

Seed Piece Size and Spacing Effects on Yield

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Abstract

A two-year study was conducted at the Aberdeen R & E Center to determine the effect of varying seed piece size and spacing while keeping the weight of seed per acre constant on yield and quality of Alturas, Russet Norkotah, and Ranger Russet potatoes. When combining the results from the three varieties and averaged over the three seed piece spacings, both total and U.S. No. 1 yields significantly increased as seed piece size increased. Conversely, when averaged over the three seed piece sizes, total and U.S. No. 1 yields decreased as seed piece spacing increased. Planting 1.5-ounce seed at 8 inches, 2.25-ounce seed at 12 inches, and 3.0-ounce seed at 16 inches, all which equal to 20.4 cwt. seed per acre, resulted in nearly equal total yields and nearly equal U.S. No. 1 yields.

It has been documented that planting larger seed pieces at the same seed piece spacing generally produces higher yields. Planting equal-sized seed pieces at closer in-row spacings also results in more yield. But, the question remains whether yield is primarily related to the interaction between seed size and spacing or is it simply related to the weight of seed planted per acre. This specific question was addressed in a study conducted at the Aberdeen R & E Center in 2005 and 2006.

Alturas, Russet Norkotah, and Ranger Russet potatoes were hand-cut into seed pieces averaging 1.5, 2.25, and 3.0 ounces with each seed piece weighing within one-quarter ounce of the average. All seed size categories for each variety were planted in 36-inch-wide rows with in-row spacings of 8, 12, or 16 inches resulting in nine seeding rate treatments for each variety. Seeding rates ranged from 10.2 cwt./a (1.5-ounce seed planted at 16 inches) to 40.5 (3.0-ounce seed planted at 8 inches). Furthermore, three of the treatments, 1.5-ounce seed planted at 8 inches, 2.25-ounce seed planted at 12 inches, and 3.0-ounce seed planted at 16 inches, all equaled 20.4 cwt. seed/a. This provided an opportunity to determine if yields differed when varying seed piece size and spacing while keeping the weight of seed per acre constant.

All varieties responded similarly, so data will be combined for this discussion. As expected from previous research, when averaged over the three seed piece spacings, both total and U.S. No. 1 yields significantly increased with larger seed piece size (Table 1). Conversely, when averaged over the three seed piece sizes, total and U.S. No. 1 yields decreased as seed piece spacing widened (Table 1).

When looking at the yields of the nine seed size by spacing treatments, it is interesting to note that planting 1.5-ounce seed at 8 inches, 2.25-ounce seed at 12 inches, and 3.0-ounce seed at 16 inches resulted in nearly equal total yields of 398, 388, and 385 cwt./a respectively (Tables 2a and 2b), and this same result held true for U.S. No. 1 yields (Tables 3a and 3b).

A logical question to ask is how does seed size and spacing affect tuber yield within a size category. Data are shown in Tables 4 and 5. Note in Table 5 that planting 2.25-ounce seed at 12 inches or 3.0-ounce seed at 16 inches resulted in non-significant yield differences for all tuber size categories.

Table 1—Seed piece size or spacing effect on total and U.S. No. 1 yields (cwt./a) averaged over three varieties in 2005-2006. Yields for seed piece size are averaged over all seed piece spacings, and yields for seed piece spacing are averaged over all seed pieces sizes. Yields within a column followed by the same letter are not statistically different at the 0.05 level of probability.

Seed Piece Size	Total Yield	U.S. No. 1 Yield	Seed Piece Spacing	Total Yield	U.S. No. 1 Yield
1.50 ounces	362 a	273 a	8 inches	420 a	315 a
2.25 ounces	383 b	289 b	12 inches	388 b	298 b
3.0 ounces	416 c	314 c	16 inches	353 c	264 c

Table 2a—Seed piece size and spacing effect on total yield (cwt./a) averaged over three varieties in 2005-2006. Yields within a column followed by the same letter are not statistically different at the 0.05 level of probability.

Seed Piece Size	--Seed Piece Spacing--		
	8 inches	12 inches	16 inches
1.5 ounces	398 a	364 a	324 a
2.25 ounces	411 a	388 ab	351 ab
3.0 ounces	451 b	413 b	385 b

Table 2b—Paired comparisons between seed piece spacing holding seed piece size constant.

Seed Piece Spacing	--Seed Piece Size--		
	1.5 ounces	2.25 ounces	3.0 ounces
8 inches	398 a	411 a	451 a
12 inches	364 a	388 ab	413 b
16 inches	324 b	351 b	385 b

Table 3a—Seed piece size and spacing effect on U.S. No. 1 yield (cwt./a) averaged over three varieties in 2005-2006. Yields within a column followed by the same letter are not statistically different at the 0.05 level of probability.

Seed Piece Size	--Seed Piece Spacing--		
	8 inches	12 inches	16 inches
1.5 ounces	304 a	281 a	235 a
2.25 ounces	307 a	297 a	264 ab
3.0 ounces	334 a	316 a	292 b

Table 3b—Paired comparisons between seed piece spacing holding seed piece size constant.

Seed Piece Spacing	--Seed Piece Size--		
	1.5 ounces	2.25 ounces	3.0 ounces
8 inches	304 a	307 a	334 a
12 inches	281 a	297 a	316 ab
16 inches	235 b	264 b	292 b

From the tuber yield data presented here, it appears that planting seed pieces weighing approximately 2.25 ounces at a spacing of 12 inches should produce a crop with acceptable yield and quality. However, the effects of varying seed piece size and spacing on economic return will depend on cost of seed and price received for the potatoes when sold. An economic analysis needs to be completed before this can be determined.

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Did You Know?

In 36-inch wide rows and seed pieces perfectly planted every 12 inches, for every one-quarter ounce increase in average seed piece size, the amount of seed needed per acre increases by approximately 2.3 cwt.

Table 4—Seed piece size and spacing effect on yield (cwt./a) tuber size categories averaged over three varieties in 2005-2006. Yields within a column within a spacing followed by the same letter are not statistically different at the 0.05 level of probability.

Spacing	Size	4-6 oz	6-10 oz	10-14 oz	>14 oz
8	1.5	56 a	130 a	66 a	52 a
8	2.25	68 b	130 a	65 a	44 ab
8	3.0	78 c	157 b	59 a	39 b
12	1.5	39 a	103 a	69 a	69 a
12	2.25	46 a	114 a	74 a	62 a
12	3.0	56 b	132 b	71 a	56 a
16	1.5	26 a	77 a	55 a	76 a
16	2.25	35 b	92 b	63 ab	74 a
16	3.0	39 b	108 c	72 b	74 a

Table 5—Seed piece size and spacing effect on yield (cwt./a) of tuber size categories when all were planted at 20.4 cwt. per acre. Means are an average of three varieties in 2005-2006. Yields within a column followed by the same letter are not statistically different at the 0.05 level of probability.

Spacing	Size	Cwt. seed/a	4-6 oz	6-10 oz	10-14 oz	>14 oz
8	1.5	20.4	56 a	130 a	66 a	52 a
12	2.25	20.4	46 b	114 b	74 a	62 ab
16	3.0	20.4	39 b	108 b	72 a	74 b

All comments should be directed to the editor, William H. Bohl.

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*Only revision made was in wording in Table 4. Previous heading read: "Seed piece size and spacing effect on yield (cwt./a) tuber size categories averaged over three varieties in 2005-2006. Yields within a column followed by the same letter are not statistically different at the 0.05 level of probability".

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