FLOWERING PATTERN OF *HEVEA* CLONES IN TRIPURA

The *Hevea* tree is reported to flower twice a year (Anon., 1953; Van Haaren, 1969). The first or main flowering in Malaysia is reported to be around February to April after the annual leaf shedding (wintering). Inflorescence appear in off-season, after the primary seed fall, in August to October. Flowering is dependent on wintering which again is dependent on the clone, age of plant, location, seasonal factors, etc. (George *et al.*, 1967). In the traditional rubber growing region (South India), wintering is observed from December to February and flowering follows. An off-season flowering during September to October has been reported in some trees (George *et al.*, 1980).

Though rubber cultivation has been in existence in Tripura for the last two and a half decades, very little information is available on the flowering characteristics of the *Hevea* tree in this region. The data on flowering of various *Hevea* clones give an indication of the synchronisation of flowering which could be of use in the design of polyclonal seed gardens. The data are also pre-requisite for breeding programmes involving hand pollination. The present study aims to understand the flowering pattern of fifteen clones of *Hevea brasiliensis* grown in Tripura.

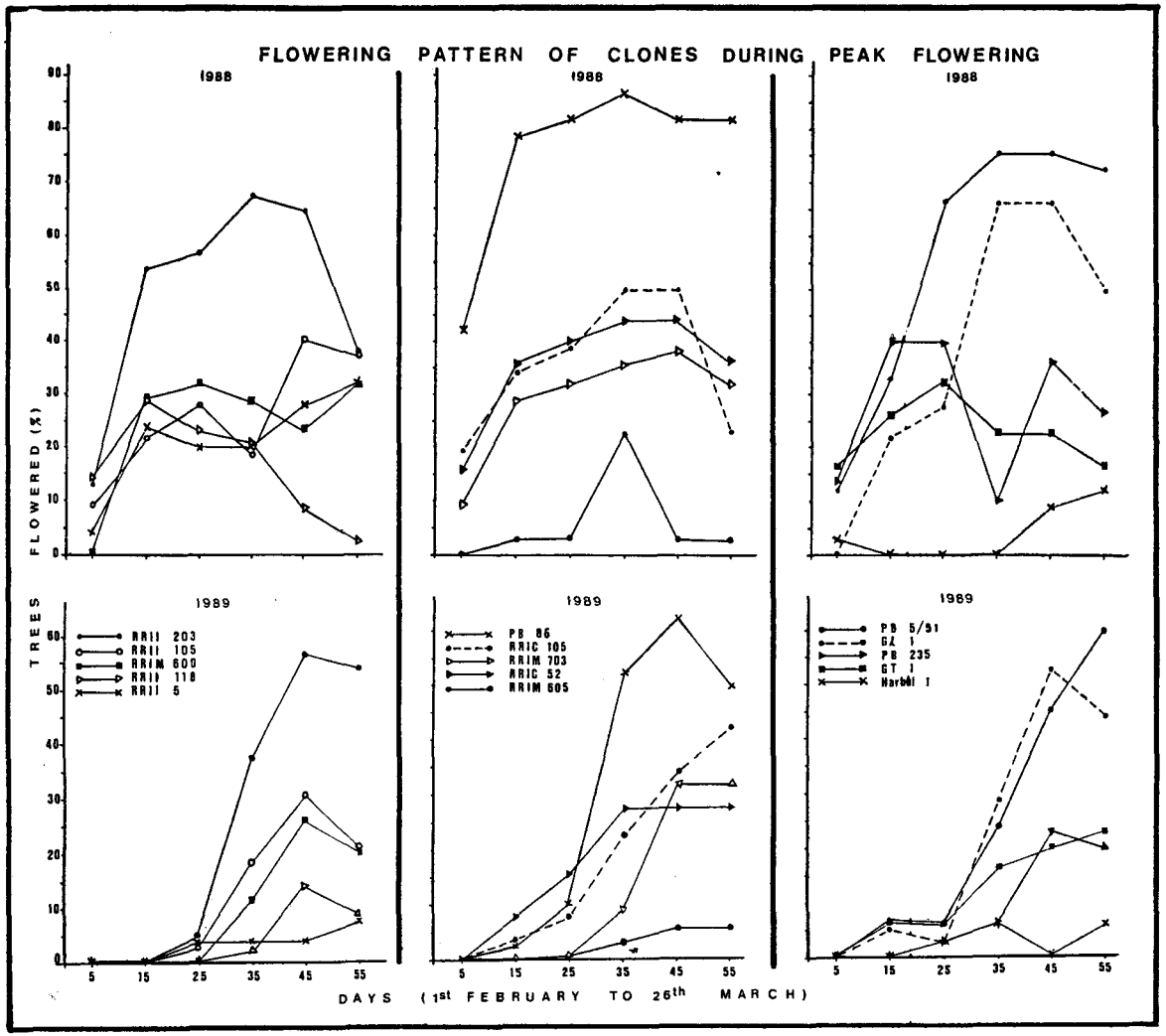
An existing field experiment started in 1979 at the Regional Research Station, Tripura with 15 clones (RRII 5, RRII 105, RRII 118, RRII 203, RRIM 600, RRIM 605, RRIM 703, PB 86, PB 5/51, PB 235, Gl 1, GT 1, RRIC 52, RRIC 105 and Harbel 1) was selected for the study. The period of study was from April 1987 to July 1989. The number of trees available under each clone varied from 25 to 38. Observations on flowering were recorded once in 10 days. Quantification of flowering has been reported to be extremely difficult and there is no universally applicable measure of flowering in clonal species (Davy, 1987). Field observations were restricted to the date of commencement of flowering, duration of flowering, percentage of trees flowered under each clone, cessation of flowering and period of off-season flowering.

