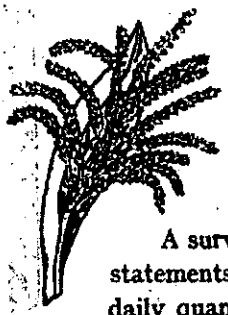
TODDY YIELDS FROM COCONUT PALMS IN CEYLON



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Introduction

A survey of the pertinent literature, which is somewhat meagre, reveals statements which are rather inconsistent and conflicting, regarding the average daily quantity of toddy which could be tapped from a coconut palm.

Judging from figures available for the Philippines, India, Malaya and Indonesia, there is doubtlessly a wide divergence in the yield of sap. There appear to be considerable variations in yield from day to day, season to season, spadix to spadix, and palm to palm. This perhaps is not surprising when we consider the fact that the flow of toddy is contingent on a variety of factors, including the expertness of the tapper.

B. J. Eaton (1916)[1] records that in moist localities in Ceylon, with one tapping a day, the daily yield of juice per palm varies from 600 to 1,200 ml., with two tappings from 600 to 3,000 ml., and with three tappings from 1,100 to 4,738 ml. He also mentions that the total volume of toddy which could be drawn during the tapping period of a spadix ranges between 3.5 to 7.5 gallons, equivalent to about 16 to 34 litres. (1 gallon = 4.546 litres).

R. Child (1936)[2] quotes the 1909 record of tapping in the province of La Laguna (Philippines) which gave 2,103,296 litres of toddy from 10,009 palms equivalent to an average of 210 litres per palm for eight months or 875 ml., per palm per day. He then compares this with certain official statistical figures for Ceylon, supplied by the Excise Department, working out to 227 litres per palm for 240 days, or 946 ml., per day, which is not very different from the Philippine figure. On the basis of these overall average figures quoted by Child it could be reckoned for purposes of general computation that five coconut palms would yield a gallon of toddy per day. In other words, a single palm could be expected to produce a daily yield of about 900 ml. of toddy.

Apart from the above records no data based on any quantitative or systematic experiments are available for the purpose of making reliable comparisons or assessments of toddy yield potentialities of coconut palms in Ceylon.

In reviewing the literature on previous work on the subject of toddy yields however, there appears to be some agreement regarding one observation. It appears to be the consensus of opinion, that whilst intelligent management will certainly increase the yield of sap per palm,

yet unduly forcing a high rate of production would doubtlessly tend to exhaust the palms rather rapidly.

Present Work

For the purpose of the present studies a special experimental licence was obtained for tapping six *typica* (tall) palms at a time, for twelve-month periods at Bandirippuwa Estate, Lunuwila, where the Research Institute is situated. Though records have been kept on different sets of palms over the years, yet for the purpose of this discussion it is felt that the records kept on 14 tall palms for 12-month periods during 1953-55 alone, warrant consideration.

The palms employed for these *ad hoc* studies had never been tapped before and were selected for uniformity with regard to age and physical characters. They were vigorous palms in their prime (30-40 years old) with close set crowns and a large number of fronds with short and sturdy petioles which are known to facilitate tapping operations. In general, the fourteen palms selected could be regarded as typical specimens ideally suited for tapping purposes.

For purposes of comparison, and in view of certain suggestions by Jack and Sands (1929)[3] in Malaya, regarding certain advantages of tapping the *nana* (dwarf) variety of the coconut palm, a separate licence was obtained for tapping trials on 30 Malayan dwarf palms—*Cocos nucifera* Lin. These palms were selected from a ten acre block at Ratmalagara Estate, Madampe, a sub-station of the Research Institute. These palms flower initially in about 3-3½ years and are short in habit, ultimately attaining a height of only about 20 feet. For tapping purposes, the early flowering nature and short habit, have been adduced as desirable characteristics for economic exploitation.

Though thirty dwarf palms were actually selected and stamped by the excise authorities for the tapping trials, six palms had to be abandoned as they proved unsuitable for tapping. Unlike the tall variety these palms were found to exhibit a periodicity in the emergence of flower spathes, a phenomenon which perhaps explains the low nut yields in alternate years which have been recorded by certain workers. This irregularity in bearing, among other things, doubtlessly constitutes a serious handicap to continuous tapping for commercial purposes.

The tapping technique applied for drawing sap from the 14 tall palms (A to N) and the 24 dwarfs (1-30) selected for these studies was the same. As the object in view was to obtain an assessment of average yields, from typical palms, without forcing them to maximum yielding capacity, the spadices were pared off and the receiving vessels changed twice a day only, at 7 a.m. and 4 p.m.

For reasons adduced below it was found expedient to discontinue the tapping operations on the 24 dwarf palms (1-30) at the close of six months. For purposes of comparison therefore, yield records kept at Bandirippuwa Estate on three dwarf palms (X to Z) for a period of one year are also included. These palms too were tapped in precisely the same manner as the others under study.

As it will be superfluous and unwieldy to present the daily records, the yields of toddy for 4-day periods alone for each of the palms selected are summarised in Tables I to III. These are considered adequate for a discussion of the essential features of the basal data. It is note-

worthy that the different palms gave different yields of toddy and also that the yields from individual palms fluctuated within wide ranges at different periods.

Observations and Discussion

Even though the figures relate to a small number of palms, yet in the absence of any other recorded data the observations are informative and significant.

The preliminary preparation of the first spadix tapped was commenced about the 15th of December in each of the palms, and any yields prior to the 1st of January were small and are not included in the tables. The following is a summary of observations on both varieties of palms based on data presented in Tables I to III.

(1) *Yield Variations* :—Figure I reveals at a glance that both the tall and dwarf varieties show wide diurnal and seasonal fluctuations in the yield of sap. It would be seen that during the first months of tapping the yield of juice is comparatively low, the flow having a decided tendency for a steady increase thereafter for a period. Apart from these characteristics the behaviour and yielding capacities of the two varieties are quite distinct.

An abrupt decline in yields is evident in the dwarf palms after the fourth month of tapping and in fact this drop was found to be concomitant with adverse symptoms of health and decreased vigour of the palms. As 50 per cent of the palms or so were seriously affected the tapping operations had to be discontinued after the 30th of June. Though the three dwarf palms (X to Z) also show a similar declension in yield after the fourth month of tapping, yet it was found possible to keep records for a year. The fact that these three palms withstood the rigours of tapping better is perhaps to be explained by the fact that at Bandirippuwa Estate (unlike at Ratmalagara where the 24 dwarfs were grown) the weather is somewhat milder with lower temperatures and a better rainfall distribution.

The tall palms showed no deterioration in health at any stage during the year though a slight trend for decline in daily yields is evident after six months of tapping. The summarised data given in Table IV would serve to elucidate the salient features and the stark contrasts in the yield potentialities of the tall and dwarf coconut palms. Table IV (A), columns 3 and 5 show that the overall daily yield per tall palm (during a twelve-month tapping period) is 1582 ml., ranging between 0 and 5420 ml., whereas the corresponding yield for dwarf palms is only 303 ml., ranging between 0 and 1260 ml. Computing the daily toddy yields on an acreage basis of 64 talls to 100 dwarfs it will be found that they will yield 22.3 gallons and 6.7 gallons respectively per acre per day. The inordinate disparity in the figures speaks for itself. (Browning and Symons (1916)[5] quote an average daily yield of only 650 ml., per tall palm for the Philippines but mention that selected palms would yield about 500 litres a year equivalent to 1370 ml. per day).

With regard to distribution of yields Fig. I, shows that the dwarf palms are erratic in this respect and in fact after the fourth month the decline is very steep in both sets of dwarfs under study. Table III shows that palms (X to Z) gave no toddy in December and only an average of 31 ml., per palm during November. In the case of palm (Z), death supervened during the last month of tapping. Comparatively speaking the tall palms show more regularity in their yield distribution over the year. They indicate a steady rise to a peak during the sixth month of tapping. Thereafter there is only a gradual drop till the eleventh month. Table I, column 10 will show that the twelfth month if at all is the period when a critical decline is discernible, the average of 1455 ml., per day for November dropping to 619 ml. in December.

As the determination of an economic and safe tapping period is a vital consideration; the data summarised in Table IV (B) and (C) and the histograms in Figure II are useful in evaluating this information. Table IV (B) shows the overall daily yields for different tapping periods ranging from one month to a year, and Fig. II is a diagrammatic representation of this data. It will be seen that in tall palms the daily average, increases steadily with the tapping period up to the tenth month. It is only after this period of tapping that a slight drop from 1707 ml. to 1684 ml. is noticeable. This tendency persists reducing the average to 1582 ml. at the close of the twelve-month period. In the case of the dwarf palms however the picture is different. The daily average after a four-month tapping period steadily decreases finishing up with an overall daily average of only 303 ml., for twelve months.

Table IV (C) illustrates the monthly recoveries of sap in relation to the total annual yields. In this respect too the two types of palms are markedly different. Column (2) shows that in tall palms the yield of sap is fairly evenly distributed between the third and tenth months of tapping, the monthly recoveries, ranging between 8.4 and 11.9% of the total annual yield. The sap recovered during the first eight months of tapping is 70.5% and the first ten months 88.6% of the total annual yield. The dwarf palms appear to reveal a stimulus for enhanced yields during the early months of tapping. Column (3) shows that 54.4% of the total annual yield is recovered at the close of the fourth month, whereas the corresponding figure for the tall palms is only 27.3%. After the fourth month the monthly recoveries in the dwarfs are characterised by a steady decline culminating in a complete cessation of yields about the tenth month.

The figures summarised in Table IV (A), column (4) present points of great interest. It will be seen that the morning and afternoon collections are widely divergent. For the tall palms the morning collection representing a flow for 15 hours is 1116 ml., equivalent to 74.4 ml. per hour. The afternoon collection during 9 hours is 466 ml. which works out to 51.8 ml. per hour. In other words the rate of flow between 4 p.m. and 7 a.m. is about 44% higher than that between 7 a.m. and 4 p.m. In the case of the dwarf palms (X to Z) which registered 212 ml. in the morning and 91 ml. in the afternoon, the corresponding difference in the rates of flow is of the same order working out to about 40%. That there is a decided difference in the rates of flow is not open to any doubt.

There is no doubt that this difference in rates is a manifestation linked up directly or indirectly with physiological forces concerned with sap movement, transpiration and the action of the hydrostatic system of the palm involved in elevating water from the soil. As these processes themselves according to D. T. MacDougal (1925)[4] are conjoined with various factors which change during the course of a day, we have some explanation for the fluctuations observed in the rates of flow of toddy during different times of the day.

(a) *Yields in terms of spadices*

The interval between the preparatory initiation of the tapping process and the commencement of flow of juice in the case of tall palms was rarely found to exceed 25 days. The corresponding period for the dwarfs however, was found to be in the region of 13 days. The difference is possibly due to the fact that the spadices of the dwarf palms are smaller in size and the inner spathe covering the flower buds is thinner in structure whereby the bruising operations take effect quicker than in the tall variety. This slightly shorter pre-treatment period required for the dwarfs cannot however be regarded as being of particular economic advantage.

