

FRUITING PATTERN OF IRRIGATED COCOA IN KERALA

M. A. HASSAN, R. VIKRAMAN NAIR & P. D. VIJAYAGOPAL

College of Horticulture, Vellanikkara, Trichur.

Three sets of factors are generally attributed as responsible for induction of flowering and fruiting in cocoa. These are age of the tree, the stimuli originating in the leaves and environmental factors (Alvim et al. 1972). Among the environmental factors, the most important is considered to be moisture status within the plant, flowering being induced by moisture supply following a period of water stress. The time interval between fertilisation of the flower and harvesting the ripe pod is about 5 months (Wood, 1975). This being the case, peak harvesting season is to be expected five months after receipt of monsoon showers in rainfed cocoa in Kerala. However, for irrigated cocoa, no distinct seasonal peaks in harvesting are to be expected and fruit yield should be theoretically uniform round the year.

The present investigation was aimed at studying the seasonal pattern of yield in irrigated cocoa.

The study was conducted at the Coconut Research Station, Pilicode on a standing crop of cocoa grown as a mixed crop in coconut. The cocoa trees were eight years old and were irrigated during the summer. The data on the month-wise yield of 576 cocoa plants for a period of four years from 1975 to 1978 were collected and these are presented in the Table and Fig. 1. The results showed that there was wide fluctuation in the yield of pods from month to month. Months of peak harvest were July, August, June and October which together accounted for 78 per cent of the total annual yield. The lean months were January, December, February and March, the total yield during these months being 3 per cent. Of these, the crop did not practically yield during January. The total yield during the remaining five months together accounted for 19 per cent. of the annual production.

TABLE—Seasonal fluctuations in yield of irrigated Cocoa in relation to environmental factors

Month	Mean monthly rainfall, 1975-1978 (Cm.)	Mean monthly rainy days 1975-1978	Mean monthly temperature °C			Mean monthly yield of pods from 576 cocoa plants, 1975-1978	
			Max.	Min.	Mean		
January	0	0	33.10	19.58	26.34	June	1770.25
February	0.51	0.50	32.74	21.81	27.27	July	3129.75
March	3.04	1.00	32.60	23.43	28.02	August	2045.50
April	5.57	3.00	33.25	24.63	28.94	September	399.50
May	31.79	11.25	31.59	24.28	27.94	October	1208.75
June	118.96	25.75	27.77	22.58	25.18	November	426.25
July	138.04	28.00	26.97	21.72	24.34	December	65.50
August	67.99	24.75	28.23	24.18	26.21	January	..
September	30.29	12.50	29.03	22.67	25.85	February	117.75
October	17.34	11.5	30.31	22.87	26.59	March	183.75
November	26.39	8.75	30.91	22.13	26.52	April	595.25
December	3.55	0.75	33.26	21.12	27.19	May	584.75
Correlation coefficient	—0.51	—0.64	+0.62	—0.27	+0.50		10527.00
	N.S.	Sig.	Sig.	N.S.	N.S.		

An attempt was made to relate the above fruiting pattern of cocoa with environmental factors existing during the period. According to Wood (1975), the peak harvesting season coincides with the receipt of rainfall following a period of drought five months prior to the harvest in the case of rainfed cocoa. Being irrigated, no such relation was to be expected in the case of this cocoa crop and the results also showed absolutely no such relationship. Yet, wide seasonal fluctuations were observed and hence, further attempts were made to relate it with the other available environmental factors. Simple correlations were worked out between rainfall, number of rainy days and mean monthly maximum, minimum and average temperatures with the yield of pods five months after. It was found that correlations between rainfall, minimum temperature and mean temperature were non-significant. There was significant positive correlation between the number of harvested pods and mean monthly maximum temperature and significant negative correlation with the number of rainy days. It may be concluded that maximum temperature appears to have direct or indirect relation with flowering in irrigated cocoa. According to Wood (1975) flower induction occurs when mean monthly temperature exceeds 23°C and monthly rainfall is greater than the potential evapotranspiration. Based on the above critical tempera-

ture limit, it is not possible again to conclusively indicate that temperature had any substantial influence because all along, even the mean monthly temperature was well above 23°C. However, the conditions existing in intercropped irrigated cocoa are different from those of a mono-crop of rainfed cocoa whose pattern has been quoted in the reference above. The only indication given is that maximum temperature appears probably to have some relation with flowering.

Another factor which showed significant correlation with pod yield was the number of rainy days. There is no information available in literature indicating direct relationship of cocoa yield with number of rainy days. It appears therefore, that the observed significant correlation may be related to either of the following two factors (i) Maximum temperature which appears to show an inverse relation with number of rainy days (ii) Solar receipt which again may show an inverse relation with number of rainy days. The latter assumes importance especially in the case of cocoa cultivated under coconut in which case the light intensity received by cocoa may be sub-optimal.

To conclude, it was found that there was wide seasonal fluctuation in yield of irrigated cocoa grown along with coconut with the peak harvest being in the rainy season. The environmental factors responsible for this fluctuation appears to be related to the variation in maximum temperature and/or light intensity received during the period the period five months prior to harvest.

ACKNOWLEDGEMENT

The authors are grateful to Dr. U. P. Bhaskaran, Director of Research, Kerala Agricultural University for his interest and encouragement in the work. Technical help from Mr. K. Viswambharan is duly acknowledged.

REFERENCES

1. Alvim, P. De, T. Machado, A. D. and Vello, F. (1972). Physiological responses of cocoa to environmental factors. Proceedings of the IV International Cocoa Research Conference 8—18 January, 1972. St. Augustine, Trinidad. 210—225 pp.
2. Wood G.A.R. 1975. Cocoa. Longmen Group Limited, London. 200—204 pp.

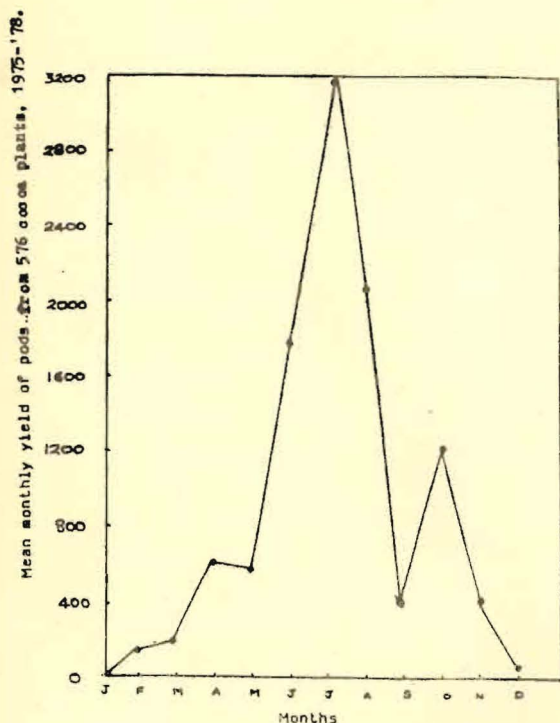


Fig. 1. Seasonal fluctuations in yield of irrigated Cocoa.