SAMARU GERMPLASM REPOSITORY OF NIGERIAN POPULATIONS OF THE DATE PALM (Phoenix dactylifera, L)

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I SUMMARY

The variation exhibited within populations of the Date Palm (Phoenix dactylifera, L) in Nigeria would appear to suggest that these populations originated from seedlings. The distribution of the palms in the arid and semi arid sudan and subsudan ecological zones of Nigeria suggests that climatic factors like low rainfall, low humidity and high temperature may have favoured their adaptation in these zones.

In the absence of recognised varieties, random sampling of populations was practised. Twenty four population types were recognised and their fruit and seedling characteristics described. A population type was defined as the mean performance of a population of palms sharing a common gene pool within a single location.

Collection and evaluation of the locally adapted genotypes is a long term investment for the systematic improvement of the Date Palm in Nigeria. It is suggested that the Samaru Germplasm Repository fulfils the need for such an investment.

II INTRODUCTION

1. Origin and Distribution of the Date Palm

The Date Palm (Phoenix dactylifera, L), is of ancient origin, possibly in S.W. Asia (Simmonds, 1979). It is one of the oldest cultivated tree crops (Popenoe, 1913), and its culture was well established in Mesopotamia 'Iraq) between 3000-4000 BC (Dowson, 1962; Nixon and Carpenter, 1978).

The Date Palm is distributed between 5° and 32° North of the equator. The Northern limit is in Northern Iraq and Pakistan around the Indus valley area. The Sorthern limit is in Samailia East Africa,

2. Uses

'In the"middle East, all parts of the palm are utilized and about 800 uses have been recorded (Purseglore, 1972). The trunks are used for buildings, leaves for thatching basketware, matting and the spathes maybe tapped for palm wine. The main economic product is the pericarp of the ripe fruit which is consumed directly. The pericarp is also used in the biscuit and confectionary trade.

Dates are more of a staple food crop in countries bordering the Western and Southern Sahara, where date varieties tolerant to sub optimal or marginal conditions provides food and other products on land unsuitable to other crops.

The importance of the date palm as a food crop looms large in Saudi Arabia, where the palm is grown on about ninety percent of the cultivated land (Nixon, 1954).

3. Classification and Sugar Composition

Dates can be conveniently classified into soft, semi dry and dry types. The pericarp of the ripe date contains about 75-80 percent sugar. In almost all of the soft dates, the sugar is of the reducing type (glucose and fructose), while in the semi dry and dry dates there is a relatively high proportion of non-reducing sucrose sugar (Nixon and Carpenter, 1978). The high percentage of total sugar makes the Date Palm a potential source of sugar. The palm when planted at 125 palms per hectare will produce 100 kg of dates per tree annuum with a total sugar content of over 60% (Dowson, 1962).

4. Date producing Countries and Yield

The main date producing Countries are Iraq, Saudi Arabia, Iran, Egypt, Algeria and Pakistan. Other Countries are Morocco, Libya, Tunisia, Sudan, Museat, Oman, Bahrein, Mauritania and U.S.A. world date production in 1966 was estimated at 1,826,000 metric tons from 96,000,000 trees. (Dowson, 1968).

Yields of 136 kg per tree at planting distances of 30 feet x 30 feet has been reported for the Deglet Noor varieties grown in the U.S.A.(Nixon and Carpenter, 1978).

5. Distribution in Nigeria

The Date Palm is distributed in a belt between latitude 10° - 14°W and longitude 4° - 12° E in Northern Nigeria (Fig 1) the palms occur in scattered groups of a few trees near homesteads to larger populations of over 100 trees in other areas.

6. Date Palm Research Substation

The interest in the Date Palm as a potential food and cash crop for the arid and semi-arid areas of Northern Nigeria may have prompted the establishment of a 500 Acre Date Palm Research Substation by the Nigerian Institute for Oil Palm Research (NIFOR), at Dutse, Kano State. The substation has a grove of about 150 acres consisting of over 100 fruiting palms, 15 male palms and several juvenile palm.

