*THE WEED PROBLEM ON TEA ESTATES

By

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At the outset I should like to say that when your Chairman invited me to talk to you today, he was very insistent that the subject should be that of weeds. No doubt this is a subject of considerable interest to most of you but it is also one, I must confess, about which we have little definite information to offer. Accordingly, I do not propose to give you any formal talk but rather to touch on such aspects of the weed problem as may provide food for thought and subsequent discussion.

Firstly, I think there is little room for doubt that the problem of weeds has been coming increasingly to the fore in many up-country districts in the past few years. As I have felt and said before, this increase in weed incidence is to my mind entirely the result of a decrease in the vigour of our bushes and is in no way concerned with the virulence of the weeds themselves. Hard pruning in the past, coupled with blister blight over the last five years has undoubtedly, reduced the size of many of our up-country bushes and thereby allowed more exposed soil to be available for the growth of weeds. With an increasing area of our fields covered by weeds the competition has naturally increased and has again reacted on the vigour of our bushes. If not stopped in time, this situation has obviously the makings of a vicious circle. However, I am glad to say that the outlook for the future is nothing like so gloomy as my previous remarks may have led you to suppose. We have now, I feel fairly confident in saying, got the ravages of blister blight well in check by the crop protection measures which have been introduced by the Tea Research Institute. Furthermore, the adoption of the much lighter style of pruning which we have been

* *Lecture delivered to Dickoya District Planters' Association on 30-7-51.*

recommending for some years past, is now beginning to show results in improved spread of our bushes. Provided, therefore, that this lighter pruning is persisted with and the bushes are efficiently protected from blister blight during their recovery period, I see no reason why we should not soon develop a fairly good cover of tea over most of our fields. Once a satisfactory cover has been restored, then, I feel certain, the problem of weeds will be reduced to almost negligible proportions.

However, even though an improved cover of tea does successfully crowd out weeds during the succeeding years of the cycle, it may well be expected that weeds will constitute a considerable problem during the first year of the cycle for many years to come. Owing to the heavy weed growth that has been developing in the past, there are undoubtedly millions and millions of weed seeds still viable in the soil. Given suitable conditions to germinate, such as those following pruning, these may be expected to come up in very large numbers. Obviously, therefore, it is important that efficient weed control measures should be carried out during the first year of the cycle so that the weeds are prevented from seeding and perpetuating the problem. Once the numbers of weed seeds in the soil are reduced to a comparatively low level, then I see no reason to expect that, provided they are efficiently controlled, weeds should constitute a problem at any stage in the cycle. Fortunately, there is a very simple solution to this particular aspect of our weed problem and this is to thatch immediately after pruning. Thatching will not only keep our weeds in check but it will also serve the equally valuable purpose of protecting our otherwise bare soil from the evil effects of heavy rain and insolation.

In the meantime, how are we going to deal with our existing weeds ? At the present time, there is, I am a afraid, still no easy solution to this problem and we must, therefore, still continue to deal with our weeds in the hard way. None of the weed killers of which we have completed tests to-date can be safely recommended for use in mature tea. However, we are at present experimenting with a new weed killer known as sodium trichloracetate, which is alleged to be reasonably selective for monocotyledonous plants such as grasses. If these claims are borne out in practice, then there is some possibility that this could be used for the destruction of grasses and other monocotyledonous weeds in standing tea. At the moment, owing to prevailing weather conditions, it has not been possible to carry out extensive tests with this substance and all I can tell you at the present is that it does at least appear to be very effective against mosses and ferns. This problem of dealing with weeds is likely to be still more complicated in the near future since, under the new Soil Conservation Act, Parliament has empowered the Director of Agriculture to make regulations prohibiting clean weeding in scheduled areas.

In any satisfactory system of weed management, there are two factors which must be taken into account. These are :-

(i.) The weeds themselves absorb a considerable amount of plant food which should on no account be removed from our tea fields and

(ii.) No weeds should be returned to the field unless all viable seeds have been destroyed or else disposed of in such a way that they are subsequently unable to germinate.

In practice, there would appear to be only two satisfactory ways of meeting the above requirements :—

(i.) By collecting the weeds and composting them off the fields. This is a process which has to be done carefully if all the weed seeds are to be destroyed and any nutrient loss avoided. Composting must be done under cover to avoid loss of valuable nutrients such as potash, due to leaching by rain, and care must also be taken to see that the weed piles heat up efficiently and the process of decomposition really gets going. This can probably be assisted by the use of a little extra sulphate of ammonia between the layers. Once it has been properly made

compost is, of course, completely safe and can be put in, in the normal way, behind the fork. However, I would like to emphasise at, this point, that composting is only recommended in the case of weeds in order to kill all weed seeds, since, however well done, there is a very large loss of organic matter during the composting process which is thus extremely wasteful.

