255

Newsletter BERITA ISOPB

THE INTERNATIONAL SOCIETY FOR OIL PALM BREEDERS
PERSATUAN AHLI-AHLI PEMBIAK BAIK KELAPA SAWIT ANTARA BANGSA

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EDITORIAL

The phenomenal success of the oil palm in the second half of this century should be more than enough reason to spur the search for other natural sources of commercially exploitable vegatable oils. Of palms, South America promises a known handful that would benefit systematic cultivation and careful study. It is almost 50 years since Celestino Pesce's Oleaginosas da Amazonia and yet only two (*Elaeis oleifera* and *Bactris* sp.) have been seriously examined; Elaeis oleifera largely because it was found to readily hybridise with *E. guineensis*, and the hybrids possess some good traits, and *Bactris* because of its high food value. Of the rest, the Jessenia-Oenocarpus complex, noted for high quality oil like olive oil, holds great promise. Michael J. Balick's 1980 thesis on the field biology and economics of this complex is the only substantial work in an area where the average time between articles is about ten years. The article by Rajanaidu *et al.* on their collection expedition in Colombia for Jessenia - Oenocarpus in this issue of the ISOPB newsletter is an important addition.

Also in this newslatter are selected abstracts from papers presented at the ISOPB organised International Symposium on the Application of Statistics to Perennial Tree Crops Research. This was held around this time last year, followed by a one week course on statistics for breeders and agronomists by Robert E. Kempson of Wye College, University of London. The usefulness of the latter has prompted the ISOPB to consider organising a statistics course for assistant plant breeders and assistant agronomists.

FEATURE ARTICLE:

JESSENIA - OENOCARPUS COLLECTION IN COLOMBIA

Rajanaidu N[+], Eduardo Lleras*, Rodrigo Artunduaga,* & Eric Owen*

Introduction

In the early 20th century rubber and oil palm species were introduced to Malaysia as botanical curiosities. To-day, both these crops developed into a bilion dollar industries; a feat inconceivable by the pioneer plant explorers. Since then, a very few species of economic potential had been introduced to Malaysia. Balick (1988) had advocated the importance of Jessenia Oencarpus species which are endemic to South America. These palms are being exploited by the natives for oil, palm heart etc.

The collection of Jessenia Oenocarpus was carried out with cooperation and participation of Instituto Colombiano Agropecuria (ICA) and this paper outlines the first systematic collection of Jessenia Oenocarpus species in Colombia.

Occurrence and distribution of Jessenia Oenocarpus in Colombia.

Based on the research carried out by Balick, Prof. Schultes of University of Harvard, Boston, U.S.A recommended that Jessenia Oenocarpus germplasm be collected in five major areas in Colombia. They are:-

(1) Carimagua (near Los Gaviatos),
(2) Tumaco
(3) Leticia (and Puerto Narino)
(4) Puerto lleras (South of Villavicencio)
(5) Quibdo

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256

Figure 1 shows the major areas of sampling of Jessenia Oenocarpus.

The populations at Carimagua, Tumaco, Leticia and Puerto lleras were sparse as compared to Quibdo. At Carimagua (Llanos) the palms were confined to the valleys. At letica and Puerto Narino bunches were collected along the banks of river Amazon. The dense populations of Jessenia Oenocarpus were noticed at Quibdo (Choco) area. The palms in these area are being exploited for preparation of beverages. In addition to river banks and valleys, the Jessenia Oenocarpus populations were also found at higher grounds especially at Choco and Leticia.

Sampling.

Palms were sampled at 23 sites within the 5 major areas of occurrence of Jessenia Oenocarpus. At each site 1-51 palms were collected. In the case of Quibdo, palms sampled at various sites were pooled into one sample; thus inflating the sample size. The incidence of Oenocarpus at most sites is lower than Jessenia and this is reflected in the size of sample collected.

A total of 168 Jessenia and 14 Oenocarpus samples were collected in Colombia (*Table 1*). For each accession approximately 200 seeds were collected; thus a total of 30,000 seeds were gathered. Fifty percent of the seeds collected were deposited at the Instituto Colombiano Agropecuario (ICA) for local planting and evaluation.

Characteristics of material collected

In the field, data were collected on palm height, vegetative traits, fruit characteristics such as fruit wt, nut wt and mesocarp to fruit (%) especially for the palms sampled at Tumaco and Leticia.

Figs. (2-4) give the histograms for mean fruit wt (g), mesocarp to fruit (%) and mean nut wt (g) respectively; showing the level of variation for these traits. The fruit wt varies from 11 to 40 g; mesocarp to fruit (%), 23-41 and mean nut wt from 7-30g.

