

Newsletter BERITA ISOPB

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

January - June 1994

MEMBERS ONLY

Vol. 10 No. 1

EDITORIAL

In the previous issue A. Kushairi Din et al have suggested that the Tumbuk short palms may have Dumpy E206 ancestry. This meant genetic dwarfness, but not from novel genes and hence was good and bad news for breeders with such materials. In this issue Mr. E. A. Rosenquist, of BPRO fame among others, recollects otherwise from memory and published literature. This is welcome debate as research on dwarf oil palms is overdue from previous frustrations with E206 and E. oleifera. Oil palm fruits like coconuts do fall, some at least, but abscinding fruit bunches appear unlikely, genetic engineering notwithstanding. Plant breeding may yet provide some relief to harvesting tall palms and breeders with records of the Tumbuk palms or their descendants or other short palms can help by disseminating such information for wider benefit.

The feature article in this issue is a picture filled report by Dr. Rajanaidu and Prof. Jalani on the oil palms encountered and collected in Senegal, the northernmost reaches of the palm's natural distribution. Interestingly, all the palms visited were Duras and the authors suggest why this may have been so.

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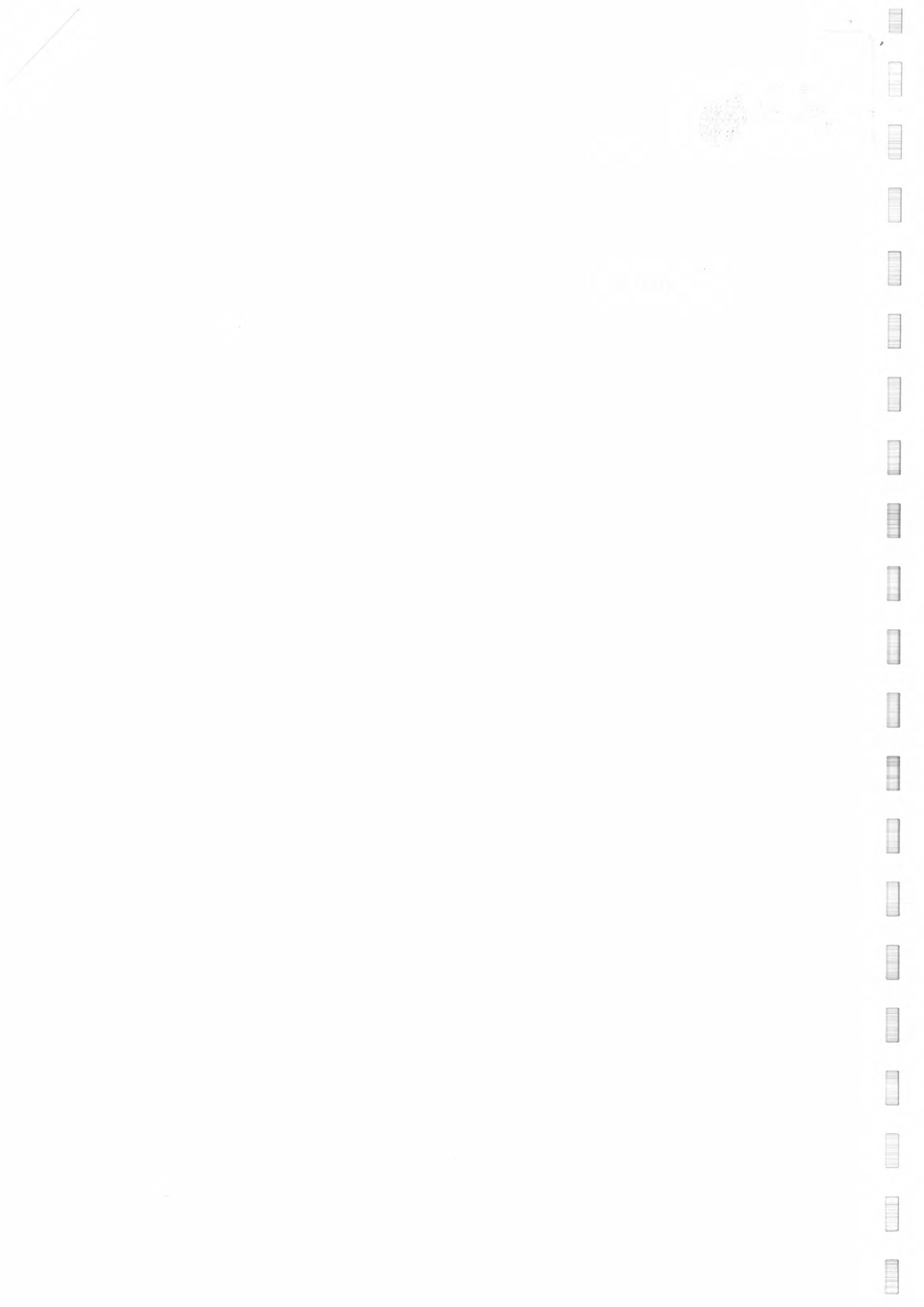
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FEATURE ARTICLE

OIL PALM GERMPLASM COLLECTION IN SENEGAL

Rajanaidu, N. and Jalani, B.S

INTRODUCTION

The genetic base of oil palm breeding material is very narrow (Rajanaidu *et al* 1979). Palm Oil Research Institute of Malaysia (PORIM) has been collecting oil palm genetic material in West Africa for the past twenty years. To-date collections have made in Nigeria, Camerouns, Zaire, Tanzania, Madagascar and Angola. Senegal is the northern extreme of natural oil palm groves in west Africa.

This paper outlines the collection method and the characteristics of the material found in Senegal.

MATERIAL AND METHODS

Collection was carried out in July/August 1993 with the cooperation of Ministry of Agriculture, Senegal officers. Palms were sampled at 13 sites (Fig. 1) and the details of the sites are given in Table 1. At each site 5-10 palms were sampled. Seeds derived from each of bunch (Palm) are kept separate until field planting as an "Open-pollinated" family. A total of 104 samples were collected in Senegal (Table 2). Only *Dura* palms were encountered in Senegal. It could be due to the low rainfall and the differential survival of *duras* and *teneras*.

Table 1. Senegal Collection Sites

Site	Names of Sites
1	45 km from Ziguinchor, 051
2	Diatene
3	Essaout
4	Dar Salam
5	Babadinka 17 km de Ziguinchor/Soucouta
6	Diarone
7	Djiti Coumbon
8	Takene
9	Badiana, 25 km from Bigonona
10	Ebinaro, 35 km
11	Kabiline 1, 48 km
12	Mboro
13	Theudem Sarr Lac Tamn, 15 km de Bayakh Carrefour

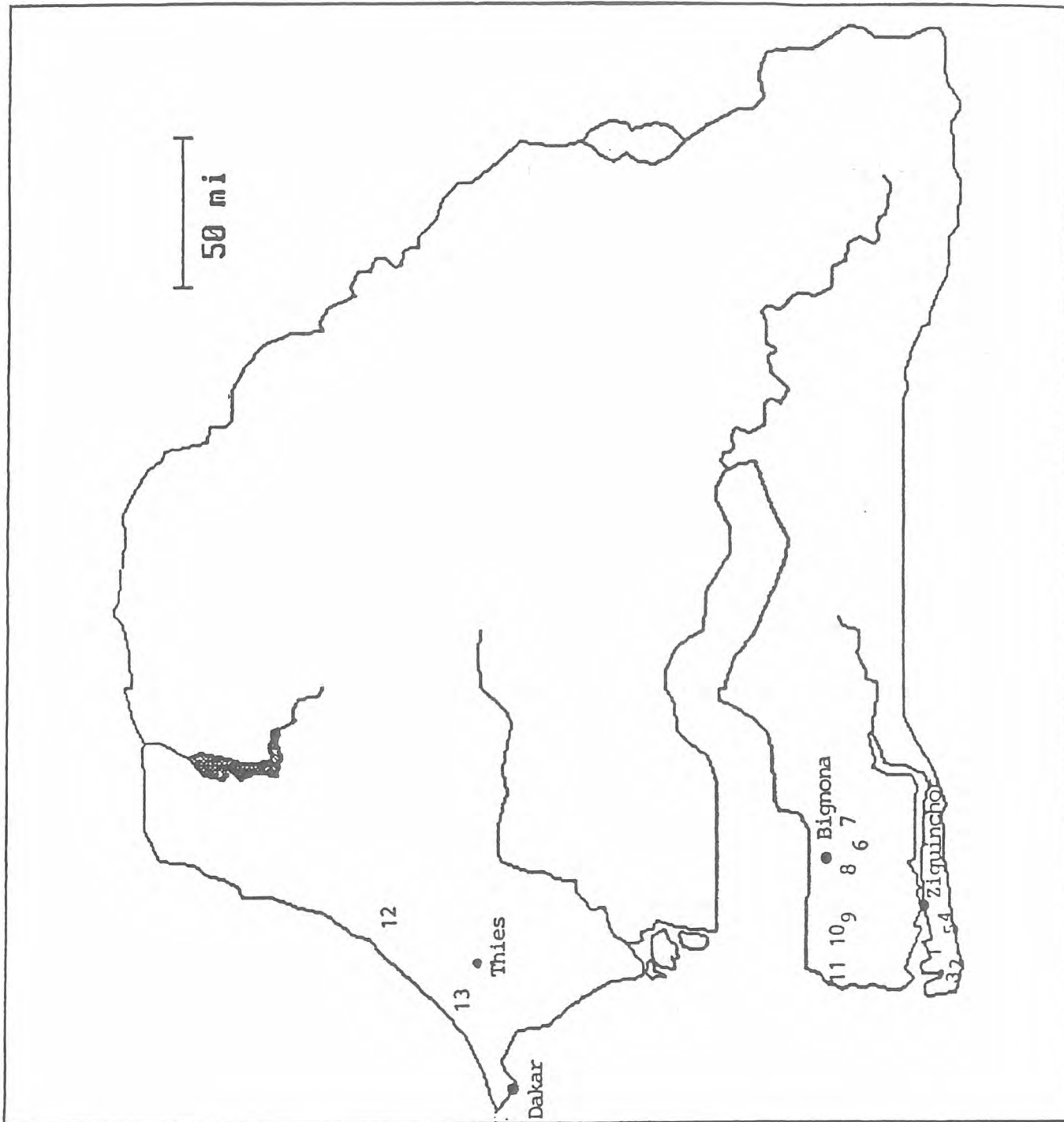


Fig. 1 : Map of Senegal showing the sample sites

Table 2 : Sample Size

Site	Size Sample		
	Dura	Tenera	Total
1	10	-	10
2	10	-	10
3	10	-	10
4	5	-	5
5	10	-	10
6	10	-	10
7	10	-	10
8	5	-	5
9	5	-	5
10	5	-	5
11	6	-	6
12	10	-	10
13	8	-	8
			<hr/>
			104
			=====

The palm groves are isolated in the areas around Dakar. However, extensive groves were encountered in the Southern part of Senegal around Ziguinchor where the rainfall exceeds 1000 mm per annum.

The following data were scored in the field.

- 1) Bunch wt (kg)
- 2) Bunch depth (cm)
- 3) Bunch length (cm)
- 4) Bunch breadth (cm)
- 5) Diameter of fruits (cm)
- 6) Diameter of nut (cm)
- 7) Diameter of kernel (cm)
- 8) Length of fruit (cm)
- 9) Wt of 10 fruits (g)
- 10) Wt of 10 Nuts (g)
- 11) Mesocarp/fruit (%)

RESULTS AND DISCUSSION

Table 3 gives the mean and coefficient of variation (c.v.) for the traits scored in the field. The mean bunch wt is only 5.94 kg and the mesocarp/fruit (%) (M/F) is 35.18. The characteristics of the bunch and fruit traits of Senegal genetic material were compared to the collections carried out in other countries. The dura bunch wt and M/F(%) are the lowest when compared to the materials collected elsewhere. The summary of the bunch and fruit

characteristics is given in *Table 4*.

