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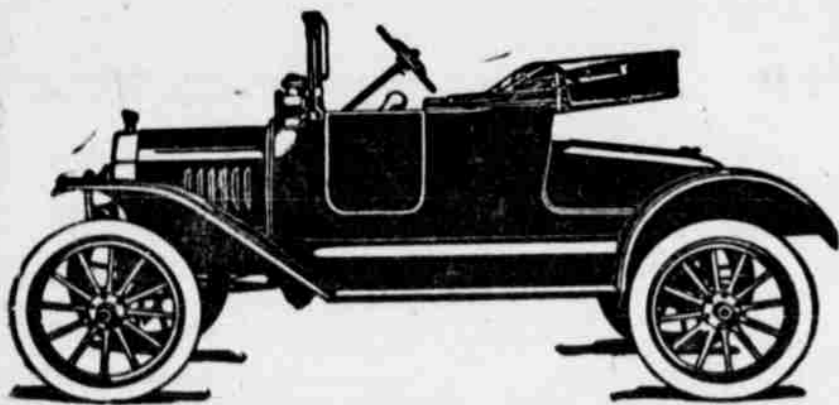
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POTATO DISEASES

Show Tendency to Spread in Various Parts of the Country—Seed Pot Method of Control

Potato diseases, which are showing a tendency to become established or to spread in various parts of the country, can best be controlled in most cases through the adoption by farmers of the seed-bed method of control, according to Dr. H. A. Edson, truck-crop disease specialist of the U. S. Department of Agriculture. In discussing the potato-disease situation and possible control measures in a recent address, Dr. Edson said: "A disease of the potato which is making its appearance in several sections of the country is the one designated by Orton as streak. The cause of this disease is unknown. It is characterized by the appearance of angular spots on the leaves, which have a tendency to run down the vein through the stems of the leaflets to the main petiole, or leafstalk, producing a streaked appearance. The affected portions of the plant wither and die, the leafstalks break over at the axil of the leaves—that is, their junction points with the branches—with the result that leaves hang directly down, swinging in the wind and attached only by a portion of the epidermis. In severe cases the plants are eventually entirely killed. The trouble is apparently transmitted from generation to generation by means of the seed tubers and there is some indication that it is transmitted from plant to plant in the field. In the absence of more definite knowledge of the disease, it is recommended that roguing be practiced as a precautionary measure wherever it appears.

Heavy Loss from Mosaic
"Mosaic is assuming great importance as a potato disease in certain sections of the country. It is characterized by a mottling in the green of the leaves, sometimes accompanied also by a crinkling but not a rolling of the foliage. The disease should not be confused with the uneven yellowing which results from the application of excessive water in irrigated regions nor with the somewhat different yellowing and rolling associated with excessive alkali content in soils, nor should it be confused with the condition of partial absence of coloring matter, possibly chimeras, seen occasionally in fields, more particularly in certain sections of the west. The cause of mosaic has never been determined but it is known that the disease is reproduced when tubers from affected plants are used for seed. The experimental data which have been secured both in the United States and abroad show that yield from mosaic plants is less than that from healthy plants of the same variety grown under the same conditions or in the same field. The average reduction in yield in trials made by the department with various varieties and in several different sections of the country is approximately 30 per cent. Roguing out affected plants in the seed plot affords a practical though perhaps not complete control of the trouble.

"The late blight of the potato caused by *Phytophthora infestans* and the rot of tubers which follows in the winter are too well known to call for description. It has recently been shown, however, that the planting of tubers affected with *Phytophthora* decay affords a means for infection of the growing crop. The development of the disease, however, is entirely dependent upon weather conditions. In dry seasons one may plant affected tubers without incurring the development of the late blight but it has been shown that the original infections follow up the stems from the seed tubers if the weather conditions are favorable to the development of the fungus. It is, therefore, advisable to avoid infected seed when possible in addition to employing the usual control by Bordeaux mixture, which is well-established practice.

