Citrus Canker

ITS ORIGIN, DISTRIBUTION AND SPREAD

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Mr. President, Ladies and Gentlemen:

When and how citrus canker was first discovered in Florida by the Inspector of Nursery Stock, and Deputy Inspector E. V. Blackman of Miami, its distribution in the Gulf States, its introduction from Japan, and original distribution in Florida, was told by the writer at the meeting of this Society at Palatka last year (See Proceedings, Florida State Horticultural Society, 1914, p. 120.)

A rather concise but detailed account by the writer, on the History of Citrus Canker, together with papers by Prof. H. E. Stevens and Mr. Frank Stirling, were also read at the last Citrus Seminar at Gainesville, Sept. 23, 1914, and printed in Bulletin 124, Florida Experiment Station, October, 1914. A still more complete account on its history in Florida was later published by the writer in The Florida Grower of November 14, 1914. Bulletin 122, Florida Expt. Station, by H. E. Stevens, April, 1914, is probably the first document on this disease ever printed. In May, 1914, Dr. F. A. Wolf and A. B. Massey, A. & M. College, Auburn, Ala., published Circular No. 27, independently corroborating the results given in Bulletin 122. In October, 1914, appeared Bulletin 150, Louisiana Expt. Station, by C. W. Edgerton. For the purpose of this paper, therefore, only the briefest kind of summary on its origin and introduction into Florida will be offered.

ORIGIN AND INTRODUCTION.

Citrus Canker is present in Japan and specimens have been received from there at the Florida Expt. Station. The specimens had been labeled "Scab" by the Japanese.

During a visit to the Gulf States in 1914, (March 14-April 5), the writer found the disease in Alabama, Mississippi, Louisiana and Texas. Information elicited there from nurserymen and others was always to the effect that the disease had first been observed on C. T. stock recently obtained from Japan. The infection started at Monticello also had its origin in C. T. seedlings from Japan, planted in the Spring of 1910. As per statement of the owners the infection at Silver Palm was brought from Port Arthur, Texas, in January, 1912, on sour seedlings.

As to the distribution of Citrus Canker in Japan or whether it exists in other foreign countries nothing is known.
The writer saw, what now appears to have been the first citrus canker seen in Florida, at Monticello, Sept. 30, 1912. Specimens were collected, as the thing looked suspicious, and referred to plant pathologists, who diagnosed it as common citrus scab. No stock was sold out of the block, less than one acre, as the owners became financially embarrassed and the stock was temporarily abandoned.

In April, 1913, specimens from Silver Palm, South Dade county, were received at the Experiment Station (Bul. 122) and the disease recognized as something different than scab; but the Nursery Inspector did not learn of this until he himself received specimens from there. In July, 1913, under date of the 18th, the first specimens and a letter were received from Deputy Inspector, E. V. Blackman, appraising the inspector of a new disease in a nursery at Silver Palm. On July 28, the Inspector personally visited this nursery, saw the disease and collected specimens. Certificate was withheld and treatment recommended which resulted in materially reducing the amount of infection. The nursery was again visited on December 15, 1913 and April 21, 1914, and comparatively few specimens of the disease found.

On Sept. 23, 1913, the block at Monticello in which the suspected material had been found on Sept. 30, 1912, was again visited and the infection recognized as being the same as the one in Dade county. Certificate was withheld and the block later grubbed up and burned. Two other isolated blocks at Monticello found infected in Sept., 1913, were later voluntarily burned by the owners.

Preliminary reports on the presence of a new citrus disease in Florida were made at the Citrus Seminar at Gainesville in Oct., 1913, by Prof. H. E. Stevens and the writer. On February 11, 1914, the disease was discussed by the writer at a Farmers' Institute at Lakeland. In March, 1914, Bul. 122, Citrus Canker, Fla. Expt. Station, was published and mailed to the public in April. The disease was again discussed in April, 1914, at the Palatka meeting of this Society. In May, 1914, the first specimens were received at the Experiment Station from a grove in South Dade County. On May 19th, the writer conducted Mr. Frank Stirling, a deputy inspector of nursery stock, but under pay of the Florida Growers and Shippers League, to Silver Palm, Dade county, to look up infected places, and to advise and assist in the treatment of infected stock as directed in Nursery Inspector Circular 8. On June 4th, 1914, citrus canker was discussed at a large meeting of growers at the Redland P. O., Dade County. Mr. Stirling has told us in Bulletin 124, Florida Exp. Station, what happened after that and will tell us more today.

**DISTRIBUTION IN FLORIDA.**

In view of the fact that Mr. Stirling will give details on the distribution of citrus canker in Dade county, I shall limit myself to the distribution outside of that county.

