

POTATO SEED -- WHAT IS IN IT?

by

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Despite the large amount of research conducted on it, there has been and still is considerable lack of understanding as to the behavior of seed potatoes. The reasons for this are many and they are justifiable reasons. First of all, many people have not realized the magnitude of differences among varieties and tend to relate behavior of all varieties on the basis of one. Secondly, the conditions under which a seed crop is grown influences the behavior of the seed the next year. Third, the conditions under which the seed crop was harvested and stored influences its behavior and fourth, the germinating conditions such as time of planting, soil temperature, moisture and even fertilizer rate influences the behavior of seed after planting.

It is important for commercial and seed growers to understand how to keep seed in its most productive condition. It is impossible to obtain a good commercial crop of potatoes from poor seed.

The most obvious way seed manifest their condition or behavior is by the number and vigor of stems arising from each seed piece. What factors control or influence the number of stems arising out of a seed piece and how is this related to yield? I am sure you will agree that this is vitally important in affecting vigor of plant, grade, yield and possibly, ultimate specific gravity. I think you will also agree that there is considerable variability in stem number in any field you go into. The numbers of stem/seed piece can range all the way from 1 stem/hill to 8-10 stems/hill. More precision planting and greater control of stems arising out of a seed piece is going to be required in the future.

One of the most obvious factors which affects number of stems arising out of a seed piece is chronological and physiological age. The older the seed piece becomes, more and generally weaker stems arise out of the seed piece. At the present time we do not have much control over this.

As size of seed piece increases average numbers of stems increase (Table 1). Our present recommendation is a seed size of around 1-1/2 to 2 oz. In 1970 seed of this size produced between 2 and 3 stems/seed piece, however, in 1971 stem numbers averaged between 1-1/2 to 2 stems/seed piece.

Table 1. Influence of seed piece size on average numbers of stems arising from seed piece.

Av. Stem No/Seed Piece

Seed piece size (oz)	1970	1971
1.5	1.9	1.3
1.0	2.0	1.4
1.5	2.2	1.6
2.0	2.7	1.9

In Table 2 is shown the variability we have experienced in stem numbers among different years and varieties with essentially the same size seed. Numerous stems produced by Norgold Russet is a varietal difference and probably can be explained by its tendency to break dormancy much earlier than Russet Burbank. The differences among years is unexplainable at this time.

Time of planting has considerable influence on numbers of stems arising out of a seed piece (Fig. 1). Later plantings produced more stems. This could be due to several reasons. First,

with later planting the seed is physiologically older and thus more stems. Secondly, with later planting the germinating temperatures are higher which tends to produce more stems/seed piece. This is shown in Table 3 where seed from two sources planted in the greenhouse (germinating temperature 65°F) averaged more stems than the same seed planted in the field (germinating temp 50°F) at a later date. Germinating temperatures on this occasion had greater influence than time of planting.

Table 2. Varietal differences and influence of different years on stem numbers.

Year	Russet Burbank	Norgold Russet
1969	---	4.7
1970	3.8	7.3
1971	1.6	---
1972	2.5	---
1973	2.4	5.2

Figure 1: Influence of planting date on numbers of stems (plants) arising from seed of the same lot.

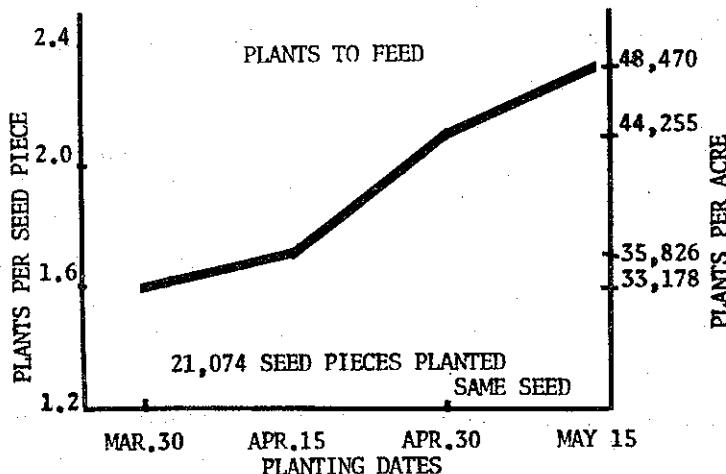


Table 3. Effect of germination temperatures on average number of stems/seed piece.

