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# IRISH POTATO SEED PIECES



# CUTTING IRISH POTATO SEED PIECES

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Irish potato growers in North Carolina have shown considerable interest in finding improved practices that will lead to larger yields of marketable potatoes per acre. In this connection, the importance of seed piece size was brought to the attention of growers in eastern North Carolina and the interest shown prompted the preparation of

this bulletin. The purpose of the publication is to present information on the seed piece size most practical under North Carolina conditions and to describe a method of cutting seed pieces of the proper size and shape. While emphasis is placed on seed piece size and cutting, other related subjects are also discussed.

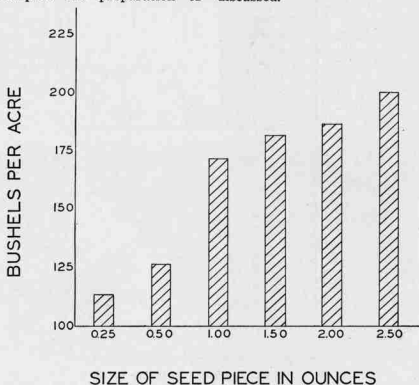


Figure 1. The effect of the size of seed piece on yield.

### Size of Seed Piece

The size of seed piece has been shown by a number of experiments to have a pronounced effect on yield of Irish potatoes. Tests conducted in North Carolina are in general agreement with studies conducted in other states and Canada, and are given in Figure 1.

It will be observed that the yield increases as the size of seed piece increases. It is generally agreed that a seed piece weighing at least one and one-half ounces is the better size. Using larger pieces will require extra seed to plant each acre, but are an assurance of better stands, larger plants and better yields. (Table 2.)

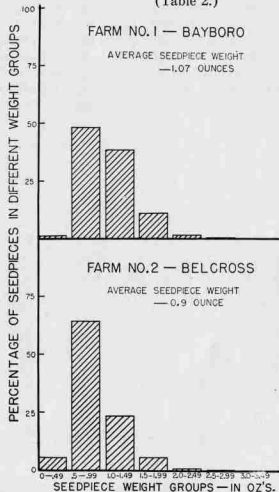


Figure 2. Percentage of seed pieces falling in different weight groups on two farms studied.

### What Size Seed Pieces Have We Been Planting?

It is the policy of many growers to make a bag of seed stock plant as many yards of row as possible. During the planting season of 1943, seed pieces were weighed to determine the average size being planted on two large farms. On each farm approximately one thousand seed pieces were weighed from each of two cutters. The results are illustrated in Figure 2.

It will be observed that approximately 50 to 60 per cent of the seed pieces weighed less than one ounce, and that over 90 per cent weighed less than 1½ ounces. The average weight of the measured seed pieces on both farms was about one ounce or less. Seed pieces examined on several farms in 1942 and 1943

indicated that most growers were planting seed pieces about the same size as those weighed on the two farms. In some cases, even smaller pieces were being planted. On the basis of the experimental data on seed piece size best suited for North Carolina, the average size being planted is too small for maximum yield.

### Seed Piece Size As Related To Emergence and Stand

Larger, more blocky seed pieces provide a greater reserve of food for the growth of the young plant. This assures more vigorous plants and quicker emergence as illustrated in Figure 3. Earlier emergence is followed by more rapid development in the early stages of growth, because of the reserve food supplementing that manu-



Figure 3. Seven rows of potatoes planted March 25, 1942. Photographed April 22, 1942. Rows 2, 4, and 6 planted with seed pieces averaging approximately 1½ ounces. Remaining rows planted with seed pieces averaging one ounce or less. Note difference in emergence.

factured by the young plants. Plants that get off to an early, vigorous start have a better chance of producing a maximum yield of potatoes.

Bigger seed pieces give greater assurance of a good stand. Small seed pieces, because of their size and large amount of cut surface, are more likely to be injured by drying out if not planted immediately, and are more likely to be decayed by organisms in the cold, wet soils at planting time.