When at the Citrus Seminar on Sept. 23, 1914, the growers of the state had taken steps to raise funds for the purpose of tracing and inspecting every suspected
shipment of stock sent out from Dade county, or received from other states, the Florida Growers and Shippers League, under whose auspices the money raised was to be spent, placed eight additional inspectors in the field. This was in addition to Mr. Stirling whom the League had employed since the middle of last May. The additional inspectors, like Mr. Stirling, were also appointed Deputy Inspectors of Nursery Stock in order to give them a legal status in the nurseries. This arrangement was, furthermore, fortunate as it permitted the Inspector to use their reports on nurseries for issuing certificates, and besides, by consent of the League to use them in making inspections of nurseries in the territory to which they were assigned, because the Inspector would have found it impossible to have made any but a few of the 200 and more inspections himself.


It may, furthermore, be explained here that, under the circumstances, the single Inspector provided by the Nursery Inspection Law of 1911 has become wholly inadequate to meet the demand for inspection. In 1911-1912, 70 nurseries were inspected; in 1912-1913, 102; in 1913-1914, 142; and in 1914-1915 the number has increased to over 200.

Several lists of sales and shipments made from nurseries one or two years prior to the discovery of canker in them, were obtained from the nurserymen, and these lists were used by the inspectors. One extensive list representing just about 500 sales and shipments furnished by a leading nurseryman of Dade county became the principal factor in arousing the growers of the state at large to action. While the figures of this list appeared very formidable, a careful analysis of the list brings out the fact that the distribution of the shipments was not correspondingly state wide, but wide enough to warrant the apprehension that was aroused. Herewith follows a summary of the list in question:

<table>
<thead>
<tr>
<th>No. sales.</th>
<th>Trees and buds.</th>
<th>No. sales.</th>
<th>Trees and buds.</th>
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<tr>
<td>Total No. of sales and shipments, trees and budwood per list, about 500 169,290</td>
<td>Number into Dade county 252 28,495</td>
<td>Number into other East Coast counties 143 8,124</td>
<td>No. into state at large, not including East Coast, and not including seedlings and buds to branch nurseries 69 26,148</td>
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<td>Seedlings to branch 17 88,521</td>
<td>3000 buds and some trees to main nursery 4 4,810</td>
<td>Out of state into other states 7 10,106</td>
<td>Out of mainland of U. S. 8 30,86</td>
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<td>500 169,290</td>
<td>500 169,290</td>
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This analysis shows that only about 69 shipments, but representing over 26,000 trees and buds, were sent into the state at large, the greater bulk having gone into Dade county and the other lower East Coast counties.

I should add that the parties outside of the United States receiving the eight shipments listed were notified either directly through this office or through the
Federal Horticultural Board, Washington, D. C., that the stock they received from Florida had been exposed to infection by canker.

**EAST COAST INFECTIONS.**

*Pompano*—Messrs. Henry and O'Byrne discovered a large infection at this place early last fall. The infection involves approximately 200 trees. None of these trees have been burned as the owner believes he is going to show us how to eradicate canker without destroying the trees. He has sprayed them with Bordeaux and other dopes, many of which the trained plant pathologist has long ago cast aside as useless. But the owner refuses to be advised. Fortunately his grove is isolated by at least five miles from any other grove and being off the road the danger of the disease spreading from it to other groves is much lessened. There is no law to compel the owner to eradicate the disease, except, perhaps, that through a long process of litigation, it could be declared a public nuisance.

**Other East Coast Infections**—Messrs. Henry and O'Byrne, and later Mr. O'Byrne by himself, have found infections at Boynton, Stuart, Micco, Tillman, and Cocoa. In so far as the writer is aware, nothing need be feared from these infections as all diseased trees are burned as soon as found, and only a few have been found recently, so that we look forward to an early eradication of the disease in these places.

**WEST COAST INFECTIONS.**

Slight infections have been found at Elfers by Messrs Hunter and Clark, at Largo by Mr. J. A. Miller, at Alva (Lee county), by Prof. H. E. Stevens, and at Edge and Ft. Myers, (DeSoto county), by Mr. D. M. Badger. All of these infections were promptly burned and presumably eradicated as no new infections have been found, except at Elfers, where a few trees have recently been found; but we expect these to be the last and do not fear the outcome.

**WEST FLORIDA INFECTIONS.**

No canker has been found at Monticello since December when a few infected trees were discovered in town and burned. None of the nurseries doing a citrus business there now ever had canker. The nurseries and the groves near and about town have been repeatedly inspected by Messrs. Nelson, Hainlin, and Daniel, since October, 1914, and all indications are that canker at Monticello is a thing of the past.

