

Mycological Notes (7).

Oidium Leaf Disease of *Hevea*.

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INTEREST has been aroused in Ceylon by the report that a leaf disease of *Hevea* has caused of late a certain amount of perturbation in Java. Enquiries addressed to the Department of Agriculture in Java have elicited the information that the unusually dry weather conditions of the last two years have led to an increase in the incidence of a leaf disease of *Hevea* in certain areas of that country. The disease in question is caused by a species of *Oidium* or powdery mildew; it has been known in Java for a number of years. As diseases of the type caused by *Oidium* are considered to be "dry-weather" rather than "wet-weather" diseases, it is of interest to note that the weather conditions associated with the reported increase of disease were abnormally dry.

The interest aroused by the report from Java has drawn more attention than usual to leaf disease of rubber in Ceylon, and reports have been received that certain estates are suffering from severe attacks. Investigation of such claims has shown the necessity for indicating clearly the symptoms and effects by which *Oidium* disease may be recognised, for damage caused by wind, rim-blight and root disease has been attributed in error to *Oidium*.

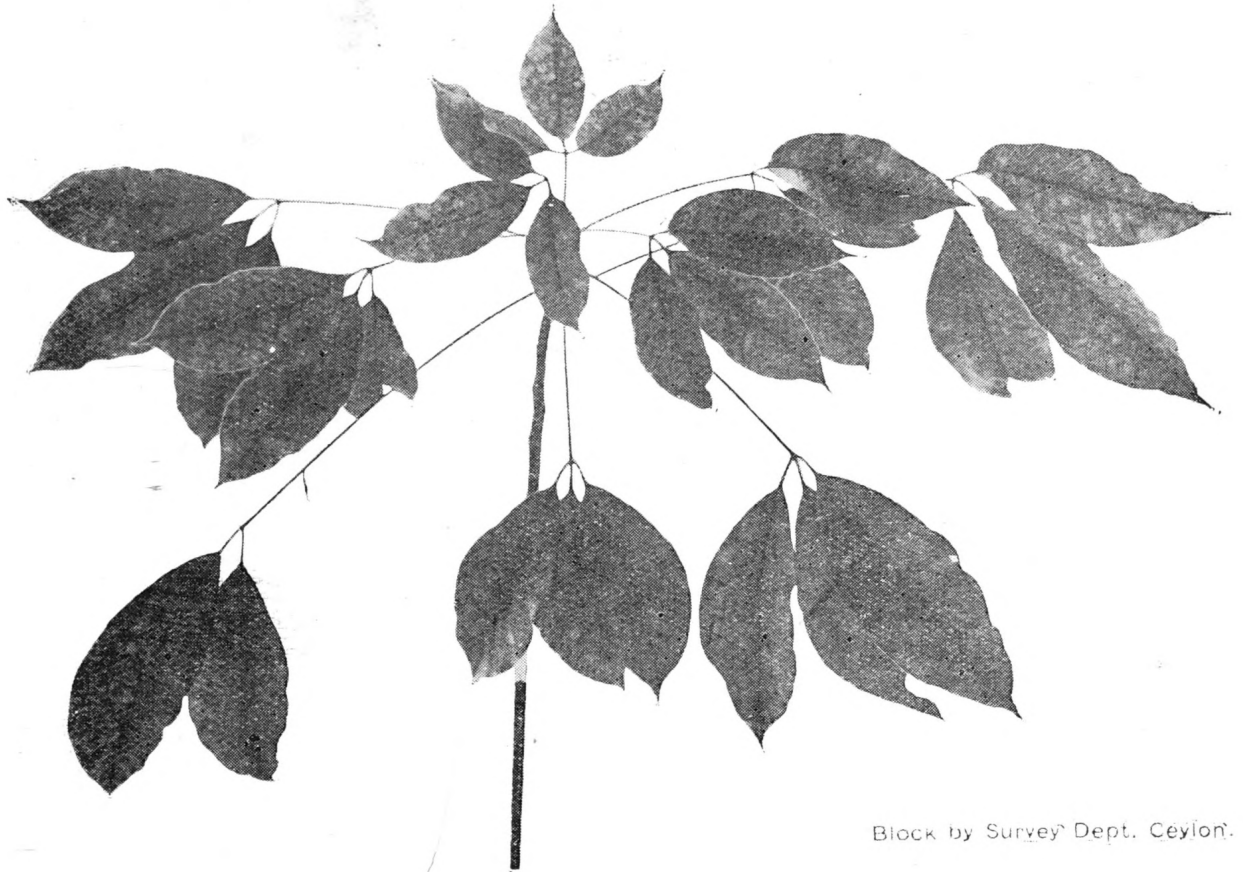
Hevea mildew, as *Oidium* disease has been called, attracted attention in 1925 for the first time in Ceylon, and articles on the disease were written by Stoughton-Harris (1) and Gadd (2). Since that time *Oidium* disease has become of common occurrence. Its effects are more marked than formerly and they appear to be more or less serious in certain districts and at certain elevations. The best-known form of attack occurs on young leaves at the time of their early growth and rapid expansion. Their leaflets become discoloured, curl from the margins and fall, and examination with a lens discloses the white, powdery superficial covering of the fungus *Oidium*. This form of attack is the most serious because it causes defoliation, but it has been

found that trees partially or wholly defoliated in this manner put out fresh leaves and so recover. The latter, however, may or may not be attacked in turn at the time of unfolding.

