

# Fertilizer Placement Affects Potato Growth

W. D. Pew and James H. Park

Among the many factors affecting potato growth and yield, one of the most interesting is that of fertilizer placement. Small, seemingly unimportant changes in fertilizer placement often play an important role and markedly influence potato production.

Fortunately, most growers use an excellent fertilizer placement program. That is, they try to use the location for fertilizer bands demonstrated through extensive tests as being best. However, all too often, because the machines are not carefully checked, they fail to achieve the position desired.

Under these conditions, yields are often sharply reduced and sometimes quality, expressed in terms of tuber size and smoothness, is jeopardized. Reasons for this are presented and discussed herein.

## Effects of location of fertilizer bands on potato plant growth and tuber yield.

No.	Treatment		Yield 100# Sacks/Acre
	To Each Side	Depth of Seed Pieces*	
1	4 inches	both level	310
2	4 inches	both 2 inches below	367
3	4 inches	both 4 inches below	344
4	4 inches	one level	
5	4 inches	one 2 inches below	331
		one 4 inches below	342
6	2 inches	both level	298
7	6 inches	both level	328
8	6 inches	both 2 inches below	350

\* Depth measured from center of seed piece and not from bottom edge.

W. D. Pew is professor of Horticulture and superintendent of the Mesa, Arizona, Branch Experiment Station. James H. Park is assistant in research in Horticulture, formerly at the Mesa Station but now at the Yuma Branch Experiment Station.

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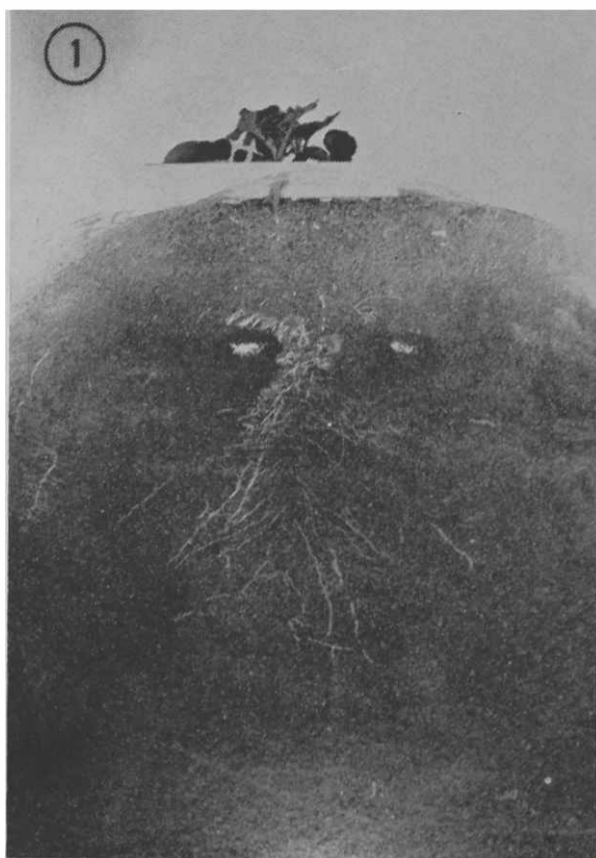


FIGURE 1 — Appearance of root system where fertilizer was placed too close to seed piece. Note limited root system and severe fertilizer burning. Damaged stolons are not seen in the picture.

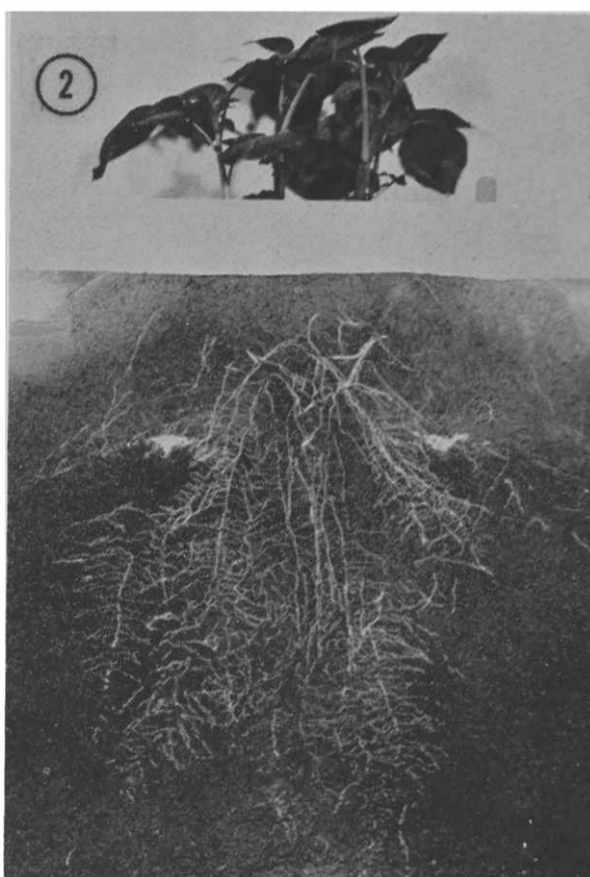


FIGURE 2 — Note well-developed root system from proper positioning of fertilizer and timely first irrigation. Note slight root burning, but root regeneration is already beginning.

