Early Performance of Some Tanzanian Palms

Rao, V*; Rajanaidu, N and Jalani, S+

RINGKASAN

EPA telah menanam 142 palma yang diperolehi daripada prospeksi dan koleksi PORIM di Tanzania pada tahun 1986. Pengukuran tampang pada tahun ketiga tidak menunjukkan sebarang palma yang boleh dibezakan dengan nyata daripada ciri seperti itu tetapi terdapat juga palma yang mempunyai pelepah yang ringan. Hasil FFB adalah berkadar purata seperti yang dijangka bagi bahan-bahan germaplasma. Hasil yang tinggi telah dikenalpasti termasuk pisifera subur yang menghasilkan 180 kg dalam masa lapan bulan pertama pada tahun ketiga ia mengeluarkan hasil. Tandan yang terlalu berat (> 20kg) juga diperoleh dalam koleksi tersebut. Dura *mungkin mempunyai M/F lebih daripada 60% dan banyak lagi yang dapat dibandingkan dengan* Deli dura, *dengan itu berguna untuk pembiakan masa depan.*

INTRODUCTION

In 1987 EPA formally decided to embark on an oil palm breeding programme and among the breeding materials obtained were 142 palms from four open pollinated progenies from Tanzania. These were a small sample of the 60 progenies prospected and collected by the PORIM mission to Tanzania in 1985–1986. The four progenies were Nos. 17, 21, 32 and 52.

The seedlings of the four progenies were inadvertently mixed during planting and the material is now treated as a single collection. The mix-up is unfortunate as comparisons with performance elsewhere become less valuable and there will be implications for inbreeding if more than one palm is used for future breeding. Another weakness is the lack of any DxP control within the experiment. Nevertheless the materials appear to show some promise and EPA hopes to use them to develop new breeding lines.

The seedlings were planted in July 1989 and yield recording commenced from September 1991, *i.e.* 26 months after field planting. In 1992 twelve palms had to be relocated to give way to a water supply pond and three did not recover from the relocation. In July 1992 palms were measured for vegetative characters and in 1993 each palm was bunch analyzed once.

FRUIT TYPE AND FORM

The trial was fruit typed in early 1991 and out of 131 palms examined 114 were *dura*, 16 were *tenera* and one a very fertile *pisifera*. One of the *duras*

**Plant Breeding Laboratory, EPA Management Sdn Bhd.*

+*Palm Oil Res. Inst. of Malaysia (PORIM)*

was virescens with thick shell and large kernel and since this was the only virescens fruit palm in the whole collection it would be the pollen parent that was virescent rather than the prospected palm. Four palms showed severe crown disease in the early years. No genetic mantle palm was found.

VEGETATIVE CHARACTERS

Vegetative traits were first measured when most of the palms had come into bearing, *i.e.* three years after planting and a summary of the data is given in *Table 1*.

The data do not show any palms to be exceptional for any of the measured vegetative traits whose values are normal for age. Likewise the CV values are also normal, indeed lower than anticipated from the trials early unhappy history. The range shows the maximum to be mostly double that of the minimum except for peptiole cross-section where fronds of palm 76 are at least four times heavier than palm 32 with the lightest fronds. The latter had long thin fronds bearing an average number of widely spaced narrow leaflets while the former had below average rachis length with above average number of broad leaves.

Palm height has not yet been measured but no dwarf palms were seen during a recent visit to the trial. However some other progenies may be dwarf (Chin, personal communication).

TABLE 1. VEGETATIVE TRAITS OF THREE YEAR OLD TANZANIAN PALMS

	Frond Production	Frond Number	Rachis Length	Leaflet Number	Leaflet Length	Width	Petiole X-Section
Mean	17	45	291.6	111	67.5	3.6	11.5
CV(%)	11.1	12.2	12.0	8.9	10.9	12.4	24.7
min	11	25	210.0	81	54.2	3.1	5.1
max	22	68	400.0	154	94.8	5.4	22.4

1 - Six months production

All units are measured in centimetres.

YIELD

Yield recording commenced in September 1991 (26 months) and yield data for 1992, 1993 and to June 1994 are summarized in *Table 2*.

