OIDIUM HEVEÆ

REPORT ON THE 1933 OUTBREAK OF HEVEA LEAF MILDEW

BY

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On February 8th a letter was circulated to the press for publication setting forth the symptoms of the disease and requesting that samples of leaves suspected of attack should be sent to the Institute for examination. As a result of the appearance of this letter in the Malayan Press an appreciable number of samples of diseased leaves have been received. It is interesting to note that no reports of the outbreak of Oidium were received prior to March 7th, although wintering was then well advanced and in many districts some 15—20 per cent. of trees had obtained their new leaves.

In the week, March 8—14th, six cases were reported from Negri Sembilan. From the 15th to 21st a further twenty six cases were reported from both Malacca and Negri Sembilan while from the 22nd to 28th a further twenty four cases were reported chiefly from these districts with a few in Johore, and isolated occurrences in Sitiawan and Province Wellesley.

Nine cases only were reported during the period March 29th to April 5th, since when no further cases have come to our notice indicating that the outbreak rapidly abated as from that date.

The total number of reports received therefore, despite the press notices, was only 65 as compared with 38 in 1932, and 61 in 1931, the latter being considered the most severe outbreak ever known in recent years. Whereas the reports in 1931 came from practically all parts of the western States, those of 1933 came chiefly from the coastal districts of Negri Sembilan and Malacca and certain parts of Johore, while the reports and observations in other parts of the country indicate that little or no damage was caused by Oidium this year as compared with 1931. This is thought to be due to the continuous wet weather experienced in those districts during the refoliation period.

From the information supplied by the managers of estates the following points stand out.

1. That during the very dry weather preceding March 7th a normal though severe wintering and refoliation was taking place, and that trees refoliating previous to that date were not attacked by the fungus.

2. That light rains falling in the early period of March in the Malacca and Negri Sembilan districts caused a rapid and almost epidemic spread of the disease.

3. That in most cases the lower shaded branches were most heavily attacked.

4. That the exceptionally heavy rains falling during March in central and northern Selangor, Perak, South Kedah and Pahang had prevented a similar attack in those districts, although a hot dry period of weather causing a similar severe wintering had been experienced in those districts.

5. That in the districts most affected viz. South Selangor, Negri Sembilan, Malacca and parts of Johore the outbreak this year was not so severe as it was two years ago, nor so extensive, while even in the worst districts many blocks of rubber are to be found bearing an excellent foliage, such areas usually lying on flat peaty lands or on sloping ground bearing a deep clay loam soil. Even on estates bearing a general heavy infection the disease has been serious only in patches, here and there; a few acres have suffered a heavy leaf fall, while in between are areas bearing quite good foliage. This fact will have a distinct influence on control of the disease when, for reasons of economy, selective dusting of the worst areas only need to be carried out.

6. That trees of all ages may be attacked, from the undergrowth of seedling rubber to trees of thirty years and over.

Older trees, however, suffer more severely than the younger. The observation that seedlings of a few months old may be attacked is new to Malaya. Previously it had been thought that rubber trees were not susceptible to Oidium attack before the age of three years had been attained. Leaf fall of such young trees had not been observed by the writer.

7. That the inflorescence is still the main seat of attack. Often a tree may appear to have perfectly healthy foliage while the flowers are badly diseased. This appears to be due to the natural hirsute condition of the flowers and flower stalks providing a suitably cool, damp, and protective environment for the fungus. Hence, even in Selangor, certain areas kept under observation have failed to produce a crop of seed although the foliage shows little or no signs of attack by the Oidium fungus. A recent count of seeding trees in an area of rubber in Selangor showed that only 4 per cent. of the trees bore fruit, and those bore only a very small quantity.

An analysis of the replies given to our published request for information regarding the disease shows that,

(a) the number of reports of the disease increases with the age of the trees, i.e. areas of old rubber suffered more than areas of young rubber.

(b) the number of reports of the disease decreases with increased intensity of the disease, i.e. many estates reported a light attack while very few reported heavy attacks.

(c) many more reports were obtained from estates having poor sandy soils than from estates having heavy clay soils. Fewer reports came from estates having peat soils, while loam soils fell between peat and heavy clay soils.

