IMPORTATION OF RUBBER BUDWOOD AND BUDDED STUMPS

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PREVIOUS CONSIDERATION OF THE PROBLEM

THE question of the danger of importing fungus diseases with rubber budwood and budded stumps arose in 1929 in connection with a disease of young bud-shoots. The fungus causing this disease was found to be a particularly virulent strain of *Phytophthora palmivora* (*P. Faberi*) which had not previously been reported in Ceylon. The first specimens of this disease were received simultaneously from two estates, the infection having developed in each case on the same Java clone. When it was ascertained that the material on both these estates came from the same consignment of budwood, and that the disease and the particular strain of *Phytophthora* were known in Java, there was strong reason to suspect that the fungus had come to Ceylon on imported material.

The matter was brought to the attention of the Technical Committee of the Rubber Research Scheme and, at a meeting held in October 1929, it was resolved that experiments should be undertaken to discover an effective and harmless means of disinfecting imported budwood and budded stumps. Attention was drawn to the fact that harmful fungi might be carried in a dormant state on budwood which was itself quite healthy, and that the most careful inspection would not reveal such an external "infection".

In this connection it is of interest to quote Resolution No. 5 of the Second Imperial Mycological Conference held in September 1929. "The Conference suggests that the attention of the Governments of Malaya and Ceylon should be drawn to the desirability of investigating the possibility of treating budwood of rubber against diseases before import".

EXPERIMENTS IN CEYLON AND MALAYA

Experiments were started in Ceylon towards the end of 1929 with a view to finding an effective and practicable means of disinfecting budwood, but unfortunately pressure of other

work has prevented these experiments being carried to a conclusion. For a full summary of this work reference may be made to a memorandum issued in July 1930, which constitutes an interim report of the work carried out up to that date, and sets forth some of the practical considerations in connection with the application of any disinfectant treatment.

Briefly stated, the most satisfactory results were obtained by dipping the budwood for 5 minutes in weak solutions of copper sulphate, this treatment being apparently both effective in killing fungal spores, and harmless to the budwood. More recent work, however has shown that clones vary greatly in their susceptibility to damage by immersion in copper sulphate, and it is now clear that this fungicide could not be used as a general budwood disinfectant, at any rate at the concentrations previously tested. It was at this inconclusive stage that the investigations had to be abandoned owing to the prior claim of other duties.

The matter of disinfecting budwood has also received the attention of the Rubber Research Institute of Malaya, and a report entitled "The Effects of Certain Fungicides on the Viability of *Hevea* Buds" was recently published in the Quarterly Journal of that Institute. The report shows that certain chemicals can safely be used for disinfecting budwood. The investigations, however, were admittedly incomplete, and the Rubber Research Institute of Malaya is not yet in a position to recommend a treatment which will be effective, harmless to all clones, and easy and cheap in practical application.

PRESENT REGULATIONS

The present regulations governing the import of *Hevea* material into Ceylon prohibit absolutely the introduction of any seeds or plants from the Western Hemisphere. In order to import material from the Eastern Hemisphere a permit in writing must be obtained from the Director of Agriculture, Ceylon, and the material must be accompanied by a certificate of freedom from pests and diseases issued by the exporting country. The Inspector, Plant Fumigatorium, Colombo, may unpack and inspect any consignment, but in the case of budwood this inspection is usually waived in order that the budwood may reach the estate with the minimum delay.

The regulations ensure that no actually diseased budwood or budded stumps shall be introduced, since the material has to be carefully inspected in the country of export. They do not, however, prevent the entry of harmful fungi which may be in a dormant state on the surface of the budwood or even in the packing material, since the most careful inspection would not

reveal the presence of resting spores or mycelium. We may enquire, then, to what extent the possibility of introducing new disease agents with imported budwood is a real danger.

DANGER OF INTRODUCING NEW DISEASES

The possibility of fungi new to Ceylon being introduced with imported budwood is exemplified by the case of the strain *Phytophthora palmivora* referred to above, though its entry in this manner cannot be more than strongly suspected. The disease caused by this fungus has unfortunately caused considerable damage in budwood nurseries during the recent S. W. Monsoon, though it yields fairly readily to control measures. Owing to its wide-spread occurrence in Ceylon at the present time this disease, however, can clearly have no bearing on restriction of future importations. It is also uncertain whether the strain of *Phytophthora* in question has been responsible for all the cases reported. The indigenous strain of *Phytophthora palmivora*, although somewhat less virulent in this country than the imported strain, is also capable of causing a die-back of green shoots under favourable conditions.

