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A CRITICAL EVALUATION OF THE CURRENTLY AVAILABLE RESULTS OF SOME ETHREL TRIALS IN SRI LANKA

By

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ABRAHAM (1970) presented his findings from field trials on the use of Ethrel as a yield stimulant for rubber, at the RRIM Planters' Conference in 1970. A 10% solution of Ethrel in palm oil was found to give a large yield response on a wide range of cultivars and tapping systems. Experiments on Ethrel commenced in Sri Lanka in early 1971. At this time Ethrel was available as a 40% concentrate and our immediate problem was to find a suitable substitute for palm oil, which was used in Malaysia for diluting Ethrel. The first 50 cc sample of Ethrel we obtained in 1971 was therefore tested at 10% strength in coconut oil on a few trees of clones PB 86, GT 1 and *Hevea benthamiana*. Yield recordings made on these proved the efficacy of coconut oil as a suitable substitute for palm oil. There was virtually a doubling of yield in clonel PB 86 and GT 1 and a fifteenfold increase in yield in budgrafts of *H. benthamiana*. In view of the fact that the largest acreage of rubber in Sri Lanka is planted with clone PB 86 and it responds readily to Ethrel, as noted in Malaysia, our early trails were confined to this clone.

Out of a large number of possible treatments, priority was given to investigations on the following aspects :

(1) The lowest concentration of Ethrel that would give an effective yield response
(2) Long term effects of Ethrel stimularion.
(3) The use of Ethrel as a possible alternative to a progressive intensification of tapping before replanting.
(4) The economics of Ethrel stimulation under conditions prevailing in Sri Lanka.

Concentration of Ethrel

In view of the high costs of Ethrel in Sri Lanka, a trial was set down in 1971 to evaluate the effects of three concentrations of Ethrel (5%, 10% and 15%) in coconut oil. Applications were made once every two months on a 1½ in. strip of scraped bark below the tapping cut on panel C of clone PB 86. Tapping was done on the S/2, d/2, 100% system. The experimental design was a randomised layout with a plot size of 50 trees. Plain coconut oil was applied in the control plots and the four treatments are replicated six times. The yields recorded for the first twelve months of the trial in g per tree per tapping are shown in Table 1.

TABLE 1

AVERAGE YIELD IN G/TREE/TAPPING

	Control	Concentration of Ethrel		
		5%	10%	15%
Yield	37.2	56.8	58.1	64.1
% Yield	100	152.7	156.2	173.7

It indicated that a 5% concentration of Ethrel was equally effective as a 10% concentration.

Long Term Effects

In these trials, a 10% mixture of Ethrel in coconut oil was applied to a 1½ in. strip of lightly scraped bark below the tapping cut once every two months. The trials are sited in commercial estates and all operations such as tapping and Ethrel applications are carried out under commercial conditions. The plot size consists of a tappers task so that the yields could be recorded on the basis of daily output per tapper.

TRIAL 1

In one trial stimulation was on panel C of clone PB 86 and tapped on the S/2, d/2, 100% system. Two tapping tasks are stimulated while two tasks serve as the controls. The yields recorded for the first two yr. are shown in Table 2.

TABLE 2

YIELDS OF CONTROL AND STIMULATED PLOTS

		1st yr		2nd yr	
		Control	Stimulated	Control	Stimulated
1	Yield/ac. (lb)	877.8	1911.3	850.4	1553.6
2	% Yield of controls	100.0	217.7	100.0	182.7
3	Average yield/tapper(lb)	11.9	25.2	10.5	19.1

During the first year, the stimulated plots have recorded a yield increase of 117.7% over the control plots while in the second year it has declined to 82.7% of the control plots. However, in the control plots there had been a 12% drop in yield in the second year as compared with a 25% drop in yield in the stimulated plots.

TRIAL 2

This trial is just over a year old and stimulation is carried out on panel D of clone PB 86, tapped on S/2, d/2, 100% system. Three tappers tasks are stimulated while three tasks serve as controls. The yields recorded during the first twelve months are given in Table 3.

TABLE 3

THE YIELD OF CONTROL AND STIMULATED PLOTS FOR THE FIRST TWELVE MONTHS

		Control	Stimulated
1	Total yield for 3 tasks (lb)	4346	8070
2	Percentage yield	100	186

It had recorded a yield increase of 86% with only 5 applications of Ethrel. The sixth application could not be made due to wet weather.

TRIAL 3

The comparisons in this trial are as follows :

(*a*) Tapped on S/2, d/2, 100% without stimulation (Control).

(*b*) Tapped on S/2, d/3, 67% with Ethrel stimulation once every two months.

