

## PLANTER PERFORMANCE STUDY

by  
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Our Planter Performance Study involved four growers. The speed the plots were planted at was measured with a mechanism (similar to a speedometer) that fits on the front of the tractor. This mechanism (or speedometer) was demonstrated to the growers last year. The makes of planters used in our study were John Deere and Acme, two and four row planters.

Growers are beginning to realize that their planters are not doing too good a job of planting potatoes, but are entirely helpless as this is the best they can do in their operation. The manufacturers of potato planters are now suggesting slowing down planting speed, but that still isn't good enough.

In 1972 Arthur J. Waltz did a study on potato orientation. He noticed the different growth types of potato stems from the seed pieces, based on the orientation of the potato seed piece.

He then took a closer look at the orientation of seed and its effect on yield. They took whole seed weighing 3 to 4 ounces in size and cut the seed in half to keep it as blocky as possible. They planted one furrow with the cut seed surface up and the eyes down, the other furrow was planted with the cut surface down and the eye up. The plots with the cut surface oriented in the down position (eyes up) emerged 1 to 2 days ahead of the plots with the cut surface oriented in the up position. The plots with the cut surface oriented in the down position yielded an average of 434 cwt. per acre. The plots with the cut surface oriented in the up position yielded an average of 395 cwt. per acre, a difference in yield of 39 cwt. per acre based on the way the cut seed was planted. Don't you think that's quite remarkable?

The Planter Performance Study was started by the Alberta Potato Commission in 1972. Last year I was asked to present these findings to you here at Moses Lake on the study of planter speeds in Alberta. At this Washington meeting a group of people expressed interest in working together trying to obtain better plant stands than they were presently getting. The people involved were:

Mr. Glen Vogt, Ore-Ida Foods, Ontario, Oregon  
 Mr. Lynn Johnson, Research Extension Center, Aberdeen, Idaho  
 Mr. Gene Dallimore, Potato Extension Specialist, Idaho  
 Dr. Robert Thornton, Extension Horticulturist, Pullman, Washington

Bob Thornton did most of the plot designing for the Planter Performance Study. This design will be in the proceedings.

### PLANTER STUDY - 1974

REPS.						
FIRST	1	4	3	2	5	6
SECOND	2	3	5	6	4	1
THIRD	5	1	4	2	6	3
FOURTH	6	2	3	5	1	4

TREATMENTS

- 1 - Undisturbed - Counted after Germination
- 2 - Unchanged (uncovered and measured)
- 3 - Equal spacing
- 4 - Intended spacing -- random
- 5 - Intended spacing -- eye down
- 6 - Intended spacing -- eye up (not down)

ROWS 25'

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The same procedure was carried out by each of the interested people I have just mentioned. For my project I planted all the plots at 3 mph, so there won't be any higher or lower planter speeds in the plots.

Each rep was 25 feet long and replicated six times in the growers field, each rep having four rows. The treatments are described as follows:

- 1. Undisturbed - means that this treatment wasn't changed.
- 2. Unchanged - means uncovered, distance measured between the seed pieces and recorded on survey sheets.
- 3. Equal Spacing - the same number or less, as in number 2. If the seed pieces were bunched together they were spaced equally along the 25' of row.
- 4. Intended Spacing - random. By this spacing the seed pieces were placed in the row just as the planter would place them. If it was planting them 12" or 9" then I would plant them exactly at that spacing. The seed pieces were eye up and eye down, whichever way they would fall.
- 5. Intended spacing - eye down. The seed pieces were planted eye down 12" apart or whatever the grower was planting.
- 6. Intended spacing - eye up. Here again the spacing was what the grower intended his spacing to be, but with the eye up.

