

HOW SERIOUS WAS LEAF ROLL IN 1965

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High prices a year ago caused many potato growers to eagerly welcome the 1965 season. But, there was so much leaf roll in some of the late-crop areas last year that many of these same growers were just as happy to see the '65 season end.

Although much has been written and said about potato leaf roll and net necrosis, this problem still remains a major deterrent to the production of late storage potatoes in Eastern Washington, because of the variety we are growing. Current season spread of leaf roll and net necrosis is more serious in the Columbia Basin than in any other major potato producing area in the United States.

For example in the State of Maine the climate is too cold for volunteer potatoes and the major varieties grown (Katahdin and Kennebec) are resistant to net necrosis. In the Red River Valley area the climate is too cold for volunteers and host plants. Thus, there is not as much inoculum, fewer host plants for the aphid, fewer aphids, less leaf roll, and less net necrosis. The same is true for the upper Snake River Valley area of Idaho.

In the Columbia Basin of Washington the leaf roll virus can infect some potato plants of nearly every potato farmer. Potato fields harvested in July and early August are exceptions to net necrosis damage in the tubers. In fact, the leaf roll problem was one reason why the potato industry traditionally concentrated on late summer production in Washington.

Over the past seven or eight years processing has been gradually on the increase. This started a trend toward late crop potatoes for storage. In 1965 the potato processing industry greatly expanded their requirements for storage potatoes. Construction of storage facilities set an all-time record in 1965 and doubled the existing capacity to store potatoes.

More construction is planned for 1966. But when planting for storage, central Washington potato growers cannot be sure the crop will escape serious damage from net necrosis, because the Russet Burbank variety is very susceptible to leaf roll and shows net necrosis readily.

This leads to the question why not grow a different variety.

Russet Burbank enjoys a definite preference with consumers and processors. Our industry must continue to grow and market this variety, or a very similar variety, in order to stay in the potato business.

Thus a potato breeding program was initiated in 1958 to develop a better variety. One with resistance to Verticillium wilt, leaf roll and net necrosis -- yet look like Russet Burbank. Dr. Bill Hoyman heads this project. Combining disease resistance with good horticultural qualities is always a tough job. But in this case it must also have the right shape (long) a russet skin, as well as high dry matter content and good processing characteristics. A leaf roll and net necrosis resistant selection with a russet skin has been developed by Dr. Hoyman, but it still lacks the desired horticultural shape. That is it has a tendency to be a blocky, oblong-type tuber. So the chances for a resistant variety is still in the future. Since we have no resistant variety as yet, it is necessary to fight this virus disease with every possible method known to modern science.

The speakers who follow me this morning will discuss this phase of the problem. I would like to confine my remarks to the economic aspects.

PROBLEMS WITH LEAF ROLL

Indirect Effects

The indirect effects of leaf roll may not be so obvious but are costly just the same. For example: (1) A mild winter may allow potatoes to volunteer. Volunteer plants may become infected with leaf roll virus the previous fall prior to harvest. These diseased volunteers exert a "Typhoid Mary" effect the following year. Many growers never budget money to "rouge out" these volunteers. (2) A potato field intended for storage may have to be diverted to some other outlet and for some other use. (3) Leaf roll may cause a grower to beat the vines early and store prematurely resulting in bad storage problems. (4) Growers who store potatoes containing net necrosis may take serious financial losses when these potatoes are sold.

Green Peach Aphids, in large enough numbers, could hurt a potato crop even if they did not carry the leaf roll virus disease. Aphids damage potatoes by sucking the sap from the plants, which results in a stunting of the plant, curling of the leaves, and dropping of flowers. When plant growth is checked by attack of aphids, tuber growth is also checked resulting in bottleneck or dumbbell shaped tubers. (Other conditions which cause temporary slowing in growth of the potato plant, such as lack of water, may also cause bottleneck tubers.) While aphids are a factor in causing malformed tubers, the greatest damage is caused by the leaf roll virus and the subsequent development of net necrosis in the tubers.

If the infection of leaf roll occurs early in the growth cycle when plants are small, yields can be severely reduced. If the infection occurs late in the growing season yields may not be affected and typical symptoms of net necrosis may not be well defined. But net necrosis is progressive and can become worse in storage.

RESULTS OF LEAF ROLL COST SURVEY

Direct Cost

A survey was conducted to estimate what the leaf roll virus disease cost the Washington potato industry in 1965. Forms were sent to 31 shippers and 12 processors. The results of this survey (see Fig. 1) are based on returns from 19 shippers and 7 processors.

CONCLUSION

This study revealed that the most expensive item was the cost to farmers for chemicals to control aphids. The second most expensive item was reported by processors. Apparently it doesn't pay to process potatoes having net necrosis. The next most expensive item was reported by shippers who reported rejected car lots by the shipping point inspector. Finally, the lowest cost went for the control of volunteers.

It is interesting to note that there were no rejections by the terminal market inspector for "internal discoloration" due to net necrosis.

This survey indicated a loss of \$ 440,277 could be attributed to the leaf roll virus in 1965. Inasmuch as these findings are based on approximately 50 percent of the returns that were mailed out, these figures are considered to be incomplete.

ESTIMATED COST OF LEAF ROLL
TO THE WASHINGTON POTATO INDUSTRY FOR 1965

1. Cost of chemicals to control aphids during summer of 1965. Include your costs, plus the cost of aphid control of all the potato farmers who sold their potatoes to you. (Please make estimate.)	<u>\$278,235</u>
2. Cultivation costs or hand hoeing costs required to remove volunteers,	<u>\$ 3,550</u>
3. Number of cars rejected by shipping point inspector because of net necrosis.	<u>71</u>
4. How much money did this (Item #3) represent? (Make estimate)	<u>\$ 73,000</u>
5. Number of cars rejected at terminal market by inspector because of net necrosis.	<u>-</u>
6. How much money did this (Item #5) represent? (Make estimate)	<u>\$ -</u>
7. When net necrosis gets in processing plant, does this increase your operating costs?	<u>Unanimous (16) Yes</u>
8. Can you give an estimate of what leaf roll cost your processing plant?	<u>\$ 85,492</u>
Estimated Total	<u>\$440,277</u>

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Figure 1