Table 3 : Variation of various traits recorded in the field in Senegal

Character	n	\bar{x}	cv
Bunch wt (kg)	104	5.94	36.90
Diameter of fruit	104	1.49	12.65
Diameter of nut (cm)	104	1.25	15.27
Diameter of kernel (cm)	104	0.97	21.90
Length of fruit (cm)	104	2.31	12.96
Wt of 10 fruits (g)	104	26.46	26.63
Wt of 10 nuts (g)	104	17.35	33.63
Mesocarp to fruit (%)	104	35.18	18.75
Bunch depth (cm)	104	17.51	15.31
Bunch length (cm)	104	30.03	14.87
Bunch breadth (cm)	104	25.42	12.83

Table 4 : A Comparison of Bunch Characters Of Oil Palm Genetic Material Collected in West African Countries

Country	B/wt (kg)	Dura Single fruit wt(g)	Mesocarp (%)	B/wt (kg)	Tenera Single wt (kg)	Mesocarp (%)
Senegal	5.94 (36.90)	2.65 (18.75)	35.18	-	-	-
Gambia	5.74 (39.52)	2.54 (16.35)	33.47	-	-	-
Ivory Coast	10.9 (37.0)	6.9 (28.87)	41.8 (12.92)	9.8 (40.72)	5.8 (27.99)	61.2 (10.46)
Nigeria	11.8 (15.86)	7.98 (34.34)	47.3 (16.38)	10.9 (47.09)	8.5 (30.00)	70.99 (13.78)
Cameroons	16.8 (53.9)	10.3 (32.04)	39.7 (19.32)	17.3 (45.37)	8.6 (33.17)	62.4 (12.20)
Zaire	17.6 (41.14)	14.2 (29.95)	43.9 (16.39)	17.4 (48.73)	12.6 (33.03)	64.1 (20.41)
Tanzania	18.4 (73.60)	16.9 (24.40)	46.7 (21.55)	13.7 (47.50)	15.5 (33.87)	70.8 (12.52)
Angola	21.4	14.2	48.9	16.0	11.7	70.9

Note : Figures in the Parenthesis are coefficient of variation.

between and within population (*Table 5*). All the characters excepts for fruits length showed significant differences between the populations.

The relationship between mean and c.v. was also studied. The results show that the weight of fruits is higher in populations sampled near Dakar (pop. 12 and Pop. 13) but the M/F (%) is lower (*Fig. 13-23*).

Principal component analysis (PCA) was carried out using the bunch and fruit traits. The population 13 is rather distinct from other populations.

CONCLUSIONS

The data scored in Senegal shows that there is a clinal increase in dura bunch wt and M/F from Senegal to Angola. The single fruit wt increases gradually from Senegal to Tanzania. However, the single fruit wt is slightly lower in Angola.

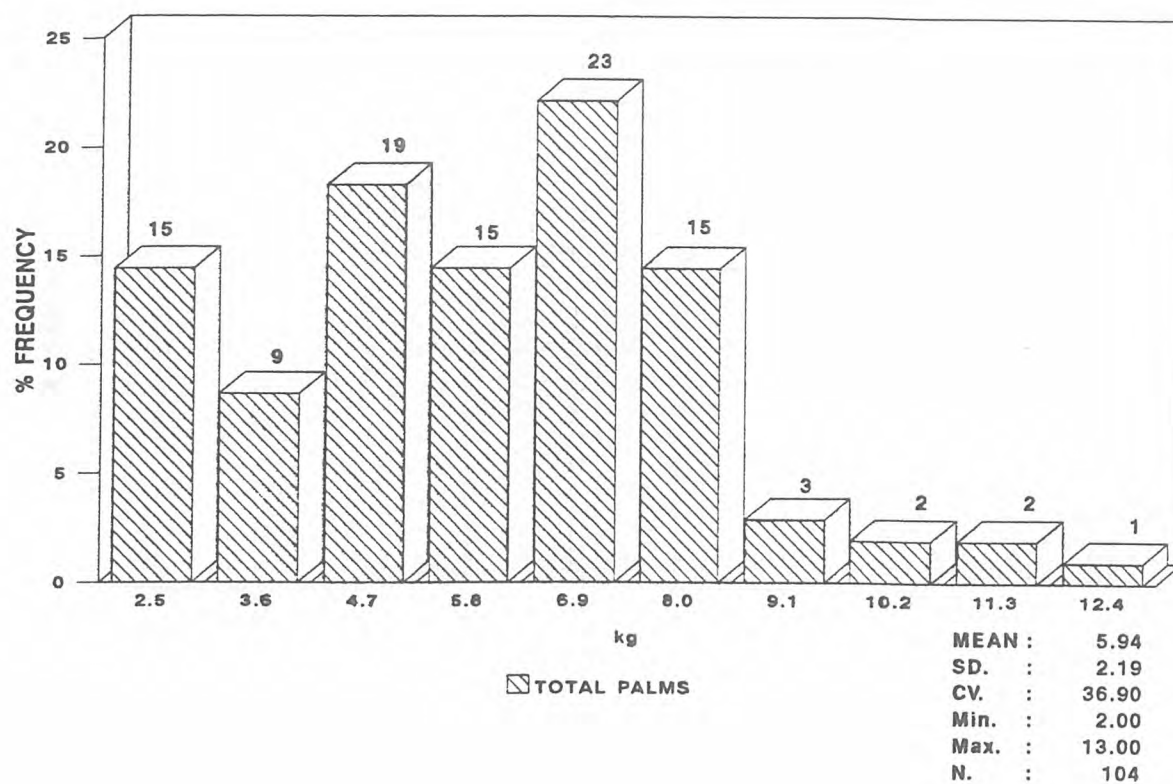
REFERENCES

Rajanaidu, N., Arasu, N.T. and Obasola, C.O. (1979). Collection of oil palm genetic material in Nigeria II. Phenotypic variation of natural population. *MARDI Res. Bull.*, 7(1) : 1-27.

Table 5 : ANOVA of Field Data Collected in Senegal

Source of variation	df	Bunch wt	Bunch length	Bunch breadth	Bunch depth	Wt of 10 fruits	Wt of 10 nuts	Mesocarp to fruit	fruit length	fruit diameter	nut diameter	kernel diameter
Between Population	12	**	**	**	**	**	**	**	NS	**	**	**
Within Populations	91											

