

Diagram 1. PEDIGREE OF DELI DURA MOTHER PALMS USED FOR SEED PRODUCTION AT BSM

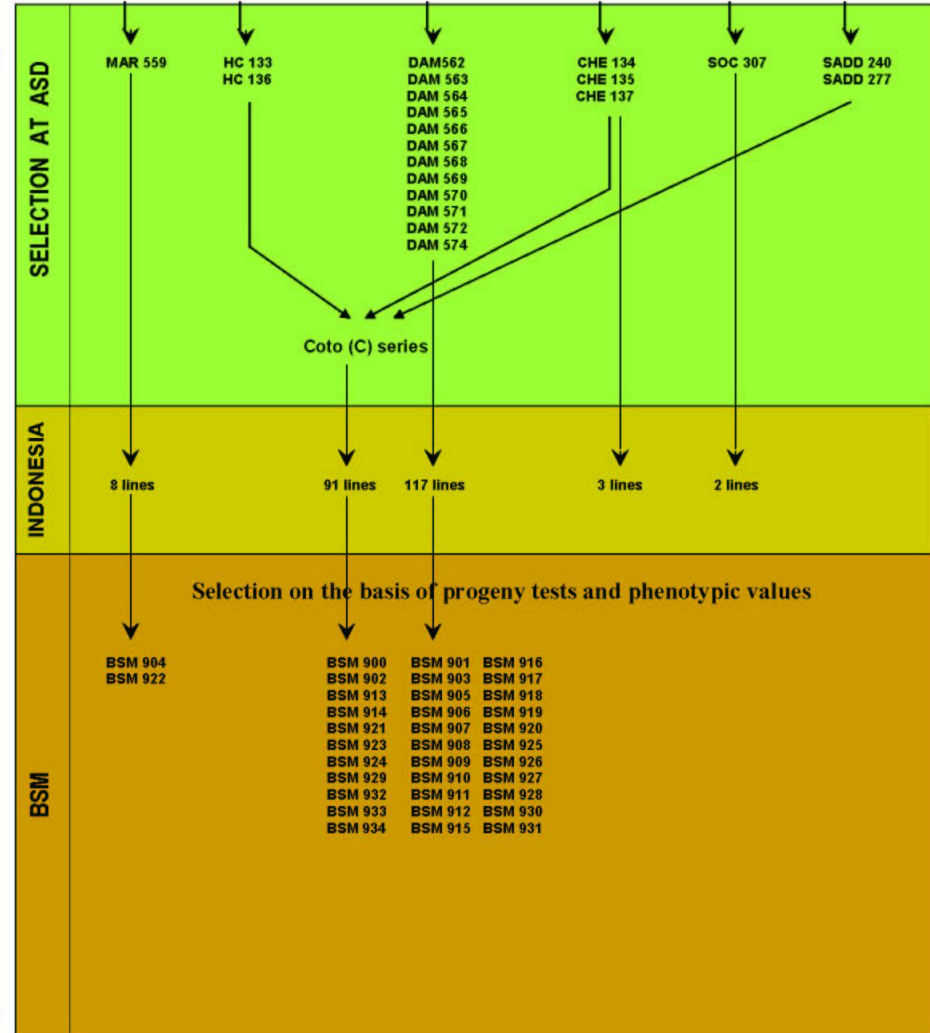