ANOVA was carried out for the populations sampled at Leticia and Tumaco and it showed significant differences between the populations (*Table 2*) *Table 3* gives the details of the population means of the material collected at Leticia and Tumaco. The populations sampled at Tumaco had higher means for fruit wt, nut wt and mesocarp to fruit (%) as compared to populations sampled at Leticia.

Plant quarantine requirement

A number of steps were taken before the Jessenia Oenocarpus seeds were brought to Malaysia. They are:-

(1) The seeds were collected from healthy palm only.

(2) At the intermediate quarantine station (UK), seeds were soaked in + 0.1% teepol solution for 2 minutes. The seed were agitated vigourously during the treatment.

(3) The seeds were not treated in colombia.

(4) Phytosanitory Certificate was obtained from Colombia.

(5) At the intermediate quarantine station (UK), a representative sample of the seeds has been examined for Fusarium oxysporum; the seeds repacked and retreated with chemicals as outlined in paragraph 2.

(6) The germinated seedlings were raised in the green house in PORIM, Bangi and were subjected to postentry quarantine inspection for a period of 12 months.

(7) The seedling from the whole collection will be planted at PORIM Research Station at Ulu Paka, Kuala Trengganu. The plants are subjected to further quarantine surveillance for an indefinite period and any plant suspected to carry exotic disease will be destroyed.

Germination of seeds

The seeds were depericarped and wrapped in slightly moistened newspaper. These seeds were sealed in plastic bags. The germination of the seeds was extremely high; nearly 76 % after 8

The germination (%) of seeds which were kept dry was extremely low; especially those collected at Carimagua area. The seeds collected in this area were young and these were embryocultured for conservation and field planting.

Seedlings in the nursery

Table 4 gives the list of Jessenia and Oenocarpus seedlings which are available for field planting. The Jessenia seedlings of Leticia, Puerto lleras and Quidbo area are well represented. Due to poor germination, only a limited number of Jessenia seedlings from Carimagua and Tumaco are available for field planting. In the case of Oenocarpus, seeds were collected in four areas (except Puerto lleras). Seedlings of Leticia and Quibdo origin are available for field evaluation.

Economic potential of Jessenia and Oenocarpus palms

The fatty acid composition (FAC) of Jessenia, Oenocarpus, olive, E. guineensis, E. oleifera and their hybrids is given in Table 5 for comparative study.The FAC of Jessenia is close to that of olive but Oenocarpus distichus has a very high content of Pentadecanoic acid. Fatty acids with odd carbon number is not normally found in plants and it has to be verified in the case of O.distichus. The FAC of Jessenia is useful to diversify the present palm oil to more liquid type which can remain in liquid form at <4°C and could be used as salad oil in countries with cold climate.

The field evaluation of Jessenia Oenocarpus under proper agronomic practices is important to obtain information on the economic potential of this species.

In additon to oil, Jessenia Oenocarpus palm hearts is a useful source of vegetable salad and this is a multimillion dollar industry in South America.

With the new development in the field biotechnology especially tissue culture and genetic engineering, in future, it may be possible to transfer genes from Jessenia Oenocarpus to oil palm; especially the genes controlling the FAC.

Conclusion

The FAC of Jessenia Oenocarpus is unique and the economic potential of these palms has to be studied under proper agronomic conditions for economic comparison with the African oil palm.

References

Balick, M.J. (1988) Jessenia and Oenocarpus: neotropical oil palm worthy of domestication. FAO Plant Production and Protection Paper No. 88.

Acknowledgement

The author wishes to thank Prof Shultes of Harvard University, Bostan, USA, who had initiated this programme at PORIM. The collection was carried out with the cooperation of Instituto Colombiano Agropecuario (ICA) and a number of ICA scientists were involved in the collection trips. Dr Rajanaidu wishes to thank the Director General of PORIM for permission to publish this paper.

TABLE 1.
Number of Jessenia Oenocarpus palms sampled at various sites in Colombia.

Site	Name of place	Jessenia	Oenocarpus
1	Carimaguq (Llanos)	4	-
2	"	6	-
3	"	3	-
4	"	3	-
5	"	-	3
6	"	-	2
7	Tumaco	5	-
8	"	1	1
9	"	5	-
10	"	8	-
11	"	1	-
12	"	1	-
13	"	11	-
14	"	2	-
15	"	2	-
16	"	2	-
17	Leticia	1	1
18	"	4	2
19	"	17	-
20	Puerto Lleras	15	-
21	Leticia	18	-
22	"	3	-
23	Quibdo	46	5
	Total	**168**	**14**

TABLE 2
ANOVA of population differences for fruit wt (g), nut wt (g) and mesocarp (%).

