1909

Preliminary report on the anthracnose or pod spot disease of beans

Claude Wilbur Edgerton

Follow this and additional works at: http://digitalcommons.lsu.edu/agexp

Recommended Citation
Edgerton, Claude Wilbur, "Preliminary report on the anthracnose or pod spot disease of beans" (1909). LSU Agricultural Experiment Station Reports. 358.
http://digitalcommons.lsu.edu/agexp/358

This Article is brought to you for free and open access by the LSU AgCenter at LSU Digital Commons. It has been accepted for inclusion in LSU Agricultural Experiment Station Reports by an authorized administrator of LSU Digital Commons. For more information, please contact gcoste1@lsu.edu.
Agricultural Experiment Station

OF THE

Louisiana State University and A. & M. College

Baton Rouge.

PRELIMINARY REPORT

ON THE

ANTHRACNOSE OR POD SPOT DISEASE OF BEANS

By C. W. Edgerton.
Plant Pathologist.

Baton Rouge
The New Advocate, Official Journal
1909
Louisiana State University and
A. & M. College

Louisiana State Board of Agriculture and Immigration

EX-OFFICIO.

GOVERNOR JARED Y. SANDERS, President.
HENRY L. FUQUA, Vice President of Board of Supervisors.
CHAS. SCHULER, Commissioner of Agriculture and Immigration.
THOMAS D. BOYD, President State University.
W. R. DODSON, Director Experiment Stations.

MEMBERS.

Jeff D. Marks, Crowley.

STATION STAFF.

W. R. DODSON, A. B., B. S., Director, Baton Rouge.
HAMILTON P. AGE, B. S., Assistant Director, Audubon Park, New Orleans.
J. B. GARRETT, B. S., Assistant Director, Calhoun.
S. E. McCLENDON, B. S., Assistant Director, Baton Rouge.
P. A. YODER, Ph. D., Chemist and Sugar Maker, Audubon Park, New Orleans.
W. G. TAGGART, B. S., Assistant Chemist, Audubon Park, New Orleans.
R. E. GRAHAM, B. S., Assistant Chemist, Audubon Park, New Orleans.
WM. G. OWEN, B. S., Bacteriologist, Audubon Park, New Orleans.
J. K. McHugh, Secretary and Stenographer, Audubon Park, New Orleans.
J. E. HALLIGAN, B. S., Chemist, Baton Rouge.
H. L. GREEN, B. S., Assistant Chemist, Baton Rouge.
A. P. KERR, B. S., Assistant Chemist, Baton Rouge.
R. BAUS, B. S., Assistant Chemist, Baton Rouge.
R. G. FULLER, B. S., Assistant Chemist, Baton Rouge.
W. D. REID, B. S., Assistant Chemist, Baton Rouge.
R. G. TILLERY, B. S., Assistant Chemist, Baton Rouge.
S. W. PLAUCHE, B. S., Assistant Chemist, Baton Rouge.
ROGER P. SWIRE, Treasurer, Baton Rouge.
WILMON NEWELL, M. S., Entomologist, Baton Rouge.
G. L. TIEBOUT, B. S., Horticulturist, Baton Rouge.
C. W. EDGERTON, Ph. D., Plant Pathologist, Baton Rouge.
J. T. TANNER, B. A., Secretary and Stenographer, Baton Rouge.
IVY WATSON, Farm Manager, Calhoun.
E. J. WATSON, Horticulturist, Calhoun.
J. G. LEE, Jr., B. S., in Charge of Feeding Experiments, Baton Rouge.
E. W. KERR, M. E., Professor Mechanical Engineering, Baton Rouge.
E. M. PERCY, B. S., Assistant Mechanical Engineer, Baton Rouge.
T. C. PAULSEN, B. S., M. D. C., Assistant Veterinarian and Bacteriologist.
The greatest drawback to the growing of beans in Louisiana is the trouble that is called "spot," "speck," "anthracnose," or quite commonly, "rust." The latter name, however, should not be used, as the term "rust" is more properly applied to another disease which sometimes attacks the leaves. Probably there is no one in the State that grows beans to any extent who is not familiar with the appearance of the "pod spot" trouble and who does not dread its appearance in his field. Quite often one hears in the trucking district the expression, "I would grow more beans if I could keep them from spotting." Beans are a profitable crop when the disease is absent, but when it is present, the financial returns are very apt to be negative. Consequently it is not surprising to hear of the reluctance of the truckers to grow more of the crop.

The Experiment Station has been working on this trouble during the past two years, and it is believed that the control of the disease rests in the hands of the grower.

NATURE OF THE DISEASE.

