

EFFICIENT PLANTER PERFORMANCE ADDS TO POTATO PROFITS

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Potato fields with poor stands are easy to see when the plants first emerge and are small. Later, as the plants get larger and start to fill the rows, even the worst fields start to look “pretty good” and it is easy to forget that missing plants will translate into reduced yield and lower quality at harvest. Research has shown that a decrease in stand from 100 to 90% will decrease yield by about 8%. Each additional 10% reduction in stand results in a slightly smaller reduction in yield because the plants on either side of the missing plant tend to compensate by producing slightly higher yields. However, this compensation does not totally replace the yield of the missing plant, and tuber quality is often reduced because the plants are exposed to an oversupply of nutrients and water. If we apply this information to stand counts taken by the Idaho Ag Statistics Service each fall, we would estimate that the 75% stand they report for Idaho potato fields is resulting in about a 16% yield loss. We think you would agree that this kind of yield loss is important enough to justify a little effort to improve stands.

It should be noted that solving a stand problem involves more than just getting more seed planted in the field. If the solution were that easy, we could put someone on the back of each planter to scoop seed out of a bucket and simply broadcast it onto the field. Where the seed is placed is every bit as important as how much seed is planted. Recent research at Washington State University illustrates how planter accuracy affects yield and quality of Russet Burbank potatoes. Figure 1 illustrates how spacing affects tuber yield and quality. Notice how total yields decrease as spacing increases from 4.5 inches to 27 inches. The proportion of US No 1 yield reaches a maximum at 9 inches, the desired spacing. This seems logical because close spacing would result in a higher proportion of under 4 oz. tubers, while wide spacing increases the proportion of knobby and malformed tubers. It should be noted that not all potato varieties react the same to plant spacing. Russet Norkotah, for example, appears to be much less likely than Russet Burbank to produce off-type tubers as a result of wide spacing (Figure 2).

Usually 85 to 95% of the missing hills in a potato field are due to missing seed pieces. The missing seed pieces may never have been dispensed by the planter, resulting in a skip, or they may end up far from where they were intended to be placed, resulting in a double. In either case, poor planter performance can be identified as the cause for missing hills. The main factors that determine planter accuracy are seed piece size, planter speed, and planter settings.

Seven years of studies and field observations in Elmore and Owyhee counties have indicated that good seed health, optimal seed size, and efficient planter performance can increase profits by 8 to 33%. Prior to adjustments, planters in these counties averaged 32% efficiency in achieving desirable spacing (8 to 12 inches between seed pieces).

Average efficiency increased to 64% in 1988 and 73% in 1994, following minor planter adjustments, especially adjustments in speed (Figures 3 and 4). In some cases, planter efficiency was as high as 98%. Overall, growers with high planter efficiencies reported more uniform potatoes and more US No 1's.

The University of Idaho has several forms available that can be used to record the information needed to determine planter accuracy. The following is an example of how to determine the information that is requested on the forms. You first need an accurate measurement of planter speed. Your speedometer may not be accurate enough if your tractor experiences wheel slippage during planting. After planting, uncover the seed pieces in 25 feet of row behind each planter shoe. Measure the distance from the center of each seed piece to the next, and record the distance. Count the number of seed spacings in each of the following categories: 0 to 7 inches (under-spaced), 8 to 12 inches (acceptable range), and over 13 inches (over-spaced). Divide the number in the 8 to 12 inch range by the total number of seed pieces, in the row, then multiply by 100 to obtain the percent planter efficiency.

Example:	<u>Spacing</u>	<u>Number of seed piece spaces measured</u>	
	0-7 inches	10	
	8-12 inches	10	Efficiency = $(10/25) \times 100 = 40\%$
	<u>13 inches or more</u>	<u>5</u>	
	Total	25	

Note this example assumes a desired spacing of 10 inches. The acceptable range includes the area 2 inches on either side of the desired spacing. To determine the acceptable range for any other desired spacing, just add and subtract 2 inches. If your desired spacing were 12 inches for example, you would use 10 to 14 inches as the acceptable range.

Based on observations of numerous planting operations we can make the following management recommendations to increase planter accuracy:

- 1) Repair and maintain the planter during the off-season, not during planting time.
- 2) The grower's presence can eliminate many mechanical and decision making problems at planting time. Do not rely solely on your hired help unless you have complete confidence in them.
- 3) Determine planter efficiency using the method described above. Adjusting planter speed will solve over 80% of performance problems.
- 4) Evaluate your seed piece size profile. It is difficult to find any planter that does a good job of planting a very wide range of seed sizes.
- 5) Height extensions on the potato seed hopper may decrease planter performance because they increase bridging.
- 6) Monitor your pick arrangement, cup size, seed bowl level and sprockets for proper operation.