(d) few reports were received from very dry districts e.g. Province Wellesley and Kedah with 0.33 to 2.90 inches of rain in February and from very wet districts e.g. inland Perak, and Selangor with 8—13 inches, while the great majority of reports of the occurrence of the disease came from estates having between 3 and 6 inches of rain in February and between 3 and 6 inches in the first half of March.

The above analysis in graphical form together with a plan map of the distribution of the reported occurrences of the disease are attached and show that the disease has occurred chiefly in Malacca and Negri Sembilan with isolated cases in Johore, Sitiawan and Province Wellesley. Though only nine estates in Malacca Territory reported the occurrence of Oidium, actual observation indicated that practically the whole of that state was infected, and suffered a comparatively heavy fall of leaf.

This year's attack of *Oidium Heveae* ended about the first week in April since when no cases of further outbreaks have been received. The recovery towards the end of the month was remarkably good, owing most probably to the advent of regular fairly heavy rains. The new foliage is very good and is considered to be much better than in the previous few years. Seed is very scarce and has formed only on those trees which wintered and flowered before the attack.

The districts which have suffered most severely this year are roughly as follows:—

(a) Malacca Territory except the inland district around Batang Malaka, though Chabau nearby had quite an appreciable attack.

(b) Negri Sembilan, the districts of Linggi, Rantau, Rasah,—Port Dickson, Labu and Setul.

(c) Selangor—the estates along the valley of the S. Sepang in the district of Kuala Langat.

(d) Johore—mild attacks have been experienced in the districts of Segamat and Kluang.

In regard to the Dindings little can be said owing to lack of opportunity for visiting that district. Only two estates reported the disease this year whereas in previous years a number of estates in the Sitiawan district were known to have experienced mildew leaf fall.

It is well to note here that well over 25 per cent. of the leaf specimens sent in were diagnosed as being attacked not by Oidium but by insects, producing a malformed leaf at first somewhat similar to that caused by the mildew fungus. It was found that in such cases the damage was caused firstly by an Attid spider which weaves its web around the very young leaves. Leaves so bound together in triplets form between them an ideal damp chamber for the development of leaf spotting fungi of the *Helminthosporium* and *Gloeosporium* types. These fungi cause death of the leaf tips which later are torn apart by the wind thus resulting in the ragged appearance of the leaf. Leaves damaged in this way are usually malformed, the tips discoloured and badly torn, while even healthy parts of the leaves have been eaten away and are often badly spotted.

Other leaf eating insects also fond of the shelter provided by the bound leaves are responsible for further damage. A weevil *Phytoscaphus leporinus* Faust. of the family *Anculionidae* is the most common of the leaf eating insects found in such cases while the common mite, *Tarsonemus translucens* is also frequently observed within the sheltered leaf chamber.

This spider pest has been active particularly in young immature rubber, 1—6 years old, in the States of Selangor, Perak, South Kedah and South Johore and seems to prefer a rainy season, but is much less dependent on climatic conditions than is Oidium. The point is mentioned here to avoid confusion with the Oidium disease.

The Problem of Control

The question of control of the disease now arises. Liquid sprays, owing to the heavy costs of labour, haulage and power plant must be ruled out. Dusting of fungicidal powders has proved the most economical and feasible method of control.

The problem of the necessity for carrying out extensive treatment for control of Oidium is rather a thorny one. The following brief points are however put forward.

It should be noted that really heavy rains or complete lack of rain prevent an epidemic spread of the disease. The fungus appears to be so dependent upon young leaf tissue for its development that little benefit can be expected from dusting before the new young leaves begin to appear. Having efficiently dusted the

buds and young leaves, the sulphur may be expected to give a prophylactic effect for a period of about 7 to 10 days, provided that no heavy rain falls during that period. It is of little advantage to dust during wet weather for, not only is it difficult to get the sulphur powder on to the trees but, having done so, it will be washed off by the rain within a few hours, thus leaving the leaves unprotected until the next round of treatment.

Dusting should start only when the early attack of young leaves takes place. A severe wintering will most likely indicate a rapid and more uniform refoliation, in which case only a brief yet intense attack need be expected, and two or three rounds of dusting will probably give adequate control. A slow, desultory wintering indicates an indistinct season, showers instead of definite drought, and then is the time to expect a heavy attack of leaf disease for the following reasons (a) comparatively cool moist conditions obtain for growth of the fungus (b) slow wintering and slow refoliation giving time for spread and time for action upon the leaf (c) suitable young leaves are available over a long period to maintain a longer active life of the fungus.