7. Date Palm Prospection in Nigeria

The logical first step in any crop improvement programme, where no systematic improvement has been effected by man, is the evaluation of the genetic potential and variability, of the locally adapted varieties, cultivars or strains. In annual crops like cereals which produce large quantities of seed per plant, the collection and evaluation of such materials at one or more locations is relatively simple.

In tree crops however, the problems are manifold. Tree crops have long generation intervals. Some are cross pollinated and dioecious like the Date Palm, and especially when no distinct varieties or cultivars exist, evaluation procedures become costly of time, land, labour and capital.

The Date Palm was introduced into Nigeria possibly from neighbouring countries in proximity to the Sahara or from traditional date growing countries in the middle East. The variation exhibited by the palms in Nigeria would appear to suggest that they originated from seedlings. The distribution of the palms in the arid and semi arid sudan and sub sudan ecological zones of Nigeria is strongly indicative that climate, principally low rainfall and high temperature favoured their adaptation. Natural selection may have played an improtant role in this respect. Human selection probably contributed towards the thinning out of the unwanted male palms and the conservation of female palms.

The main objective of this paper is to describe the fruit and seedling characters of Nigerian germplasm collections of the Date Palm maintained at the Samaru germplasm repository.

III MATERIALS AND METHODS

1. Prospection

Prospection of the Date Palm in Nigeria was conducted by the Nigerian Institute for Oil Palm Research (NIFOR) in 1980. One hundred and six palms were sampled from twentysix locations covering sixteen local government areas in Sokoto, Kaduna, Kano, Bauchi and Borno States respectively (Table 1.)

2. Random sampling and fruit evaluation

Random samples of 100 fruits from each of 99 palms and 335 fruits from 7 palms totalling 10, 235 fruits were used to evaluate fruit and seed characteristics. The fruit characteristics evaluated were length, circumference weight, mesocarp thickness and mesocarp weight, while the seed characters were length, cercumference and weight.

3. Seed germination

Date palm seed may take 2-6 months to germinate if planted directly into the soil. The long germination interval and the erratic sprouting is a disadvantage in breeding programmes. The rapid germination technique reported herein was used to overcome this problem.

A total of 26,243 seed from 174 palms obtained from 24 locations were used in the germination experiment (Table 2). about 100-200 seed from each palm were placed in polythene bags, and the seed covered with water for 3 days. The water was then drained off, the bags weighted, and kept in the dark for one day. The bags were thereafter kept open for aeration, and the seed moistened daily with a mist sprayer. Percentage germination counts taken one week following the soaking treatment are shown in the results.

4. Planting at Germplasm Repository

The pregerminated seed were planted in polybags filled with sieved soil, with one seed per bag. The bags were then arranged in rows (2' x 2') in a nursery 550' x 200' and the area enclosed by a wire mesh fence. The enclosed area was named the Samaru germplasm repository, and is located at the University Farm, Ahmadu Bello University, Samaru.

Records were taken on the percentage leaf emergence at one and two months following planting, while mean leaf number and mean plant height were recorded when the plants were 6 months of age.