**Fig. 2 : Collection of germplasm in Senegal
Bunch Wt**



**Fig. 3 : Collection of germplasm in Senegal
Bunch Length**

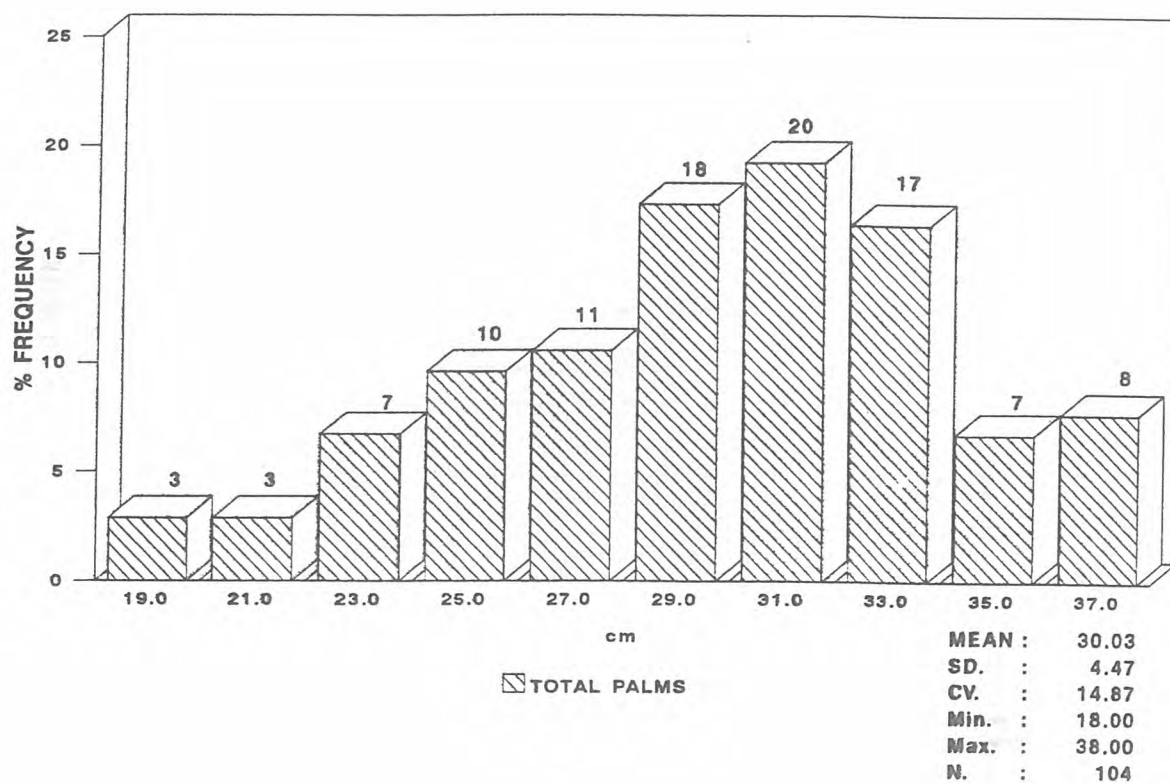


Fig. 4 : Collection of germplasm in Senegal
Bunch Depth

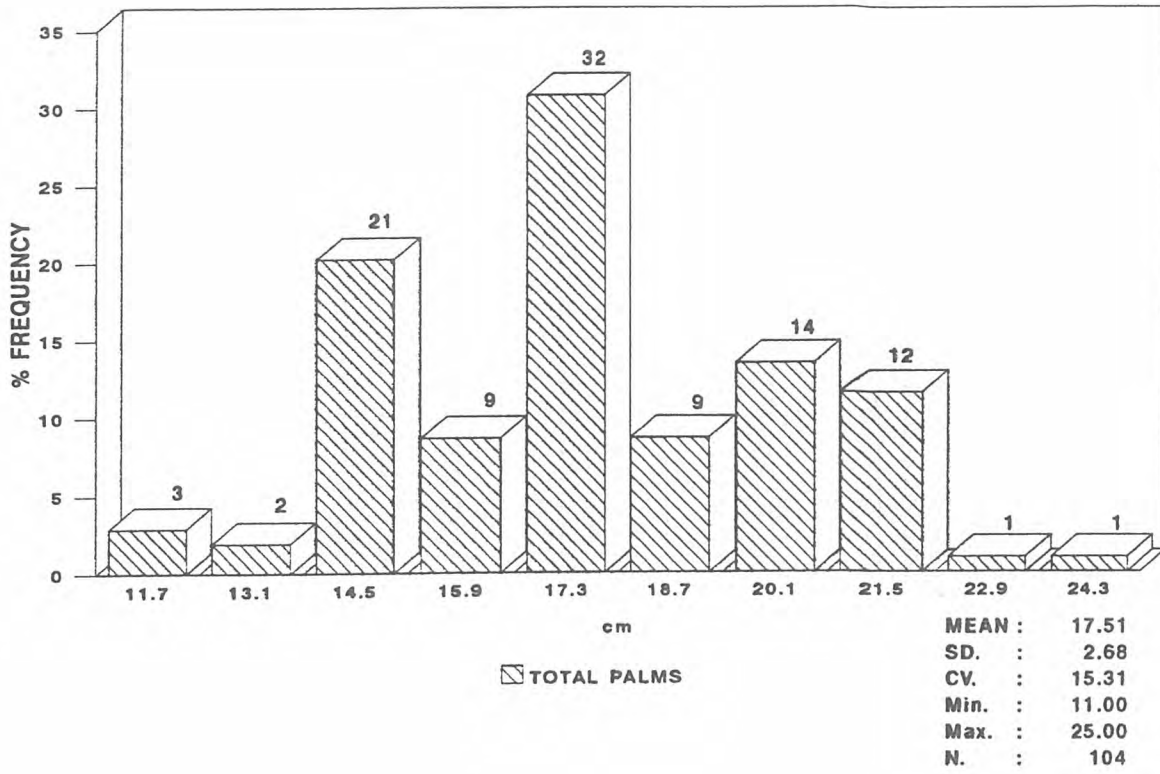


Fig. 5 : Collection of germplasm in Senegal
Bunch Breadth

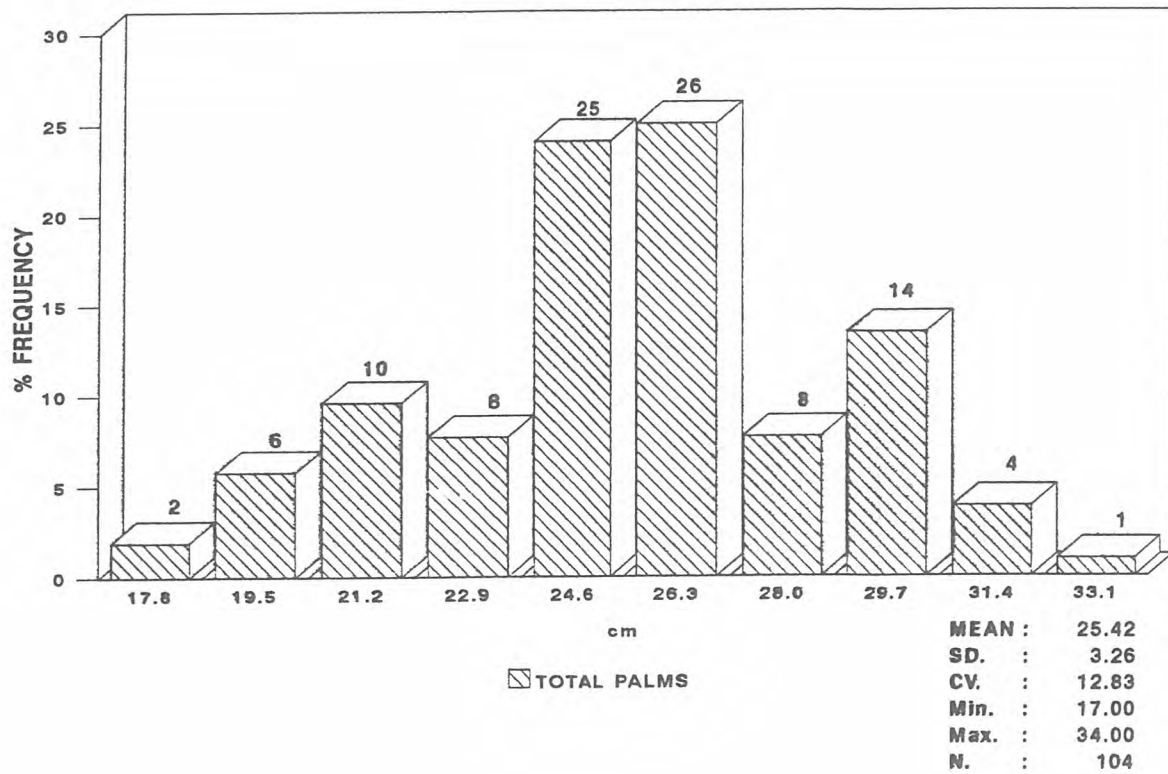


Fig. 6 : Collection of germplasm in Senegal
Diameter of fruit

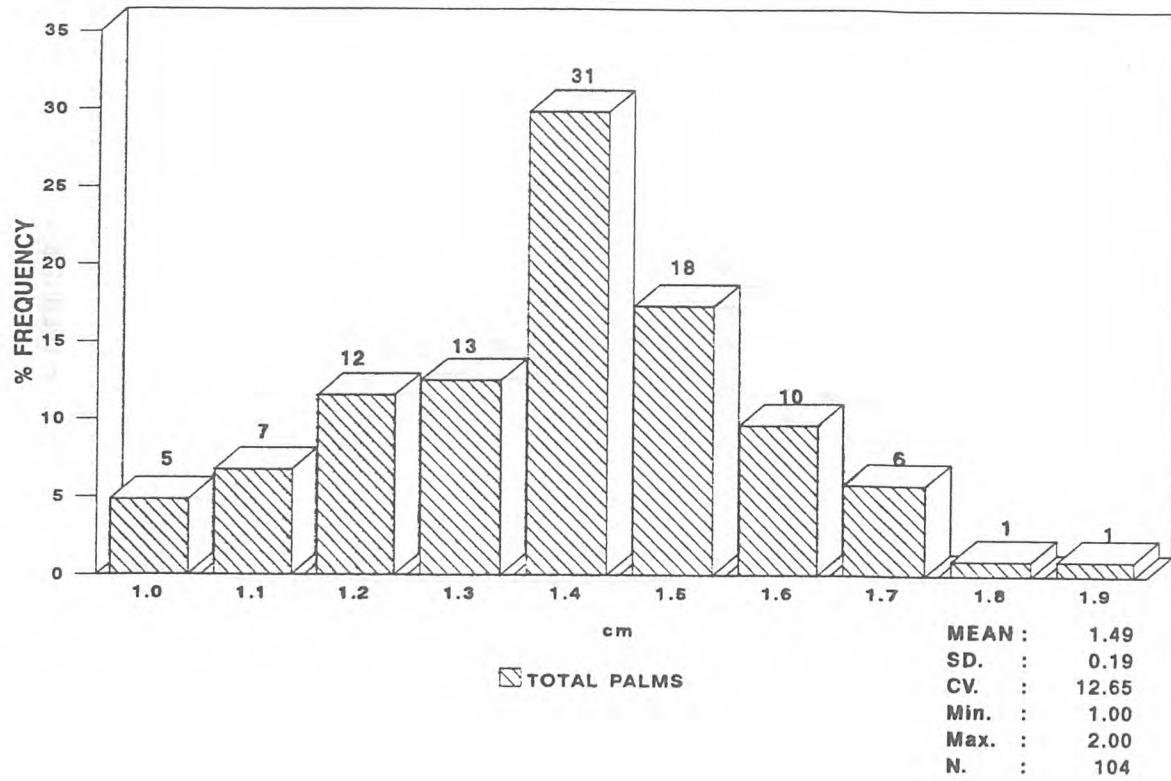


Fig. 7 : Collection of germplasm in Senegal
Diameter of nut

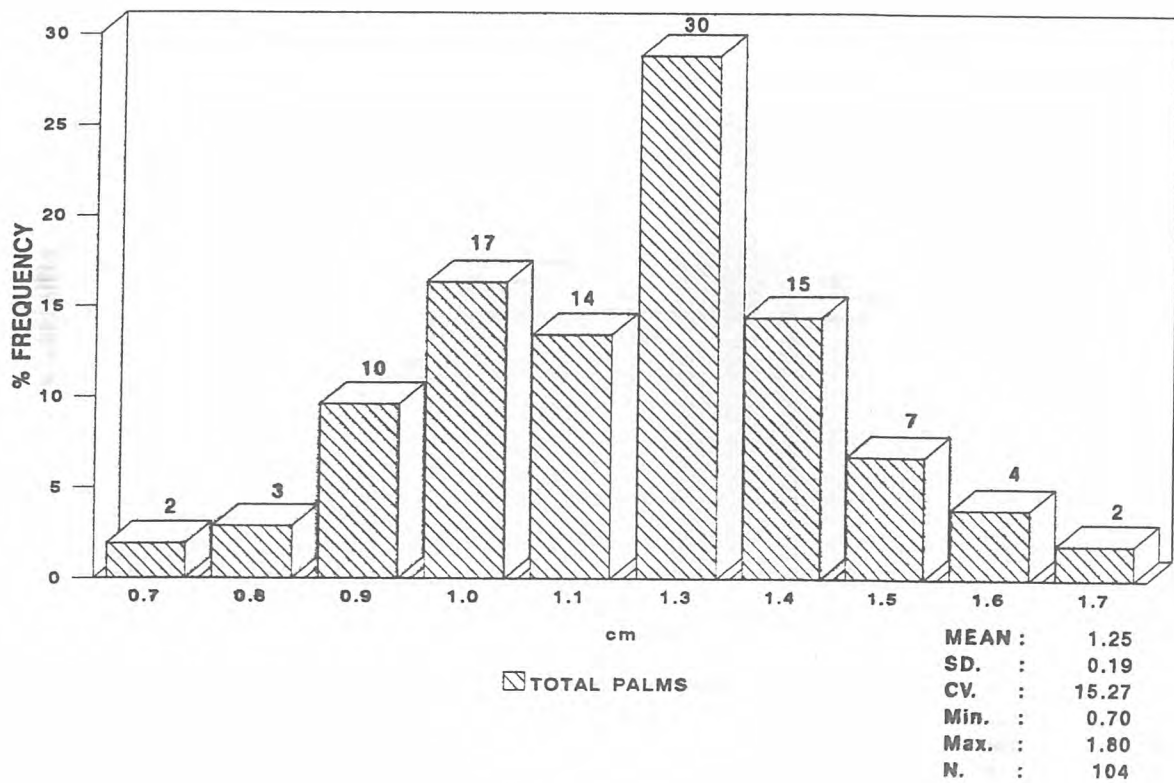


Fig. 8 : Collection of germplasm in Senegal
Diameter of kernel

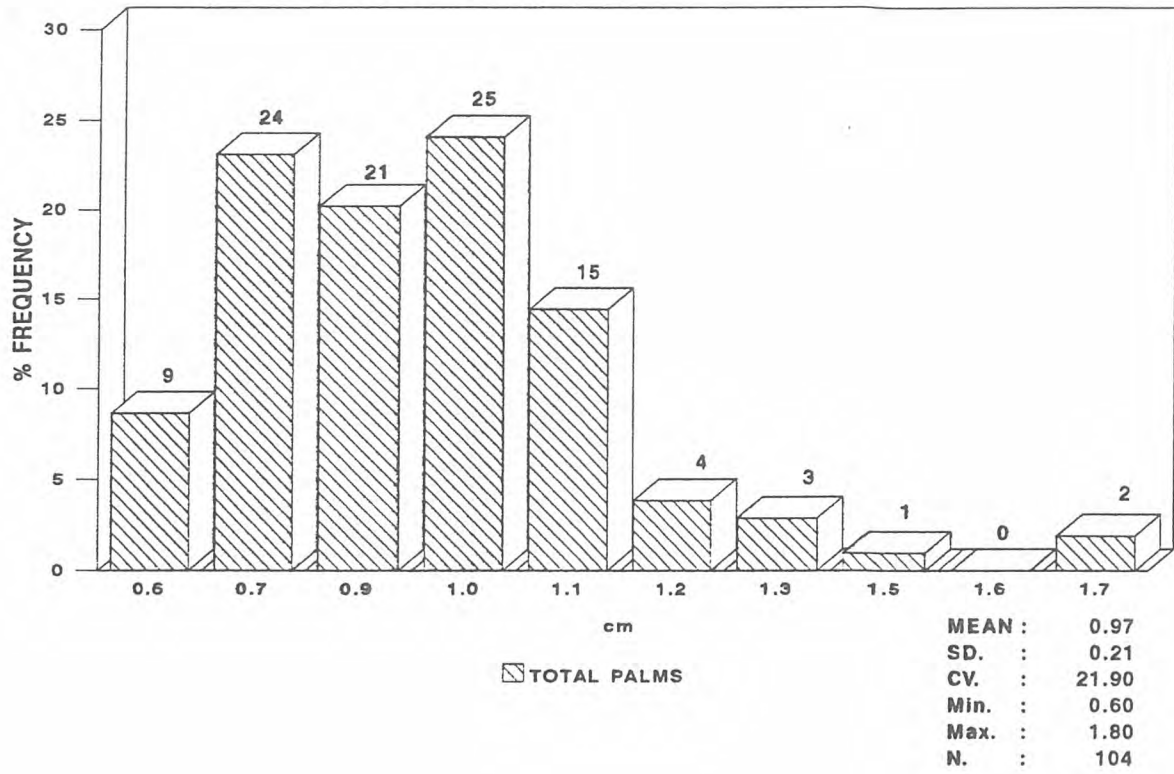


Fig. 9 : Collection of germplasm in Senegal
Weight of 10 fruits

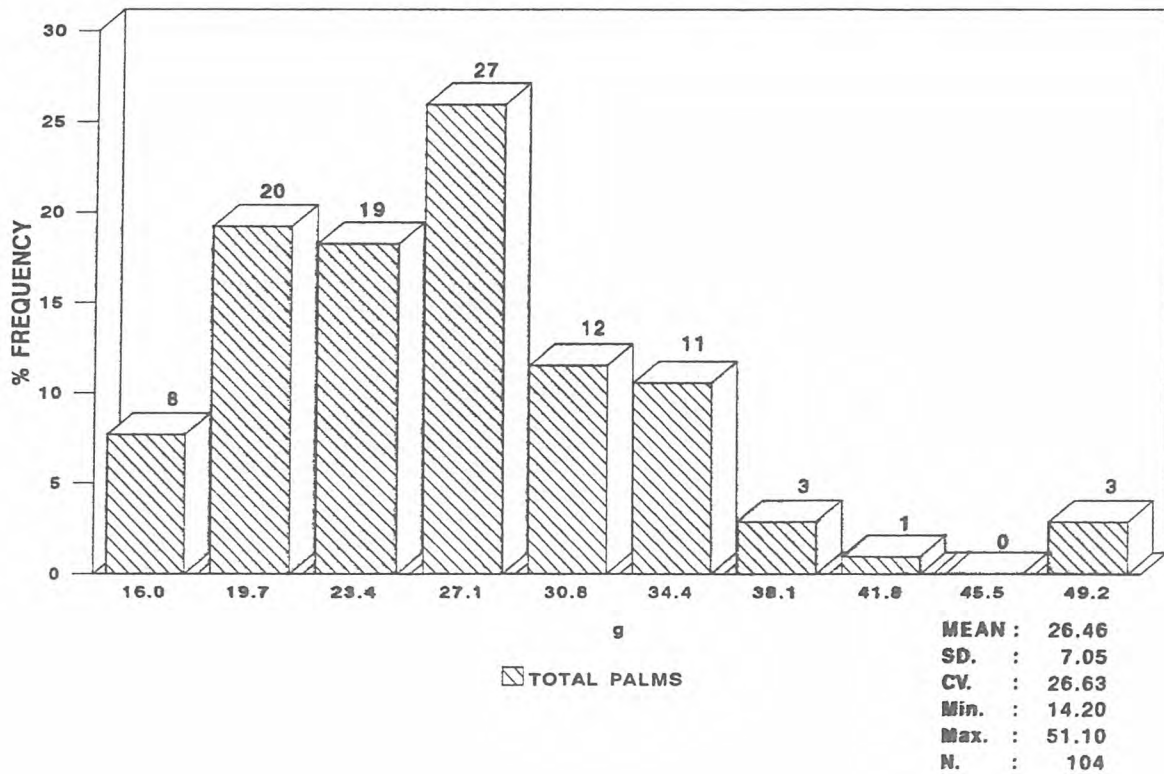


Fig. 10 : Collection of germplasm in Senegal
Weight of 10 nuts

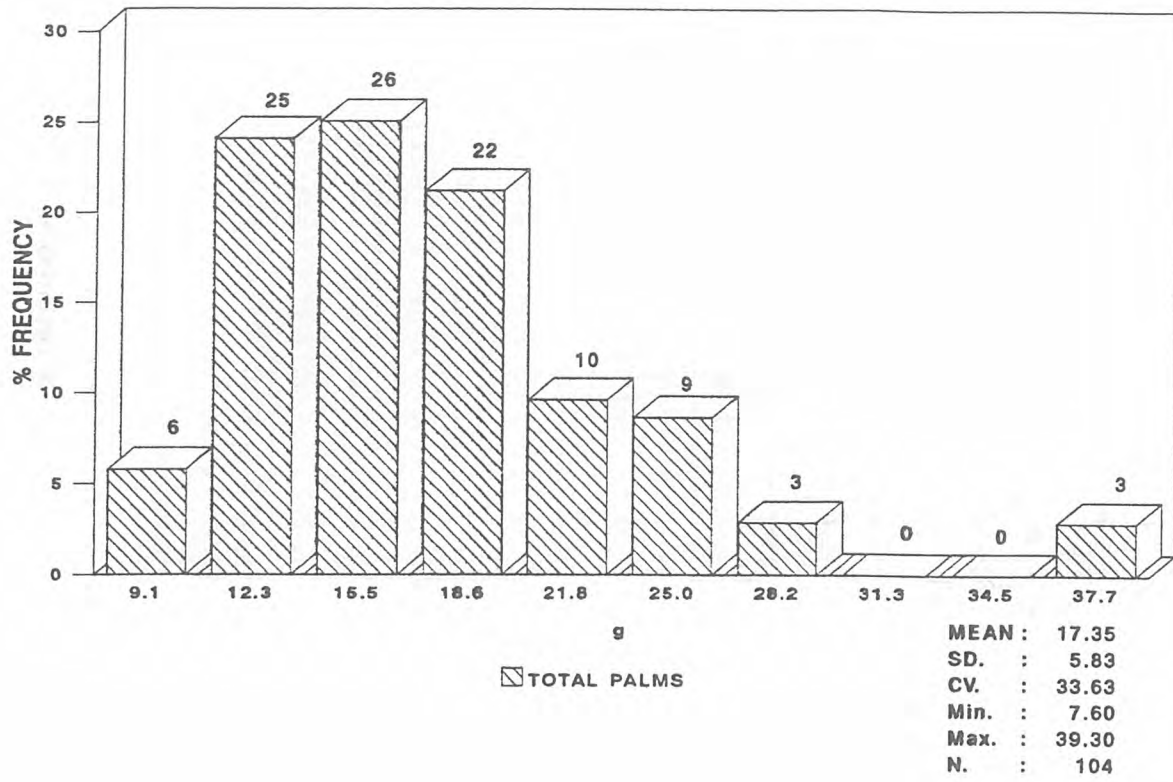


Fig. 11 : Collection of germplasm in Senegal
Length of fruit

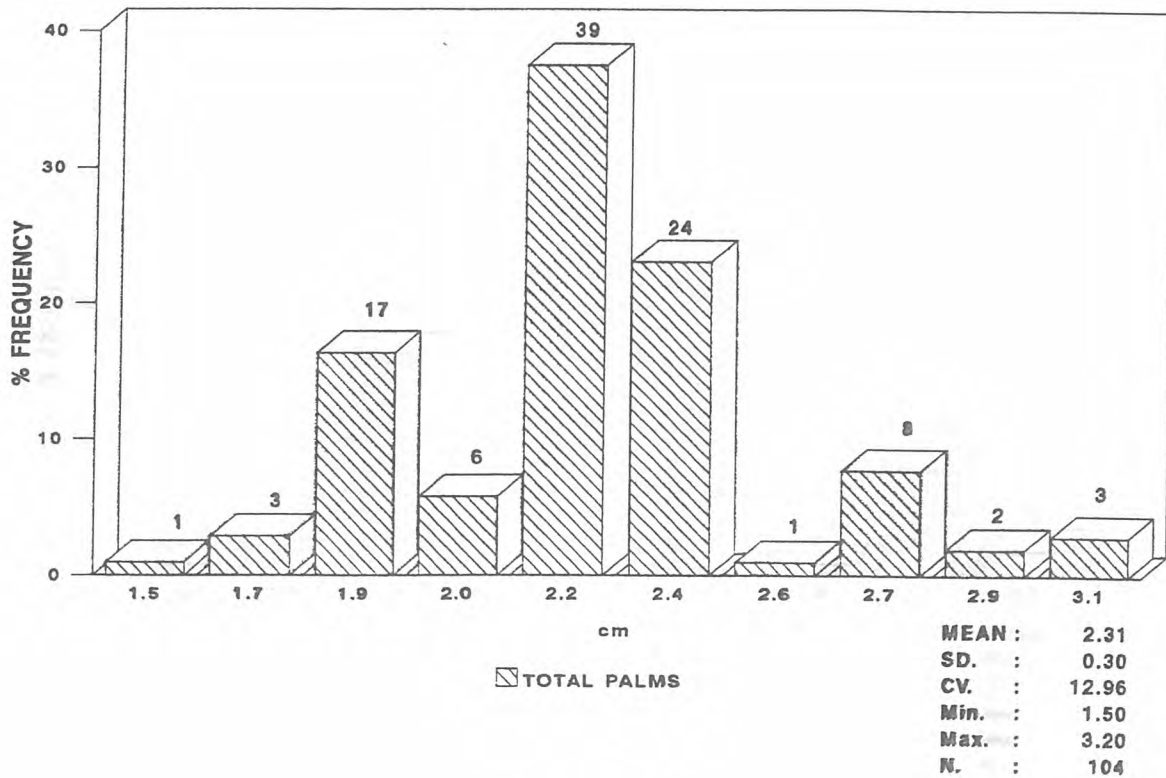


Fig. 12 : Collection of germplasm in Senegal
Mesocarp to fruit

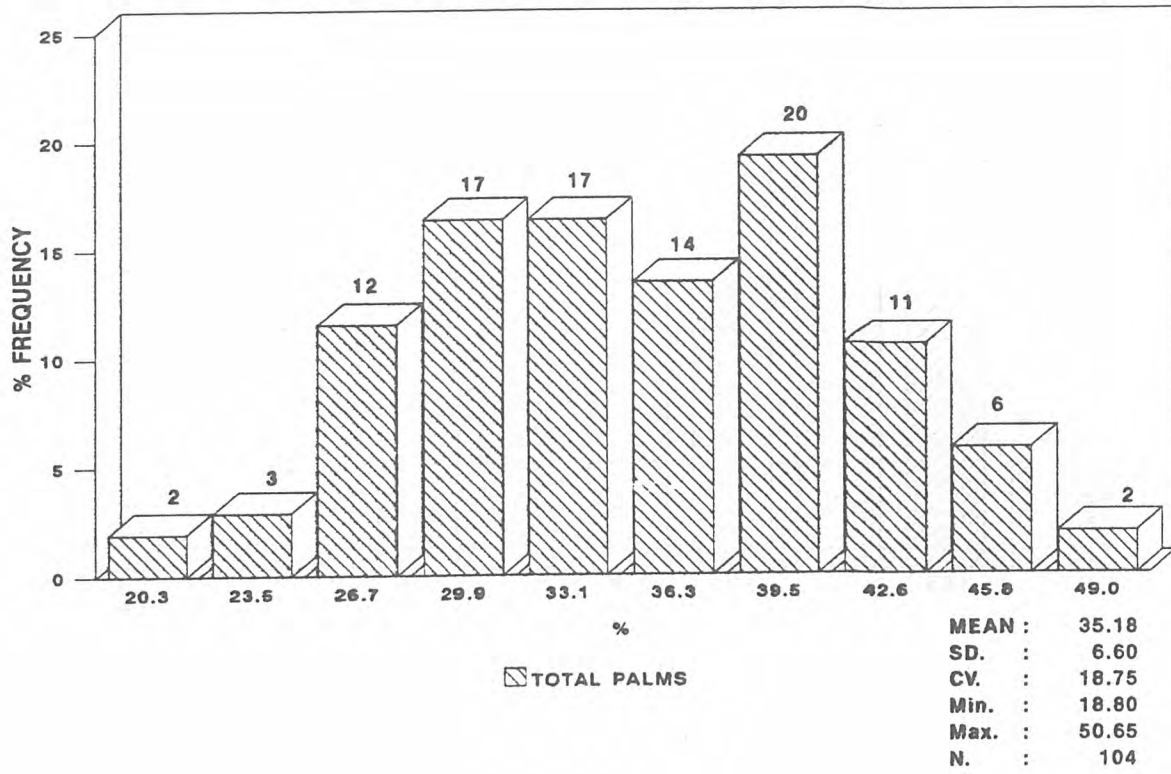


Fig. 13 : Collection of germplasm in Senegal (1993)
Bunch Weight

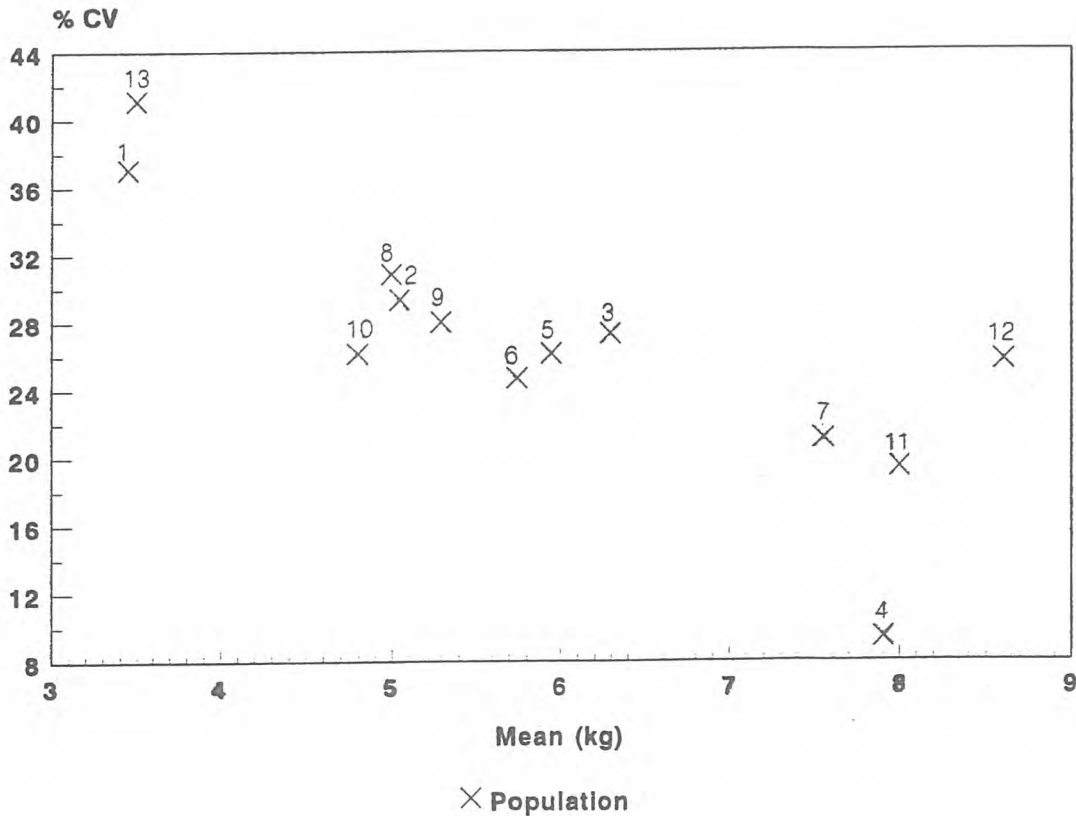


Fig. 14 : **Collection of germplasm in Senegal (1993)**
Bunch depth

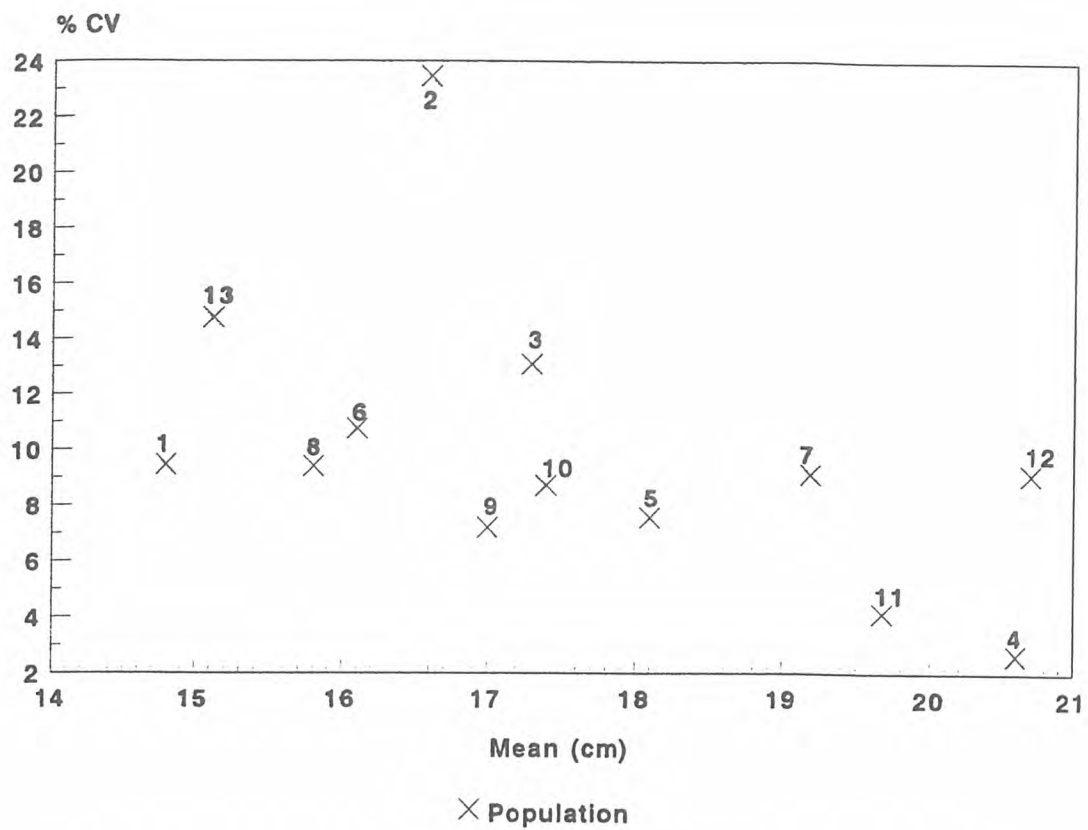


Fig. 15 : **Collection of germplasm in Senegal (1993)**
Bunch Length

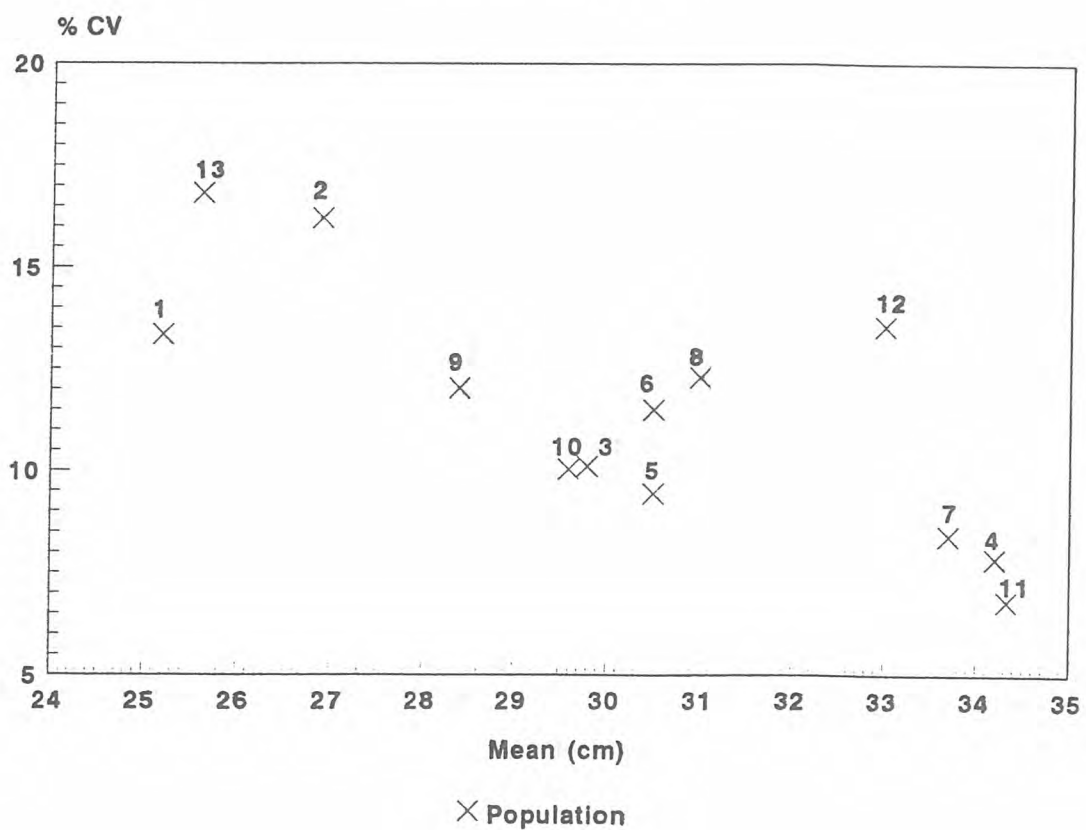


Fig. 16 : **Collection of germplasm in Senegal (1993)**
Bunch Breadth

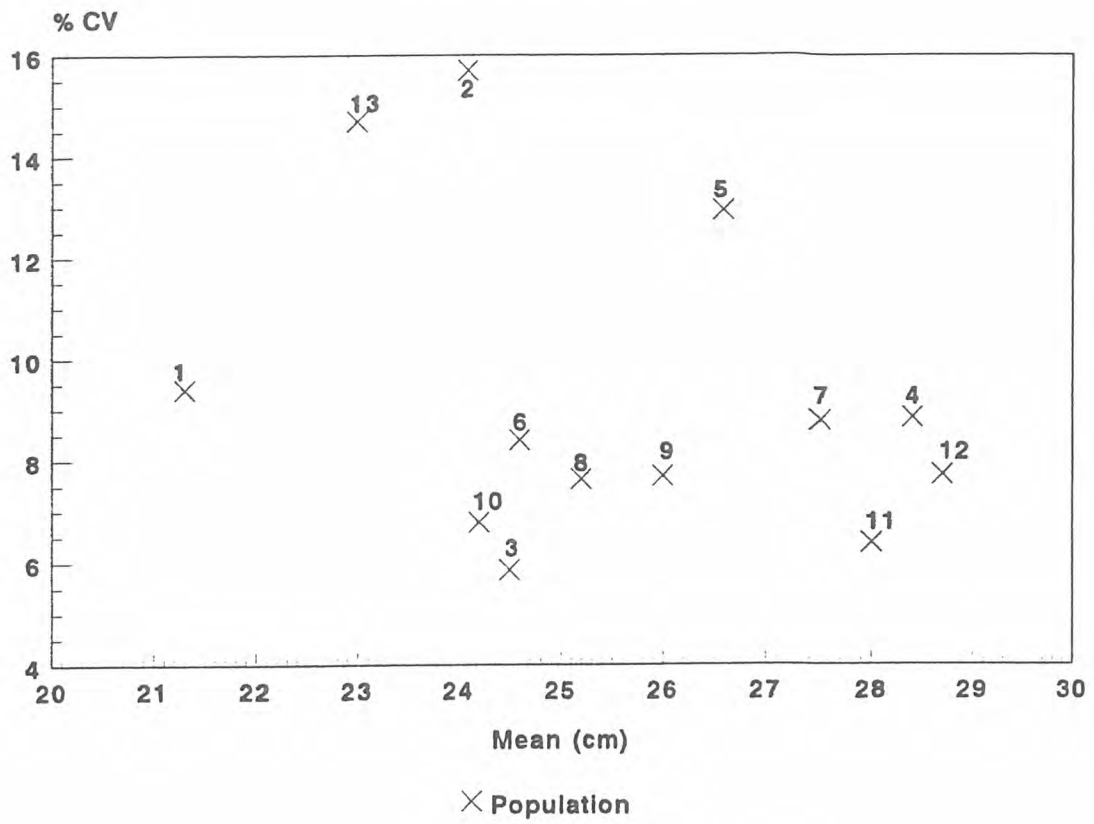


Fig. 17 : **Collection of germplasm in Senegal (1993)**
Diameter of Fruit

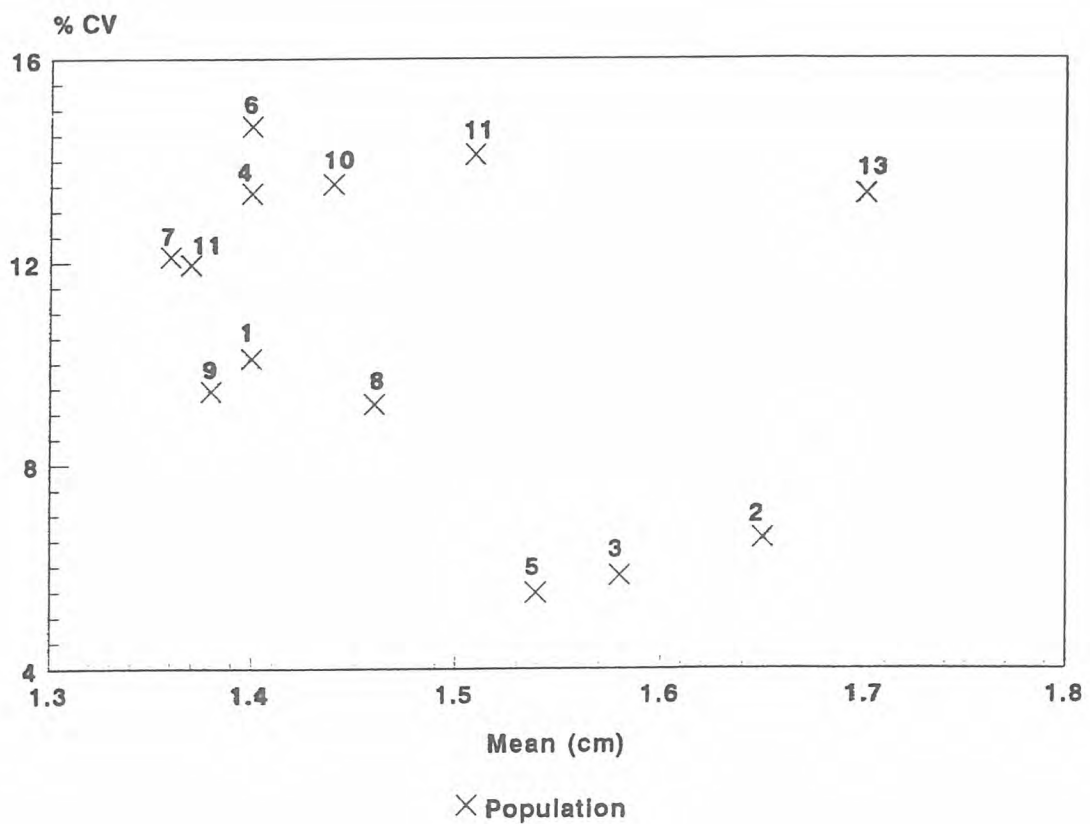


