POTATO DISEASES
AND
METHODS OF CONTROL
—BY—
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Most of the annual losses from potato diseases are due to the shipment of unhealthy seed into the State, and to the failure to apply seed treatment as well as other preventative measures. Most of the losses in Colorado are due to Blackleg, Dry Stem Rot, Wilt and Tuber Dry Rot, Scab and Early Blight.

BLACKLEG
This is a bacterial disease which affects the vines and tubers. The organism is carried with the seed. Affected seed, when cut across, shows a blackened ring near the outside. In advanced stages the tubers exhibit a dark, soft rot and may be found either in storage or in the field. Affected seed produces characteristic inky-black discolorations upon the vines near the ground, beginning usually at the seed and extending to, or slightly above, the ground line. The ultimate effect is that of rotting the stem, the plant wilts, turns yellow, falls and dies. Even young sprouts are attacked and killed before they attain any considerable growth, thus resulting in “missing hills.”

Control
1. Do not plant seed showing internal blackening.
2. Disinfect seed with corrosive sublimate or formaldehyde.
3. Rotate crops if the disease has gained a foot-hold.

DRY STEM ROT (Rhizoctonia)
Affected tubers possess small black specks on the surface which serve to transmit the disease from season to season. Upon the vines and young shoots there are noticed various symptoms as follows:
1. Young sprouts may be quickly killed or may partially escape the attacks and develop weak, spindly stems.
2. Older stems may be greatly weakened as a result of being partly diseased, and large bushy vines, bearing little potatoes result.
3. Small potatoes occurring upon the vines above ground.
4. Rolling or curling of the leaves along the midrib and numerous short, leafy branches (rosette) are also common.
5. Uneven stands and reduced yields are very common to this disease.

Control
1. Elimination of this disease is difficult because it thrives equally well on other plants such as the sugar beet, carrot, radish, cabbage, and bean and is a soil organism.
2. Practice crop rotation, using legume or cereal crops.
3. Disinfect the seed with corrosive sublimate before planting.

WILT AND TUBER DRY ROT
Fusarium Wilt and Dry Rot are widespread in Colorado. The organism causes wilt by plugging up the water-conducting tubes of the stem and
roots, causing premature dying and great reduction of crop. Wilt is noticeable in the field about midsummer or earlier, when affected hills show a yellowing of the foliage and a strong tendency to wilt badly during the hottest part of the day. Later they are unable to recover, and die. A dry rot is also caused. A ring of discoloration may appear at the stem end of the tuber. Rotting occurs in the field and especially in storage and in shipment. It is very dangerous and unprofitable to ship affected potatoes in bulk.

Control
1. Do not plant seed showing rot.
2. Rotate crops three or four years. It is possible that the soil infection is the greatest difficulty in the matter of control.
3. Treat the seed with corrosive sublimate or formaldehyde.

COMMON SCAB

Scab is so well known to farmers and potato growers that a description is quite unnecessary. The scab is carried over on the seed, in the soil and in manure.

Control
1. Do not plant potatoes that are badly scabbed.
2. Practice crop rotation.
3. Avoid using large amounts of manure or alkaline fertilizers.
4. Treat the seed with corrosive sublimate or formaldehyde.

EARLY BLIGHT

Early blight is a disease of the leaves, recognized by circular or irregular brown spots with concentric rings. The leaves of affected vines, beginning with the lower ones, gradually die until only a few green spotted leaves are left at the top of the plant. Plants under moist conditions may be attacked at almost any stage of their growth. The amount of damage varies with the season, and also with the variety grown, the Triumphs being readily susceptible to attack.

Control
1. If the blight occurs only to slight extent, remove and burn affected plants.
2. If very prevalent, spray with 5-5-50 Bordeaux mixture. Spray first about the time the plants are 10-12 inches high. In normal seasons one or two applications are sufficient. Keep the spray on the plants until the middle of July.

OTHER POTATO INJURIES

When potatoes are kept at a temperature from about 99 to 105 degrees F. there often develops, on the inside, a purplish color which later becomes dark. This is known as Black Heart. It is not a disease but a physiological disorder, brought about by unfavorable storage. It occurs often in carload shipments where the tubers become over-heated.

Potatoes with hollow centers are often harvested. This is not a disease but is a condition caused by a too rapid or irregular growth of the potato.

The internal Brown Spot is another physiological disorder, common in tubers and seems to be due to unfavorable conditions of growth. It is probably not carried into next season's crop on the seed.

Net Necrosis, another physiological disorder, is recognized by the occurrence of netted brown or black areas beginning near the stem end and
extending for varying lengths thru the potato. While it is not believed to affect yield, it is advisable not to plant potatoes showing distinct discolorations.

HOW TO TREAT WITH CORROSIVE SUBLIMATE
Solution Required.—Powdered corrosive sublimate, four ounces, dissolved in 30 gallons of water.
1. Dissolve the corrosive sublimate in 5 gallons of hot water; then add 25 gallons of water.
2. Remember that this substance is deadly poisonous and must be kept away from children and animals. It will not injure the hands.
3. Soak potatoes not less than an hour and not longer than one and one-half hours.
4. Remove and dry the tubers, after which they may be cut.
5. Use a fresh solution after every third or fourth batch of seed treated.
6. Do not use metal vessels for treatment as corrosive sublimate corrodes metals.
7. Thirty gallons of solution will treat about thirty bushels.

THE FORMALDEHYDE TREATMENT
Solution Required.—One pound of formaldehyde (40% strength) mixed with 30 gallons of water.
1. Soak the tubers for two hours.
2. Formaldehyde does not poison the seed as corrosive sublimate does. Seed may be eaten after treatment.
3. Any kind of vessel may be used.
4. Formaldehyde treatment is not recommended for serious cases of Rhizoctonia and Blackleg.
5. Cost of treatment with either method varies from 16 to 26 cents per acre.

FUMIGATION WITH FORMALDEHYDE GAS
1. This should be done in a cellar or room that can be made airtight.
2. For 1,000 cubic feet of space use 23 ounces of potassium permanganate, and 3 pints of formaldehyde.
3. Prepare for fumigation by first placing the tubers in slatted bins or open crates so that free circulation of the gas can take place. If piled upon the floor, they should not be more than 1 foot in depth.
4. There should not be less than 160 bushels of potatoes per 1,000 cubic feet of space. If the cellar is smaller or larger than 1,000 cubic feet, keep the proportion of 160 bushels to 1,000 cubic feet and the treatment will be satisfactory. With a much smaller quantity of potatoes in the same space the gas might cause injury to the eyes of the tubers.
5. Secure a suitable pan, or if the space is large, several pans and spread crystals of potassium permanganate over the bottom. Then add formaldehyde at the rate of 3 pints to 23 ounces potassium permanganate.
6. Keep the storage house closed tightly for 24 hours, after which open the doors and ventilators.
7. The treatment is most successful at a temperature of about 60°F.
8. Place the pans so that the solution does not boil over on the potatoes.
9. Potatoes should not be placed directly over the pan because of possible injury.