

BACTERIAL RING ROT OF POTATO

J. H. MUNCIE

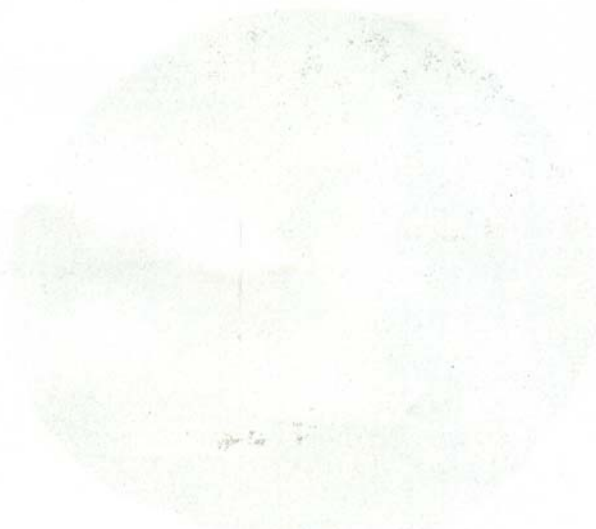


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The bacterial ring rot is a new potato disease in Michigan. It was suspected in 1939 and definitely proved to be present in this state in 1940. At present the disease is confined, so far as is known to only a few lots of potatoes. In one instance, a field of table stock Chippewa potatoes in 1940 showed approximately 74 per cent of the hills affected with this disease. In this case, the disease came into the state on out-of-state seed in 1939.

The bacterial ring rot where it has become established is considered the most serious disease of potatoes yet to appear in the United States. Every effort is being made to eradicate the disease, especially from lots of certified seed in all the seed-producing states. Seed lots showing a single tuber so affected should be sold as table stock. They are unfit for seed purposes.

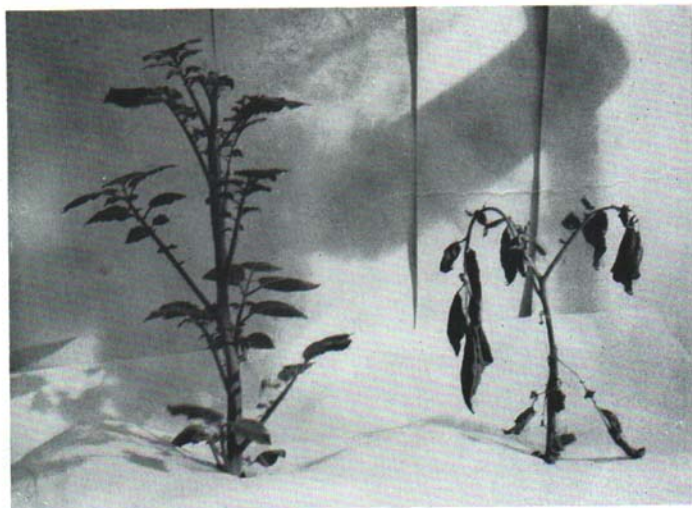


Fig. 1. Chippewa potato plant showing wilting symptoms. This type of wilting may appear on all or part of the plant. Note healthy plant on left.

SIGNS OF THE DISEASE

The disease is not apparent on the vines until blossoming time or even later. Affected plants show wilting of the foliage, at first without yellowing (Fig. 1). Later, depending upon weather conditions, the leaves roll upward at the edges, turn yellow, wilt permanently, and usually remain attached to the plant. Wilting and yellowing usually begin on the lower leaves and proceed upward, following the course of infection up the stem. Finally the entire plant is affected and dies.

Infection of the tubers begins at the stem end and proceeds towards the bud end through the water-conducting vessels. When one cuts crosswise of the tuber at the stem end, infection is first seen as slightly yellowish areas near the vascular ring (Fig. 2). Affected tissue often becomes cheesy in consistency. Later the infected flesh of the spots may become brownish and break away from the sound flesh, leaving an outer firm shell of tissue (Fig. 3). In cases of very light infection, no discoloration is evident but such diseased tubers can be detected by means of ultra-violet light.

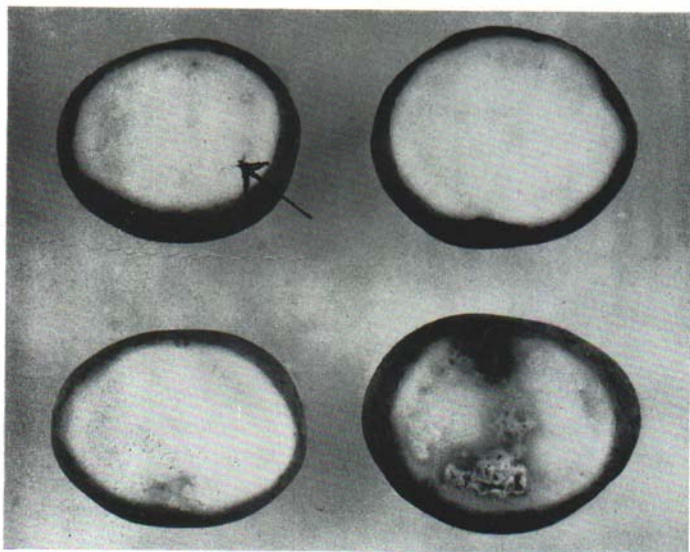


Fig. 2. Cut tubers showing very light infection shown by slight discoloration near vascular ring. The ring rot bacteria are spread on the cutting knife from such lightly infected tubers. Arrow indicates vascular ring.

