RING ROT INCREASE IN POTATO SEED LOTS HAVING KNOWN QUANTITIES OF INFECTION

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1. Seed Lots Having a "Trace" of Ring-Rot.

In order to secure more information relative to the justification of a ring-rot tolerance in certified seed potatoes, several one-bushel samples were tested at the Wyoming Agricultural Experiment Station in 1942. These samples were sent at the request of Dr. T. P. Dykstra from the following states: Maine, Nebraska, North Dakota, Minnesota and New York. All samples were selected by the respective donors on the basis that they contained a "trace" of ring-rot. These samples were to be planted and inspected to determine how much ring-rot spread would take place in the subsequent crop, through the ordinary cultural practices. Similar work was planned also for other states. The subsequent report summarizes the work done in Wyoming.

Just previous to planting, each lot of potatoes was inspected and divided into the three subgroups as follows: (1) small tubers, to be planted whole; (2) larger tubers, to be cut for planting; and (3) rotted tubers or those unfit for planting. These were later tested for the presence of ring-rot by the gram-stain method. The number of rotted tubers found, together with the number of those rots that contained ring-rot bacteria was as follows for the various lots: Maine—3 rots, all containing ring-rot bacteria; Minnesota—7 rots, 5 with ring-rot; Nebraska—5 rots, 4 with ring-rot; New York*—22 rots, 6 with ring-rot and North

*This lot of seed was mis-sent to Beltsville, Md., and was in transit longer than the others. This accounts for the larger amount of rot.
Dakota—3 rots, all containing ring-rot bacteria. The small tubers and the seed pieces cut from the larger tubers were counted and planted separately so that the proportion of cut seed and whole seed could be determined. The lots were planted with an assisted-feed planter and without a seed treatment in order to permit a maximum amount of ring-rot spread to take place. However, the planter was disinfected between each lot planted so that there would be no spread of ring-rot between the potatoes from the different states. The potatoes were planted on the 29th of May, and received an application of irrigation water on the following dates: 8th and 28th of July and the 12th and 25th of August. They were inspected in the field for ring-rot symptoms on the 4th, 9th and 27th of August, and on the 8th of September.

Shortly after the last inspection, all plants were staked that showed even a suspicion of ring-rot. Later on stems were collected from each of the staked hills and were used to make stem smears which were gram-stained for subsequent microscopic examination. The percentages of ring-rot were then calculated for each lot of potatoes. Table 1 shows the number of hills in the whole-tuber and the cut-tuber lots, the amount of ring-rot present as shown by plant symptoms and also by the gram-stain method and the percentages of ring-rot resulting from "trace" ring-rot seed lots.

2. Seed Lots Having 0.10, 0.25, 0.50 and 1.00 Per Cent of Ring-Rot.

In order to conduct this study further, five lots of healthy seed were used in which known amounts of ring-rot infected tubers were introduced. Each lot consisted of a 100-pound sack of Bliss Triumph potatoes. During the cutting process the following amounts of ring-rot were introduced in the respective samples: 0.10 per cent or 1 tuber; 0.25 per cent or 2 tubers; 0.50 per cent or 3, and 1.00 per cent or 4 tubers. One sack was also used as a check. The ring-rot infected tubers were well spaced in the cutting process in order to permit the maximum amount of infection from the cutting knife which was contaminated by the cutting of the infected tubers. As each tuber was cut into seed pieces, one-half of it was placed into one container whereas the other one-half was put into another. In this manner, all the tubers were equally divided, and one-half of them was treated with corrosive sublimate (1:500) for 20 minutes, while the other one-half was left untreated.

These potatoes were planted soon after cutting and treating by means of an assisted-feed planter. The planter was disinfected with copper sulphate (1 pound to 10 gallons of water) between the planting of each of the ten lots of potatoes.