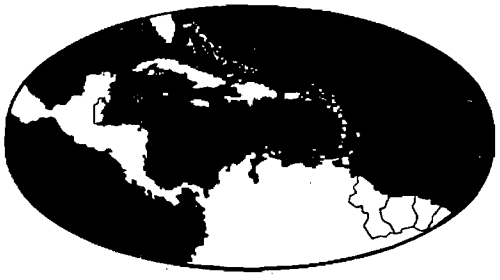
CARIBBEAN FOOD CROPS SOCIETY



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SPHAEROPSIS KNOT DISEASE OF CITRUS IN JAMAICA

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Introduction

The fungus, Sphaeropsis tumefaciens, was first isolated in Florida in 1904 by Hedges(1) from knot-affected lime material from Jamaica. A different strain of the fungus from that found on lime was obtained by the same worker from orange stems, also from Jamaica. The parasitic nature of the fungus isolated was proved by repeated inoculations, development of symptoms and re-isolation. In 1911, a similar disease was observed on a lime tree in Florida and the major work on this fungus, using material from Jamaica, was done in Florida by Hedges and Tenny and published in 1912(2).

The attention of these workers was confined mostly to the cultural characteristics of the fungus on a number of media and to the susceptibility of different citrus species to artificial inoculation.

Sphaeropsis knot disease is either not a problem or does not exist in the larger citrus-producing countries, and very little work has been reported on it from any source. Besides Jamaica, it is to be found in Florida, Cuba and possibly Venezuela. In Jamaica this disease has been destroying large numbers of lime and to a less extent rough lemon plants every year, but no detailed work on it has been done in the island. Recently, the disease was found on the Ortanique variety which is regarded as a natural cross between the sweet orange and tangerine and is now fairly extensively grown. This is a popular variety and commands a good price in both local and foreign markets.

Symptoms of Disease

The knots produced by the causal fungus mainly on young branches or new growths on the stem are hard woody galls which are either elongated along the stem or rounded, and may girdle the affected parts. Knots may also be found on older parts of the stem and have even been found in Jamaica on rough lemon rootstocks below or close to ground level.

The surface of the knot is usually smooth at first but in old infections it may become broken, fissured, sunken or cankerous. It may also remain intact with small outgrowths or uneven elevated swellings. The galls have a broad basal attachment and cannot be easily broken from affected portions. On limes a witchbroom type of growth is often produced from the galls and the ends of branches die back. Severe infection will result in death of the affected plants in a few years. Seedling infection or infection near the base of mature plants can cause death in shorter time.

Disease in Jamaica

For many years sphaeropsis knot disease (Sphaeropsis tumefaciens) has been the limiting factor in the successful production of West Indian limes in Jamaica. It occurs mostly along the north coast, the south-western and south-eastern sections of the island, and has destroyed many plantations of limes. The disease is often seen on rough lemon but very rarely on sweet oranges or tangerines. It has never been observed or reported on grapefruits or other citrus varieties in Jamaica other than the ones mentioned above.

During January 1963 new interest in the knot disease was aroused with the discovery of galls on the 'Ortanique' variety of citrus on one estate in the north-west section of the island.

As the disease on lime is widespread throughout most of the island and occurs in areas with 'Ortaniques', preliminary studies were conducted to ascertain the following:

(1) whether the strain of the fungus from lime can infect the ortanique variety

(2) whether the fungus was seed-borne or not

(3) how far below the knots the fungus could be found

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(4) how the disease is spread

(5) how the disease can be controlled

Materials and Methods

Cultures of knot-affected lime and knot-affected 'Ortanique' branches were made on potato dextrose agar and held at lab temperature varying from approximately 80°-85° Fahrenheit. The fungal growths obtained from the lime material were similar in color, pattern of growth, shape and thickness of the mycelium to that produced from the ortanique material. The mycelium was 2-3.5 thick and in mass was almost black, with individual strands reddish brown. Side buds or warts were common on the mycelium, but sporing was absent even on cultures several months old.

Cultures were also made of Ortanique, lime and rough lemon seeds taken from fruits growing close to knots and also of stem sections at different distances from knots.

Discussions

From the results of the work done, it appears that the same strain of the fungus as found on limes has been the cause of the outbreak of knot on Ortaniques. In areas where Ortaniques are being grown all lime plants with knot should therefore be cut and burnt.

There was no evidence to indicate that the disease was seed-borne and although the fungus could occasionally be found in the fruit it was not isolated from the seeds. Since the fungus can be found in the fruit it is not advisable to use seeds from knot-affected plants for planting as this will avoid possible surface contamination.

Pruning offbranches at least 18 inches below the last gall and burning of diseased material appear a possible method of control, although new growths may become quickly infected. Where the knots are low on the main stem the type of pruning recommended will eliminate the entire plant. Spraying of affected trees to prevent sporulation of the fungus has not yet been tried, but is envisaged, though it is not expected to give good control.

This disease of citrus is a serious one and efforts should be made to keep it out of all citrus-producing areas and countries in which it is not yet found.

Literature Cited

(1) Hedges, Florence, (1911). Sphaeropsis tumefaciens, Nov. Sp., the cause of the lime and orange knot. Phytopathology 1:63-65.

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