CROP PROTECTION BY WET SPRAYING COMPARED WITH CROP PROTECTION BY DUSTING IN 1951

By

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At the Tea Research Institute Conference held in 1950 I read a paper [1] with a similar title. This article is a continuation of that paper and embodies opinions based on further experience gained during 1951.

Weather

1951 was undoubtedly a year of good growth conditions. Although it was certainly favourable to the growth of the tea bush, it was not wholly favourable to the growth of the organism causing blister blight disease. These observations apply particularly to the south west monsoon zone but are equally applicable to the greater part of the tea growing areas of Ceylon.

Blister Blight Attack

I have already stated that the year was not wholly favourable to blister blight disease. Even if spray protection had not been given, blister blight attack would most probably not have been so severe as it has been in previous years. However, spray protection was given over a very large area. At a rough estimate, based on the imports of fungicide and equipment, as well as on more direct information and observations, something approaching 200,000 acres received some degree of protection.

Conditions for spraying and dusting were good, and where crop protection methods were applied, success was easily achieved.

Since the suppression of each blister prevents the production of several million spores effective prophylactic treatment may be expected to have a very marked effect on an epidemic. Just as an epidemic attack builds up in geometric progression so the effect of control measures may be expected to have a very rapid effect on the general incidence of the disease. Large scale spraying and dusting may well, therefore, have had a profound effect on the general incidence of the disease in 1951, and since conditions were on the whole favourable for the retention of fungicides on sprayed or dusted leaf, it is uncertain just how severe attacks might have been if there had been no attempt at protection. When protective measures are employed over large areas, control (unprotected) plots are to some degree less liable to infection and thus less reliable as indications of the success of prophylactic treatment.

Assessment of the success of attempts at large scale crop protection during 1951 is, therefore, difficult. We must await a south west monsoon bringing with it a long period of damp dull weather before anything approaching a final verdict is possible.

Wet Spraying

The recommendations already published by the Tea Research Institute have proved to be adaptable to normal estate routine. We still recommend the use of four ounces of 50% copper fungicides dispersed in 10 gallons of water to be applied

with pressure retaining knapsack type equipment. The rate of application is variable but should average 12-15 gallons per acre. Spraying rounds should not be longer than 10 days and in difficult circumstances may be reduced, with advantage, provided the plucking rounds can be adapted to allow spraying immediately after plucking. Under these circumstances the concentration of copper fungicide should be reduced in proportion.

It is most essential that fungicides should be weighed and not measured by volume. A simple postal type of spring balance enables quick weighing into convenient tins (cigarette tins) which can then be packed into rainproof boxes in numbers sufficient for a day's supply for a spraying gang. Large containers of fungicide should not be taken out into the field and exposed to rain, with the additional danger of being left with the lid off. Stocks of fungicide must be stored in dry sheds and containers should be examined for damage on arrival. A damp fungicide may not disperse properly if stored for several months before use.

I have remarked previously that success with control measures was easily attained during 1951. The standard of work in some cases would not have met with equal success in a more difficult year, and although confidence gained at the start of an operation is a valuable asset, over-confidence or under-estimation of difficulties is highly dangerous.

Wet spraying is completely dependent for its success on the use of the correct jets operated over the range of pressures for which they are designed, on proper maintenance of equipment and above all on *organisation and supervision.*

We strongly recommend that superintendents should commence the next spraying season with a revision of our published recommendations, and a " refresher course " of training for the labourers to be employed on spraying. Organisation must be reviewed and, if possible, improved. When results are not satisfactory blame the supervisor, the organisation and the labour before laying blame on the equipment or fungicide.

If we have a difficult south west monsoon in 1952, there will be many cases of disappointing results as a consequence of under-estimation of difficulties in 1951. The remedy to be applied has been clearly indicated. I wish I could recommend a method of " spraying without tears " but for some time to come spraying must remain an exacting operation.