	Mean fruit wt		Mean nut wt		Mesocarp/ fruit(%)	
Item	**df**	**MS**	**df**	**MS**	**df**	**MS**
Between Population	9	580.1**	10	205.7**	9	109.5**
Within Population	60	23.5	60	10.7	59	27.2

TABLE 3.
Population means for fruit wt, nut wt and mesocarp (%) for Jessenia palms collected in Tumaco and Leticia.

Site No.	Place	Mean fruit wt (g)	Mean nut wt (g)	Mesocarp to fruit (%)
7	Tumaco	29.5(5)*	17.9(5)	39.1(5)
8	Tumaco	- (-)	16.7(1)	- (-)
9	Tumaco	40.1(3)	22.6(4)	39.6(3)
10	Tumaco	31.4(8)	20.0(8)	36.1(8)
11	Tumaco	30.9(1)	29.6(1)	36.5(1)
13	Tumaco	19.8(11)	12.9(11)	36.1(11)
14	Tumaco	12.8(2)	7.4(1)	41.2(1)
18	Leticia	11.1(4)	8.5(4)	23.9(4)
19	Leticia	11.7(16)	8.0(16)	31.5(16)
21	Leticia	12.7(17)	8.7(17)	31.6(17)
22	Leticia	11.2(3)	7.4(3)	36.8(3)

* number in the parenthesis is sample size.

TABLE 4.
Seedlings of Jessenia and Oenocarpus available in the nursery for field planting.

	Area	Jessenia	Oenocarpus
1.	Carimagua	34	-
2.	Tumaco	137	-
3.	Leticia	1323	30
4.	Puerto lleras	1698	-
5.	Quibdo	5008	605
	Total	**8200**	**635**

TABLE 5.
Fatty acid composition of Jessenia, olive, Oenocarpus, E. guineensis, Elaeis oleifera and their hybrids

Fatty acid	Jessenia*	Olive	Oenocarpus distichus*	Elaeis guineensis(2)	Eleais olifera(1)	(1 × 2)
Pentadecanoic	-	-	25.3			
Myristic	-	-	-	0.3	1.1	0.5
Palmitic	13.2	7.0	1.6	31.2	17.2	32.5
Palmitoleic	0.6	-	1.6	-	-	-
Stearic	3.6	2.3	2.5	7.0	1.1	2.5
Oleic	77.7	85.8	36.8	49.1	59.9	49.7
Linoleic	2.7	4.7	27.7	12.9	19.0	13.2
Linolenic	0.6	-	1.6	-	-	-
Others	1.6	0.2	-	-	-	-

* *Balick M.J (1988)*

NEWS

International Workshop on Yield Potential in Oil Palm (*Elaeis guineensis*) and Field Visit.

A two-day workshop is being organised to review the present yield of oil palm and to develop methods to increase the yield further.

OBJECTIVES

To review:

○ Current yield of oil palm in different parts of the world;

○ The physiological yield potential (theoretical assessment);

○ Oil palm yield in breeding trials;

○ Oil palm yield in agronomy trials;

○ Oil palm yield under irrigation and density trails.

FIELD VISIT

In addition to the Workshop, a field visit to the Oil Palm Research Stations, oil palm plantations and Horticulture Research Station will be organised.

The details of registration fees for the Workshop, air fare, hotel accommodation, internal travel and food will be announced at a later date.

PARTICIPATION.

This workshop is organized specially for ISOPB members. Non-members are welcomed but they are encouraged to join ISOPB in order to benefit from this workshop and other activities of the Society.

PROGRAMME

28.10.1990 (Sunday) KL/Phuket
29.10.1990 (Monday)

SESSION 1

Country Report (Workshop)

1) Malaysia
2) Indonesia
3) Nigeria
4) Papua New Guinea
5) Colombia
6) Zaire
7) Cameron
8) Ghana
9) Costa Rica
10) Thailand
11) Ecuador
12) Brazil
13) Venezuela
14) Ivory Coast

30.10.1990 (Tuesday) (Workshop)

Session 11

Trials

1) Breeding
2) Agronomy
3) Physiology
4) Irrigation
5) Density

31.10.1990 (Wednesday)
Phuket to Univanich Plantations

1.11.1990 (Thursday)
To Surat Tani

2.11.1990 (Friday)
Visit Oil Palm Research Station and Horticultural Research Station.