Seed Source	Greenhouse April 65°F	Field May 50°F
Aberdeen	5.1	3.1
Tetonia	4.2	3.0

Bruising causes more stems to emerge out of a seed piece (Table 4). The mere act of cutting stimulates more stem production. This is probably an attempt by that seed piece to survive or reproduce itself.

Table 4. Effect of bruising on number of stems arising out of seed piece.

Treatment	Avg. Stem No.
1. Check	2.9
2. Bruised by dropping	4.7
3. Scarred with knife	4.5
4. Cut in half	3.1

Another factor on which considerable work has been done is storage temperatures of seed. The results obtained in 1970 and 73 indicate increasing stem numbers with higher storage temperatures (Table 5). Also, 1970 had considerably more stem numbers than in 1973. The reason is unexplainable at this time. There was a trend of higher yields with less stem numbers within the different years. How seed potatoes respond to different storage conditions depends upon the condition of the tubers going into storage. Generally around 40F has been found to be optimum temperature for seed storage by most research workers.

Table 5. Influence of storage temperatures on average number of stems/seed piece and yield.

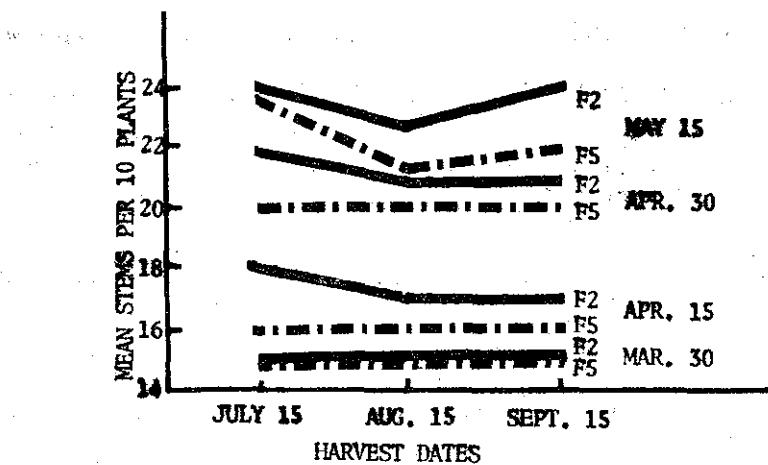
Storage Temp °F	Stem No.		Total Yield Cwt/A	
	1973	1970	1973	1970
34°	1.6	3.3	516	737
38	1.9	---	427	---
42	2.1	3.8	439	731
48	2.1	6.2	403	668

Another factor which I never suspected to have influence on stem numbers is fertilizer rate (Table 6). The fertilizer was banded at planting time. Higher fertilizer rates caused less stem numbers/seed piece and also a decrease in percent stand. These results were undoubtedly due to inadequate moisture for the high fertilizer rates used. Earlier data obtained by Dr. Kunkel (Fig. 2) indicate fertility rate had no influence on early planting dates but differences were apparent on later dates of planting. This again is probably due to inadequate moisture for the high fertility rates used.

Table 6. Influence of fertilizer rate on average stem numbers, percent stand and yield. (1973 data)

Fertilizer Rate lbs/A (triple 16)	Avg. Stem No.	Percent Stand	Total Yield Cwt/A
75	2.2	91.8	413
150	2.0	89.9	416
225	1.9	78.8	492
300	1.8	72.3	463

Figure 2: Effect of fertilizer rate and planting date on numbers of stems arising from seed piece.



We have pointed out some of the factors which influence numbers of stems arising out of a seed piece, some of which are controllable to a degree. Our knowledge of the optimum number of stems derived from a seed piece for high yields and high specific gravity under Columbia Basin growing conditions is not adequate to make specific recommendations. It appears that a compromise is in order between a one stem plant which is derived from physiologically young seed and which produces a vigorous vegetative plant with not much tubers and a 6-8 stems/seed piece which generally produces a much less vigorous plant but sets many tubers.