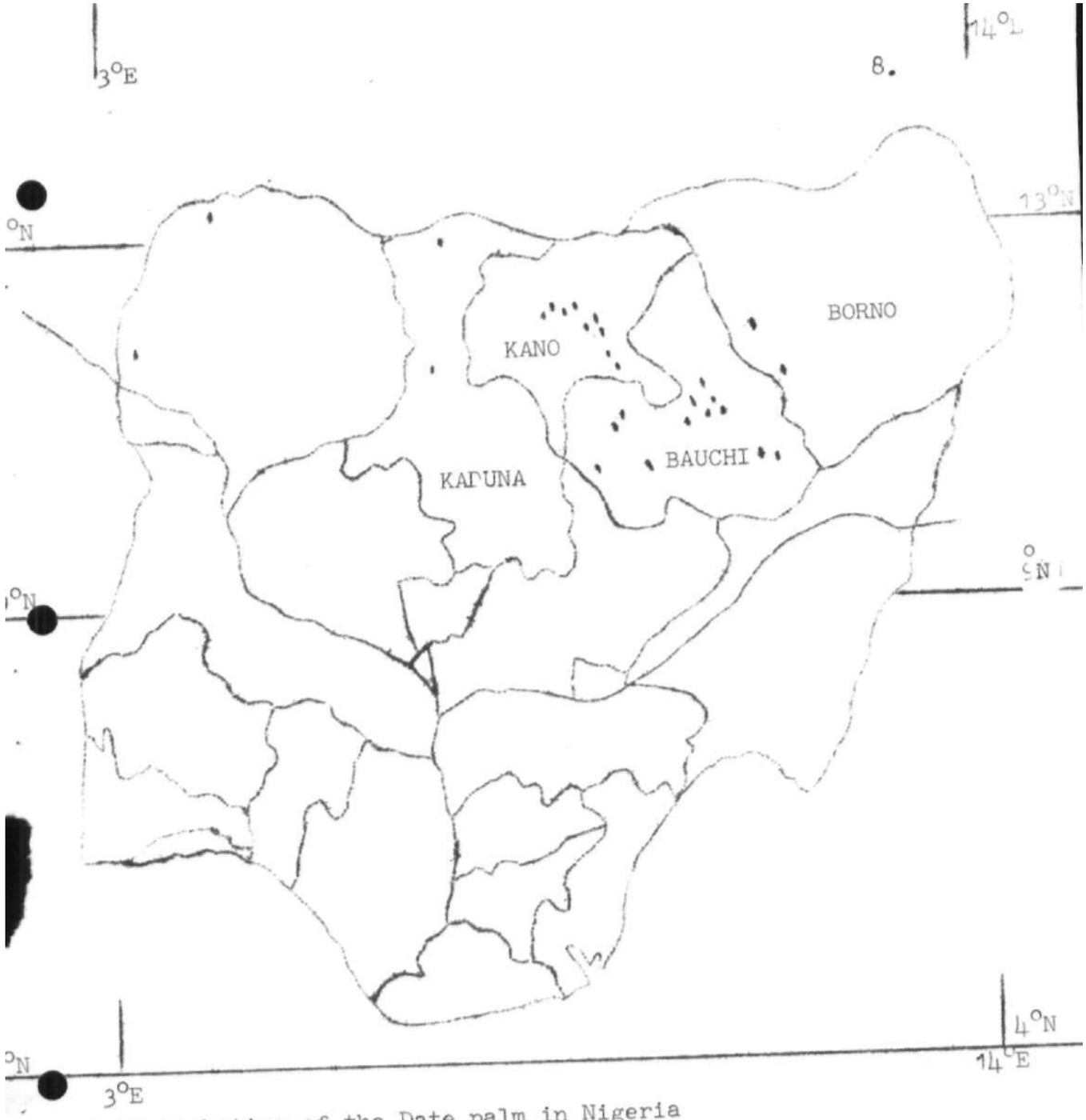


Fig.I Distribution of the Date palm in Nigeria

Table 1. Date Palm Prospection in Nigeria, 1980

	State	LGA	Location	No. of Palms Sampled
1	Sokoto	1 Gawdawa	1. Kella	1
	"	2. Anka	2. Maru	1
2	Kaduna	3. Funtua	3. Funtua	1
	"	4. Katsina	4. Katsina	5
3	Kano	5. Wudil	5. Zuga	5
	"	6. Gaya	6. Gamawa	6
	"	7. Dutse	7. Tsangaya	5
	"	"	8. Panda	5
		"	9. Guruduba	5
		"	10. Duhuwa	5
	"	8. Birninkudu	11. Kila	2
	"	"	12. Samamiya	1
	"	"	13. Kangire	7
4	Bauchi	9. Gombe	14. Gombe	10
	"	10. Ningi	15. Tiffi	9
	"	11. Bauchi	16. Miri	6
	"	"	17. Tirwin	4
	"	12. Darazo	18. Darazo	1
	"	"	19 Gabarin	2
	"	"	20. Konkiel	4
	"	"	21. Lago	3
	"	13. Misau	22. Misau	4
	"	"	23. Ajili	1
	"	14. Shira	24. Shira	5
5.	Borno	15. Fika	25. Fika	7
	"	16. Potiskum	26. Potiskum	1
5	5	16	26	106

Table 2 Number of Seed Presprouted in Palms from different locations.

