HOW TO ECONOMISE ON BLISTER-BLIGHT CONTROL

THE DECISION TO SPRAY BASED ON SUNSHINE RECORDS

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Blister-blight control has gone on for over a decade on most estates and it is time to review the matter and set new aims for the future. The first impact of the disease was so alarming that most people involved were willing to sacrifice a lot of money, time, and effort, not to speak of shade trees, to save their bushes from death. Now we have come to live with Blister Blight and we should consider whether our control measures are up-to-date.

One relatively new possibility is the use of colloidal copper formulations. As early as 1953, colloidal copper was tried with good results in Southern India against Blister Blight (U.P.A.S.I., 1954). In Indonesia too, colloidal copper proved successful in the control of Blister Blight (Van der Knaap, 1956). The copper content of these products varies from 12 to 27%. So far, colloidal copper has not become particularly popular amongst planters in Ceylon. One of the reasons may be that this form of copper is less visible on the leaf than the oxide and oxychloride wettable powders. In the future this may be less of a disadvantage in connection with the use of mistblowers, because instead of spraying bushes individually a whole area of 6–10 rows is sprayed.

Another rather new group of fungicides contains a mixture of a copper compound and an organic zinc compound, namely Zineb (zinc ethylene-bisdithiocarbamate). These products have the same advantage of a lower copper content like the colloidal coppers, and, in addition to that, the advantage of adding zinc to the plant and the soil. These are the only interesting new possibilities in the field of fungicides.

The economy of spraying is very much linked with the time and the *method* of application. The time of application is, as a matter of fact, of the highest importance in connection with the efficiency of the whole control measure. Until recently the date on which to start spraying has been decided on in relation to the onset of the monsoon as the decisive factor. This implies that the amount of rainfall has been taken as the most important weather condition.

It has been shown by the work of Visser, Sabanayagam and Shanmuganathan (1958), based on earlier work done by Van der Knaap (1955, 1956) and de Weille (1956, 1957) in Indonesia, that not only rainfall but also sunshine decides the amount of Blister Blight you are going to have. This has led to the installation of thirty-seven sunshine recorders on various progressive estates (See Plate 1).

My main purpose at present is to help to further the cause of the sunshine recorders, so that you may get the most out of them. We have introduced the measurement of sunshine as a guide for blister-blight control because the ultra-violet rays of the sunlight kill the spores of the blister-blight fungus. The depressing effect of sunshine on the spread of the fungus has been shown to be greater than the promoting effect of rainfall. This is most probably due to the fact that it is not the rainfall in itself that is so important for blister-blight development, but the wetness or dryness of the leaf surface.

Leaf wetness is not governed by rainfall alone, but also by air humidity, air temperature and wind velocity. If the wetness were easy to measure, we would probably by now have a leaf-wetness recorder on every estate. This, however, is not so. Leaf wetness is hard to define and hard to measure. Therefore sunshine recording, which is very easy, has been developed into a good alternative (Plate 2).

A number of experiments have proved the practical value of sunshine records as a guide to help one to decide whether to spray or not to spray on a certain day.

The only trouble in the application of this timing scheme for blister-blight spraying is that inevitably, when one omits spraying rounds on the basis of sunshine records, one must counter-balance the greater risk one runs of future outbreaks by being able to spray big areas in a short time, *i.e.* in half the time that was available before. The practical reason is that a round is not really omitted, but only postponed for four or five days and might therefore coincide with the spraying of another part of the division. This theoretically necessitates the doubling of spraying gangs and spraying equipment. Such an emergency would not arise often and different estates have already managed to overcome this difficulty and have successfully applied the new system of timing blister-blight control. However, this emergency situation that might arise has no doubt frightened several planters and kept them from applying their sunshine records to the full advantage of reducing the number of spraying rounds. Here modern spraying equipment comes to our rescue. The recently introduced mist-blowers have saved the spray-timing system from the danger of remaining a mere hobby of scientists. Mist-blowers can do the work of spraying in much less than half the time and they are therefore the answer to this problem of how to double the acreage covered on a certain day.

