

THE EFFECT OF EARTH-COWDUNG MIXTURES ON RENEWING BARK

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1. INTRODUCTION

THE practice of applying mixtures containing cow-dung and earth as basic substances to recently tapped bark at the time of annual or six-monthly change-over of the tapping panel has been widely adopted in Ceylon for many years. The claim by the advocates of this practice that the bark renewal is thereby benefited does not, however, appear to have been substantiated by any controlled experiments. An offer by Mr. A. D. Panton, Superintendent of Nivitigala Estate, Nivitigala, to co-operate in an experiment to shed light on this point was therefore readily accepted.

2. DETAILS OF EXPERIMENT

(a) *Experimental Area*.—A uniform field of well-grown mature rubber (1905 planting) was selected on Nivitigala Estate. Tapping had been stopped on the 31st May, 1931, for an indefinite period.

(b) *Treatments*.—Three mixtures were chosen which were thought to be representative of the types used on Ceylon estates. The composition of these mixtures is given below:

Treatment	A	B	C	D
Ant-hill earth	24 parts	14 parts	16 parts	CONTROL
Cow-dung (dry)	12 "	28 "	32 "	
Tallow	6 "	7 "	—	
Sulphur	3 "	—	—	
Copper Sulphate	1 "	—	—	
Lime	1 "	—	—	

Mixture A was prepared as follows: The ant-hill earth and dried cow-dung were thoroughly mixed and the sulphur added. The tallow was then melted and stirred in. The copper sulphate and lime were dissolved in enough water to make a thick paste of the whole mixture. Mixture B was prepared by mixing the earth and cow-dung, adding water to make a paste, and then working in the unmelted tallow which was broken down with the hands. The method of incorporating the tallow used for Mixture A was found to be the quicker, and probably ensures a more intimate mixture.

(c) *Arrangement of Plots.*—Each plot consisted of approximately 60 trees (10×6). Fourfold replication of each treatment (including the control) was adopted, giving a total of 16 plots. The plots were arranged in the form of a Latin Square as shown below. The special feature of a Latin Square is that each treatment occurs once in each column and once in each row, thereby allowing for elimination of soil differences by statistical methods in two directions, i.e., between columns and between rows.

A	B	C	D
C	D	A	B
B	C	D	A
D	A	B	C

In order to facilitate the identification of plots by the labourers applying the mixtures, the outside trees of each plot were painted with a broad ring, a colour being allotted to each treatment:

(d) *Application.*—Tapping was stopped on the 31st May 1931, but owing to incessant rain it was impossible to apply the mixtures until August. The applications were made on August 9th to 11th, under the personal supervision of the Superintendent. A heavy fall of rain following immediately afterwards necessitated a second application being made.

As noted below all mixtures were found to adhere satisfactorily.

3. RESULTS

The trees were examined by the junior author on the 15th to 17th August, 1932, i.e., one year after the mixtures were applied. A sample of renewing bark was taken from each tree one inch above the middle of the cut, and the thickness of each sample measured with a micrometer gauge to 1/100 millimetre. The mean thickness of renewing bark for the four treatments was as follows:

Treatment	A	B	C	D
Mean Thickness of Renewing Bark in mms.	3.52	3.48	3.34	3.44
Number of trees	205	200	216	187

A statistical examination of the detailed results shows that there is no significant difference between any of the treatments.

While taking the bark samples the outer corky layer together with the layer of cow-dung mixture became detached in most cases, and the above figures are therefore measurements of the live cortex only. In order to determine whether the application of the mixtures had resulted in any increased thickness of the outer layer all samples which retained this layer intact were measured with and without the outer bark. The mean figures for the difference i.e., the thickness of the outer bark only, are given below:

Treatment	A	B	C	D
Mean Thickness of Outer Bark in mms.	1.13	1.21	1.13	1.01
Number of trees	74	92	88	75

It will be seen that the figures for the treated bark are in all cases slightly higher than that for the control, but it is probable that most if not all of this difference (amounting to only about $\frac{1}{5}$ — $\frac{1}{10}$ millimetre) was due to the thickness of the actual layer of mixture. In any case measurements of rough bark to this degree of accuracy are rather uncertain, and it must be concluded that no increased thickness due to the treatments is evident.

The adherence of all three mixtures was satisfactory, Mixtures A and B, containing tallow, being somewhat better in this respect than the mixture of earth and cow-dung alone. In the B and C plots a large number of panels had been stripped of the mixtures by termites, but Mixture A, containing various chemicals, was untouched.

4. CONCLUSIONS

This experiment shows that under the conditions obtaining on Nivitigala Estate during the period August, 1931, to August, 1932, the application of the mixtures concerned has not proved beneficial to the renewal of the recently tapped cortex, and this conclusion can probably be extended to embrace any other mixtures of a similar type. It would be rash, however, to conclude that under no circumstances will the application of such a mixture be of benefit. Any improvement in bark renewal as the result of such treatment would probably be due to partial shading of the inner cortex from strong sunlight. It is to be noted that unusually wet weather was experienced on Nivitigala Estate for some months after the applications were made, so that the renewing bark was seldom exposed to sunlight. It is possible that the treatment may be of benefit when carried out immediately before the wintering period or on estates where the foliage is sparse. Further experiments are needed to elucidate this point, but in the meantime it would appear that estates with normal foliage which employ a six-monthly change-over might omit the treatment when the cuts are changed in September.

5. ACKNOWLEDGMENT

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