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BLACK ROT OF SWEET POTATOES

(Sphaeronema fimbriatum)

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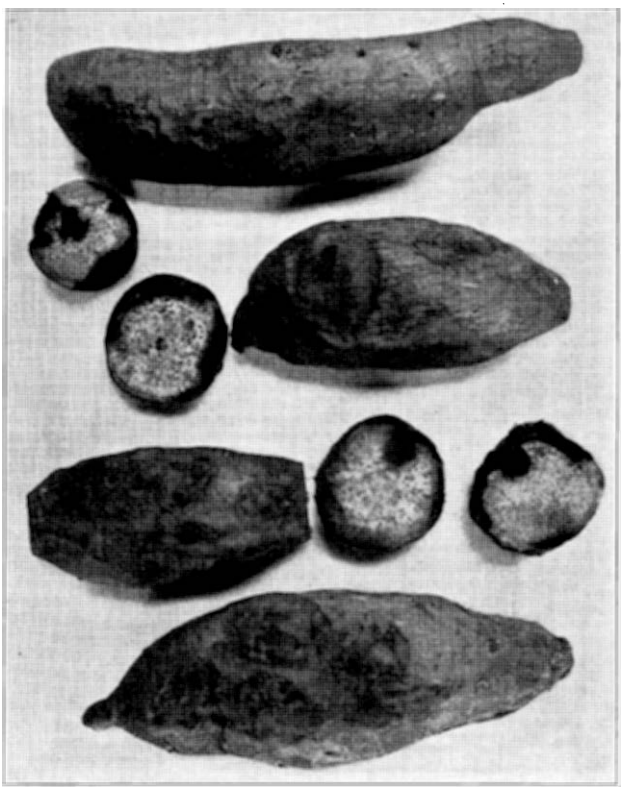
During the last few years, black rot of the sweet potato has caused much loss to sweet potato growers and dealers in this State. It is undoubtedly the most destructive disease attacking this plant that we have in Oklahoma. It is known to occur over a greater portion of the sweet potato growing area, and each year it is spreading into new neighborhoods. Many inquiries have been received in regard to the nature of the disease and the methods of control. The object of this circular is to give some general information regarding this trouble.

Black rot is the direct result of a parasitic fungus growing on and in the sweet potato plant. This fungus, like all fungi, comes from a spore, a microscopic body, which on coming in contact with the surface of the potato grows and sends out threads which penetrate the tissue of the potato. The disease commonly occurs in two forms, one of which is known as black rot and the other as black shank. The form known as black rot is where the fungus attacks the sweet potato itself. In this form of the disease it shows upon the potato as dark brown or black spots or patches from one-quarter-inch to two inches in diameter, and more or less depressed or sunken, depending on the stage of the disease. If the potato be cut it will be found that the tissue next to the outside and deeper, depending on the extent of the rot, is of a greenish-black color and appears to be dry and hard. Infected potatoes are bitter and next to worthless. This form of the disease may be present in both field and storage, but it is most apt to be noticed in storage, where it causes the most loss. If the potatoes are infected when dug, as they usually are, the presence of the disease usually passes unnoticed. After the potatoes are in storage, conditions are still favorable to the growth of the fungus. The rot will appear to spread from potato to potato until most of them are affected.

The form known as "black shank" shows in the hotbeds where "slips" or "draws" are being grown for transplanting to the field. It shows on the main stem, a short distance below the ground, as blackened and more or less constricted areas. This form of the disease is particularly noticeable on account of the contrast between the blackened areas and the white un-



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(*Sphaeronema fimbriatum*)

derground stem. There may be several places of infection scattered over the underground stem and some of the plants may be so badly diseased as to break when being pulled. "Black shank" is always due to one of two causes : Either the slips are raised from diseased potatoes or are raised in soil containing spores of the disease. The conditions which produce a rapid growth of the slips will also produce a rapid growth of the fungus. Many of these diseased slips will have the disease so slightly as not to be noticed, and thus the disease is carried to the field.

The fungus causing rot or black shank affects the sweet potato plant only below ground, and it is to this peculiarity that the only practicable method of holding the disease in check is based.

Methods of Control

The methods of control suggest themselves from the above statements of what is known about the disease.

First the soil in both the field where the sweet potatoes are to be grown and in the hotbed in which the slips are to be forced must be free from spores of the fungus. In the case of the hotbed, this can be secured by throwing out all of the soil, whitewashing the inside of the woodwork, and hauling in fresh soil from some field or roadside where sweet potatoes have not previously been raised. To secure a field free from this fungus the only safe way is to take a field in which sweet potatoes have not been raised for some years. If ground can be secured which has been devoted to grains or to pasture purposes this would be best of all.

