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FIRST PANEL YIELD OF EIGHT *HEVEA* CLONES IN SUB-TROPICAL MEGHALAYA

Meghalaya is one of the areas in North East India identified for rubber (*Hevea brasiliensis* Willd. ex Adr. de Juss. Muell. Arg.) cultivation. Reports are now available on adequate growth and good yield performance of various clones of *Hevea* from North East India (Meenattoor *et al.*, 1991; Vinod *et al.*, 1996; Priyadarshan *et al.*, 1998; Mondal *et al.*, 1999; Reju *et al.*, 2000) in spite of the environmental constraints. Under regular alternate daily tapping (1/2S d/2) system, rubber trees can be exploited for a minimum of 20 years (Vijayakumar *et al.*, 2000). Comparative yield performance of eight *Hevea* clones on the BO-1 panel is analyzed in this study.

The experiment was carried out at the Regional Research Farm, Tura (25° 31' N; 90° 14' E) in Meghalaya. Yield data for the study were collected from eight clones *viz.*, RRII 105, RRII 118, RRII 203, RRIM 600, RRIM 605, PB 86, PB 235 and GT 1, planted in 1985 in a completely randomized block design with 50 replications. Trees were opened for tapping ten years after planting, on attaining tappable girth and were subjected to 1/2S d/2 system of exploitation. Rubber yield was recorded at fortnightly intervals by cup coagulation method. Clone-wise monthly dry rubber yield over the first five years of tapping was statistically analysed (Table 1). Agrometeorological parameters such as rainfall, relative humidity, maximum and minimum temperature, soil temperature, evaporation, bright sunshine hours and wind velocity were also recorded from the agromet observatory at the plantation site and correlated with the yield.

After five years of tapping, RRIM 600 recorded the highest mean yield (24.1 g/t/t) followed by RRII 105 (21.7 g/t/t) and RRII 118 (21.5 g/t/t). The lowest yield was recorded in RRIM 605 (13.5 g/t/t). During the first year of tapping, the average yield was 14.2 g/t/t and no clone was significantly superior. During the second year, the average yield decreased to 13.3 g/t/t and clonal differences were still not significant. Average yield was found to increase from the third year of tapping with significant clonal differences. Mean yield was 15.1, 21.7 and 29.8 g/t/t during the third, fourth and fifth years of tapping respectively.

Mean monthly yield composition var-

Table 1. **Yield on BO-1 panel (g/t/t)**

Clone	Year					Mean
	I	II	III	IV	V	
RRII 105	15.1	14.9	19.9	29.0	29.5	21.7
RRII 118	15.4	16.6	18.2	26.9	30.5	21.5
RRII 203	11.9	11.6	18.0	20.7	33.6	19.2
RRIM 600	18.2	17.6	17.8	23.1	43.8	24.1
RRIM 605	11.2	8.9	9.5	15.8	22.3	13.5
PB 86	15.5	11.7	13.4	18.6	25.2	16.9
PB 235	16.7	16.7	11.4	16.7	32.0	18.1
GT 1	9.7	9.7	12.5	22.7	21.8	15.7
Mean	14.2	13.3	15.1	21.7	29.8	18.8
SE	1.0	1.0	1.4	1.7	2.5	1.2
CD (P ≤ 0.05)	NS	NS	6.5	7.5	10.4	4.5
(P ≤ 0.01)	NS	NS	8.5	9.8	13.7	5.9

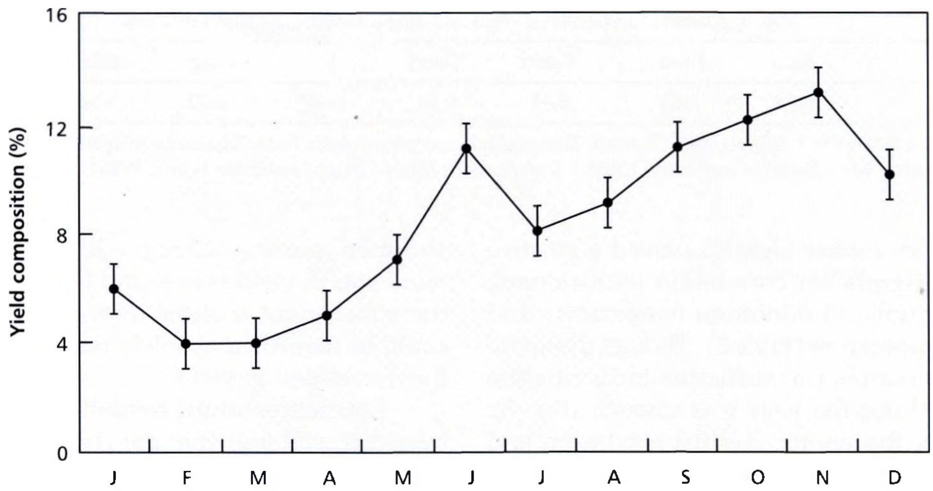

Fig. 1. Mean monthly yield pattern of eight *Hevea* clones over five years (%)