State	LGA	Location	No. of Palms	No of seeds pres-prouted
Kaduna	Funtua	Funtua	1	185
"	Katsina	Katsina	5	751
Kano	Wudil	Zuga	5	817
"	Gaya	Gamawa	6	1039
"	Dutse	Dutse Substation	71	10,624
"	"	Tsangaya	5	801
"	"	Panda	5	887
"	"	Guruduba	5	696
"	"	Duhuwa	5	827
"	Birninkudu	Kila	2	400
"	"	Kangire	7	1109
Bauchi	Gombe	Gombe	10	1233
"	Ningi	Tiffi	9	1150
"	Bauchi	Miri	6	965
"	"	Tirwin	4	588
"	Darazo	Darazo	1	134
"	"	Gabarin	2	168
"	"	Konkiel	4	639
"	"	Lago	3	481
"	Misau	Misau	4	541
"	"	Ajili	1	168
"	Shira	Shira	5	726
Borno	Fika	Fika	7	1174
"	Potiskum	Potiskum	1	140
4	14	24	174	26,243

IV RESULTS

KADUNA STATE
LGA - FUNTUA
1. FUNTUA TYPE

A. Fruit characteristics

a) Pericarp: Length 37-50mm, mean 43.7mm; Circumference 60-75mm, mean 67.5mm; mesocarp thickness 3.5-5.7mm, mean 4.5mm; mesocarp weight 5.1-10.7g, mean 7.8g.

b) Seed: Length 20-30mm, mean 23.8mm; circumference 20-38mm, mean 28.7mm; weight 1.2-2.0g, mean 1.7g.

c) Fruit weight (Pericarp + seed) = 6.5-12.4g, mean 9.7 g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
12%	40%	50%

C. Seedling vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
23.74	3

KADUNA STATE

LGA - KATSINA

2. KATSINA TYPE

A. Fruit characteristics

a) Pericarp: Length 21-36mm, mean 31.2mm; circumference 27-68mm, mean 49.5mm; mesocarp thickness 1.2-5.7mm, mean 3.0mm; mesocarp weight 0.7-4.8g, mean 3.0g.

b) Seed: Length 17-32mm, mean 22.1mm; circumference 20-33mm, mean 26.7mm; weight 0.6-1.9g, mean 1.1g.

c) Fruit weight (Pericapr + seed) = 1.8-8.0g, mean 4.2g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in 2 months
74%	60%	81%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
24.86	3

KANO STATE
LGA - WUDIL
3. ZUGA TYPE

A. Fruit characteristics

a) Pericarp: Length 27-44mm, mean 33.4mm;
circumference 36-77mm, mean 57.7mm;
mesocarp thickness 1.0-5.5mm, mean 2.9mm;
mesocarp weight 0.6-7.4g, mean 3.7g.

b) Seed: Length 15-27mm, mean 22.0mm,
circumference 15-35mm, mean 26.0mm, weight 15-27g,
mean

c) Fruit weight (Pericarp + seed) = 1.3-8.7g,
mean 4.7%

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
79%	61%	72%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
24.86	3

KANO STATE
LGA - GAYA
4. GAMAWA TYPE

A. Fruit Characteristics

a) Pericarp: Length 15-48mm, mean 35.1mm;
circumference 40-97mm, mean 61.3mm;
mesocarp thickness 2.1-9.1mm, mean 3.7mm;
mesocarp weight 0.5-196g, mean 5.2g.

b) Seed: Length 17-38mm, mean 25.4mm;
circumference 23-37mm, mean 28.9mm;
weight 0.5-2.0g, mean 1.2g.

c) Fruit weight (Pericarp + seed) = 1.7-21.3g,
mean 6.4g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
67%	54%	78%

C. Seedling Vigour at six months

Mean Plant Height (cm)	Mean Leaf Number
27.58	3

KANO STATE
LGA - DUTSE

5. TSANGAYA TYPE

A. Fruit characteristics

a) Pericarp: Length 27-63m, mean 39.4mm.
circumference 42-72m, mean 56.0mm;
mesocarp thickness 1.6-5.2mm, mean 3.5mm;
mesocarp weight 1.6-9.6g, mean 4.0g.