#### Number of Eyes per Seed Piece

When cutting the bud-end of potatoes it is impossible to cut pieces to a single eye and at the same time obtain blockiness. More than one eye per seed piece does not make it undesirable although more than one stem may be produced. Work in Ohio, on the yield of hills having more than one stem, showed that 2-, 3-, and 4-stem hills yielded as many or more number one potatoes as single-stem hills. The size of seed piece is much more important than the number of eyes per piece.

Some growers have preferred seed pieces cut from the eye-end

of the potatoes. But on the basis of work done in New York, the superiority of the eye-end over the stem-end was only noticeable if potatoes having sprouts  $\frac{1}{4}$  to  $\frac{1}{2}$  inch long were used. If the potatoes were cut when the sprouts had not started to develop or when they were very small, as is the usual case in North Carolina, the difference in plants from the eye- and stem-end seed pieces were not significant. This point, therefore, should be of little concern to the early potato growers who cut their seed stock before sprouting has developed to any great extent.

#### A Method of Estimating Seed Piece Size

While cutting, there is an easy and rapid method of determining the average seed piece size. It consists of weighing one hundred seed pieces. No attempt should be made to select the pieces, but rather count out the first one hundred from a bag or hamper. By obtaining the weight of one hundred seed pieces the average size can be readily estimated with Table 1.

TABLE 1. TABLE FOR ESTIMATING AVERAGE SEED PIECE WEIGHT FROM THE TOTAL WEIGHT OF 100 SEED PIECES.

| Weight of 100 seed pieces | 6 lbs. 4 ozs. | 7 lbs. 13 ozs.       | 9 lbs. 6 ozs.        | 12 lbs. 8 ozs. |
|---------------------------|---------------|----------------------|----------------------|----------------|
| Average seed piece weight | 1 oz.         | 1 $\frac{1}{4}$ ozs. | 1 $\frac{1}{2}$ ozs. | 2 ozs.         |

Another method of estimating seed piece size is to determine the number of pounds planted per acre. This method is less desirable for the small grower, as most of his potatoes are cut before planting starts. The occasional weighing of one hundred seed pieces would be his best guide for regulating size.

For large growers who plant for several days or weeks, the pounds or bags of seed stock planted per acre would be a convenient check on this weighing method. As an aid to those growers who may wish to use this method of checking seed piece size, Table 2 is presented. The table was prepared on the basis of 12-inch hill spacing in the row and a 100 per cent stand.

Most of the growers questioned have reported that they plant from 4.0 to 5.0 bags (165 pounds) of seed stock per acre, depending on the width of the rows. Since the 1  $\frac{1}{2}$  ounce seed piece is most desirable, the po-

tatoes should be cut so that one hundred sets will weigh approximately 9 pounds and 6 ounces; or, it should require 1,165 pounds, or seven bags, of seed stock to plant one acre of potatoes in rows 42 inches wide. An examination of Table 2 will show many growers that they have been planting seed pieces having an average weight of one ounce or less.

#### A Convenient Method for Cutting Larger Seed Pieces

In many potato sections, a homemade seed cutter has been used for a number of years. The cutter employs a cutting knife in a fixed position, thus leaving both hands free for the cutting operation (see cover). With this cutter, the operator is able to cut blockier seed pieces and more potatoes than by the usual hand cutting method.

The potato seed cutter can be constructed to fit the needs of the grower. Figure 4 shows

TABLE 2. THE APPROXIMATE SEED STOCK REQUIREMENTS FOR PLANTING ONE ACRE WITH SEED PIECES AVERAGING 1, 1  $\frac{1}{2}$  AND 2 OUNCES.

| Seed piece weight (average) | 36" rows             |                            | 42" rows             |                            | 48" rows             |                            |
|-----------------------------|----------------------|----------------------------|----------------------|----------------------------|----------------------|----------------------------|
|                             | Pounds of seed stock | 165-lb. bags of seed stock | Pounds of seed stock | 165-lb. bags of seed stock | Pounds of seed stock | 165-lb. bags of seed stock |
| 1 oz.                       | 907                  | 5.5                        | 777                  | 4.7                        | 680                  | 4.1                        |
| 1 $\frac{1}{2}$ ozs.        | 1360                 | 8.25                       | 1165                 | 7.1                        | 1020                 | 6.2                        |
| 2 oz.                       | 1814                 | 11.0                       | 1555                 | 9.4                        | 1360                 | 8.25                       |

