THE RELATIONSHIP BETWEEN MATURITY, YIELD, COLOR AND COOKING QUALITY OF EARLY-CROP TRIUMPH POTATOES

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Growers of Triumph potatoes in the Gilcrest district of Colorado have observed that as the tubers mature the color tends to fade. They have also observed that once the vines are dead the tubers lose color, and this influences the length of time the tubers can be left in the soil. Bright red tubers sell more readily and at a somewhat higher price than poorly colored ones.

To obtain some information on the nature of the changes taking place, an exploratory experiment was started in 1946. Five samples of fifty tubers each were taken from as many different locations in a two-row strip through the field on the 25th of July, and on the 5th and 21st of August. At the time these samples were taken, the vines were removed from tubers in the adjacent row, but the tubers were left in the soil. It was planned to harvest the tubers which had had the tops removed on the 21st of August; however, they were not harvested until the 8th of September. By using this technique it was possible to get two sets of data, one giving the color and specific gravity (used as a criterion for cooking quality) at a certain stage of maturity; the other, the color and specific gravity of similar potatoes after they had lain in the soil for various lengths of time after removal of the vines. The results are given in table 1.

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The same kind of experiment was conducted on a different farm in 1947 to determine the changes in yield, color and specific gravity as the plant matures and the change in quality resulting from leaving tubers in the soil without vines. A split plot randomized block arrangement of five replications with 50 hills in each plot was used.

Both years the tops were removed by placing one foot on each side of the stems and pulling them loose from the tubers. This resulted in the removal of the entire stalk without pulling the tubers out of the soil.

Tuber color was determined with the disk colorimeter described by Sparks¹. Specific gravity was calculated from the relationship of the weight of the tubers in air divided by the difference between the weight of the tubers in air and the weight of the tubers when immersed in water. Both color and specific gravity measurements were made within four days after the tubers were dug. In the meantime, they were stored at approximately 35° to 40° F. In 1946 the statistical comparisons were made by the "T" test, and in 1947 by analysis of variance. In 1947 soil, air and tuber temperatures were taken on a bright, sunny day with thermocouples. The results are shown in table 3. The soil was classified as Gilcrest sand.

**RESULTS**

In 1946 the specific gravity of tubers with vines attached remained about the same between the 26th of July and the 21st of August as shown in table 1. Similar tubers when left in the soil without vines from the 26th of July until the 8th of September decreased in specific gravity from 1.0690 to 1.0619. The difference is significant at odds exceeding 19:1. Tubers from which the vines were removed the 26th of July were lower in specific gravity than those from which the vines were removed 10 days later, (August 5), by odds exceeding 19:1.

In 1946 tubers attached to green vines decreased in color from 74.7 per cent Eugenia red to 70.3 per cent Eugenia red between the 26th of July and the 21st of August. This difference in color is statistically significant at odds exceeding 99:1. Leaving similar tubers without vines in the soil from the 26th of July until the 8th of September resulted in the color fading from 74.7 per cent Eugenia red to 56.1 per cent Eugenia red, a color difference statistically significant at odds exceeding 19:1. Leaving tubers without vines in the soil from the 5th of August to the 8th of September resulted in the color fading from 70.8 per cent Eugenia red to 57.2 per cent Eugenia red. This color difference is statistically significant at odds exceeding 19:1 as you will note in table 1.