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CHARACTERISTICS OF COCONUT TYPES IN ORISSA

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ABSTRACT

A survey was conducted in the coconut growing areas, Sakhigopal, Brahmagiri, Konark and Kakatpur of Puri districts, Orissa. Seventeen forms of tall and dwarf varieties were identified based on size, shape and colour of nuts. Characterization of forms was made base on the vegetative, reproductive and nut characters. Local strain Bana recorded to be superior yielder. Dhanei noted for more number of female flowers and Suryabana for dwarfness and ivory skin colour.

INTRODUCTION

Coconut is the most important plantation crop of coastal Orissa. In most of the areas tall variety like "Odissi Tall" or "Sakhigopal Tall" is found. Odissi Tall is a distinct member of the East Coast Tall group. This has probably been segregated form the rest of the East Coast Tall due to a long period of geographical isolation, segregation of characters through generations and consequent character stabilization and natural selection resulting in a separate type. Presently, we observed different forms under tall and dwarf with recognizable variation in growth, yield and nut characteristics. Through the study of these forms/ strains in the coconut growing area of Orissa, can provide the basic information regarding their productivity, nut quality.

MATERIALS AND METHODS

The different forms or types of Sakhigopal Local Tall/ Odissi Tall were identified by surveying (1995-98) palms in the coconut growing areas - Sakhigopal, Brahmagiri, Konark and Kakatpur (Puri district). The local types were identified based on variation in size, shape and colour of the nut. For collecting data on various characters, five competitive palms of each forms were selected. While selecting the palms maximum care has been taken in selecting the palm site by rejecting the palms grown near pond, moistl land or water logging area and near compost pit.

RESULTS AND DISCUSSION

During the survey 17 forms were identified based on size, shape and colour of nuts (Table-1). **Suryabana**, is a medium sized nut with whitish yellow/ ivory colour skin. having a small bole at the base. **Bangara**, a dwarf form with small to medium sized nut with green to light green colour. The name **Dhanei** denotes heavy compact bunches with more or less linear nuts arranged like a paddy ear head. It produces more number of nuts (more than 100) per bunch, where as **Ladhei** produces minimum number of nuts. **Ladhei** means fight, its importance is thick shell and being used for nut fighting competition during the festival "Gamha Purnima". The form **Bana** is tall type producing 80 nuts with green to brown colour skin having red streak and blotches on the skin. **Chaka and Gol** form recorded round nut with orange yellow/ green colour skin. **Chaka** denotes perfect round shape like football where as Gol is comparatively small and slightly elongated. **Mamuli, Local Yellow and Tinisira** identified based on their colour and shape, produce medium sized fruit. **Mamuli** means ordinary and the name **Tinisira** denotes triangular in shape as the nut has very prominent ridges. **Local Brown** was selected for its oval shape fruit with brown colour skin. **Goja** and **Narangi** were identified for elongated and pointed nut (Goja) and **Narangi** mean unique deep red skin colour. **Jahaji** (means the shape of ship or boat) and **Jahiji Yellow** recorded for their elongated oblong shape and big sized fruit. **Dhila** (means loose) has fibre content which are less compact producing bigger sized nut and **Odissi Giant** observed to be the biggest oval shaped nut.

VEGETATIVE CHARACTERS:

Leaf:

The total number of leaves on the crown during the observational period reveals that the highest leaves on the crown was recorded (32.4) in the local forms Bana type, followed by Local Brown (32.2), where as minimum number of leaves was observed in Suryabana (24.2) (Table-1).

Table 1. Characteristics of Local strains of forms of Orissa Coconut

Characters	Local forms/ strains								
	Suryabana	Bangera	Dhanei	Ladhei	Bana	Chaka	Mamuli	Tinisira	Local yellow
A. General									
1 Habit	Semi dwarf	Dwarf	Tall	Tall	Tall	Tall	Tall	Tall	Tall
2 Crown shape	Spherical	Erect	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical
3 Total leaves (nos)	24.2	25.4	28.2	28.6	32.4	28.5	30.4	28.2	29.5
4 Leaves per year	10.2	9.2	12.5	11.0	14.7	12.5	10.8	12.2	11.2
5 Leaf length (m)	3.4	2.5	3.5	3.4	3.8	3.2	3.8	3.8	3.5
6 Leaf breadth (m)	2.2	1.8	2.0	2.2	2.3	2.3	1.9	2.2	2.0
7 Petiole length (m)	1.2	0.95	1.1	1.2	0.96	0.87	1.06	1.1	0.97
8 Trunk girth (cm)	86.2	32.6	91.4	120.3	83.4	83.8	110.2	120.3	89.7
9 Age of first flowering (years)	6.	4.	6	7	6	7	7	7	8
10 Age of first harvest	7	5	7	10	7	8	9	8	10
B. Reproductive									
1 Length of inflorescence (cm)	30.3	38.4	65.2	46.8	52.2	56.3	65.4	48.4	68.2
2 Stalk length	8.8	12.2	22.3	21.7	26.8	28.3	25.6	16.7	23.4
3 Spikelet length (cm)	25.3	28.3	30.4	26.6	34.3	30.4	35.1	38.3	31.0
4 Nos. of Spikelet	30.8	21.4	34.8	28.4	27.6	28.6	38.6	33.4	39.2
5 Nos. of female flower	12.8	15.6	98.8	8.8	28.2	24.4	23.4	24.2	28.2
6 No. of inflorescence per year	10.2	9.1	9.3	8.1	13.2	11.6	10.3	12.4	10.1
7 Length of male phase (days)	14	14	19	22	21	22	21	24	21
8 Length of female phase (days)	4.4	5.4	9.4	4.6	8.4	8.2	5.2	5.4	9.2
9 Gap between male & female phase (days)	-	-	2	2	3	2	1	2	2

