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A STUDY ON WEED CONTROL BY HERBICIDES AND MANUAL MEANS ON PLANTING STRIPS IN A YOUNG RUBBER PLANTATION

M. MATHEW, S.N. POTTY and K.I. PUNNOOSE

ABSTRACT

An experiment was conducted from 1981 to 1984 in a young rubber plantation to find the comparative effect of the herbicides Paraquat, Fernoxone and Dalapon in combinations and manual weeding on the control of weeds in contour terraces. The treatments paraquat as Gramoxone at 2.5 l/ha plus Fernoxone at 1.25 kg/ha and Dalapon at 5 kg/ha plus Paraquat at 2 l/ha were superior to manual weeding for control of weeds. The girth of the trees after three years of experimentation was higher in plots where the above herbicides were applied. On cost comparison with the treatment Paraquat plus Fernoxone was the cheapest followed by Dalapon plus Paraquat. Manual weeding was costlier to the herbicide treatments.

INTRODUCTION

The control of weeds on the planting lines or terraces of immature rubber plantations is very important to facilitate the quick growth of rubber plants. Apart from competing with young rubber plants for light, nutrients and water, weeds cause serious inconvenience to various estate operations for plant protection and manuring. The conventional method being adopted to achieve this objective is scraping with a spade. Due to favourable

moisture condition during most of the months it may require several repeated manual operations using a spade in order to get an all the year round control of weeds in the planting lines. Research work done by the various Rubber Research Institutes indicates the possibility of weed control by the application of herbicides in rubber plantations (Abdul Kalam and Punnoose, 1975; Mathew et al., 1977). Where labour is available at low cost, manual weed control may be cheaper than herbicide applications. Since in most parts of the country the labour rates show an increasing trend, chemical methods are likely to become on par with or even cheaper than manual weeding. Chemical weed control has other advantages — it does not disturb the soil surface and expose the soil to erosion, and it is less time consuming. Therefore, the present work is taken up to find the best schedule of herbicide application, and to compare its effectiveness and economy with manual methods of weed control.

MATERIALS AND METHODS

The experiment was laid out in a plantation located at Erumely in Pathanamthitta District of Kerala State. The field was a seed-at-stake planting budded with R.R.I.I. 105 in September, 1980. The treatments are listed below:

T 1 —Gramoxone at 2.5 l/ha plus Fernoxone 1.25 kg/ha of actually sprayed area.

T 2 —Manual weeding—scraping plant basins and slashing in between the plant basins.

T 3 —Spraying plant basins with Treatment T 1 and slashing in between the plant basins.

T 4 —Dalapon at 5 kg/ha and followed by Gramoxone at 2 l/ha one to ten days after Dalapon spraying—of actually sprayed area.

The above treatments were imposed only on the planting strips or terrace. The treatments were started in October, 1981 and were repeated, so as to get a continuous control of weeds. Observations on the percentage regeneration of weeds were taken periodically and the girth of trees recorded equally. The dates on which the treatments were imposed and observations recorded are given in Appendix 1. The data on rainfall during the period of experiment are presented in Appendix 2.

RESULTS AND DISCUSSION

The results of the different parameters observed are discussed:

Effect on weed regeneration: The data on percentage regeneration of weeds recorded on different dates are presented in Table 1.

1) Observation on 25.2.1982: The treatment Dalapon plus Gramoxone and the treatment Gramoxone plus Fernoxone in plant basin and slashing in between were significantly superior to the treatments Gramoxone plus Fernoxone and complete manual weeding. Further the treatment Dalapon plus Gramoxone was superior to Gramoxone plus Fernoxone in plant bases and slashing in between. Treatments Gramoxone plus Fernoxone and complete manual weeding were on par with each other.

2) Observation on 23.4.1982: The results show that the treatment Dalapon plus Gramoxone was significantly better than all the other treatments. The effect of the other three treatments were on par, with each other.

3) Observation on 19.7.1982: It is seen that the treatments Gramoxone plus Fernoxone and Dalapon plus Gramoxone were superior to the other treatments and the treatment of complete manual weeding was inferior to all the others.

4) Observation on 20.9.1983: The best control was observed for the treatments Gramoxone plus Fernoxone and Dalapon plus Gramoxone. The treatment of manual weeding was inferior to all the others.

5) Observation on 29.11.1983: The treatment Gramoxone plus Fernoxone was on par with the treatment Dalapon plus Gramoxone, but was significantly better than the other two treatments.

6) Observation on 3.2.1984 and 27.6.1984: The treatments Dalapon plus Gramoxone and Gramoxone plus Fernoxone gave the best control of weeds. Manual weeding gave the lowest control.

A general evaluation of the above results indicates that the treatments Gramoxone plus Fernoxone and Dalapon plus Gramoxone are superior for efficient weed control and manual weeding is inferior. These results are in full conformity with the results obtained by different authors (Riepma, 1968; Darter, 1968; Anonymous, 1967; Peng, 1970; Lee, 1975; Mathew et al., 1977).

