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POTATO SCAB

—BY—

L. F. HENDERSON

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BULLETINS

The regular bulletins of the Station are sent free to all citizens of Idaho who request them. Late bulletins are:

46. Grape Phylloxera.
47. Pruning the Apple Orchard.
48. Raising Calves on Separator Milk.
49. Soil Temperatures 1903--4 and Summary Weather Data 1894--1904.
50. Trap Rock of the Palouse Region as Road Material. Part II.
51. Alkali Conditions in the Payette Valley.

POTATO SCAB

— BY —

L. F. HENDERSON

Potatoes raised upon the writer's farm in 1904 were quite scabby. The ground had been cleared only two years previous, and this, added to the poor cultivation they received, may account for the presence of scab that season. Probably one fifth of the tubers showed more or less of the disease. It therefore occurred to me that this might be good ground to plant to potatoes the next year, and see whether the scab wintered over in the ground. By extending the planting into new ground adjoining that planted in 1904, and by treating some of the tubers to kill the fungus, while others were left untreated, it was thought a rather interesting experiment might be undertaken, and the results put into a bulletin might prove helpful to many growers of potatoes in our state.

The ground used for this purpose was a rich hillside sloping to the west and planted to young apple trees. There is an abundance of humus, while small pieces of stems and roots abound in the soil and help to render it very porous, possibly to an extreme. Owing to the fact that the orchard and its cultivation are the things of prime importance with me, I planted only three rows of potatoes in each space between adjacent apple-tree rows, and these as near the center as possible, so that disk and weed-cutter could be used without interfering either with trees or potatoes. The rows are about three feet apart, so as to permit of cultivation with a shovel-plow and cultivator, and the seed was planted about two feet apart in the row.

In order to be sure the land should be in good shape, I had it plowed, then harrowed, then disked, then harrowed again. The rows were opened by a double-shovel plow, running as deep as it could be conveniently held. After the potatoes were dropped, the centers between the rows were plowed out by a walking-plow in two directions, throwing the dirt towards the potatoes and covering them deeply. When the weeds had made a start, about two weeks afterwards, a spike-tooth harrow was run over the whole patch two or three times, at from forty five degrees to right angles with the rows, levelling the ground and lowering the earth from above the seed, which by this time had sprouted. Three or four cultivations through the spring and summer completed the attention given the patch.

Before the potatoes were planted the following plan was outlined by me:

First: Part of the present patch should be in new ground, part in the ground used for potatoes the year before.

Second: Some of the seed potatoes should be very scabby, some slightly scabby, and some clean, to the eye at least.

Third: Some of the seed should be treated before planting, some should remain untreated.

Fourth: The fungicides to be used should be Corrosive Sublimate, Formalin, or as sometimes called Formaldehyde, and Dry Sulphur.

Fifth: Small seed in some rows, large in others, to see whether any difference could be detected at harvest time from size of seed used. This, it is evident, had no connection with the scab problem, but it was thought the result might be of as much interest to many potato growers as it was to the writer.

The land having been previously put into proper shape, we began planting on the 12th of April. I had previously raised Blue Victors, Burbanks, Six Weeks, Peerless, and Late Ohio, but there proving to be no sale for the first splendid tuber, owing to foolish prejudice against its blue or purple skin, this potato was

not amongst those planted. The Six Weeks could be told from the others by the pink skin, the remainder being white potatoes. These had become so mixed by three years planting that no attempt was made to keep them apart. Very few Burbanks were used, as this has proved a poor yielder and undersized on my farm, and the "small potatoes" were generally the small ones of the ordinarily large Peerless and Late Ohios. The scab, unfortunately for the experiment, was mainly to be found upon the Blue Victors and the Six Weeks. The first I did not use for the reason stated, while the quantity of the latter was very limited. By carefully sorting each sack for scab and size, enough scabby specimens of the other three varieties could be found to enable me to plant several rows under each treatment and in both scabby and new ground. Every thing over a hen's egg in size was classed in the "large" potatoes, everything the size of a large hen's egg, or smaller, was classed as "small".

Treatment and Purpose.

As the writer has been so frequently asked by letter and at institutes "Which is the best fungicide for potato-scab, corrosive sublimate or formalin?", I determined to settle this in one experiment, if possible. As one eastern bulletin had come under the writer's notice in which sulphur had been used with no great degree of success, I proposed to try this material also, for it seemed to me improbable that a substance of such value in many ways when used as a fungicide *above* ground, should not be of equal value when used *below*. The treatments follow:

1. Corrosive Sublimate. An intense poison and should be handled with care, guarding against using the vessel in which this substance has been dissolved for any such purposes as mixing feed, or putting anything in it which is intended to be used for man or beast. The poison was poured into warm water in a *wooden* tub and stirred vigorously with a lath till dissolved. The approved amount being 10 ounces sublimate to 60 gallons of water, the keg holding with potatoes only 15 gallons, and not

needing more, I used 3 ounces sublimate to 15 gallons. The potatoes were immersed whole, care being taken that all of the sack was submerged also, and after leaving them from an hour and one half to two hours were taken out, dried, and then cut for planting.