Other infections in West Florida were found near Paxton by Mr. Nelson and by Mr. Daniel at Cottage Hill, Santa Rosa, and Galliver. Due to the rather extensive defoliation of small citrus trees and young citrus trees here, inspection work was suspended after December but has recently been resumed. We are therefore not so well informed on the situation in extreme West Florida as in the rest of the state.

**THE GULF STATES.**

In Alabama, beginning in November, 683,359 citrus orchard trees (441,116 Satsuma, 242,243 miscellaneous), have been inspected in Mobile county: Sixty-one orchards and five nurseries were found more or less infected. Infected
pomelo, round orange and lemon trees were burned in a manner similar to that in Florida. Infected satsuma trees have been defoliated and treated with Bordeaux mixture. Very little has been done in Baldwin county. Lack of funds is delaying the work. (Information per letter, dated April 6, 1915.)

Mississippi has three inspectors in the field and expects to put on two or three more. Mississippi plans to inspect every citrus plant in the state. All infected trees found are burned. My informant states that most of these trees were burned before systematic inspection was undertaken as the owners wished to eradicate the disease. Their principal infections are at Wiggins, and Big Point, Jackson county—(Information per letter, dated April 6, 1915.)

In Louisiana, my informant states that they are "in nearly a hopeless condition." Plaquemines Parish and New Orleans appear to be the only localities in which funds for eradication of citrus canker have been raised. The state has not assisted with funds and only one canker inspector has been employed. Several large nurseries, however, have been destroyed; one of 65,000 trees; another of 30,000; and another of 40,000. "Otherwise the number has ranged from a few trees up to several hundred in different cases." No regular burning outfit has been used, but trees were simply cut, piled and burned by the best available means in the field. Louisiana has, furthermore, been unable to meet the conditions for Federal co-operative aid. Neither can the Louisiana Inspector of Nursery Stock pass upon and refuse entry of shipments of citrus stock from outside nurseries because the Supreme Court of that state has annulled the quarantine regulation intended to protect Louisiana against the further introduction of diseased trees. (Information per letter, dated April 7, 1915.)

Information from Texas is to the effect that 10 inspectors are engaged permanently in canker work. These have four assistants; besides three gang foremen, a total of 20 to 30 laborers are employed, cutting, grubbing and burning infected stock. A small tractor has also been purchased for jerking out citrus trifoliata by the roots. Satsuma trees are being cut back and treated but other citrus is burned. A state appropriation of $5,000 with a small sum, amount not named, from the Federal Government, has recently become available. By November 2th, 1914, canker had been found in 67 out of 92 nurseries growing citrus in Texas—(Information per letters, dated April 8, 1915, and November 5, 1914.)

The comparatively small figures representing the expenditures and men employed in the Gulf States do not necessarily indicate that no efficient work is being done in any of them. It is probably not claiming too much to state that many counties in Florida may contain more citrus than any one of those states.

THE DANGER.

But it must not be assumed that the battle against canker has been won. The amount of money already spent and that will be spent by July 1st, will be wasted if the inspection and eradication work is
not continued after that date. Any single case of canker left undestroyed would soon increase and endanger the whole state.

I have in mind the foolhardy experience of Massachusetts, with the Gipsy Moth. Up to 1900 really good progress had been made toward exterminating this pest—such excellent progress apparently that the reduction in the numbers of the Gipsy Moth influenced the special legislative committee which was appointed to investigate the Gipsy Moth work to report adversely to continuing the same. I shall quote herewith in full a short section from Bul. 87, Bureau Entomology, U. S. D. A., 1910:

"DISCONTINUANCE OF THE STATE WORK IN MASSACHUSETTS."

"At the annual session of the legislature in the winter of 1900 a special committee was appointed to investigate the gipsy-moth work. After numerous hearings it was reported that the insect need not be considered a serious pest, and further that 'we find no substantial proof that garden crops or woodlands have suffered serious or lasting injury or are likely, with that precaution or oversight which prudent owners are disposed to give their own interests, to be subjected to that devastation which one would have the right to anticipate from these reports. It appears to us that the fears of the farmers throughout the state have been unnecessarily and unwarrantably aroused, evidently for the purpose of securing the effect of those fears upon the matter of annual appropriations * * * We do not share these exaggerated fears, and the prophesies of the devastation and ruin are unwarranted and in the most charitable view are but the fallacies of honest enthusiasts.' As a result of the report of this committee no further appropriation was made for carrying on the work. The tools and equipment which had been used were ordered sold, and the insect was allowed to develop without restriction."