The toddy yield data for the 14 tall palms (A to N) and the 3 dwarf palms (X to Z) in terms of the spadices tapped are given in Tables V and VI and Fig. III. The corresponding data for the 24 dwarf palms (1-30) are not given because the records which were kept for only a period of six months, are of not much relevance. The following is a summary of the mean averages for the yields per spadix for the two sets of palms.

Number of spathe	Average yield of juice/spathe (ml.)	
	Tall Palms (A to N)	Dwarf Palms (X to Z)
1	16,982	5,609
2	34,805	12,656
3	46,135	14,053
4	61,083	12,676
5	66,829	15,379
6	68,632	12,492
7	67,726	9,716
8	58,390	8,272
9	53,304	5,495
10	45,390	5,553
11	39,514	4,923
12	38,064	2,523
13	36,275	1,053
14	45,165	100
15	22,340	—
Tot. yield for 365 days (ml.) weighted av.	577,491	110,503
Mean production/spathe for all spathes tapped (ml.) weighted average	49,520	8,494
Range of production/spathe (ml.)	16,982 to 68,632	100 to 15,379
Coefficient of variation	34.2%	63.5%
Standard deviation	± 15,980	± 5,010
Average duration of tapping period/spathe (days)	31.2	28.1

It was observed that the period during which the spadices yielded juice varied from spadix to spadix. The ov[illegible] averages for this period for the tall palms and dwarf palms were 31.2 days and 28.1 days respectively. Though these are fairly close to each other, it will be seen that the yields of sap per spadix in the two varieties are widely different averaging 49,520 ml. (10.9 gallons) for the tall palms and only 8,494 ml. (1.9 gallons) for the dwarfs. These yields per spadix will be seen to range between wide limits for both varieties, 16,982 to 68,632 ml. (3.7—15.1 gallons) for the tall and 100 to 15,379 ml. (0—3.4 gallons) for the dwarf palms. The coefficients of variability of the yields per spadix being 34.2% and 63.5% for the tall and dwarfs respectively. It has already been mentioned that Eas[illegible] (loc. cit.) states that the total yield per spadix in Ceylon may range between 3.5 and 7.5 gall[illegible] Browning and Symons (1916)[6], also without any supporting data mention that the t[illegible]

ld per spathe for tall palms in Ceylon may be expected to vary between 3·5 and 17·5 gallons. It is interesting however, to note that the figures obtained in the present studies, whilst ... higher than Eaton's figures, fall within the range mentioned by the latter authors.

Among the workers in other countries yield statistics for individual spathes of tall palms are quoted by J. S. Patel (1938)[6] only, for Kasaragod, South Kanara District, Madras State, South India. He quotes figures which average about 18,000 ml. (4·0 gallons) per spathe with a maximum in the region of about 9·0 gallons per spathe. It will be observed that the potential yields in this part of India are considerably lower than those obtained in these studies, and those reported by other workers for Ceylon.

(3) *Yields in relation to climate and other factors*

The plant environment is made up of many factors which are both climatic and edaphic (i.e. pertaining to soil conditions). It is recognised at the outset that climate which includes, temperature, humidity, atmospheric pressure, wind velocity, rainfall and sunlight is a very complex factor. Indeed, any one of these elements of climate may be extremely complicated in its effects on the plant. Thus sunlight, which influences the photosynthetic activity of plants in a very fundamental way may vary in intensity and in quality with the seasons. It is also recognised that all of the effects of soil and climate are so inter-related that it is difficult if not impossible, to isolate and characterize the influence of any one of these factors in the plant environment.

With the meagre data available it is thus not proposed in the present study to attempt to disentangle large interaction effects or even draw correlations between the yield of sap and any specific climatic or meteorological factors of the natural environment. All the same it is considered that a brief discussion may be useful on account of certain indications which could very well be the subject of wider study.

As the erratic yields of dwarf palms do not present any points of significance in this context they do not merit consideration here, except for the fact that they have been proved to react adversely to conditions of low rainfall and drought.

In figures IV to VII the graph representing the yield fluctuations of tall palm toddy (after smoothening to reduce skewness, by plotting monthly averages for the year, instead of ten day averages) is compared with corresponding changes during the year of various factors principally weather and climate, based on statistics kept at Bandirippuwa Estate. Graphical data for the following factors have been presented in the figures :—(*a*) Crop per palm (*b*) Rainfall (*c*) Temperature (*d*) Vapour pressure (*e*) Cloudiness (*f*) Hours of sunshine (*g*) Number of wet days (*h*) Relative humidity (*i*) Day length (*j*) per cent setting of nuts (*k*) Number of female flowers and (*l*) Number of bunches.

Though it is well nigh impossible with the statistics available and presented in the figures to evaluate quantitatively the effects of one or a combination of the factors, yet judging from the trend of the curves it is a logical assumption that a number of these interactive factors must be active in determining the pattern of toddy yields during the year. It is a matter for conjecture however that the effects of some of the factors may be complementary whilst others are naturally confounded so that conclusions cannot necessarily be drawn for each and every factor concerned.

Though the palms were selected for uniformity in age and vigour, yet the possibility of genetic differences could not be altogether excluded. Regarding soil factors however, as the palms were grown on the same soil type and received the same biennial fertilizer treatments for soil amendments during the past 20 years, it is safe to assume that the nutrient status, physical characters and other edaphic factors were fairly constant. On the basis of the assumption that the toddy yields were principally influenced by climatic factors, the similarity in some of the curves is not without interest and could not be divorced as being altogether fortuitous.

It will be recognised that another interesting feature is that the characters including the setting of nuts, number of female flowers, number of bunches and the general crop pattern reveal a fairly consistent trend, and bear to a certain extent a striking similarity to the toddy yield distribution during the year. This relationship is perhaps understandable on account of the fact that from infancy to senescence the flowers and fruits are dependent on the sap for their development and maturation.

The available evidence points strongly to the idea that the yield and flow of sap (and indirectly the production of nuts) are dependent on a complex inter-relationship between biological and physical factors associated with the environment, and which can in fact bear a critical influence.

General Deductions

As these studies were undertaken with certain specific objectives in mind, it may be useful at this stage to enumerate any positive inferences drawn from this somewhat preliminary evaluation of the relative merits of tall and dwarf palms for tapping purposes.

1. There is clear-cut evidence to warrant the conclusion that under climatic conditions prevailing in Ceylon the *nana* or dwarf variety of the coconut palm will not prove economical for tapping purposes. Dwarf palms on tapping, do yield a flow of juice, but a period not exceeding 4 months (which is too short to be economical) appears to be the safe time. Prolonged tapping tends to result in complete derangement of health and metabolism of the palms resulting in a breakdown of their vegetative and reproductive cycles of growth. A periodicity in the emergence of spathes, a tapping period of short duration, combined with relatively poor and erratic yields (in comparison with tall palms on an acreage basis) are grave disadvantages.

2. The advantages the dwarf palms possess of early bearing and short habit (providing facility of tapping) are more than offset by the fact that the palms are delicate and are adversely affected during periods of drought. The primary consideration being the yield of sap, and a safe economical tapping period, it is quite obvious that on these grounds alone they can be adequately condemned as being commercially unsuitable for tapping purposes.

2. In analogous contexts, the yield potentialities and other vital characteristics of the tall palms have been consistently found to be superior and eminently suited for tapping purposes in contrast to the dwarf palms.

3. In effect these studies have shown, that instead of random tapping of whole groves, it is a decided advantage (in spite of possible practical difficulties) to select palms for tapping purposes on predetermined characters, the so-called ' toddy trunks ' which experienced and skilled tappers could always identify. A system of selecting palms would eliminate ' duds ' and also keep at a minimum any effects due to genetic factors, thereby ensuring considerably higher and more uniform yields than those which have been estimated to be produced under the present system of random tapping.

4. The duration of the period for which palms can be tapped economically is a vital consideration. The results have shown that the daily average yield per palm increases steadily with the tapping period up to the tenth month, dropping thereafter only very slightly. If different sets of palms are tapped annually in rotation, it should be safe and economical to tap them for a twelve month period. If on the contrary, the same palms are tapped continuously, then perhaps the present system of eight months tapping with a four month rest period is to be recommended.

5. Though the study has not been comprehensive enough, yet on the basis of available evidence, the indications are that the interactions of certain physical environmental variables associated with weather and climate must play a dominant role in influencing the production and flow of toddy. The factual evidence regarding diurnal and seasonal fluctuations in the yield of toddy, combined with the roughly periodic variations of certain physical factors, are strongly suggestive of some such inter-locking relationship.

As the production of sap is indirectly linked up with the floral biology of the coconut, the production of nuts and other concomitant characters, the available data give indications of possible interesting correlations which could very well form a subject for further investigations.

Conclusion

Though the present studies had to be based on a limited number of palms, yet the observations nd deductions being of a fundamental nature are not necessarily restricted in their application. he climatic conditions prevailing in Ceylon being predominantly insular and not subject to olent fluctuations, the principal coconut growing areas of the island are assured of comparable d fairly stable weather conditions. Thus, broadly speaking, it can be concluded that the ervations are of fairly general application, and of particular significance to those associated th, and interested in, the economics of tapping coconut palms for industrial utilisation in ylon.

Acknowledgments

Thanks are due to Mr. V. Abeywardena, Biometrician, for preparing the figures based on teorological data, Mr. M. P. Tissera, Technical Assistant for assistance in recording the toddy lds, and J. E. Premaratne, Laboratory Attendant, for the actual tapping operations on the ms.

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(2) Child, R. (1936). Production of Sugar from Sweet Coconut Toddy. *Ceylon Journal*, **1**, No. 12, 410-5.

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(5) Browning, K. C. and Symons, C. T. (1916). Coconut Toddy in Ceylon. *Journ. Soc. Chem. Ind.*, **35**, No. 22, 1138-42.