Sunshine records can not only guide us in the decision of postponing spraying rounds to be carried out on days following a period of sufficient sunshine, but can be of even greater value in indicating the right dates for starting the spraying campaign and for ending it. It very often happens that Superintendents are, despite their long experience, taken by surprise by an early development of blisters and thus start spraying too late. If they had kept an eye on the sunshine records, they would have noticed that, although the rains had not properly started, sunshine hours had diminished to such an extent that spraying was indicated.

At the end of the monsoon, spraying has become part of the routine work and, as an insurance against an unexpected prolongation of the monsoon, blister-blight control is kept going, although a marked improvement in weather conditions has set in. This practice results in useless continuation of spraying which can be avoided by examination of the sunshine records.

TABLE 1.—*Number of spraying rounds that could have been saved if spraying had been done according to sunshine data*

ESTATE	No. of rounds sprayed	No. of rounds necessary. (calculated)	No. of rounds that could have been saved
JUNE–DEC. 1959			
St Coombs ...	26	16	10
Dessford ...	20	17	3
Meddecombra ...	19	15	4
Kirimetiya ...	17	6	11
JAN–DEC. 1960			
St Coombs ...	26	21	5
Court Lodge ...	32	25	7
Balangoda Group ...	22 or 18½	16 or 18	2 or 4
Galemudena ...	22	27	5
Cannavarella ...	25 (Dusting)	15	10
Dickwella ...	18 (Dusting)	18	0
Queenstown ...	10	8	2

The results obtained in 1959 at St Coombs Estate are further illustrated in Fig. 1.