3.11.1990 (Saturday)
Surat Tani to Phuket

4.11.1990
Phuket to Kuala Lumpur.

Costs

The following choice is available

(a) Return air fare, accommodation (single), internal transport and Workshop registration **$1500***

(b) Workshop Registration only $ 200

(c) Internal transport only $ 100

(d) Spouse $ 420

(e) Children (below 12) $ 290

Genetics & Biotechnology News

Nobel laureate, James Watson, co-discoverer of the structure of DNA, is currently director of HUGO (Human Genome Organisation) and heading an ambitious US$3 billion international project to unravel the human genetic code contained in the estimated 100,000 human genes. The information obtained will give rise to a host of medical applications such as diagnosing and possibly preventing genetic disorders such as Alzheimers disease, schizophrenia, Huntington's chorea etc., as well as a bonanza of new commercial opportunities.

In a recent US congressional hearing, Watson complained about the lack of financial support from other countries, particularly Japan, for the project. Ironically it was a Japanese scientist who first made the proposal for international collaboration on genome research such as marrying Japanese manufacturing technology with US libraries of DNA. He, in fact, made a start on the project in 1981 backed by Japanese government's Science & Technology Agency, and several compenies e.g. Seiko Epson, Fuji Photo Film. The project failed because the machines did not work well, and their sequence method became obsolete.

The attempt however alerted the U.S. to Japan's technological potential in the field, and set in motion their own effort in human genome research.

261

It started as a proposal from the office health and environmental research for the U.S. Dept. of Energy. Control of the project was subsequently transferred to the National Institutes of Health. HUGO was formed in July 1988 but has been largely inactive due to lack of funds.

Lately, the pace has been picking up with donation of US$1 million from Howard Hughes Medical Institution and further funds from Wellcome Foundation of U.K. but none Japan, the world's second richest country.

The reasons attributed are that Japanese private foundations are rather small; Japanese law forbids the government to donate to organisations below a certain status, and commercial firms are more interested in research in complementary DNA (which leads to commercial products) than on other parts of the genome which has not known function i.e. junk DNA. It is likely that external pressure will prevail upon Japan to particulate actively in the project.

Asiatechnology; Feb. 1990

Chinese Pigs for America

Swine has been domesticated in China for over 6000 years and there are now 1000 different varieties which are a source of valuable genetic qualities for American pigs. The three types selected; Ming, Meishan and Fengjing, for the U.S. breeding programme are noted for producing large litters (14-17vs 10-12 for the American varieties), having high resistance to diseases (trichinosis) and possessing the abilty to digest high roughage diets.

Asiatechnology; Feb. 1990

Gene for Long Shelf-Life

Scientists at Cornell University have found a chemical polyamine 1,4 butanediamine, in a little know Brazilian tomato, Alcobaca, which when sprayed onto normal commercial tomatoes will prolong their shelf-life for more than a week. The alcobaca tomato also can only ripen on the plant, making the fruits sweeter. Plant breeders are hoping to exploit these unique genetic traits in developing new varieties of long lastingt tomatoes.

From New Scientist; 24, June 1989

Abstracts of Selected Papers from the 1989 ISOPB /PORIM International Syposium on Application of statistics for Perennial Tree Crops Research

Completely Randomised Design for Oil Palm Breeding Trials

V.Rao[1], Christopher Donough[2], N. Rajanaidu[1] & Chow Chee Sing[1]

ABSTRACT

Oil palm breeding trials are usually organised in randomised block designs; in some instances because local control is obviously necessary, otherwise from tradition. If significant local control is achieved this design may be considered satisfactory, though again it is necessary to ask whether the objectives of the experiment are best served by growing families in plots. If, however, the blocking families ineffective the randomised complete block design (RCBD) would result in a loss of error degrees of freedom and, worse, inflate the error variance if in appropriate. The simpler completely randomised design (RD) may be preferable for such sites. With the RCBD moreover, the block × families interaction, if significant, is usually used as the error term. This is biologically less meaningful and often less precisely measured than the σ_w^2 of the CRD. Completely randomised designs are also more appropriate for some kinds of genetical and progeny trials, are more robust and allow more efficient use of experimental materials and land.

A SURVEY OF THE PRECISION OF SOME COCOA PROGENY AND AGRONOMY TRIALS IN MALAYSIA.

Ooi Ling Hoak and Goh Kah Joo[1]

ABSTRACT

A preliminary survey of the yield records of 27 progeny and 21 agronomy trials in Malaysia was conducted and the CV% (coefficient of variation) and D% (true treatment difference as percentage of trial mean) were computed to provide an indication of their precisions. The results of a uniformity trial carried out in Malaysia were also presented.

Results of the yield data from 18 progeny trials indicated that CVs declined very sharply from the first to the second year of harvest. The CVs became more stable from the second year onwards. It is, however, advisable to yield record the trials for at least four years as this would improve the precision of the trials significantly.