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TABLE VI

Variation in the Production of Toddy per Spadix (Volume in Milli-litres)

(Records kept during 1950 on 3 Malayan Dwarf Coconut Palms (X to Z) at Bandirippuwa Estate, Lunuwila)

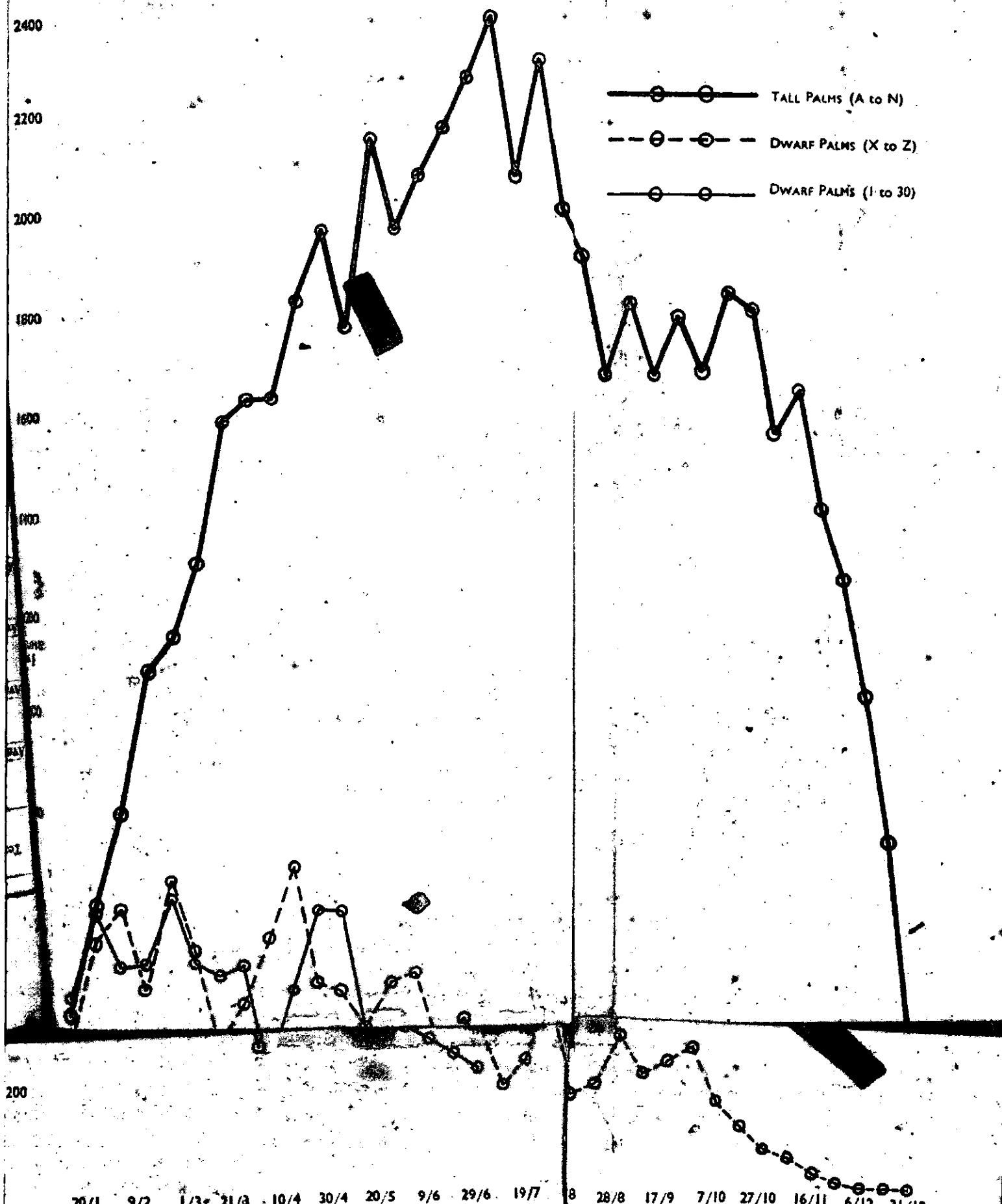
1	2	3	4	5
Spadix No.	PALM X	PALM Y	PALM Z	**Average yield per spadix for 3 palms**
1	4,291	7,559	4,978	**5,609**
2	13,235	12,267	12,467	**12,656**
3	11,265	15,235	15,660	**14,053**
4	10,134	16,280	11,615	**12,676**
5	17,920	14,440	13,778	**15,379**
6	14,550	11,972	10,955	**12,492**
7	11,465	9,657	8,026	**9,716**
8	10,465	7,950	6,400	**8,272**
9	8,806	3,900	3,780	**5,495**
10	9,880	4,030	2,750	**5,553**
11	8,950	3,700	2,120	**4,923**
12	5,600	1,380	590	**2,523**
13	3,160	—	nil	**1,053**
14	300	—	—	**100**
Total for 365 days (ml.)	130,021	108,370	93,119	Average of total for 365 days **110,503** (3 palms)
Average volume per spathe (ml.) excluding first and last spathes tapped	10,452	9,943	8,013	9,469
Average volume per spathe (ml.) all spathes tapped	9,287	9,031	7,163	8,494

$$\frac{110{,}503}{8{,}494} = 13.0 \text{ spathes per 365 days,}$$

i.e. 1 spathe was tapped for **28.1 days** (approx.)

FIGURE I

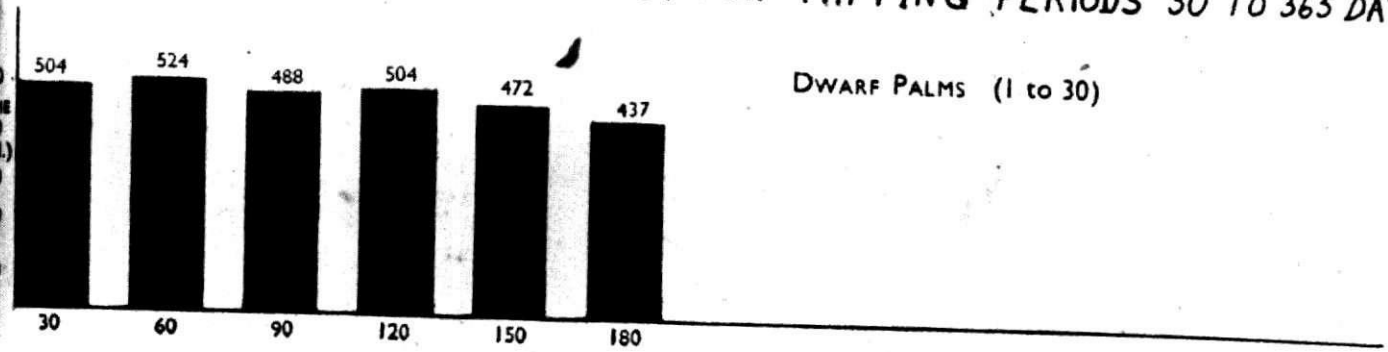
TODDY YIELD AVERAGES PER DAY FOR TEN-DAY PERIODS.

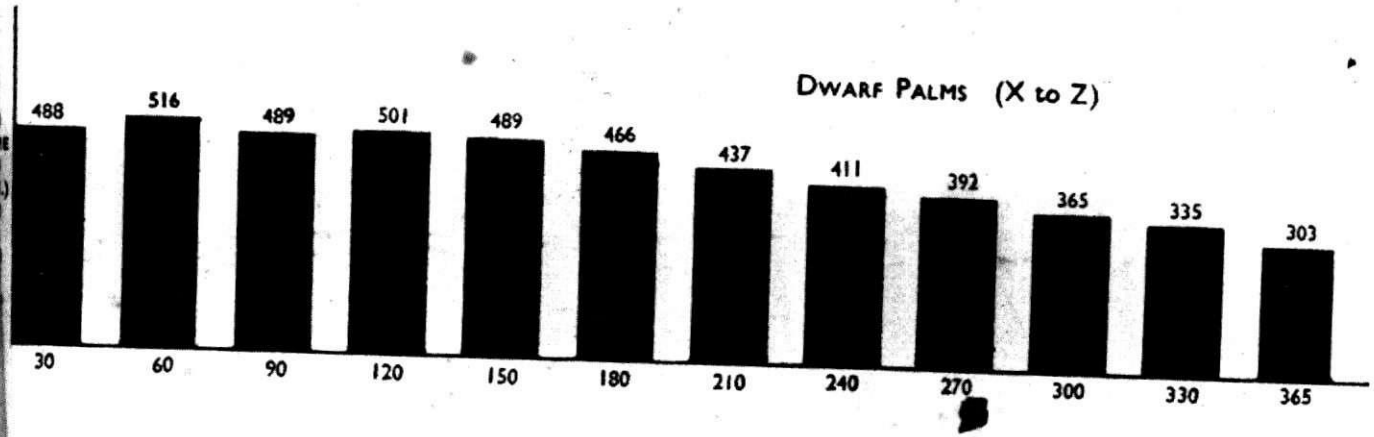


TEN-DAY TAPPING PERIODS (JANUARY - DECEMBER)

