

ACARICIDAL TRIALS AGAINST THE SCARLET MITE, *BREVIPALPUS AUSTRALIS* TUCKER, ON TEA

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Introduction

Scarlet mite, originally known as *Brevipalpus ghovatus* Dunn, was first observed on tea by Green in 1890 but it was only sixty years later that it reached the status of a pest. Prior to 1950 the mite invariably manifested itself only during periods of dry weather, but subsequently it was observed during the rains. Defoliation which is most noticeable in the third year of pruning is a characteristic feature of recent severe outbreaks. The lighter type of pruning adopted in recent years, which obviously could not have affected a total elimination of the mites at pruning, is a probable contributory factor to the carry over of the pest from one cycle to another.

Dusting with sulphur was the only specific acaricide which was recommended for its control in earlier years, the reason being that no estate possessed any spraying equipment. With the arrival of blister blight the situation changed. Most up-country tea estates are now equipped with batteries of sprayers, and these are, therefore, available for checking an outbreak of mites by spraying with acaricides, which is far more effective than dusting.

Acaricidal applications

(a) **Tainting acaricides** :—Although sulphur is one of the cheapest and most effective acaricides in the market, a great disadvantage in its application on tea is the undesirable taint it causes to the manufactured product. It has been found that if sulphur is applied to tea in plucking for the control of mites, a period of three weeks after the last application must elapse before the leaf from the treated tea could be used for manufacture, to avoid taint.

The most suitable time for the applications of sulphur for scarlet mite control is, therefore, between pruning and tipping when three to four applications, at intervals of a week to ten days, could be made. An interval of three weeks is necessary between the last application of sulphur and the first plucking.

As scarlet mites live on the under side of the more mature leaves, spray applications for their control should be directed to reach the under side of such leaves. During the period following pruning, when there are only a few branches and leaves left on the bushes, the labourers could carry out the spraying operations efficiently.

When a scarlet mite infested field is pruned a large proportion of the mite population is eliminated in the prunings. As the leaves on the prunings dry up, the mites on the infested leaves die. A few mites, however, migrate back to the bushes and continue to live on the few leaves and green portions of the side branches that are left on the frames. It is at this period that a thorough application of the acaricide is necessary, either as a spray or dust. This operation or measure should reduce the residual mites to an extremely low level and avoid a build-up in the 3rd or 4th year, provided of course no serious re-infestation occurs from outside sources such as shade trees.

(b) **Non-tainting acaricides**.—Chlorobenzilate (Akar), an organic compound, is one of the non-tainting and effective acaricides against scarlet mites that has come

into use recently. One week should, however, elapse between its application and the following pluck. The cost of Akar is about three times that of wettable sulphur. The product is compatible with the copper fungicides usually used in blister blight control and could be incorporated with such fungicides without harmful effects to the tea.

Planting Opinion.—In planting circles opinion prevails that when a scarlet mite field is pruned and most of the mite infested leaves are removed, the mites which are left behind on the leaves and those that fall from the shade trees may be effectively controlled if Akar is introduced in correct proportions into the routine spray recommended for the control of blister blight. If this method is adopted from the commencement of blister control and continued throughout the cycle, it is assumed that a build-up of scarlet mites in the third and fourth years may be prevented.

It is obvious that if combined applications of acaricides and fungicides are effective against both scarlet mites and blister blight, a considerable saving could be effected by reducing the cost of special spray operations for mite control work.

Another advantage of this combined method is the elimination of the difficulty of maintaining a separate set of spraying machines for sulphur applications and another for copper spraying during the blister season. If the machines used for the applications of sulphur are also used for copper spraying, there is always the risk of sulphur taints developing in the made tea.

Earlier Trials.—Baptist and Ranaweera (1955) have indicated that weekly applications of a light spray of Akar in the dilution of 1 in 1,000, applied from above as for blister blight control at 15 gallons of spray per acre, do not give adequate control compared with heavy applications of the same acaricide (150 gallons per acre) of the same concentration directed to reach the under sides of the foliage where the scarlet mite lives and breeds. Their experiment was limited to 4 applications of both treatments when their report was written. Table I gives the comparative figures of control achieved for the same experiment, continued over a period of 14 weeks. Fourteen light sprays of Akar in the dilution of 1 in 1,000 were given against 8 heavy applications, the latter number being restricted by the absence of mites in these plots after this particular application. But it will be noticed that at the end of the 14th weekly light application an appreciable number of mites continued to survive.

