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EXPERIMENTAL WORK ON POTATO CULTURE*

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The Results Point to the Importance of Using Seed of Strong Vitality—Larger Yields from Imported Potatoes The Advisability of Changing Seed.

It is not necessary to give statistics to convince you of the great importance of the potato crop in Canada. When we consider that most of our people eat potatoes at least once a day nearly every day of the year we have some idea of the enormous quantity required for home consumption. It will readily be seen that if by any experiments which may be conducted, or any information which can be given, we are able to cause a general improvement in the culture of this important food product, the total increase in production would be very large, even though but slight improvement were made in each individual case.

During the 20 years in which I have had charge of the experiments with potatoes at the Central Experimental Farm, Ottawa, I have been many times convinced that there are few, if any, crops which can be improved so much by better methods of cultivation as the potato. There is no field crop that I know of where such a range in yield between different varieties and different strains of seed is found. In 1904 in a test of 75 varieties of potatoes at Ottawa under fairly uniform conditions the most productive variety yielded at the rate of 554 bushels an acre, while the least productive yielded only 123 bushels an acre, a difference of 431 bushels an acre. In 1905 in a test of 78 varieties the highest yield was at the rate of 475 bushels an acre, and the lowest 114 bushels an acre, a difference of 361 bushels an acre. During the years 1906, 1907, 1908, and 1909 the yields in the experimental plots have been much reduced owing to drought, and other causes which will be discussed later, yet the difference between varieties is still marked, the most productive yielding at the rate of 321 bushels an acre in 1909, while the least productive yielded only 17 bushels an acre.

Although this difference in productiveness is, under some circumstances, largely due to variety, much depends on the kind of seed used. One might continue to show how the potato crop could be improved, by thorough preparation of the soil, by using seed of the proper size, by cultivating frequently to conserve moisture, by spraying in good time to kill the Colorado potato beetle, and to keep the potato blights under control, and many other operations which if well done mean an increase in the crop. All this, however, has been discussed so frequently that at this time I shall confine myself to a discussion of the "seed."

Up to the year 1906 the importance of the source of seed supply in Canada had not been strongly impressed upon me, although in the previous year while on a visit to England I was struck by the importance of it there. At the Experimental Farm we had been growing some varieties year after year from the same stock, grown on very similar sandy loam soil each year. Each

year the best potatoes were selected for planting in the experimental plots, and the results obtained seemed to justify the continuance of our own stock from year to year. Taking the results from four well known varieties, for instance, the average yields were the following for the first four and the last four years in the 16 years, 1890-1905, during which time there was no change of seed:

	1890-1893	1902-1905	Increase Bus. per Acre
Early Rose, 257 bus. an acre	317	361	60
State of Maine, 325 bus. an acre	361	37	37
Empire State, 301 bus. an acre	338	37	37
Delaware, 296 bushels an acre	352	56	56

There was thus no indication of deterioration in the variety after 16 years without a change of seed, but a fair increase due, no doubt, to careful selection and good cultivation each year. But in the year 1906 there was a sudden change. That year was one of the most unfavorable seasons for potatoes that has ever been experienced at the Experimental Farm. During the early part of summer there was sufficient rain to keep the plants growing nicely, but just after the last cultivation, dry, hot weather set in and continued all summer, with the result that the plants were stunted, the foliage dried up prematurely and there was a poor crop of tubers. Moreover, during the month of July there was a veritable plague of aphid which attacked the foliage and doubtless did their share in lessening the crop. The best tubers were used for seed in 1907, but the best were small and had been prematurely ripened in 1906. The early part of the summer of 1907 was dry and the tubers did not form well. The crop was again small, although most of the tubers which formed became of marketable size and were clean and well formed. The best of these tubers were used for seed in 1908, but during that year there was never enough moisture from the middle of June until the vines died, notwithstanding thorough cultivation. A severe attack of thrips also checked the growth of the vines. Again the best tubers were planted in 1909, and the seed used would have been considered by its appearance to be first class seed, as it had been kept in a cool cellar and the tubers were firm and showed little sprouting when the potatoes were planted, yet the results were very poor.

A table of yields of the four varieties already referred to for the years 1906-09 is interesting.

	Early Rose	State of Maine	Empire State	Delaware
	Yield per acre Bush.	Yield per acre Bush.	Yield per acre Bush.	Yield per acre Bush.
1906	150	132	132	103
1907	128	174	117	114
1908	69	97	117	156
1909	18	62	62	53

Aver: 1906-9	91	116	132	131
Average 1902-1905, before the drought:				
	317	361	338	352

It will be seen from these figures that there has been a marked falling off in yield during the past four years, part of which in the years 1907 and 1908 was doubtless due to the weakened vitality of the seed, and part to the very unfavorable seasons. In 1909 with a more favorable season and good cultivation the small yield is evidently owing largely to seed low in vitality, although in 1909 there was considerable injury from disease which caused the rotting of the stem. Newer seed of other varieties yielded in these bad years as high as at the rate of 234 bushels an acre in 1906, 402 bushels in 1907, 325 bushels an acre in 1908, and 321 bushels an acre in 1909, showing that notwithstanding unfavorable conditions good seed gave good results.

RESULTS FROM IMPORTED SEED

The crop of potatoes had been so poor in 1906, and the prospects for a good crop in 1907 from the tubers not being thought favorable, it was considered desirable to compare the results with imported seed. Accordingly, small quantities of tubers of six well known varieties of potatoes were procured from the Exorietal Farm, Nappan, N.S. As the best of the homegrown seed had been used in other experiments before this imported seed was planted the results obtained that year are not considered reliable, but it may be said that the average yield from the imported varieties was almost twice as great as from the home-grown seed of the same sorts. In 1908 it was possible to make a fairer comparison, and before was compared with the best seed of the home-grown stock. The results given in the following table show that the extra vigour and productiveness of the imported stock were still maintained to a marked degree.

Name of Variety	Seed from Nappan, N.S., 1907 Total Yield per Acre C.E.F., '08 Bush.	C.E.F. Seed '07 Total Yield per Acre C.E.F., '08 Bush.
Late Puritan	343	118
Rochester Rose	281	96
Early White Prize	272	123
Vick's Extra Early	213	156
Money Maker	213	118
Carman No. 1	193	103
Average	253	119

This test was continued in 1909, new seed of some of the same varieties being obtained from Nappan again this year and compared with the Nappan stock of 1907 grown two years at Ottawa, and with our old stock. The results are as follows:

	Rochester Rose	Carman No. 1	Vick's Extra Early
	Bush. lbs.	Bush. lbs.	Bush. lbs.
Nappan seed 1900	215	36	198
Nappan seed, 1907	127	36	62
C.E.F. seed	44	58	36
			74

It will be seen from this table that in every case the Nappan seed of 1909 yielded much more than the Experimental seed, nearly five times as much in one case, and more than twice as much in two cases. In two cases the Nappan seed of 1907 yielded much better than the Farm seed of the old stock, although in one case the Farm seed did a little better.

*An address delivered at the Convention of the Ontario Vegetable Growers Association held in Toronto last week.