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Agricultural Experiment Station

OF THE

LOUISIANA STATE UNIVERSITY
AND A. & M. COLLEGE

BATON ROUGE

CITRUS CANKER

BY

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BATON ROUGE
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tell definitely whether some spots are cankers or some other leaf trouble. If the cankered spots are typical and well developed, however, they can be readily told. Typical canker spots snow on both sides of the leaf and are usually raised and made up of corky brown tissue which is exposed after the light colored covering membrane has fallen away. Grape fruit and Citrus trifoliata leaves become badly affected and frequently fall so badly that the trees are nearly defoliated.

PLATE II. CITRUS CANKER ON TWIGS OF CITRUS TRIFOLIATA.
Fig. 1, Twigs from Mobile district in Alabama.
Fig. 2, Twigs from Plaquemines Parish, Louisiana.
On the twigs (Plate II) the spots are variously shaped and generally larger than on the leaves. Here also the brownish corky tissue shows after the light colored membrane has fallen. The cankers are generally somewhat raised, though quite often Citrus trifoliata cankers do not show this character. Sweet orange twig cankers, while not as abundant as the trifoliata twig cankers, are more apt to be considerably raised from the surface. On Citrus trifoliata, the cankers are particularly abundant on the thorns, though other parts of the twigs are readily affected. The disease is only present in the surface layers of the twigs, but this causes sufficient injury to frequently kill the twigs. On Citrus trifoliata, the cankers are sometimes found on quite large twigs.

The spots on the fruits (Plate I, Fig. 2), while similar to those on the leaves, are frequently larger, as they sometimes reach a half inch in diameter, and if several run together the cankered area may be quite large. These spots are more or less circular in shape, raised from the surface, and show the corky grayish or brownish tissue. These spots give the fruit an unsightly appearance and, furthermore, cause them to ripen prematurely and fall or to crack very badly.

**DISTRIBUTION OF THE DISEASE.**

The disease is now known to occur in practically all of the gulf states. It was in Florida and Texas as early as the summer of 1911, and perhaps further investigations will show its presence in some localities at an earlier date. Alabama has an infected area in the Mobile district. In Louisiana, the disease was present in an advanced stage at Lafayette in the summer of 1913 and from reports it had been established there for a couple of years previous to that. It is also well established in Calcasieu parish near Lake Charles and in Plaquemines parish below New Orleans. It is also known to be present in Lafourche parish near Raceland. It may also be found in other parishes, but no specimens containing the disease have been received. The exact locations of the different areas in the state will only be known after a survey has been made of the citrus parishes.

The origin of the disease has not been definitely settled. The disease is in Japan and it is probable that we obtained our in-
fection from that country, but whether the disease is a native of Japan or was introduced into that country from Brazil or some other tropical country is not known. A fungus described from Brazil by Noack as *Didymella citri* has some of the characters of our canker fungus, but without comparing the two diseases and testing them out it is impossible to say whether they are the same.

**DISTINCTION FROM OTHER CITRUS DISEASES.**

Another disease of citrus fruits, the common "scab" or "sour scab," may be mistaken for the canker if the characters of the two are not mentioned. The scab is rather common in various parts of the state and is not nearly as serious a disease as the canker seems to be. While the scab forms spots on the young twigs, leaves and fruit, it is usually possible to distinguish the two, especially if considerable material is present. The scab usually distorts the leaves and fruit, while the canker does not. Furthermore, the canker spots are round and much larger than those produced by the scab.

Occasionally also spots produced by other fungi or from other causes which may be confused with the canker are present on leaves. Leaves with such spots are frequently sent in to the Experiment Station for diagnosis. When only two or three leaves are all that can be examined, it is not always possible to be certain of the disease. If the examination is made in the orchard, however, or if an abundance of material is under observation, the chances of a wrong determination are slight. If canker is present, typical spots will be found on some of the leaves or twigs.

**FUTURE OF THE DISEASE.**

It is not possible to say with certainty just what damage this disease is liable to cause to the citrus industry of the south. From the way the disease has spread, however, and the damage that it is causing in infected nurseries and orchards, it would seem that there is a fight ahead for the citrus grower if he expects to continue to grow these fruits successfully. It may be that we will find some method of control which will be satisfactory, but from our present knowledge of the trouble it appears that this
disease is going to be the most serious of all of the citrus pests. It is well at least for all growers to take this viewpoint of the matter before the disease has spread all over the state and the south. The disease will be easier to eradicate now than after it has obtained a firm foothold. This disease, like the Chestnut blight in the east, seems to have found the American varieties very susceptible to its attack.