Three tappers tasks are stimulated while three serve as the controls. Owing to wet weather only five applications were possible during the first twelve months. The yields recorded in this trial are given in Table 4.

TABLE 4

AVERAGE YIELDS FOR THE FIRST TWELVE MONTHS

		Control	Stimulated
1	Yield/ac. (lb)	951.4	1586.2
2	Percentage yield	100	166
3	Average yield/tapping per task	10.9	17.9

The stimulated plots have recorded a yield increase of 66% during the first year of the trial. This trial is being continued in its second year in 1973 and in Table 5 the yields during the first six months of the 1st yr are compared with the corresponding period in the second year.

TABLE 5

AVERAGE YIELDS FOR 6 MONTHS OF THE FIRST YEAR COMPARED WITH THE SAME PERIOD OF THE SECOND YEAR

		Control	Stimulated	% Increase
1	Yield/ac. (lb) (Aug. 1971—Jan. 1972)	490.6	717.2	46.2
2	Yield/ac. (lb) (Aug. 1972—Jan. 1973)	550.0	837.2	52.0

Tapping at 67% intensity with stimulation had not led to any decreasing trends in yields in the second year.

Intensification of Tapping

In Sri Lanka, it is the general practice to carry out a progressive intensification of tapping for a period of 6-7 yr before replanting. Owing to the introduction of extra tapping cuts at this stage it is necessary to re-allocate tapping tasks at every stage of intensification. This results in extra yield being obtained at extra cost.

Investigations on the possible use of Ethrel at this stage have therefore proceeded on the following basis:

(1) The economics of Ethrel stimulation at 100 per cent tapping intensity as compared with a progressive intensification of tapping before replanting.

(2) The possibility of reverting to 100 per cent intensity tapping with Ethrel stimulation after a period of high intensity tapping.

One trial comparing high intensity tapping with Ethrel stimulation at 100 per cent intensity tapping has been in progress for just over a year. In this trial, each of the following treatments are applied to two tapping tasks on panel D of clone PB 86.

(1) Tapped at 150 per cent intensity without stimulation (Control)

(2) ,, 100 ,, ,, ,, and stimulated with Ethrel

Here 10% Ethrel in Coconut oil is applied to a $1\frac{1}{2}$ in. strip of scraped bark below the tapping cut once every two months. Owing to the differences in the tapping systems the task size for control plots is 160 trees and for stimulated plots 217 trees. The yields during the first twelve months are given in Table 6.

TABLE 6

YIELDS RECORDED FOR THE FIRST 12 MONTHS

		Control	Stimulated
1	Average yield/ac. (lb)	1582.5	1226.2
2	Percentage yield	100	77.6
3	,, scrap	100	138.1
4	Average yield/tapper (lb)	19.2	19.1

The unstimulated plots tapped at 150% intensity have recorded higher yields per ac. than plots tapped at 100% and Ethrel stimulated during the first year. The average yield per tapper has remained practically the same for the two treatments, but the yield of 19.1 lb per tapper in the stimulated plots have been obtained at extra cost for Ethrel and its applications. The results therefore indicate that at least in the first year of the trial it had been more profitable to tap at 150% intensity than to stimulate with Ethrel at 100% intensity. However, one cannot be certain whether the same trend will be continued through-out the intensification period, particularly in view of the fact that the yields generally tend to decline with time under high tapping intensities. In two other small scale trials, where tapping at high intensity has been done for a period after which the tapping intensity was reduced to 100% and stimulated once every two months with Ethrel the yields for the first year are as follows:

TABLE 7

CLONE PB 86 TAPPED AT 150% INTENSITY FOR 4 YR AND STIMULATED ON PANEL D AT 100% INTENSITY

		Control 240 trees	Stimulated 240 trees
1	Average yield/tapping (lb)	16.0	19.6
2	Percentage yield increase	—	23.0

In the next table clone PB 86 had been tapped at 133% intensity on the double three system for two years and then reverted to 100% intensity and stimulated once every two months on panel C.

TABLE 8

CLONE PB 86 TAPPED AT 133% FOR 2 YR AND STIMULATED ON PANEL C AT 100% INTENSITY

		Control 240 trees	Stimulated 240 trees
1	Average yield/tapping (lb)	14.3	17.6
2	Percentage yield increase	—	23.0

Here too the response had been rather poor with only a 23% increase in yield.

Costs of Production

The cost of tapping and collection of latex in Ethrel stimulated areas in Sri Lanka, had been variable, depending on each estate. This had been largely due to the different methods of collection and rates of payment to tappers adopted by individual estates. Another contributory factor, though of minor significance, had been the weather conditions prevailing in each district. In general, many collections are made during the day at periods of peak response and extra payments are made for these, the rates being varied according to the amount of latex collected. The tapping costs per lb of rubber harvested in the various experimental areas are given in Table 9.