"Recent studies upon the powdery scab have demonstrated the fact that this disease is less serious in its character in the United States than was at first feared. It is apparently unable to survive except in the more northern sections of the country, and the damage done there is, in many years, not serious. The disease is correlated with heavy, rather wet soils, or more particularly with subsoils of this character. The damage done is to a large extent dependent upon weather conditions even in these unfavorable types of soil.

Decay in Storage
Several species of *Fusarium* are now known to produce potato diseases. These may be classified in two groups. The first is the wilt-producing group which attacks the vascular tissues and the root system of the plant, cutting off the water supply and causing injury in proportion to the extent of the invasion. In extreme cases a yellowing, or at least an unhealthy green color and a characteristic rolling of the foliage develop to be followed by sudden wilting and death. The tubers produced upon infected plants frequently carry the fungus in their vascular tissue, as may often be demonstrated by the appearance of a dark ring near their stem end. Infected tubers, stored under unfavorable conditions, may develop a serious decay, which is either of the wet or the dry type according to the temperature and moisture. The second group includes other species of *Fusarium*, which are to be classified as wound parasites. They infect the tubers through wounds resulting from handling while digging or storing. The infections may occur in the field or in the storage houses. These forms of decay may be controlled to a large extent by regulating the storage conditions. The stock should be stored at low temperatures (34 to 40 degrees F.) in well ventilated houses. Our knowledge of *Fusarium* wilt diseases has not reached a stage where directions for the satisfactory control of the vascular parasites can be given. It is possible, however, to improve the conditions by crop rotation and by careful selection of the seed

stock. Tubers produced on infected plants are likely to carry the disease, hence such progeny should never be used for seed. Diseases depend upon the soil to produce a healthy crop on infected soil.

Black Leg Caused by Seed
"Black leg is a disease which, so far as is known, is entirely seed-borne in its character. In typical cases affected plants die in the early part of the season as the result of a block, relatively dry, decay of the stem which originates at the base where the plant comes in contact with the parent tuber. During the early stages of the disease the leaves roll and the plant assumes a more or less stunted and bushy appearance. In other cases the disease progresses less rapidly so that the plants may arrive at full growth without showing evidence of infection. In some cases the disease is confined to the pith of the stem, not showing at all at the surface. Plants affected by this delayed type of black leg produce tubers which, however, are more or less seriously infected. It is stock of this sort which perpetuates the disease. All of the evidence accumulated to date indicates that the bacteria are unable to live in the soil even during a single winter. These organisms are especially susceptible to drying and are also readily killed on the surface of seed potatoes by common disinfectants, such as bichlorid of mercury. The roguing out of diseased plants from stock intended for seed is one of the most effective means of controlling black leg. This practice, coupled with treatment of the seed with bichlorid of mercury according to the method recommended by Morse, affords an almost complete control.

Rhizoctonia and Black Leg
"Rhizoctonia, the cause of the well-known black scurf of potatoes, is also frequently responsible for injurious diseases of the growing plants. It is very generally distributed in all agricultural soils and has recently been shown to be a normal inhabitant of virgin lands. Its parasitism upon the potato appears to be correlated with conditions of environment. Generally speaking, those types of environment which are unfavorable to the potato and which consequently weaken its vitality or lessen its vigor may be expected to result in increasing the injury produced by Rhizoctonia, since the fungus itself seems capable of thriving in all types of soil under all conditions of climate. The most common type of disease with which Rhizoctonia is associated are the killing back of the sprouts of young plants in the spring, which may be spoken of as a damping off, the production of lesions or damaged spots upon the underground stems and upon the stolens, which carry the tubers, and in severe cases the production of a drying of the external tissues of the tuber. The lesions upon stems are frequently present without apparent injury to the vigor of the plant or the amount of yield. The injury produced is dependent upon the depth to which these lesions kill the tissue.

