CROP PROTECTION DURING RECOVERY FROM PRUNING.

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The Institute's original recommendation to estates in bad blister blight areas to adjust their pruning programmes so that recovery takes place during the driest and most mist free period of the year is now well known. From the outset it was realised that this policy of minimising the damage done by blister blight by modifying our normal agricultural practice was by no means the final answer in regard to blister blight control. Although obviously only a temporary palliative, subsequent experience has fully confirmed the soundness of this recommendation, which has almost certainly played a major part in keeping estates in economic operation in bad blister blight areas.

Unfortunately pruning into the dry weather has itself a number of disadvantages and dangers from the agricultural standpoint. Considering the disadvantages first:— Pruning into the dry weather in areas receiving both monsoons almost certainly means pruning around November/December with the consequence that a quarter or even a third of the estate is out of bearing during the quality months of March and April when highest prices should be realised. Furthermore, and this applies to all areas, recovery during the dry weather is very considerably slowed up, resulting in anything up to a complete month's crop being lost during the course of the cycle.

Most of you will doubtless think the foregoing amply justifies your reverting to your pre-blister blight pruning programmes as soon as satisfactory protection can be assured. However, I should be failing in my duty if I did not also take this opportunity of warning you of some of the actual dangers attendant on pruning into the dry weather. Too little attention has been paid in the past, in this country at any rate, to the effects of sun scorch on exposed branches. Our recent experience indicates that this danger is a very real one and, as the effects are likely to be cumulative, a marked increase in the incidence of branch canker must be anticipated if fields continue to be pruned into the dry weather. Fortunately, the danger of sun scorch damage may be minimised to some extent by protecting the frames of the pruned bushes as far as possible from the direct rays of the sun. Accordingly, I would suggest that the prunings should be piled back on top of the pruned bushes. Alternatively, manna grass or jungle loppings can be used for shade as has been the usual practice in N. India after a severe prune.

Drought by itself may also lead to dying back of branches from the pruning cut inwards and thus cause a permanent reduction in frame size. Here, of course, the usual drought precautions are all that can be done to prevent such die back. In particular it is most important that no forking is done during the dry weather, otherwise the rate of water loss from the soil may be much increased.

A further objection to dry weather recovery is the possibility of a heavy mite attack building up which may cause shedding of the newly formed leaves and thus seriously reduce the amount of blister resistant maintenance foliage available for the coming cycle.

At this stage I feel that I have said enough to convince you all of the undesirability of continuing pruning into the dry weather any longer than is strictly necessary as an anti-blister blight measure. This has been the view of this Institute for some years now with the consequence that, as the Director has already told you, we have made the problem of protecting tea recovering from pruning one of the highest priority in our experimental work. In what follows, therefore, I shall attempt to give you as much information as possible concerning our progress to-date in solving this particular problem.

Those of you who attended our Symposium on blister blight in November last year will recall that we had already reached the conclusion that spraying with a suspension of a copper fungicide in water might provide satisfactory protection. A suitable concentration appeared to be 4 oz. of "Perenox" to 10 gallons of water. It was also our opinion and that of our expert advisers, Mr. Lane of Plant Protection, Ltd., and Dr. Greenslade of Pest Control, Ltd., that low volume spraying at a rate of about 12 gallons per acre was essential if costs of protection were to be kept at an economic level. For this purpose the most satisfactory type of spraying equipment then available was generally agreed to be a battery of pressure retaining knapsack sprayers and central charge pump. Low volume nozzles were, of course, essential.

Although no field experiments on any reasonable scale had then been carried out on the protection of tea recovering from pruning during the south west monsoon, a nine acre experiment on the protection of tea recovering from pruning during the north east monsoon was actually in operation on Uda Radella Estate, Nanu Oya, at the time of our Symposium. This experiment proved very successful and as it is fully described by Mr. Loos in a *Tea Quarterly* article, I do not propose to consider it further today.

In spite of the apparent success of this Uda Radella experiment we were still uncertain whether spraying under the more difficult conditions of the south west monsoon would afford adequate protection to tea recovering from pruning. Furthermore, no valid figures regarding the cost of spraying under estate conditions were as yet available. Accordingly, early this year, plans for spraying some 200 acres of tea recovering from pruning during the south west monsoon were drawn up and an order placed with the Four Oaks Company for some 40 pressure retaining knapsacks, complete with double boom lances, and four central charge pumps. Shortly afterwards the Consolidated Estates Company Limited kindly sanctioned an experiment on 200 acres on Kataboola Group, Kotmale, for this south west monsoon. This estate was most suitable as it suffers very heavily from blister blight both during the south west and north east monsoons and offered a wide variety of terrain from the most difficult to the most favourable. The offer was enthusiastically endorsed by the Superintendent, Mr. Garnier, who has been of the very greatest assistance to us throughout the whole course of the experiment. Mr. Garnier entirely rearranged his pruning programme so as to revert to what would have been the normal south west pruning dates and went to great pains to ensure that the necessary labour for spraying was available when required.

