

10-1989

Stubble Losses of Kentucky Soybeans

Larry J. Grabau

University of Kentucky, larry.grabau@uky.edu

Todd W. Pfeiffer

University of Kentucky, tpfeiffe@uky.edu

Follow this and additional works at: https://uknowledge.uky.edu/pss_notes



Part of the [Agronomy and Crop Sciences Commons](#)

Right click to open a feedback form in a new tab to let us know how this document benefits you.

Repository Citation

Grabau, Larry J. and Pfeiffer, Todd W., "Stubble Losses of Kentucky Soybeans" (1989). *Agronomy Notes*. 62.

https://uknowledge.uky.edu/pss_notes/62

This Report is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in Agronomy Notes by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

AGRONOMY NOTES

Vol. 22, No. 2, October 1989

Stubble Losses of Kentucky Soybeans

L.J. Grabau and T.W. Pfeiffer

Double crop soybeans in Kentucky tend to be shorter than plants from full season plantings. Since lowest pod height is related to plant height, double crop soybeans may be subject to greater harvest losses due to pods remaining below the level at which the combine header is operated. While it would be possible to lower the header closer to the soil to pick up some of those pods, that would slow down harvest and increase the risk of picking up stones and other trash. Although the actual cutting heights used in Kentucky are not known, some producers use combines with flexible "ground-hugging" headers, and others use nonflexible headers. Regardless of header type, some producers cut higher to avoid stones or to complete harvest more quickly.

Varietal characteristics are also involved in stubble losses. Varieties which are shorter or mature earlier might have more problems with stubble losses in double cropping. Perhaps an increased planting rate or leaving taller wheat stubble in no-till systems would favor higher pod set, thus reducing the potential for such losses.

The objectives of this research were: 1) to determine the actual cutting heights used and potential stubble losses suffered by Kentucky producers, 2) to compare lowest pod height and stubble losses of ten varieties in full season and double crop cropping systems, and 3) to test the influence of variety maturity, soybean planting rate, and wheat stubble height on harvest losses of double crop soybean.

Materials and Methods

Experiment A. Survey of Producer Combine Cutting Height.

In 1985, approximately eight fields were surveyed from each of 20 Kentucky counties, including the top 18 counties for soybean production (from 1984 data). This resulted in a total of 206 fields surveyed. Harvest had not begun in 145 of these fields and had been completed in 61 of them. For the 145 fields for which harvest had not yet begun, an 8 square foot sample of

The College of Agriculture is an Equal Opportunity Organization with respect to education and employment and is authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, national origin, sex, religion, age and handicap. Inquiries regarding compliance with Title VI and Title VII of the Civil Rights Act of 1964, Title IX of the Educational Amendments, Section 504 of the Rehabilitation Act and other related matters should be directed to Equal Opportunity Office, College of Agriculture, University of Kentucky, Room S-105, Agricultural Science Building-North, Lexington, Kentucky 40546.

soybean plants was cut at the soil surface. Plants were taken back to Lexington and cut at 2, 4, and 6 inches from their bases. The weight of seeds below these levels was compared with the weight of seeds from the whole plants to get percentage stubble losses. Lowest pod height (the height of the lowest node with a pod attached) was also measured. For the 61 fields for which harvest had been completed, actual cutting height was measured from ten adjacent rows at each of three widely separated sites within a field. In 1986, an additional 24 fields in six of the same counties were sampled, and 11 of those fields were measured for actual cutting height.

Experiment B. Effect of Cropping System on Varieties.

Ten varieties were chosen from the University of Kentucky's 1985 and 1986 full season and double crop variety trials at Princeton, KY for measuring lowest pod height and potential stubble losses at 2, 4, and 6 inches. The varieties were: Pella and Williams 82 (Maturity Group III), Lawrence and Union (early IV), Pixie and Ripley (early IV semi-dwarfs), Douglas (mid IV), Mitchell 450 and Pershing (late IV), and Essex (V). Full season soybeans were planted with conventional tillage in 30 inch rows at 157,000 seeds per acre. Double crop soybeans were no-till planted in 15 inch rows at 192,000 seeds per acre.

Experiment C. Management Practices Designed to Reduce Stubble Losses.

These studies were no-till planted in 14 inch rows 27 June, 1985 and 24 June, 1986 at Lexington, KY. Prior to soybean planting, wheat had been cut at the soil surface, or at 6 or 12 inches above the surface. The varieties used were Pella, Douglas, and Mitchell 450. Planting rates were 150, 260, or 370 thousand seeds per acre. Lowest pod height and potential stubble losses were determined as above. A small plot combine was used for harvest.