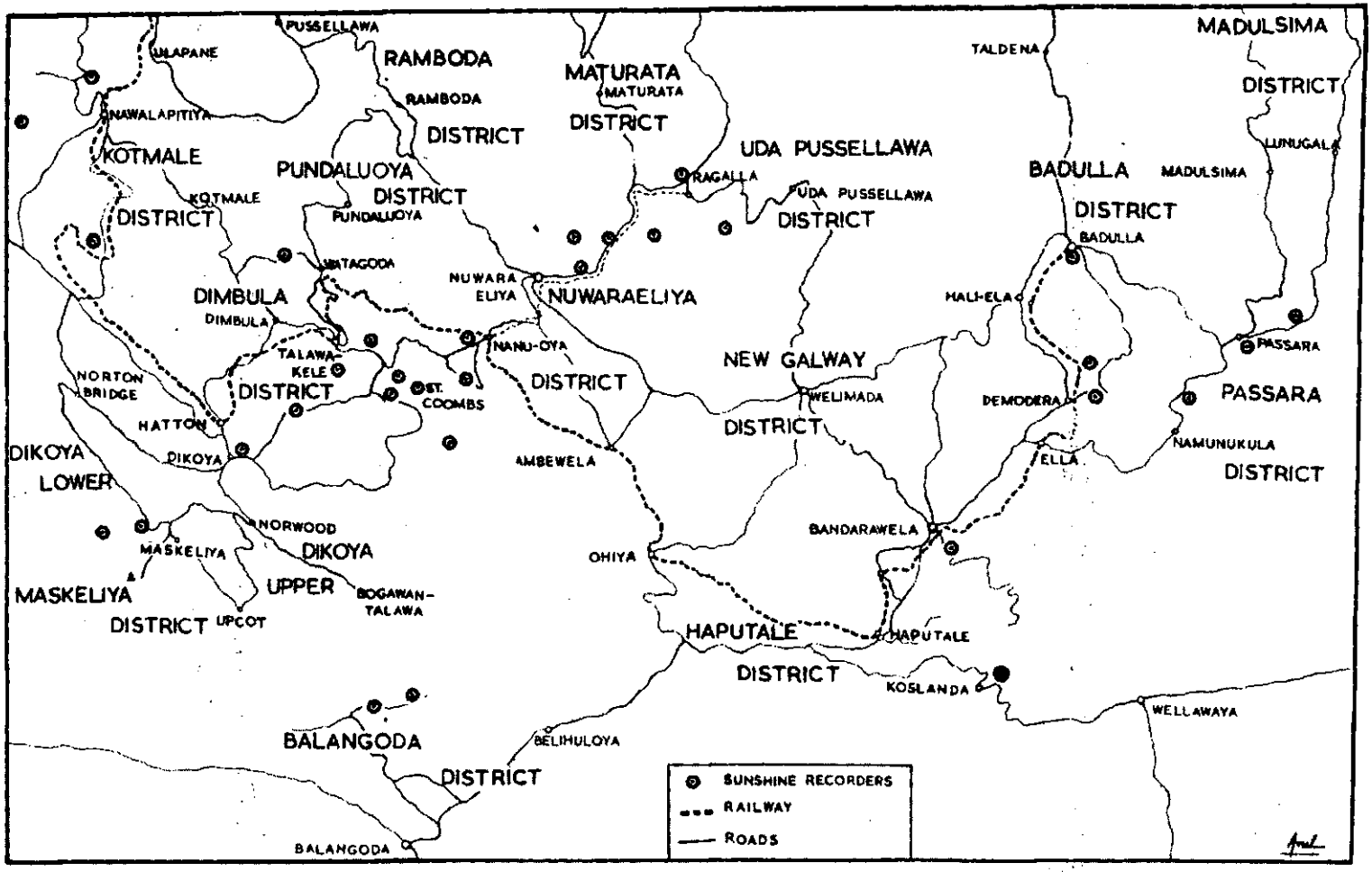

Plate 1. Map showing the location of sunshine recorders in Ceylon.

