

Influence of Seed Piece Size on Potato Yields  
(W. D. Pew and J. H. Park)

Abstract: During the past several years considerable experimenting has been aimed at developing methods for improving potato yields. One of the easiest and most effective ways found was to adjust the seed piece size and number of eyes per piece. Seed pieces were cut to meet the following size categories: 1/2, 1, 1-1/2, and 2 ounces and small whole tubers; 1-1/2, 2 and 2-3 ounces. Significant differences in yield were obtained between the various seed piece size treatments. The yield advantage was in favor of the larger size. The number of eyes per piece was less important except with the smallest size. In this case the seed pieces were incapable of adequately supplying plant growth from more than one eye. Small, whole tubers from good high yielding fields were found to be excellent for seed potato pieces.

Introduction

Four sizes of cut seed pieces and two sizes of small whole tubers were used. Each size of cut seed pieces was also grouped into those having 1, 2, or 3 eyes per piece. The test reported herein was conducted on the Ed LeBaron Ranch east of Mesa and includes information from the past 3 years.

Methods

Certified seed of the Kennebec variety was used. Planting was done with a special cell drop experimental planter available from the USDA Agricultural Engineering service.

Pieces were carefully planted 6 inches deep and 7 inches apart on 34-inch rows. The soil was a decomposed granite and possessed a relatively good uniform water penetration rate, an average water holding capacity, and was in good tilth at the time the tests were run.

One thousand pounds of 16-48 ammoniated phosphate was applied per acre at planting time. No additional fertilizer was used. Plots consisted of rows 30 feet long and the harvest area was the center 20 feet of the plots.

An unplanted row was left between each of the plots and a 5-foot alleyway cut at the ends of the plots. Uniform cultural practices, approximating the normal commercial practices or those developed from experimental information found to be most ideal, were employed. Six replications were used.

## Results and Discussion

Table 1. Effect of seed piece size and number of eyes on yield of potatoes.

| Treatment                      | Grade           |         | Culls |
|--------------------------------|-----------------|---------|-------|
|                                | No. 1-A         | No. 1-B |       |
|                                | 100# Sacks/Acre |         |       |
| 1. 1/2 oz. - 1 eye             | 217             | 129     | 62    |
| 2. 1/2 oz. - 2 eyes            | 216             | 125     | 42    |
| 3. 1/2 oz. - 3 eyes            | 205             | 127     | 74    |
| 4. 1 oz. - 1 eye               | 242             | 131     | 90    |
| 5. 1 oz. - 2 eyes              | 230             | 137     | 103   |
| 6. 1 oz. - 3 eyes              | 226             | 147     | 86    |
| 7. 1-1/2 oz. - 1 eye           | 257             | 147     | 87    |
| 8. 1-1/2 oz. - 2 eyes          | 256             | 145     | 81    |
| 9. 1-1/2 oz. - 3 eyes          | 256             | 145     | 81    |
| 10. 2 oz. - 1 eye              | 255             | 169     | 60    |
| 11. 2 oz. - 2 eyes             | 265             | 149     | 84    |
| 12. 2 oz. - 3 eyes             | 285             | 161     | 67    |
| 13. 1-1/2--2 oz. (small whole) | 267             | 103     | 28    |
| 14. 2--3 oz. (medium whole)    | 287             | 88      | 35    |

An evaluation of the data show the value of the small, whole tubers as seed piece material. Certain advantages using this type of seed were: eliminating cutting costs, better protection against disease, and ease of handling the seed pieces. Some of the disadvantages were: an inadequate supply of this type of potato and the possible chance of obtaining seed with poor genetic capabilities.

Based on an evaluation of the data in this Table, several general trends are noted. Important is the fact that the larger the seed piece, the greater the yield. However, the close relationship between seed-piece size and number of eyes, especially where the seed pieces are small, was also evident. For example, using 1/2 ounce seed pieces, the 3-eye pieces were less productive than where only 1 or 2 eyes were left. This points up the need for adequate seed-piece size and shows that the 1/2 ounce pieces are incapable of supporting the number of stems originating from the three eyes.

It was also noted that the stems from these seed pieces are small, and emergence and growth slower than those from the larger seed pieces. Increasing the seed size to 1-1/2 ounces seemed to nullify the yield-reducing influence of the number of stems per plant. A comparison of the yields in treatments 7, 8, and 9, which are almost identical, shows that the influence of the number of eyes had been overcome. Seed pieces smaller than 1-1/2 ounces show progressively better yields as the number of eyes are reduced, with the greatest yields occurring with the 3-eye pieces, although not greatly different than for 1- and 2-eye pieces of the larger sizes.

Plants from the larger seed piece also appear to produce a larger total number of tubers per plant, with no significant difference in the number of culls obtained from any of the treatments involving cut seed pieces. However, significantly fewer culls were found in the whole seed plots.

These findings indicate that a potato grower should carefully consider the use of small, whole tubers where an adequate supply is available. If an adequate supply is not available, and cut pieces must be used, every effort should be made to insure that they be at least 1-1/2 ounces in size. Seed pieces smaller than 1-1/2 ounces are not recommended.

Fertilizer Studies With Potatoes in the Queen Creek Area  
(Fred Turner, Jr., and W. D. Pew)

Abstract: In a fertilizer study in the Queen Creek area, a strong response to nitrogen and phosphorus fertilizers was obtained. Potatoes did not respond to potassium when applied with nitrogen and phosphorus.

Introduction and Methods

Seed potatoes were planted early in December 1957 with the various combinations of N, P and K sidedressed. One-half of the total amount of fertilizer was applied at this time and the remainder was sidedressed on March 22, 1958. The crop was harvested on May 29.

Results and Discussion

The yield results (in pounds of potatoes per plot) of this experiment are shown in the following Table:

|  |                      | P <sub>2</sub> O <sub>5</sub> (lbs. per acre) |  |                      |                      |
|--|----------------------|---|--|----------------------|----------------------|
|  |                      | P <sub>0</sub> (0)                            | P <sub>1</sub> (60)                          | P <sub>2</sub> (120) | P <sub>3</sub> (240) |
| N(lbs./acre)                                   | N <sub>0</sub> (0)   | 39  | 96   | 54                   | 43                   |
|  | N <sub>1</sub> (60)  | 44  | 104  | 100                  | 156                  |
|  | N <sub>2</sub> (120) | 35  | 108  | 137                  | 241                  |
|  | N <sub>3</sub> (240) | 21  | 38   | 43                   | 136                  |
| K <sub>1</sub> = 100 lbs. K <sub>20</sub> /ac. |                      |   | N <sub>3</sub> P <sub>3</sub> K <sub>1</sub> |                      | 124                  |
| K <sub>2</sub> = 200 lbs. K <sub>20</sub> /ac. |                      |   | N <sub>3</sub> P <sub>3</sub> K <sub>2</sub> |                      | 96                   |