Leaves which are older than the very young leaves mentioned above, but which are still in an immature state may also be attacked, but in their case the whole area of the leaf need not necessarily become diseased. Areas at the margin, tip or about the midrib may become discoloured; the leaves may or may not fall as the result of attack. If they remain on the tree, the healthy portion of the leaf continues to expand while the diseased area cannot do so, and the consequence is a malformation which is one of the most characteristic symptoms of *Oidium* disease in Ceylon. The distortion persists throughout the life of the leaf although the fungus may have ceased to be in a condition of active parasitism upon it. This second type of attack is not considered to be as serious as that on the very young leaves since diseased older leaves do not fall from the trees in the same large numbers as young leaves.

The symptoms enumerated above describe briefly *Oidium* disease as it has been known in Ceylon. The term "primary attack" may be adopted to indicate them. Primary attack is most prominent at the period immediately after wintering, and observations in Ceylon have tended to show hitherto that the attack is arrested when the leaves attain maturity. Recent investigations, however, have shown that this view may be erroneous and that the fungus may attack fully-developed leaves. The symptoms noted in certain cases are described below. In these cases, *Oidium* disease has occurred on mature leaves in the months of June and July, a fact which is not in accord with the view that the disease occurs in dry rather than wet weather. The South-West Monsoon of the present year has been of average intensity in the districts in which the attack on mature leaves has been observed.

The symptoms of this "secondary attack" or attack on full-grown leaves differ from those of primary attack. Irregular yellowish translucent spots are scattered over the surfaces of the leaves. Such spots are best seen when the affected leaf is held up to the light; they give the leaflets an irregularly mottled appearance. The accompanying photograph shows a typical appearance. In advanced cases the powdery mildew which is made up of the hyphae and spores of the *Oidium* can be discerned readily with a lens on the undersides of the spots. Seen under the microscope the spores are indistinguishable from those of the *Oidium* that is found in primary attacks. As the spots grow older, they turn purple-brown in colour and eventually dry up, forming irregular brown areas the centres of which may fall out and leave small irregular holes with a brown margin.



Block by Survey Dept. Ceylon.

Photo by

L. S. Bertus

Photograph Showing Symptoms of "Secondary Attack"
of *Oidium* Leaf Disease of *Hevea*.

In no case has secondary attack been noted to cause defoliation. In this respect it is less serious than primary attack. It may be wide-spread; on a certain estate recently inspected the majority of the leaves showed typical spots. *Oidium* disease appears to be more serious in its effects at mid-country elevations but that may be explained on the ground that attack in the low-country rubber districts is masked by the leaf and pod disease caused by *Phytophthora Faberi*.

The effects of a primary attack of *Oidium* disease are to be seen in the sparsity of the foliage. The foliage put forth by a tree after more or less complete defoliation as a result of *Oidium* disease may be poor and the leaves smaller and more yellow in colour than the normal. It is obvious that defoliation of this nature must be a considerable drain on the resources of the tree. On the other hand, damage caused by the secondary form of attack may not appear to be so serious. No defoliation is caused but a proportion of the leaf surface must cease to function in the processes of photosynthesis and, as the proportion of diseased to healthy area becomes greater, the effects of secondary attack may be more serious.

There are no records in Ceylon to indicate that *Oidium* disease causes a decrease in the yield of latex. It is possible, however, that the cumulative effects of consecutive attacks may result in a lowering of the vitality of the trees and a reduction in yield. This possibility should be borne in mind when considering treatment for the disease.

Diseases of the mildew type of other crops, for example, the grape-vine, have been controlled by spraying with Bordeaux Mixture or a similar fungicide. Spraying is a *preventive* measure and the essential for successful control of disease is that the sprayed surface should have a complete coating of fungicide in order that the parasite may be prevented from attacking and entering the plant tissues. It is obvious that in the case of primary attack of *Hevea* by *Oidium* such a condition can be fulfilled only by constant spraying, since the leaves at the time of attack are expanding and a superficial film of fungicide will remain complete only for a very short time. Satisfactory spraying for control of primary attacks with the present form of sprayers is therefore impracticable under Ceylon conditions. Once the leaves have reached their full-growth, however, a single spraying, if well applied, should be sufficient to control secondary attack. The secondary form of attack, however, is at the present time less serious in its effects than the attack on young expanding leaves.

Direct control, therefore, is hardly feasible in practice, and indirect treatment is indicated. It is a well-known agricultural principle that nitrogenous manures tend to increase the amount and better the condition of the foliage of plants, but there is no

record that rubber trees which are heavily manured with quick-acting nitrogenous manures are more immune or resistant to leaf disease than unmanured trees. There is little doubt, however, that such treatment results in a better cover of leaves *after* an attack of leaf disease. No experiments have been carried out to confirm this statement in regard to *Oidium* leaf disease but inspection of fields manured with nitrogenous manure and their comparison with similarly situated unmanured areas has demonstrated a marked improvement in the former.

From the above it may be concluded that since primary attack of *Oidium* leaf disease of *Hevea* is not directly and easily controllable under field conditions, indirect control should be attempted by cultivation and the application of quick-acting nitrogenous manures at or about wintering time. Badly affected trees may have to be rested. To control secondary attack spraying with Bordeaux Mixture at the time when leaves are just attaining maturity may be advised; in certain districts this spraying would serve the double purpose of controlling secondary attack of *Oidium* leaf disease and leaf and pod disease due to *Phytophthora Faberi*.

References.

1. Stoughton-Harris, R. H.—1st Quarterly Circular for 1925, Rubber Research Scheme (Ceylon), p. 8.
2. Gadd, C. H.—Year Book of Department of Agriculture for 1926, p. 22.