	Gol	Local Brown	Goja	Narangi	Jahaji	Jahaji Yellow	Dhila	Odissi Giant
A. General								
1 Habit	Tall	Tall	Tall	Tall	Tall	Tall	Tall	Tall
2 Crown shape	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical
3 Total leaves (nos)	34.0	32.2	27.5	28.3	32.1	30.2	31.0	28.2
4 Leaves per year	12.0	13.1	11.2	10.3	15.1	11.5	14.1	11.1
5 Leaf length (m)	3.3	3.6	3.4	3.6	4.5	4.5	4.3	4.3
6 Leaf breadth (m)	2.2	2.1	2.2	2.3	2.2	2.0	2.3	2.3
7 Petiole length (m)	1.0	0.94	1.2	1.2	1.1	0.98	1.1	1.0
8 Trunk girth (cm)	8.2	100.2	100.4	100.6	170.4	130.3	86.5	83.6
9 Age of first flowering (years)	6	7	7	6	8	9	7	7
10 Age of first harvest	7	8	9	8	9	10	9	9
B. Reproductive								
1 Length of inflorescence (cm)	79.5	66.4	38.3	54.2	64.6	68.3	38.4	70.0
2 Stalk length	39.3	19.5	25.3	20.8	24.5	26.4	25.3	20.4
3 Spikelet length (cm)	33.4	28.1	36.2	33.2	34.1	38.3	28.2	28.4
4 Nos. of Spikelet	37.5	42.2	18.1	24.4	41.2	38.2	27.4	25.2
5 Nos. of female flower	21.5	26.4	18.2	22.4	26.2	22.2	16.2	11.4
6 No. of inflorescence per year	10.3	10.1	9.6	10.5	12.1	10.4	9.2	7.4
7 Length of male phase (days)	21.0	21	17	21	22	21	22	22
8 Length of female phase (days)	8.0	9.2	5.4	5.2	8.4	7.2	7.2	7.4
9 Gap between male & female phase (days)	3	2	2	4	1	1	1	1

Jahaji showed maximum number of leaves produced per year (15.1) followed by Bana (14.7) and Dhila (14.1) where as Bangera produced less number of leaves (9.2). The remaining local forms recorded between 10.2 to 13.1 number of leaves during the observational period.

Maximum leaf length (4.5m) was recorded in Jahaji and Jahaji Yellow, followed by Dhila and Odissi Giant (4.3m), where as maximum leaf breadth (2.3m) was recorded in Bana, Dhila, Odisi Giant and Narangi.

The petiole length ranged between 0.87 and 1.2m. The maximum petiole length was noticed in Goja, Narangi, where as shortest length recorded in Chaka.

REPRODUCTIVE CHARACTERS:

The strains like Bangera took 4 years for flowering, where as other tall strains flowered at the age of 6-8 years and first harvest was recorded at the age of 7-10 years (Table-1).

Inflorescence:

The inflorescence length varied from 30.3 to 79.5cm in Suryabana and Gol. Maximum stalk length was recorded in strain Gol (39.3cm) and minimum in Suryabana (8.8cm). More number of spikelet was observed in Local Brown (42.2) followed by Jahaji (41.2) and Local yellow (39.2) where as least number of spikelet was recorded in Goja (18.4).

Dhanei recorded higher number of female flowers (98.8) per inflorescence followed by Bana (28.2). The minimum number of female flowers was observed in strains like Ladhei (8.8), Odissi Giant (11.4), Surya (12.8) and Bangera (15.6).

Highest number of inflorescence produced per year was recorded in Bana (13.2) followed by Tinisira (12.4), Jahaji (12.1), where as lowest number of inflorescence was produced by Odissi Giant (7.4) followed by Ladhei (8.1), Bangera (9.1) and Dhila (9.2).