FIGURE II

OVERALL DAILY YIELDS OF TODDY FOR TAPPING PERIODS 30 TO 365 DAYS





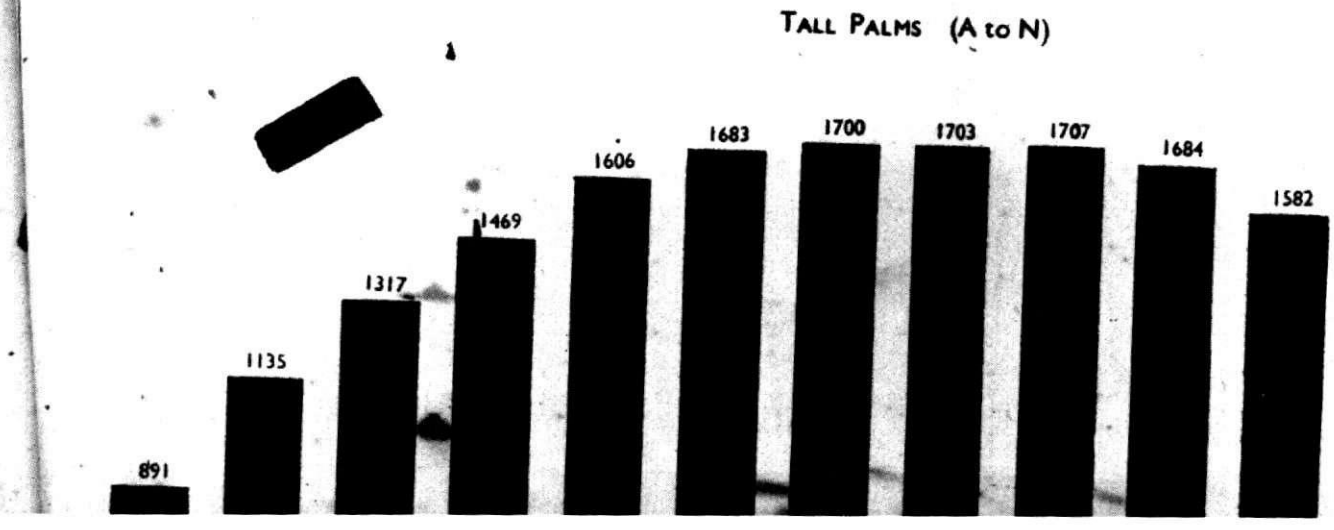


FIGURE III

TODDY YIELDS IN TERMS OF SPADICES

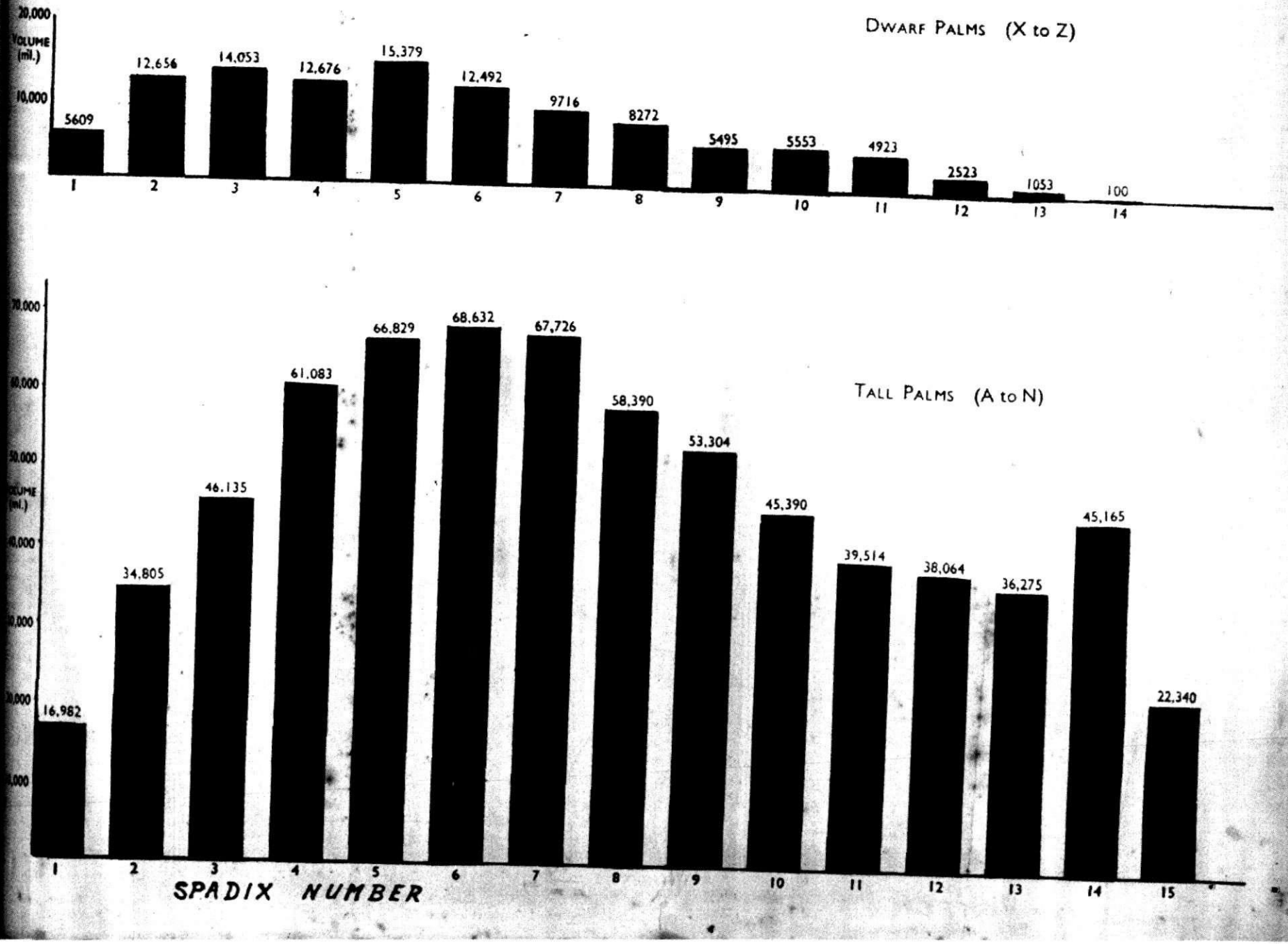


FIGURE IV

TODDY YIELDS IN RELATION TO CLIMATE AND OTHER FACTORS.

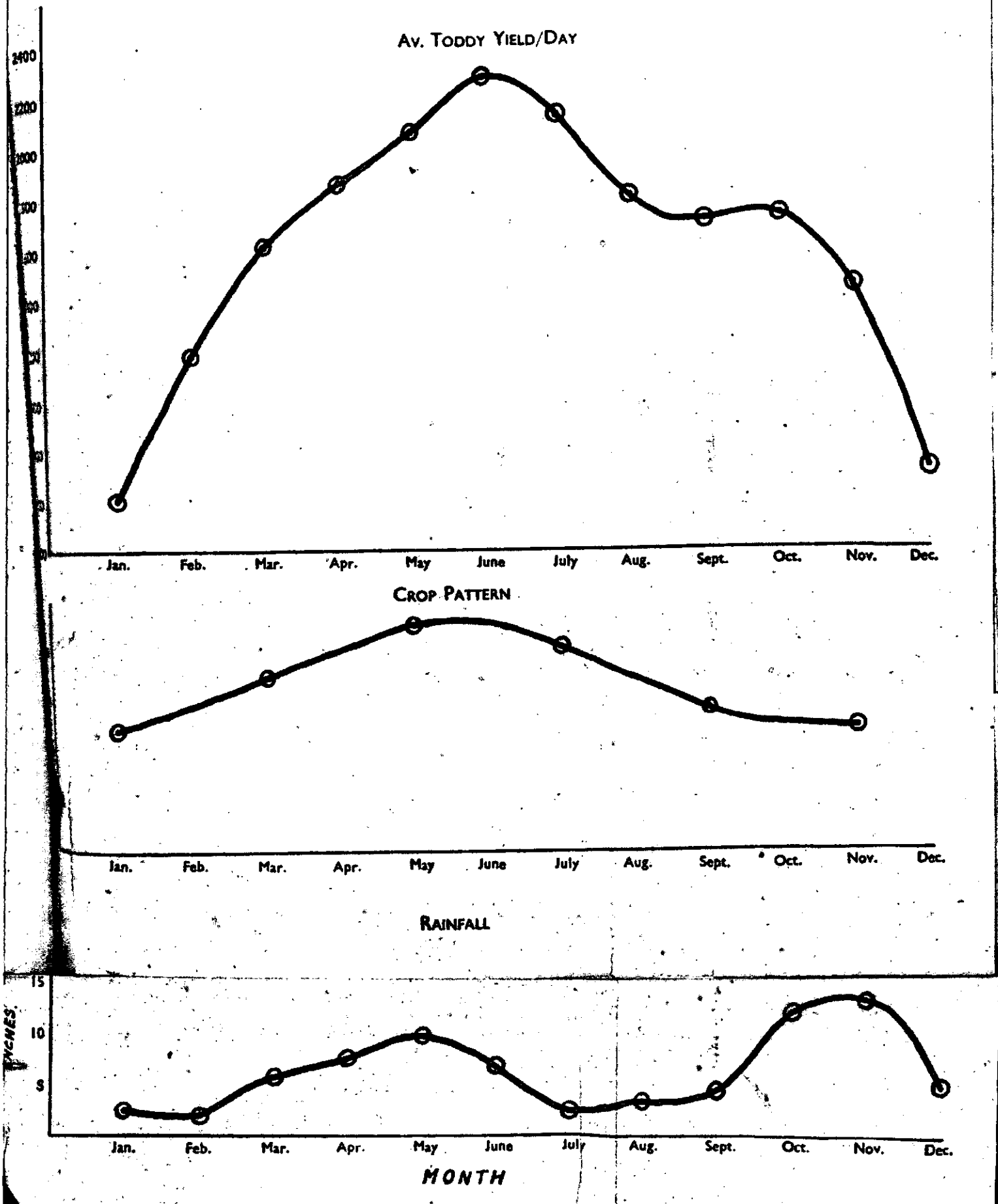


FIGURE V

TODDY YIELDS IN RELATION TO CLIMATE AND OTHER FACTORS.

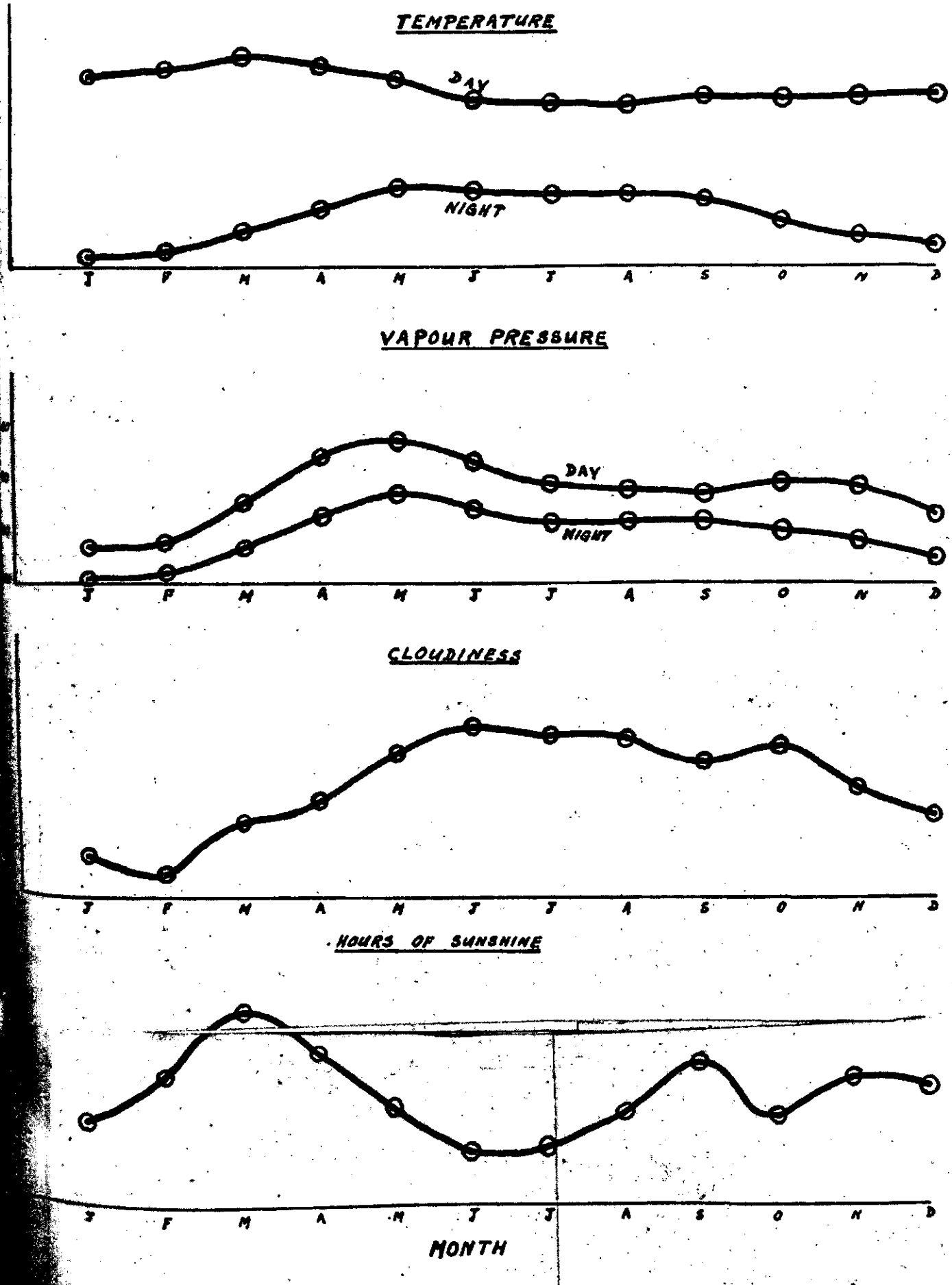
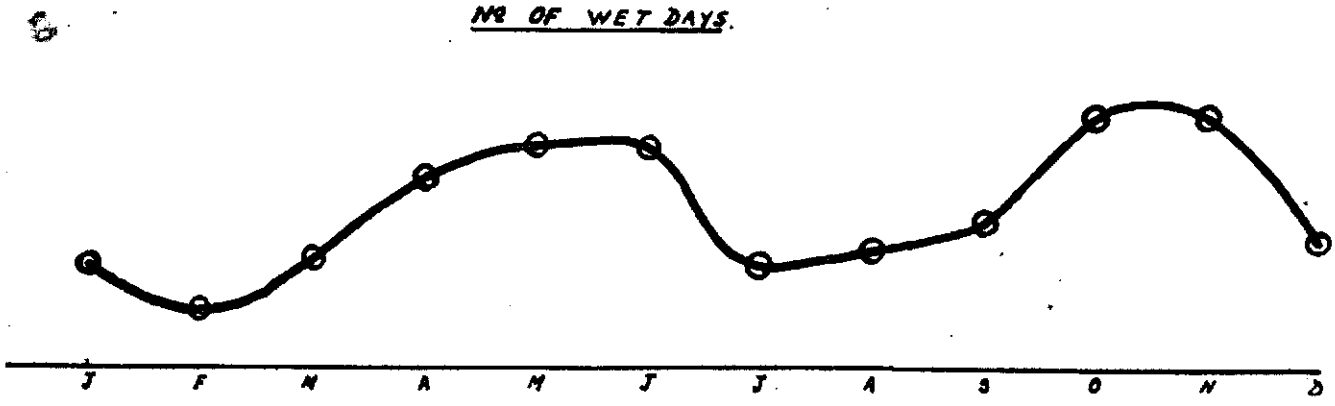
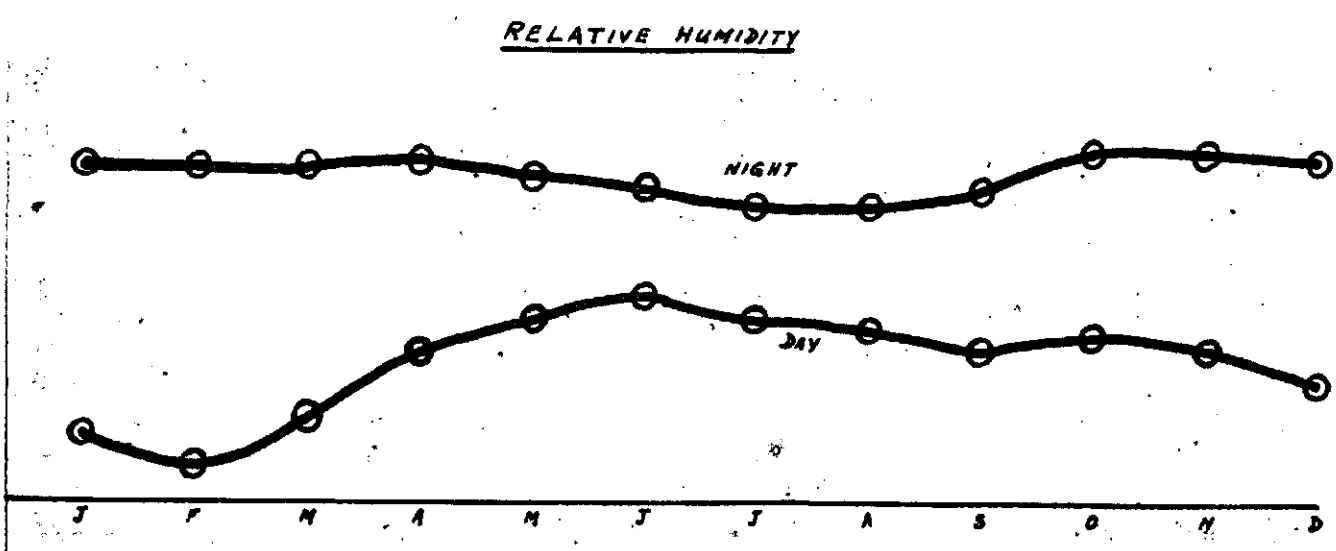