To understand the method of control, it is necessary to understand the general nature of the disease. The disease is due to a very small organism which causes the decay of the bean substance. All understand that germs cause diseases in man and animals, but the fact that they also cause diseases in plants is not so generally understood. The organism that causes the spot on the bean pods is a very small plant, or fungus, as it is generally called, which can only be seen clearly by the use of a strong microscope. As higher plants reproduce themselves by seeds, this fungus reproduces itself by very small microscopic
bodies which we call spores. These fall on the young bean pods and by growth cause the decay of the pod. The fungus uses the bean pod for food. After the fungus has been growing for a few days in the pod, it begins again to form the spores on the surface of the spot. Millions of these may be produced on a single bean pod in a few days' time. The slimy pink substance which is present in the spots is nothing but a mass of these spores. These spores carried to another pod produce again the spots. As these spores are imbedded in a gelatinous mass, they cannot be readily removed when the pods are dry. Hence we see the reason why we should not walk among or cultivate the beans while they are moist. There is a great danger of spreading the disease to all parts of the field.

The spores that are produced are not long lived, and are not normally able to live through the winter. For passing the winter the fungus has another method. If one will take the trouble to examine some ripe or nearly ripe bean pods that are badly spotted, he will very readily see the method of passing the winter. By breaking open the pod and examining the bean directly under the spot, he will often see that the bean itself has a spot on it. The fungus has entered the bean and in that condition it is able to pass the winter. A few of such affected beans are shown in Fig. 1. I examined during a trip to Pon-

FIG. 1.—AFFECTED SEED OF DAVIS WHITE WAX BEANS.
From such seed the "Pod Spot" disease is introduced into the field.
chatoula in the spring, a number of samples of beans that had been used for planting. I found in some cases as high as 10 per cent of the beans that were spotted in this manner. When these beans are planted, the fungus grows with the beans, and consequently we have the disease present in the field and ready to spot the beans if the weather conditions are suitable. Is it any wonder that with 10 per cent of the beans spotted, there were very few clean bean pods harvested?

With this brief description of the nature of the disease, we can see the reasons for the directions which are outlined for the control.

THE CONTROL OF THE DISEASE.

In the control of the disease there are two things to be taken into consideration. If you buy Northern grown seed, you are in most cases buying seeds which are more or less infected. In other words, you are introducing the disease in your field with each infected seed. In this case there can be nothing done other than to try to keep the disease from spreading from the diseased plants to the others. This is often difficult to do on account of weather and other conditions. Before planting time in 1909 a circular letter was sent out to a large number of truck growers in regard to the control of the trouble. Certain suggestions were made which we believed would be helpful in checking the spread of the disease. These suggestions were as follows:

1. Plant the beans if practicable so that the plants will not touch each other when grown. (We have found three beans to the hill and the hills eighteen inches apart very satisfactory.)

2. After the beans come up, stay out of the field until the cotyledons, or large, thick, seed leaves, drop off. This will only take a few days. This disease is carried through on these leaves, and on walking through the field the disease is liable to be carried from a diseased plant to healthy ones on the clothing.

3. After the cotyledons have fallen, the plants may be cultivated or hoed as desired. Taking the following precautions: Do not enter the field when the plants are wet, either from dew or from rain. Only enter the field when the plants are perfectly dry. The germs of the disease are very sticky and are easily carried from plant to plant when moist. However, when they are dry, it is very difficult to rub them off from the diseased
plants. Do not by any means try to hoe or cultivate the plants while wet, as you are sure, if there is disease at all in the field, to carry it to all the plants.

4. Also in picking the beans, do so only when the plants are perfectly dry.

Some of the growers in the trucking districts tried to follow out the directions, and from a visit to some of the fields, I am convinced that they had less pod spot than they would otherwise have had. But some of them had used such badly infected seed to plant that it was out of the question to check the trouble. In order to give these suggestions a thorough trial, two plats planted with Wardell's Kidney Wax beans were laid out on the Experiment Station grounds, each of one-eighth of an acre. One plat was worked according to directions, and one was worked only in the early morning when the dew was heavy on the plants. None of the seed was affected, so to insure the presence of the disease in the plot, strips two feet wide running across the rows were inoculated with the disease. This inoculation was made when the plants were young, before they came in flower. The infected strips were twenty-five feet apart. When the pods were well formed, we had a very hard wind and rain which knocked the plants down and beat the pods into the ground. The conditions could not have been better for the spread of the disease. After this storm I expected the experiment to be a failure because the conditions were so exceptionally good for the disease. However, about two weeks after the storm, one row of each plot was gone over carefully, and the badly infected, slightly infected and clean beans in each row were counted. Each row represented about 1-120 of an acre. There were over 3,000 pods to the row. The row which was cultivated according to directions had 46.5 per cent of the pods spotted, while the row that was cultivated while the plants were wet had 55.3 per cent of the pods spotted. Or, in other words, there was a gain in clean pods in the plot cultivated according to the suggestions of 8.8 per cent. This would have meant twenty bushels of clean pods more to the acre. Under ordinary weather conditions this would probably have been doubled.
THE USE OF CLEAN SEED.