Fig. 18 : **Collection of germplasm in Senegal (1993)**
Diameter of Nut

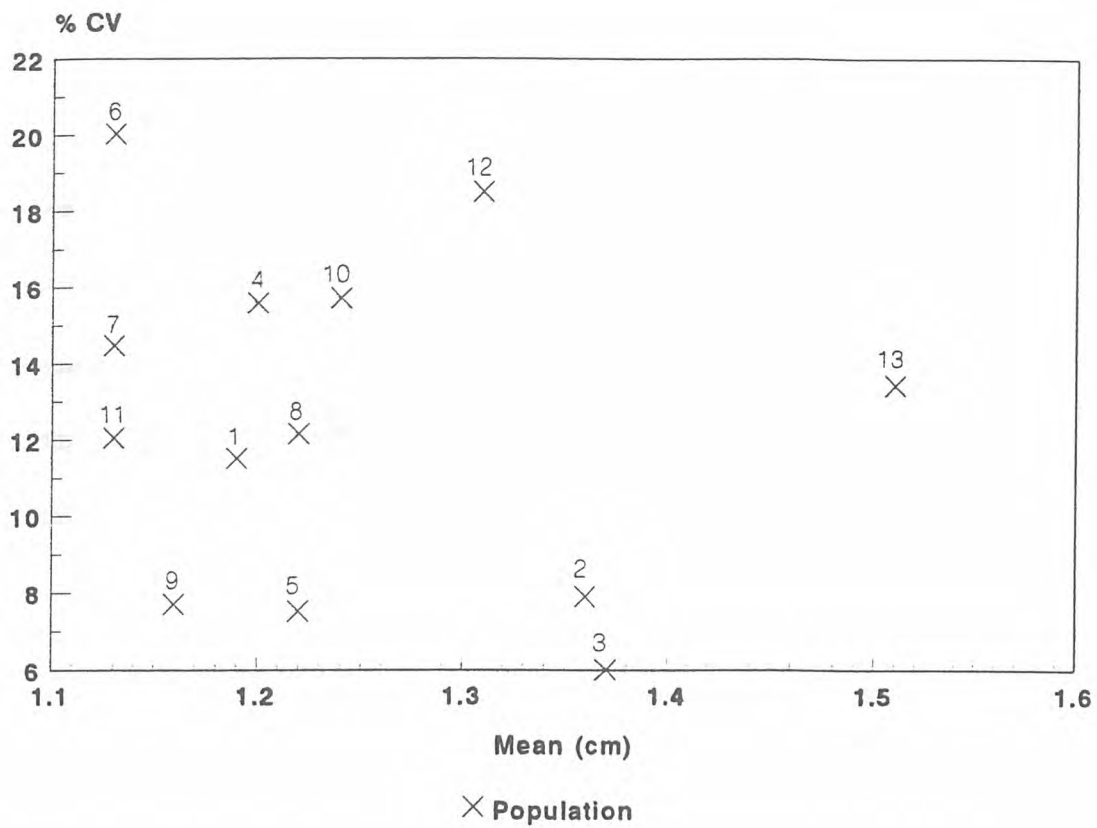


Fig. 19 : **Collection of germplasm in Senegal (1993)**
Diameter of Kernel

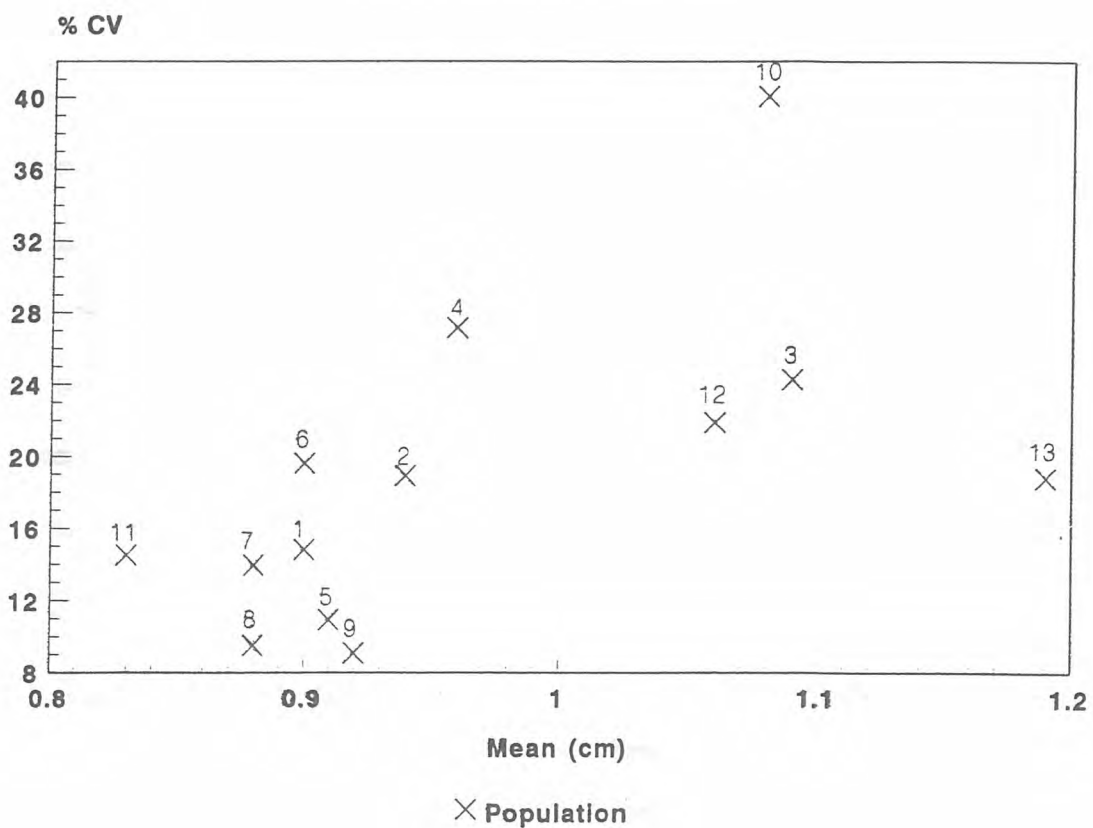


Fig. 20 : **Collection of germplasm in Senegal (1993)**
Length of Fruit

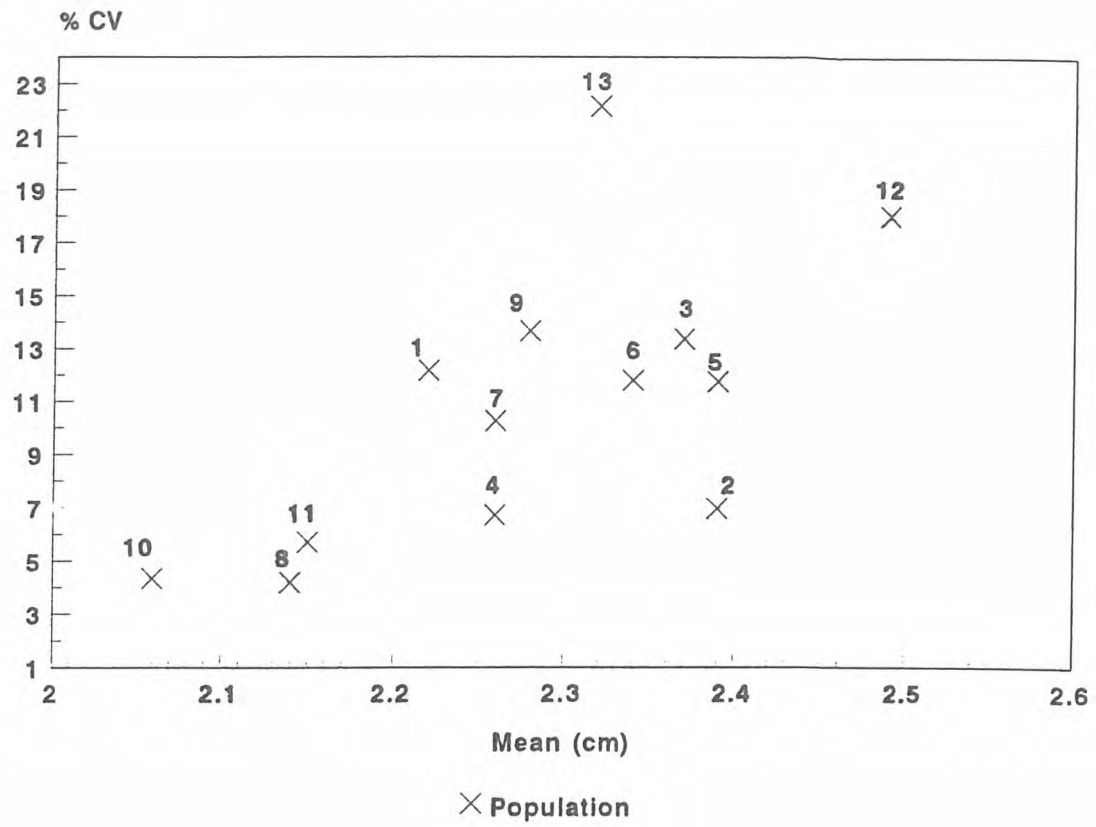


Fig. 21 : **Collection of germplasm in Senegal (1993)**
Wt of 10 Fruits

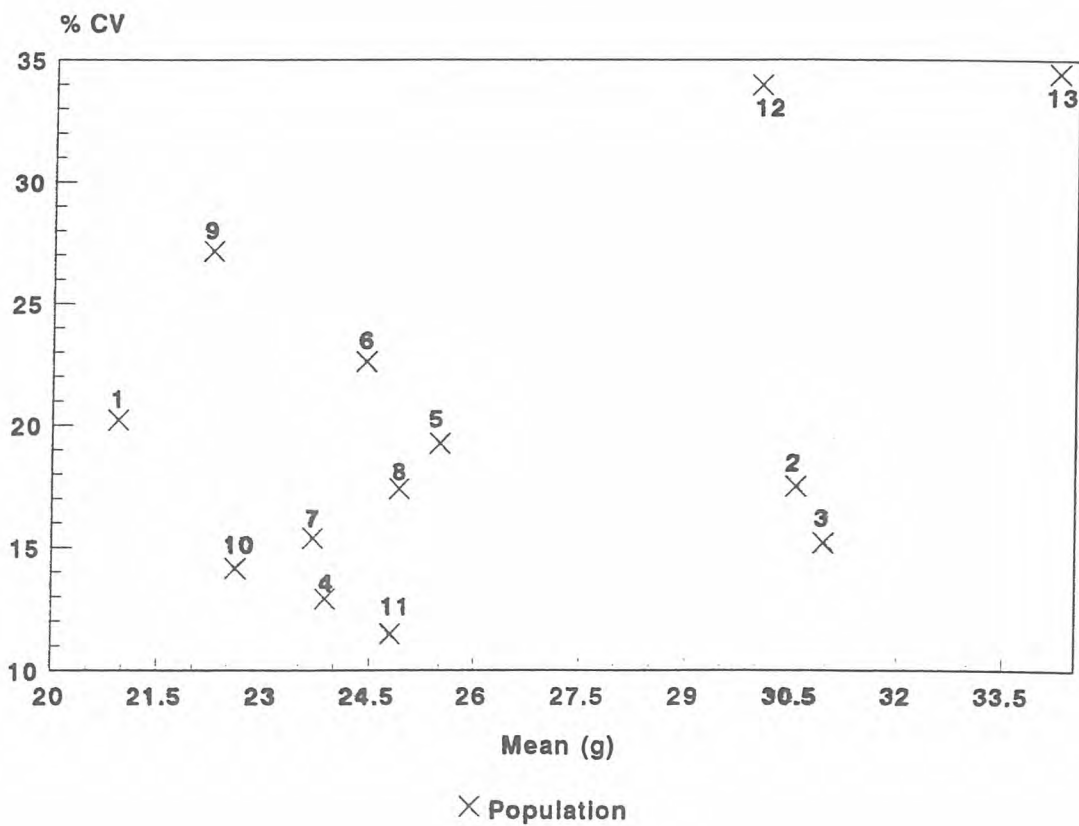


Fig. 22 : **Collection of germplasm in Senegal (1993)**
Wt of 10 Nuts

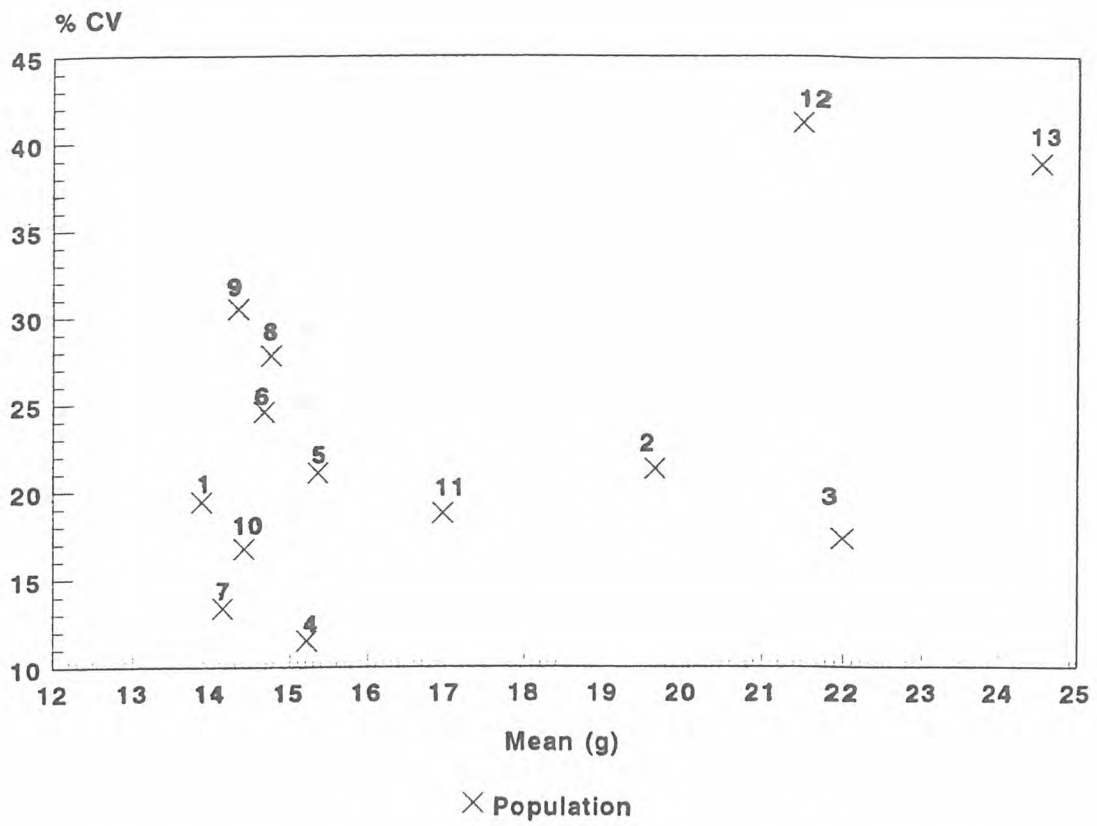


Fig. 23 : **Collection of germplasm in Senegal (1993)**
Mesocarp to Fruit

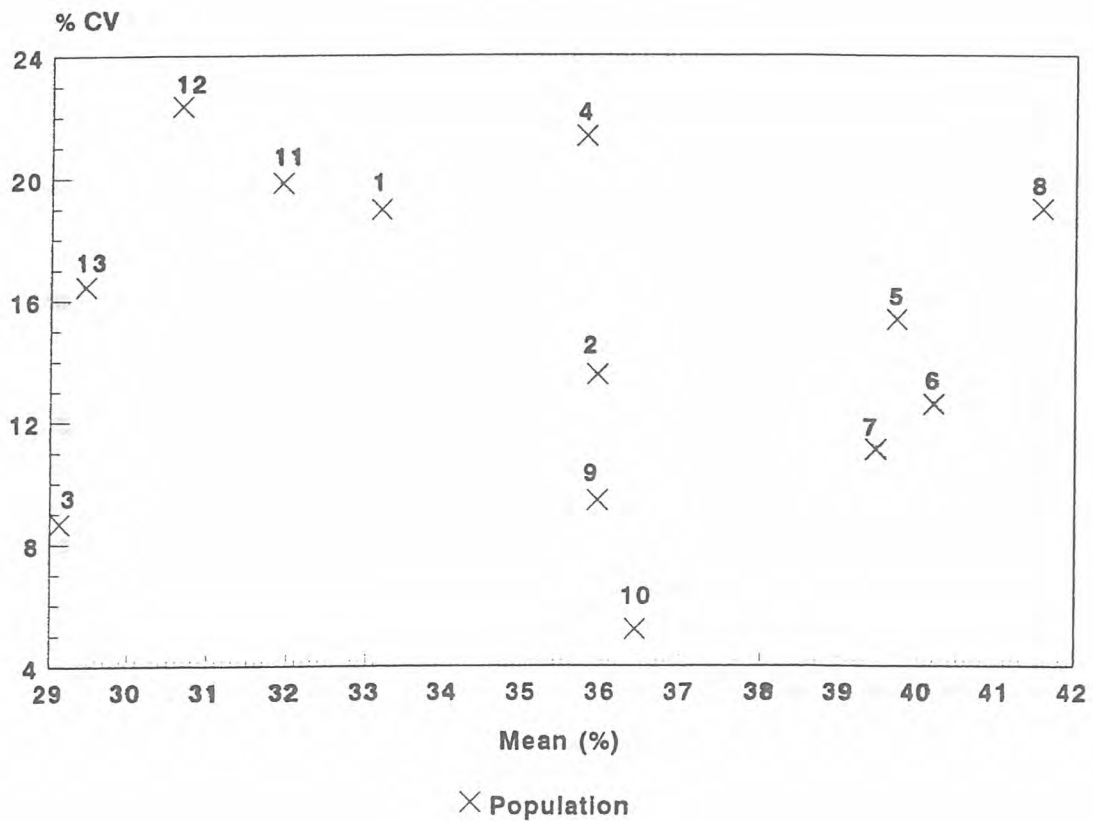
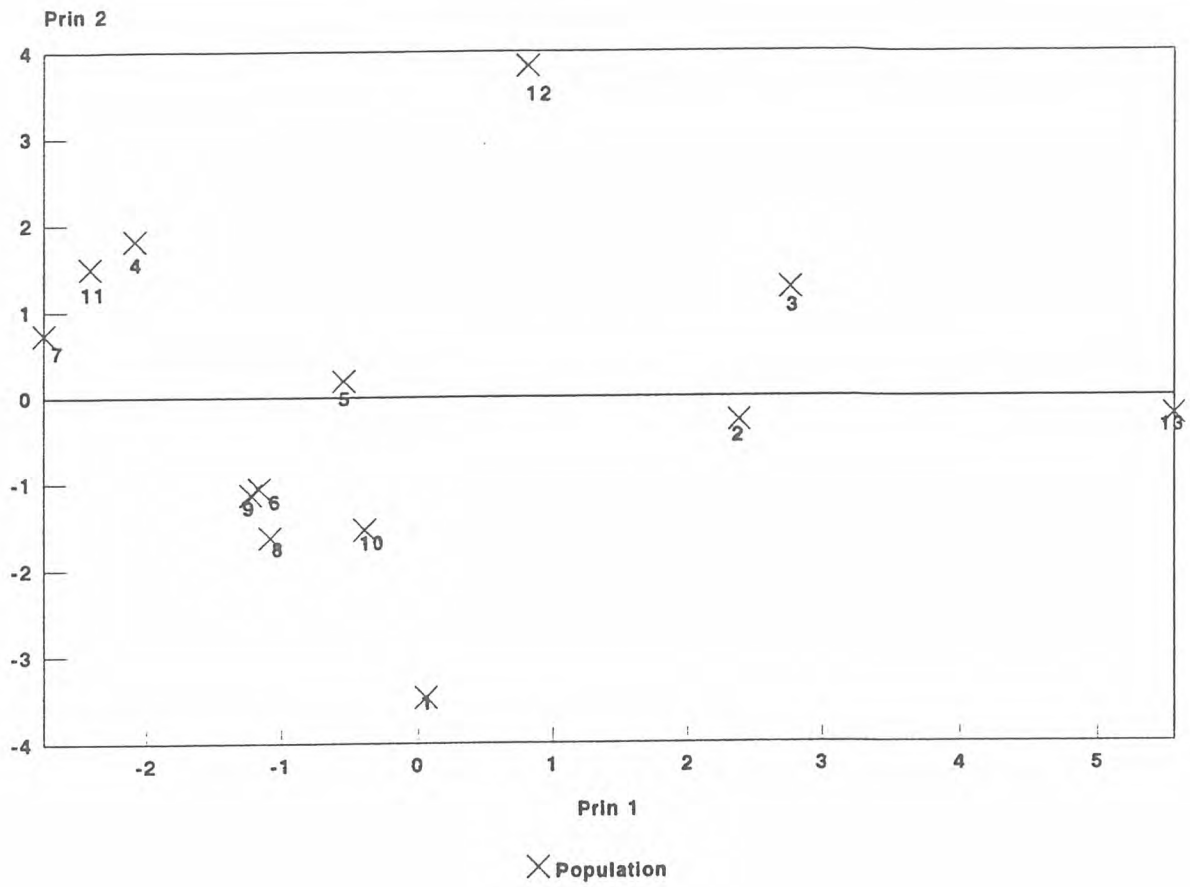


Fig. 24 : Principal Component Analysis (Senegal)



ORIGIN OF TUMBUK PALMS - A REPLY

E.A. Rosenquist

The recent ISOPB newsletter refers to the Tumbuk palms and I attach some notes.

The Dumpy palm was certainly a selection on Elmina Estate in the original areas planted with Rantau Panjang seed in 1920-21 (see Jagoe MAJ 1952 (35) pp 3-11.) This in turn probably came from St. Cyr Estate in Sumatra.

The Tumbuk palms used in the Co-operative Breeding programme were, I believe, as described by Haddon and Tong (Maj 1959 (42) pp 124-156). My memory is that these palms were in a pre-war planting on Tumbuk and not in the Tumbuk trial 0.10. Where the seed came from for this pre-war Tumbuk planting I do not know. It is quite possible that it was from Tennamaram, in which case it probably originated from Tanjong M6rawa Kiri in Sumatra - between Medan and Tebing Tinggi (See Jagoe as above p. 7).

I do not think the Tumbuk palms were closely related to E206.