More detailed information, planter performance charts and examples of performance evaluations are available from the authors at 208-587-2136.

Figure 1: Russet Burbank seed spacing (1989-1990)

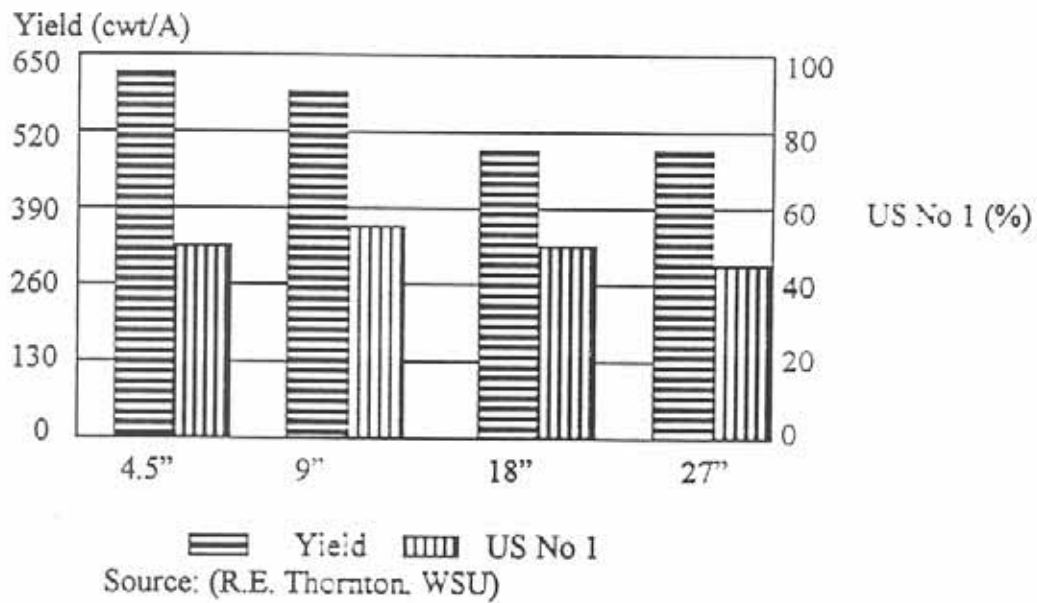


Figure 2: Russet Norkotah seed spacing (1989-1990)