b) Seed: Length 20-33mm, mean 26.9g;
circumference 20-31mm, mean 26.7g;
weight 0.6-1.1g, mean 1.2g

c) Fruit weight (Pericarp + seed) = 1.6-9.6g,
mean 5.1g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
95%	78%	90%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
24.22	3

KANO STATE
LGA - DUTSE
6. PANDA TYPE

A. Fruit characteristics

a) Pericarp: Length 21-51mm, mean 32.4mm;
circumference 29-94mm, mean 57.5mm;
mesocarp thickness 1.2-6.3mm, mean 3.4mm;
mesocarp weight 0.6-124g, mean 3.6g.

b) Seed: Length 17.32mm, mean 22.5mm;
circumference 21-36mm, mean 27.9mm,
weight 0.4-1.7g, mean 1.2g

c) Fruit weight (Pericarp + Seed) = 1.6-13.8g,
mean 4.8g.

B. Seed germination and Lead Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
81%	75%	90%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
26.58	3

KANO STATE
LGA - DUTSE
7. GURUDUBA TYPE

A. Fruit characteristics

a) Perocarp: Length 32-63mm, mean 43mm;
circumference 45-82mm, mean 70.2mm;
mesocarp thickness 1.9-6.7mm, mean 4.6mm;
mesocarp weight 1.3-13.1g, mean 6.4g;

b) Seed: Length 20-37mm, mean 27.1mm;
circumference 23-32mm, mean 28.4mm; weight 0.8-2.3g
c) Fruit weight (Pericarp + seed) = 1.7-12.0g;
mean 7.3g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
77%	59%	80%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
26.24	4

KANO STATE
LGA - DUTSE
8. DUHUWA TYPE

A. Fruit characteristics

a) Pericarp characters: Length 25-67mm, mean 37.3mm;
circumference 45-94mm, mean 61.7mm;
mesocarp thickness 1.4-6.5mm, mean 3.0mm;
mesocarp weight 0.5-9.8g, mean 4.7g,

b) Seed characters: Length 16-29mm, mean 23.9mm;
circumference 19-32mm, mean 26.7mm;
weight 0.4-1.9g, mean 1.1g

c) Fruit weight (Pericarp + seed) = 0.8-10.7; mean 5.6g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
67%	39%	59%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
25.82	3

KANO STATE
LGA - BIRNINKUDU
9. KILA TYPE

A. Fruit characteristics

a) Pericarp characters: Length 25-31mm, mean 27.8mm, circumference 31-60mm, mean 50.9mm; mesocarp thicknes 2.1mm - 5.2mm, mean 3.5mm; mesocarp weight 0.5-9.8mm, mean 2.6mm;

b) Seed characters: Length 17-30mm, mean 20.2mm circumference 20-32mm, mean 25.3mm; weight 0.6-1.5g, mean 0.9g.

c) Fruit weight (Pericarp + seed) = 1.8-5.2; mean 3.6 g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
42%	46%	72%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
27.12	3

KANO STATE
LGA - BIRNINKUDU

10. SAMAMIYA TYPE

A. Fruit characteristics

a) Pericarp characters: Length 25-38mm, mean 30.9mm
circumference 42-65mm, mean 50.5mm;
mesocarp thickness 3.1 - 4.6, mean 3.9mm;
mesocarp weight 1.2 - 7.6g, mean 2.3g

b) Seed characters: Length 11.29mm, mean 18.1mm;
circumference 10-18mm, mean 14.3mm;
weight .01-1.9g, mean 0.18g.

c) Fruit weight (Pericarp + seed) = 1.3-8.0g,
mean 2.42g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
-	-	-

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
-	-

KANO STATE
LGA - BIRNINKUDU
11.KANGIRE TYPE

A. Fruit characteristics

a) Pericarp characters: Length 20-52mm, mean 37.2mm;
circumference 43-91mm, mean 61.6mm;
mesocarp thickness 2.1-6.1mm, mean 3.9mm;
mesocarp weight 1.3-11.5g, mean 5.6g

b) Seed characters: Length 17-39mm, mean 24.9mm;
circumference 23-39mm, mean 29.4mm;
weight 0.6-2.2g, mean 1.3g

c) Fruit weight (Pericarp + seed) = 2.3-13.1g,
mean 7.0 g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
71%	34%	75%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
26.6	3