The second thing to be taken into consideration in the control of the disease is the use of seed from pods which were not spotted. If we have such seed to start with and take the precautions given in the suggestions above, there is no reason why there should be any of the anthracnose in the field. This has been demonstrated many times by Experiment Stations and bean growers. At the same time as the two plots described above were planted on the Experiment Station grounds at Baton Rouge, a third plot of the same size was planted with beans from the same lot, but the young plants were not inoculated with the disease. As this plot and the other two where the disease was present were not more than 100 yards apart, special care was taken to keep the disease from getting started in the plot. We tried to keep out of the plot as much as possible, especially after being in the infected beans. The following is a statement of the results:

While the two plots previously described had 46.5 and 55.3 per cent of the beans spotted, not a single pod, spotted with the anthracnose, was observed in this plot. Figures 2 and 3 show typical plants from this plot and from one of the other plots where the disease was present.

The solution of the trouble seems to rest on the question of obtaining the clean seed. Most of the seed bought from Northern growers is infected. It is impossible to pick over these seed and pick out the diseased ones, because some will always be overlooked. Furthermore, some of the germs of the disease which fall from the diseased seed to the healthy ones are still able to cause infection in the young plants.

Some have been trying Colorado grown seed with results more or less variable. While there is no doubt that the Colorado seed is freer from the disease than Michigan seed, it is still a question whether the best results are obtained from this seed. I have seen the anthracnose spots in various fields grown from Colorado seed. Whether the disease came in with the seed or whether it was introduced from a neighboring field is, of course, a question. However, during the past year, at least, the plants from Colorado seed have been much worse affected with the blight, another common disease of beans, than plants from other
FIG. 3.—PLANTS WITH CLEAN PODS FROM A PLOT IN WHICH THERE WAS NOT A SINGLE SPOTTED BEAN.
seed. I noticed some fields at Ponchatoula in which a large per cent of the leaves had dried up and fallen from this disease. This is also a disease which is carried through on the seed. If this is generally the case with Colorado seed, it is questionable whether there is anything gained by its use.

The thing that we are advising is the use of home-grown seed. From a perscual knowledge of the severity of the anthracnose disease in both the North and South, I am convinced that as a rule we have less of the disease in this section than further north. Yet we are buying these badly infected beans each year from the North for planting, and getting each year a new infection of the disease. A few experiments have been undertaken by the Experiment Station to test the practicability of using home grown seed as a method of controlling the disease, and they have been very successful. There are several factors in this region which normally tend to keep the trouble in check. These are primarily weather and soil conditions, but the discussion of these will be left for a future bulletin. We have found from the experiments that beans grown in the fall, even from diseased seed, are more or less free from the disease. The experiments are not as yet conclusive, but supplemented with the statements of several prominent truck growers that the fall grown crop is normally freer from the disease than the spring crop, they are worth taking into account. Test plots in the fall of 1908, both at Baton Rouge and Roseland, from seed containing a considerable quantity of disease, gave crops absolutely free from the disease. Some of the Roseland grown seed was planted at the Station grounds at Baton Rouge, and at the time of the writing of this bulletin, though we have had three weeks in which it has rained practically every day, there is not an anthracnose spot in the plot.

The object of this bulletin is to encourage truck growers to try planting some beans this fall for seed, the seed to be used next spring for planting the full crop. The planting can be made in July, or perhaps even early in August, and have the beans mature before a killing frost. The recommendations given above for the cultivation of the crop should be followed. We would be glad to hear from any of the growers who will try this, and also glad to get their results. From previous experiments and observations of various growers, it is probable that the fall
crop will be entirely free from the trouble. However, if, as sometimes happens even in the fall, there is some spot on the beans, the healthy seed can be very readily saved at the time the beans are picked. If one discards all the pods that have spots on them, and only saves the clean pods for seed, the results will be the same. This will take a little more time, but when it may mean a saving of half the crop the succeeding year, it is surely worth doing. Now, in saving the seed, one should not confuse the anthracnose spots with some other spots which nearly always appear on ripening pods. These other spots are of no importance, and a pod should not be thrown out on account of their presence.

There is some prejudice against using home grown seed, but it seems to be unfounded. Beans grown at Roseland in 1908, planted at Baton Rouge along side Colorado grown seed of the same variety, are not in the least inferior. The plants are as vigorous and the beans are as early. Bulletin No. 68 of the Louisiana Experiment Station, describing four years' experiments with the use of home grown seed, has this to say: "At Baton Rouge, nine times in four years the home seed fell behind (Northern grown seed), fifteen times it ran ahead, and in all other trials were equal. The results show plainly that when the seeds of bush beans are carefully selected and cured they will be the equal if not the superior of those grown in the North."

**SUMMARY.**

Briefly, the methods for the control of the disease may be summed up as follows:

1. Grow the seed which is desired for planting the following spring in the fall.

2. If by chance there is some disease in the fall crop, select for seed only the healthy pods.

3. Follow the recommendations in regard to cultivation and picking which are outlined above, in order not to spread any disease which may accidentally get into the field.

**Note.**—During the fall or early winter, a bulletin will be published by the Experiment Station giving in detail the experiments which have been conducted on this disease. If any one desires this who is not already on the mailing list of the Station, it can be obtained at the time by writing to the Station.