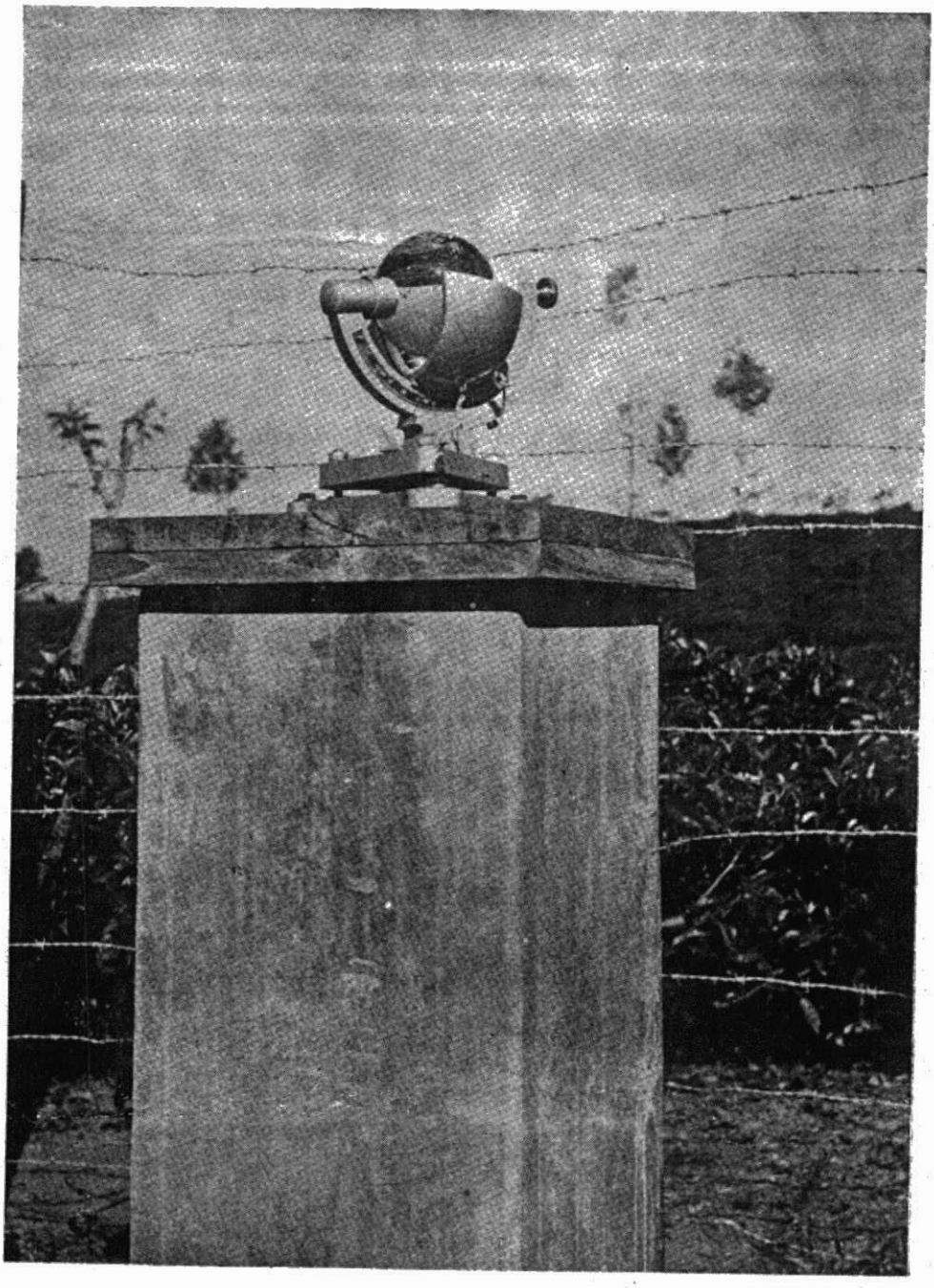

Plate 2. Sunshine recorder of the Campbell-Stokes type, mounted on a stone column and surrounded by a fence, at St Coombs Estate.

Some Superintendents have enquired "To what acreage should the records of one sunshine recorder be applied"? The answer is that this naturally depends on the lie of the land and the climatic variations in the area concerned. On the average, each division should have its own recorder. It should be taken into account here that our minimum of 20 hours of sunshine over a period of 5 days has been worked out for average tea land including less-favourably situated slopes. On flat land, one could most probably do with much less than 20 hours.

In places, however, where one half of a division lies on the more sunny slopes towards Uva districts and the other half on misty slopes, exposed to the south-west monsoon, one should naturally not try to apply the same sunshine records taken on the sunny side to blister-blight timing in misty areas. This is a matter that has to be sorted out by each Superintendent for his own estate by trial and error. In this connection, it is of importance to mention the fact that an assessment of the amount of Blister Blight present on the third leaf in a certain field can easily be carried out by the estate staff (for instance a conductor) according to the method given in a leaflet of the T.R.I. Care should be taken not to judge the standards of blister-blight control by walking along the road, but by taking samples at random well inside the field.

Summarising, we can conclude that the future development of blister-blight spraying is directed towards:

(1) taking sunshine records for the timing of applications;

(2) using fungicides which contain less copper;

(3) using spraying equipment that can cover large areas in a shorter time with less liquid.

References

U.P.A.S.I. (1954). Report of the Chief Scientific Officer. *Annu. Admin. Rep. United Planters Ass. S. India for* 1934/4:

Van Der Knaap, W. P. (1955). Notes on disease incidence of *Exobasidium vexans* Massee on tea. *Arch. Theecultures ned. Ind.* **19** (2): 99–113.

Van Der Knaap, W. P. (1956). Developments in blister-blight control. (in Dutch) *Bergcultures* **25**: 577–581.

Visser, T., Shanmuganathan, N. & Sabanayagam, J. V. (1958). Blister-blight control in 1957 with respect to fungicidal formulation, application rates, and yield. *Tea Quart.*, **29**: 1–12.

Visser, T., Shanmuganathan, N. & Mulder, D. (1959). The possibility of timing blister-blight spraying according to sunshine records. *Tea Quart.*, **30**: 39–43.

De Weille, G. A. (1956). The fungicidal action of light of different wave-lengths in connection with Blister Blight of tea. *Ber. Alg. Proefst. der A.V.R.O.S.* no. 1: 11 pp.

De Weille, G. A. (1957). Possibilities offered by the use of sunshine data for the purpose of forecasting epidemics of fungus plant diseases. *Ber. Alg. Proefst. der A.V.R.O.S.* no. 9: 6 pp.