BAUCHI STATE
LGA - GOMBE
12. GOMBE TYPE

A. Fruit characteristics

a) Pericarp characters: Length 21-46mm, mean 33. 1mm;
circumference 40-84mm, mean 60.5mm,
mesocarp thickness 1.1-4.5mm, mean 3.1mm;
mesocarp weight 1.1-10.9g, mean 4.8g;

b) Seed characters: Length 15-33mm, mean 23.0mm;
circumference 11-37mm, mean 29.7mm;
weight .06-4.1g, mean 1.3g

c) Fruit weight (Pericarp + seed) = 1.5-13.8g,
mean 6.8g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
48%	60%	82%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
26.10	4

BAUCHI STATE
LGA NINGI
13. TIFFI TYPE

A. Fruit characteristics

a) Pericarp characters: Length 21-53mm, mean 37.5mm;
circumference 39-83mm, mean 61.9mm;
mesocarp thickness 2-6.4mm, mean 3.6mm;
mesocarp weight 0.6-13.4g, mean 5.6g.
b) Seed characters: Length 19-37mm, mean 25.6mm;
circumference 19-38mm, mean 29.3mm;
weight 0.6-2.6g, mean 1.4g.
c) Fruit weight (Pericarp + seed) = 1.9-14.7mm,
mean 6.9mm.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
80%	77%	93%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
28.6	4

BAUCHI STATE
LGA - BAUCHI
14. MIRI TYPE

A. Fruit characteristics

a) Pericarp characters: Length 25-39mm, mean 32mm;
circumference 42-78mm, mean 61.9mm;
mesocarp thickness 1.3-4.9mm, mean 3.3mm;
mesocarp weight 1.2-7.6g, mean 3.9g.

b) Seed characters: Length 17.0-32mm, mean 22.4mm;
Circumference mean 28.3mm, weight mean 1.27g

c) Fruit weight (Pericarp + Seed) = mean 5-10g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
80%	82%	90%

C. Seedling Visour at Six months

Mean Plant Height (cm)	Mean Leaf Number
36.4	3

BAUCHI STATE
LGA - BAUCHI
15. TIRWIN TYPE

A. Fruit characteristics

a) Pericarp characters: Length 23-39mm, mean 29.4mm;
circumference 35-72mm, mean 55.9mm;
mesocarp thickness 1.5-5.6mm, mean 3.5mm;
mesocarp weight 0.6-6.4g, mean 3.3 g;

b) Seed characters: Length 18-26mm, mean 20.8mm;
circumference 10-35mm, mean 26.0mm;
weight 0.6-1.8g, mean 1.1g

c) Fruit weight (Pericarp + seed) = 1.4-7.5g,
mean 4.5g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
78%	75%	90%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
34.16	4

BAUCHI STATE
LGA - DARAZO
16. DARAZO TYPE

A. Fruit characteristics

a) Pericarp characters: Length 35-47mm, mean 41.9mm;
circumference 41-79mm, mean 68.1mm;
mesocarp thickness 3.5-5.5mm, mean 4.4mm;
mesocarp weight 1.0-10.7g, mean 7.6 g;

b) Seed characters: Length 27-32mm, mean 30.0mm
circumference 30-40mm, mean 33.7mm;
weight 1.4-2.4g, mean 1.84g.

c) Fruit weight (Pericarp + seed) = 2.6-13.1g,
mean 9.3g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
31%	78%	87%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
32.52	4

BAUCHI STATE
LGA - DARAZO
17. GABARIN TYPE

A. Fruit characteristics

a) Pericarp characters: Length 30-37mm, mean 33.5mm;
circumference 45-75mm, mean 59.8mm;
mesocarp thickness 3.2-6.0mm, mean 4.1 mm;
mesocarp weight 2.0-9.5g, mean 4.8g

b) Seed characters: Length 20-26mm, mean 22.1mm;
circumference 21-33mm, mean 26.9mm;
weight 0.74-1.43g, mean 1.1g.