FIGURE VI

TODDY YIELDS IN RELATION TO CLIMATE AND OTHER FACTORS.





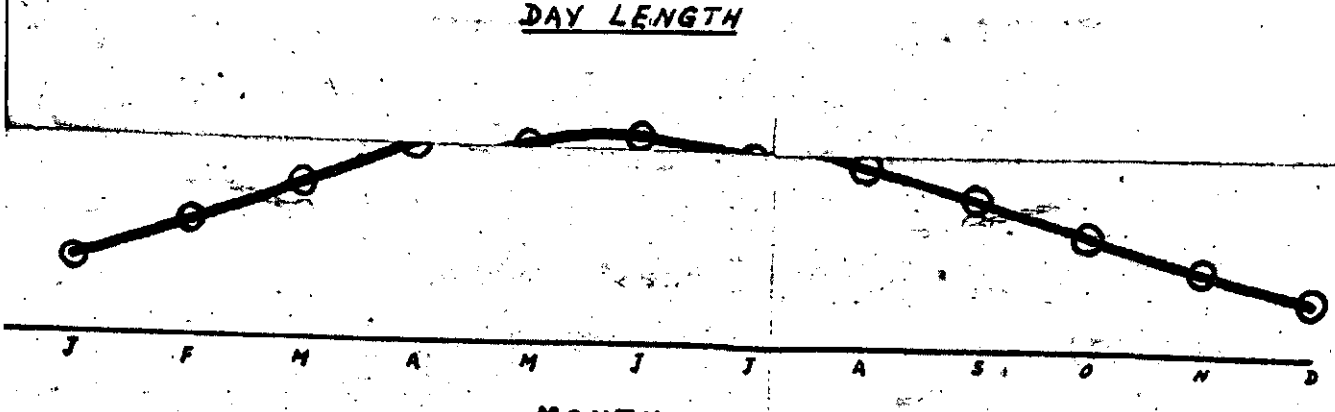


FIGURE VII

TODDY YIELDS IN RELATION TO CLIMATE AND OTHER FACTORS

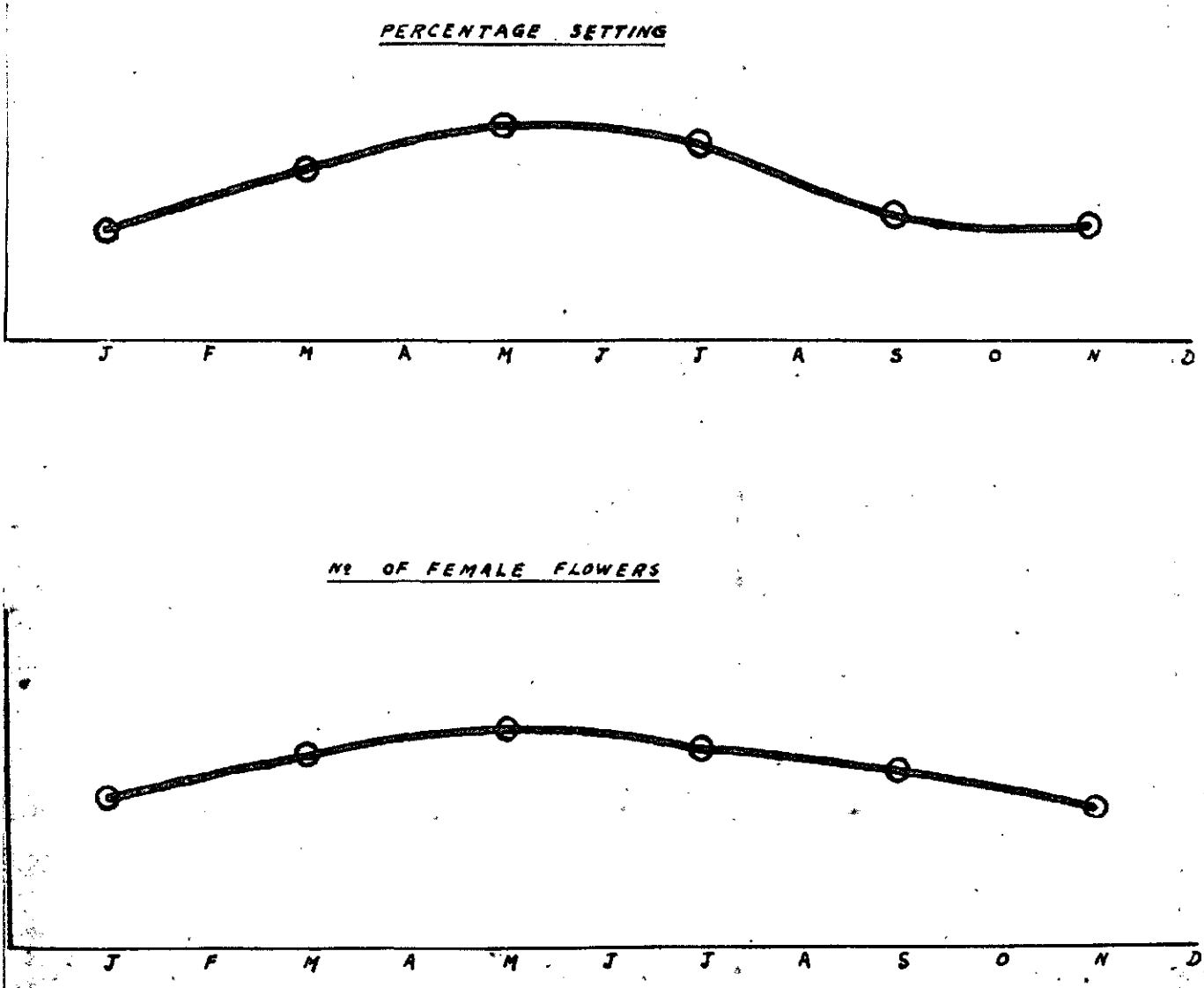


TABLE I

YIELDS OF TODDY (millilitres)

(Records kept during 1953-55 on 14 tall coconut palms (A to N) at Bandirippuwa Estate, Lunuwila.)

