THE ECONOMICS OF *PORIA* ERADICATION

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This morning I am going to flog the old horse again, and I hope it is not going turn out to be a dead horse. You will remember at our last Conference held at Colombo about three years ago, I spoke to you on certain developments in the chemical control of *Poria* Root Disease. Today, it is my intention to revert to the same subject in order to tell you more about it. As the theme of this Conference is economy, I shall attempt, wherever possible, to suggest methods by which losses caused by *Poria* and other root diseases can be minimized.

There are possibly several reasons for the present widespread occurrence of *Poria* in several up-country estates. One of them is in my opinion the pragmatic approach adopted by the early planters in the treatment of this disease. As transmission is slow and deaths are extended over long periods, the insidious nature of the disease is often not realized until after it has become well established in the plantation. Further, because the benefits of control are not immediate and obvious, there is a general tendency to neglect the treatment of root diseases. Another possible contributory factor might have been the lack of a facile and effective method for eradicating the disease. In fact, it must be admitted that the methods adopted in the past for *Poria* eradication, in particular, have not been markedly successful.

Today, thanks to methyl bromide, we have a method for eradicating *Poria* which is not only effective but also relatively cheap. Yet it is most disheartening to note that some estates are not making any effort at all to get rid of the *Poria* on their estates, and many others are making only half-hearted attempts, despite the fact that a good portion of the estate has already been rendered bare by the disease.

In considering economy, two things come to my mind straightaway--both cases of false economy. On a number of estates it is still not uncommon to resupply *Poria* patches without having carried out any type of cleaning out. This is without doubt a complete waste of effort and money, because the old *Poria* patch continues to enlarge, killing in its wake a number of bushes, and after a few years the newly supplied tea also contracts the disease and succumbs to it (Figure 1). It is, therefore, inadvisable to resupply *Poria* patches when the fungus is still active.

Failure to remove all infected bushes during *Poria* cleaning is another instance of false economy. It is certainly most unwise to treat only the centre of the patch while leaving behind infected bushes on the perimeter, as the disease can continue to advance not only outwards but also inwards and attack the new tea planted on the treated area (Figure 2). I wish to emphasize and repeat here that during *Poria* cleaning it is imperative that the uprooting of bushes be continued until a ring of perfectly healthy bushes has been taken out from the perimeter. It is only then that you can be sure that all infected bushes have been uprooted. It may be argued that this may result in an unnecessary removal of a few healthy bushes ; it probably will, but an apparent sacrifice of a few healthy bushes now will definitely prove economical eventually.

In this connexion, I would advise estates where *Poria* is a serious problem to have a permanent *Poria* control gang consisting of well-trained men who can identify the disease easily. With such a gang and close supervision, the number of healthy bushes that have to be removed from a patch can be reduced appreciably.

After the patch has been cleaned out, the rest of the operations is fairly simple. The application of methyl bromide itself is a straightforward operation and one can hardly make any mistakes. Nevertheless, there are a few practical points which may be mentioned here with advantage. Please remember it is not possible to reduce the recommended dosage of methyl bromide any further. Any attempt to economize on the chemical is likely to result in unsatisfactory control. Further, because the diffusion of fumigant outside the treated area is almost negligible, it is necessary to have the plots as contiguous as possible. The polythene sheet should be checked for holes or splits, especially at the seams, and if necessary repaired before the fumigant is applied. Similarly, the plastic tubing of the jiffy applicator should also be checked. The polythene sheet should be lifted well above the ground to create space for the even distribution of gas. If these points are not attended to, you may not only waste fumigant, but the control is also likely to suffer.

The best control of *Poria* is to prevent the introduction of the fungus into your fields. Initial outbreaks of root diseases in young plantations were probably the result of leaving behind infected roots in the soil after clearing the jungle. But fresh outbreaks in old plantations are due to the accidental dispersal of infected material within the plantation, or due to the infection of the stumps of felled shade trees. The dispersal of infected material within your plantations can be prevented only by rigorous supervision during up-rooting for root disease control or for replanting. Infections arising from shade tree stumps can be greatly minimized if shade trees are ringbarked correctly before felling. Ringbarking shade trees has been found to be sound in both theory and practice and there is no satisfactory alternative to it at present. For ringbarking to be fully effective, a ring of bark about 18 in in length should be removed carefully without cutting into the outer sapwood and the trees then left alone to die. As depletion of reserves in the roots is a slow process, a *Grevillea* tree with a girth of about 30 in may take anything from 18 to 24 months to die. Trees should be felled only after they have defoliated either completely or nearly so. The practice of pollarding ringbarked shade trees is in my opinion wrong, because the removal of the top may lower the natural resistance of the roots to infection by parasitic fungi and thus facilitate infection. Ring-barked trees should also be examined periodically and any regenerating bark on the ring removed to avoid recovery of the tree.

