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## **DISEASES OF SUB-TROPICAL FRUITS**

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Mr. Floyd asked me to lead the discussion on the disease side of the question this afternoon. However I am not going to do a great deal of talking, as I am limited to ten minutes by your chairman.

I will mention a few of the common troubles of the Avocado and some of the Mango. It was my pleasure some years ago to study the diseases of the Avocado, and I made that study in the Homestead section of your country here. Lack of soil used to be one of my great worries when I was working here. I wondered how a person could live in a place like this where you couldn't get soil enough to cover the roots of the trees. However, from what I have seen of the Avocados in this section, and in other sections of the State, and of your other fruit trees, such as the mango, there is no question but that this section of Florida is the Avocado section of the State for the varieties we have at present. It may be possible that later we will develop varieties for Northern and Central Florida, but you have a monopoly on what are growing here at present.

Your Vice-President just mentioned the fact that when a crop becomes common why is it that so many of these pests and diseases follow. He probably has forgotten that these pests have to make a living themselves; and we quite often find when we bring trees or groups of plants together that they form a very convenient place for insects to breed and collect, and for plant diseases accumulate. That's why we have so many diseases. They begin accumulating as the possibility of the seed increases. They continue to increase as long as they have a favorable environment unless some force unknown or intervention by man prevents.

Now I will only touch on two of the Avocado diseases more common at this time—Scab and Fruit Spots.

The Scab of the Avocado is somewhat similar in its action to the Scab on citrus. It attacks the young, tender growth of the Avocado, also the fruit. It attacks the fruit in the very young stage, apparently from the time the bloom drops until six weeks or two months afterward. This scab is a fungus disease. The fungus causing the scab of the Avocado is very similar to the scab of citrus. I have taken the organism of Scab from Avocados and produced Scab on citrus. We have not been able to take the Scab from citrus and product it on the Avocado.

So our method of controlling Avocado Scab would be somewhat similar to the methods we employ on citrus,—absolute cleanup and spray with Bordeaux Mixture for one or two applications when the fruit is in a very young stage. When you do not care to make too many applications, as spraying is costly, probably two timely applications of Bordeaux Mixture 3-3-50 would help you control Scab. I notice it is the practice to make a dormant application before any bloom puts out. That is probably very well and all right, but in

case you did not wish to make this extra spray I would rather delay it until the bloom has about dropped and fruit set—make one application then and follow with a second application a month later. I think those two applications would control Avocado Scab fairly well.

We do not apparently get into the trouble in the use of Bordeaux Mixture on the Avocado that we do when it is used in a citrus grove, so if you are prepared to spray, and feel you can spend the money, three applications do better.

The other disease is Spotting of Fruit. There is one distinct spot known as the Black Spot. It derives its name from the peculiar black spot produced on the fruit, and this extends in a rotten mass down toward the seed. Quite often you can take them out and it will leave a depression in the fruit a half or more inches in depth. But there is another spot which I consider more serious, and that is Blotch. This is a small irregular blotch or pit on the surface of the fruit. They both occur about the same time, and I think a great deal of the Black Spot is secondary to the other type or Blotch. Blotch is caused by a fungus more or less parasitic. It is a species that has not been definitely determined yet. It winters over on leaves or on dead wood probably. The Black Spot, so far as I can judge from data I have obtained is a species of *Colletotrichum* similar to the Anthracnose that works on citrus fruit.

In regard to control, I carried out some spraying experiments over a period of two years. I had to leave that work before it was completed, and did not have an opportunity to make any further spraying experiments, but I found in the results of that two years work that two or three applications of Bordeaux mixture, I think that 4-4-50 was the formula, controlled these types of Spot perfectly.

Our first application, or the first application I will say that probably would be necessary to apply with the early maturing of seedling varieties would be an application the latter part of May, then another application in June, and possibly another in July. That should take care of the spotting under ordinary conditions of the early fruit, and the seedling fruit, fruit coming in from July until August.

With your late varieties you may have to extend the spraying period much longer, beginning later, and that is the problem that has to be worked out in the near future. We are planning to carry on some experiments here again this season, and have outlined one or two for this section. I hope if we can continue in the work here so that we will be able to gather within a year or two some more data in regard to this disease, and ascertain the most economical method of control.

I have sketched a brief outline of the Avocado diseases, and will say a few words in regard to the Mango troubles. Those I have not studied very extensively. The greatest trouble we have with the Mangos is the fungus that effects the bloom, and is the cause of anthracnose. You have noticed it is difficult to set a crop of fruit of the Mangos on trees in this section if you have rainy periods, or warm weather during the rainy season.

There is a fungus related to the one we have in citrus groves that attacks the bloom and kills it out. It attacks very young fruit, makes scabby looking fruit, causes it to drop. In favorable conditions for the development of this fungus, the entire bloom may be blasted. Years ago, the Federal Government spent considerable investigating this

trouble on the lower East Coast, but they didn't get very good results from spraying. I think they sprayed as often as two or three times a week, and under unusually rainy conditions it was apparently impossible to set the bloom.

I have seen Mango trees on this trip that seemed to be pretty well painted with Bordeaux Mixture. I don't know how much fruit they had, but the Bloom blight is a disease or trouble that needs more investigation, and one that I hope we can turn our attention to. If you have to spray two or three times a week through a period of several months I don't see how you can afford to produce Mangos.

I have had a little experience with copper lime dust but the results are hardly enough to recommend its use, but the results I have obtained from one or two season's trial has given me some encouragement in the use of this in the bloom. I believe it is going to be most difficult to try to carry through your early bloom of the Mango. That comes on in December or January. But I do believe that you can protect the late bloom that conies out, and set your crop of fruit either with the Copper Lime Dust or with the Bordeaux Spray.