Table I. *Chlorobenzilate (Akar) applied in light and heavy sprays.*

Time of Estimation	Light Spray		Heavy Spray		Control	
	No. of live mites present	Percentage	No. of live mites present	Percentage	No. of live mites present	Percentage
Before application	257	100	165	100	210	100
5 days after 1st application	191	74	73	44	193	92
6 -do- 2nd -do-	160	62	29	18	224	107
6 -do- 3rd -do-	106	41	6	4	180	86
6 -do- 4th -do-	95	37	1	1	201	95
8 -do- 5th -do-	88	34	3	2	190	90
7 -do- 6th -do-	93	36	—	—	166	79
8 -do- 7th -do-	101	39	3	2	145	69
6 -do- 8th -do-	80	31	—	—	135	64
8 -do- 9th -do-	72	28	—	—	120	57
7 -do- 10th -do-	57	22	—	—	138	66
6 -do- 11th -do-	77	30	—	—	131	62
7 -do- 12th -do-	96	37	—	—	168	80
7 -do- 13th -do-	77	30	—	—	177	84
8 -do- 14th -do-	72	28	—	—	121	58

Recent Trials.—In order to determine the relative effectiveness of sulphur (Spersul) when applied as a heavy post pruning spray, compared with a light spray application of Chlorobenzilate (Akar) incorporated with Perenox in the routine blister control spray, a replicated trial was started on a field of tea at St. Coombs estate at the beginning of the cycle soon after pruning. The field had run for 4 years and had a fairly heavy attack of scarlet mite.

Treatments which were randomised and replicated six times in six blocks were as follows:—

1. Sulphur applied as Spersul, at a concentration of 1 lb. in 25 gallons of water and at the rate of 40 gallons to the acre, as a special spray in 4 applications at two-weekly intervals; first application 4 weeks after pruning. Old leaves left behind on the branches at the time of pruning were removed between the 3rd and 4th application as recommended by Baptist and Ranaweera (1955).

2. Chlorobenzilate (Akar) incorporated with Perenox at a concentration of 1 in 1,000 by volume, applied at the rate of 15 gallons to the acre as a light superficial application in the normal blister control spray, commencing 4 weeks after pruning and continuing throughout the cycle.

3. Untreated.

Records.—Mite counts were carried out at monthly intervals. Dry weights of weekly pluckings were kept in order to ascertain any possible loss of crop.

After the 53rd application, the incorporation of Akar in the Perenox spray was discontinued and all plots given normal blister protection by spraying them with Perenox alone once a week. Table II below gives the records of mite counts and dry weight yields.

Table II. *Chlorobenzilate (Akar) light spray incorporated with Perenox versus Sulphur (Spersul) heavy spray.*

Treatments

Age from pruning Month	Spersul heavy spray				Akar and Perenox light spray				Untreated			
	Total No. of sprays given	Mite counts at the particular month	Total mite counts	Total dry wgt. yield (pounds)	Total No. of sprays given	Mite counts at the particular month	Total mite counts	Total dry wgt. yield (pounds)	Total No. of sprays given	Mite counts at the particular month	Total mite counts	Total dry wgt. yield (pounds)
6th	4	11	15	25.98	18	154	204	25.44	Nil	183	304	27.82
15th	4	540	3,749	208.74	53	429	5,589	212.34	Nil	629	9,512	216.13
20th	4	1,770	9,301	327.70	53	1,904	11,395	335.82	Nil	2,643	16,340	335.77

Comparative costs of 2 treatments:

Heavy application of Spersul.—Cost of spraying 1 acre of pruned tea with Spersul at a concentration of 1 lb. in 25 gallons water and at the rate of 40 gallons to the acre per round for 4 rounds.

Cost of Spersul @ 85 cts. per lb.	Rs.	5.44
„ „ labour 1.5 labourers per acre per round × 4 rounds	„	15.00
	Rs.	<u>20.44</u>

Light superficial application of Akar.—Cost of spraying 1 acre of tea recovering from pruning with Akar (incorporated with a copper fungicide) at a concentration of 1:1,000 and at the rate of 15 gallons to the acre for 53 rounds.

Cost of Akar @ Rs. 100/- per gallon	Rs.	79.50
Cost of labour		Nil
	Rs.	<u>79.50</u>

Yield.—No significant difference in yield was noticeable in the three treatments up to 20 months from pruning.

Bush Defoliation.—A general defoliation due to mite attack was not observed in the untreated plots up to the 20th month from pruning.

Discussion

An examination of the data of Table 2 would indicate that the post pruning heavy spray treatment of Spersul coupled with the removal of old leaves after the third application was more effective in reducing the mite population up to the 6th month from pruning than the Akar and Perenox light spray treatment. Thereafter, there was a build-up of mite populations in all treatments, so that at the 15th month from pruning the mite population was about the same in both the treated plots and in the control. There was no difference in yield between the treated plots up to the 20th month from pruning, nor was any general defoliation observed in the bushes up to that period.

Since the sulphur treatment was much the cheaper of the two, it would appear that the opinion held in planting circles, that the incorporation of a non-tainting acaricide like Akar with the weekly applications of fungicide sprays for the control of blister blight was the most economical measure of control for scarlet mite, was not borne out by these trials.

References

Baptist, B. A. and Ranaweera, D. J. W. (1955).—The Scarlet mites of the genus *Brevipalpus* as pests of tea in Ceylon. *Tea Quarterly*, Vol. 26, part 4, pp. 127-137.

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