

PRESENT STATUS OF LIME BARK DISEASES

W. B. Tisdale

Agricultural Experiment Station, Gainesville

Two years ago, I described before this Society a bark disease of Tahiti lime and Perrine lemon trees and stated that two fungous parasites, *Phomopsis citri* and *Diplodia natalensis*, were causing the trouble. At that time, it was also pointed out that these fungi initiate their attack on the trees in growth cracks in the bark, thorn punctures, pruning wounds and other kinds of mechanical injury. Experiments had been inaugurated at that time and others were started during the summer of 1934 in an effort to determine some practical method of control. Unfortunately, however, practically all of the experimental trees were killed by the freeze in December, 1934, and it was not until this spring that trees could be procured for a new start. Consequently, little experimental progress has been made during the past two years. The most that can be done at this time, therefore, is to give you further information obtained from surveys of groves and to offer certain suggestions which may be of benefit in holding the disease in check until more definite information can be obtained.

Observations made during the spring of 1935 showed that the twigs and larger limbs of many trees that were injured by low temperature in December, 1934, continued to die back after growth started and usually showed an exudation of gum from the lower extremity of the dead portion. A similar condition has been observed in trees severely affected by drought. As a rule, gum did not begin to appear until after the injured parts became infected and the trees started growth. Gummings was also prevalent on orange and grapefruit trees injured by the cold and drought, but usually the twigs and limbs did not continue to die back after active growth started. In many such cases *Phomopsis* was producing spores in abundance on the dead wood in early spring and the new growth in the vicinity of this dead wood showed heavy melanose infection. This condition was observed on the lime and lemon, as well as

on orange and grapefruit. Cultures made from the juncture of healthy and dead wood invariably yielded *Phomopsis* or *Diplodia*, the *Diplodia* being more commonly obtained from the trunks and large limbs. Occasionally, the withertip fungus, *Colletotrichum gloeosporioides*, was also obtained from the dying twigs and branches. This fungus is also parasitic in lime and lemon bark and wood. A good percentage of young Tahiti lime and Perrine lemon trees thus affected early in the spring continued to die back to the union with the understock. Thus, it appears that any factor or combination of factors which weakens the trees or parts of trees, predisposes them to infection by *Phomopsis* and *Diplodia*.

In the case of Tahiti limes and Perrine lemons, it has been observed that longitudinal splitting of the bark occurs on the trunks and limbs during the growing season. So far insufficient data has been obtained to show any definite correlation between this splitting and the kinds and amounts of fertilizer used or cultural practices, but more of it has been found in certain groves than in others. Infection occurs in many of these cracks and often a considerable volume of the bark and wood is invaded before the infection is detected. Indeed, infection of the trunk and limbs of trees two or more years old is always difficult to detect until gum appears on or around the diseased parts. By this time the foliage of the top or affected branch may be yellow and death of the part rapidly approaching.

Older grove trees that were injured by the hurricane in September, 1935, and were not given attention soon afterward became infected in the split or broken branches and many of the affected parts have died suddenly this spring. In some instances, the entire tree has died. On the other hand, trees that had the injured branches removed and the wounds treated soon after the hurricane show comparatively little infection now. These cases are pointed out to emphasize that the Tahiti

lime and Perrine lemon woods are more susceptible to infection and invasion by *Phomopsis* and *Diplodia* than other varieties of citrus tested and because of this it appears necessary to give them more care to prevent mechanical injury and to treat any injuries which may occur as soon as possible thereafter. All dead or diseased limbs should be pruned out, making the cut below the dead portion and, immediately after pruning, the cut surfaces should be painted with a disinfectant or suitable paint. The grove should be given good care after pruning in order to bring about a strong vigorous growth that will be more resistant to further attacks of the fungi.

Many growers have experienced considerable difficulty with young trees planted in groves this year. In some groves a percentage of the trees have failed entirely, while a high percentage of the remaining ones have died back from the cut end for one inch to more than half the length of the trunk. Many of the trees are still dying, as indicated by the exudation of gum and wilting of new shoots on the lower half of the trunk. In some instances, *Phomopsis* was producing abundant spores on the dead wood and young shoots below showed severe melanose infection. You may wish to know why this condition is more prevalent this year than it has been at other times. First of all, lime and lemon wood is very susceptible to infection. In the second place, the trees, especially the ones that were set late, have been exposed to cool drying winds which dried out the trunks and

retarded growth, thus making them more susceptible to invasion by the fungi.

It appears that the best treatment for trees thus affected is to cut off the trunks below the dead portion (being sure to remove all discolored wood), treat the cut end with a fungicide and then with a safe wound dressing to prevent further drying out. The experiments started this year have shown that the wound dressing, *Save-a-Tree*, is injurious to lime wood when placed on the freshly cut ends of the trunks of young trees. It would perhaps be best to wait until new growth starts before removing the dead parts.

What is the remedy to prevent this trouble? Many growers would like to know. We are trying to find out. Experiments were started this year to test certain possibilities. These experiments have not gone far enough to warrant conclusions, but the indications are that a combination treatment which will prevent infection and drying out may be most effective.

What has been said is based primarily upon *observations* made during the past two years. It is hoped that in the near future sufficient experimental data will be available to permit definite recommendations. In the meantime, it would seem advisable for growers to employ a system of grove management that will keep the trees in a vigorous condition and to inspect the trees at frequent intervals and remove diseased parts and treat wounds and injuries to prevent further infection.