But we need not go to Massachusetts for men who fail to understand. We have those in Florida, right now, who believe that all agitation on account of canker is for effect. Note the following taken from a letter received a few days ago:

"Neither did the * * * Nursery Company have any citrus stock that was infected in any way with Citrus Canker. The particular block of citrus nursery stock that you mentioned in above (named) circular was diseased on account of fertilization. The 18,000 of nursery stock you mention in your circular was on less than one-half acre as you well know, and to be right frank with you, the writer was of the opinion that you did not know any more about what you were trying to do than he did after seeing you make your inspection, while he knew himself what was the matter with this particular block of citrus stock, and he wanted to test you and see what you would have to say about it, and he really found out that you did not know anything at all about what was the matter. As a matter of fact on this particular block of less than one half acre, there were used four sacks of nitrate of soda and four sacks of fertilizer that contained a very high percent of potash and in less than two weeks after it was applied this
scaldy, rusty looking appearance on the leaves showed up.

"** ** In the judgment of the writer, you have created a great big scare and done the people here a great injustice where there was no excuse for it known to the writer, except that you are not competent to handle your job.

"Now on account of this citrus fruit scare, there is a howl from different parts of the United States landed in the law-making bodies in Washington, D. C., and in Tallahassee, Fla., for appropriation to take care of the citrus canker, where you, the man in authority for the State of Florida, know absolutely nothing about it, it seems to the writer; but, as you have acted, shot off a lot of hot air seemingly to help get the legislative bodies to swell the appropriation for nursery and fruit stock inspection and insect pests, without informing yourself. Yours truly for unadulterated facts."

But to get back to the Massachusetts situation again. Up to that time, 1890-1900, $1,175,000 had been spent by Massachusetts for the suppression of the gipsy moth, when it was allowed to lapse during five years. But in 1905 the situation became so serious and appeals for assistance so urgent that the Massachusetts legislature again took action in the matter.

In the meantime the area of infestation had increased from 359 sq. miles to 2,224 sq. miles and had also spread into Maine, New Hampshire, Rhode Island and Connecticut, so that the Federal Government was also appealed to for assistance. Since 1905, when the work was resumed, until 1910 nearly $4,000.00 have been expended jointly by the Federal Govern-
Insects and birds must also be carriers, since it is otherwise impossible to explain infections starting in the tops of trees. Wind storms and rain storms may also explain its spread locally. I am not aware, however, that any of these agencies have spread it any great distance.

But when it comes to carrying infections long distances we find, in every instance, that they came about by means of nursery stock. Was the canker infection not brought from Japan to the United States on nursery stock? Was it not carried from state to state on nursery stock? Was the infection not brought to Florida on nursery stock? and were the fifteen or more infections in Florida, outside of Dade county, not carried on nursery stock? And finally, the great majority of the 201 infected properties in Dade county were infected by means of infected nursery stock.

It is evident, therefore, that in order to forestall the introduction of these pests into Florida, and to limit the spread of those already in Florida, whether of citrus and other fruits, whether of garden vegetables and farm crops, all stock intended for planting or propagating must be carefully inspected upon its arrival in Florida, or if grown in Florida, before it is allowed to be sold. In order that this may be efficiently done it will require more than one inspector and more than $3,000 per annum, for which the Nursery Inspection Law of 1911 only provides.

But that is not all. Florida has a very long coast line, with many harbors, at which ocean going vessels may land. Passengers will land at these places from Bermuda (where the Mediterranean fruitfly has ruined the fruit industry), from Mexico (where they have the Mexican fruitfly or Orange Maggot), from the West Indies (where they have the Pink Mealybug of sugar cane), from Central America, Brazil and other South American countries, where, who knows what unknown pests exist! Did any one know that canker existed in Japan? No, but it was brought here just the same. The opening of the canal may sooner or later result in vessels landing passengers and cargoes at Florida ports coming directly from the Orient, where a new disease of corn has recently been discovered. What will these passengers bring with them? It is only natural that a traveler should wish to bring home some new plants, budwood, fruits, seeds, and what not. In California a State Inspector accompanies the Customs Officers on board vessels and all fruits, plants, seeds, etc., that are under the ban are confiscated. It is reported that a California Inspector will take an orange from a crying child's hand. California also has a comparatively long coast, but few ports, so that their problem is less difficult than ours. But Florida must solve this problem of protection itself against careless tourists. Would a capitalist owning a $200,000,000 industry, and the citrus industry has been estimated at that, hesitate to spend a couple hundred thousand dollars to protect it? That would be only one-tenth of 1 per cent on the investment.