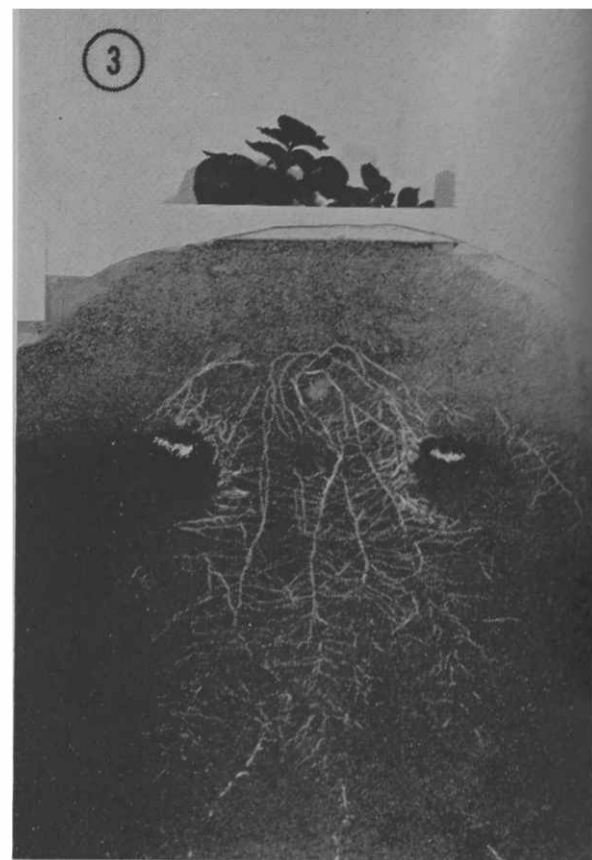


FIGURE 3 — Here's an example of root system with ideal fertilizer location but improper timing of first irrigation. Note some root damage and lack of regeneration.

A review of data in our table show that pronounced differences may be expected. These differences can, for the most part, be attributed to the relationship between the effects of the fertilizer bands to root development, stolon formation, and flow of water through the soil from the irrigation streams. Note in Figure 1 the root damage in the fertilizer band areas where they have been positioned too close to the seed piece. (Two white dots to either side of seed piece in each picture is inert material used to mark location of fertilizer.) Obviously, roots of this type are incapable of producing plants for maximum production.

### This Cuts Production

From careful study and observation, root systems so severely damaged show virtually no recovery, or the recovery is so limited that production capability is drastically reduced. In addition to root damage, the ends of the stolons (stems on which potatoes are found) are damaged similarly by the closely placed fertilizer. Stolons damaged in such a manner seldom produce marketable tubers.

The effect of a timely first irrigation is shown in Figures 2 and 3. Compare the damage in these illustrations. In Figure 2, the plant received an irrigation three weeks after planting.

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## Sally Retired But Warmly Remembered

Ever since "Sally" taught boys and girls the three "r's" at the little red schoolhouse in Sego, Ohio, she has had a feeling of "belonging" wherever she worked.

"Sally" is the affectionate name by which Mrs. Sarah Fulton is known in The University of Arizona's College of Agriculture.

At the end of October Sally officially retired. Unofficially, Sally maintains, "I'm not retiring, just changing jobs." She figures she has at least one more career left and will soon be in pursuit of another job.

Many around the College of Agriculture will regret not seeing Sally's smiling face, including Dr. Harold E. Myers, the college's dean.

"Sally has served us long and well," said the dean. "She has been a dedicated worker, and we shall all miss her."

Sally Fulton has lived in Tucson since August, 1945, and has worked for the College of Agriculture since April, 1946.

As a child, she attended school in a little red schoolhouse in Sego, a small town near St. Joseph, Ohio, and later taught there. She went on to Meredith Business College in Zanesville, Ohio, where she taught typing and shorthand for \$20 a month.

She also taught public schools in Zanesville for one term. The pay was small there, so she went to Cleveland, where she did legal work and stenographic work for some top corporations.

Her husband was bedfast when she came to Tucson in 1945 and he died in 1951. These circumstances, of course, made life difficult for Sally, but she rose to the occasion and went to work at the U of A.