In an experiment of this size it is very necessary to have a responsible man on the spot to train the spray gangs, organise all the technical details and to keep complete records of costs, etc. Accordingly, Mr. N. M. Lindsay, a graduate in agriculture, was very kindly loaned to us by the Colombo Commercial Company for the duration of the experiment.

In accordance with pre-blister blight estate practice pruning started about the the middle of June and was completed by the middle of

August. Particulars of the fields pruned and the dates spraying started in each are shown in the table.

TABLE I.

KATABOOLA GROUP

200-ACRE EXPERIMENT, 1950.

Division.	Field.	Acres.	Pruning Dates.		First sprayed.
			Start.	Finish.	
Hoonoocotua	No. 1	55	12.6.50	13.7.50	14.7.50
do.	No. 2B	33	4.8.50	12.8.50	17.8.50
Top	No. 5	54½	10.7.50	3.8.50	2.8.50
Middle	No. 4	14½	10.7.50	14.8.50	2.8.50
do.	Yellabanda A	6	12.6.50	24.6.50	11.7.50
Lower	Kotmale A	16½	12.6.50	8.7.50	12.7.50
Accrawatta	No. 2A	12½	29.7.50	5.8.50	11.8.50
do.	No. 3	8½	15.7.50	24.7.50	3.8.50
		200½			

Note.—Yellabanda A and Kotmale A are very steep and difficult fields.

It will be noted that in the earlier pruned fields spraying did not start till about one month from pruning. Budbreak was, however, rather earlier than this and it was soon realised that spraying should start within about a fortnight from pruning if blister blight infection of the earliest shoots was to be avoided. The principle of spraying within a fortnight of pruning was accordingly adopted for all later fields. Furthermore, although it had been the original intention to spray throughout on 7 day rounds it was decided to close up the first three rounds on all fields to 4 day intervals as far as availability of labour and equipment rendered this practicable.

By the middle of August the whole 200 acres was being sprayed and both equipment and labour was fully extended. It had originally been hoped that under very adverse weather conditions it would have been possible to postpone spraying for that day and complete the programme later in the week. This was found to be impossible in practice and it was accordingly decided to spray right through the week irrespective of weather. The weather this monsoon was particularly bad and some 72 inches of rain fell during the 4 months from July to October.

TABLE II.

KATABOOLA RAINFALL, 1950.

Month		Inches	Wet Days
July	...	20.81	30
August	...	17.04	29
September	...	22.40	22
October	...	12.39	25
Total	...	72.64	106

Although there were less wet days in September the rainfall during the early part of this month was excessively heavy. Spraying during this period did not appear to give complete protection and there was a certain amount of blister blight infection in evidence some two to three weeks later. This is now thought to be mainly due to wind drift of the spray rather than to heavy rain. Apart from this one period, spraying during rain appears to have been most successful and we have thus succeeded in initiating an entirely new principle in crop protection.

Those of you who attended our demonstration at Kataboola last month will have seen for yourselves the successful outcome of this large scale experiment. To those of you who have not been able to visit Kataboola I would merely like to quote Mr. Garnier's opinion that recovery in most of the sprayed fields is as good as it was before the advent of blister blight. (See plate).

In Kotmale A and Yellabanda A fields however, where the bushes were badly debilitated we had a very slow recovery. Slow recovery increased the difficulties of spray protection and thus increased the scope of our experiments. We, therefore, strongly recommend a period of rest *with spray protection* before pruning areas where starch reserves are low. Mr. Garnier had rested Yellabanda three times but on each occasion blister blight destroyed the new foliage of the resting bushes and annulled the benefit of the resting period.

Now as to costs. Average costs per acre spraying round, worked out up to October 31st are as shown.

TABLE III.

KATABOOLA GROUP

200-ACRE EXPERIMENT, 1950.