Effect on the girth of trees: The mean girth of plants recorded

Table 1. Mean percentage regeneration of weeds on different dates (transformed values)

Dates Treatment	25.2.1982	23.4.1982	19.7.1982	20.9.1983	29.11.1983	3.2.1984	27.6.1984
T 1	37.73 (37.50)*	53.08 (63.75)	39.23 (40.00)	12.92 (5.00)	28.14 (22.50)	15.68 (7.50)	29.89 (25.00)
T 2	37.73 (37.50)	50.77 (60.00)	45.72 (63.75)	37.44 (37.50)	45.00 (50.00)	42.82 (46.25)	45.00 (50.00)
T 3	33.17 (30.00)	52.28 (62.50)	42.13 (45.00)	24.45 (17.50)	39.11 (40.00)	23.73 (16.25)	38.45 (38.75)
T 4	26.48 (20.00)	43.56 (47.00)	39.23 (40.00)	12.92 (5.00)	33.75 (31.25)	12.92 (5.00)	29.71 (25.00)
	S.E: 1.32 C.D: 4.71	S.E: 1.49 C.D: 4.71	S.E: 0.36 C.D: 1.13	S.E. 2.69 C.D: 8.57	S.E: 2.22 C.D: 7.07	S.E: 1.21 C.D: 3.84	S.E 2.08 C.D 6.64

*Figures in parentheses indicate actual percentage.
C.D. values are at 5 per cent confidence limit.

annually is furnished in Table 2. The pre-treatment girth data (1981) did not show statistical difference among the treatments, which reveal the uniformity of experimental area. The data recorded in 1983 also did not show statistical difference, probably because a period of one year may not be enough to get the effect of weed control reflected on the growth of rubber plants.

Table 2. Mean girth of trees (CMS) on different dates

Dates Treatment	10.10.1981	15.1.1983	9.2.1984
T 1	10.08	15.62	22.73
T 2	9.98	14.61	21.07
T 3	10.24	15.26	22.82
T 4	10.36	15.50	23.20
	S.E: 0.34	S.E: 0.49	S.E: 0.47
			C.D: 1.48 (at 5%)

The girth data recorded two years after commencement of the trial (1984) showed significant difference among the treatments. Manual weeding was inferior to all the herbicide treated plots. However, there was no significant difference between the three herbicide treatments.

Cost comparison of different treatments: The treatment Gramoxone plus Fernoxone is the cheapest means of weed control followed by the treatment Dalapon plus Gramoxone (Table 3). Manual weeding is the costliest treatment.

Table 3. Cost of herbicide treatment/manual weeding per ha of rubber plantation from 10.10.1981 to 13.3.1984 involved to keep the planting lines (terraces) weed free

Treatment	Cost of herbicide Rs.	Labour charge Rs.	Total cost Rs.
T 1	324.00	160.71	484.71
T 2	—	1227.24	1227.24
T 3	137.48	886.34	1023.82
T 4	489.20	262.98	752.18

Considering the extent of weed control and growth of rubber, the treatments Gramoxone plus Fernoxone and Dalapon plus Gramoxone could be rated as the best herbicide combinations. Treatment Gramoxone plus Fernoxone is the cheapest combination of weedicides followed by the treatment Dalapon plus Gramoxone. Therefore from the point of view of benefit derived and cost involved treatment Gramoxone plus Fernoxone is the most advantageous one followed by the treatment Dalapon plus Gramoxone.

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DISCUSSION

Q : It is reported elsewhere that addition of Urea (0.5%) will reduce the quantity of weedicides. Have you tried this?

Ans: A trial on this line is in progress.

Q : A single high dose of dalapon will affect translocation of weedicides beyond the point of entry. Therefore repeated applications of lower doses might be more useful?

Ans: Doses lower than this were not effective even by repeated spraying.

Q : The girth should be retarding from the third year because herbicides affect soil microflora?

Ans: The girth increase observed could be attributed to less soil disturbance. Moreover, application of herbicides is localised.

Q : Have you given a general weeding before incorporation of treatments?

Ans: Contour terraces were cut before commencement of experiment.

Appendix 1. Dates of treatment imposition and recording observations

Dates of treatment imposition		Dates of recording weed regeneration	Dates of recording girth of trees
Weedicide spraying	Manual weeding		
10.10.1981	10.10.1981	25.2.1982	10.10.1981
11.12.1981	23. 4.1982	23.4.1982	15. 1.1983
23. 4.1982	31. 8.1982	19.7.1982	9. 2.1984
29. 7.1982	16.10.1982	20.9.1983	
9. 9.1982	10.12.1982	29.11.1983	
16.10.1982	29.11.1983	3.2.1984	
19. 7.1983	13. 3.1984		
29.11.1983			
13. 3.1984			

Appendix 2. Rainfall data from January 1981 to June 1984

Year/Month	1981		1982		1983		1984	
	Rainfall (mm)	No. of rainy days	Rainfall (mm)	No. of rainy days	Rainfall (mm)	No. of rainy days	Rainfall (mm)	No. of rainy days
January	68	4	—	—	—	—	15	2
February	44	5	—	—	39	2	181	10
March	189	14	115	8	27	1	99	13
April	208	14	193	9	22	3	278	15
May	349	15	466	16	162	13	176	10
June	1208	27	708	26	391	21	679	28
July	964	22	443	25	645	20		
August	561	24	398	18	[illegible]	[illegible]		
September	789	22	136	10	470	26		
October	549	21	236	14	241	18		
November	95	15	190	15	271	8		
December	23	2	16	1	228	7		
Total	5047	185	2901	142	3143	143		