The incidence of root disease can also be reduced appreciably if dead bushes are removed promptly with their roots and destroyed irrespective of cause. If dead bushes are left on the field they can get infected by root disease fungi and then become a source of infection for the neighbourng healthy tea. It must be borne in mind that root disease fungi can attack dead roots more readily than they can attack living roots.

On estates where a large area has already been devastated by the disease, the problem must be tackled from an economic standpoint. In such cases, it would be foolish if one attempted to clean the whole estate at once. I would advise such estates to draw up a programme for dealing with the problem, and have a set target for each year according to the availability of finance. I have been often asked on estates where one should begin, when the position is rather serious. I have given considerable thought to this question and I have arrived at the following order of precedence for eradication of *Poria* on badly affected estates :

1 — Fields that are due for uprooting for replanting should be taken first. The *Poria* patches should be first cleaned and treated with methyl bromide before the remaining tea is uprooted. This is important because if the entire tea is uprooted regardless of the *Poria* patches, it would be difficult to locate these patches later. Further, if this is not done, *Poria* is certain to break out in the new clearing.

2 — The *Poria* in new clearings, if any, should then be taken. Although these patches may be small, one would not like the disease to spread in new high-yielding clonal tea. Moreover, *Poria* eradication in new clearings is less difficult than in old tea.

FIGURE 1 — *Dead supplies in a* Poria *patch which has been planted without control measures against the fungus*

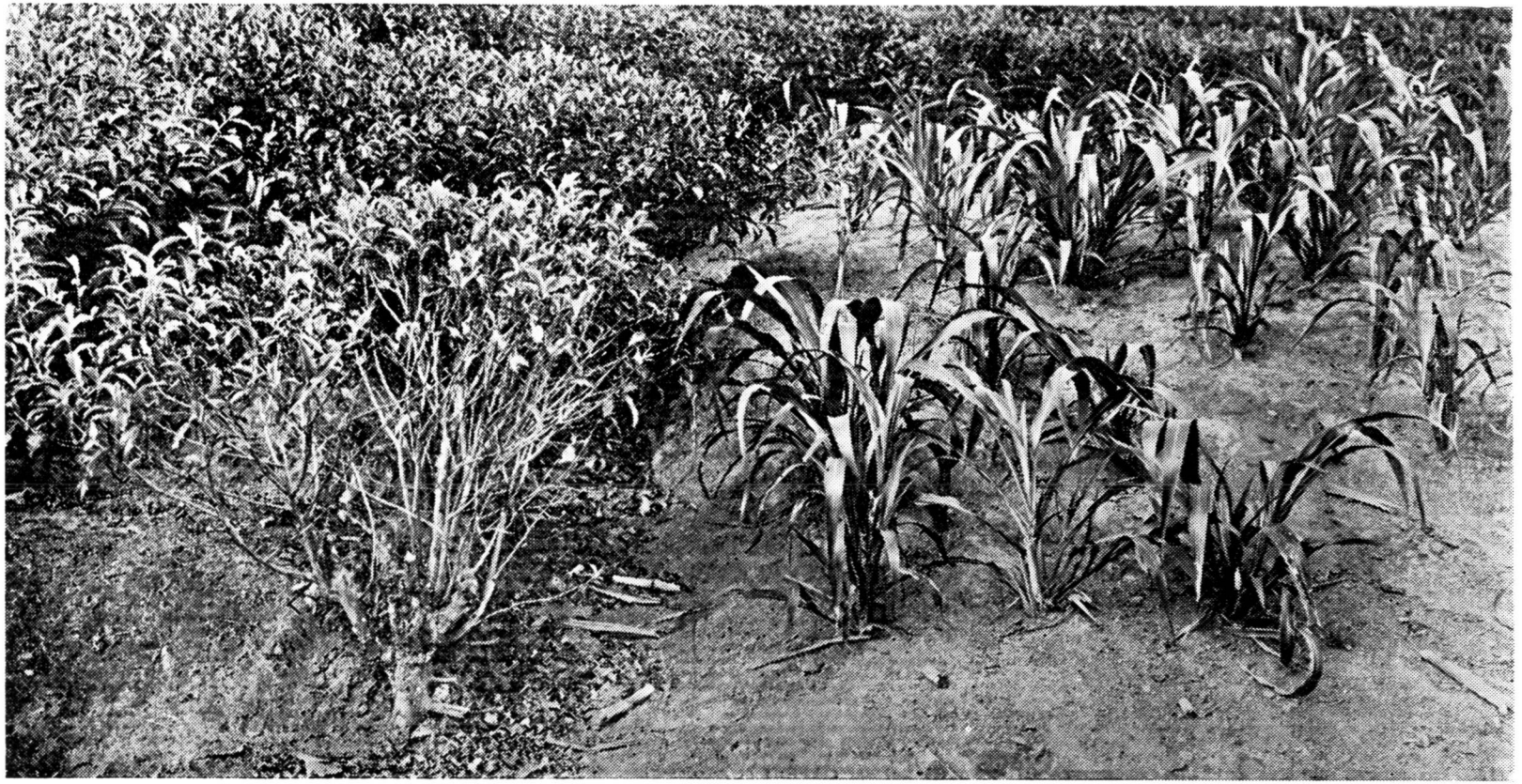

FIGURE 2 — *An improperly cleaned* Poria *patch, where the fungus kills bushes outside the patch, and will later kill supplies within the treated area*