For single-year yields,

the average CVs for agronomy and progeny trials were 15.1% (mode = 10% to 15%) and 21.9% (mode = 15% to 20%) respectively. Such CVs could only detect treatment differences of 30% to 40% in experiments where the treatments were replicated 4 times. These differences occurred in only about 30% and 34% of the progeny and agronomy trials surveyed respectively.

The CVs were reduced by 30% to 40% when more than four years' yields were summed and analysed as cumulative figures. The agronomy trials generally achieved better improvement in precision than the progeny trials using this approach.

Using stem diameter as the criterion, it was estimated that for eight-year old cocoa, the optimum plot size was 64 trees and 6 to 7 replications were to obtain a 20% treatment difference.

The precision of cocoa field trials need to be improved and more work is required to achieve this.

The Precision of Oil Palm Breeding Experiments in Malaysia

Soh, A.C., Lee, C.H., Yong, Y.Y., Chin, C.W., Tan Y.P., Rajanaidu, N and Phuah, P.K.

ABSTRACT

A study of precision for bunch yield of 30 typical oil palm breeding trials conducted in different parts of the country gave an average coefficient of variation of 7.9%. Such trials could only detect differences of 15% and above which occured in only one third of the trials. Treatment differences of 5-10% and 10-15% occuring in equal proportions in the rest of the trials, were left undetected. Soil heterogeneity index (b) values computed indicated that increasing both plot size and replications would increase precision. Trials on coastal areas, laid out in randomized block with plot size 12-16 palms replicated 4-5 times should be able to detect differences of 10-15% whereas for inland trials, the replications would have to be increased to 6-10 times or a plot size of 20 with 5 replicates would perhaps have to be adopted.

The triple lattice experiment and the completely randomized experiment studied did not demonstrate the superiority of their design over the randomized block design.

EXPERIMENTAL PLOT SIZE AND SHAPE FOR OIL PALM EXPERIMENT

Ahmad Alwi and Chan Kook Weng

ABSTRACT

This paper gives a working guideline for the determination of a practical experimental plot size over different soil types, number of year of yield recoding, number of replications and blocks basing on the soil heterogeneity index, 'b' as developed by Smith (1938) and the coefficient of variation. The b values for Guthrie's inland soils (Rengam, Tavy/Bungor, Tavy/Munchong) ranges from 0.29 to 1.0 based on 5 year yield data. The precision of methods of estimating b is discussed. It was found that ordinary least square method proposed by Smith is not precise. The linear method, weighted by the number of available plots, shows better estimation compared to that of the unweighted linear and nonlinear methods as measured by the coefficent of determination, R^2.

The results strengthen the conviction of the soil scientists that Rengam series soil is good for experimentation with b ranging from 0.6 to 0.9. However, one should try to avoid mixed soil series for example Tavy/Munchong or Tavy/Bungor for experimentation. If one insists on conducting experiments on such a poor soil, then it warrants a much larger plot size and extra care in minimising the variability from the soil.

MODELLING OF PLANT ARCHITECTURE APPLICATION TO TROPICAL AGRONOMIC PERENNIAL PLANTS PARTICULAR CASE OF PALMACEAE

Ph. de REFFYE
R. LECOUSTRE- J. DAUZAT
S.OUATTARA - N'CHO - FLORI

ABSTRACT

Messrs. Halle, Oldeman and Edelin, botanists from the Universite des Sciences et Techniques du Languedoc in Montpellier, have determined plant growth and branching strategies and subsequently categorized them into twenty or so architectural models. A CIRAD agronomist, Ph. de Reffye conducted, concurrently with this qualitative work, quantitative modelloing of *Coffea robusta* growth in Cote d'Ivoire.

In conjunction with USTL the Universite Louis Pasteur in Strasbourg, the Ecole Normale Superieure and departments of CIRAD such as IRCC, IRHO, IRFA, IRCT, and IRCA, the CIRAD modelling laboratory has developed field observation techniques, based on the concept of plant architecture. It then developed methods for the statistical analysis of the resulting probability laws, along the lines of operational research. Finally, the laboratory developed software for calculating and simulating plants, which stochastically respects these laws and strategies; this software is based on the principle of a "growth motor" along the lines of inference motors.

A few examples are given for coffee, cotton, lychee, rubber, oil palm and coconut. Applications and current potential outlets for such modelling are presented, particularly those being considered by IRHO for oil palm and coconut.