Comments on ISOPB News-letter Vol. 9 No. 2

1) The above news-letter quotes from the Annual Report of the Department of Agriculture 1957 as follows:-

"The short *dura* palms on Tumbuk Estate were grown from seed collected at Tennamaram Estate which also supplied the seed of the Serdang Dumpies....."

The phrase which is underlined does not agree with "The Oil Palm in Malaysia" 1966 edition page 4 which states that the original E206 was an Elmina selection. I am rather certain that this is correct. Palm E206 was on Elmina Estate not Tennamaram. The letter E prefix denotes Elmina.

2) Tumbuk trial 0.10 was planted in November, 1952 as the News-letter reports. The 'P' numbers were pollination numbers used at Serdang. Three of the same crosses were planted at Ulu Remis in GB 1X B in October, 1952.

UR Code

UR 465	Serdang 1/9 X 3/5 (p99)
467	7/9 X 2/4 (p91)
468	2/4 X 2/4 (p86)

(The above UR codes are from the Chemara Annual Report 1958 page 11).

I agree that Tumbuk planted Dumpy X Dumpy crosses in November, 1952.

3) Tumbuk parents in UR GB XV.B and XVI

The 1957 Chemara report summarises material received from the D of A under the Co-operative Breeding Scheme (page 22). Tumbuk palms are listed as being parents of 8 crosses which had been planted or were to be planted.

Planted

GB XIVB 2 Dumpy X Tumbuk short family
 2 Semi-dumpy X tumbuk Short family

To be planted

GB XVB 2 Dumpy X Tumbuk Short
GB XVIA 2 Dumpy X Tumbuk Short

I have not been able to find a list of crosses planted in GB XIVB (in 1957) but the following were planted in 1958:-

GB XVB UR 593 E206 1/2 X Tumbuk 2/8 (page 13)
" UR 594 E206 1/3 X Tumbuk 2/8 (page 13)