"This is just like home to me," said Sally a little sadly when asked how she likes her work.

Sally has reared two highly successful sons. One is Robert Fulton, an electroencephalographic technician for Tucson Medical Center. The other son is George Fulton, Jr., assistant supervisor and programming IBM operator for the Pacific Pump Company in Los Angeles.

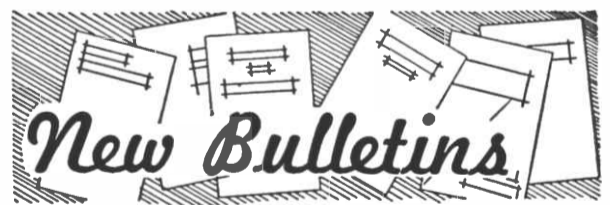


SALLY FULTON

detrimental. Placing fertilizer closer than four inches, or directly below the seed piece, should be avoided to minimize root and stolon damage. If precision placement cannot be achieved, it is better to locate the fertilizer slightly farther than four inches from the seed piece than to place it closer.

However, it should be remembered that placing fertilizers at a greater distance than the ideal decreases its efficiency and reduces the production capabilities of the plants, because it lengthens the time required for the plant to develop a root system that can reach and utilize the fertilizer.

Careful adjustment of the planting and fertilizer placement equipment, and timely and judicious application of irrigation water, are inseparable factors for maximum fertilizer efficiency and tuber production.



- Arizona Home Gardening (Revised) Circular 130
- Control Vegetable Garden Insects (Revised) Circular 122
- Control Insects of Flowers, Shrubs, and Shade Trees (Revised) Bulletin A-18
- Pecans in Arizona (Revised) Circular 247
- Pruning Hedges, Shrubs, and Trees (Revised) Bulletin A-8
- Soil Management (Revised) Bulletin A-11
- Marketing of Cattle Manure in Arizona Bulletin A-36
- Rose Varieties for Arizona 1965 Folder 103

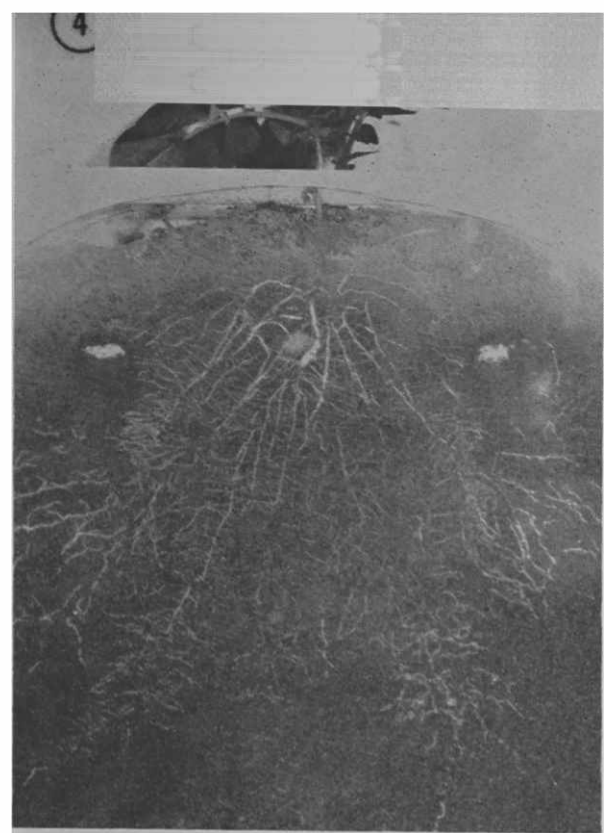


FIGURE 4 — Here is an excellent extensive root system with a minimum of root burning. However, the root system is not as well developed as in Figure 1.

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thereby reducing, through water movement, the concentration of fertilizer in the bands. The plant in Figure 3 had not received an irrigation since planting. This was approximately seven weeks. The placement in Figure 2 and 3 is identical and is considered most ideal, but as is shown in Figure 3, the factor of timely irrigations is also important when considering the appropriate placement of fertilizer.

In Figure 4, the bands were placed farther to the sides than is considered best. In this case, the burning damage was insignificant, but the roots were not in contact with the fertilizer material soon enough to achieve quickest and most ideal growth stimulation. Some delay in early growth resulted. Where the fertilizer was placed at a different level on each side of the seed piece, a combination of effects was found. Each side responded independently, but in relation to the fertilizer and its placement.

### This Position Ideal

In summary, the data and pictures would indicate that placing of fertilizer four inches to each side and two inches below center of the seed piece is the most ideal location. Greatest benefits from this placement were obtained where the plants were irrigated fairly early — within three to four weeks from planting, or as soon as the stand is established. Delaying the irrigation at this stage can be