TABLE 9

TAPPING COSTS IN CTS/LB OF DRY RUBBER HARVESTED

Estate	Tapping System	Control	Stimulated
A	S/2, d/2, 100%	27.2	29.0
B	,,	35.5	31.4
C	S/2, d/3, 67%	34.0	37.9
D*	S/2, d/2, 100%	25.6	35.2

*In estate D, the control plots are tapped at 150% intensity.

In all estates except B the tapping cost per lb of dry rubber harvested in the stimulated plots have been higher than in the control polts. In estate B the costs of extra fertilizer applied have not been included in the costs. There has also been a slight saving in labour costs. This might account for the relatively lower costs in the stimulated plots. In estate D the tapping costs are considerably lower in plots tapped at 150% intensity than in plots tapped at 100% intensity with Ethrel stimulation. A breakdown of the various items of expenditure involved in Ethrel stimulation in the experimental plots is given in Table 10 and 14.

TABLE 10

COST IN CTS/LB DRY RUBBER HARVESTED TAPPED S/2, d/2, 100%

		ESTATE A		ESTATE B	
		Control	Stimulated	Control	Stimulated
1	Tapping and collection	27.2	18.8	35.5	21.5
2	Ethrel	—	5.3	—	8.4
3	Coconut oil	—	0.3	—	0.2
4	Labour for application	—	3.1	—	1.3
5	Extra fertilizer	—	1.5	—	—
	TOTAL	27.2	29.0	35.5	31.4

TABLE 11

COST IN CTS/LB DRY RUBBER HARVESTED ON DIFFERENT TAPPING SYSTEMS

		ESTATE C		ESTATE D	
		Control s/2, d/2	Stimulated s/2, d/3	Control s/2,s/4,d/2,150%	Stimulated s/2,d/2,100%
1	Tapping and collection	34.0	25.5	25.6	26.4
2	Ethrel	—	8.2	—	6.5
3	Coconut oil	—	0.3	—	0.2
4	Labour for application	—	1.6	—	2.1
5	Extra fertilizer	—	2.3	—	—
	TOTAL	34.0	37.9	25.6	35.2

It will be seen from these tables that the largest single item of extra expenditure in stimulated plots is the cost of Ethrel which has varied from 5.3 cts to 8.4 cts on a lb of dry rubber harvested. This cost includes the import duty and FEECs levied in Sri Lanka. The use of 5% Ethrel in place of 10% used in these trials is likely to reduce costs of Ethrel. Tapping on a third-daily frequency at 67% intensity with stimulation had not resulted in any reduction in tapping costs of the stimulated plots.

DISCUSSION

A number of trials carried out in Sri Lanka, though they have been of relatively short duration, have confirmed the findings in other countries that Ethrel is by far the most effective yield stimulant for rubber yet known. It has given large yield increases on panels C and D of clone PB 86.

Any future large scale use of Ethrel in Sri Lanka would therefore depend on finding answers to two important questions, namely;

(1) How long can Ethrel stimulation be continued without any adverse effects and

(2) What are the relative costs of Ethrel stimulation.

In one trial which had been in progress for over two years, there had been a trend towards a declined response in the second year, inspite of application of additional fertilizer. Tapping in this instance had been on 100% intensity with Ethrel stimulation once every two months.

In another trial where tapping intensity is reduced to 67% with Ethrel stimulation once every two months, a declining trend had not been observed in the second year.

However, due to the relatively short duration of these trials, which are continuing, it appears too early to arrive at firm conclusions of the long term effects of stimulation. Further, a reduced number of applications per year than the maximum six applications offer further prospects for experimentation. If the present indications are to serve as any guide to the future, they seem to favour the combination of low tapping intensities with Ethrel stimulation.

Inspite of the large yield increases one notable feature in trials carried out so far is the high cost per lb of rubber harvested under Ethrel stimulation. An important contributory factor appears to be the high cost of Ethrel in Sri Lanka. In addition to this there is also the extra costs involved in collection of the extra yield. This has become necessary in Sri Lanka where latex and scrap are collected separately for the manufacture of crepe or smoked sheet.

In spite of this, at times of high rubber prices, Ethrel stimulation should result in substantial profits by virtue of a large output of rubber. But there still appears to be a certain degree of uncertainty as to the point at which Ethrel can safely be introduced during the economic life of a plantation. Long term experiments, which are now in progress should provide the answer.

REFERENCE

ABRAHAM, P. D. (1970). Field trails with Ethrel.
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