Results and Discussion

Exp. A. (Survey of Cutting Height) Combine cutting height in Kentucky producers' fields averaged 4.2 inches but ranged from 2.0 to 6.7 inches, while lowest pod height averaged 7.8 inches but ranged from 4.1 to 11.6 inches. Actual stubble losses averaged around 1% both years, but were as high as 3.5% for some fields. Losses as high as 3.5% were due to high cutting heights of plants with pods set close to the ground. Thus, while most producers were doing an excellent job of harvest, others were leaving a good share of their profits in the stubble.

Exp. B. (Effect of Cropping System on Varieties) Yields averaged 46.8 bushels/acre for full season and 35.4 bushels/acre for double crop. No yield differences were found among the ten tested varieties in either cropping system. Stubble losses were less than 1.0% for all varieties at the 2 inch cutting height, and so are not shown. Table 1 shows that lowest pod height was reduced in double cropping for some cultivars. When cut at 4 inches, which is close to the Kentucky average of 4.2 inches, several of the early varieties had greater stubble losses when double cropped than when grown full season (Table 1). At a 6 inch cutting height, double crop losses were greater than 9.0% for all varieties except Mitchell 450, Pershing, and Essex. These varieties had consistently low stubble losses under either cropping system.

Exp. C. (Effect of Management Practices on Stubble Loss) Table 2 shows that while Mitchell 450 had its pods higher off the ground and suffered smaller stubble losses, it did not yield as well as Pella or Douglas at Lexington. In addition, neither increased planting rate nor wheat stubble height were effective in reducing soybean harvest losses. Yield of the 0 inch wheat stubble height treatment was 19.3 bu/A, while yields of the 6 or 12 inch stubble were both 22.6 bu/A in 1986. This was probably due to higher surface evaporation without the protective cover of wheat stubble.

Conclusions

Most Kentucky soybean producers are doing a good job of harvesting their crop, although some are leaving more than 3.5% in the stubble. Early varieties are more prone to greatest harvest losses due to low podding heights in double cropping than are later varieties. However, later varieties may not produce as much yield when double cropped, particularly if planted late (for example, 1989) or frosted early (for example, 1988). It must be noted that this data runs counter to the accepted practice of planting maturity group V soybeans when double cropping in the Southern Tier counties. Neither increased soybean planting rate nor wheat stubble height were effective in reducing soybean harvest losses. The most important thing to do in order to avoid leaving grain in soybean stubble is to operate the combine header at or below 4 inches.

Table 1. Influence of cropping system on lowest pod height and stubble harvest losses at 4 and 6 inches at Princeton in 1985 and 1986.

Variety	Maturity Group	Relative Maturity ^a	Lowest pod height		Stubble losses at:			
			FS ^b	DC	4 inches		6 inches	
			---inches---		-----%-----			
Pella	III	0	6.6	5.0	1.3	2.8	5.6	10.8
Williams 82	III	4	6.0	4.9	1.4	4.0	4.9	12.9
Lawrence	IV	5	5.6	4.8	1.2	2.3	4.5	9.1
Union	IV	6	6.3	5.1	1.0	3.0	3.1	11.4
Pixie	IV	4	4.0	4.3	4.0	4.2	12.9	14.8
Ripley	IV	5	5.0	5.3	1.8	1.4	7.1	9.4
Douglas	IV	12	7.1	5.6	0.4	2.5	1.9	10.9
Mitchell 450	IV	19	9.7	7.5	0.1	0.1	0.4	1.4
Pershing	IV	20	7.4	8.0	0.7	0.1	1.8	0.8
Essex	V	22	7.8	8.7	0.2	0.0	0.8	0.2
LSD(0.05) ^c			1.3		1.3		4.7	

^aaverage number of days later than Pella.

^bFS = full season, DC = double crop.

^cFor comparing the response of a given variety to the two cropping systems.

Table 2. Influence of variety, soybean planting rate, and wheat stubble height on lowest pod height, 4 and 6 inch stubble losses and yield of double crop soybean at Lexington in 1985 and 1986.

<u>Item tested</u>	<u>Name or amount</u>	<u>Lowest pod height (inches)</u>	<u>Stubble losses at:</u>		<u>Yield (bu/A)</u>
			<u>4 inches</u> ----- (%) -----	<u>6 inches</u> -----	
Variety	Pella	5.8	3.5	10.8	30.6
	Douglas	7.2	2.2	7.2	30.1
	Mitchell 450	10.0	0.4	1.8	25.5
	LSD (0.05) ^a	0.6	0.8	1.9	2.7
Planting rate (thousand seeds per acre)	150	6.8	2.2	7.6	29.4
	260	8.0	2.0	5.8	29.1
	370	8.1	2.0	6.3	27.8
	LSD (0.05)	0.6	NS ^b	NS	NS
Wheat stubble height (inches)	0	7.5	2.5	7.6	27.8
	6	7.8	1.6	5.7	28.8
	12	7.6	2.0	6.4	29.7
	LSD (0.05)	NS	NS	NS	1.5

^aFor comparing varieties, planting rates or wheat stubble heights.

^bNS = no significant difference was measured.