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IMPROVEMENT OF THE SEED POTATO

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In yield per acre, the potato crop of this country is just where it was fifty years ago. Increase in production has been due to increase in acreage rather than to greater yields. During the first twenty-five years of this period there was a great decrease in yields, and during the last twenty-five years the ground lost has just been regained. The decline in yield is due to "run out" seed stock, uncontrolled disease, the rav-



Left: Hills from hill-selected stock.
Right: Hills from best available stock, not hill-selected (same variety).

ages of insect pests and poor stand. The upward trend is due to seed selection, and in a measure to disease control, and the united effort of growers in many sections to improve the crop.

The average yield of potatoes in Oregon is only 130 bushels an acre, while many of our best growers are getting more than double that yield. More attention to the subject of improvement must evidently be given

if the Oregon potato is to hold its place in the markets of the country, either as a seed potato or table stock.

Select the Seed Potato. Potato seed does not "run out" if properly selected. Signs of "running out" or deterioration in the potato are pointed ends, and constrictions in the middle of the long type of tubers. The tendency for roundish or blocky potatoes to get ill-shaped and long, is an indication of the same thing. Seasonal and climatic conditions are sometimes responsible for ill-shaped potatoes (potatoes with protuberances, etc.) but generally these irregular-shaped tubers are indications of poor seed stock. Do not plant them.

To accomplish the end desired in potato improvement, three lines of work must be given attention.

First, the careful selection of tubers of the right size, true to varietal type, and free from disease.

Second, the treatment or disinfecting of all seed tubers.

Third, the planting of potatoes on disease-free soil.

Unless the grower who contemplates potato improvement has some very good seed of his own, he might save a great deal of time and money by getting some pure seed of the variety he desires to grow and select from. The first method or type of selection would be to go to the potato bin, just after digging time, and select from it the choicest potatoes weighing from 4 to 8 ounces, having the varietal characteristics strongly marked, and having also smooth surfaces free from blemish. This would do for the field or general planting, and would at least be one step in advance of the method of planting what is left in the potato bin in the spring, regardless of the quality or condition of the tubers.

W. A. Orton, Pathologist, Washington, D. C., declares that, "Nearly all of the diseases which are commonly spread in the seed, are brought into practically complete control by the methods of hill selection."

At the present time the best known practices of selecting potatoes as used by growers are known as the tuber-unit method, mass selection by hill method, and hill selection and hill testing by row method.

Tuber-Unit Method. By the tuber-unit method the very choicest potatoes in the bin or from hill selection, are selected. These potatoes should weigh 6 to 8 ounces, be smooth and free from disease, and show plainly the varietal characteristics of the given variety. When planting time comes each tuber is cut from stem to seed end into halves, and then into quarters. Round or blocky potatoes may be quartered through seed end, and the four pieces are planted in one unit in the row. A little more space is left between units than between hills. The cuttings from each potato in turn are planted in four hills as a unit. These units are labeled or numbered so that check can be had on them in the fall at harvest time. During the summer the weak plants should be rogued out. At harvest time the units are harvested separately, and only those that have shown promise are reserved for continued planting. Those showing weaknesses and low yield are eliminated. The following spring ten good potatoes from each unit saved are selected, and there will be forty hills in the unit this season instead of four as in the beginning. By the third season the amount of seed available as a result of this work should be enough to plant a considerable area. The

selection from this point may be carried on further by what is known as the hill method.

Mass Selection by Hill. By hill selection is meant the selection, during the growing season, of hills in the field that show promise as indicated by the thrifty vines, and by the stalks having the varietal characteristics well marked. Look for the five pound hill, or better, of the smooth medium sized tubers. A large number of these hills may be selected, and marked to be dug separately at harvest time. Just before the field harvest, or at digging time, each hill is dug separately, and inspected carefully for disease or for signs of deterioration or running out, and if it does not come up to the standard, it is thrown out. A great many hills of high-yielding stock are thus saved, and may be massed in a seed plot, which the following year will go into the general field planting.