In most plantations it is noticeable that the old rubber suffers most and, even in such areas, only patches of a few acres in extent may be affected sufficiently heavily to merit dusting, so that only selective dusting of the worst areas need be attempted, such areas being singled out for dusting by observation during the period of refoliation of the trees.

The adoption of correct methods of cultivation within rubber plantations so as to ensure the maintenance of vigour of the trees must necessarily be a first item of disease treatment.

Points brought to light by recent experiments on dusting indicate:—

(a) that more efficient control is obtained by dusting 5 lbs. of sulphur at intervals of 7 days only than by dusting 7 to 10 lbs. at intervals of 10 days. The 10 day interval proved too long for this year's sudden, brief and intense attack.

(b) early and late season dusting is of little if any advantage so that it is required to dust only during the refoliation period when the main mass of leaves are in the young stage.

(c) an economic area for treatment for one gang of labourers and one machine is about 2,000 acres per season, when treatment 5 times at the rate of 5 lbs. per acre at 1933 prices can be accomplished at a cost of a little over $2.00 per acre including share of costs of machine and European supervision.

Apart from these facts it is reasonable to ask what benefits one might hope to derive from this expensive treatment. In regard to yield of rubber per acre, it is not yet possible to state

that a definite increase in yield can be expected following dusting. It can only be stated that yields do improve slightly as a result directly of dusting. A second direct benefit is the assurance of improved foliage and absence of leaf fall thus avoiding unnecessary drain on the living resources of the tree. From results of experimental dusting in Malaya it can be said that improved foliage, improved bark and slightly improved yields may be expected, while benefits from additional shade to soil, improved soil flora, protection of bark from direct sun, all tend to improve conditions of growth for the trees. The estimation of the value of these factors is however very difficult and requires further prolonged investigation.

However necessary dusting may be from a pathological point of view it is not yet decided whether or not the operation is economically sound at present commodity prices. In many parts of Malaya conditions are suitable to rapid growth of trees throughout the year so that they are able themselves to overcome, and almost completely recover from the disease. In certain parts however e.g. the districts of Negri Sembilan and Malacca mentioned above, where conditions of soil and climate are so favourable, it is well worth while considering dusting on a limited scale. Large estates could derive benefits from one machine, and smaller estates might combine and utilise one machine jointly, in each case selectively dusting the worst affected areas. If the required benefits are derived from this limited treatment it can in future years be extended as required or as further funds become available.

While strongly recommending such experimental dusting in Malacca and Negri Sembilan, and possibly the districts of Segamat and Sitiawan, this year's records indicate that the disease is waning and treatment will be unnecessary on estates in Selangor, Perak, Kedah, Province Wellesley, Pahang and Kelantan.

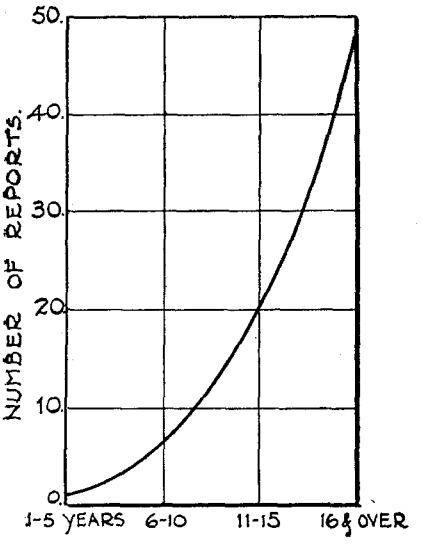
All seed gardens and budwood multiplication nurseries should be dusted with sulphur as a routine practice, so as to maintain continual protection of such valuable material not only from Oidium but from many other fungi and pests capable of causing damage to the rubber leaf, buds or flowers.

In conclusion I would like to thank all those managers of estates who sent in samples of leaves, accompanied by the various items of information for which we asked and which have proved of great value. It is a pleasure to record the tremendous amount of interest taken in this subject by the planting community and the great help that we have received from them during the investigations.

