

SUMMARY OF THREE YEARS RESULTS OF FERTILITY RATES AND HARVEST DATE EXPERIMENTS

Robert Kunkel, Horticulturist
Washington State University, Pullman, Washington

Most potato growing areas have a relatively short planting and harvest periods. To say this another way, the number of growing days is about the same every year because of spring and fall frosts. In the Columbia Basin, the number of growing days for potatoes is more often determined by the amount of available plant nutrients than by frost. When premature death of potato plants occurs and the skins on the tubers no longer slip, they are called mature.

Death of potato plants has been considered a natural phenomenon, but it is no more natural than flu, smallpox or starvation. Is it logical to conclude, that he or she matured at 30 years of age because of death? Not really! An autopsy is performed and the cause of death is determined.

Unfortunately time does not permit a full discussion of all factors concerned, but let me stimulate your thinking and you can fill in the missing information from your own experiences, or by referring to the data published in previous issues of the Potato Conference Proceedings.

Experiments with different planting dates, fertilizer rates and harvest dates over the past 3 years have shown:

1. Potato plants do not just mature and die; they are killed by something or the lack of something.
2. Maximum yields are not the result of a single factor but rather the result of the integration or blending of all essential factors in proper amounts. Some 17 factors need to be considered, but only 10 of them can be more or less grower controlled.
3. The number of good growing days is more important for high yields than the date of planting or the date of harvest. Potatoes planted May 1 produced yields almost as high as those planted April 1, providing there was a long fall.
4. High yields require large quantities of plant nutrients and a long growing season. Fertilization should be according to the anticipated time of harvest and the fertility status of the soil.
5. High rates of fertilizer application tend to reduce specific gravity of the tubers. If the rate of fertilization is according to the anticipated harvest date, the reduction is usually minor.
6. It has not been possible to demonstrate that large amounts of

fertilizer or nutrient balance have a major effect on the color of either potato chips or french fries.

7. Within a variety, blackspot and specific gravity are directly related if the high specific gravity is the result of tuber desiccation, either in the field or in storage. Maintaining soil moisture, however, does not eliminate blackspot if potassium is deficient during the growing season.

8. On moist soil, greenness of vines resulting from high fertilization or late planting reduces blackspot. The greener the vines, the lower the specific gravity and the more blackspot resistant are the tubers.

9. The number of seed pieces planted is a poor indication of the number of plants which need to be fed. Most eyes on a tuber are potentially capable of producing 5 independent plants. The longer planting was delayed between April 1 and May 15, the greater was the number of plants which developed from a seed piece. Plants which arise from the seed piece have their own independent root system and tuber set.

10. The 1968 results support those of the preceding two years. The numerical results for 1968 are attached.

RESULTS FROM THE 1968 PLANTING DATE, FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

July 18 Harvest

Table 1. Total Yield cwt/acre

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	289	279	206	115
200	342	303	210	105
300	309	278	180	61
400	307	255	208	42
500	276	257	180	36

1. Each value is the mean of 8 replications.

RESULTS FROM THE 1968 PLANTING DATE,
FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

July 18 Harvest

Table 2. Chip Color (higher numbers, better color - over 25 O.K.)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	25	24	23	20
200	24	26	26	19
300	26	26	23	20
400	25	22	24	19
500	24	23	22	19

Table 3. Blackspot (higher numbers, less blackspot) (over 80, no blackspot)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	74	79	80	82
200	78	79	79	80
300	77	79	79	82
400	80	80	80	82
500	81	79	81	82

Table 4. Specific Gravity (higher specific gravity, better processing quality)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	1.092	1.089	1.079	1.075
200	1.080	1.083	1.071	1.075
300	1.073	1.076	1.066	1.069
400	1.073	1.070	1.065	1.068
500	1.072	1.071	1.063	1.075

1. Each value is the mean of 8 replications.

RESULTS FROM THE 1968 PLANTING DATE,
FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

August 19 Harvest

Table 5. Total Yield cwt/acre

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	418	405	419	329
200	542	521	465	380
300	587	578	480	324
400	595	561	494	312
500	591	574	462	330

Table 6. Chip Color (higher numbers, better color - over 25 O. K.)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	29	30	31	30
200	34	31	30	29
300	28	30	29	29
400	34	30	32	27
500	29	29	30	25

Table 7. Blackspot (higher numbers, less blackspot) (over 80, no blackspot)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	58	65	75	79
200	69	75	72	81
300	69	73	79	79
400	72	76	76	81
500	76	76	75	81

1. Each value is the mean of 8 replications.

RESULTS FROM THE 1968 PLANTING DATE,
FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

August 19 Harvest

Table 8. Specific Gravity (higher specific gravity, better processing quality)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	1.099	1.097	1.093	1.092
200	1.092	1.091	1.088	1.086
300	1.089	1.087	1.082	1.083
400	1.084	1.085	1.082	1.079
500	1.080	1.081	1.079	1.077

September 19 Harvest

Table 9. Total Yield cwt/acre

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	463	422	473	348
200	592	568	532	446
300	669	635	620	493
400	627	647	696	519
500	697	718	671	504

Table 10. Chip Color (higher numbers, better color - over 25 O.K.)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	22	23	24	21
200	26	26	25	23
300	26	27	23	26
400	23	25	28	26
500	26	26	27	23

1. Each value is the mean of 8 replications.

RESULTS FROM THE 1968 PLANTING DATE.
FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

September 19 Harvest

Table 11. Blackspot (higher numbers, less blackspot) (over 80, no blackspot)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	61	64	68	70
200	64	64	69	72
300	66	68	73	74
400	67	70	73	76
500	71	70	73	75

Table 12. Specific Gravity (higher specific gravity, better processing quality)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	1.097	1.094	1.094	1.094
200	1.089	1.091	1.092	1.093
300	1.091	1.091	1.088	1.093
400	1.089	1.089	1.091	1.092
500	1.088	1.086	1.089	1.090

October 17 Harvest

Table 13. Total Yield cwt/acre

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	472	436	437	393
200	617	577	574	485
300	668	651	675	540
400	726	695	699	543
500	732	683	643	530

1. Each value is the mean of 8 replications.

RESULTS FROM THE 1968 PLANTING DATE,
FERTILIZER RATE AND HARVEST DATE EXPERIMENT¹

October 17 Harvest

Table 14. Chip Color (higher numbers, better color - over 25 O.K.)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	24	23	25	25
200	25	27	27	25
300	25	25	26	28
400	26	25	27	26
500	27	26	28	26

Table 15. Blackspot (higher numbers, less blackspot) (over 80, no blackspot)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	58	63	63	70
200	58	65	68	68
300	62	65	68	68
400	65	65	67	70
500	66	63	69	72

Table 16. Specific Gravity (higher specific gravity, better processing quality)

Pounds of N, P ₂ O ₅ , and K ₂ O Per Acre	Planting Date			
	April 2	April 17	May 1	May 16
100	1.092	1.093	1.093	1.093
200	1.089	1.090	1.088	1.093
300	1.087	1.088	1.087	1.092
400	1.086	1.089	1.087	1.089
500	1.090	1.087	1.085	1.090

1. Each value is the mean of 8 replications.