Hill Selection and Row Testing. Hills of phenomenal promise should be kept separate and propagated further, in a row test in the breeding plot. This gives another check on a given hill. Potato growers are realizing more and more that there is a difference in strains of potatoes, and that the selection for high yield and for quality gives results at harvest time. Reports from growers who have been practicing hill selection, indicate that hill-selected stock yields from 30 percent to 50 percent more than the best stock obtainable from ordinary bin selection.

Hand in hand with field selection must go rigorous selection and treatment against disease. The potato seed should be treated for scab and other diseases, and careful roguing out of all the weak and diseased plants should follow long before harvest time.

Seed Treatment. The standard potato seed treatment as adopted by the Certification Board of the College is as follows:

4 ounces of Mercuric chloride (Corrosive sublimate).
30 gallons of water.

This will be effective against common scab, rhizoctonia, and any fungus diseases that have spores on the surface of the potato. The material used in this treatment will corrode metals, and should therefore be used only in wooden or porcelain containers.

Corrosive sublimate is a deadly poison, and potatoes not planted after treatment should be buried or burned, so as to be put out of the reach of live stock.

The corrosive sublimate should be dissolved in a small amount of hot water and then mixed into the larger amount of 30 gallons of water. This material is taken up by the potatoes and deteriorates, so that this one mixture can safely be used to treat only four lots of potatoes. One batch of 30 gallons would treat about 40 bushels of potatoes. (Send for Extension Bulletin 186 on the diseases of potatoes).

Disease-free Soil. Clean seed should be planted on clean soil. In order to keep the disease in the soil down to the minimum, potatoes should not have been planted on the seed plots for at least five or six years. If clean seed had been used at all previous plantings, of course, this interval might be cut in two. The seed-potato crop resulting from this combination of clean seed and clean soil should be comparatively free from disease. In order to keep up the quality of the stock after

selection, a good cropping system or rotation should be followed. A very good system of crop rotation for Western Oregon would consist of potatoes, one year, followed by either fall or spring cereals, which would be seeded to clover. The clover should be grown for one or two years, followed by a cultivated crop, such as corn, if possible, before potatoes are again included in the rotation. The clover crop is often followed by potatoes, a practice not objectionable except for the fact that some of the potato diseases tend to harbor over in the clover crop. If potatoes are planted immediately following clover, however, the ground should at least be fall plowed, and reworked the following spring.

In irrigated sections where alfalfa is grown, the same objection might be made to the alfalfa sod that is made to the clover sod; and here, as with clover, a corn crop should preferably come in between the alfalfa and the potato crop. In many sections of the dry-farm area, which are devoted largely to wheat, potatoes might well be used occasionally as a substitute for summer fallow.

Storage. Potatoes should be dry, clean, and cool when going into storage. Seed potatoes in particular, should be kept in a cool, well ventilated cave or root cellar. A temperature of 36° F. or as near that as possible should be maintained. Ventilation is important and especially right after the potatoes go into storage, for they sweat some at that time. Seed potatoes allowed to sprout and grow in storage will often drop 40 percent in yielding power.

Community Cooperation. Greater results can be obtained from potato improvement through community cooperation. Consequently a good live potato-growers' association will aid materially in doing this work. By this plan it is possible for the community to adopt a single variety or at most, two or three varieties, which are suitable for their conditions, and to specialize on this variety or varieties. This plan immediately stimulates community pride, and rivalry to produce the best product possible; and thus the potato crop is not only improved, but better prices are realized where carload lots, of one or two particular varieties, are obtainable, and of the quality demanded by the market.

Summary. Good seed is a determining factor in the production of profitable crops of potatoes in the State of Oregon. Better seed will result from the tuber-unit and hill-selection methods of selection, through the elimination of the weak and unproductive hills.

If weak tubers are planted, a similar harvest will be the result.

All potatoes showing discoloration of the flesh or rot injury from disease, should be rejected at planting time.

The highest standard for purity of seed stock should be maintained; serious losses are sustained by the growers through raising badly mixed varieties of potatoes.

The use of certified seed should increase the returns from the potato crop of the State by many thousands of dollars.

All seed should be treated with the corrosive-sublimate treatment, and be planted on disease-free soil for best results.

If clean potatoes are to be had, a crop rotation of general cropping should be followed out for at least five years.

Good storage for seed potatoes must be provided if they are to retain their quality until planting time.