c) Fruit weight (Pericarp + seed) = 2.1-11.2mm,
mean 6.1g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
79%	78%	93%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
28.2	4

BAUCHI STATE
LGA - DARAZO
18. KONKIEL TYPE

A. Fruit characteristics

Pericarp characters: Length 21-47mm, mean 33.1mm;
circumference 40-61mm, mean 50mm,
mesocarp thickness 2.1-4.8mm, mean 3.4mm;
mesocarp weight 1.0-6.1g, mean 2.9g;

b) Seed characters: Length 17.33mm, mean 23.9mm;
circumference 11.32mm, mean 25.4mm;
weight 0.07-2.1g, mean 1.2g.

c) Fruit weight (Pericarp + seed) = 1.6-73g; mean 4.9g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
59%	56%	91%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
26.84	4

BAUCHI STATE
LGA - DARAZO
19. LAGO TYPE

A. Fruit characteristics

a) Pericarp characters: Length 28-39mm, mean 33.4mm;
circumference 41-60mm, mean 53.8mm;
mesocarp thickness 1.4-5.5mm, mean 3.1mm;
mesocarp weight 1.6-5.4g, mean 3.6g.

b) Seed characters: Length 20-29mm, mean 24mm;
circumference 20-37mm, mean 27.2mm;
weight 0.30-1.97g, mean 1.14g.

c) Fruit weight (Pericarp + seed) = 2.2-7.7g;
mean 4.8g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
49%	86%	86%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
27.2	3

BAUCHI STATE
LGA - MISAU
20. MISAU TYPE

A. Fruit characteristics

a) Pericarp characters: Length 26-43mm, mean 35-1mm, circumference 40-89mm, mean 60.7mm; mesocarp thickness 1.4-5.0mm, mean 2.8mm, mesocarp weight 0.5-13.1g, mean 5.0g;

b) Seed characters: Length 18-36mm, mean 23.3mm; circumference 15-39mm, mean 28.9mm; weight 0.52-1.9g, mean 1.29g

•) Fruit weight (Pericarp + seed) = 1.27-13.18 g, mean 6.3g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
55%	48%	71%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
30.3	4

BAUCHI STATE
LGA - MISAU
21. AJILI TYPE

A. Fruit characteristics

a) Pericarp characters: Length 22-30mm, mean 25.1mm;
circumference 40-57mm, mean 53.2mm;
mesocarp thickness 2.1-5.0mm, mean 3.15mm;
mesocarp weight 0.72-3.39g, mean 2.17g;

b) Seed characters: Length 16-23mm, mean 20.0mm;
circumference 26-35mm, mean 30.7mm;
weight 0.83-2.17g, mean 1.3g.

c) Fruit weight (Pericarp + seed) = 2.18-4.82g,
mean 3.6g.

B. Seed germination and Leaf Emergence

Seed germination in one [illegible]	Leaf Emergence in one month	Leaf Emergence in two months
[illegible] 91% [illegible]	[illegible] 90% [illegible]	[illegible] 92% [illegible]

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
28.44	3

BAUCHI STATE
LGA - SHIRA
22. SHIRA TYPE

A. Fruit characteristics

a) Pericarp characters: Length 26-50mm, mean 36.0mm;
circumference 40-73mm, mean 56.7mm;
mesocarp thickness 1.14-5.21mm, mean 2.8mm;
mesocarp weight 1.01-12.61g, mean 5.0g;

b) Seed characters: Length 14-36mm, mean 23.8mm;
circumference 22-35mm, mean 28.1mm;
weight 0.42g-2.12g, mean 1.22g

c) Fruit weight (Pericarp + seed) = 1.4-13.7g,
mean 6.2g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
81%	77%	88%

C. Seedling Vigour at Six months

Mean Plant Height cm	Mean Leaf Number
26.22	4

BORNO STATE

LGA - FIKA

23. FIKA TYPE

A. Fruit characteristics

a) Pericarp characters: Length 25-54mm, mean 31mm;
circumference 26-91mm, mean 47mm;
mesocarp thickness 1.2-5.3mm, mean 3.0mm;
mesocarp weight 0.64-5.71g, mean 2.8g;

b) Seed characters: Length 16-29mm, mean 21.6mm;
circumference 21-41mm, mean 31.6mm;
weight 0.67-1.96g, mean 1.16g.

c) Fruit weight (Pericarp + seed) = 1.1-9.8g,
mean 4.0g.