GB XVI UR 599 E206 1/9 X Tumbuk 1/6 (page 15)
" XVI UR 524 E206 3/10 X Tumbuk 3/8 (page 15)

Seed of these crosses were received at Ulu Remis in 1957. The crosses must have been made in 1956 or earlier. It seems unlikely that Tumbuk pollen would have come from the November 1952 planting in field C (38.89 ac).
4) Haddon and Tong - Maj 42.3 1959 pp 124-156

Haddon and Tong gave a comprehensive progress report on D of A activity in the early 1950's. On page 136 they describe strains of short Deli *dura* palms other than Dumpy.

Their list includes Tumbuk Estate palms which came from Quote "A high yielding block of 18 acres, containing some very tall and some short palms. Pollen was collected from short palms with a large girth" end quote.

They describe a "Dumpy X Short" programme and in their table XV list mat trial that was distributed to Host Estates. The list includes the following:-

Dumpy X Tumbuk Estate near Dumpy

Klanang Bahru	Ulu Remis	Johor Labis	Jenderata	Total
5	6	7	4	9

Hence a total of 9 different derived from Tumbuk selections were distributed to four Estates participating in the Co-operative Breeding Scheme.

5) The last sentence of the feature article in the News-letter Vol. 9.2 reads "It is thus concluded that the Tumbuk palms are derivatives of the famous Dumpy E206 originating from Elmina Estate".

I am convinced that the Tumbuk selections were NOT derived from E206.

SOCIETY NEWS

The Society held its AGM in September 1993 and new office bearers were elected. The president for the two year term is Prof. Jalani Sukaimi of the Palm Oil Research Institute of Malaysia. The full list of office bearers is given in the frontpage of this issue.