FACTOR ANALYSIS OF SOME AGRONOMIC AND PHYSIOLOGICAL TRAITS IN TWO OIL PALM BREEDING TRIALS

C.S. Chow and A.C. Soh

ABSTRACT

Principal components analysis (PAC) and factor analysis (FA) were carried out on data from two oil palm breeding trials to gain insight into the independence and the number of factors accounting for the major variations of the 15 variables i.e. oil yield (YLD), fresh fuit bunch (FFB), bunch number (BNO), average bunch weight (ABW), fruit to bunch (ratio) (FB%), mesocarp to fruit (MF%), oil to wet pericarp (OWP%), shell to fruit (SF%), kernel to fruit (KF%) oil to dry pericarp (ODP%), bunch index (BI), leaf area ratio (LAR), height (HT) and height increment (HTIN). The PCA showed that six common factors were able to explain nearly 90% variations of the 15 variables. Factor pattern in terms of dominant factors over the variables was suggested by FA where extracted factors were futher refined by factor rotation. The six dominant factors may be identified to be: (1) the yield product factor which could have determined FFB, YLD, BI and BNO; (2) the fruit components factor for MF%, SF% and KF%;(3) the vegetative product factor for HTIN, HT and LAR; (4) the oil /pericarp factor for OWP % and ODP % (5) the yield/bunch factor for FB% and OB% and (6) the bunch weight factor (ABW). While some of the traits are thought to be more heritable and and genetically correlated with yield, the results may throw lights regarding the dependence and independence of these traits.

By using the stepwise regression technique relating the canonical and observed variates, the main contributing variates to the principal components were separated from the highly 'overlapping' ones.

A method for estimating missing values in the data of multivariates was investigated. The factor analysis model in this aspect appeared to be fruitful.

DEFECTIVE DATA: A COMMON THREAT TO RESEARCHERS

Ahmad Alwi and Lim Kim Chiew

ABSTRACT

Several methods of analysing defective data are available. The three methods of analysis discussed in the paper are Fitting missing value (FMV), Kuiper-corsten iteration, and Analysis of Covariance. The sensitivities of these methods were compared.

As an illustration of the methods of analysis as well as to assess the amount of information lost in an oil palm experiment, one of the sixteen long-term fertiliser experiments which had 32 defective plots out of 144 is used.

It is shown all the three methods employed in the calculaton of missing or defective data, invariably yielded the same analysis of variance (ANOVA).

Results showed that when 32 out of 144 plots were defective there was a loss of more than 30% of the information.

MANAGEMENT AND EXPLOITATION OF EXPERIMENTAL DATA FOR OIL PALM AND COCONUT USING MICROCOMPUTERS

F. Bonnot

ABSTRACT

Agronomical experiments on oil palm and coconut call for various data to be taken into account; this explains why the experiments set up by IRHO often reach 150 plots, totalling 3000 trees, on which several variables are observed monthly over more than 10 years. Today's microcomputers are sufficiently powerful to manage and exploit such data. Whilst there are many statistical software systems permitting various types of analysis their data management modules are, however, too rudimentary to deal efficiently with the complex tangle of perennial oil crop experimental data. On the other hand, using a data base management system interfaced with existing statistical software is a classic solution for carrying out calculations on specific studies, but is not suitable for regular trial analysis, due to the complicated computer processes involved in transferring data from one software system to another. These considerations led IRHO to develop a specific software system, comprising a management module specially adapted to oil palm and coconut experimental data, and statistical modules enabling those design most used for these plants to be analyzed. This software covers the management of treatment, experimental plot and tree characteristics and the corresponding data, which may be monthly or annual.

Annual plot values for all variables, automatically collected or calculated from basic, can be regrouped over any number of years and then analyzed statistically according to experimental design.

A DATA MANAGEMENT SYSTEM FOR COMMERCIAL PERFORMANCE OF RUBBER PLANTING MATERIALS

Md. Yusuf Hj. Ahmad, Ahmad Asri Husain & H. Tan

ABSTRACT

One of the important questions in crop improvement research is that how cultivars selected from breeding trials perform in commercial environments. To answer this question, plant breeders usually conduct survey of cultivars grown in various commercial fields and then relate the commercial performance data with those from

264

their own trials. Field surveys of this nature often result in accumulations of massive data which require proper data handling, storage, processing and summary.

In the Rubber Research Institute of Malaysia, rubber cultivars have been produced through controlled hybridization programme since 1928. Promising cultivars were evaluated and recommended to the rubber planting industry. In early 1960's, rubber breeders started collection of some data on yield and tapping system of rubber cultivars planted in a few large estates in order to monitor and compare the performance of recommended materials under commercial environments with those of experimental trials.

In 1967, this effort has been intensified to collect more data from both small and large estates. Annual survey questionnaires have been sent to all the registered small and large estates in Peninsular Malaysia and the completed survey forms returned to the Institute. Annually and a large volumn of data set (referred to commercial registration data) is now available for various research needs.

