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EFFECT OF LEGUMINOUS COVER CROPS ON THE GROWTH OF IMMATURE RUBBER PLANTS

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Abstract: An experiment was conducted to study the effect of leguminous cover crops on growth of immature rubber. It is observed that the leguminous cover crops increased the absorption of N,P and K from soil by the rubber plants. It is also noted that the nutrition to cover crops increased the Dry Matter Production (DMP) of cover crops and the decomposed biomass of cover returned sufficient quantity of nutrients; which in turn used by the rubber plants and produced better girth.

1. Introduction

The use of cover crops interplanted with the main crop is a common practice in tropical plantations, their presence serving to protect the crop and soil from the more extreme climatic conditions. Among the covercrops, leguminous sp are perennial creepers with very fast growing habit, capable of smothering weeds, tolerant to shade, pest and disease having nitrogen fixing capacity, performing least competition with rubber for nutrients and moisture, Pushparajah (1977) and Potty *et al.*, (1990). Hence an attempt was made to study the effect of cover crops on the growth of immature rubber.

2. Materials and Methods

The experiment was carried out from 1990 to 1993 to study the effect of leguminous cover crops on the growth of young rubber plants with the clone RRII 105. The rubber plants were planted and field budded at a spacing of 5 x 5 m during 1990 June. The cover crops namely *Pueraria Phaseoloides* and *Mucuna bracteata* were planted in the interrow space of rubber. The experiment was statistically laid out in RBD, with three replications. the rubber plants received fertilizers as per the recommendations of the Rubber Research Institute of India. The cover crops were applied with five levels of N P K fertilizers as per the treatments.

The girth of rubber plants were measured by the methods described by Owen *et al* (1957) during 1991, 1992 and 1993. From these observations the girth increments were worked out for the period 1991-93 and expressed in centimetre. The dry matter production of cover crops were also estimated. The leaf nutrient analysis of rubber plants were done for Nitrogen, Phosphorus and Potassium at the end of the experiment. Nitrogen was determined by Micro Kjeldhal method (Piper,

Table 1. Girth increment of rubber and Dry Matter Production of cover crops.

Treatments NPK levels	Girth (cm)			DMP (Kg/ha)		
	C1	C2	Mean (F)	C1	C2	Mean (F)
FO 0:0:0	5.87	5.90	5.88	2625.00	3065.00	2845.00
F1 0:30;30	7.10	7.23	7.17	2663.33	3265.00	2964.17
F2 10:30:30	8.00	8.10	8.05	3068.33	3868.33	3468.33
F3 0:60:60	7.57	7.83	7.70	2670.00	3768.33	3219.17
F4 10:60:60	8.17	8.27	8.22	3245.00	4676.67	3960.88
Mean (C)	7.34	7.47	7.41	2854.33	3728.67	3291.50
Mean of control		3.333				1575.00
CD t		1.462				755.719
CD C		NS				337.968
CD F		1.034				534.374
CD CF		NS				NS
CD t (vs) control		1.08				560.461

Table 2. Hevea leaf N.P.K. 1993

N.P.K. levels	Nitrogen			Phosphorus			Potassium		
Treatments	C1	C2	Mean (F)	C1	C2	Mean(F)	C1	C2	Mean(F)
F0									
0:0:0	3.273	3.396	3.335	0.267	0.238	0.253	1.271	1.277	1.274
F1									
0:30:30	3.311	3.457	3.384	0.247	0.257	0.252	1.303	1.311	1.207
F2									
10:30:30	3.432	3.547	3.490	0.256	0.267	0.262	1.325	1.329	1.327
F3									
0:60:60	3.380	3.522	3.4457	0.265	0.287	0.276	1.353	1.357	1.355
F4									
10:60:60	3.478	3.550	3.514	0.280	0.294	0.284	1.466	1.469	1.468
Mean (C)	3.375	3.494	3.385	0.263	0.269	0.266	1.344	1.349	1..347
Mean of control		2.192			0.151				0.810
CD t Vs control		0.725			0.056				0.267
CD t		NS			NS				NS
CD C		NS			NS				NS
CD F		NS			NS				NS
CD CF		NS			NS				NS

1950). Phosphorus was determined by Molybdenum blue method in a spectrophotometer (Jackson, 1973). Potassium was determined by flame photometer (Jackson, 1973) and the nutrient contents were expressed as percentage.

3. Results and Discussion

It is seen from the table (1) that growing of cover crops even without any fertilizer gave more girth than plots without any cover crops thereby showing distinct advantage of cover crop alone. This is evidenced from the table that all the treatments were significantly superior to the absolute control. Among the levels of fertilizers applied to the cover crops the levels F4, F2 and F3 were significantly superior to F1 and F0. There was no significant difference found between the cover crops and also there was no interaction effect.

The dry matter production of cover crop, Table (1) was significantly superior in the Mucuna bracteata grown plots. Among the treatments F4 level in the Mucuna cover cropped area was significantly superior over all the other treatments. Among the levels of N P K, F2 and F4 levels were on par with each other and superior over other levels.

Growing of cover crops in the young rubber plantations increased the girth of the rubber plants. This increase is probably due to the increased absorption of N, P and K by the plants when grown along with cover crops. This is sustantiated from table (2) that the N, P and K content of rubber leaves were significantly higher in plots where cover crops were grown. This finding is supported by the results obtained by Yogaratnam et al.,(1984).

As far as the DMP of cover crops are concerned, the levels F4, F3 and F2 recorded significantly better quantity. This increased addition of dry matter into the soil and nutrition addition through the decomposed biomass might have contributed to the increased absorption of N, P and K by rubber plants and produced better girth.

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