

SULPHUR TAINTS.

J. LAMB.

During the treatment of rubber trees with clouds of sulphur in a very finely divided condition, there is often a risk of sulphur falling on to tea bushes in the vicinity. Sulphur dust is also employed in some cases as a preventative measure against mite infections of the tea bush. With the co-operation of the Rubber Research Scheme a series of experiments was carried out in order to determine whether sulphur dust falling on to tea bushes would cause taint to appear in the made tea; and if so, how long the taint remained. Previous experiments have been carried out on this subject, but the results were confused by the appearance of taints in the control leaf plucked and manufactured alongside the dusted leaf; probably due to the absence of experimental machinery, necessitating hand rolling and improvised firing.

There are at least two possible ways in which taints may be caused by sulphur. Firstly, the retention of free sulphur dust by the flush on which it has fallen and subsequent inclusion of sulphur with the leaf at the time of manufacture. Secondly, absorption of sulphur by permanent leaves and the passage of toxic sulphur derivatives to the flush. In order to test out these two hypotheses, dust was applied to the experimental areas both immediately before, and immediately after plucking. Thus, in the first case, sulphur dust could be carried away on the plucked leaf. In the second case, the whole of the plucking interval would be available for the absorption of sulphur by the permanent leaves, and for any effects due to this to appear in the crop.

In addition, two intermediate applications were tested. An experiment on these lines was carried out on Gonakelle Estate, Passara with the kind co-operation of Mr. G. Kent Deaker.

Four one-acre plots were used, and 10 lbs. per acre of sulphur applied at four different times. The plots were plucked at intervals of 9 days, and the leaf was conveyed to St. Coombs for manufacture.

The samples were submitted to five different Colombo buyers for report.

When these teas were sent for report, samples of ordinary St. Coombs B.O.P. were included in such a manner that the tasters dealt with sulphur dusted and ordinary teas alternately. This arrangement safeguarded against taints being retained on the tasters' palates.

The details of the experiment follow in tabular form:—

Dusted	Plucked	Interval between dusting and plucking	Tasters' Report
<i>Plot A.</i>			
Aug. 22	Aug. 22	(Dusted before plucking)	Badly tainted
.. 31	.. 31	nil
<i>Plot B.</i>			
Aug. 19	Aug. 22	3 days	Slightly tainted
.. 28	.. 31	3 days
<i>Plot C.</i>			
Aug. 17	Aug. 22	5 days	Slightly tainted
.. 25	.. 31	5 days
<i>Plot D.</i>			
Aug. 22	Aug. 22	(Dusted after 1st plucking)	Free of taint
.. 31	.. 31	9 days	Slightly tainted
.. 31	Sept. 9	9 days

Control (undusted) leaf was obtained from Plot D on August 22nd. On the occasion of the second plucking on August 31st control leaf was obtained from bushes adjacent to the experimental area. Both controls were reported as free of taint.

A strong smell of sulphur was observed during the firing of teas from Plot A; the liquors had a most objectionable taste, and smelt of sulphur while hot. These features were much less evident in the teas from the remaining plots, and this indicates that the application of sulphur in Plot C, where absorption could not have produced any effect, caused bad tainting, whereas that applied to other plots, where the time interval enabled absorption, if any, to occur, caused only a slight tainting. Since some of the tainting in the remaining plots must have been due to sulphur remaining on the shoots which were plucked subsequently, it appears that even if absorption by the older leaves occurs, it is of minor importance.

Analysis of the made teas indicated a rise of total sulphur content after dusting, as shown in the following table:—

Plot	Interval between dusting & plucking (days)	No. of applications of sulphur dust	Percentage of sulphur in dry matter
A	0	1	0.371
A	0	2	0.323
C	5	1	0.462
C	5	2	0.512
D	—	0	0.276
D	9	1	0.312
D	9	2	0.354

The weather conditions during this experiment were difficult. Dryness and high winds, culminating in absence of dew in the early mornings, at which time dust was applied, resulted in some of the sulphur failing to stick to the leaves. Later in the experiment rain fell, amounting to over an inch on the 29th.

*Rainfall during rainy days on Gonakelle.
(August 1934.)*

5th	9-30 a.m.	0.05''
12th	3-30 p.m.	0.02''
23rd	3-30 p.m.	0.07''
25th	9-30 a.m.	0.02''
25th	3-30 p.m.	0.13''
26th	3-30 p.m.	0.62''
27th	3-30 p.m.	0.01''
29th	3-30 p.m.	1.07''
30th	3-30 p.m.	0.09''
31st	9-30 a.m.	0.07''
31st	3-30 p.m.	0.03''

A further examination of the problem was carried out on St. Coombs. Four one-acre plots were employed. A and B received 5 lbs. dust per acre, and C & D 2 lbs. per acre. A & C were dusted immediately before plucking, and B & D immediately after plucking. The details of the various applications of sulphur dust are given below, together with the tasters' reports. The experimental procedure was the same as in the previous experiments.

(a). Dusting and plucking on 31-1-35.

Plot A — dusted with 5 lbs. and plucked	} Badly tainted
B — plucked and dusted with 5 lbs.	
C — dusted with 2 lbs. and plucked	
D — plucked and dusted with 2 lbs.	

(b). Second Dusting and Plucking on 9-2-35.

Plot A — dusted with 5 lbs. and plucked	Bad taint
B — plucked and dusted with 5 lbs.	Slight taint
C — dusted with 2 lbs. and plucked	Bad taint
D — plucked and dusted with 2 lbs.	Slight taint

(c). Plucking only on 4-3-35 (23 days after last plucking — see Section b).

Plot A plucked only	} Free of taint
B " "	
C " "	
D " "	

(d). Dusting on 13-3-35 and plucking on 26-3-35 (13 days after last plucking).

Plot B dusted with 5 lbs. } Tainted
 C dusted with 2 lbs. }

(e). Plucking only 16-4-35 (21 days after previous plucking, 34 days after previous dusting).

Plot B } Free of taint
 C }

Total rainfall since previous plucking:—

Plucking	(a)	...	0.0"
"	(b)	...	0.0"
"	(c)	...	1.03" 6 wet days in 23.
"	(d)	...	3.19" 10 wet days in 13.
"	(e)	...	8.91"

These data suggest that the length of interval between dusting and plucking is more important than rainfall, since 3.19 inches of rain did not remove taint in an interval of 13 days, whereas taints disappeared after 23 days during which only 1.03 inches of rain fell.

The rainfall in these two cases was of the same type as the following analysis shows:—

(c) 0.11 on 14-2-35	(d) 0.01 on 16-3-35
0.04	0.09
0.12	0.33
0.71	0.88
0.03	0.55
0.02 on 24-2-35	0.04
	0.27
Total 1.03	0.16
	0.60
	0.20 on 26-3-35
	Total 3.19

There are not any indications of an accumulative effect due to successive dustings. The probability is that, once sulphur dust, in a very finely divided condition, sticks to the leaves of a tea bush, anything akin to normal rainfall is not sufficient to wash it off.

CONCLUSION.

Sulphur dust in a finely divided condition applied to tea bushes in as small a quantity as 2 lbs. per acre may cause marked taints.

After such tainting has occurred it is necessary to allow an interval, after the application of the sulphur dust, sufficient for the growth of flush on which dust has not fallen.
