

# PS6: BREEDING POPULATIONS SELECTED FOR LARGE FRUIT *DURAs*

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Improvement programmes had been focussing on the selection for bunch yields and oil yield components. Improvements in oil extraction through breeding and selection have been largely due to the increments in mesocarp to fruit (M/F). In addition, selection for large fruits could be advantageous, as the best type would give the largest absolute quantity of mesocarp and most importantly, oil yield.

Fruit size is indicated by the mean fruit weight (MFW) in bunch analysis procedure. Although large fruits may sometimes be indicative of unfavourable characters, such as poor fruit set, this however, could be overcome through breeding and selection of the desirable traits, for example selection for high fruit to bunch (F/B). Large fruit, on the other hand, might have advantages in milling. Fruit sizes of some of the *duras* within the collection of the Malaysian Palm Oil Board (MPOB) were very large (Kushairi *et al.*, 2003).

## SELECTION

Generally, MFW is positively correlated with the oil-related-traits such as mesocarp to fruit (M/F), oil to dry mesocarp (O/DM), oil to wet mesocarp (O/WM), oil to bunch (O/B) and oil yield (OY), and negatively related with kernel yields and F/B (Kushairi *et al.*, 1999). The O/B is the product of, and strongly associated with F/B, M/F and O/WM. Since F/B is negatively

related to MFW, the former is a disturbing factor in realizing high O/B. Within certain genotypes however, positive relationship between MFW and F/B were identified (Kushairi *et al.*, 2003). The MFW of PS6 are between 24 g and 34 g (Table 1) as compared with that of current *tenera* from *dura x pisifera* (DxP) planting materials, which is about 10 g.

## COMMERCIALIZATION POTENTIAL

It is expected that large fruits would give the largest absolute quantity of mesocarp, kernel and oil. PS6 are for the development of mother palms for use in the production of large fruit DxP planting materials targeting for superior absolute oil yield and total economic product (TEP).

The TEP, being the sum of oil yield (OY) and 60% kernel yield (KY) would be high from bunches of both high mesocarp and kernel contents, suggesting the importance for maintaining a high F/B, especially in the *dura* parents (Kushairi *et al.*, 1999). When high M/F, K/B and F/B are combined with high O/B and fresh fruit bunch (FFB), yields would likely be increased substantially. A medium sized bunch with large fruits and good F/B is anticipated to give the desired oil yield.

Planting materials with large fruits had, on average higher oil yields than smaller ones (Kushairi *et al.*, 2003). PS6 had significantly larger



MFW and maintaining comparatively higher F/B, M/F and O/DM, resulting in significantly higher O/B. Large fruits with high mesocarp content would give the highest oil yield, and,

therefore, the highest monetary return as compared with those of current planting materials.



Figure 1. Fresh fruit bunches from typical Deli dura (left) and selected dura with large fruits (right).



Figure 2. Characteristics of large fruit dura.

**TABLE 1. CHARACTERISTICS OF PS6 LARGE FRUIT (high MFW) DURAS**

No.	Palm No.	Progeny	FFB	BNO	ABW	NBA	F/B	MFW	M/F	S/F	O/DM	O/B	K/B	OY	TEP	HT	BI
1	0.311/124	AGO 06-06	58.14	10.40	5.59	2	65.28	33.97	51.83	39.22	77.10	16.53	5.84	9.61	11.65	3.26	0.19
2	0.311/892	AGO 03-10	125.98	11.60	10.86	2	76.60	33.82	49.93	41.74	79.10	19.61	6.38	24.70	29.52	2.87	0.44
3	0.311/775	AGO 03-05	167.72	13.40	12.52	3	65.36	30.44	51.20	40.57	78.13	16.16	5.37	27.10	32.51	3.30	0.44
4	0.311/269	AGO 08-12	119.48	10.80	11.06	1	69.08	30.10	51.94	38.43	79.40	17.86	6.66	21.34	26.12	3.72	0.43
5	0.312/1241	AGO 06-03	178.65	11.83	15.10	2	53.80	29.03	61.99	29.90	76.40	15.96	4.11	28.51	32.91	1.00	0.50
6	0.311/405	AGO 03-02	105.46	19.40	5.44	3	69.49	28.37	51.63	38.70	74.93	15.74	6.72	16.60	20.85	3.39	0.33
7	0.311/633	AGO 06-05	209.10	13.00	16.08	2	72.66	26.95	62.03	30.69	80.00	21.19	5.36	44.31	51.04	2.29	0.54
8	0.312/296	AGO 03-01	180.28	18.33	9.84	3	60.46	26.53	53.42	38.59	77.47	18.68	4.83	33.68	38.91	3.85	0.45
9	0.311/549	AGO 05-01	163.22	14.40	11.33	2	65.78	26.17	60.85	31.47	81.70	22.67	5.06	37.00	41.96	3.02	0.39
10	0.311/548	AGO 05-01	171.50	16.00	10.72	1	73.54	25.47	49.35	42.28	80.60	17.38	6.16	29.81	36.15	2.54	0.45
11	0.312/929	AGO 03-01	129.20	13.17	9.81	3	70.35	25.47	54.34	38.45	78.40	18.26	5.02	23.59	27.48	3.70	0.34
12	0.312/1150	AGO 06-06	194.07	17.17	11.30	2	66.01	25.36	52.33	38.71	76.50	16.60	5.90	32.22	39.09	2.47	0.51
13	0.312/619	AGO 03-06	180.80	16.00	11.30	3	60.29	24.86	56.97	34.46	82.40	17.33	5.17	31.33	36.94	2.15	0.41
14	0.311/786	AGO 03-02	174.50	10.60	16.46	3	73.13	24.85	55.42	36.07	81.47	19.91	6.24	34.74	41.27	2.98	0.51
15	0.311/754	AGO 03-07	146.54	22.60	6.48	3	56.00	24.33	60.21	31.87	81.53	17.56	4.42	25.73	29.62	2.54	0.43
16	0.312/789	AGO 03-02	171.12	21.33	8.02	3	70.01	24.30	50.56	41.46	74.85	17.18	5.59	29.40	35.14	3.43	0.41

Notes: Mean fruit weight of a typical Deli x AVROS is about 10 g.

Field planted 1994. Yield recording 1997-2002, bunch analysis 1999-2002, vegetative measurements 2002. NBA = number of bunch analysis. FFB = fresh fruit bunch (kg palm<sup>-1</sup> yr<sup>-1</sup>), BNO = bunch number (No. palm<sup>-1</sup> yr<sup>-1</sup>), ABW = average bunch weight (kg palm<sup>-1</sup> yr<sup>-1</sup>),

F/B = fruit to bunch (%), MFW = mean fruit weight (g), M/F = mesocarp to fruit (%), O/DM = oil to dry mesocarp (%), O/B = oil to bunch (%), K/B = kernel to bunch (%), OY = oil yield (kg palm<sup>-1</sup> yr<sup>-1</sup>), TEP = total economic product, HT = height (m), BI = bunch index.

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