# EFFECT OF SEED PIECE SIZE ON YIELD A. George O'Leary Administrative Assistant Washington State Potato Commission

The first study made on machine cut seed in the Columbia Basin was reported in 1961 by Dr. Robert Kunkel and Nicholas Sandar. Figure 1 shows the results of their studies in graph form. The yields of the various sized seed pieces are expressed as some percent of the yield of 1.50 ounce seed size. The smaller the seed piece size, the smaller the percentage when compared to the total yield.



Figure 1

In 1968 the Washington State Potato Commission in cooperation with Robert Thornton and Dr. W. M. Iritani planted a demonstration plot in conjunction with the 1968 Othello Seed Trials at the Research Unit located at Othello, Washington. The different size seed used was collected from grower lots that was being cut and planted in the year 1968. Figure 2 shows the results of that trial. The yields of the various seed sizes are again expressed as a percentage of the single drop seed which averaged 1.75 to 2.0 ounces. The side chips in this demonstration averaged less than 0.5 ounces, while the end chips averaged about 0.75 ounces.



#### Figure 2

In 1969 the Washington State Potato Commission conducted a survey of potato growers planting Russet Burbank potatoes. The seed piece sizes for each individual lot were determined, and this information combined into a composite sample. Each of the 30 growers in the survey had his seed sampled after it was delivered from the cutter and before it was put into the planter. Each sample was sorted as to size and the individual weight of each piece was determined by the use of postal scale. Figure 3 shows the result of the composite sample, of which 36.5% weighed 1.25 to 2 ounces. The balance or 63.5% averaged less than 1.0 ounces. The average of the individual growers was 1.13 ounces, which is indicated by the dashed line in Figure 3.



### Figure 3

During the period of the survey among the growers seed was cut to the sizes listed in Figure 4 and planted at the Othello Research unit as part of the Othello Seed Lot Trials. Again the trial followed pretty much the basic pattern established in the two previous years. - the smaller the seed piece, the lower the yield. This data varies in percent from year to year. This phenomenon is possibly due to the difference in the weather conditions of the different years. In Figure 4 it will be noted that the 1.50 ounce seed piece out yielded the 1.75 ounce seed piece. The 1.50 ounce piece was a single drop, uncut tuber, while the 1.75 ounce piece was cut from a larger tuber.

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Figure 4

When the data given in Figure 4 is combined with the data given in Figure 3, then the result can be present in a graph which is presented as Figure 5. The average grower in the survey planting a seed lot which averaged 1.13 ounces and was made up of the sizes as shown in Figure 3. Then this lot of seed is only 74% as efficient when compared with 2.0 ounce seed that might have been planted. Therefore, the 74% represents an average for all the different seed sizes present in the composite lot of seed.



Figure 5

In the final analysis the thing that is really important in this whole survey is the ultimate return to the grower. The difference in the seed size is of very little importance if it can not be demonstrated that it makes a difference to the grower in returns per acre. The COST COMPARISON given in Figure 6 shows a complete breakdown of the different costs as they are related to a difference in seed piece size. When comparing the average seed size of 1.13 ounces as used in 1969 against 1.75 ounce seed pieces the differences are these:

1. Six more hundredweight of cut seed are required per acre to plant the larger seed (using a 9-inch drop and a 34 inch row spacing) If seed costs \$5.00/cwt. this adds \$30.00 more to the cost.

2. An increase in yield of 8 tons will cost the grower an additional \$5.00 per ton to dig and haul, or a total of \$40.00 more per ton

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3. The additional seed cost and harvest cost then total \$70.00, and increases the cost per acre from \$450.00 to \$520.00 per acre.

4. The gross per acre in the first column (\$600.00) is based on a quality that returns the grower \$25.00 per ton. The gross per acre in the second column (\$960.00) is based on a quality that returns to the grower \$30.00 per ton. This higher figure is based on the fact that the second lot has a higher percentage of U.S. No. 1's.

Seed Size	1.13 oz.	1.75 oz.
Cwt. per acre	15.0	21.0
Cost per acre	\$ 450.00	\$ 520.00
Yield per acre	24 Tons	32 Tons
Gross per acre	\$ 600,00	\$ 960.00
NET	\$ 150.00	\$ 440.00
DIFFERENCE		\$ 290.00
Percentage gain		<u>414 %</u>
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## COST COMPARISION

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### Figure 6

5. Net gain in column 2 is \$440.00, while the net gain in column 1 is \$150.00 or a difference of \$290.00.

6. This is a percentage gain of 414% !!!

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How do you check your own seed piece size? A very simple method is to take a 10-quart, or 2-1/2 gallon bucket and fill it full with cut seed. This amount of seed in this size bucket weighs approximately 12 pounds, or 192 ounces. Count out the number of seed in the bucket and compare this number with the number listed in Figure 7.

Number of pieces in 12 lb. sample	Average weight of each seed piece	
96	2,00 ounces	
109	1.75 ounces	
128	1.50 ounces	
154	1.25 ounces	
192	1.00 ounce	

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#### Figure 7

For instance, if you count 128 - 132 seed pieces your seed piece size is approximately 1.50 ounces. If the number counted is 195-200, then the average size is 1.0 ounces or less.

When the size of the seed piece is determined then it is possible to know how much cut seed will be required to plant an acre when the plants are spaced on a 9-inch drop spaced on 34-inch rows. Figure 8 shows that 1.5 ounce seed will require 19.3 CWT/acre.

SEED SIZE (Ounces)	CWT. Acre	
1.0	12.9	
1.5	19.3	
2.0	25.8	
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# SEED PER ACRE

Figure 8

## SUMMARY

Growers have always been urged to use potato seed that ranged in size from 1.5 to 2.0 ounces. Seed in this size range will usually average from 2.5 to 4 stems per hill. This number of stems per hill with hills spaced 9 inches apart in the row and 34 inches between rows will produce between 50,000 to 60,000 stems per acre. Proper seed size coupled with a good sound fertilizer program will insure good yields of high quality tubers at harvest time. Small seed pieces on the other hand, tend to produce mostly single stem weak plants. "Skips" or missed seed pieces in the row occur most often when using small seed pieces because the planter does not function properly. The uneven stand which results cannot utilize the fertilizer applied to the field properly and the resulting crop is usually low in yield and quality.

Charles Marche

While seed of the proper size, and in a quantity to plant a given amount of ground will cost more money at the outset, it will pay dividends at harvest time.

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