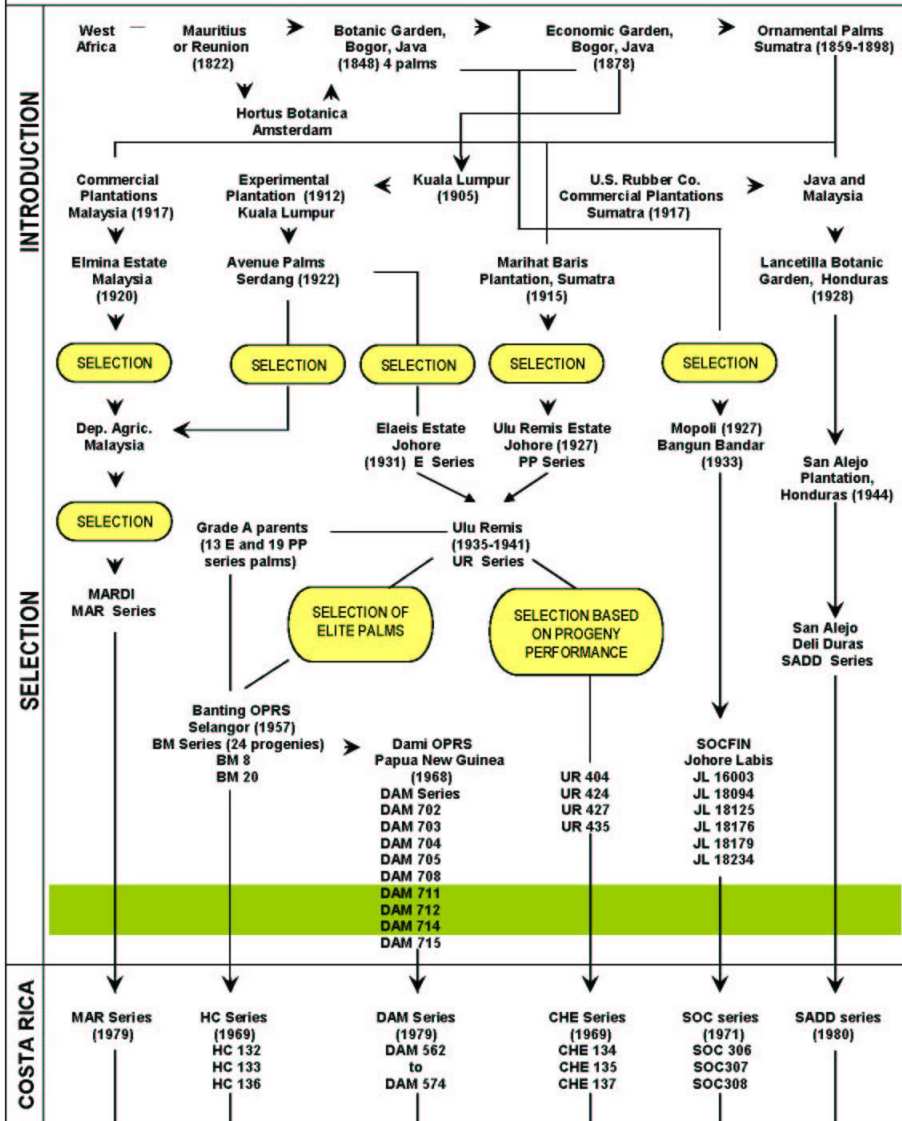
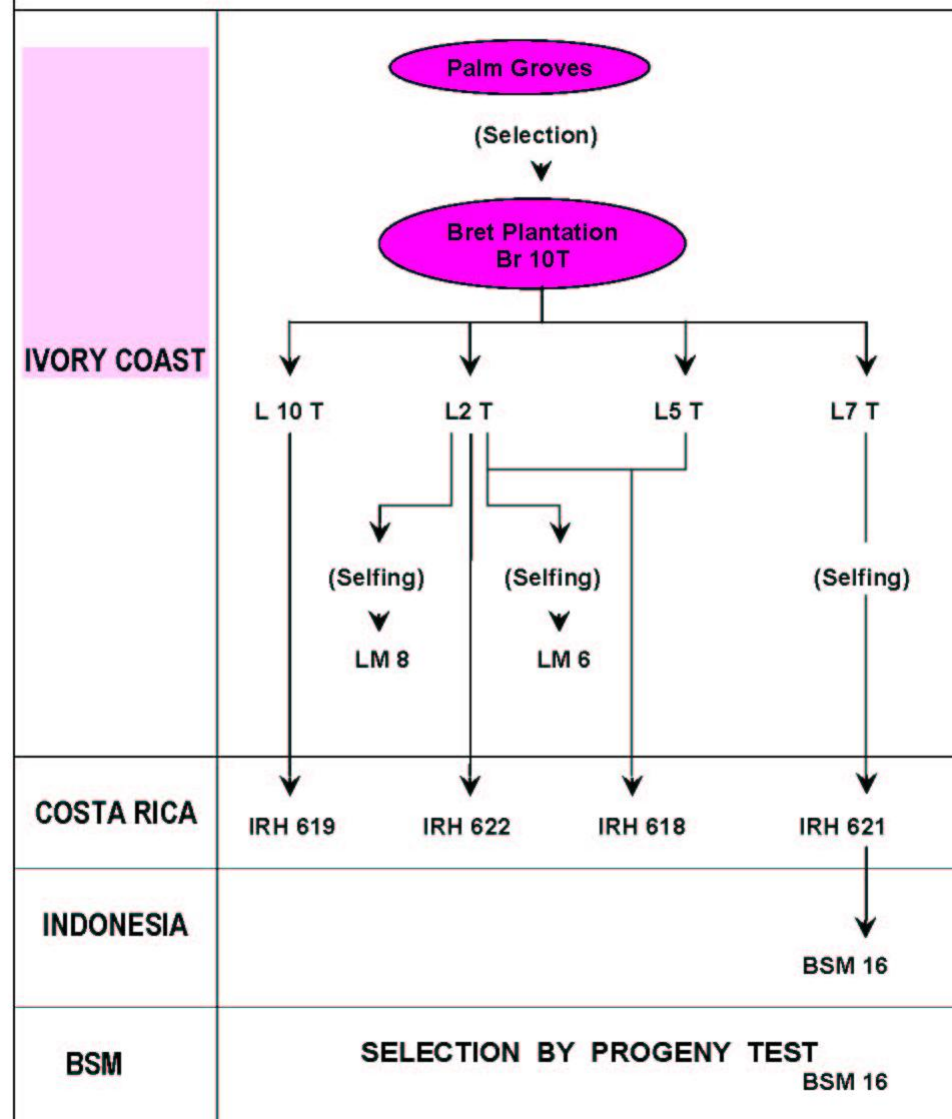
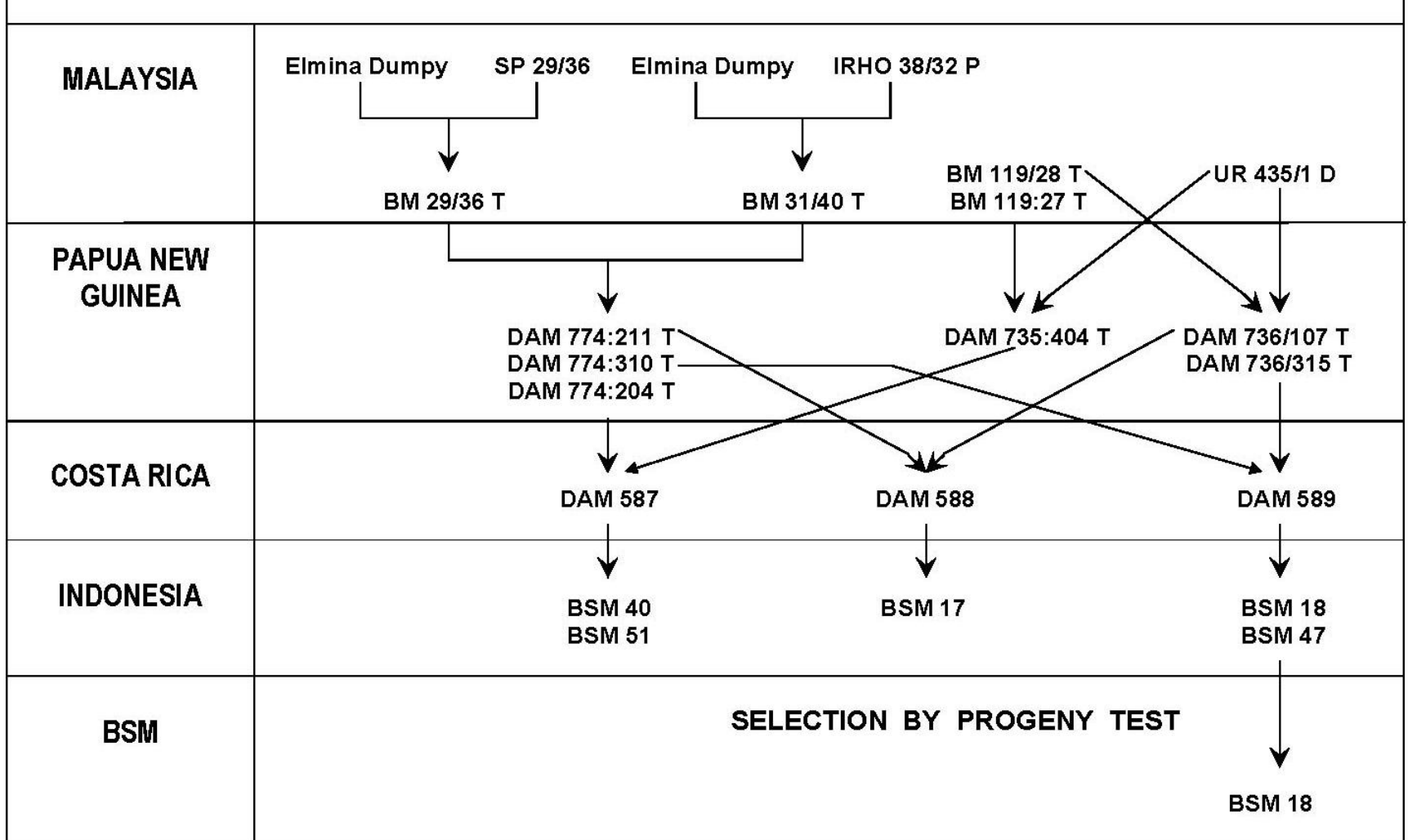