Male phase:

The male phase lasted for 14 days in strains like Suryabana and Bangera; 17 days in Goja; 19 days in Dhanei; 21 days in Bana, Mamuli, Local Yellow, Gol, Local Brown, Narangi, Jahaji Yellow; 22 days in Ladhei, Chaka, Jahaji, Dhila and Odisssi Giant and 24 days in Tinisira.

NUT CHARACTER:

Length and Circumference of nut:

Jahaji record maximum length of nut (35.5 cm) followed by Odissi Giant (34cm), Jahaji yellow and Dhila and minimum length (20.0 cm) was recorded in Bangera (Table-2).

Maximum circumference of nut was recorded in Odissi giant (61 cm) followed by Chaka, Dhial and Bana. Minimum circumference was recorded in Bangera (32cm).

Nut weight:

Odissi Giant (1900g) followed by Dhila (1800g), Local Brown, Bana and Tinisira recordwed highest nut weight, where as Dhila (860g) and Odissi Giant (780g) recorded maximum husked nut weight. The least weight was recorded in Dhanei (360g) and Goja (400g).

Husk:

Maximum husk weight was recorded in Odissi giant (1115g, 58.5 per cent of fruit) followed by Dhila (940g, 52.2%), Jahaji (690g, 57.5%). Minimum husk weight was recorded in Bangera (260g), followed by Dhanei (280g), Bana recorded lowest husk per cent being 36.9%.

Dhila recorded maximum husked nut length (17.3cm) flowed by Odissi Giant (16.5cm), Suryabana and Jahaji Yellow where as minimum nut length was recorded in Mamuli (10.8cm).

Dhial and Mamuli recorded maximum nut circumference (32.2cm) and Tinisira, the least circumference (23.3cm).

Shape of nut:

Among the local types, Suryabana, Ladhei, Jahaji Yellow, Odissi Giant produced egg shaped nut. Bangera, Goja and Narangi recorded pointed nut. Dhanei and Jahaji produced flat nut. Chaka, Local Yellow, Local Brown, Gol and Dhial produced round shaped nut. Elongated nuts were found in Bana and Tinisira.

Kernel weight:

Maximum kernel weight was recorded in the bigger sized nut. Dhila recorded maximum kernel weight (390g) followed by Chaka (350g), Bana and Odissi Giant (340g). Minimum kernel content was recorded in Dhanei (170g). Among the local forms, Chaka recorded maximum percentage of kernel over total fruit (32.8%) followed by Narangi (28.8%), Bana (27.9%) and the minimum

Table 2. Characteristics of local strains of forms of Orissa Coconut

Character	Local strains/ forms								
	Suryabana	Bangera	Dhanei	Ladhei	Bana	Chaka	Mamuli	Tinisira	Local Yellow
C. Harvest data									
1 No. bunches harvested	7.2	6.8	5.4	4.6	8.8	8.2	8.2	8.6	8.2
2 Nos. bunch without nut	-	1	3	1	2	1	1	-	-
3 Nos. of nuts/ bunch	7.4	6.4	66.2	4.4	13.6	8.0	8.4	8.2	7.6
4 Nuts harvested per palm	52.2	43.6	124.0	12.6	91.6	57.0	59.0	70.0	61.0
D. Nut Character									
1 Fruit colour	Light yellow	Green	Green	Green	Green	Orange yellow	Green	Green	Yellow
2 Fruit shape	Oval	Oval	elongated	Oval	Oval	Round	Oval	Triangular	Triangular
3 Fruit length	24.1	20.0	25.1	24.2	28.2	25.1	25.5	26.1	28.0
4 Circumference of fruit	47.5	32.0	35.8	35.0	59.0	60.0	51.3	51.0	53.0
5 Weight of fruit (kg)	1.0	0.7	0.58	0.8	1.22	1.06	1.09	1.2	1.0
6 Wt. Of husked nut (kg)	0.53	0.44	0.36	0.45	0.78	0.63	0.56	0.63	0.54
7 Husk weight (kg)	0.47	0.26	0.28	0.38	0.44	0.43	0.53	0.57	0.46
8 Husk %	47.0	37.1	48.3	43.7	36.0	40.4	48.6	47.5	46.0
9 Shape of husked nut	Egg	Pointed	Round flat	Elongated	Round	Flat	Elongated	Round	Round
10 Kernel thickness (mm)	13	10	10	12	12	10	12	13	12
11 Wt. Of kernel (g)	260	180	170	175	340	350	240	280	280
12 % of kernel to total fruit	26	25.7	20.3	18.7	27.9	32.8	22.0	23.3	23
13 Shell thickness (mm)	3	3	2	4.5	2	3	3	3	3
	Gol	Local Brown	Goja	Narangi	Jahaji	Jahaji Yellow	Dhila	Odissi Giant	
C. Harvest data									
1 No. bunches harvested	8.4	9.0	7.0	8.0	8.6	7.0	4.4	5.0	
2 Nos. bunch without nut	-	2.0	2.0	1.0	2.0	-	-	-	
3 Nos. of nuts/ bunch	8.1	12.0	8.0	7.0	6.8	7.4	7.0	8.2	
4 Nuts harvested per palm	67.8	84.0	38.0	49.0	51.4	51.8	30.0	40.4	
D. Nut Character									
1 Fruit colour	Green	Brown	Green	Merum	Green	Yellow	Green	Green	
2 Fruit shape	Round	Oval	Elongated	Elongated	Elongated	Elongated	Oval	Elongated	
3 Fruit length	23.2	25.9	29.1	26.0	35.5	33.5	31.0	34.0	
4 Circumference of fruit	53.2	50.0	41.0	40.0	51.0	48.5	60.0	61.0	
5 Weight of fruit (kg)	1.19	1.27	0.69	0.66	1.2	1.12	1.8	1.9	
6 Wt. Of husked nut (kg)	0.63	0.67	0.40	0.50	0.51	0.45	0.86	0.78	
7 Husk weight (kg)	0.48	0.61	0.29	0.26	0.69	0.67	0.94	1.12	
8 Husk %	43.3	48	42	39.4	57.5	59.8	52.2	58.7	
9 Shape of husked nut	Round	Round	Round	Pointed	Pointed	Flat	Egg	Round	
10 Kernel thickness (mm)	13	13	13	10	10	10	12	12	
11 Wt. Of kernel (g)	300	290	180	190	240	200	390	340	
12 % of kernel to total fruit	27	22.8	26.1	28.8	20.0	17.9	21.7	17.9	
13 Shell thickness (mm)	3	3	3	3	3	2	3	3	