Second, sweet potatoes which are absolutely free from the disease must be secured for producing slips. Almost any price in the bounds of reason may be profitably paid for seed potatoes which are known to be free from the disorder. If one is forced to take unknown potatoes, they should be carefully examined, one by one, and all those showing anything abnormal should be broken, and if they show any sign of internal discoloration should be at once rejected. It is wise as a further precaution to wash all potatoes intended for seed with soap and water to remove any spores which may possibly be on the outside.

A method of securing seed potatoes free from this disease from fields of potatoes known to be infected is now being practiced in many of the older sweet potato sections. This consists in always raising seed potatoes from vine cuttings. Cuttings are made from the growing vines some time in the latter part of May or early June. Since black rot does not affect the part of the plant above ground, these cuttings are free from the disease regardless of whether the roots of the plants are affected. These cuttings should be planted on clean land, and from this patch all of the potatoes for planting in the hotbed should be taken. These cuttings of the runners may be made a foot or eighteen inches long and should be coiled around in the soil so as to reach down about eight inches. Be careful to pack the dirt about them firmly. The potatoes from this cutting patch will not be as large as the crop from the earlier planted slips, but they will be plenty big enough for the purpose for which they are intended.

Disinfecting the Storage House

There are myriads of spores of the fungus causing this disease in any storage house in which potatoes affected with black rot have been stored. Disease-free potatoes if placed in one of these houses will be likely to be attacked more or less by the disease. On this account any storage house which is under suspicion should be cleaned out and disinfected at the beginning of the storage season. To do this the house should be first thoroughly swept—floor, bins, walls and ceiling. Any accumulations of dirt on the floor should be scraped up with a shovel. If the floor is of earth, an inch of clean soil or sand should be placed over the entire surface. Everything then should be washed as thoroughly as is practicable. The house should

then be left to dry out for several days with the doors and ventilators open, and then everything inside should be covered with a coat of whitewash. This procedure would probably insure a clean house, but as a further precaution it would be wise to sulphur the house. This sulphuring is done by burning inside the house one-quarter-pound of sulphur for each 100 cubic feet of air space. If the house has a dirt floor the sulphur may be burned directly on the floor, taking care to set it well away from any woodwork to prevent fire. If the house is of wood throughout, it is safe and convenient to set the pan of sulphur in a tub of water with a guard pan or piece of tin supported some distance above to prevent the flames from setting anything afire. As the sulphur is set afire, the operator should go out and carefully close all openings so that none of the fumes escape. Open the house the next day. Be careful that no small, stray animals are left in the house, for the sulphur fumes will kill them. This whole process means considerable trouble and a slight expense, but it will pay in the end. This disinfecting of the storage house will be of benefit not only in repressing the black rot, but will diminish other forms of rot as well.

It is often asked whether black rot can be controlled when sweet potatoes are removed from the field to the storage house. This question can never be answered positively one way or the other, for it depends wholly on how far the disease has progressed. If the tissue of the potato has already been penetrated by the mycelium thread of the germinating spore, nothing can be done. No methods are known of destroying these rots in tissues except by destroying the tissue itself. If the spore is simply in contact with the surface of the potato, the spore might be destroyed either by washing the potato with an antiseptic solution or possibly by fumigating with formaldehyde, sulphur or some similar method. Since many of the potatoes are certain to already have the rot inside the potato, and since the rot will spread from potato to potato, this method is not regarded as being practicable.

Other Rots Which Attack Sweet Potatoes

Some of the other rots which may be confused with black rot are Soft Rot, Dry Rot and Soil Rot.

Soft rot may be recognized by the soft, wrinkled condition of the potato. It also has a sweetish odor, and usually the disease area is covered by a white, and later a black, growth of mold. This disease is sometimes found in the field, but it is not usually destructive till the potatoes are in storage.

Dry rot causes the potatoes to become dry, much wrinkled, and changes the flesh within to a dry, almost powdery, condition.

Soil rot attacks the roots when small. The part diseased ceases to grow, and the potatoes when mature frequently present a dumb-bell-like appearance. The flesh of a potato attacked by soil rot changes to a brown or black color.

SUMMARY

To Prevent Black Rot

1. Sweet potato patches should be located on land free from the disease. This usually means land which has not been planted to sweet potatoes for some years.

2. The seed potatoes used for producing slips must be free from the disease. Healthy seed must either be secured on the market, or else it must be raised from vine cuttings.

3. The propagating bed must be kept free from the disease. This means cleaning up the bed and hauling in fresh, uncontaminated soil.

4. The storage house, if it has been used for storing sweet potatoes affected with black rot, must be cleaned and disinfected.