Data on the percentage of trees flowered under each clone are presented in Table 1. The clones PB 5/51 and PB 86 flowered early, the flowering commencing in January in both the cases during 1988. In all other clones flowering started during the first week of February. However, in clones RRIM 600, RRIM 605 and Gl 1 flowering started only during the second week of February. As inferred from the data (Table 1) the peak flowering had been during February and March in most of the clones. The flowering distribution during these two peak months is presented in the figure. Flowering continued from April to June in almost all the clones, except RRIM 703, RRIM 605, RRIM 600 and RRII 105. In these clones, flowering was over by May itself. Though RRIM 600 is reported to be a prolific seeder (Paardekooper, 1965), under Tripura conditions the flowering percentage of this clone had been minimum with only 30 per cent flowering during February and 28 per cent flowering during March and the flowering was restricted to mostly February and March. Clones RRIC 105 and RRIC 52 showed protracted flowering and so was the case with Gl 1, RRII 105, RRII 5 and RRII 203.

Table 1. **Percentage trees flowered* during 1988 and 1989 in different clones**

Clone	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE	
	1988	1989	1988	1989	1988	1989	1988	1989	1988	1989	1988	1989
RRII 105	—	—	19.80	1.04	32.30	23.96	8.25	6.25	15.62	11.46	5.46	9.37
RRII 5	—	—	16.00	1.33	26.70	5.33	21.00	—	—	4.00	1.00	10.60
RRII 203	1.00	—	41.40	1.80	56.76	49.54	—	17.12	2.07	13.51	1.35	13.51
RRII 118	—	—	22.50	—	10.80	8.80	—	1.00	1.47	7.84	—	5.88
RRIM 600	—	—	30.80	—	28.40	20.00	—	3.92	2.94	4.99	—	2.91
RRIM 605	—	—	2.13	—	9.70	5.36	—	1.06	2.42	3.22	—	2.15
RRIM 703	—	—	23.60	—	35.50	24.75	2.42	8.60	1.61	4.30	—	4.30
RRIC 105	—	—	30.80	3.80	41.00	33.30	4.81	10.25	5.77	10.26	7.69	19.22
RRIC 52	—	—	30.70	8.00	41.30	28.00	5.00	14.67	9.00	18.67	14.00	25.33
PB 235	—	—	31.10	1.11	24.50	16.66	3.30	2.32	2.50	1.10	0.83	10.00
PB 86	10.53	1.00	67.50	4.40	83.30	55.25	3.95	14.03	21.05	22.80	7.89	20.17
PB 5/51	3.03	—	37.40	4.04	74.80	43.40	4.55	14.14	10.61	7.07	2.27	11.11
GT 1	—	1.11	25.50	4.40	20.90	20.00	1.39	1.11	—	2.21	2.27	1.11
Gl 1	—	—	25.00	2.78	61.10	41.66	10.42	9.33	10.42	2.77	1.39	1.85
Harbel 1	—	—	1.01	1.01	7.00	4.00	—	4.04	3.79	5.05	0.76	3.03