Division.	Field	Number of rounds up to Oct. 31st	Cost per acre per round	Normal tipping date.
			Rs.	
Hoonoocotua	No. 1	16	2.30	31.10.50
do.	No. 2B	11	1.91	30.11.50
Top	No. 6	14	2.25	31.10.50
Middle	No. 4	14	2.10	4.11.50
do.	Yellabanda A	18	2.66	30.11.50
Lower	Kotmale A	17	2.61	18.11.50
Accrawatta	No. 2A	12	2.02	23.11.50
do.	No. 3	13	2.42	6.11.50

Over the whole 200 acres the average acreage per labourer employed works out at 1.17 and the average cost per acre per round up to October 31st is Rs. 2.25. Assuming an average of some 16 spraying rounds over the whole area up to tipping to be sufficient, this means that it has been possible to protect tea recovering from pruning for as little as **Rs. 36.16** per acre. This figure covers all field labour employed, including kanganies, plus the cost of Perenox at 11 cents per ounce. It does not, however, include the cost of staff grade supervision. At Kataboola an estate K.P. was employed full time on supervisory duties from the start of the experiment. Later on, as the scope of the work increased, it became necessary to provide for additional supervision by stationing one of our own field attendants at Kataboola.

It will be noted that costs vary considerably from field to field, the steeper and more difficult fields costing more per acre per round.

Legend : View of Yellabanda A'field taken mid-October, showing a part of the unprotected control plot at right centre. The complete destruction of all new growth by blister blight in this unprotected area is in marked contrast to the normal recovery of the sprayed bushes on the left.

As Mr. Scoles will be dealing with this subject later in the day, I do not propose to say anything further regarding supervision or other operational difficulties encountered in the course of this experiment.

Parallel with the main 200 acre experiment at Kataboola, a number of different estates in bad blister areas in several different districts agreed to co-operate with us by spraying areas of about 50 acres each of tea pruned down into the south west monsoon. Similar equipment to that at Kataboola was to be used but the conduct of the experiments was the sole responsibility of the superintendents. However, we promised to give as much assistance as possible and actually ran training courses at St. Coombs for the superintendents concerned in June and for their spraying labourers in July last.

Details of the estates taking part in these experiments are as shown.

TABLE IV.

SPRAYING EXPERIMENTS.
SOUTH WEST MONSOON 1950.

Estate.	District.	Acres.	Pruning Start.	Pruning Finish.
Agra Ouvah	Agrapatana	40	6.7.50	16. 9.50
Dessford	Nanu Oya	30	15.6.50	24. 6.50
Diyagama West	Agrapatana	37	1.7.50	24. 7.50
Frotoft	Ramboda	24	1.7.50	31. 7.50
Glasgow	Agrapatana	33	1.7.50	24. 7.50
Hope	Hewaheta	39	10.7.50	11. 8.50
Mayfield	Hatton	83	5.9.50	5.10.50
Mooloya	Hewaheta	111½	1.6.50	13. 7.50
Pedro	Nuwara Eliya	24	15.6.50	31. 7.50
Tangakelle	Lindula	50	1.7.50	24. 8.50
Uda Radella	Nanu Oya	80	1.7.50	26. 8.50

In all cases where the experiment is sufficiently advanced there is no doubt on the part of the superintendent concerned that it has been successful from the crop protection angle. Actual costs per acre per round however vary from a minimum of Rs. 1.60 to a maximum of Rs. 4.57 depending on the estate. High cost figures resulted when the superintendents concentrated on ensuring adequate spray protection rather than on keeping costs down. I must stress that the main object of these experiments was to test the possibilities of spray protection and to elicit difficulties which might arise in normal estate adoption of crop protection methods. The very low figure of Rs. 1.60 is undoubtedly exceptional since extremely favourable weather conditions were experienced throughout on the estate concerned. In general, it would appear that a fair average for the costs incurred in these series of experiments would lie between about Rs. 2·50 and Rs. 3.00 per acre per round. **We are confident that our own figures represent a reasonable cost.**

Anyway there can be little doubt, as a result of this season's work, that spraying with a copper fungicide on 7 day rounds regardless of weather conditions, can provide satisfactory protection for tea recovering from pruning during the south west monsoon. As to whether it is an economic proposition, that is a question which I must leave you to decide for yourselves.

I have given you reliable figures for the costs at Kataboola which are most encouraging, but you must remember that these figures do not include costs of staff grade supervision nor depreciation of equipment.

In conclusion, I would like to express our sincerest thanks to all those proprietors, agency houses and superintendents who have so readily placed their acreages at our disposal and given us their whole hearted co-operation in this series of experiments.