"The conducting elements in the potato stem are located in a vascular ring, the center of which contains the xylem, or that portion of the conducting tissue through which the materials taken up by the roots are conducted to the above-ground portion of the plant. On either side of the xylem are the phloem strands, through which the elaborated food materials are conveyed from the leaves to the tubers. Whenever lesions penetrate into the tissues far enough to produce the death of these conducting cells, the communication between the leaves and the roots is interrupted and the injury to the plant is proportional to the amount of interruption. The lesions upon the stolens produce an injury in a similar way, cutting off the communication between the leaves and the growing tubers, making it impossible for starch to be conveyed to them as it is elaborated day by day. Superficial lesions cause little injury, but deep lesions make the deposit of starch in the tubers in a normal way impossible, and frequently result in the production of swollen internodes or aerial tubers of the formation of small tubers on new stolens developed on portions of the stem above the lesions.

"Curly dwarf is a disease characterized by the foreshortening of all of the portions of the potato plant above the ground, frequently accompanied by a crinkling of the leaflets. The whole effect is to produce a stunted, more or less rosetted plant, of which the yield is greatly reduced or frequently nil. The cause of curly dwarf is unknown, but it appears to be physiological. The progeny of curly dwarf plants invariably produce curly dwarf, and it is usually true that affected stock runs out entirely and is lost in a few years.

Cause of Leaf Roll Unknown
"Leaf roll is another disease of the potato which has been believed to be physiological. This is characterized by an upright habit of the tips of the stems, by a tubular rolling of the leaves of a portion or of the entire plant, frequently accompanied by a discoloration most pronounced at the margin of the leaflets. The character of this discoloration varies with the varieties from a light yellow to a deep purple. The petioles of the leaflets of leaf-roll plants are frequently twisted so that the underside of the leaf is turned outward or upward. There is often a metallic luster of the leaflets most noticeable from beneath, the tissues are more brittle than normal, and are exceptionally rigid. The dull rustle given out by shaking the leaves of such plants against one another has led to the application of the term 'rustle' in some sections. The cause of leaf roll has never been determined, but it has been generally believed, both in this country and abroad, that the progeny of leaf-roll plants could not produce healthy stock. It is certainly the case that leaf-roll progeny frequently does reproduce its like, so that it is inadvisable to employ such stock for seed purposes.

Control in Seed Plot Most Practical
"Aside from the specific means of control which have been mentioned,

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the most practical method of combating the diseases discussed is probably that of the seed plot. For this purpose the farmer employs in the first year the best stock available, planting it upon his best soil type, and caring for it in the most approved manner. From time to time during the growing season the weak, diseased, or otherwise undesirable plants are rogued out. At digging time it is highly desirable to harvest at least a portion of this field by hand, selecting those hills whose yields approximate most closely to the grower's ideal. Tubers obtained in this way form the nucleus for the next year's seed crop. If this method is followed consistently, many of the diseases which are now so vexatious will be largely held under control, and in addition the general vigor and consequent productivity of the stock will be held at a high level."

SAYS HOT WATER WASHES POISONS FROM THE LIVER
Everyone should drink hot water with phosphate in it, before breakfast.

To feel as fine as the proverbial fiddle, we must keep the liver washed clean, almost every morning, to prevent its sponge-like pores from clogging with indigestible material, sour bile and poisonous toxins, says a noted physician.
If you get headaches, it's your liver. If you catch cold easily, it's your liver. If you wake up with a bad taste, furred tongue, nasty breath or stomach becomes rancid, it's your liver. Sallow skin, muddy complexion, watery eyes all denote liver uncleanness. Your liver is the most important, also the most abused and neglected organ of the body. Few know its function or how to release the dammed-up body waste, bile and toxins. Most folks resort to violent calomel, which is a dangerous, salivating chemical which can only be used occasionally because it accumulates in the tissues, also attacks the bones.
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