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
65%	62%	87%

C. Seedling Vigour at Six months

311950

Mean Plant Height cm	Mean Leaf Number
28.12	3

BORNO STATE
LGA - POTISKUM
24. POTISKUM TYPE

A. Fruit characteristics

a) Pericarp characters: Length 28-34mm, mean 31.3mm;
circumference 52-70mm, mean 62.3mm;
mesocarp thickness 2.2-5.5mm; mean 4.1mm;
mesocarp weight 2.7-5.9g; mean 4.3g.

b) Seed characters: Length 18-25mm, mean 20.7mm,
circumference 26-34mm, mean 30.3mm;
weight 0.8-1.29g, mean 1.03g.

c) Fruit weight (Pericarp + seed) = 3.4-7.0;
mean 5.3g

B. Seed germination and Leaf Emergence

Seed germination in one week	Leaf Emergence in one month	Leaf Emergence in two months
89%	66%	86%

C. Seedling Vigour at Six months

Mean Plant Height (cm)	Mean Leaf Number
24.9	3

V DISCUSSION

No recognised varieties of Date Palm exist in Nigeria. Consequently a group of palms randomly sampled at a single location was treated as a population sample for the purposes of this paper. Individual palms within the group were treated as subsamples of the population sample. It is assumed that the mean values of the variables evaluated in the population sample represent the mean values of a larger finite or infinite population at that location so long as the pollen sources within the population at that location remains unchanged. Each population was given a 'type' name representing the location at which the population was sampled. 'Type' deseriptions of fruit characteristics seed characteristics, seed germination, leaf emergence and seedling vigour at six months are shown in pages. 11-34

1. Kaduna State

Two types referred to as the Funtua type (page 11.) and Katsina type (page 12.) occur in Kaduna State. The Funtua type is large fruited type in comparison to the medium sized Katsina type. However, the Katsina type had higher seed germination and leaf emergence. The two types were similar in seedling vigour at six months of age.

2. Kano State

Much variation in fruit size exists among the types in Kano State. The nine recorded types were Zuga (page 13); Gamawa (page 14); Tsangaya (page 15); Panda (page 16); Guruduba (page 17); Duhuwa (page 18); Kila (page 19); Samamiya (Page 20); and Kangire (page 21). The Guruduba and Tsangaya types are large fruited types, whereas Zuga, Gamawa, Panda, Duhuwa, Samamiya and Kangire and medium sized. The Kila type is a small fruited type. The Tsangaya type had 95% germination in one week and 90% leaf emergence in two months. The Panda, Zuga, Kangire, Gamawa and Duhuwa types varied in germination from 81 to 67 percent. The Kila type had the lowest germination percentage (42%). The failure of the Samamiya type was mainly due to the few seeds that were available for germination tests. All types produced three leaves at six months of age except the Guruduba type which had four.

3. Bauchi State

Eleven types were recorded in Bauchi State. These were: Darazo (page 26); Shira (Page 32); Misau (Page 30); Tiffi (page 23); Kankiel (page 28); Gombe (page 22); Gabarin (page 27); Lago (Page 29); Miri (Page 24); Tirwin (Page 25) and Ajili (Page 31). medium fruit size types predominated in Bauchi State.

These types were: Shira, Misau, Tiffi, Konkiel, Gombe, Gabarin, Lago and Miri. The only large fruited type was Darazo while Tirwin and Ajili were small fruited. The medium and small fruited types had good germination, ranging from 48 to 91% whereas the large fruited Darazo type was slow in germination and gave only 31% germination in one week. Leaf emergence after two months was excellent for all types and ranged from 71% to 93%. The Lago, Miri and Ajili types had 3 leaves at 6 months of age, whereas all the other types had 4 leaves indicative of good seedling vigour.

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