DO WHOLE SMALL POTATOES MAKE GOOD SEED?

SUMMARIZED BY
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DO WHOLE SMALL POTATOES MAKE GOOD SEED?

J. D. LUCKETT

A recommendation to use whole small potatoes for seed would undoubtedly appeal to potato growers in general, providing they could overcome the prevailing uncertainty as to whether such a practice is safe or desirable. Much time and effort has been devoted to a study of the utilization of small uncut potatoes for seed as compared with pieces of larger tubers. Some growers are using the small tubers quite successfully, while others hesitate to use them because of the belief that they increase the proportion of unmarketable tubers in the crop and result in a greater amount of diseased and weakened plants than would be the case with pieces of large tubers.

The Experiment Station first took up the matter in 1906 when four rows of potatoes planted with whole small tubers of Carman No. 3 were alternated with four rows planted with pieces of large tubers selected from the same plants that furnished the small tubers. The results of this limited experiment showed that the whole small tubers outyielded the pieces of large tubers by 21.4 bushels of marketable tubers (more than 2 ounces) per acre and 8.6 bushels of small tubers (less than 2 ounces) per acre.

Nothing further was done on this problem until 1920, when a much more comprehensive study was made leading to the general conclusion that, for seed purposes, small uncut potatoes weighing from 1 to 2 ounces are as good as, if not a little better than, pieces of equal weight cut from large tubers of the same plants.

*This is a brief review of Bulletin No. 491 of this Station entitled Potato Seed Experiments: Whole Small Tubers vs. Pieces of Large Tubers of the Same Plant, by F. C. Stewart. A copy of the complete bulletin will be sent upon request to anyone specially interested in a detailed account of the investigation.

[3]
In the fall of 1919, the Station seed plat of Enormous No. 9 was dug by hand and wherever a small tuber weighing from 1 to 2 ounces was found it was saved for seed. At the same time a large tuber weighing from 6 to 10 ounces was selected from each plant supplying a small tuber. This was continued until 1,000 small tubers and 1,000 large tubers of the same plants had been obtained.

The following spring a single seed piece weighing between 1 and 2 ounces was cut from each of the large tubers and the remainder discarded. There were 20 rows in the experiment, each of the odd-numbered rows being planted with 100 pieces from the large tubers and each of the even-numbered rows with 100 whole small tubers. The experimental plat was on a clay loam soil of medium fertility.

In drawing conclusions from the results secured in this experiment, it is pointed out that under different conditions of soil and climate and with a different variety of potatoes, somewhat different results might be secured. The conditions are strictly applicable, therefore, only under the conditions indicated and for the variety specified.

The plants from both lots of seed came up rather slowly and somewhat unevenly, but those from whole small tubers came up a little earlier than did those from the pieces of large tubers. A stand of 99.8 per cent was secured from the whole tubers, as compared with a stand of 99.2 per cent from the pieces.

It has been generally regarded that whatever increases the rate of growth of potato plants in the earlier stages increases the yield and, in order to test this, measurements were made of the height of the two lots of plants at about six weeks after planting and again at eight weeks. In 14 of the 20 rows the plants from the whole small tubers had attained a greater height at the time the measurements were made than had the plants from the pieces of large tubers. There also seemed to be a distinct connection between rapid early growth and increased yield as the taller plants gave higher yields in practically every case.

Further observations on potato growing made at the Station show, however, that plants making early rapid growth may not always give higher yields than those growing more slowly, as unfavorable
weather conditions in the early growing stages, such as lack of rainfall, may retard rapid early development only to be followed later by quite favorable conditions during the remainder of the growing season. Apparently, then, if subsequent conditions are favorable, anything that increases the early rate of growth of the potato increases the yield.

Leafroll not associated with small tubers

As already stated, the seed used in the experiment was grown in the Station seed plat. This plat had been carefully inspected for leafroll and all visibly affected plants removed. In spite of this care 98 of the experimental plants were found to be definitely infected with leafroll with 10 suspected plants. Of these 98 plants, 41 were from whole small tubers and 57 from pieces of large tubers. It is evident, therefore, that small tubers are no more responsible for leafroll than are large tubers, and, also, that both leafroll and normal plants may come from different tubers of the same plant.