4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PALM C	PALM D	PALM E	PALM F	PALM G	PALM H	PALM I	PALM J	PALM K	PALM L	PALM M	PALM N	Average daily yield/palm	Range of total daily yield/palm (Palms A to N)	Rainfall for corresponding 10 day periods. Average (1953-55). Inches
6,240	710	5,995	8,500	2,270	nil	580	1,740	2,980	2,590	1,220	5,340	388	0-1,540	1.84
11,385	1,450	7,625	9,960	6,800	400	1,960	3,440	4,470	5,750	3,490	8,530	612	0-1,590	1.06
11,680	3,000	15,110	12,800	13,530	600	4,290	4,330	5,500	8,830	3,350	7,400	799	0-2,240	0.56
9,768	**1,730**	**9,577**	**10,440**	**7,533**	**333**	**2,610**	**3,170**	**4,347**	**5,723**	**2,687**	**7,090**	**599**	**0-2,240**	**1.15**
13,975	4,100	20,100	19,390	18,170	1,080	7,460	7,850	9,130	10,220	7,110	11,330	1,088	0-3,200	0.23
17,350	5,845	13,270	19,240	24,320	7,520	9,950	9,080	8,050	12,850	8,350	12,000	1,154	0-3,460	0.95
16,810	5,830	20,980	16,180	28,760	7,370	8,940	8,070	10,630	12,970	10,990	15,820	1,305	100-3,580	1.24
16,045	**5,278**	**18,137**	**18,270**	**23,750**	**5,323**	**8,470**	**8,333**	**9,270**	**12,013**	**8,783**	**13,050**	**1,183**	**0-3,580**	**0.81**
19,360	4,630	33,270	29,890	17,920	8,370	9,930	9,880	12,730	16,300	11,200	16,970	1,592	0-4,360	1.29
18,380	8,110	27,830	21,000	28,220	8,100	13,280	15,050	12,960	13,840	13,630	16,150	1,636	240-3,540	4.37
17,300	14,640	24,900	14,700	32,880	9,060	13,420	19,620	14,280	9,550	10,420	19,580	1,639	0-3,840	1.64
18,347	**9,133**	**28,020**	**21,863**	**26,340**	**8,510**	**12,210**	**14,850**	**13,323**	**13,230**	**11,770**	**17,567**	**1,622**	**0-4,360**	**2.43**
31,350	19,570	24,660	23,810	19,860	9,000	19,340	20,710	11,070	10,610	10,510	20,620	1,837	0-4,340	1.94
33,590	24,750	24,160	20,740	37,420	10,090	19,190	27,080	13,650	10,970	6,100	14,270	1,979	0-4,430	2.17
33,020	19,400	28,290	29,750	23,260	10,120	20,830	10,850	11,250	7,610	2,820	15,100	1,781	0-3,670	9.73
32,953	**21,240**	**25,703**	**24,767**	**26,513**	**9,737**	**20,187**	**19,547**	**11,990**	**9,730**	**6,477**	**16,663**	**1,865**	**0-4,430**	**4.61**
37,820	25,540	23,770	22,580	30,780	8,770	22,250	32,700	20,400	4,090	6,170	29,250	2,161	0-4,280	3.52
29,850	26,980	25,790	21,030	17,530	17,390	18,000	25,200	17,790	10,060	18,030	28,850	1,980	0-3,920	3.99
22,830	31,720	28,400	33,280	31,010	27,660	17,650	15,420	10,530	16,930	15,740	22,180	2,091	0-4,020	2.46
30,167	**24,747**	**25,987**	**25,630**	**26,440**	**18,940**	**19,300**	**24,440**	**16,240**	**10,360**	**13,313**	**26,760**	**2,077**	**0-4,620**	**3.32**
34,910	23,750	33,320	24,490	33,290	21,210	16,680	14,890	16,170	25,950	17,820	16,400	2,185	0-4,130	2.61
46,960	20,680	29,580	35,300	16,300	14,600	19,500	10,580	29,250	19,600	6,720	34,500	2,285	0-5,420	0.42
41,386	24,830	19,650	30,290	27,540	22,940	14,140	17,620	19,460	9,400	16,850	40,760	2,403	230-4,860	0.42
41,083	**23,087**	**27,517**	**30,027**	**25,710**	**19,613**	**16,773**	**14,363**	**21,627**	**18,017**	**13,797**	**30,687**	**2,291**	**0-5,420**	**1.15**
35,970	24,160	23,970	29,730	16,510	15,150	13,560	21,030	9,040	21,650	20,050	17,320	2,085	0-4,240	5.87
29,190	24,040	27,125	21,880	33,610	10,120	21,930	26,540	20,450	26,670	23,220	18,260	2,320	240-4,180	1.85
21,870	21,530	25,640	23,780	28,420	16,640	16,730	14,350	27,150	15,190	8,200	29,990	2,021	0-3,960	0.97
29,010	**23,243**	**25,578**	**25,130**	**26,180**	**13,970**	**17,397**	**20,640**	**18,880**	**21,170**	**19,157**	**21,857**	**2,142**	**0-4,240**	**2.90**
23,290	20,590	22,450	20,240	23,470	20,580	17,920	10,760	20,080	4,990	16,510	29,450	1,925	0-3,490	2.08
31,700	24,080	24,450	22,150	9,110	14,360	16,320	13,210	6,990	12,030	18,710	19,940	1,693	0-3,750	0.20
26,120	33,930	17,220	16,950	22,800	18,550	16,000	15,790	15,720	18,240	14,710	5,460	1,832	0-3,770	0.08
27,037	**26,400**	**21,387**	**21,780**	**18,463**	**17,830**	**16,753**	**18,253**	**14,263**	**11,753**	**16,643**	**18,283**	**1,817**	**0-3,770**	**0.79**
32,080	23,890	1,510	15,810	15,470	25,570	19,821	8,080	23,980	19,260	7,090	11,370	1,686	0-3,580	0.19
30,190	28,720	21,250	26,360	9,240	12,520	19,510	14,280	26,690	8,160	6,560	17,140	1,805	0-3,640	2.07
26,630	24,660	19,980	19,250	15,990	15,160	16,100	10,620	3,610	18,520	15,530	26,160	1,694	0-3,300	5.58
29,633	**25,757**	**14,247**	**20,473**	**13,567**	**17,750**	**17,810**	**10,993**	**18,093**	**12,647**	**9,727**	**18,123**	**1,728**	**0-3,640**	**2.61**
37,810	23,440	27,730	21,750	25,080	12,690	11,930	14,310	10,260	12,500	18,030	14,920	1,851	0-4,150	1.81
37,640	23,660	25,020	18,520	22,190	16,720	13,350	15,650	19,800	14,030	9,460	12,190	1,820	0-4,180	5.25
36,980	17,250	9,370	14,900	17,040	19,280	17,190	11,650	15,590	17,710	10,460	13,710	1,572	0-4,040	7.21
37,477	**21,450**	**20,707**	**18,390**	**21,433**	**16,230**	**14,320**	**13,870**	**15,217**	**14,767**	**12,650**	**13,607**	**1,748**	**0-4,180**	**4.76**
10,210	23,850	15,290	18,610	16,480	16,780	13,910	14,700	17,890	13,040	15,180	12,400	1,660	580-3,610	3.69
15,415	10,210	8,830	24,050	19,970	14,410	14,180	13,290	13,420	11,860	16,030	10,560	1,420	0-3,050	0.82
15,620	12,340	9,330	14,250	15,670	12,550	14,190	15,730	13,010	11,000	6,470	9,730	1,284	0-3,450	3.64
17,098	**15,467**	**11,150**	**18,970**	**17,373**	**14,580**	**13,760**	**13,707**	**14,773**	**11,967**	**12,560**	**10,897**	**1,455**	**0-3,610**	**2.72**
3,090	9,940	11,200	13,550	11,140	8,270	9,010	8,360	7,430	12,420	2,760	6,530	1,046	0-2,650	2.16
1,690	9,860	7,500	7,100	8,790	7,200	8,320	6,790	5,710	5,580	950	7,710	754	0-1,520	2.31
7,560	2,100	1,910	5,010	1,030	840	5,210	6,310	2,830	1,740	600	5,290	367	0-1,460	2.30
6,097	**6,266**	**5,889**	**7,331**	**5,986**	**4,660**	**6,180**	**6,131**	**4,563**	**5,640**	**1,257**	**8,583**	**619**	**0-2,650**	**2.26**
2,555	1,686	2,274	2,224	2,262	1,141	1,[illegible]	1,502	1,374	1,275	1,158	1,899	1,700	0-5,420 (Jan.-August)	2.14 (Jan. to August)
1,570	**1,684**	**1,931**	**2,008**	**1,975**	**1,194**	**1,[illegible]**	**1,367**	**1,243**	**1,216**	**1,061**	**1,654**	**1,582**	**0-5,420 (Jan.-**	**2.42 (Jan. to December)**
1195	614,525	704,035	737,850	[illegible]	[illegible]	[illegible]	[illegible]	590,040	453,07[illegible]	[illegible]	[illegible]	Aver. of year		

), at Ratmalagara Estate, Madampe)

17	18	19	20	21	22	23	24	25	26	27	28
ALM 20	PALM 21	PALM 22	PALM 23	PALM 25	PALM 26	PALM 28	PALM 29	PALM 30	Average daily yield per palm	Range of total daily yield per palm (palms 1 to 30)	Rainfall for corresponding 10 day period (1951). Inches
530	4,770	3,200	2,080	5,540	3,890	820	hil	2,150	426	0–1250	0.39
450	3,130	7,460	2,430	8,240	nil	3,070	nil	8,180	598	0–1910	0.23
370	1,920	6,330	7,060	8,490	nil	8,635	1,770	920	489	0–1600	0.37
50	3,273	5,663	3,857	7,423	1,297	4,175	590	3,750	504	0-1910	0.33
870	9,710	2,390	3,030	8,750	2,050	5,270	4,060	nil	495	0–1810	nil
440	9,560	1,820	2,150	9,610	4,560	6,510	nil	3,410	629	0–2930	0.76
nil	4,780	5,140	4,680	3,640	nil	7,280	nil	3,830	505	0–1980	2.83
437	8,017	3,117	3,287	7,333	2,203	6,353	1,353	2,413	543	0-2930	1.20
990	4,730	250	1,270	890	3,910	3,410	nil	240	475	0–1270	0.79
240	1,400	nil	nil	7,380	3,730	3,290	nil	nil	493	0–1460	0.12
210	1,950	4,910	2,160	6,485	60	nil	1,880	nil	282	0–1730	nil
480	2,693	1,720	1,143	4,918	2,567	2,233	627	80	417	0-1730	0.30
nil	8,810	5,740	7,900	5,480	nil	nil	7,670	nil	452	0–1430	5.31
030	4,340	3,630	6,090	3,510	4,680	1,720	1,920	nil	606	0–1810	nil
820	890	nil	1,720	9,000	3,830	13,190	8,640	nil	605	0–1890	0.16
950	4,680	3,123	5,237	5,997	2,837	4,970	6,077	nil	554	0-1890	1.82
240	6,850	nil	5,370	3,270	nil	630	1,070	nil	366	0–1340	1.02
380	5,630	920	3,120	2,310	80	720	2,090	nil	344	0–1260	0.45
100	5,820	1,020	2,060	1,820	620	1,060	2,400	nil	313	0–1220	0.47
573	6,100	647	3,517	2,467	233	803	1,853	nil	341	0-1340	0.65
320	4,750	750	2,830	1,320	560	950	2,300	nil	293	0–1080	1.58
510	4,920	430	2,750	1,430	310	620	1,980	nil	262	0–1020	nil
360	4,630	390	2,780	1,600	180	360	1,720	nil	228	0– 960	1·18
397	4,767	523	2,787	1,450	350	643	2,000	nil	261	0-1080	0·92
383	467	341	338	642	223	443	216	156	504	0-2930	0·91
321	492	247	330	493	158	320	208	104	437	0-2930	0·87