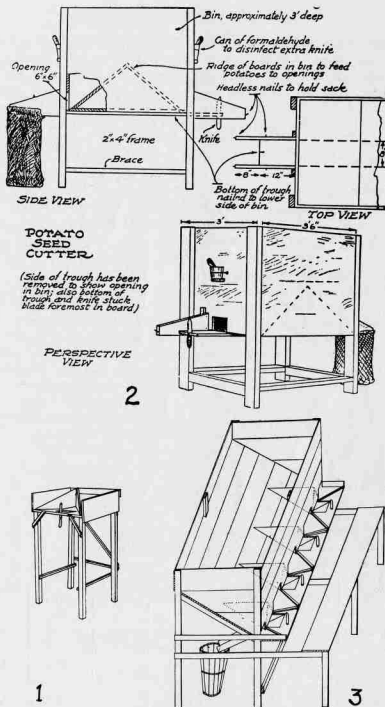


Figure 4. Potato seed cutters. 1. One-place cutter; 2. Two-place cutter (from Colorado Agr. Exp. Sta. Bul. 446); 3. Four-place cutter, about 5½ feet high and 12 feet long. Seed pieces are dropped in chutes and collected in baskets or other containers.

three cutters built to accommodate one, two and four people. For small growers the one- or two-place cutters would probably serve best, while one or more four-place cutters would be more practical for the larger growers.

The hopper should be large enough, even on the small cutter, to hold at least one bag of seed potatoes. For the large cutters the construction should be sufficiently sturdy to support the weight of several bags of potatoes.

An inexpensive table or case knife has been found satisfactory for the cutting blade. A simple method of installing the knife is to bore a hole through the supporting board slightly smaller than the width of the blade. The knife can be forced firmly into the hole by tapping it lightly with a hammer. The cutting edge of the knife can be turned in either direction so as to cut the potatoes by a pushing movement (see cover) or by a pulling movement.

The cutters can be built to hold bags for catching the seed pieces or the seed pieces may fall into a basket as is suggested for the larger cutter (Figure 4). In designing the larger cutter, it was assumed that a man would spend his full time placing potatoes in the hopper and removing the cut potatoes from the

chutes. By so doing, the persons cutting would be able to work continuously.

### Learning To Use the Cutter

With the following description and Figure 4a, it should take only a few hours to learn to use the cutter. The accompanying chart was prepared for cutting seed pieces having an average weight of 1½ ounces. Many growers will find that seed pieces cut according to the chart will be much larger than those planted in the past.

By referring to the chart, the following description will explain the cutting procedure. Potatoes as small or smaller than number 1 should not be cut, but planted whole. Potatoes about the size of number 2 should be cut once. In such cases always cut the potato from the eye-end to the stem-end or vice versa as illustrated. Potatoes about the size of number 3 should be cut into three pieces. The location of the two cuts is indicated on the drawing (1 means first cut, 2 means second cut). Potatoes about the size of number 4 should be cut into four pieces as indicated by the numbered lines. The remaining drawings on the chart indicate how larger potatoes should be cut. For badly shaped tubers, or long varieties, the operator must use his own judgment.

The line drawings on the chart

were copied from natural size pictures. When learning to use the cutter, merely match the potato to be cut with the line drawing nearest its size and cut the tuber according to the suggested lines on the drawing.

During the planting season of 1943, one thousand seed pieces cut with the hand knife by one

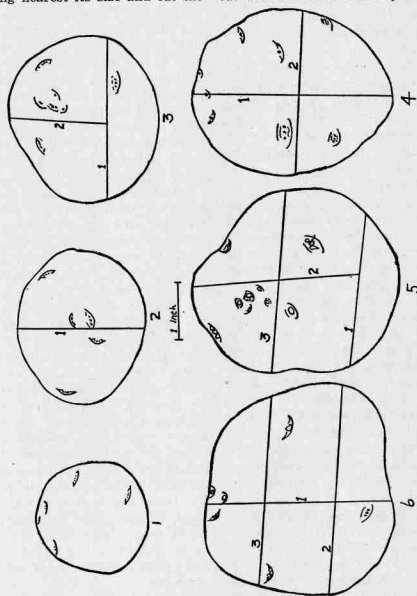


Figure 4a. A guide for cutting potatoes.

