maturity ratings of 106 to 112 days reached harvestable moisture earlier than longer-season hybrids did. Although shorter-season hybrids yield less than longer-season ones, the shorter-season ones can be harvested earlier to avoid losses to borers. Our 1974 data indicate that shorter-season corn would be superior economically to growing irrigated sorghum to avoid borer damage. Pioneer 3722, a shorter season hybrid, even when

Table 2. Planting dates of irrigated hybrid corn related to corn borer damage, Sandyland experiment field.

Hybrid	Days to Maturity ¹	Date of planting								
		April 10			April 25			May 10		
		Yield bu/a	% Stalks infested ²	% Stalks girdled ²	Yield bu/a	% Stalks infested ²	% Stalks girdled ²	Yield bu/a	% Stalks infested ²	% Stalks girdled ²
Pioneer 3149	137	206	35	0	210	25	3	184	32	2
Pioneer 3306	128	182	53	2	206	32	13	194	48	20
Pioneer 3195	129	180	55	0	204	40	7	197	40	8
DeKalb 72A	130	190	43	4	202	50	27	202	43	17
DeKalb 372	125	177	35	8	173	52	28	177	55	20
DeKalb 8840	135	161	47	4	156	37	13	205	37	5
Moews 421	117	175	42	4	163	43	10	202	40	10
Moews 520	120	163	37	0	190	42	22	210	28	22
Moews 822	120	173	45	2	186	67	32	189	43	9
Prairie Valley 82S	118	198	40	2	196	32	10	189	63	22
Prairie Valley 40S	116	169	45	2	160	28	8	168	48	8
NC+ 57	114	185	48	0	175	52	23	170	35	8
NC+ 33SX	106	156	8	2	164	22	8	179	43	13
Pioneer 3722	112	169	20	0	173	18	8	168	32	12
Pioneer 3780	107	153	28	0	155	27	13	182	32	12
Pioneer 3390	119	184	43	2	193	48	7	184	48	8
I.S.D. 05		21			29			22		

heavily infested with borers, lodged less in 1974 than did other hybrids.

At the Sandyland Experiment Field borers damage hybrids little, if any, if they are planted in April and harvested at 30% moisture content.

Table 3. Moisture contents of selected corn hybrids planted three dates and sampled when indicated, irrigated corn, Sandyland Experiment Field.

Hybrid	Planting date					
	April 10		April 25		May 10	
	Sam- pling date	Moist. %	Sam- pling date	Moist. %	Sam- pling date	Moist. %
Pioneer 3149			9-17	32.6		
Pioneer 3306			9-17	28.4		
Pioneer 3195	8-30	34.1				
DeKalb 72A			9-17	30.4		
DeKalb 372	8-30	31.4				
Moews 421	8-30	32.0				
Moews 520	8-30	34.0				
Moews 822			9-17	24.9		
Prairie						
Valley 40S	8-30	30.0				
NC + 33SX	8-29	25.5	9-4	26.3	9-17	25.0
Pioneer 3722	8-29	23.6	9-4	26.5	9-17	25.9
Pioneer 3780	8-29	22.4	9-4	25.8	9-17	26.4
Pioneer 3390	8-29	27.7	9-4	29.3	9-17	29.3

CONCLUSIONS

Date-of-planting did not influence yields of irrigated corn in our long-time tests, but did influence harvestable yields by influencing harvest date. Lodging and harvestable yields are directly related to days the corn must wait to be harvested after September 1.

Harvest date can be influenced by the destination of the grain produced. Producers who use or market their production as earlage, wet corn, acid-treated corn, or who have sufficient drying capacity for their own production can harvest at moisture levels of 30% and above.

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