* Mean of three observations


FLOWERING PATTERN OF CLONES DURING PEAK FLOWERING
1988
1988
1988
1989
1989
1989
FLOWERED (%)
TREES
RRII 203
RRII 105
RRIM 600
RRII 118
RRII 5
PB 86
RRIC 105
RRIM 703
RRIC 52
RRIM 605
PB 5/51
GT 1
PB 235
GT 1
Harbil 1
DAYS (1st FEBRUARY TO 26th MARCH)

From the data it could be seen that the percentage of trees flowered was more for RRII 203 among the RRII clones. There has been a marked variation in the flowering between the years 1988 and 1989. In general, percentage of trees flowered in January and February in 1989 was less than that during the same period in 1988. This could be attributed to meteorological parameters. 1989 experienced extreme cold conditions and the mean minimum temperature in January was 8.7°C (minimum recorded being 3.8°C) as against 10°C during the year 1988. The minimum percentage of trees flowered out of these clones was in Harbel 1.

It must be mentioned that during the month of April, flowering process has reduced drastically in all the clones in both the years. This could be attributed to the high air turbulence quite often resulting in heavy winds with occasional hail-storms. However, after April also flowering seems to continue in all the clones and prolonged flowering was more pronounced in most of the clones during 1989. A longer duration of flowering could be attributed to the winter shock as has been reported in other plants (Ray, 1963). From the point of view of breeding programme, hand-pollination in particular, clones with short flowering period (PB clones) may necessitate storage of pollen.

The study conducted is only preliminary in nature and floral biology, fruitset, wintering pattern, etc. had not been considered. Experiments on these are also being taken up and studies are being pursued and extended to plantations of different age and also in other States in this region. The data generated through the present study are expected to give background information for the breeding programmes and design of polyclonal seed gardens.

REFERENCES

Anonymous. (1953). Hand pollination in *Hevea brasiliensis*. *Planters Bulletin*, **5**: 29.

Davy, A. J. (1987). Measurement and prediction of flowering in clonal plants. In: *Manipulation of Flowering*. (Ed. I. G. Atherton). Butterworths. p. 54.

George, P. J., Panikkar, A .O. N. & Bhaskaran Nair, V. K. (1967). Observation on the floral biology and fruit set in *Hevea brasiliensis* Muell. Arg. *Rubber Board Bulletin*, **9**: 18–27.

George, P. J., Premakumari, D., Markose, V. C. & Panikkar, A. O. N. (1980). The rubber tree (*Hevea brasiliensis* Muell. Arg.). In: *Handbook of Natural Rubber Production in India*. (Ed. P. N. Radhakrishna Pillai), Rubber Research Institute of India. p. 25–29.

Paardekooper, E. C. (1965). Clones of *Hevea brasiliensis* of commercial interest in Malaya. *Rubber Research Institute of Malaya, Planting Manual*, **12**: 135.

Ray Peter Martin (1963). Flowering plant reproduction. In: *The Living Plant*. Saunder College Publishing. p. 193.

Van Haaren, A. J. H. (1969). Observation on rubber growing in Malaya. *Papua New Guinea Agricultural Journal*, **16** (1) : 45.

J. RAJESWARI MEENATTOOR

A. K. KRISHNAKUMAR

R. R. SINHA

S. N. POTTY

Research Complex (N. E. Region),
Rubber Research Institute of India,
Guwahati-781 003.