The absolute inhibition of all *Hevea* imports from the Western Hemisphere is on account of a dangerous disease known as South American Leaf Disease whose causal fungus, *Melanopsammopsis ulei*, is fortunately confined to South America. Most of the diseases which occur in the other rubber-producing countries in the Eastern Hemisphere are known also in Ceylon, though they are not of equal importance in all countries. So far as is known the only diseases of consequence which occur further East but not in Ceylon are two in number:

1. Mouldy Rot of the tapped surface caused by *Sphaeronema fibriatum*, known in Malaya and the Dutch East Indies.

2. Wet Root Rot caused by *Fomes pseudoferreus*, which occurs only in Malaya.

The introduction of these two fungi on imported budwood is possible though it cannot be considered very probable. *Fomes pseudoferreus* might occur on the roots of budded stumps but would be unlikely to pass the inspection in the country of export. (In this connection it is of interest to record that the introduction into Indo-China of budded stumps infected with certain root disease has been reported).

The possibility must also be borne in mind of a fungus, which is a weak parasite in its native country, becoming strongly parasitic and possibly dangerous under the different ecological conditions of the country to which it is introduced. Thus the fungus causing a certain disease in, say, Java may be a different

biological strain to that causing similar symptoms in Ceylon. The former, on introduction from Java to Ceylon, might become more virulent than either its counterpart native to Ceylon or itself in Java.

It is thus clear that with the present system of almost unrestricted imports the danger of the introduction of new diseases must always be present. In the last section of this report the possible methods of safeguarding the rubber areas in Ceylon against new diseases are briefly considered.

PROTECTIVE METHODS

There appear to be two means by which the entry into Ceylon of disease organisms could be prevented more surely than under existing regulations:

(1) Absolute inhibition of the importation of *Hevea* budwood, budded stumps and seed.

(2) Disinfection of all imported material.

(1) INHIBITION OF IMPORTS

Inhibition of the importation of all *Hevea* material would be a very drastic measure, clearly attended by many objections. It is only necessary to state that such a measure would preclude Ceylon growers from obtaining any of the improved planting material which will become available in Malaya and the Dutch East Indies during the next few years. It is certain that better foreign clones than those at present known will come on the market during the next few years and, until proved Ceylon material is available, budwood or budded stumps from these clones will be required for new plantings and rejuvenation. It is submitted that such a drastic action could only be recommended to Government if there was a likelihood of any disease being introduced which would be a real menace to the plantation industry. At the present time there appears to be no cause for apprehension on this account.

(2) DISINFECTION

The consideration of recommending legislation to enforce the disinfection of budwood and budded stumps before import must await results of further investigation into disinfecting methods. At the present moment no work is being conducted along these lines in Ceylon owing to shortage of staff, but it is understood that the subject is receiving the attention of the Rubber Research Institute of Malaya. In this matter it may be found desirable to follow the lead of the latter country.

It is unnecessary in this report to deal with the practical problems in connection with any disinfectant treatment. Whether the disinfecting is carried out in the country of export or

import such difficulties are not likely to prove insuperable. When a suitable treatment is found it is possible that all countries which are exporting or importing *Hevea* material may introduce regulations for disinfection. In the meantime there appears to be no special cause for fearing the introduction into Ceylon of new diseases, and, at the present juncture, any restriction placed on the import of high yielding material is to be deprecated.

SUMMARY

1. This report has been written on the instructions of the Board of Management of the Rubber Research Scheme, arising from a suggestion that the importation of *Hevea* budwood and budded stumps should be prohibited in order to prevent the introduction into Ceylon of new diseases.

2. This matter received previous consideration in 1929 as the result of the suspected introduction from Java of a virulent strain of *Phytophthora palmivora*. This fungus has since caused considerable damage to young shoots in budwood nurseries.

3. Experiments have been carried out in Ceylon and Malaya with a view to finding a method of disinfecting budwood which is cheap, easy, effective and harmless. This work has not yet reached a stage at which any definite recommendations can be made.

4. The existing regulations governing the importation of *Hevea* material constitute an adequate safeguard against the entry into Ceylon of any material on which disease has developed, but they do not ensure the exclusion of harmful organisms in a dormant state.

5. Although it is suspected that the die-back of bud-shoots caused by *Phytophthora palmivora* originated from imported budwood, this disease is now so wide-spread in Ceylon that it cannot be regarded as having any bearing on future importations.

6. There is always the possibility of new disease organisms being introduced with imported material, but there is at present no cause for special apprehension on this account.

7. There are two alternative methods of further safeguarding the Ceylon rubber industry against the introduction from other countries of new diseases.

(1) Absolute prohibition of the importation of all plants or parts of plants of *Hevea*. It is submitted that such a drastic measure could only be justified by the existence in any exporting country of a disease which, if introduced to Ceylon, would constitute a serious menace to the health of the plantations.

(2) Disinfection of all imported *Hevea* material. When a suitable disinfecting treatment is discovered such a measure may prove a desirable and practicable addition to the present regulations.

8. It is submitted that any unnecessary restriction placed on the entry into Ceylon of high yielding material is, at the present time, highly undesirable.