TABLE 2. EARLY YIELDS OF TANZANIAN PALMS

	2½ yrs		1992		30 mth		1993		1994
	FFB	BNo	BWt	FFB	BNo	BWt	FFB	BNo	BWt
mean	33.9	16.1	2.1	67.3	11.9	5.9	54.4	8.0	7.1
CV(%)	56.2	46.5	26.1	45.8	44.9	31.7	57.5	52.9	40.1
min	2.8	2	0.9	4.2	1	2.2	4.8	1	3.4
max	89.0	36	4.2	154.2	25	12.8	155.7	18	22.0

* *All Units are measured in kilogramme*

Yields are normal for the area but could have been higher with better initial cultivation practices. As it was a small collection received during a no replanting period, an abandoned terraced cocoa nursery was used and ground covers were never satisfactory. CV values are relatively high but not uncommon for germplasm material. As in most other similar studies, bunch weight is relatively less variable than bunch number.

The above notwithstanding, there are individual palms that performed well; the best yields in the third and fourth year being 89 and 154 kg/palm/ and respectively, and in 1994 the best had already produced almost 156 kg within the first six months.

Palm 135 was exceptional in reaching very high bunch weights relatively early, as the following table shows.

	1992	1993	1994
FFB (kg)	61.3	18.2	134.4
BWT (kg)	2.9	9.1	25.4

Conversely, the fertile pisifera, gives a good example of high yields from a high bunch number and average bunch weight.

	1992	1993	1994 (to early August)
FFB (kg)	11.4	123	179.7
BWT (kg)	10	22	19

BUNCH AND FRUIT CHARACTERS

To date a single round of bunch analysis has been completed on 108 palms and the discussion below is limited to data of these palms. *Table 3* summarizes the mean and range for the principal bunch and fruit characters of the *duras, teneras* and *pisifera* in this collection.

Because the palms were just four years old when first sampled for bunch analysis some of the bunches would still be relatively poorly formed and this would influence characters such as oil/dry mesocarp. Nevertheless, the Tanzanian palms are of great interest because some of the *duras* have exceptionally high mesocarp to fruit (M/F) ratio. The best *dura* had percentage M/F of 65.0 while four had more than 60% and eight had more than 57%. These figures compare well with *Deli duras* and the mean percentage M/F of this collection is higher than for the Nigerian material, arguably containing the best of the prospected material to date.

TABLE 3. BUNCH AND FRUIT TRAITS OF TANZANIAN PALMS

		BWt (kg)	%F/B	%M/F	%O/DM	%O/B	%K/B
Duras	mean	7.8	67.4	46.3	72.8	12.8	8.7
	min	3.5	47.5	32.9	58.9	5.9	4.5
	max	22.3	80.2	65.0	81.0	19.8	15.1
Teneras	mean	6.8	63.3	69.0	73.4	18.3	9.3
	min	4.0	42.0	56.4	64.4	9.5	2.7
	max	10.5	76.2	84.6	80.8	25.9	16.7
Pisifera		6.5	30.5	90.3	77.6	12.9	0.8

The *teneras* have been generally disappointing for important bunch traits but not much can be said since there were so few in this collection/sample.

CONCLUSION

The Tanzanian material with EPA is a very small but nevertheless interesting collection. No dwarf palms are expected but there may be palms with high BI from lighter fronds. Yields of these palm are satisfactory and high yielding individuals are not uncommon. One palm has given a significant number of very heavy bunches. The fertile *pisifera* is the highest yielder in 1994 (to August) at 180 kg and an average bunch weight of nearly 10 kg makes it very fertile indeed.

The promise of these materials may, however, be in their *duras*, with the high percentage M/F comparable in some palms to *Deli duras*. However the complete absence of a fibre ring and fibrous tail cannot alone be conclusive evidence that they are not thick shell *teneras* and the breeding test will be conducted.

The breeding tests will be part of a plan to use these materials in an integrated programme of selfing and intra and intercrossing with EPA's other advanced materials.

ACKNOWLEDGEMENTS

The principal author would like to thank EPA Management Sdn Bhd for permission to present the data and the authors wish to thank the Director-General of PORIM for permission to publish this paper.