CONTROL OF THE DISEASE.

As the citrus canker has only been in this country for a short time, it is impossible to say with certainty just what are the best methods of control or eradication. Judging, however, from the knowledge of other somewhat similar diseases on other plants, the best methods of control would seem to include the following: (1) destruction of diseased material; (2) spraying with good fungicides; (3) a rigid inspection of all citrus stock in the state followed by a strict quarantine on all infected nurseries. These may be considered briefly.

DESTRUCTION OF DISEASED MATERIAL.

Trees that are slightly affected should be gone over carefully about every two weeks and every leaf or twig that shows a suspicious spot should be cut and burned. A bottle of some good disinfectant, such as corrosive sublimate, should be at hand and the knife should be dipped into it after cutting each twig. It may also be necessary to wash the hands in the disinfectant after examining each tree so as not to carry the infection to other trees. It might be well also to wear an apron and sleeves made of oil cloth, as spores of the fungus will be much less liable to cling to this material. During the winter, extra care should be taken to remove every diseased branch or leaf so that the trees will be as free from infection in the spring when the growing season begins as it is possible to get them.

Trees that are badly affected will probably have to be cut back very severely, at least to the trunk, and perhaps to the ground. The trunk or stump should also be covered with some good fungicide, such as extra strong Bordeaux Mixture or Lime Sulfur. The disease cannot be eradicated from these trees merely by cutting off the diseased twigs.
All diseased material that is cut must be burned. It should not be carried or dragged around through the orchard, as this will spread the disease everywhere.

Young stock that is diseased should be destroyed. This is being practiced by some growers in the state at present. Do not use any diseased stock for budding.

SPRAYING.

After the infected material is cut out, the new growth should be protected by some good fungicide, such as Bordeaux Mixture. If a good coating of Bordeaux Mixture is kept on the leaves and twigs, there will be less chance of infection. This will mean spraying every two weeks, and perhaps oftener along the gulf coast, where the rainfall is very abundant.

Spraying with fungicides should not be practiced, however, after the danger of infection from the canker is over. Spraying also kills the red, yellow and brown fungi, which are parasitic on the white fly, and if these are killed, the damage caused by the white fly will become greater.

INSPECTION AND QUARANTINE.

This disease will have to be considered as a serious pest and no nurseryman or grower should be allowed to sell trees if he has the disease in his nursery or orchard. Unless the nurseryman can show that there is none of the disease among his trees, the Department of Agriculture should not allow him the use of inspection tags and any attempt made to sell the stock should be vigorously prosecuted. The citrus grower is in danger and it will be himself alone that is the loser if he allows the shipment of diseased stock throughout the state.

At a meeting of the citrus growers of the state held in New Orleans on September 19, the questions of inspection and quarantine were discussed. Several hundred dollars were subscribed and an inspector was appointed whose first duty it will be to make a survey of the citrus parishes and find out just where the infected areas are. The diseased material in these areas will be ordered destroyed and then these regions will be kept under observation for some time to make sure that the disease does not break out again.
The question of quarantine on other states was also discussed and it was the opinion of the meeting that it would be best to place a temporary quarantine on all citrus plants until we have more definite knowledge of the disease and until we know what success the other gulf states will have in their attempt to eradicate the disease from their nurseries. How rigid the quarantine will be will depend upon future development.

The quarantine notice as prepared by the State Entomologist and submitted to the meeting was adopted by a very large majority. This notice is as follows:

"In order to prevent the introduction of the dangerous citrus disease known as citrus canker, prevalent in the principal citrus-growing states of the United States, but not found to be prevalent in Louisiana, the importation into this state of any and all kinds of citrus plants and parts of citrus plants, grafting and budding wood of citrus plants, and all host plants of this disease when they are known, except seeds, and fruits of citrus plants intended for eating purposes, from all the states of the United States, its territories and possessions and from all foreign countries, is hereby prohibited.

"Importations of limited quantities of new or rare varieties of citrus plants may be allowed by special permit of the entomologist, if in his opinion such importations may be made without danger.

"The provisions of this regulation do not apply to importations or shipments made by the United States Department of Agriculture or the Louisiana Experiment Stations.

"Violations of this regulation shall be punished as provided by Act No. 36 of the General Assembly of 1910."

EXAMINATION OF SPECIMENS.

The Experiment Station is always ready to examine specimens for any grower in the state if he is in doubt in regard to any trouble he may be having. We are glad to get the specimens, as it helps us out in our survey of the state. Address all communications to the Plant Pathologist, Experiment Station, Baton Rouge, La.