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POTATO LEAF ROLL

Symptoms, Cause and Control

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Potato leaf roll is the most serious virus disease of potatoes in Idaho. The disease affects both the commercial potato producer and the certified seed potato grower. Reductions in yield in commercial fields have been reported to be in excess of 60% when leaf roll infected seed stock was planted. Leaf roll is one of the major causes for the rejection of seed potatoes from certification.

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Symptoms

Seed-borne leaf roll is recognized in the field by the upward cupping or rolling of the leaflets. Only the lower leaves are affected at first, but finally all the leaflets on the plant exhibit this symptom (Figure 1). The leaflets point more or less upward and are stiff and leathery. Yellowing of the leaves is very obvious. Infected plants are stunted from the time of emergence and scarcely half as tall as healthy plants at the time of maximum vine growth. Tubers produced by such plants are smaller in size and fewer in number.

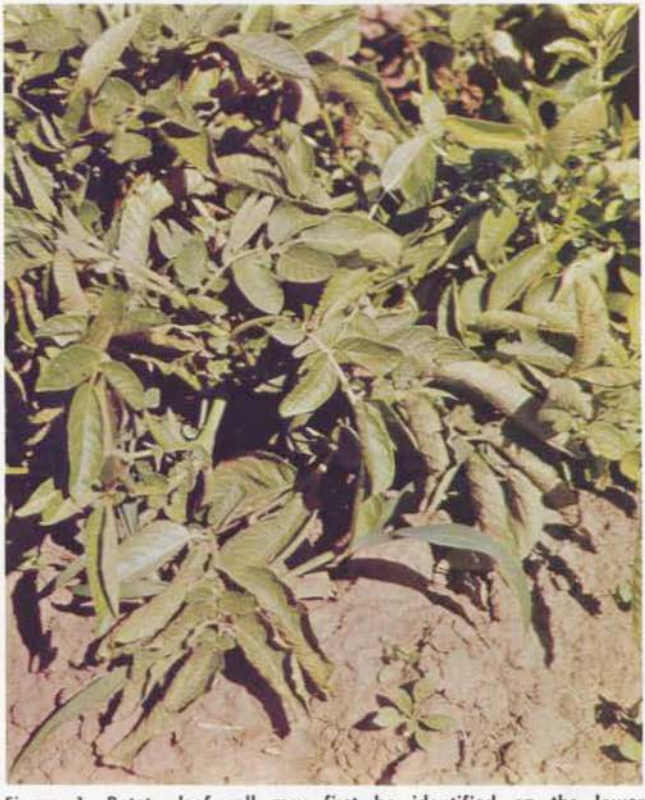

Figure 1. Potato leaf roll may first be identified on the lower plant leaves. Leaflets become rolled or cupped upward and have a leathery texture. Later in the season, all leaves on the plant may be similarly affected. Yellowing is very obvious.

Figure 2. Internal discoloration or net necrosis is frequently a symptom of leaf roll. The dark-brown scattered strands may not appear until tubers have been in storage. Necrosis is progressive during the storage season and most pronounced at the stem end of the tuber.

Current-season leaf roll. Potato plants infected during the growing season first exhibit a rolling of the new leaves. The margins of such leaves become yellow and sometimes tinged with red. The leaves on the rest of the plant gradually become rolled until symptoms are similar to those described under seed-borne leaf roll. In eastern Idaho, plants infected after August 15 may not exhibit foliage symptoms at all.

Tubers produced by plants infected during the growing season often develop an internal discoloration called net necrosis (Figure 2). This discoloration appears as dark brown, scattered strands at the stem end and sometimes extends through the tuber. Tubers infected early in the season often show net necrosis at the time of harvest. Tubers infected later in the growing season may not exhibit net necrosis until placed in storage. The degree of net necrosis increases with increased storage time. Some infected tubers will never show net necrosis.

Perpetuation of Leaf Roll

Non-certified or "year out" seed potatoes usually contain many potato tubers that are infected with the leaf roll virus. When these tubers are planted, they give rise to plants exhibiting the symptoms of seed-borne leaf roll.

In Idaho, the green peach aphid is the primary means of leaf roll spread in the field from a diseased plant to a healthy plant. When this aphid feeds on the leaves of a diseased plant, it picks up the leaf roll virus in the plant sap that it ingests. When the aphid moves to a healthy plant to feed, it transmits the virus during the feeding process. Disease symptoms may appear in 10 to 14 days if the plant is infected early in the growing season. Infected plants may be symptomless if infection occurs after mid-season. The virus multiplies within the potato leaves and is eventually transported through the stem and stolons to the tubers.

Control

For commercial potato producers, planting certified seed stock is the only practical means of controlling potato leaf roll. The use of insecticides to control the green peach aphid in commercial potato fields is not recommended for control of leaf roll in Idaho.

A strict program of field sanitation is practiced in potato fields grown for seed certification. Fields are isolated, rogued of diseased plants, field inspected, and tuber samples are winter tested. Such a program assures the commercial producer that leaf roll will be kept at a minimum in certifed seed stock.

Growers of certified seed. The University of Idaho undertakes extensive precautions to maintain virus free foundation seed stock, but strict precautions on the part of the grower producing certified seed potatoes are essential.

1. Control the vectors
   (a) Remove all apricot and peach trees or apply a dormant spray to the trees to eradicate the green peach aphid early in the spring.
   (b) Spray all garden transplanting material with malathion to rid such plants of the green peach aphid.

2. Eradicate the virus source
   (a) Rogue potato fields early.
   (b) Plant only Idaho certified seed in the home garden.
3. Do not keep seed stocks that are grown near towns or communities.
4. Save seed stocks from the center portion of the field for the next year's planting.
5. Practice tuber uniting for maintenance of seed stocks.

PESTICIDE RESIDUES: The grower is responsible for chemical residues on his crops as well as for problems caused by drift from his property to other properties or crops. Recommendations in this bulletin are based upon the best information currently available. Read labels carefully with respect to dosage, levels, number of applications and minimum interval between application and harvest.

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