

INFLUENCE OF PARENT TUBER ON POTATO PRODUCTION

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Because the potato crop is vegetatively propagated by planting a piece of a tuber, the parent tuber from which a seed piece comes is an important influence on production. The ability of the parent or mother tuber to produce is influenced by the growing season in which it was produced, the environment in which it was stored, and by its own size. Botanically the potato tuber is stem tissue, and is influenced by hormones which cause dormancy and apical dominance. On the surface of the potato tuber are several buds or eyes, each of which is capable of producing one or more complete potato plants.

The potato tuber is a living, respiring, organism. The respiration rate at the apical end is more rapid due to the larger number of buds per unit area. As respiration continues during storage, the influence of dormancy gradually disappears, first near the apical end. After dormancy disappears, buds will grow when they are placed in a favorable environment. The apical or growing point of a sprout produces hormones which prevent other lateral buds from growing. If the growing point or sprout is removed, lateral buds are released from the apical dominance of the growing sprout. All these complicated factors influence the seed piece which is planted to produce a potato crop.

The objective of planting potato seed pieces is to produce yields of a marketable product. Quality objectives of a seed grower may differ somewhat from those of a grower of processing potatoes. The major components of potato yield are plants per acre, tubers per plant and tuber size. Seed piece type will strongly influence these major yield components through the ability of the seed piece to produce plants.

Seed piece type is determined by the size of parent tuber from which the seed piece comes, and by the position from which the seed piece is cut from that tuber. Seed piece type may vary from a whole small tuber to a fraction of a larger tuber and may be taken from the bud, center or stem end sections of the parent tuber. Seed piece type will determine the number of buds on each seed piece and its ability to produce plants.

In an experiment with Norgold potatoes (Table 1) there was little increase in the number of buds per tuber as the size of the parent tuber increased. Ten buds were counted on two ounce tubers, while only twelve buds were counted on twelve ounce tubers. There were more buds or seedpieces from the apical end of all tubers. When twelve ounce parent tubers were cut into eight seed pieces each, the apical end pieces averaged 3.5 buds each while only 60 percent of the stem end pieces included any buds. When four ounce tubers with ten buds were cut across the middle, the apical end pieces averaged eight buds each while the stem end pieces included only two buds.

Average percent stand, (Table 2), is the percent of seed pieces which produced any plants. Percent stand and plants per hill were both strongly influenced by seed piece type. Ninety-eight percent of the whole two ounce seed pieces produced 4.8 plants each, while only 60 percent of the stem end pieces from the twelve ounce tuber produced 2.6 plants each. Commercial seed cutting operations would bulk together seed pieces from all positions on the parent tuber. Thus, seed pieces from smaller tubers will produce more uniform stand with fewer missing hills.

For a given seed piece spacing, percent stand and plants per hill determine the number of plants produced per acre. Plants per acre varied widely with different seed piece types. Tubers produced by each plant and ounces per tuber were strongly influenced by the number of plants per acre, or plant competition. Where seed pieces were spaced 9 inches apart in the row, whole two ounce drop seed produced 90,000 plants per acre with 1.6 tubers per plant of an average 6.3 ounce size. Seed pieces from the center section nearest the stem end of twelve ounce tubers produced only 20,000 plants per acre under the same conditions but with 2.4 tubers on each plant of an average 8.9 ounce size. Whole seed produced a yield of 367 cwt. per acre of U.S. No. 1 potatoes while seed from the center nearest the stem end of twelve ounce tubers produced only 149 cwt. per acre.

Hollow heart in large Norgold tubers is an important consideration. The percent hollow tubers may be excessive for the Norgold variety when the average tuber size is eight ounces or larger. Thus it would appear that higher plant populations are desirable. Highest yields of U.S. number one potatoes were produced where plant populations averaged 54,000 to 90,000 plants per acre.

SUMMARY

Seed piece type is determined by the size of the parent tuber and the position from which the seed piece is cut. Seed piece type strongly influenced the ability of the seed piece to produce plants and yield. Uniform stands of 54,000 to 90,000 plants per acre produced the most U.S. number one Norgold potatoes. Seed from parent tubers weighing eight ounces or less produced the highest yields.

TABLE 1

Numbers of buds on six sizes of Norgold parent tubers and ten seed piece types.


















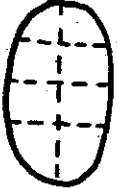
Parent Tuber		Type		Seedpiece	
Ounces	Buds			Ounces	Buds
2	10	Whole		2	10
4	10	Bud		2	8
4	10	Stem		2	2
6	11	Third		2	3.7
8	12	Fourth		2	3
9	12	Sixth		1.5	2
12	12	Bud		1.5	3.5
12	12	Center		1.5	0.9
12	12	Center		1.5	0.9
12	12	Stem		1.5	0.9

TABLE 2

Average percent stand, plants per hill, plants per acre, tubers per plant, ounces per tuber and hundredweight per acre of U. S. Number 1 potatoes with two inch minimum diameter produced by ten different types of Norgold seedpieces spaced nine inches apart in rows thirty-six inches apart.

Type	Seedpiece	Ounces	Percent Stand	Plants /hill	Plants /acre	Tubers /plant	Ounces /tuber	Cwt. /A U. S. No. 1
Whole		2	98	4.8	90060	1.6	6.3	369
Bud		2	93	4.9	88000	1.5	6.1	286
Stem		2	96	4.0	75000	1.6	6.8	288
Third		2	95	3.6	67000	1.7	7.4	337
Fourth		2	90	3.1	54000	2.1	7.6	369
Sixth		1.5	70	2.3	31000	2.1	7.6	201
Bud		1.5	96	2.9	54000	1.9	7.3	279
Center		1.5	80	2.1	33000	2.0	8.3	203
Center		1.5	60	1.7	20000	2.4	8.9	149
Stem		1.5	60	2.6	30000	2.0	8.5	223