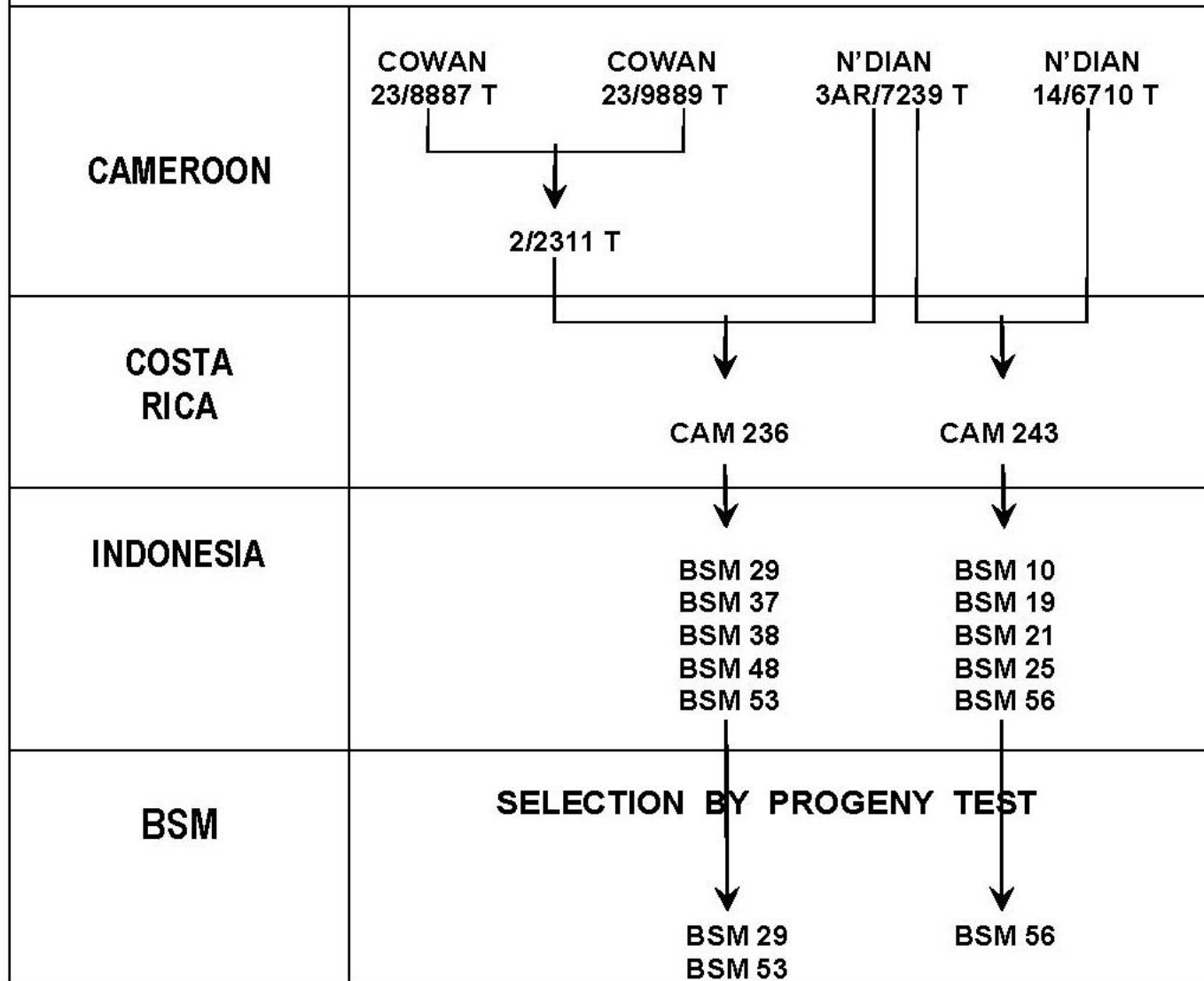
Diagram 3. PEDIGREE OF LA ME MALE PARENTS



