*THE ECONOMICS OF BLISTER BLIGHT CONTROL

I — FUNGICIDE DOSE

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It has been found that the incidence of Blister Blight (*Exobasidium vexans* Massee) on unshaded tea at St Coombs Estate (elevation 4500 ft) was inversely proportional to the dosage of fungicide sprayed for its control (de Silva 1967). It has also been reported that assessments of crop loss did not have the same relationship to blister blight infection as did fungicide dosage ; but instead, crop losses were negligible at doses above one oz of a copper fungicide containing 50% metallic copper, and appreciable when the dose was less than half oz (de Silva 1967).

Based on these findings, it would seem logical to determine to what extent fungicide dosage can be reduced without losing crop. This article presents suggestions to estates on how this can be achieved. It must be emphasized that there is not sufficient information to recommend unreservedly the *same* fungicide dose for *all* estates in Ceylon. The extent to which the scheme will succeed depends largely on the initiative and trouble estates are prepared to take, to determine experimentally the minimum dose of fungicide required to protect the tea from Blister Blight without losing crop.

Factors affecting disease incidence

The incidence of the disease on an estate depends on various factors, some of which are beyond the control of the estate. These include :

1—*Elevation*

The higher the elevation the greater is the incidence of the disease, because of the cooler temperature and higher relative humidity of the atmosphere, which favour the disease.

2—*Topography*

In different areas on each estate, the terrain would vary greatly. Some fields are situated in valleys and others on the crests of hills. The latter usually have less disease incidence than the former. One reason is because mist tends to accumulate in valleys for longer periods than elsewhere, and another is that temperatures tend to be lower, relative humidity higher, and duration of illumination less.

3—*Vegetation*

The nature of the surrounding natural vegetation could also possibly have an effect on disease incidence by their shading and sheltering effects.

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There are, however, factors which affect disease incidence which *are* within the capacity of the estate to control. Among these are included :

1—*The standard of the spraying*

Spraying techniques vary greatly, and in certain areas, it becomes rather difficult to supervise, especially on steep slopes and also in well-tended closely-compacted VP tea. The standard of the spraying affects disease incidence considerably.

2—*Shade*

The stand of shade trees has a marked influence on blister blight infection. The heavier the density of shade trees, the greater is the infection during periods when skies are not continuously overcast.

3—*Spray timing*

It is well known that during unusually heavy rainstorms, spraying is best avoided, because of the possibility of the fungicide being washed off. The best time to spray would be when rainfall has cleared altogether or is merely a thin drizzle.

4—*Dose of fungicide*

It has been pointed out that, within limits, infection is inversely proportional to the dosage of fungicide applied. The objective of an estate should be to keep both infection and spraying costs down to a minimum. Reducing fungicide dosage would mean a reduction in costs of controlling infection. If the best use is made of natural agencies controlling infection, and if the spraying technique is efficient, then appreciable savings can be made on fungicides while still keeping infection down to low levels. If, however, these factors are not taken seriously, it would not be possible to cut down the dose of fungicide without running the risk of having heavy infections.

Deciding the dose of fungicide to use

Before a decision is made on how much fungicide should be sprayed per acre, it is necessary to have some idea of the degree of severity of the disease on the estate. A Superintendent who has been resident on an estate for a long period would know which areas show the severest infections and which areas show only mild infections.

In case of uncertainty, a method of measuring infection is given below. According to this method, it is necessary to measure infection for at least six separate rounds, and the average of these measurements taken, before deciding on what the infection of the particular area in relation to that on other areas would be.

Five groups of five bushes each can be selected at random per acre. The flush from these bushes must be plucked and bulked together on a day when a normal plucking round is due. A sample of not less than 100 shoots is taken from the bulk and examined for blister blight infection, in the form of blisters or translucent spots (young blisters). The number of infected shoots and healthy shoots are then counted separately. It is not necessary to count the number of blisters on each shoot. Percentage infection can be worked out according to the following example :

Number of shoots showing blisters or translucent spots	=	68
Number of healthy shoots	=	34
Total number of shoots	=	104
Percentage infection $= \frac{68}{104} \times 100$	=	65.4

If field infection exceeds 20% the infection is considered as high ; if field infection is between 5 and 20% infection can be considered moderate. If it is below 5% infection can be considered low. This method can be used to compare infection in different areas. Whether a field is considered as average, above average or below average for incidence of Blister Blight must be decided upon by the Superintendent on the basis of his experience as well as on these assessments.

Having divided the estate into these areas (*viz* average, above average and below average for blister blight incidence) it is then necessary to decide how much fungicide should be sprayed on each of these areas. Table 1 gives a rough guide as to how much fungicide might be tried out on an experimental basis. This scheme is given merely as a guide. Modifications to it should be made if the Superintendent considers it necessary.

TABLE 1—*Suggestions for modifying fungicide dosage depending on whether blister blight infection is average, below average or above average*

Dose of fungicide *currently* used in areas where infection is average (oz per acre)	Dose of fungicide to be tried experimentally (oz per acre)		
	For areas with average infection	For areas where infection is above average	For areas where infection is below average
8	2½	3	2
7	2	3	1½
6	1½	2	1½
5	1½	2	1
4	1½	1½	1
3	1	1½	1
2	½	1	½
1	½	1	½

It is emphasized that the suggestions in Table 1 should only serve as a guide, and their validity should be tested before the whole estate is put on any scheme.

Extension Experiments

Estates which desire to carry out a more comprehensive survey of infection on their estates are advised to carry out the following experiment.

Take an evenly shaded area of approximately two acres and block it out into 16 plots, each covering 1/8 of an acre. The number of bushes should be the same for all plots. The field can be sprayed with fungicide as given in Table 2.

TABLE 2—*Suggested fungicide dosages to be tested in experiment to determine loss of crop caused by Blister Blight*

Current dose of fungicide (oz per acre)	Suggested rates of fungicide for experimentation (oz per acre)			
8	8	6	4	2
7	7	5	3	2
6	6	4	2	1
5	5	3	1½	1
4	4	2	1	½
3	3	1½	1	½
2	2	1½	1	½

There will be four treatments, each treatment would have to be repeated on four plots ; this would cover the 16 plots. The spraying should be done with knapsacks and should be on a field in the *second* year after the last prune, and spraying must be carefully supervised. Assessments of blister infection must be done and yield records maintained. It would be necessary to carry out the experiment from May to August inclusive in the South West Monsoon Zone and September to December inclusive in the North East Monsoon Zone. Accurate records of spraying dates, infection assessments and green leaf weights would have to be maintained for *each* plot for *each* round. An accurate spraying programme could be worked out when the results of such an experiment are available. The lowest dose of fungicide with which no crop losses occur, could be used on the estate.

It must be pointed out that no reduction in fungicide dosage should be contemplated on tea in nurseries, immature new clearings or mature tea in the first year of the pruning cycle.

Reference

DE SILVA, R. L. (1967). A new look at the economics of blister blight control. *Tea Q.* **38** : 282-286.

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