Normal plants had more stalks per plant than leafroll plants, were considerably taller, and gave much higher yields.

The number of stalks and tubers produced by each plant in the experiment was recorded in order to note any differences in these respects in the two lots of plants. The number of stalks ranged from 1 to 6 for the plants from pieces of large tubers averaging 2.14 stalks per plant. In the case of the plants from whole small tubers, the number of stalks ranged from 1 to 8 with an average of 1.91 stalks per plant.

The average number of tubers per plant for plants from whole small tubers was 6.57, and for plants from pieces of large tubers 6.39.

The yields secured with the two lots of plants have been calculated on an acre basis and show that the plants from the whole small tubers produced at the rate of 529.13 bushels per acre and the plants from pieces of large tubers at the rate of 511.83 bushels, an increase in yield in favor of whole small tubers for seed of 17.3 bushels per acre.

The criticism is sometimes advanced that when used for seed, whole small tubers increase the proportion of small potatoes in the
crop. The results secured in this experiment do not bear out this belief. The yield of small tubers was at the rate of 9.18 bushels per acre for uncut seed and 8.07 bushels for the cut pieces, giving a difference in yield of marketable tubers of 16.9 bushels per acre in favor of whole small tubers.

Granting, then, that whole tubers weighing from 1 to 2 ounces are entirely satisfactory for seed purposes as compared with pieces of equal weight from large tubers from the same plants, one or two important considerations should be kept in mind in following this practice in the field.

The use of whole small tubers from the main crop which has not been carefully inspected for diseased or weakened plants, or the practice of planting only small tubers without any selection or change of seed invariably lead to disaster. In a season when seed potatoes are high priced, whole small tubers from the main crop may be used to good advantage if the field is known to have been reasonably free from disease and from weak or degenerate plants, but this should not be done for more than one season.

In buying seed potatoes it is usually best to buy only large sized tubers unless the crop has been inspected and certified by a regularly authorized inspector whose report shows that the yield was satisfactory and that the field was nearly or quite free from mosaic, leafroll, wilt, and weak plants, in which case the size of the tubers is immaterial.

Wherever home-grown seed is used, it will be found desirable to maintain a special seed plat of sufficient size to supply all the seed required for planting the entire acreage devoted to potatoes.

The seed plat should be located at a considerable distance from other potatoes and should be planted with hill-selected seed only. The plat should be thoroly sprayed and carefully inspected and all weak plants and those affected by mosaic, leafroll, or wilt removed.

At digging time a careful selection of some of the best hills should be made and these hills dug separately and kept for the next season's seed plat. The remainder of the crop from the seed plat may then be used for planting the main acreage and all tubers over 1 ounce in weight may be safely used for seed.
Other available potato bulletins published by this Station are as follows:
No. 323. Potato spraying experiments in 1909.
No. 327. Potato fertilizers: Methods of application and form of nitrogen.
No. 349. Potato spraying experiments, 1902–1911.
No. 352. Lime sulfur vs. bordeaux mixture as a spray for potatoes, II.
No. 369. Injurious effect of formaldehyde gas on potato tubers.
No. 370. Efficiency of formaldehyde in the treatment of seed potatoes for Rhizoctonia.
No. 379. Potato spraying experiments at Rush in 1913.
No. 399. Spindling-sprout disease of potatoes.
No. 421. Lime-sulfur vs. bordeaux mixture as a spray for potatoes, IV.
No. 422. Observations on some degenerate strains of potatoes.
No. 436. Blackheart and the aeration of potatoes in storage.
No. 459. Missing hills in potato fields.
No. 474. Experiments on the spacing of potato plants.
No. 489. Further studies on missing hills in potato fields and on variation in yield of plants from halves of same seed tuber.