**Diagram 5. PEDIGREE OF DAMI COMPOSITE
MALE PARENTS**



**Diagram 6. PEDIGREE OF EKONA
MALE PARENTS**



**Diagram 7a. PEDIGREE OF GHANA
MALE PARENTS**

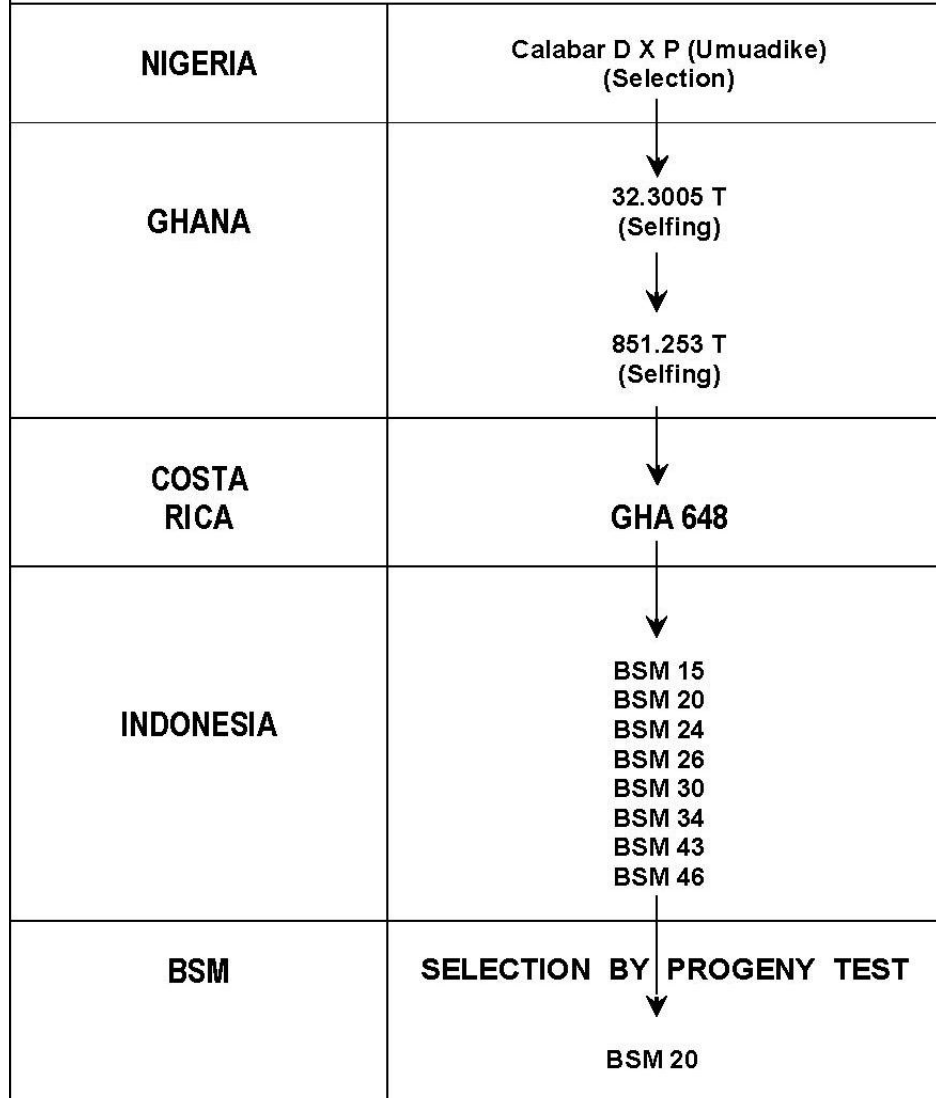


Diagram 7b. PEDIGREE OF NIGERIA
MALE PARENTS

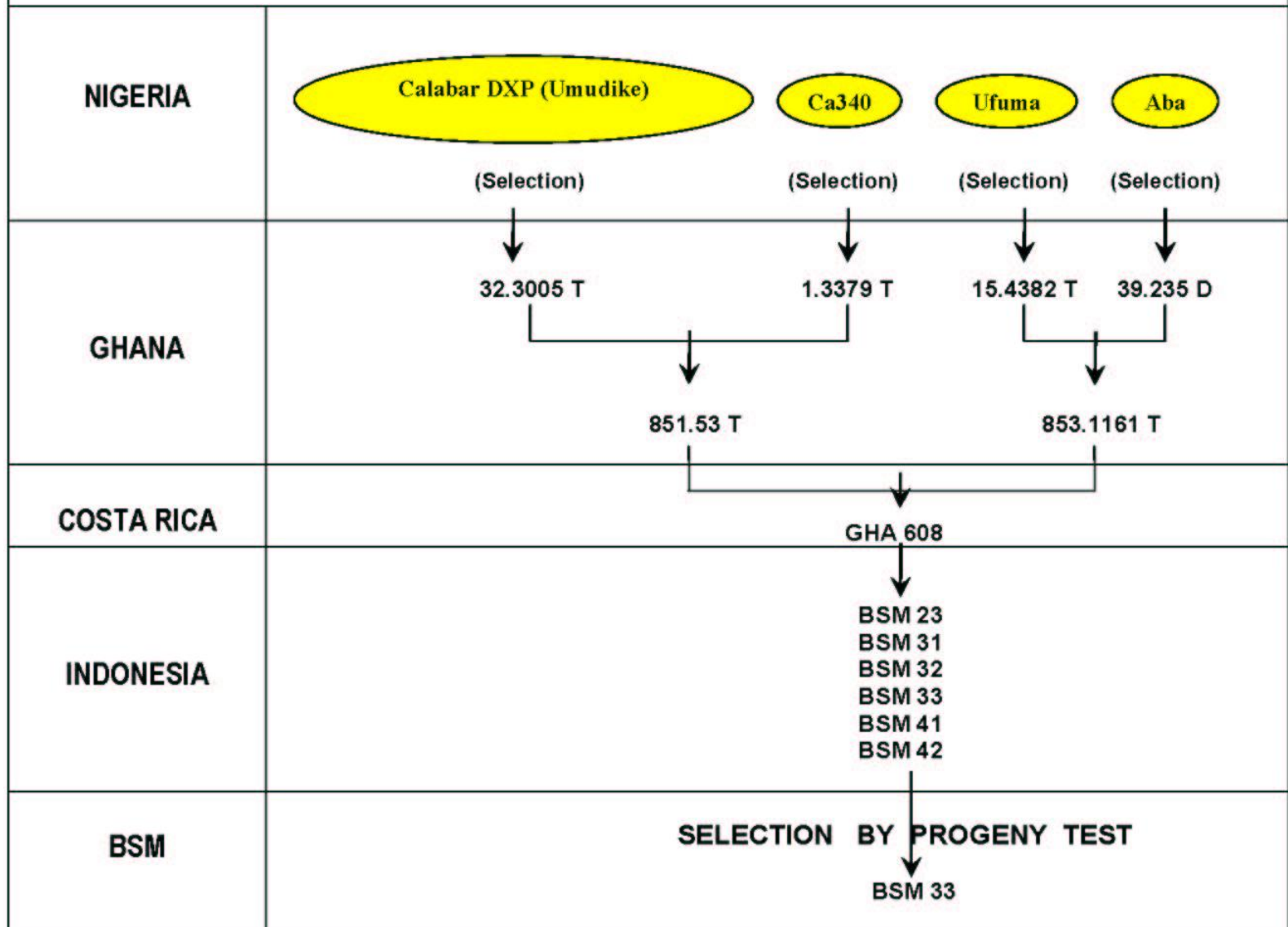
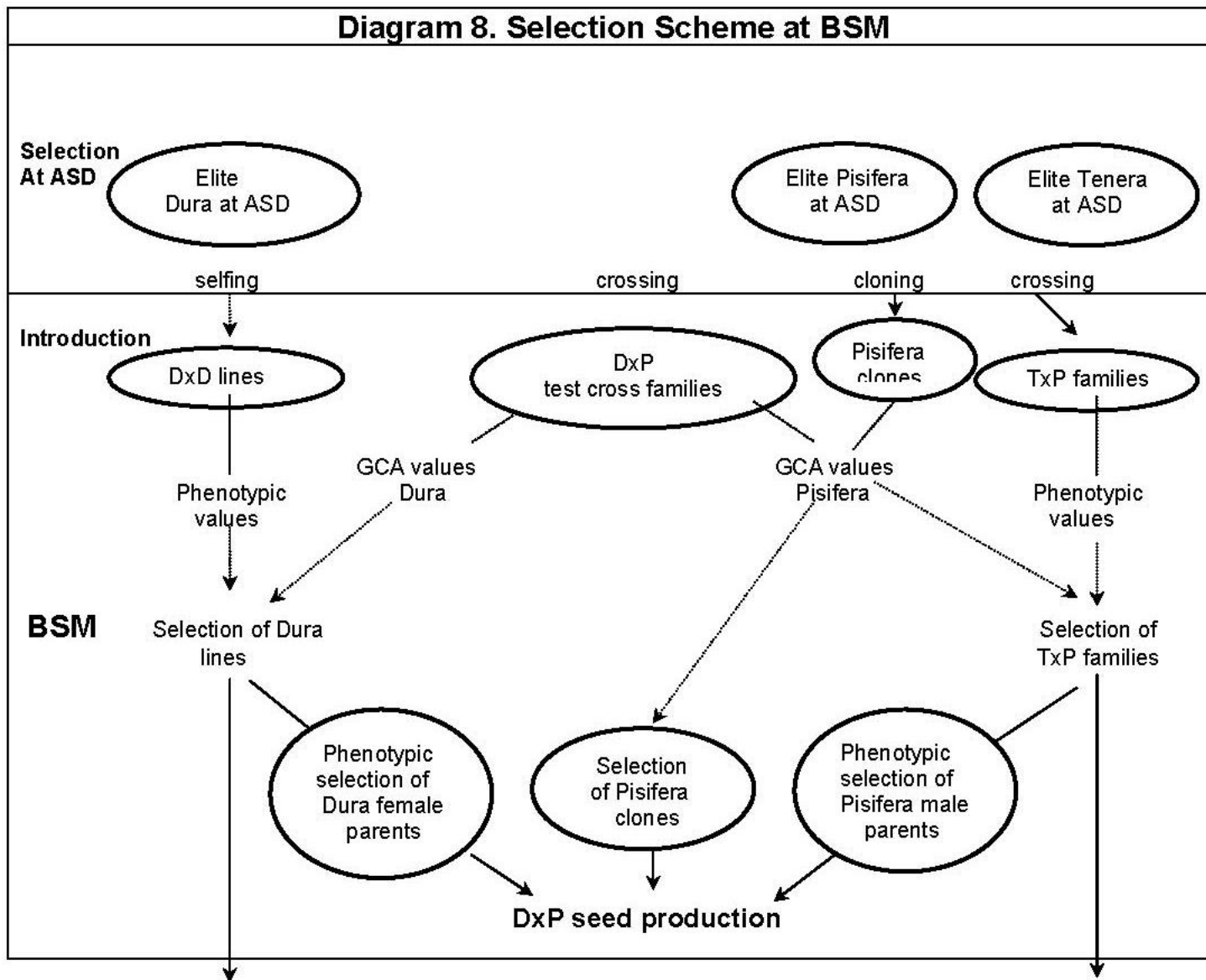