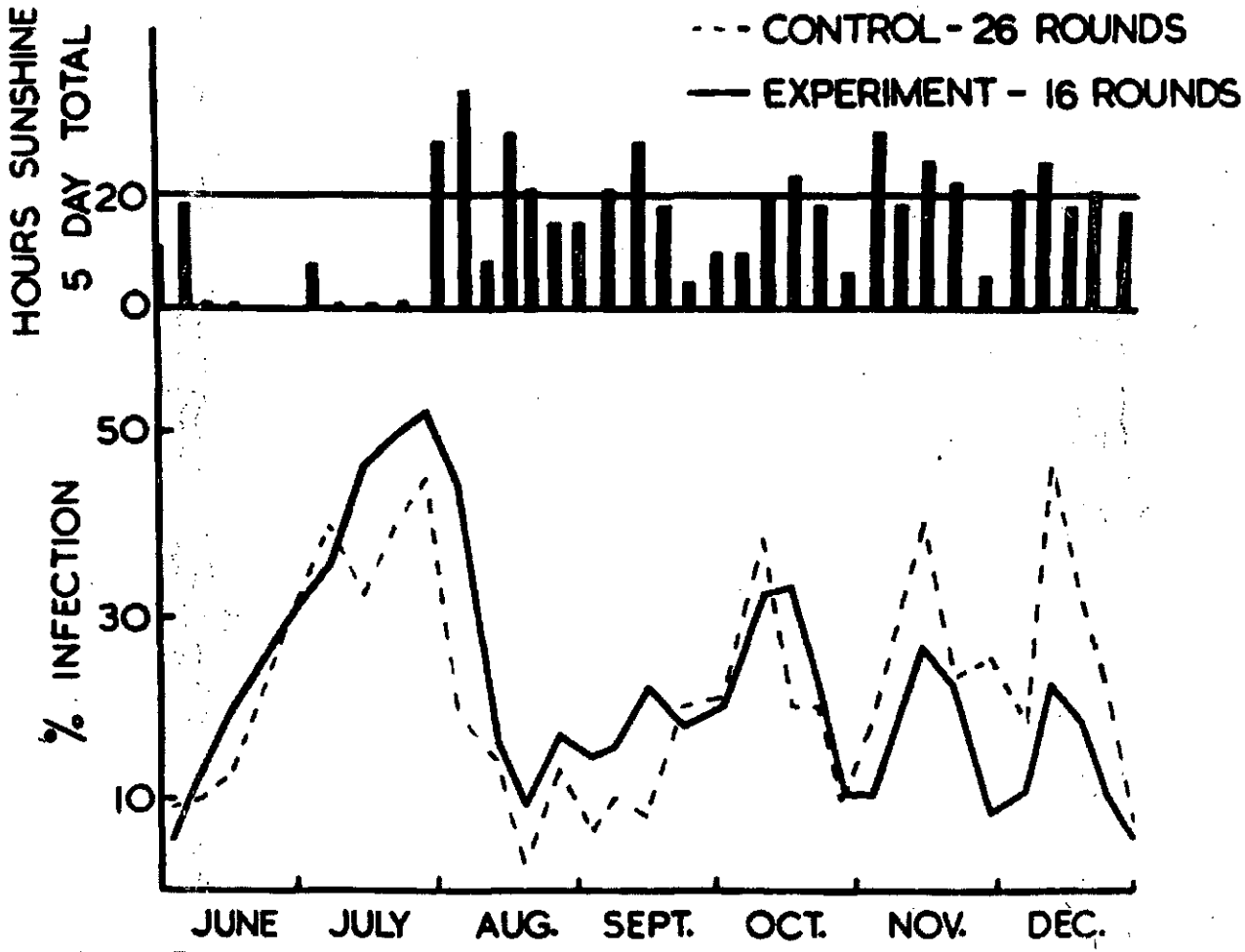

Fig. 1. Experiment on the timing of spraying against Blister Blight according to sunshine records, at St Coombs June-December, 1959.