Malayan Dwarf Coconut Palms (1 to 30) at Ratmalagara Estate, Madampe)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
PALM 14	PALM 17	PALM 18	PALM 19	PALM 20	PALM 21	PALM 22	PALM 23	PALM 25	PALM 26	PALM 28	PALM 29	PALM 30	Average daily yield per palm	Range of total daily yield per palm (palms 1 to 30)	Rainfall for corresponding 10 day period (1951). Inches
5,870 8,370 7,610	5,390 8,100 4,370	4,800 8,040 8,650	4,880 7,180 4,140	4,530 ,450 ,370	4,770 3,130 1,920	3,200 7,460 6,330	2,080 2,430 7,060	5,540 8,240 8,490	3,890 nil nil	820 3,070 8,635	nil nil 1,770	2,150 8,180 920	426 598 489	0–1250 0–1910 0–1600	0.39 0.23 0.37
,283	5,953	7,163	5,400	450	3,273	5,663	3,857	7,423	1,297	4,175	590	3,750	504	0-1910	0.33
,720 ,880 ,710	2,630 2,130 8,765	4,270 12,070 7,220	8,160 11,470	,870 ,440 nil	9,710 9,560 4,780	2,390 1,820 5,140	3,030 2,150 4,680	8,750 9,610 3,640	2,050 4,560 nil	5,270 6,510 7,280	4,060 nil nil	nil 3,410 3,830	495 629 505	0–1810 0–2930 0–1980	nil 0.76 2.83
437	4,508	7,853	9,520	,437	8,017	3,117	3,287	7,333	2,203	6,353	1,353	2,413	543	0-2930	1.20
,390 ,470 ,420	6,550 7,280 7,230	1,620 7,440 5,260	7,110 6,110 2,650	2,990 5,240 2,210	4,730 1,400 1,950	250 nil 4,910	1,270 nil 2,160	890 7,380 6,485	3,910 3,730 60	3,410 3,290 nil	nil nil 1,880	240 nil nil	475 493 282	0–1270 0–1460 0–1730	0.79 0.12 nil
827	7,020	4,773	5,290	3,480	2,693	1,720	1,143	4,918	2,567	2,233	627	80	417	0-1730	0.30
350 110 120	7,200 4,110 8,350	70	7 6,210	nil 4,030 7,820	8,810 4,340 890	5,740 3,630 nil	7,900 6,090 1,720	5,480 3,510 9,000	nil 4,680 3,830	nil 1,720 13,190	7,670 1,920 8,640	nil nil nil	452 606 605	0–1430 0–1810 0–1890	5.31 nil 0.16
293	6,553	6,510	7,830	3,950	4,680	3,123	5,237	5,997	2,837	4,970	6,077	nil	554	0-1890	1.82
500 020 220	7,100 6,130 4,860	5,810 3,260 3,010	4,180 3,890 3,620	3,240 2,380 2,100	6,850 5,630 5,820	nil 920 1,020	5,370 3,120 2,060	3,270 2,310 1,820	nil 80 620	630 720 1,060	1,070 2,090 2,400	nil nil nil	366 344 313	0–1340 0–1260 0–1220	1.02 0.45 0.47
13	6,030	4,027	3,897	2,573	6,100	647	3,517	2,467	233	803	1,853	nil	341	0-1340	0.65
930 130 880	4,980 5,160 5,230	2,520 1,630 980	2,790 2,280 1,960	1,320 1,510 1,360	4,750 4,920 4,630	750 430 390	2,830 2,750 2,780	1,320 1,430 1,600	560 310 180	950 620 360	2,300 1,980 1,720	nil nil nil	293 262 228	0–1080 0–1020 0– 960	1.58 nil 1.18
80	5,123	1,710	2,343	1,397	4,767	523	2,787	1,450	350	643	2,000	nil	261	0-1080	0.92
08	601	657	701	383	467	341	338	642	223	443	216	156	504	0-2930	0.91
24	586	534	571	321	492	247	330	493	158	320	208	104	437	0-2930	0.87

(Records kept during 1951 on 24 Malayan Dwarf Coconut Palm

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Ten days ending	PALM 1	PALM 2	PALM 4	PALM 5	PALM 6	PALM 8	PALM 9	PALM 10	PALM 11	PALM 12	PALM 13	PALM 14	PALM 17	PALM 18	P
10-1-51	9,900	9,220	4,210	4,700	nil	8,220	nil	nil	6,300	6,210	5,440	5,870	5,390	4,800	
20-1-51	10,080	12,430	8,500	8,900	nil	10,090	nil	nil	4,380	8,960	8,630	8,370	8,100	8,040	
30-1-51	9,370	8,060	2,460	9,420	2,655	7,620	320	nil	2,940	8,380	4,890	7,610	4,370	8,650	
Aver. January	**9,783**	**9,920**	**5,057**	**7,673**	**885**	**8,643**	**107**	**nil**	**4,540**	**7,850**	**6,320**	**7,283**	**5,953**	**7,163**	**5,**
9-2-51	10,890	6,840	7,120	4,710	4,250	7,660	nil	nil	9,390	nil	5,180	8,720	2,630	4,270	
19-2-51	11,060	9,460	5,840	10,270	8,420	10,160	nil	nil	12,460	nil	10,070	5,880	2,130	12,070	
1-3-51	7,110	11,280	7,040	9,030	1,670	5,260	nil	nil	4,070	nil	8,150	10,710	8,765	7,220	
Aver. February	**9,687**	**9,193**	**6,667**	**8,003**	**4,780**	**7,693**	**nil**	**nil**	**8,640**	**nil**	**7,800**	**8,437**	**4,508**	**7,853**	**9**
11-3-51	10,220	9,190	5,730	5,350	6,880	6,840	50	3,810	6,140	8,650	7,770	6,390	6,550	1,620	
21-3-51	10,360	9,170	5,520	2,180	5,570	6,400	7,250	4,750	5,150	6,900	9,680	3,470	7,280	7,440	
31-3-51	470	4,120	1,870	7,920	nil	nil	5,680	3,640	800	170	5,800	6,420	7,230	5,260	
Aver. March	**7,017**	**7,493**	**4,373**	**5,150**	**4,150**	**4,413**	**4,327**	**4,067**	**4,030**	**5,240**	**7,750**	**5,427**	**7,020**	**4,773**	**5**
10-4-51	9,330	1,220	70	7,690	8,180	nil	nil	7,430	410	480	10,160	10,350	7,200	970	
20-4-51	12,430	8,970	6,260	9,260	9,660	2,190	5,420	5,220	8,280	8,080	10,790	7,110	4,110	9,860	
30-4-51	5,240	6,510	1,310	11,820	6,440	9,060	13,360	1,800	8,760	6,950	1,400	4,120	8,350	8,700	
Aver. April	**9,000**	**5,567**	**2,547**	**9,590**	**8,093**	**3,750**	**6,260**	**4,817**	**5,817**	**5,170**	**7,450**	**7,193**	**6,553**	**6,510**	**7**
10-5-51	1,580	4,280	930	4,900	5,230	5,230	4,950	8,110	3,670	3,800	6,130	1,500	7,100	5,810	
20-5-51	1,500	4,620	1,020	4,260	5,860	5,410	4,600	8,250	4,830	2,210	7,610	1,920	6,130	3,260	
30-5-51	1,660	4,020	940	4,030	4,930	5,020	4,750	7,620	4,640	1,820	5,280	2,020	4,860	3,010	
Aver. May	**1,580**	**4,307**	**963**	**4,397**	**5,340**	**5,220**	**4,767**	**7,993**	**4,380**	**2,610**	**6,340**	**1,813**	**6,030**	**4,027**	**3**
9-6-51	1,830	3,640	830	4,260	5,180	4,620	4,230	7,820	4,360	1,560	5,320	1,630	4,980	2,520	
19-6-51	1,520	3,900	740	3,750	5,030	4,510	3,150	5,650	3,740	930	5,630	1,230	5,160	1,630	
29-6-51	1,060	3,920	620	3,120	3,960	4,610	2,360	4,690	3,020	620	4,560	980	5,230	980	
Aver. June	**1,470**	**3,820**	**730**	**3,710**	**4,723**	**4,580**	**3,247**	**6,053**	**3,707**	**1,037**	**5,170**	**1,280**	**5,123**	**1,710**	**2**
Aver. daily yield/palm 4 months (Jan. to April) 120 days	887	804	466	760	448	612	267	222	576	456	733	708	601	657	
Aver. daily yield/palm 6 months (Jan. to June) 180 days	**642**	**672**	**339**	**642**	**466**	**572**	**312**	**382**	**519**	**365**	**680**	**524**	**586**	**534**	

TABLE III

YIELDS OF TODDY (in Milli-litres)

(Records kept during 1950 on 3 Malayan Dwarf Coconut Palms (X to Z) at Bandirippuwa Estate, Lunuwila.

1	2	3	4	5	6	7
Days Ending	PALM X.	PALM Y	PALM Z	Average daily yield per palm	Range of total daily yields per palm (Palms X to Z)	Rainfall for corresponding 10 day periods (1950) Inches
10-1-50	3,221	2,669	3,851	325	65– 575	0·36
20-1-50	5,070	4,815	6,127	534	105– 925	0·02
30-1-50	7,230	6,075	4,810	604	110–1,160	nil
Aver. January	**5,174**	**4,520**	**4,929**	**488**	**65-1,160**	**0·13**
9-2-50	6,005	2,822	4,457	443	50–1,090	nil
19-2-50	3,080	7,445	7,360	663	0–1,225	5·65
1-3-50	4,185	3,450	8,090	524	20–1,205	2·41
Aver. February	**5,090**	**4,572**	**6,636**	**543**	**0-1,225**	**2·69**
11-3-50	3,554	2,420	4,210	339	20– 855	0·61
21-3-50	5,580	4,420	2,615	420	105– 885	0·67
31-3-50	7,920	3,945	4,690	552	115–1,260	nil
Aver. March	**5,685**	**3,595**	**3,838**	**437**	**20-1,260**	**0·43**
10-4-50	9,430	7,715	4,310	695	100–1,140	7·34
20-4-50	6,595	5,205	2,138	465	65– 815	0·02
30-4-50	7,525	2,960	2,970	448	105– 820	1·04
Aver. April	**7,850**	**5,093**	**3,139**	**536**	**65-1,140**	**3·00**
10-5-50	4,610	1,945	4,670	374	65– 940	2·80
20-5-50	4,555	3,110	6,270	464	100– 890	1·20
30-5-50	4,300	6,005	4,205	484	85– 975	1·17
Aver. May	**4,488**	**3,687**	**5,048**	**441**	**65- 975**	**1·72**
9-6-50	3,115	4,380	2,480	332	115– 875	4·65
19-6-50	5,270	4,897	1,571	391	75– 930	3·21
29-6-50	3,980	3,635	2,055	322	15– 740	1·47
Aver. June	**4,122**	**4,304**	**2,035**	**348**	**15- 930**	**3·11**
9-7-50	1,240	2,440	2,060	191	0– 470	0·17
19-7-50	2,836	3,080	1,340	242	0– 805	0·35
29-7-50	4,830	4,547	1,800	373	0–1,030	2·67
Aver. July	**2,969**	**3,356**	**1,733**	**269**	**0-1,030**	**1·18**
8-8-50	2,320	1,230	1,800	178	0– 555	1·35
18-8-50	2,500	2,050	1,300	197	0– 440	0·02
28-8-50	2,620	4,020	1,560	293	0– 800	1·34
Aver. August	**2,500**	**2,633**	**1,553**	**223**	**0- 800**	**0·90**
7-9-50	3,060	1,580	1,920	219	0– 696	2·32
17-9-50	3,520	2,140	1,730	246	0– 780	1·42
27-9-50	2,750	4,160	1,220	274	0– 810	0·25
Aver. September	**3,110**	**2,660**	**1,623**	**246**	**0- 810**	**1·33**
27-10-50	1,180	920	130	74	0– 425	5·54
Aver. October	**1,593**	**1,543**	**503**	**121**	**0- 720**	**5·28**
6-11-50	1,230	460	nil	56	0– 380	0·04
16-11-50	750	20	nil	26	0– 310	5·32
26-11-50	300	nil	nil	10	0– 220	0·08
Aver. November	**760**	**160**	**nil**	**31**	**0- 380**	**1·81**
6-12-50	nil	nil	PALM	nil	nil	1·64
16-12-50	nil	nil	DEAD	nil	nil	0·93
31-12-50 (15 days)	nil	nil	—	nil	nil	0·50
Aver. December	**nil**	**nil**	**nil**	**nil**	**nil**	**1·02**
Aver. daily yield per palm 6 months (Jan. to June) 180 days	540	430	417	466	0-1,260 (Jan. to June)	1·85 (Jan. to June)
Aver. daily yield per palm 12 months (Jan. to December) 365 days.	356	297	255	303	0-1,260 (Jan. to December)	1·85 (Jan. to December)
Total for 365 days (ml.)	130,021	108,370	93,119	Aver. of total for 365 days 110,503 (3 Palms)	—	—