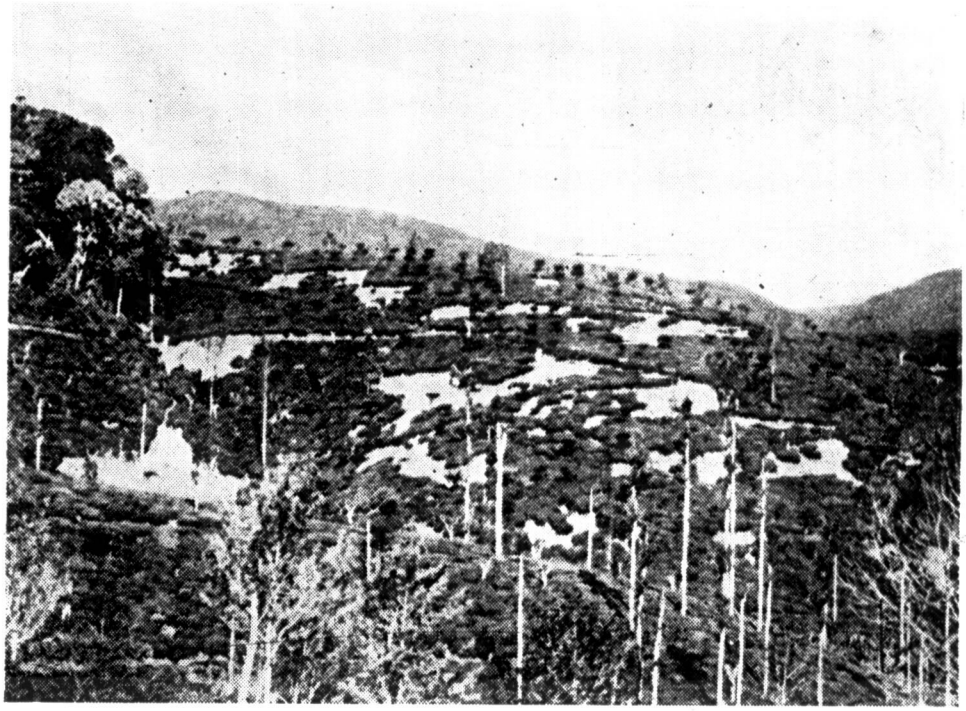

FIGURE 3 — *A very badly affected field with several areas of tea destroyed by* Poria

3 — The mature fields should be taken next. Here common sense would indicate that high-yielding fields should be given priority over poorer fields. If there are several large patches in these fields, they should be taken first, because the rate of loss of plants is greater in larger patches than in smaller ones. This is clearly illustrated in Table 1 in which the rate of spread of *Poria* has been calculated on the following assumptions :

(*a*) The fungus spreads uniformly all round from an infected bush at the rate of 27.8 in per year (based on laboratory studies).

(*b*) The interval between infection and death is three years, and

(*c*) Planting is at a spacing of 3½ ft by 3 ft.

You will note from Table 1 that in one year only eight bushes will be lost from a five-year-old patch, whereas from a ten-year-old patch the number lost will be 24. It is also evident that if a five-year-old patch is left untreated, 18 bushes will become infected in the following year, while the corresponding figure for a ten-year-old patch is 33.

TABLE 1 — *Rate of spread of* Poria *in tea*

Time (*Years*)	Number of Bushes	
	Infected	*Dead*
5	40	6
6	58	14
10	161	79
11	194	103
15	361	231
16	411	272

4 — I will take for treatment last those areas where the fungus had become so well established that the entire field or a good portion of it needs treatment. Such areas could be left alone until replanting is envisaged, when one could profitably make use of the subsidy available for replanting.

In conclusion, I would like to tell you that *Poria* is not an intractable disease ; in other words, it is a disease that can be easily dealt with provided you follow our recommendations rigidly. It may be true that we are going through a period of restriction, but I still cannot understand how one could put off by even a few years an important operation like *Poria* eradication, as this would certainly be uneconomical in the long run. On several estates in the up-country, *Poria* is today a major limiting factor in crop production. For example, if an estate of 500 acres had an average yield of 1000 pounds per acre per year and 25 acres of *Poria*, the total loss in crop would be in the region of 26,000 pounds per year. Here, even if you spent Rs 50,000 to clean this *Poria*, the money can be easily recovered in a few years.

Good estate management involves two things : (*a*) permanent maintenance of your capital, and (*b*) maintenance of this capital as a source of revenue. There is little doubt that if you neglect your *Poria*, you will achieve neither. I, therefore, urge you strongly to adopt the latest measures recommended by this Institute and get rid of all the *Poria* in your tea fields.