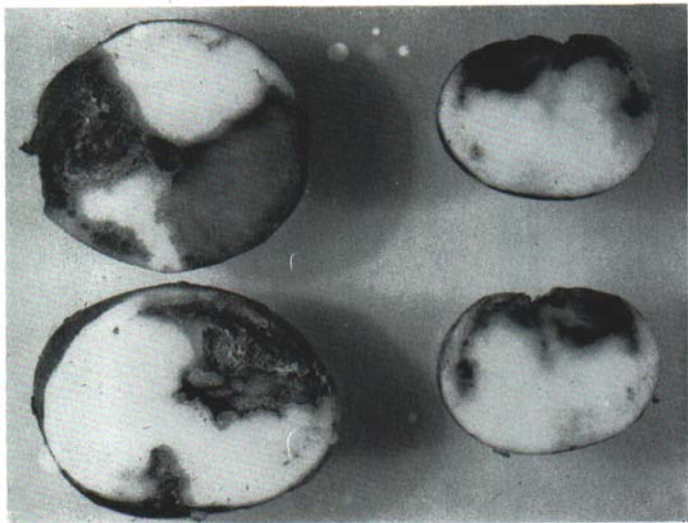


Fig. 3. Advanced decay following ring rot infection. Infected tissue is of cheesy consistency.



Fig. 4. Outward appearance of ring rot decay.

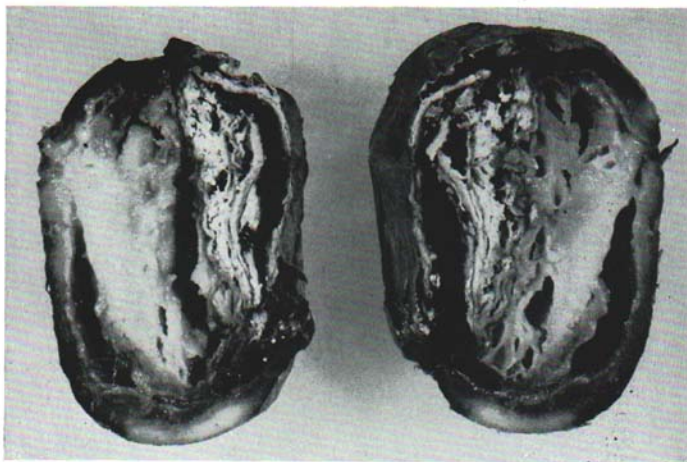


Fig. 5. Internal tuber decay following severe ring rot infection.

The skin of severely affected tubers often turns reddish-brown and cracks (Fig. 4). A cheesy dry rot follows severe tuber infection with the ring rot bacteria (Fig. 5). Cracked tubers often become affected with the common soft rot bacteria in which case the tubers rot rapidly, become slimy and give off an offensive odor.

CAUSE

The bacterial ring rot is caused by the organism *Phytophthora septonica*. When infected tubers are planted, the causal bacteria grow from the seed-piece into the young shoot and progress upward, keeping pace with the growth of the potato plant. When the young tubers are formed on the stolons, the bacteria pass into the new crop of tubers.

Tests in Maine indicate that the ring rot bacteria do not live over from year to year in the soil. It is possible that slightly infected tubers left in the field may produce volunteer plants showing ring rot the next season. The bacteria from decaying tubers in the hill are washed down the row in soil water in wet seasons. In this way one infected plant may cause the spread of the disease for a considerable distance down the row.

The causal bacteria are known to be carried from diseased to healthy tubers on the hands and knives at the time the seed is cut. It has been shown that 20 tubers may become infected in succession by first cutting a ring rot-infected tuber with the same knife. The bacteria remain alive over winter on bags and crates where infected tubers

have become crushed. The disease also is spread by the potato planter, digger, picker, and grader.

Control

At present the only known means of control is the planting of seed stock free from the bacterial ring rot disease. Roguing diseased plants from the seed field has failed to give a crop entirely free of bacterial ring rot. Use of whole seed will restrict the possibility of spreading the disease on the cutting knife to other tubers. Seed stocks known to be even slightly infected should be sold as table stock and bacterial ring rot-free seed obtained for planting.

Bacterial ring rot is very contagious and is spread on cutting knife, hands, tools, bags, and crates. Clean and disinfect the grader, planter, digger and other equipment used in handling infected potatoes. Crates and used bags may be dipped in formalin solution (one pint in five gallons of water). This solution may also be used for washing and spraying machinery and tools. Storages or bins should be disinfected by first cleaning, then spraying with a copper sulphate solution (one pound in ten gallons of water). Cutting knives may be dipped in the formaldehyde solution.

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