POTATO PLANTER STUDY, 1974  
TOTAL YIELDS IN TONS PER ACRE

<u>GROWER</u>	<u>TREATMENTS</u>					
	1	2	3	4	5	6
	<u>UN-</u> <u>DISTURBED</u>	<u>UN-</u> <u>CHANGED</u>	<u>EQUAL</u> <u>SPACING</u>	<u>INTENDED</u> <u>SPACING</u> <u>RANDOM</u>	<u>INTENDED</u> <u>SPACING</u> <u>EYE DOWN</u>	<u>INTENDED</u> <u>SPACING</u> <u>EYE UP</u>
A	7.62	8.20	7.62	10.82	11.25	12.12
B	7.77	7.70	7.84	12.56	13.29	13.50
C	10.67	9.51	10.09	11.98	11.76	13.00
D	10.16	10.67	11.11	12.05	11.83	12.20
	<u>IDENTIFICATION</u>			<u>MEAN</u>		
		2		9.055		
		1		9.020		
		3		9.165		
		4		11.853		
		5		12.032		
		6		12.705		
1	2	3	4	5	6	

These figures are by acre. Figures are arrived at by adding each rep together and dividing by the number of reps which is 4.

POTATO HARVESTER STUDY, 1974MARKETABLE YIELD IN TONS PER ACRETREATMENTS

<u>GROWER</u>	1	2	3	4	5	6
	<u>UN-DISTURBED</u>	<u>UN-CHANGED</u>	<u>EQUAL SPACING</u>	<u>INTENDED SPACING RANDOM</u>	<u>INTENDED SPACING EYE DOWN</u>	<u>INTENDED SPACING EYE UP</u>
A	6.03	6.10	5.52	9.00	9.58	10.16
B	5.66	5.15	5.45	10.24	11.11	11.11
C	9.29	7.70	8.42	10.31	9.95	12.78
D	9.66	8.64	10.45	11.47	11.18	11.62

IDENTIFICATIONMEAN

3	7.660
1	6.897
2	7.460
4	10.255
5	10.455
6	11.417

1 2 3 4 5 6

POTATO PLANTER STUDY, 1974MARKETABLE PERCENTAGESTREATMENTS

<u>GROWER</u>	1	2	3	4	5	6
	<u>UN-DISTURBED</u>	<u>UN-CHANGED</u>	<u>EQUAL SPACING</u>	<u>INTENDED SPACING RANDOM</u>	<u>INTENDED SPACING EYE DOWN</u>	<u>INTENDED SPACING EYE UP</u>
A	79	74	72	83	85	84
B	73	67	70	82	84	82
C	87	81	83	86	85	98
D	95	81	94	95	95	95

RESULTS

		<u>Total Yield</u>	<u>Marketable Yield</u>	<u>Marketable %</u>
1.	Undisturbed (counted after germination)	9	6.9	76
2.	Unchanged (uncovered and measured)	9.2	7.5	82
3.	Equal Spacing	9.6	7.9	82
4.	Intended Spacing - Random	11.2	9.6	86
5.	Intended Spacing - Eye Down	11.5	10.1	87
6.	Intended Spacing - Eye Up	12.1	11.3	93

Rows 25' Yield - tons/acre

Planter Speed 3 mph

Comparing 2 & 4 treatments

Total yield - - - 2.0 tons/acre increase 18%

Marketable yield - - - 2.1 tons/acre increase 22%

The yield you should be getting is quite evident in these treatments, especially between treatment 1 and 6. Treatment 1, which wasn't disturbed and exactly as the planter planted it, you have a marketable percentage of 76%. In treatment 6 you have a marketable percentage of 93%. Treatments 2 and 4 are more realistic, as we will probably never get a planter that will plant seed pieces with the eyes all up. Therefore, we will go back to treatment 2 and 4. Treatment 2 was unchanged (uncovered and measured). Treatment 4 was uncovered and seed pieces that were missing were placed in that row to give a perfect stand. Anyway you look at this treatment 4, you are receiving 2 tons an acre more than treatment 2.

At our process price in Alberta this year, we are losing \$120.00 an acre. On a 200 acre operation growers are losing \$24,000 dollars on that operation. Our acreage in Alberta this year is approximately 20,000 acres, and based on this acreage the growers have lost something like \$2,400,000., based on Washington acreage.

Potato planters have been with us for many years. The only difference is, planters on the market today have new covers on them. The mechanisms inside the planters have not changed too much in the last 15 years. The existing planters do not orient seed in the ground.

I hope that the information you have received today will make the growers more aware that we need a precision planter. With the high cost of production and the scarcity of fertilizers we have to make a dollar on every inch of soil that will produce potatoes.