The EXCO met twice and the second meeting at FELDA Sahabat was in conjunction with a visit to oil palm research stations in Sabah, Malaysia.

OBITUARY - DR.ANUWAR B. MAHMUD (1928-1993)

Dr. Anuwar Mahmud, the first founder president of the International Society of Oil Palm Breeders remained an active to the last; he was the third member to be honoured as a fellow of the Society and remained so until his untimely death on 20th April 1993.

Born in Petaling, Selangor sixty five years ago. Dr. Anuwar excelled early in education. In the Cambridge School Certificate Examination, he had the distinction of being one of two bumiputera(native) students that year to obtain a grade one. In 1948, he won the Colombo Plan Scholarship to study veterinary science in India. In the academic examinations he was awarded a Silver Medal for achieving the highest grade. In 1963, he was elected member of American Honors Society - Phi Kappa Phi- for outstanding performance in the Master of Science Course at the University of Hawaii.

After graduating with G.V.Sc in 1952 he joined the veterinary service in Malaysia and served in various states. His last post in the service was that of deputy veterinary officer in Kluang, Johore.

IN 1964 Dr. Anuwar joined the Faculty of Agriculture, University of Malaya where he soon rose to become its dean - the first Malaysian to hold the post. Later Dr. Anuwar served MARDI (Malaysia Agric. Res.and Dev. Inst.) as director general for four years before becoming vice-chancellor of University Kebangsaan Malaysia (National University of Malaysia) in 1975. When Dr. Anuwar came to PORIM (Palm Oil Res. Inst. of Malaysia) in 1980, he thus brought with him a broad range of experience and skills. Achieving excellent results was therefore no accident to Dr. Anuwar: it was accomplished through years of previous working experience.

The rapid progress of PORIM under his stewardship no doubt stems partly from the unanimous support and collaboration of industry. In fact, it has been said that the close collaboration of PORIM with the industry is one of the most distinguished feathers in its cap. This has been largely due to Dr. Anuwar who was able to bring PORIM and the industry into a remarkable partnership.

Dr. Anuwar is a true professional who sets high standards in work and ethics. He does not tolerate mediocrity. Honesty, sincerity and devotion to work have been his guiding principles.

From 1977 - 1981 he was the deputy chairman, International Society for the Advancement of Breeding Researchers in Asia and Oceania. His prestige and standing amongst scientists and agriculturists saw him being awarded the Fellow of Science by Malaysian Scientific Association, the Fellowship of the Incorporated Society of Planters and Fellow of Agricultural Institute of Malaysia. In 1983, he was conferred the Honorary Doctor Science degree by University Kebangsaan Malaysia.

His first acquaintance with oil palm breeding was in MARDI where oil palm was one of the more important crop divisions. And later he was to meet this plant again, when its importance justified the formation of PORIM. It was no surprise that the previously talked about idea of a society for oil palm breeders became a reality with him as a founder president.

K.C. Chang and V. Rao

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