2. Formalin. Harmless to the touch, not injurious to seeds in stronger solutions than recommended, and not poisonous internally if taken in small quantities and diluted. As the treated seed was to be planted in new as well as in scabby land, as the pint bottle was not full and it was feared it might have deteriorated by escape of the gas, the whole quantity in the pint bottle was poured into the 15 gallons of water. A pint is supposed to be enough for 30 gallons ordinarily. Care was likewise taken that each sack should be entirely immersed whenever a bushel of seed was treated. Each bushel was left in the solution for two hours, then taken out, held on the edge of the tub to drain, dried, and cut to size.

3. Sulphur. The sulphur used was the cheaper grade. The tubers were cut to size, wet just before needed, and then rolled in the sulphur, allowing as much to be planted with each piece as could possibly adhere to it.

Thirty eight rows of potatoes were planted, and of these rows 21 to 35 inclusive were in ground which had been in potatoes the previous year, and in all of which more or less scabby tubers had been raised. Not a row in this ground had produced potatoes altogether free from disease. If the germs can live over the winter, this part of the soil must have been pretty well inoculated with them. Rows 1 to 20 and 36 to 38 were in new ground,

ROW	KIND OF POTATO	AM'T OF SCAB WHEN PLANT'D	TREATMENT	Gathered Sep. 12th	
				SIZE	CONDITION
1	Large White	No evident scab	(Rolled in sulphur)	Poor	Quite Sc'by
2	Small "	"	"	Good	"
3	Large "	"	"	"	"
4	" "	"	Untreat'd	"	"
5	" "	"	"	"	"
6	" "	"	Cor. Sub.	Fine	No scab s'n
7	" "	"	"	"	"
8	" "	"	Formalin	"	"
9	" "	"	"	Rath'r P'r	"
10	" "	"	"	"	"
11	" "	"	"	"	"
12	Six Weeks	Very scabby	"	Rath'r Sm	"
13	" "	"	"	"	"
14	" "	Less scabby	"	"	"
15	" "	"	"	Good	"
16	" "	"	Cor. Sub.	Rath'r Sm	1 potato s'n with scab
17	" "	"	"	Fine	No scab s'n
18	" "	Very scabby	"	Good	"
19	" "	"	"	Fine	5 sca'by potatoes seen
20	Large White	Sub-scabby	Formalin	"	8 "
21	" "	"	"	"	quite sc'by*
22	" "	None apparent	Cor. Sub.	"	"
23	" "	"	"	"	"
24	" "	"	"	Good	not quite so scabby
25	Small "	"	"	"	"
26	" "	"	"	"	"
27	" "	"	"	"	"
28	" "	"	"	Fine	Some scab
29	" "	"	"	"	"
30	" "	"	"	"	"
31	" "	"	"	"	Less scab
32	" "	"	Formalin	"	"
33	" "	"	"	"	less sc'b still
34	" "	"	"	"	"
35	" "	"	"	"	"
36	" "	"	"	Splendid	very little scab.
37	" "	"	"	"	still less. **
38	" "	"	"	"	none s'n

* Due to scabby ground from last year's crop.

** Due to clean ground the year before?

Remarks and Summary.

1. Rolling seed-potatoes in sulphur, as has been shown at other stations, will not prevent scab much, if at all.

2. Treated potatoes, planted in soil scabby from last year's crop, will produce a scabby crop. This is shown conclusively by Rows 21 to 35.

3. Well treated potatoes taken from treated sacks and planted in *new* ground, will produce comparatively scab-free tubers, whether the seed were clean or scabby before treating. Rows 6 to 20 show this. Not two dozen scabby potatoes could be found in these fifteen rows, and of these, thirteen were found in rows 19 and 20, which were *nearest* to the ground where scabby potatoes had been raised in 1904.

4. Treating is simple and *pays*.

5. Formalin gave in this experiment just as good results as Corrosive Sublimate. That being the case, I would advise all to use it, as it is much *safer* than the other fungicide.

6. The small seed, in slightly moister and richer soil to be sure, gave as good or better results than large seed! Certainly any *better* results must be due to better soil; *as good* results may be expected the *first year* from small seed, if soil is in fine condition. It certainly would not hold if followed for a series of years, as has been demonstrated by others.