This paper presents a data management system to handle the commercial registration data collected from the surveys. This computer system which was developed and evolved on HP3000 Series 58 minicomputer. The system is basically made up of two main parts, one uses spsecific programs for information processing while the other uses IMAGE/QUERY of HP3000 for data storage and retrieval. The description of the system which follows is in general terms but detailed descriptions will be communicated to all interested in utilising the system.

Corrigendum: To feature article by Dr.Ian Henson in the June 1989 Newsletter (page 2 col. 3 line 26)

"...... dry matter conversion efficiency (e) and yield small ....."

should read

"...... dry matter conversion efficiency (e) and yield. Such models can be used, for example, to estimate the likely effects on whole canopy gas exchange, *e*, and yield, of small ......"

Fig. 1. Map of Colombia showing the five major areas of sampling of *Jessenia - Oenocarpus*.

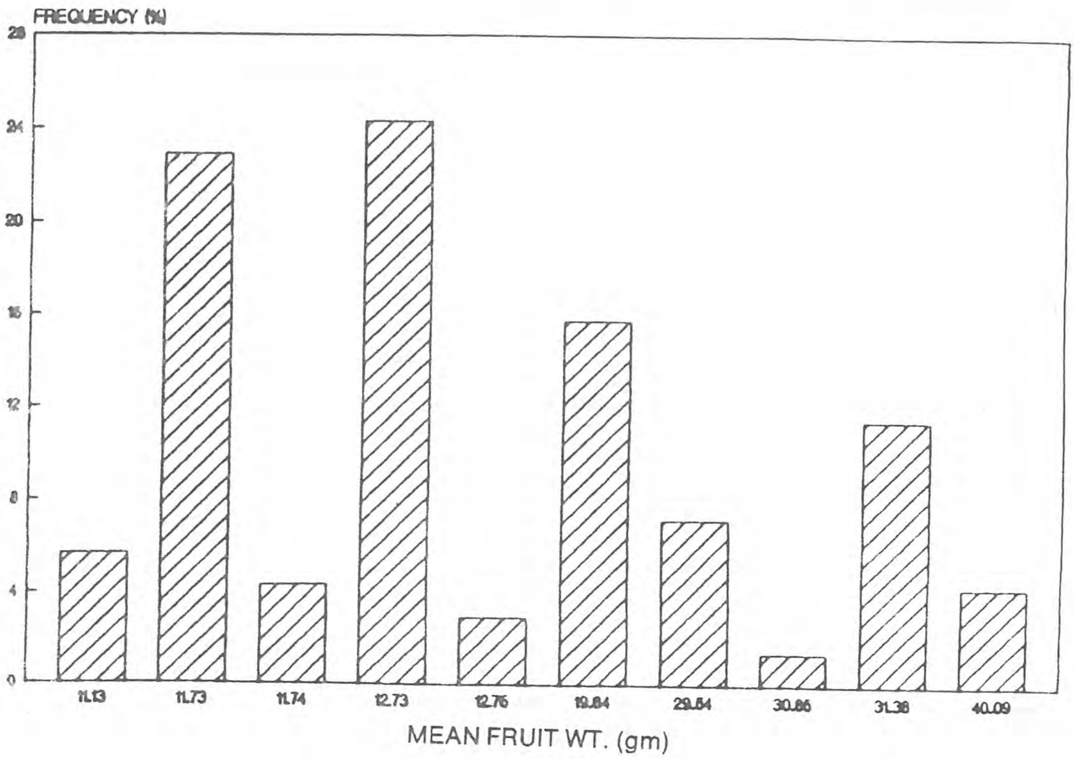

Figure 2: COLLECTION OF JESSENIA MEAN FRUIT WEIGHT

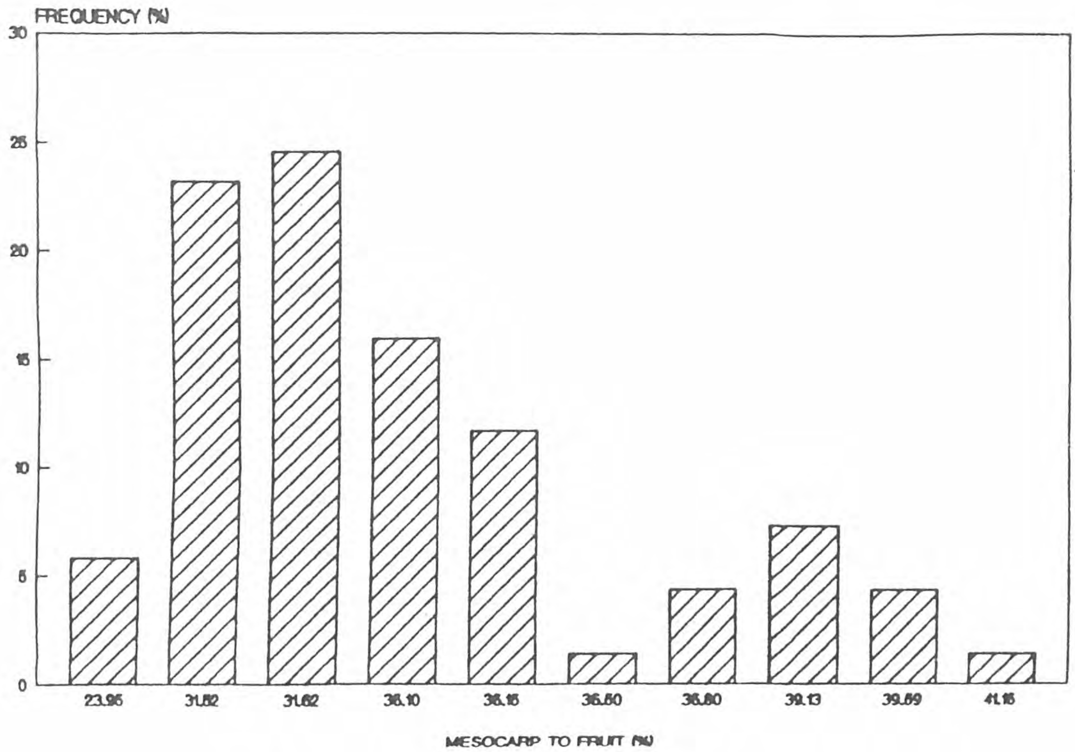

Fig.3: COLLECTION OF JESSENIA MESOCARP TO FRUIT

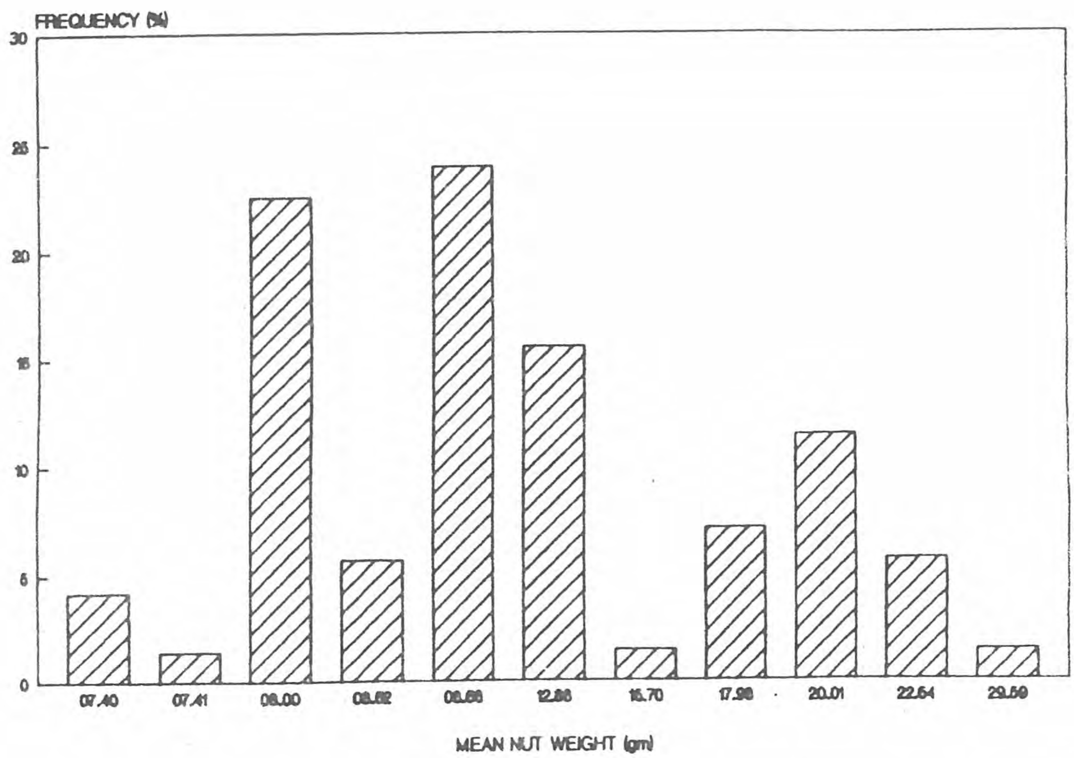

Fig.4 COLLECTION OF JESSENIA MEAN NUT WEIGHT