Dusting

Having offered nothing but cold comfort in my remarks on wet spraying, I wish I could offer an easy solution to the difficulties of crop protection methods for tea under this heading. There is, however, no easy method of crop protection against blister blight and dusting must not be regarded as even a possible easy solution. The application of dust reduces labour requirements but the dust itself is expensive. Results with dusting in 1951 have been quite encouraging but experiments have indicated the limitation of the method. Recent articles by Loos[3] and Haworth[4] should be studied in connection with this article. The important fact to realise is that hopes of being able to cover large areas from roads with an extensive blanket of dust is a mere pipe dream. Spectacular clouds of dust are not necessarily followed by spectacular results with protection.

Even with the best formulations of copper dust the vehicle or carrier (usually Kaolin) has very definite limitations in the power to carry the active principle (*i.e.*, copper), and it is unsound to attempt to dust bands of tea much more than 75 feet in depth. This places very definite limitations on the scope for heavy power dusting machines and points to the need for light and efficient portable machines. During 1951, hand operated dusters have proved to be extremely useful and will certainly have a very strong claim to extensive use so long as dusts are employed as vehicles for fungicides employed in Ceylon tea.

Most of the dusts tested in 1951 were totally unsuited for drift dusting over even short ranges, but those which " carried " reasonably well proved capable of giving good control of blister blight so long as they contained four to six per cent. of copper.

On tea in plucking, five pounds of four per cent. dust applied every five days gave satisfactory control. On tea recovering from pruning we are at present inclined to favour six per cent. dust applied at five-day intervals at the same rate (five pounds per acre). We still consider it unwise, however, to venture too far with attempts to control blister blight attacks on tea recovering from pruning. Trials should be limited to small areas until the reliability of dust is well established.

To sum up, therefore, we have obtained further satisfactory results with dusting in 1951, but cannot commit ourselves to unqualified commendations of copper dust for blister blight control purposes until further detailed trials have been carried out under the more severe weather conditions conducive to high levels of infection.

Limitations of Crop Protection Methods

Although tea leaf retains copper deposited by either wet spraying or dusting quite well under conditions of light rainfall, which are fortunately the conditions most favourable to the development of the blister blight disease, it is doubtful whether really heavy downpours of rain will allow leaves to retain sufficient copper to give protection for the required period of time. When wet sprays have dried on the leaf they will stand up to heavy rain and it is probable that dust applied to wet leaves is retained better when the leaves have dried with the copper on them. Fine spray deposits will dry rapidly even on very dull humid days.

Areas dusted or sprayed during heavy rain may, therefore, give disappointing results unless they are given further protection. North east monsoon mornings with bright sunshine are ideal for spraying but work done during an afternoon downpour of the north east monsoon type is probably almost useless.

On the other hand, dust applied in sunny periods rises in convection currents and will also adhere very loosely to dry foliage. The ideal time for dusting is before 8 a.m. on sunny days when cold air lies close to the ground and leaves are covered with dew or are wet from a previous day's rain. Dull overcast days and similar days with light rain are also favourable to the retention of copper applied in dust form.

When the relative merits of dusting and spraying are being considered, it is most essential that these limitations be borne in mind.

References

(1) Lamb, J.—Crop Protection by Wet Spraying compared with Crop Protection by Dusting. *Tea Quarterly*, Vol. XXI, Part IV, p. 44, 1950.

(2) Loos, C. A.—Studies on Blister Blight Control.
(*viii*) Power Dusting with Cuprosana Dusts containing 2, 4, and 6 per cent. of copper. *Tea Quarterly*, Vol. XXII, Part IV, p. 126.

(*x*) Evaluation of some Copper Containing Fungicidal Dusts in the Control of Blister Blight disease of Tea. *Tea Quarterly*, Vol. XXIII, Part I, p.

(3) Haworth, F.—Distribution of Copper containing Dusts. *Tea Quarterly*, Vol. XXII, Part III, p. 118, 1951.