(ii.) The second method of disposal of weed is, of course, to bury them green in pits in the fields. This again has to be done with care since the weeds must be buried at a sufficient depth so as not to be disturbed by subsequent cultivation operations and brought up to the surface when viable seeds will, of course, germinate. Accordingly, it would seem advisable that the topmost layer of weeds in a pit should be at least 18" below the surface. This method again has considerable disadvantages, since weeds buried at this depth are unlikely to become directly available in the form of plant food to the tea bushes themselves. However, we have at least carried out the ideal agricultural practice of returning all our organic matter to the soil and it may be supposed that we shall get some future benefit through the medium of shade trees or bush green manure growth.

Another method of dealing with the weed problem is, of course, selective weeding. Many of you have probably tried it and I shall be very glad to hear either in the discussion which may follow this talk or if you would write in to us at St. Coombs, what results any of you have obtained. Our own experience with selective weeding on St. Coombs is extremely disappointing. Some years ago the policy of leaving *Polygonum nepalense* on a number of fields was adopted. This policy has now had to be abandoned, within about the last year or so, owing to the enormous spread of the Polygonum, which started climbing up into the tea bushes and altogether got completely out of hand. As a result it is now being ruthlessly exterminated. This weed is one which seeds very freely and, when left without competition from other weeds, the number of seeds produced increased so enormously that it proved quite impossible to control the plants by slashing or any other form of treatment. So far, therefore, our attempts to adopt the selective weeding policy have proved a failure. This, however, does not necessarily mean that all selective weeding policies will be failures, since I feel fairly certain that the success or otherwise of selective weeding does depend to a great extent on the plant chosen to be left. *Polygonum nepalense* obviously is not a suitable plant under the conditions prevailing on St. Coombs.

Now a few words about the nutrient requirement and manurial responses given by weeds. The actual composition of a crop of weeds is, of course, very variable but average figures obtained by Dr. Eden (1) indicate that the proportion of potash is extremely high ; thus analysis of a 3½ months old crop of weeds on St. Coombs gave the following figures :—

Nitrogen	—	1.89%	
Phosphoric Acid	—	0.85%	and
Potash	—	3.46%	

There would thus appear to be approximately twice as much potash as nitrogen removed by a crop of weeds. This is rather serious at the present time considering the somewhat poor potash status of most of our fields. In particular, therefore, I would again like to emphasise the importance of protecting compost heaps from the action of weather, since if exposed to rain, almost all the potash in the weed crop will be leached out and lost.

Despite, however, their very high potash content, weed growth appears to respond primarily to phosphoric acid manuring rather than to that of potash or nitrogen. This response to phosphoric acid is extremely marked and on all the T.R.I. manurial experiments, when growth is in evidence, it is easy to pick out the different phosphoric acid treatments purely by visual differences in weed growth. Accordingly, if anybody wants to increase the amount of weeds on their estate all they need do is step up their phosphoric acid manuring. Unfortunately, I am

afraid, I cannot tell you what to do in order to reduce the weed growth. An interresting example of the effects of phosphoric acid manuring is given by our Passara Manurial Experiment, where increased doses of phosphoric acid have failed to give any increased yields of tea and have in fact produced rather less owing to the enormous increase in weed growth which has occured. There is thus considerable evidence that excessive weed growth does have a marked competitive effect on the tea bush. This Passara Manurial Experiment is also interesting in showing an interaction between phosphate and potash in regard to weed growth. With increased phosphate manuring an equivalent increase in potash increases the amount of weed growth fivefold. With excess phosphate applications, therefore, there would appear to be considerable danger of a great deal of our potash manuring merely going to increase weed growth.

Finally, as you know, we are all very concerned at the amount of deterioration which would appear to take place when bare soil is left exposed for considerable periods. Looking at things from the long term point of view, it is possible to argue that the existence of a crop of weeds on what would otherwise be bare soil may be rather more beneficial than otherwise. However, I think it is quite impossible that we can expect good yields of tea under these conditions and it therefore raises the problem as to whether we sould aim at crop now or whether we should preserve our soil for future development. Thatching after pruning will help us considerably but I have serious doubts as to whether many estates will be able to produce enough thatching material to cover their pruned fields, let alone their older fields. Accordingly, I must once again remind you of the old adage that ' the best cover for tea is tea ' and urge you once more to do all you can to increase the spread of your bushes and so crowd out your weeds, whilst at the same time protecting your soil from erosion and deterioration.

Reference

(1.) Eden, T.—Monographs on Tea Production in Ceylon, No. 1,p.39, 1949.