But, says Mr. Trucker, that is all right for the grove owners. I am not a grove owner; let the grove owners tax themselves, that is proper. I was no loser.
when the freeze destroyed the citrus industry in 1895, in fact, that was the beginning of my industry. But, Mr. Trucker, let me tell you: Do you not know that you are in danger? Do you not know that the Mediterranean fruit fly, already in Bermuda, likes beans, peppers, and strawberries as well as citrus fruits? and that the melon fly of Hawaii is a possibility when that vessel with a few melons in cold storage lands at Tampa?

Yes, Mr. Trucker, and this applies to some citrus growers. So long as everything goes well we look wise and smile a self-complacent smile. But let a bug appear, let a few leaves wilt, and most of us are as helpless as the proverbial bump on a log. Then we telephone, telegraph, write, or jump on a train for Gainesville to get help from the Experiment Station. We are like the fellow who did not believe in "them there germs theory," and then blamed the doctor that he was no good because he could not cure him, when, as a matter of fact, common sense and prevention should have prevented the disease. Did the President of this Society not sound a warning at DeLand in 1912, as to what might happen to Florida? Did it not happen? Had it not already happened. But none of us knew then that canker was already in Florida.

But, Mr. Merchant says, why should I be taxed for protecting the citrus grower or the trucker. The writer was told while at L., Florida, several years ago, that certain store rooms in a large brick block there had, before the freeze in 1895 had destroyed the citrus industry, rented for $100 per month, but were now renting at $20.00 per month. The answer is so self-evident that I have hesitated to raise the question.

But we have one more objector, namely the general farmer. But the same argument answers him that answered the trucker. Just recently a new disease of corn has been discovered in Java and India. Mr. General Farmer, who may be here, do you want this disease introduced into Florida? Would you not prefer never to learn anything about it? Then you need protection as well as the other fellow and you should see that you get it. And not only that, your prosperity depends largely upon whether or not the grove owner and the trucker are prospering.

The answer to the whole proposition is that it is the duty of the state at large to provide proper protection for the industries upon which its prosperity depends. In Florida it is the agricultural and horticultural industries that promise permanent prosperity.

For the sake of illustration permit me to discuss the canker situation at Monticello and at Silver Palm in relation to the amount of inspection provided under the law of 1911. The Monticello infections, while of longer duration, were nevertheless discovered in time, and being in isolated nurseries, have caused very little trouble. The infections were discovered before any stock had been sold, were burned, and that has apparently ended it. But in the Silver Palm section canker was not discovered in time to have headed off all sales from the infected nursery. A year and a half had elapsed between the time of its introduction and the time of its discovery. One inspection of the
nursery had been made during that time, namely, in July, 1912, or about six months after the seedlings infected with canker had been brought from Texas. If any canker spots were seen at that inspection they were passed by supposing them to be scab. But it is more probable that none were seen as the inspection was not row by row but block by block, according to the time available, so that any small infections present could readily be passed over. The general practice in inspecting has been to give as much time as was available, which for the larger nurseries was about one day, seldom more. The general practice, furthermore, was to walk around a block between the outer rows and then several times through the block. That was not efficient inspection but all that could be given. Sufficient perhaps under ordinary circumstances, but not sufficient to assure finding any new infections until such infections had become widespread in the block. And that is just what happened; the infection was discovered at the next inspection, a year later, when it had become widespread. But during that time approximately 500 sales and shipments of stock, not all from the Silver Palm Nursery, but in conjunction with stock from other nurseries, belonging to the owner in Dade county, were made.

The remedy against such a condition recurring in the future, consists, on the one hand, in prohibiting importations from without, which has been done, and very carefully inspecting and watching all importations that are permitted; on the other hand, in providing a sufficient inspection system so that every row of stock in the nursery can be inspected and every tree seen by the inspectors three or four times yearly, and then a sufficient law providing for the eradication of all dangerous and new diseases found.

A SYSTEM OF INSPECTION

I have tentatively outlined a force of inspectors and employees that I wish to present for your consideration

One Chief Inspector; 1 Chief Assistant Inspector; 6 or more Assistant Inspectors;* 6 or more Port Inspectors; 2 or more Grove, Orchard or Field Inspectors;† 2 or more Railroad Inspectors, to look after shipments of nursery stock coming to Florida on the railroads; 1 Consulting Entomologist; 1 Consulting Pathologist.

*Based on actual time required by Inspector to make 100 inspections. It is planned to inspect each nursery four times per year. There will probably not be less than 200 inspections to make from now on. Since July, 1914, over 200 inspections have been made.
†These may serve as Nursery Inspectors, when needed, or vice versa, and should start crop pest survey of state.