TABLE IV

Toddy yield statistics on Tall and Dwarf Palms

(A) Summary of overall average yields

1	2			3			4		
PALMS TAPPED	Overall total yield/palm (ml.)			Overall total daily yield per palm (ml.)			Overall daily yield per palm (ml.) (January to December—365 days)		
	6 months (180 days)	8 months (240 days)	12 months (365 days)	6 months (180 days)	8 months (240 days)	12 months (365 days)	Morning collection 4 p.m.-7 a.m. (15 hours)	Afternoon collection 7 a.m.-4 p.m. (9 hours)	Total 4 p.m.-4 p.m. (24 hours)
Tall Palms (A to N) Bandirippuwa (14 palms)	269,129	407,892	577,491	1,606	1,700	1,582	1,116	466	1,582
Dwarf Palms (X to Z) Bandirippuwa (3 palms)	83,806	98,550	110,503	466	411	303	212	91	303
Dwarf Palms (1-30) Ratmalagara (24 palms)	78,600	—	—	437	—	—	315 (6 months)	122 (6 months)	437 (6 months)

(B) Summary of overall daily yields

1	2	3	4	5	6	7	8	9	10
PALMS TAPPED	1st 30 days (1 month) (ml.)	1st 60 days (2 months) (ml.)	1st 90 days (3 months) (ml.)	1st 120 days (4 months) (ml.)	1st 150 days (5 months) (ml.)	1st 180 days (6 months) (ml.)	1st 210 days (7 months) (ml.)	1st 240 days (8 months) (ml.)	1st 270 days (9 months) (ml.)
Tall Palms (A to N) Bandirippuwa (14 Palms)	590	891	1,135	1,317	1,469	1,606	1,683	1,700	1,703
Dwarf Palms (X to Z) Bandirippuwa (3 Palms)	488	516	489	501	489	466	437	411	392
Dwarf Palms (1-30) Ratmalagara (24 Palms)	504	524	488	504	472	437	—	—	—

(C) Summary of overall monthly yields as % of total annual yield

1	2			3			DW
MONTH	TALL PALMS (A to N) Bandirippuwa (14 Palms)			DWARF PALMS (X to Z) Bandirippuwa—3 Palms			
	Monthly yield		Yield since 1st January as % of total yield (12 months)	Monthly yield		Yield since 1st January as % of total yield (12 months)	Mor
	(ml.)	As % of total yield (12 months)		(ml.)	As % of total yield (12 months)		(ml.)
January	17,990	3.1	3.1	14,632	13.2	13.2	15,128
February	35,469	6.1	9.2	16,302	14.7	27.9	16,280
March	48,070	8.4	17.6	15,112	11.9	39.8	13,497
April	55,909	9.7	27.3	16,083	14.6	54.4	16,029
May	62,320	10.8	38.1	13,222	12.0	66.4	10,225
June	68,729	11.9	50.0	10,452	9.5	75.9	7,827
July	64,239	11.1	61.1	8,062	7.3	83.2	—
August	54,499	9.4	70.5	6,682	6.0	89.2	—
September	51,849	9.0	79.5	7,392	6.7	95.9	—
October	52,429	9.1	88.6	3,642	3.3	99.2	—
November	43,639	7.6	96.2	923	0.8	100.0	—
December	21,600	3.8	100.0	nil	0.0	100.0	—
Total	**577,491**	**100.0**	—	**110,503**	**100.0**	—	**78,592**

8 months (240 days)	12 months (365 days)	Morning collection 4 p.m.-7 a.m. (15 hours)	Afternoon collection 7 a.m.-4 p.m. (9 hours)	Total 4 p.m.-4 p.m. (24 hours)	Morning collection (15 hours)	Afternoon collection (9 hours)	Total (24 hours)	6 months (180 days)	8 months (240 days)	12 months (365 days)
1,700	1,582	1,116	466	1,582	0 to 3,780	0 to 2,510	0 to 5,420	40.44	51.49	88.53
111	303	212	91	303	0 to 975	0 to 740	0 to 1,260	33.22	39.32	67.66
—	—	315 (6 months)	122 (6 months)	437 (6 months)	0 to 2,600 (6 months)	0 to 820 (6 months)	0 to 2,930 (6 months)	15.66	—	—

(B) Summary of overall daily yields

3	4	5	6	7	8	9	10	11	12	13
1st 90 days (3 months) (ml.)	1st 60 days (3 months) (ml.)	1st 120 days (4 months) (ml.)	1st 150 days (5 months) (ml.)	1st 180 days (6 months) (ml.)	1st 210 days (7 months) (ml.)	1st 240 days (8 months) (ml.)	1st 270 days (9 months) (ml.)	1st 300 days (10 months) (ml.)	1st 330 days (11 months) (ml.)	1st 365 days (1 year) (ml.)
891	1,135	1,317	1,469	1,606	1,683	1,700	1,703	1,707	1,684	1,582
516	489	501	480	466	437	411	392	365	335	303
524	488	504	474	437	—	—	—	—	—	—

(C) Summary of overall monthly yields as % of total annual yield

	3			4		
(14 Palms)	DWARF PALMS (X to Z) Bandirippuwa—3 Palms			DWARF PALMS (1-30) Ratmalagara—24 Palms		
Yield since 1st January as % of yield (12 months)	Monthly yield (ml.)	Monthly yield As % of total yield (12 months)	Yield since 1st January as % of total yield (12 months)	Monthly Yield (ml.)	Monthly Yield As % of total yield (6 months)	Yield since 1st January as % of total yield (6 months)
A.1	14,932	13.2	13.2	15,128	19.2	19.2
0.2	16,302	14.7	27.9	10,280	20.7	39.9
17.0	13,112	11.9	39.8	12,497	15.9	55.8
27.3	16,082	14.6	54.4	16,629	21.2	77.0
45.4	13,222	12.0	66.4	10,225	13.0	90.0
50.0	10,452	9.5	75.9	7,827	10.0	100.0
61.1	8,012	7.3	83.2	—	—	—
70.5	6,682	6.0	89.2	—	—	—
79.5	7,392	6.7	95.9	—	—	—
88.0	3,642	3.3	99.2	—	—	—
97.2	923	0.8	100.0	—	—	—
100.0	nil	0.0	100.0	—	—	—
—	110,503	100.0	—	78,592	100.0	—

TABLE V

Variation in the Production of Toddy per Spadix (Volume in milli-litres)

(Records kept during 1953-55 on 14 Tall Coconut Palms (A to N) at Randirippuwa Estate, Lunuwila).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Spadix No.	PALM A	PALM B	PALM C	PALM D	PALM E	PALM F	PALM G	PALM H	PALM I	PALM J	PALM K	PALM L	PALM M	PALM N	Average yield per spadix for 14 palms
1	16,030	25,905	23,305	9,350	18,730	10,320	12,070	9,600	14,990	10,300	14,170	17,390	15,170	21,270	16,982
2	37,910	40,950	44,135	16,435	43,160	39,610	43,020	23,840	33,100	34,030	27,410	35,820	30,500	31,350	34,805
3	41,540	53,010	55,040	23,210	54,520	55,890	46,680	47,040	53,150	35,380	39,240	31,690	50,660	58,840	46,135
4	72,820	74,240	74,940	53,150	65,450	69,230	61,360	60,260	36,730	57,930	46,370	41,280	52,760	68,620	61,083
5	59,520	74,540	82,590	62,320	66,220	76,890	78,680	62,900	65,320	67,900	53,740	52,040	61,320	71,430	66,829
6	51,245	57,780	86,740	66,980	74,190	80,080	79,320	70,130	66,110	69,540	68,950	50,630	67,470	71,660	68,632
7	46,176	56,700	88,340	72,730	82,350	81,610	77,130	53,250	40,520	67,650	69,940	58,880	67,130	85,570	67,726
8	39,970	58,050	75,160	67,200	81,095	79,120	73,540	41,190	34,900	47,080	50,670	56,180	42,080	69,220	58,390
9	38,900	50,790	74,990	65,610	66,670	71,420	60,860	38,690	34,010	39,210	37,090	44,300	—	70,410	53,304
10	30,245	41,910	66,200	68,100	63,490	50,270	50,310	28,860	28,790	35,290	33,480	34,900	—	58,220	45,390
11	27,190	33,660	66,820	40,310	57,980	43,510	49,230	—	30,180	34,590	30,440	20,740	—	—	39,514
12	—	—	67,810	37,010	30,580	38,300	52,720	—	21,490	—	18,540	—	—	—	38,064
13	—	—	64,620	31,920	—	27,610	20,950	—	—	—	—	—	—	—	36,275
14	—	—	45,165	—	—	—	—	—	—	—	—	—	—	—	45,165
15	—	—	22,340	—	—	—	—	—	—	—	—	—	—	—	22,340
Total for 365 days (ml.)	461,540	573,625	938,195	614,525	704,635	732,880	720,870	435,760	479,290	498,960	490,040	443,870	387,090	603,590	577,491 Aver. of total for 365 days (14 palms)
Aver. volume per spathe (ml.) excluding first and last spathes tapped.	46,480	57,108	68,658	52,114	63,532	62,359	61,623	49,662	44,281	50,446	45,733	45,082	54,973	63,512	84,969
Aver. volume per spathe (ml.) all spathes tapped.	41,958	52,148	62,546	47,271	58,720	56,375	55,453	43,576	39,941	45,360	40,837	40,352	48,386	60,359	49,520

$$\frac{577.491}{49,520} = 11.7 \text{ spathes per 365 days.}$$

i.e. 1 spathe was tapped for 31.2 days (approx.)