ied from 4 to 13 per cent (Fig. 1). Yield began to decline with the onset of cold dry weather in December and was very low from January to April. Low temperature, prolonged soil moisture deficits, wintering of the trees and refoliation, which occurred during these months, might have placed the rubber plants under considerable physiological stress, which in turn resulted in low yield during these months. Similar reports of low yield during winter are available from China (Chua, 1970; Hu Yaohua and Xie Haisheng, 1985). Though temperature was low in January and February, it rose to a congenial level during March and April. But the trees continued to yield less probably because they utilized a large amount of carbohydrate reserve for flowering, fruit set and production of new flushes (Ortolani *et al.*, 1998). Yield began to increase from May with a marked increase in June in all clones. However, there was a fall in July and August, which may be due to the high moisture status of the soil (Reju *et al.*, 2000). Higher share of yield was recorded in September to November, probably due to congenial climatic conditions. Maximum and minimum temperatures prevalent in the region during these months were found to be ideal for latex production and flow (Shangpu, 1986). On the basis of the quantum of the yield during different months, three seasons have been identified, *viz.*, low, medium and peak yield seasons, which ranged from January to April, May to August and September to December respectively (Fig. 2). The share in total yield for the three seasons were 19, 34 and 47% for the low, medium and peak seasons respectively.

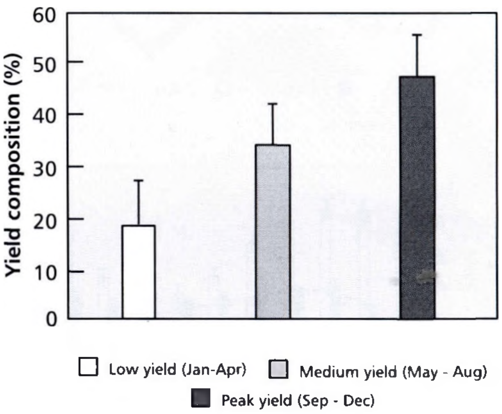

Fig. 2. Mean seasonal yield pattern of eight *Hevea* clones over five years (%)

Table 2. **Correlation between yield and agrometeorological parameters**

	Rain	T-max	T-min	T-soil	RH	Evap.	BSSH	Wind
Yield	0.18	0.39	0.44	0.26	0.64*	-0.32	-0.4	-0.76**

Significant at *P≤0.05, ** P≤0.01. Rain : Rainfall; Tmax : Maximum temperature; Tmin : Minimum temperature; T-soil : Soil temperature; RH : Relative humidity; Evap. : Evaporation; BSSH : Bright sunshine hours; Wind : Wind velocity.

Dry rubber yield displayed a positive but insignificant correlation with rainfall, maximum and minimum temperature and soil temperature (Table 2). Though the quantum of rainfall was sufficient its distribution throughout the year was uneven (Fig. 3). During the winter months maximum and minimum temperature and soil temperature were extremely low and the low yield during the winter months could be associated with these factors. Relative humidity was found to have a positive and significant correlation with yield. Yield exhibited a negative and insignificant correlation with evaporation and bright sunshine hours and a negative significant correlation with wind velocity. Wind velocity was high during summer months. Along with subsiding wind speed, yield was found to increase in the subsequent months. No single factor could be identified as solely responsible for the fluctuation in yield.

Low temperature, rainfall and relative humidity, soil moisture deficits, high wind velocity and bright sunshine hours are among the factors that rendered rubber plants low yielding during February to April. In order to withstand the stress, giving tapping rest during these months may be advisable. Among the eight clones studied, RRIM 600, RRII 105 and RRII 203 were high yielding in the BO-1 panel under the sub-tropical climatic conditions of Meghalaya.

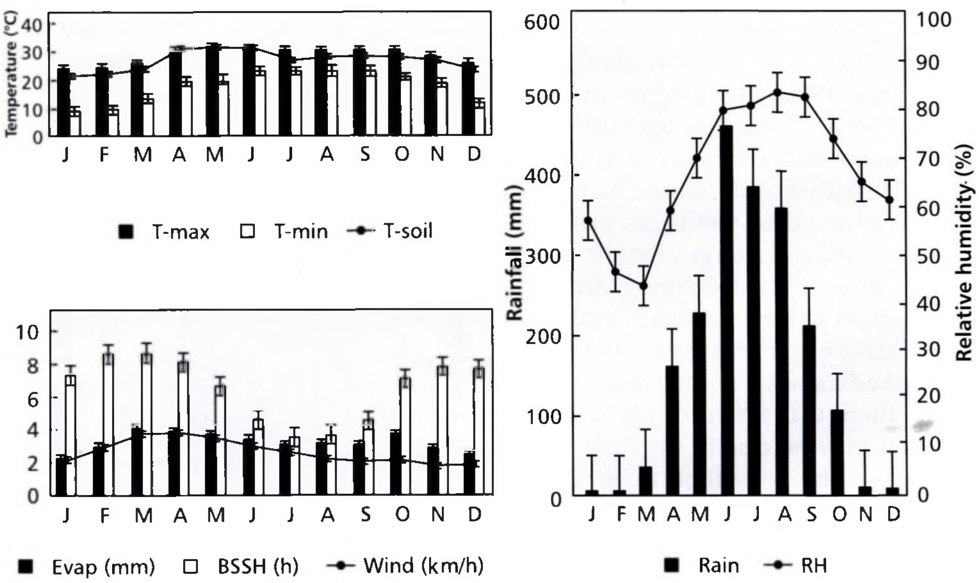

Fig. 3. Mean monthly agrometeorological parameters over five years

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