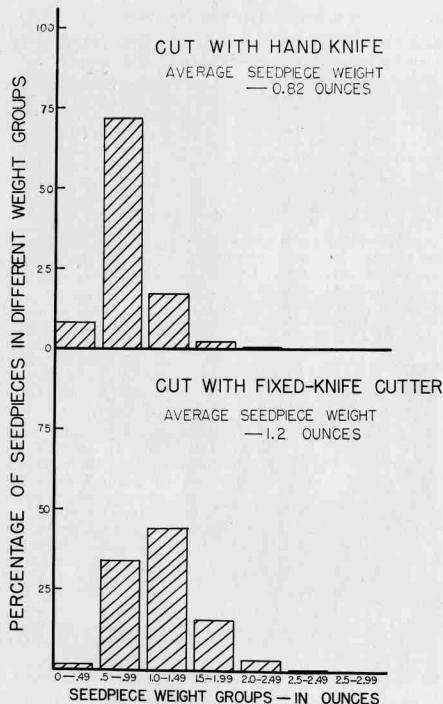


Figure 5. Graph showing the percentage of seed pieces falling in different groups when the same person used hand-knife (top) and cutter (bottom).

person were weighed. This person after some instruction then practiced with the fixed-knife cutter while cutting one 165-pound bag of potatoes. She cut a second bag of potatoes from which one thousand seed pieces were weighed. The difference in the two groups of seed pieces is shown in Figure 5.

Those seed pieces cut with the hand-knife had an average weight of 0.82 ounce; while those cut with the cutter had an average weight of 1.2 ounces. This person increased the average weight of the seed pieces nearly 50 per cent. Had she had more practice and guidance, the aver-



Figure 6. A mechanical cutter.

age size could have been increased to  $1\frac{1}{2}$  ounces.

A question of interest to the growers is the number of eyeless seed pieces that may result from using the cutter. An attempt was made in 1943 to answer this question. Those seed pieces weighed in the above test for size were also examined for eyeless pieces. Of the 4,000 cut by hand, 2.1 per cent were eyeless. Of 2,000 cut by two operators with the cutter, 2.9 per cent were eyeless. These data indicate that the number of eyeless seed pieces resulting from the use of the cutter will not be substantially greater than when the potatoes are cut with the hand-knife, and any slight increase would be offset by the benefits already mentioned.

Cutting machines are available (Figure 6), and are much more rapid than the fixed-knife method of cutting. However, the chance of getting eyeless pieces is possibly greater because the potato cannot be shifted around in the cutting operation. If the potatoes are not uniform in size and shape, there may be many small, "chip" seed pieces. Potatoes showing internal discoloration or evidence of disease are less likely to be detected with the machine cutters.

## DISCARD ALL POTATOES SHOWING EVIDENCE OF DISEASE WHEN CUTTING SEED STOCK



Late Blight. Surface rot or granular brown rot when cut.



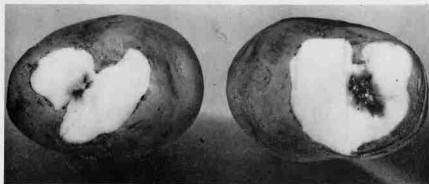
Leaf Roll. Numerous gray colored streaks in the ring.



Fusarium Wilt. Stem-end rot or brownish-black strands in the ring.



Ring Rot. Surface rot or a yellowish-cheesy rot in the ring.



Stem-end Browning. Numerous brown strands starting at stem connection and extending into ring of potato. Usually does not penetrate more than  $\frac{1}{2}$  inch into tuber. Apparently does not cause any disease in the new plant—satisfactory for seed.

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