Diagram 8. Selection Scheme at BSM



DATA FOR REGRESSION

PROG	Adjusted Mean of the DXP prog derived from these females		Predictor DXD 1 families					
	Y	BI	LA	LAR	HT	LP	CD	FDM
4	175.8	0.689	5.05	2.70	180.0	29.13	0.11	64.39
15	207.5	0.690	5.43	2.47	203.6	30.30	0.04	77.27
19	248.3	0.758	4.93	2.71	229.5	32.80	0.23	70.25
20	182.5	0.693	4.89	2.59	197.3	29.72	0.04	67.22
22	194.9	0.686	4.94	2.45	277.5	31.15	0.08	73.73
28	185.7	0.690	4.66	2.49	220.1	30.19	0.07	65.70
31	200.4	0.704	4.94	2.40	184.1	29.48	0.05	72.63
33	236.5	0.728	4.89	2.51	200.4	29.82	0.08	67.68
44	232.3	0.726	4.68	2.76	221.7	29.71	0.08	61.56
45	217.4	0.714	4.79	2.77	222.0	30.41	0.04	63.44
46	190.4	0.695	5.25	2.89	268.8	33.02	0.10	70.10
48	205.2	0.707	5.09	2.46	238.9	30.18	0.11	72.56
49	219.9	0.714	5.18	2.74	224.8	31.09	0.04	70.37
52	192.3	0.663	5.94	2.03	302.7	30.10	0.01	105.01
54	192.9	0.691	5.52	2.65	213.7	30.07	0.04	73.09
55	199.9	0.692	4.79	2.92	236.4	30.93	0.03	62.37
58	227.1	0.723	5.45	2.46	233.9	29.67	0.06	77.15
61	235.2	0.733	4.74	2.70	185.5	29.75	0.09	62.49
65	203.0	0.708	4.78	2.76	227.5	31.51	0.04	64.89
66	209.8	0.682	4.59	2.77	213.2	30.86	0.02	59.60
67	239.3	0.736	5.23	2.68	214.8	31.20	0.70	69.47
69	166.3	0.684	5.19	2.74	231.3	31.02	0.01	71.35
71	241.0	0.742	4.66	2.54	257.7	30.16	0.03	85.94
72	256.8	0.755	4.60	2.44	202.9	30.59	0.21	68.54
76	221.8	0.728	5.15	2.58	221.1	30.09	0.12	72.02
82	177.1	0.662	5.45	2.26	249.2	30.40	0.02	88.18
86	228.0	0.705	4.89	2.47	250.3	29.80	0.07	68.10
87	225.3	0.736	4.45	2.60	211.5	30.87	0.40	63.46
88	219.4	0.688	5.42	2.58	228.8	30.38	0.01	76.89
89	224.8	0.688	4.84	2.54	246.4	30.31	0.05	69.14
92	229.1	0.697	5.35	2.45	263.7	29.68	0.02	78.90
93	211.3	0.691	5.01	2.74	194.0	29.56	0.11	64.27
102	225.7	0.709	4.65	2.47	259.7	32.79	0.01	72.31
106	198.7	0.665	5.17	2.34	236.4	30.73	0.29	79.17
107	246.9	0.735	4.75	2.67	215.5	31.23	0.10	65.34
108	217.7	0.676	4.83	2.47	271.3	29.72	0.05	67.79
109	215.3	0.657	5.28	2.42	272.7	32.24	0.03	85.21
110	216.9	0.709	5.55	2.62	235.1	30.80	0.04	74.90
111	225.6	0.719	4.83	2.78	202.7	30.94	0.04	62.42
112	229.4	0.724	4.57	2.87	202.7	30.43	0.34	56.29
115	250.8	0.747	4.95	2.37	227.6	31.99	0.18	79.33
120	189.5	0.649	5.20	2.60	213.8	30.92	0.08	71.77
121	224.2	0.717	5.28	2.51	256.9	29.03	0.01	74.16
123	239.9	0.734	4.54	2.55	194.9	31.54	0.03	64.68
127	186.7	0.655	5.84	2.29	236.4	28.28	0.04	91.27
129	182.6	0.691	5.33	2.55	214.4	30.17	0.07	75.63
131	246.6	0.742	5.07	2.95	242.0	31.15	0.07	64.56
132	189.7	0.670	5.10	2.42	230.5	29.76	0.33	73.62
136	239.9	0.742	5.03	2.72	208.9	31.14	0.00	66.59
138	168.6	0.639	5.18	2.51	189.4	30.02	0.15	71.93
141	196.6	0.708	4.89	2.47	184.8	29.42	0.40	68.76
142	230.0	0.731	6.05	2.89	281.3	30.20	0.03	73.64
144	250.4	0.710	4.91	2.59	210.5	29.34	0.06	64.56
146	244.0	0.745	5.29	2.88	218.6	30.41	0.10	66.73
147	202.0	0.699	4.81	2.77	190.6	30.18	0.07	61.99
152	200.7	0.711	5.45	2.73	307.3	31.04	0.01	73.55
157	213.6	0.709	5.12	2.72	240.5	31.28	0.12	69.85
159	203.9	0.724	5.13	2.74	207.5	30.98	0.05	70.08
160	189.1	0.686	5.35	2.40	206.0	28.68	0.32	76.40
162	192.3	0.693	5.02	2.29	214.9	31.02	0.09	78.06
163	205.3	0.692	5.43	2.59	230.3	30.40	0.38	73.97
164	207.4	0.679	5.49	2.35	283.1	30.13	0.01	82.01
165	201.5	0.682	5.36	2.84	260.9	30.58	0.02	68.04

DATA FOR REGRESSION

PROG	Adjusted Mean of the DXP prog derived from these females		Predictor DXD 1 families					
	Y	BI	LA	LAR	HT	LP	CD	FDM
166	250.1	0.735	4.75	2.49	253.5	30.29	0.02	69.93
169	176.4	0.638	5.38	2.25	196.3	28.88	0.04	79.81
170	211.3	0.702	5.55	2.39	240.9	29.52	0.13	78.89
173	260.0	0.735	5.45	2.92	227.8	30.17	0.01	68.07
175	223.5	0.735	5.27	2.34	260.4	29.07	0.13	77.18
176	229.2	0.716	5.38	2.25	218.6	29.61	0.02	87.32
177	213.2	0.710	5.32	2.61	284.5	29.16	0.10	71.45
180	202.5	0.708	4.89	2.84	210.2	30.38	0.02	61.28
181	197.0	0.690	5.52	2.51	202.5	31.02	0.01	78.50
182	230.4	0.733	5.49	2.49	227.7	29.41	0.08	75.91
185	179.8	0.654	6.02	2.68	262.5	30.66	0.06	80.80
189	218.8	0.723	5.27	2.53	273.3	28.74	0.01	72.19
191	227.9	0.736	4.76	2.58	208.6	29.56	0.16	63.58
193	199.2	0.644	5.95	2.36	205.5	29.72	0.13	87.37
194	184.8	0.664	4.80	2.36	198.7	30.40	0.03	72.80
195	225.8	0.718	5.04	2.54	231.9	30.10	0.02	72.62
196	218.5	0.698	4.90	2.63	240.3	31.05	0.07	68.85
198	247.2	0.737	5.71	2.41	241.1	29.30	0.04	81.34
204	242.9	0.739	4.35	2.42	245.0	31.46	0.25	66.09
206	222.5	0.711	4.94	2.67	208.9	30.52	0.12	65.73
207	212.6	0.713	5.45	2.88	210.1	30.33	0.01	69.12
210	224.7	0.718	4.58	2.76	181.9	30.17	0.18	58.28
212	196.1	0.676	5.36	2.17	236.6	31.27	0.24	90.63
216	197.5	0.707	4.79	2.29	223.7	30.65	0.13	74.69
220	206.0	0.718	4.99	2.71	194.9	30.06	0.14	64.40
222	213.3	0.719	5.19	2.80	221.5	30.43	0.01	68.54
223	208.0	0.676	5.05	2.24	229.2	30.69	0.21	79.11
MEAN	213.9	0.704	5.12	2.57	228.2	30.37	0.10	71.85
MAX	260.0	0.758	6.05	2.95	307.3	33.02	0.70	105.01
MIN	166.3	0.638	4.35	2.03	180.0	28.28	0.00	56.29