per cent of kernel over fruit weight was recorded in heavy nuts like –Odissi Giant, Jahaji Yellow (17.9%)>

YIELD ATTRIBUTING CHARACTERS;

Bunch:

Maximum bunches were harvested form the strain Bana (8.8) followed by Tinisira (8.2) and minimum bunches recorded in Ladhei. Highest number of nut per bunch (66.2) was recorded in Dhanei followed by Bana (13.6).

Nut Yield:

Maximum nut yield per palm was recorded in strains like Dhanei (124) followed by Bana (91.6), Tinisira (70.0), Local Yellow (61.0), where as minimum nut yield was recorded in Ladhei (12.6) followed by Bangera (43.6).

GROUPING OF LOCAL FORMS:

Based on fruit weight, nut weight, husk and kernel per cent, the local forms were grouped into 7 categories (Table-3). The local forms/ strains are grouped based on characters as given below:

Group-I Small fruits with low kernel; eg. Dhanei, Ladhei and Bangera

Group-II Small fruits with high kernel; eg. Narangi and Goja

Group-III Medium fruit with high husk and low kernel; eg. Jahaji and Jahaji Yellow

Group-IV Medium fruit with low husk and high kernel; eg. Chaka, Suraybana, Gol

Group-V Medium sized fruit with large sized nut having low husk and high kernel; eg. Bana

Group-VI Medium sized fruit and nut with moderate husk & Kernel; eg. Mamuli, Tinisira, Local Yellow and Local Brown

Group-VII Large sized fruit and nut with high husk and low kernel; eg. Dhial and Odissi Giant

Among these local strains surveyed and studied, the strain Bana was found to be superior followed by Local Brown, Tinisira, Gol, Local yellow. Chaka, Suryabana, Narangi, Goja, Jahaji , Jahaji Yellow, Dhila and Odissi Giant.

Table 3. Groups of local forms/strains

Group	Characters	Wt. Of fruit (g)	Weight of nut (g)	Husk %	Kernel %	Yield	Forms
I	Small fruit and nut, low to medium husk	<900	300-500	<50	<25	Poor to good	Ladhei, Dganei, Bangera
II	Small fruit and nut, low to moderate husk, and high kernel	<900	300-500	50	<25	Moderate	Narangi, Goja
III	Medium fruit, and low kernel nut with high husk	900-1300	300-500	>50	<20	Moderate	Jahaji, Jahaji Yellow
IV	Medium fruit and nut, low to moderate husk, high kernel	900-1300	500-700	<40	>25	Poor to moderate	Suryabana, Chaka, Gol
V	Medium fruit, large nut with low husk and high kernel	900-1300	>700	<40	>25	Good	Bana
VI	Medium fruit and nut, moderate husk, and kernel	900-1300	500-700	40-50	20-25	Moderate	Mamuli, Tinisira, Local Yellow and Local Brown
VII	Large fruit and nut, high husk and low kernel	>1300	>700	>50	<20	Poor	Dhila, Odissi Giant

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