

PRELIMINARY REPORT ON AUTOMATICALLY CUT POTATO SEED PEICE SIZE STUDIES

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It has been known for many years that the size of the potato seed piece used has an effect on the yield, and grade of the potatoes and the recovery of the plant following a frost. It has been found over the years that use of a large seed piece up to 2 ounces results in a greater yield, greater percentage of U.S. No. 1 grade tubers, more stems per hill, more tubers per hill, and a greater resistance to adverse handling and growing conditions.

Mounting costs of hand cutting seed potatoes has resulted in more and more mechanical cutting, even though it is recognized that machine cutting of the Russet Burbank variety results in very uneven and some very small seed sizes. Generally, the size of the seed pieces used for planting is far below the $1\frac{1}{2}$ to 2 ounce size recommended, and the sizes are very uneven. To obtain an indication of the importance of size and unevenness of the seed under Columbia Basin conditions, it was decided to sort several bags of machine-cut seed into different size groups, plant each group separately and determine the effect on yield.

One hundred and forty-two pounds of commercial machine-cut seed was divided into five different size groups. Each size group was planted in six different plots within the experimental area on May 9. Plots were harvested on October 18. The yield was weighed and the average yield of the six plots having the same size of seed was determined. A 10 to 11 inch spacing between seed pieces was used because no adjustment for varying seed sized are made by growers.

The results are presented in several different ways in an effort to emphasize the importance of seed size as it is related to the economics of potato production. The relationship between seed size and yield is shown in Table 1. As the size of the seed increased, the total yield increased. A 40-gram seed piece is slightly smaller than the $1\frac{1}{2}$ ounce size generally recommended as the minimum size for optimum yield. It can also be seen that if the seed had been cut uniformly to each respective size it would have required about 4 CWT to plant an acre of potatoes if all of the pieces were 10 grams (about one-third ounce) in size or less and about 15 CWT of seed if the seed pieces were cut uniformly to about 40 grams (one and one-half ounce) per seed piece. The increase in yield per sack of seed planted was much greater for the smallest size of seed used than for the three largest sizes of seed used. This leads to some speculation as to what would have happened if the smallest size of seed had been planted at a 5 to 6 inch instead of a 10 to 11 inch spacing. The use of such extremely small sizes of seed pieces in conjunction with close spacing in the row should be considered cautiously until further study of the possibilities can be made.

Table 1

Effect of seed size on the total yield of potatoes and the yield per sack of seed planted.

Item	Average seed size in grams				
	10	15	25	35	40+
Yield, CWT per acre - - - - -	210	283	316	401	521
Seed, CWT per acre - - - - -	4	6	9	13	15
Yield per CWT of seed - - - - -	53	47	35	31	35

The relationship between seed size and dollar value is shown in Table 2. The largest seed piece size resulted in the greatest volume per acre but the differences are only approximate, since it would require additional labor and material to harvest and market the increased production.

Table 2.

Acre return as affected by seed size and the volume of the crop produced when potatoes are worth one dollar per CWT and seed is worth four dollars per CWT.

Item	Average seed size in grams				
	10	15	25	35	40+
Dollar value, crop - - - - -	210	283	316	401	521
Dollar value, cutting - - - - -	2	2	3	5	5
Dollar value, seed - - - - -	15	22	38	52	60
Difference - - - - -	193	259	275	344	456

There is still a third way by which to emphasize the importance of seed size as it affects total yield. Since the seed sizes resulting from the seed cutting operation (either by hand or by machine) are never uniform, the resultant yield never is equal to the yield of the largest or smallest seed size but is an average of all sizes combined. This is illustrated in Table 3. If the 142 pounds of seed which was used in this study had been planted commercially and the number of seed pieces of each size taken into consideration, the average yield per acre would have been approximately 301 CWT per acre, about 220 CWT per acre less than if all 40+ size seed had been used.

Table 3

Effect of seed size on yield when a composite of the different seed sizes are used and the number of seed pieces of each size is taken into consideration.¹

Average seed size in grams	No. of pieces/142 lbs.	Per cent of total	CWT/A
Under 10 - - - - -	283	11.4	21
15 - - - - -	430	17.3	43
25 - - - - -	814	32.7	91
35 - - - - -	710	28.6	100
40 or more - - - - -	<u>249</u>	<u>10.0</u>	<u>46</u>
Total - -	2486	100.0	301

¹ The rows were 34 inches apart and the seed pieces 11 inches apart, making a total of 16,773 plants per acre for a perfect stand