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Combine Losses from Narrow and Wide Row Corn Harvest

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Abstract
In recent years, growers have expressed renewed interest in producing corn in row spacings narrower than 30 inches. Research to compare corn yields with various row spacings has either been done with a cornhead matched to the row spacing or with hand harvesting. Some commercial producers using narrow rows have used a 30-in. cornhead at a slower speed and have ignored field losses. The objective of this study was to determine if visible machine harvest losses differed between narrow and wide cornheads and to determine the extent of harvest loss when 15- in. rows are harvested by a 30-in. row cornhead.

Disciplines
Agricultural Science | Agriculture

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Introduction

In recent years, growers have expressed renewed interest in producing corn in row spacings narrower than 30 inches. Research to compare corn yields with various row spacings has either been done with a cornhead matched to the row spacing or with hand harvesting. Some commercial producers using narrow rows have used a 30-in. cornhead at a slower speed and have ignored field losses. The objective of this study was to determine if visible machine harvest losses differed between narrow and wide cornheads and to determine the extent of harvest loss when 15-in. rows are harvested by a 30-in. row cornhead.

Materials and Methods

The experiment was conducted for three years. Three treatments included: 1) corn planted in 30-in. rows, harvested by a 30-in. head (3030); 2) corn planted in 15-in. rows, harvested by a 15-in. head (1515); and 3) corn planted in 15-in. rows, harvested by a 30-in. head (1530). Four replicated blocks consisted of 300-ft.-long randomized plots. The planter dropped an equal number of seeds (AgriPro 9560 in 1997; DeKalb 493 in 1998 and 1999) for each treatment. An International 1620 Axial-Flow combine was used each year in early November. The 15-in. cornhead was an 8-row, experimental single gathering chain row unit obtained through the local Case-IH dealer. The 30-in. cornhead used was a 4-row International 843 for the first two years and a 6-row International 1063 for the third year. Combine travel speed was 3 mi/hr except in the 1530 treatment where combine travel speed was slowed to 2 mi/hr. Settings and adjustments on the cornheads and combine were unchanged and remained as they came from the local dealer. Harvest losses were measured by a procedure described in ISU Extension bulletin Pm-574.

Results and Discussion

Corn harvesting losses for 1997, 1998, and 1999 are listed in Tables 1, 2, and 3, respectively. The largest loss difference between treatments was in ear drop at the cornhead. Even at a slower travel speed, when the 30-in. cornhead was used to harvest 15-in. rows many ears escaped capture. In 1997 the crop was moderately lodged, but in 1998 and 1999 lodging seemed to be slight to nonexistent. Severe ear loss even during 1999 with a well standing crop indicated that apparent lack of lodging in the field was not a good predictor of combine ear loss when row spacing of the head was badly mismatched from planted row spacing. Machine ear drop losses were excessive when a 30-in. cornhead was used (even at a slow 2 mi/hr travel speed) to harvest corn in 15-in. rows. Losses were 15 to 20 bu/ac in 2 of 3 years when ears were not well attached to the cornstalk.

When matched to row spacing, losses between cornheads were less and statistically similar two of three years. Increased loss with the narrow-row head in 1999 may reflect that this was a relatively early prototype. Cylinder and separating losses were very low. Negative separating losses occurred when total machine kernel loss in the area randomly selected behind the combine was measured as less than stalk roll shelling loss in the differently located area ahead of the combine.

In 1998, harvested yield of the 15-in. row treatments showed an advantage, if corn was harvested with a 15-in. row cornhead. In 1999, harvested yield of the 15-in. row treatment was less than the 30-in. row treatment unless a 15-in. cornhead was used for harvest.

Acknowledgments

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Table 1. 1997 corn harvesting losses, bu/a.

	Treatment*			
	3030	1515	1530	$LSD_{P=0.05}$†
Machine ear loss	1.6	3.2	16.8	7.7
Stalk roll shelling	0.8	1.8	3.7	NS‡
Cylinder loss	0.1	0.1	0.2	NS
Separating loss	0.1	0.9	-1.6	NS
Total visible machine loss	2.7	6.0	19.1	8.6
Preharvest dropped ears	6.5	7.6	8.9	NS
Total visible loss	9.2	13.6	28.0	
Harvested yield	131.6	143.7	111.6	NS
Total yield	140.8	157.2	139.5	

*3030 = 30-in. rows, 30-in. head; 1515 = 15-in. rows, 15-in. head; 1530 = 15-in. rows, 30-in. head
†Least significant difference for values within row at 95% confidence level (4 replications)
‡Differences are not statistically significant

Table 2. 1998 corn harvesting losses, bu/a.

	Treatment*			
	3030	1515	1530	$LSD_{P=0.05}$†
Machine ear loss	0.9	1.2	4.0	1.8
Stalk roll shelling	1.7	2.0	2.0	NS‡
Cylinder loss	0	0	0	NS
Separating loss	0.4	-0.9	0.4	NS
Total visible machine loss	3.0	2.3	6.3	2.9
Preharvest dropped ears	0.5	1.7	1.8	NS
Total visible loss	3.5	4.0	8.1	
Harvested yield	158.0	186.4	171.1	17.2
Total yield	161.5	190.4	179.2	

*3030 = 30-in. rows, 30-in. head; 1515 = 15-in. rows, 15-in. head; 1530 = 15-in. rows, 30-in. head
†Least significant difference for values within row at 95% confidence level (4 replications)
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Table 3. 1999 corn harvesting losses, bu/a.

	Treatment*			
	3030	1515	1530	$LSD_{P=0.05}$†
Machine ear loss	1.1	2.9	19.9	2.0
Stalk roll shelling	0.8	1.4	1.6	NS‡
Cylinder loss	0	0	0	NS
Separating loss	0.1	-0.2	-0.8	NS
Total visible machine loss	2.0	4.1	20.7	2.0
Preharvest dropped ears	4.4	5.0	6.4	NS
Total visible loss	6.4	9.1	27.1	
Harvested yield	163.7	163.6	149.3	12.2
Total yield	170.1	172.7	176.4	

*3030 = 30-in. rows, 30-in. head; 1515 = 15-in. rows, 15-in. head; 1530 = 15-in. rows, 30-in. head
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‡Differences are not statistically significant