Table 1. Grand means, minima, maxima and coefficients of variation (CV) of the GCA values per trait for the dura and pisifera parents obtained from the test cross families, along with the average values of the traits per origin of the pisifera palms (AVROS; Yangambi; La Me; Dami composite; Ekona; Ghana; and Nigeria). Per pisifera origin, GCA values are presented of the palm (BSM number) with the highest value for oil yield (Elite).

Parental sources	Bunch yield (kg/palm/year)	% Mesocarp/fruit	% Oil/mesocarp	% Oil/bunch	Oil yield (kg/palm/year)	Bunch Index	Height (cm)	Leaf area (m ²)	Leaf area/Leaf weight ratio	Rachis length (cm)
Dura parents										
Mean (n=225)	104	79.4	50.7	26.6	27.8	0.510	141	4.80	2.60	377
Minimum	83	73.6	43.6	21.0	22.1	0.454	111	4.11	2.30	339
Maximum	122	85.1	55.0	29.5	33.2	0.571	179	5.61	2.89	421
CV (%)	12	4.1	7.2	7.3	12.1	5.4	13	5.21	4.96	14
Pisifera parents										
Mean (n=50)	105	79.4	50.7	26.6	27.8	0.510	141	4.80	2.60	377
Minimum	94	71.1	47.7	24.8	24.4	0.454	108	3.99	2.39	344
Maximum	119	83.8	54.0	28.0	31.5	0.552	173	5.40	2.84	423
CV (%)	9	5.2	6.1	8.0	9.1	6.2	15	4.35	8.10	13
AVROS (n=15)	99	81.5	49.1	26.4	26.0	0.484	152	4.94	2.57	381
Elite (BSM 13)	103	80.9	49.8	27.2	27.9	0.503	164	4.73	2.66	368
CV (%)	12	4.3	6.7	5.4	8.9	5.9	17	3.92	8.31	15
HC (n=6)	100	81.0	49.3	26.3	26.2	0.495	153	4.74	2.58	373
CV (%)	10	5.4	3.9	5.5	8.9	4.300	11	5.61	6.78	13
C9212 (n=9)	98	81.8	49.0	26.4	25.9	0.477	151	5.07	2.57	385
CV (%)	14	4.2	4.8	4.9	9.6	3.9	10	4.18	6.44	16
Yangambi (n=4)	108	75.8	53.3	27.3	29.5	0.517	145	4.70	2.57	380
Elite (BSM 28)	113	71.1	54.0	27.0	30.6	0.506	139	4.76	2.42	373
CV (%)	12	3.6	6.7	6.5	7.8	4.9	14	4.57	6.71	12
La Me (n=1)	97	76.4	50.5	25.5	24.7	0.519	131	4.79	2.79	390
Dami comp. (n=5)	105	79.7	49.6	26.2	27.4	0.521	124	4.35	2.48	358
Elite (BSM 18)	107	79.4	49.4	26.9	28.8	0.511	125	4.65	2.44	364
CV (%)	11	3.2	5.8	5.1	8.8	3.5	14	4.71	6.27	12
Ekona (n=10)	108	77.9	51.6	26.1	28.1	0.522	130	4.80	2.63	382
Elite (BSM 10)	111	78.4	53.2	27.5	30.5	0.525	142	4.66	2.54	378
CV (%)	14	4.5	5.6	6.2	8.3	5.3	13	5.47	6.81	14
Ghana (n=9)	106	78.8	51.0	27.2	28.8	0.515	147	4.67	2.54	375
Elite (BSM 20)	112	81.6	50.2	27.6	30.9	0.521	173	4.97	2.64	383
CV (%)	13	3.9	6.0	7.2	7.4	4.9	12	6.32	6.71	16
Nigeria (n=6)	113	80.0	51.6	26.9	30.3	0.532	136	5.06	2.76	379
Elite (BSM 33)	113	79.7	53.6	27.8	31.5	0.547	114	4.79	2.78	368
CV (%)	10	4.2	6.0	6.2	7.7	5.2	10	4.70	6.11	11

Table 2. Grand means, minima, maxima and coefficients of variation for phenotypic values of TXP-1 families, along with the ranges within the five pisifera origins (AVROS, Dami composite, Ekona, Ghana, and Nigeria). The lowest line presents the data from family BSM 313 of the Nigeria origin.