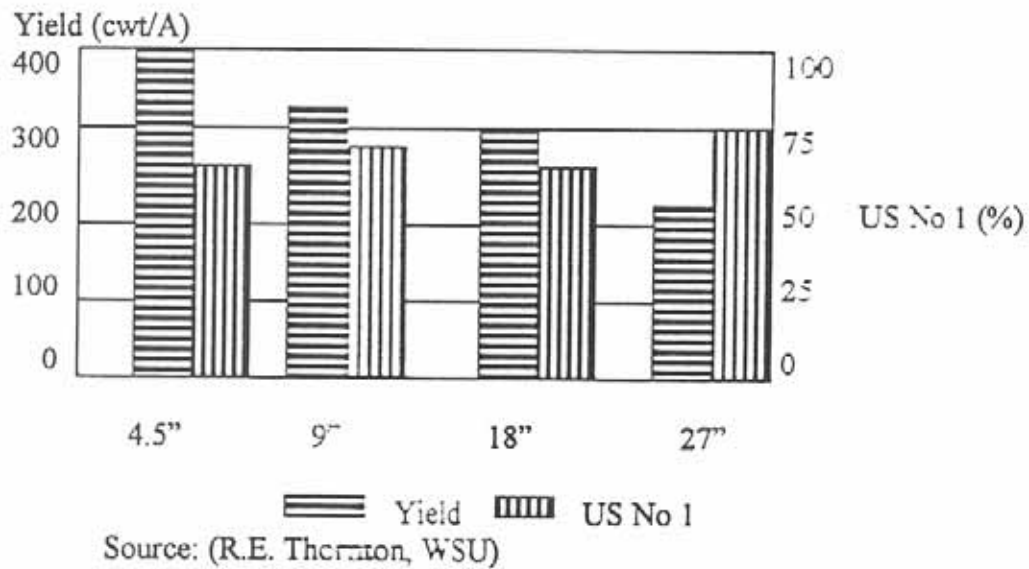
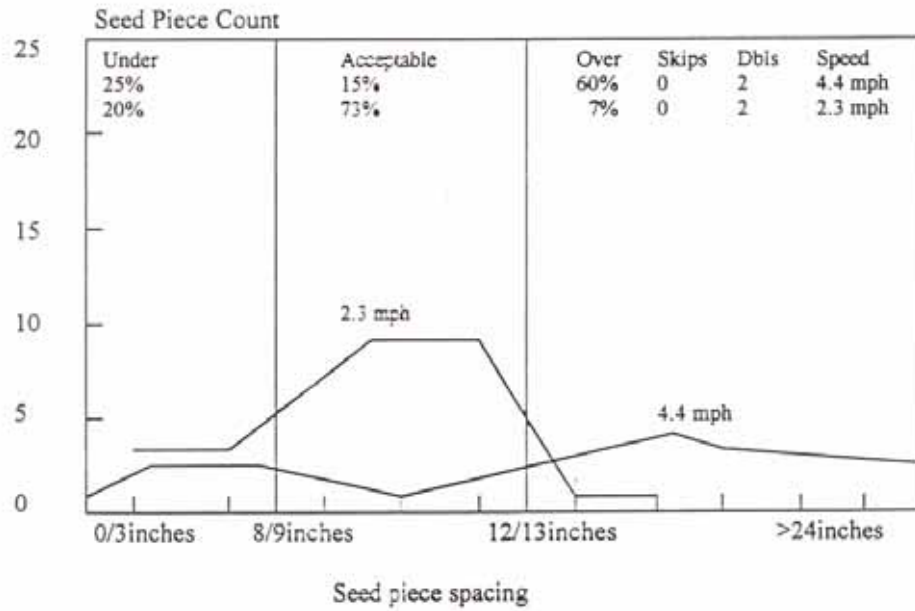
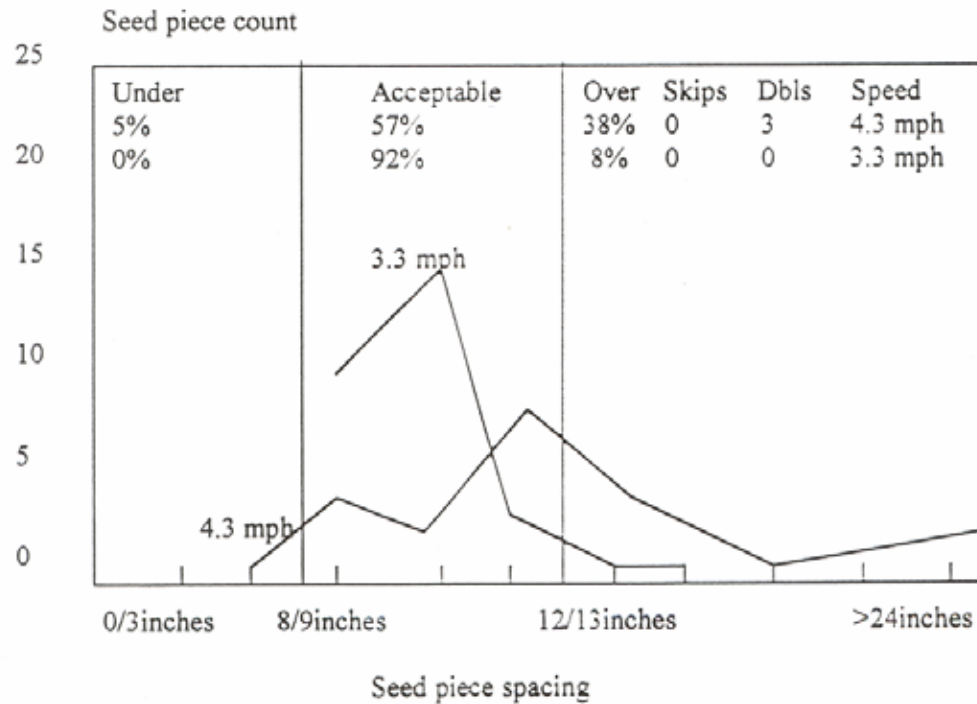


Figure 3: Planter performance based on counts made on 25 feet of row



Grower 19, Apr 20 '89

Figure 4: Planter performance based on counts made on 25 feet of row



Grower 21, Apr 10, '89