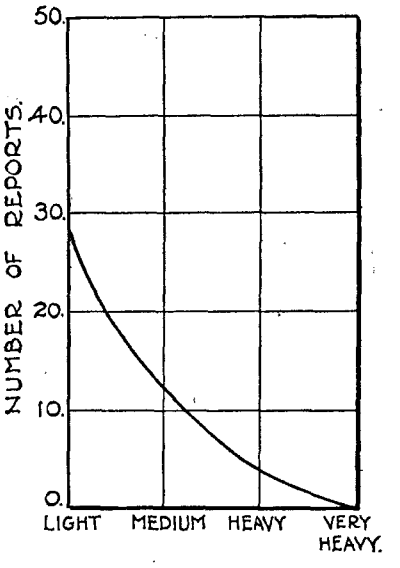
OIDIUM HEVEAE

GRAPHICAL ANALYSIS OF REPORTS RECEIVED 1933.

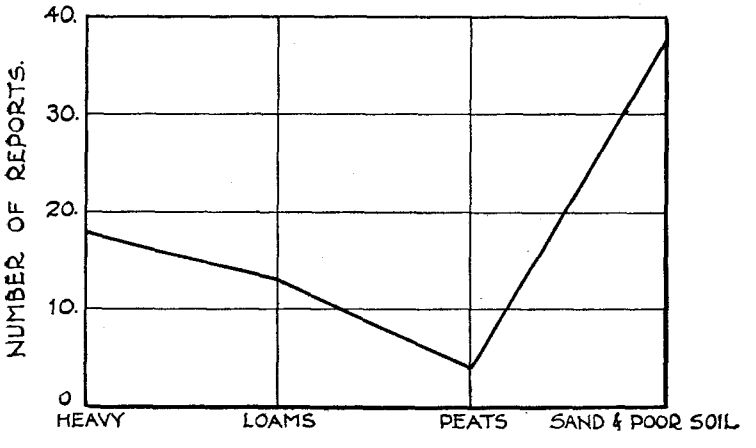
AGE



DEGREE OF INFECTION



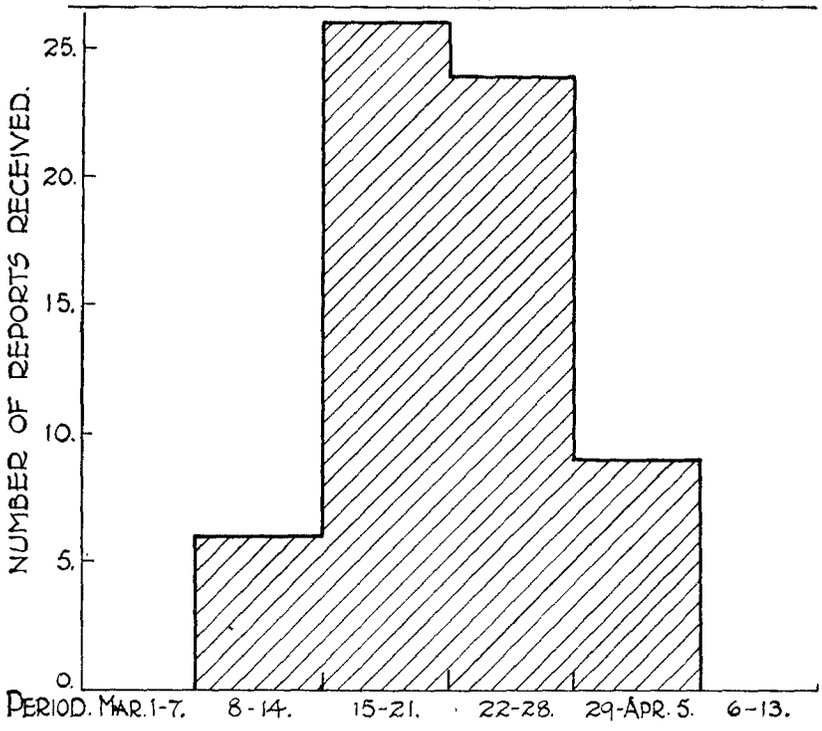
SOILS



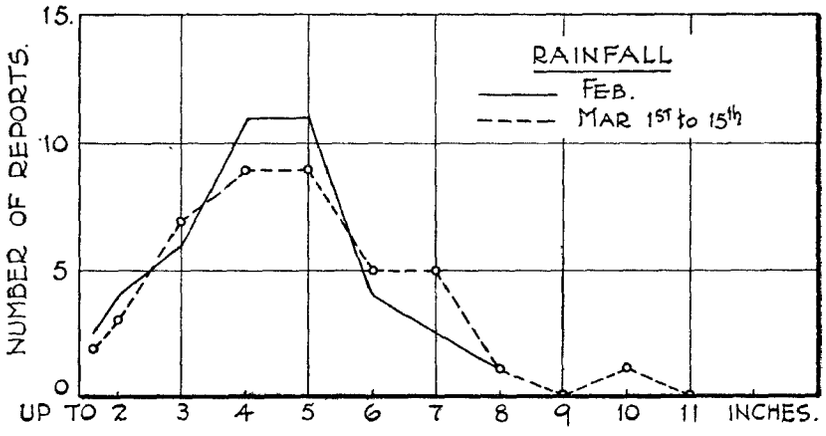
OIDIUM HEVEAE.

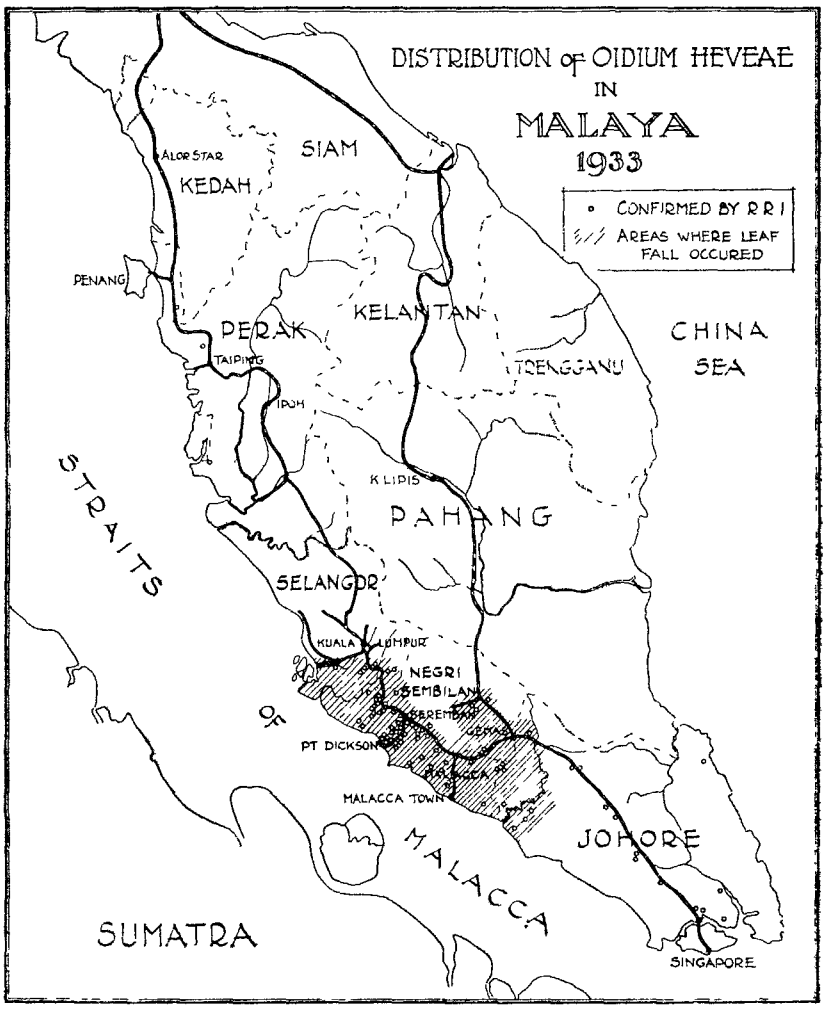
1933

NUMBER OF REPORTS RECEIVED PER WEEK PERIOD.



NUMBER OF REPORTS OF OIDIUM HEVEAE COMPARED WITH REPORTED RAINFALL.




DISTRIBUTION of OIDIUM HEVEAE
IN
MALAYA
1933
CONFIRMED BY R R I
AREAS WHERE LEAF FALL OCCURED
SIAM
ALOR STAR
KEDAH
PENANG
PERAK
KELANTAN
TRENGGANU
CHINA SEA
TAIPING
IPOH
K LIPIS
PAHANG
STRAITS
SELANGOR
KUALA LUMPUR
NEGRI SEMBILAN
PT DICKSON
MALACCA TOWN
JOHORE
MALACCA
SUMATRA
SINGAPORE