Parental Sources	Bunch yield (kg/palm/year)	% Mesocarp/ Fruit	% Oil/ mesocarp	% Oil/ bunch	Bunch Index	Height (cm)	Leaf area (m²)	Leaf area/ leaf weight ratio	% Crown disease
Tenera x Pisifera families									
Mean (n=20)	60	83.9	53.6	26.8	0.355	194	6.24	2.70	19.3
Minimum	36	77.4	47.1	21.4	0.245	127	4.42	2.03	0.0
Maximum	78	88.7	57.6	32.3	0.431	258	7.53	3.15	62.5
CV (%)	11.0	3.0	3.1	3.0	13.2	28.0	11.60	10.30	83.5
Origin									
AVROS (n=3)	46	86.3	47.5	22.5	0.295	246	6.40	2.81	42.2
range	36-51	82.7-88.7	47.1-48.2	21.4-24.6	0.245-0.320	238-258	6.09-6.65	2.73-2.89	12.5-62.5
Dami comp. (n=5)	69	83.2	53.2	27.4	0.361	169	5.53	2.46	19.5
range	60-78	81.9-84.5	51.8-54.0	24.8-29.5	0.314-0.402	147-211	4.42-6.08	2.03-2.60	10.9-33.3
Ekona (n=5)	60	81.2	55.9	25.6	0.331	186	7.10	2.77	7.8
range	54-63	77.4-86.9	53.8-57.3	24.5-26.5	0.306-0.376	161-238	6.22-7.53	2.59-2.99	0.0-14.1
Ghana (n=4)	69	85.4	55.1	31.2	0.383	218	5.89	2.51	11.3
range	60-75	83.1-87.3	53.6-55.9	30.5-32.3	0.361-0.411	188-242	5.52-6.22	2.46-2.58	4.7-17.2
Nigeria (n=3)	69	85.1	54.5	26.2	0.405	167	6.30	3.12	26.0
range	54-78	83.3-86.4	52.2-57.6	25.1-27.5	0.363-0.431	127-190	6.00-6.50	3.10-3.15	10.9-35.9
Family BSM 313 (Nigeria origin)	78	85.5	57.6	27.5	0.431	127	6.50	3.15	10.9

Table 7. Grand means, minima and maxima of the GCA values per trait for the dura and pisifera parents obtained from the test cross families, along with the average values per trait and their coefficient of variation (CV) for each origin of the dura lines (Dami, Chemara, H&C, and MARDI) and of the pisifera palms (AVROS; Yangambi; La Me; Dami composite; Ekona; Ghana; and Nigeria). Per pisifera origin, GCA values are presented of the palm with the highest value for oil yield (Elite).

	Bunch yield (kg/palm/year)	% Mesocarp/ fruit	% Oil/ mesocarp	% Oil/ bunch	Oil yield (kg/palm/year)	Bunch Index	Height (cm)	Leaf area (m ²)	Leaf area/ Leaf weight ratio	Rachis length (cm)
Dura parents										
Mean (n=225)	104	79.4	50.7	26.6	27.8	0.510	141	4.80	2.60	377
Minimum	83	73.6	43.6	21.0	22.1	0.454	111	4.11	2.30	339
Maximum	122	85.1	55.0	29.5	33.2	0.571	179	5.61	2.89	421
CV (%)	12	4.1	7.2	7.3	12.1	5.4	13	5.21	4.96	14
Dami (n=117)	#REF!	#REF!	50.2	26.4	27.8	0.512	#REF!	4.75	#REF!	371
Chemara (n=70)	105	78.7	51.2	26.6	27.9	0.509	146	4.85	#REF!	387
H & C (n=18)	103	78.7	50.2	26.3	27.0	0.498	144	4.91	2.56	381
MARDI (n= 8)	#REF!	#REF!	#REF!	27.8	#REF!	#REF!	#REF!	#REF!	#REF!	376
* Others (n=12)	103	79.3	51.0	27.2	28.1	0.504	144	4.86	2.81	381
Pisifera parents										
Mean (n=50)	105	79.4	50.7	26.6	27.8	0.510	141	4.80	2.60	377
Minimum	94	71.1	47.7	24.8	24.4	0.454	108	3.99	2.39	344
Maximum	119	83.8	54.0	28.0	31.5	0.552	173	5.40	2.84	423
CV (%)	9	5.2	6.1	8.0	9.1	6.2	15	4.35	8.10	13
AVROS (n=15)	99	81.5	49.1	26.4	26.0	0.484	152	4.94	2.57	381
Elite (BSM 13)	103	80.9	49.8	27.2	27.9	0.503	164	4.73	2.66	368
CV (%)	12	4.3	6.7	5.4	8.9	5.9	17	3.92	8.31	15
HC (n=6)	100	81.0	49.3	26.3	26.2	0.495	153	4.74	2.58	373
CV (%)	10	5.4	3.9	5.5	8.9	4.300	11	5.61	6.78	13
C8212 (n=9)	98	81.8	49.0	26.4	25.9	0.477	151	5.07	2.57	385
CV (%)	14	4.2	4.8	4.9	9.6	3.9	10	4.18	6.44	16
Yangambi (n=4)	108	75.8	53.3	27.3	29.5	0.517	145	4.70	2.57	380
Elite (BSM 28)	113	71.1	54.0	27.0	30.6	0.506	139	4.76	2.42	373
CV (%)	12	3.6	6.7	6.5	7.8	4.9	14	4.57	6.71	12
La Me (n=1)	97	76.4	50.5	25.5	24.7	0.519	131	4.79	2.79	380
Dami comp. (n=5)	105	79.7	49.6	26.2	27.4	0.521	124	4.35	2.48	358
Elite (BSM 18)	107	79.4	49.4	26.9	28.8	0.511	125	4.65	2.44	364
CV (%)	11	3.2	5.8	5.1	8.8	3.5	14	4.71	6.27	12
Ekona (n=10)	108	77.9	51.6	26.1	28.1	0.522	130	4.80	2.63	382
Elite (BSM 10)	111	78.4	53.2	27.5	30.5	0.525	142	4.66	2.54	378
CV (%)	14	4.5	5.6	6.2	8.3	5.3	13	5.47	6.81	14
Ghana (n=9)	106	78.8	51.0	27.2	28.8	0.515	147	4.67	2.54	375
Elite (BSM 20)	112	81.6	50.2	27.6	30.9	0.521	173	4.97	2.64	383
CV (%)	13	3.9	6.0	7.2	7.4	4.9	12	6.32	6.71	16
Nigeria (n=6)	113	80.0	51.6	26.9	30.3	0.532	136	5.06	2.76	379
Elite (BSM 33)	113	79.7	53.6	27.8	31.5	0.547	114	4.79	2.78	368
CV (%)	10	4.2	6.0	6.2	7.7	5.2	10	4.70	6.11	11

* Crosses between origins