

Evaluation of Released Cashew Varieties under Odisha Condition

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Abstract

In order to address the challenge of poor nut yield of present cashew plantations in India, a trial consists of twenty five released varieties of cashew from different parts of India was laid out during 2008 under RBD with two replications having six plants treatment⁻¹. The results recorded over two years namely 2013 and 2014 revealed significant variations among the varieties for vegetative growth, nut yield attributing parameters and nut yield. The cashew varieties such as Amrutha, BPP-4, Madakathara-2, K-22-1, VRI-3, Ullal-4, UN-50 and Goa-1 were identified for dwarf plant architecture, due to their cumulative plant height (2.58 to 4.05 m) and canopy spread area (7.78 to 16.67 m²) at 6th and 7th year of planting, which need further evaluation. Similarly, both Priyanka and Dhana can be exploited for cashew apple processing purpose due to their large and heavy cashew apples (68.00 to 76.50 g). The shelling % demonstrated by majority of the varieties was within the acceptable International Standard of more than 28.00%. The cashew varieties namely BPP-8, Vengurla-7, Bhaskara, NRCC Sel-2, Ullal-3, Kanaka, Vengurla-4, Bhubaneswar-1, VRI-3 and Dhana combined two or three traits which were significantly different from rest of the varieties evaluated. However, cashew varieties such as BPP-8, Vengurla-7, Bhaskara, NRCC Sel-2 and Ullal-3 seem outstanding for most of the parameters considered namely trunk girth (34.73-54.40 cm), canopy spread area (12.06-37.73 m²), nut weight (7.45-10.10 g), nut yield plant⁻¹ (4.00-6.05 k) and cumulative nut yield (8.011.86 k plant⁻¹) at 7th year of planting.

1. Introduction

Cashew (*Anacardium occidentale* L.) treated as “Wonder nut of the World” is native to Brazil having about 75 genera and 700 species. Although cashew was introduced to India by Portuguese as a crop of afforestation and soil conservation purpose, but later on the crop was exploited commercially due to its versatile uses. Though, India rank 1st in production, processing and export of kernel in the world, however, productivity of existing cashew plantation is very poor, hardly 722 k ha⁻¹ (Saroj et al., 2014). The leading states of cashew production in India includes Maharastra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal etc. Maharashtra is the largest producer of cashew nuts among Indian states, accounting for 33% of cashew nut production in India followed by Andhra Pradesh (17%) and Odisha (15%) during 2011-12 (Saroj et al., 2014). Among the several factor influence the cashew productivity in the country as well as state of Odisha, use of traditional varieties of low

yield potential, lack of production and protection technologies etc. are the major causes. Even new plantation of cashew with high yielding varieties/hybrids, the low productivity is contributed by improper planting density as well as nutrient management practices. In India, usually cashew is grown as a rainfed crop, cultivated in neglected land which otherwise unsuitable for any other crop (Rejani and Yadukumar, 2010). Use of traditional varieties having low yield potential, lack of production and protection technologies etc. are some of the factors that influence the cashew productivity in the country as well as Odisha. Therefore, the low production and productivity problems of cashew can be addressed effectively by planting of superior cashew varieties with high yield potential under proper package of practices. The research paper presents the findings of a study, aimed at evaluating the potential yield of twenty five released varieties of cashew developed at different Cashew Research Stations of the country, their shelling % and tree architecture (canopy area) under the agro-climatic



conditions of Odisha, India.

2. Materials and Methods

A multi-locational released varietal trial of cashew was carried out at Cashew Research Station, Ransinghpur, Bhubaneswar under All India Coordinated Research Project on Cashew of Orissa University of Agriculture and Technology, Odisha, India (latitude 20° 45" N, longitude 86° 10" E and altitude 60 m) during 2008 to 2014. The soil of the experimental plot was red lateritic in texture with pH of 4.8. Twenty five released cashew varieties developed by different Cashew Research Stations of the country were used in the study by adopting Randomized Block Design (RBD), replicated twice having six plants treatment⁻¹. The details of source of cashew varieties are presented in (Table 1). The grafted plants of desirable cashew varieties were transplanted during 2008 with a normal spacing of 7.0×7.0 m² by adopting the recommended package of practices. The nut yield was recorded on individual tree basis from 2011 to 2014 commencing from last week of March to May. The vegetative growth parameters such as tree height, tree trunk girth, canopy spread (both N-S and E-W direction) were recorded every year, however, presented only for 2013 and 2014 in this paper. Similarly, nut yield attributing parameters such as average nut weight, nuts panicle⁻¹, nuts m⁻² and flowering laterals m⁻² were recorded and calculated by

adopting standard procedures. Canopy spread was estimated by computing the average of the radius of the canopy measuring from (both N-S and E-W direction) in the formula πr^2 where, $\pi=3.142$ and r =radius of canopy. The shelling % was calculated using the formula Shelling %=(KWt/NtWt)×100, where KWt= kernel weight and NWt=Nut weight. Nut weight and kernel weight were recorded during each year and the mean was used in the analysis of data. Similarly, nut yield tree⁻¹ was calculated by adding the total individual nut yield harvested each time. Statistical analysis of all the recorded data were done by adopting the standard procedure suggested by Panse and Sukhatme (1978).

3. Results and Discussion

3.1. Vegetative growth attributing parameters

Statistical analysis of important vegetative growth parameters such as tree height, trunk girth, canopy spread in both North-South and East-West directions and canopy spread area among the tested cashew varieties indicated significant variations during the year, 2013 and 2014 (Table 2). These variations on vegetative growth parameters were expected due to diverse genotypes included in the present investigation. The tree height varies from 2.58 m (Ullal-4) to 4.08 m (Kanaka) during 2013 while 3.03 m (VRI-3) to 4.43 m (BPP-8) during 2014, respectively. The results also indicated dwarf tree height with cashew variety, K-22-1 (3.11 to 3.28 m), VRI-3 (2.74 to 3.09 m) and Ullal-4 (2.58 to 3.98 m) during both the years of observations which may be useful for high density planting system in future, after proper evaluation.

Similarly, the tree trunk girth varies from 24.17 cm in Ullal-4 to 46.58 cm in BPP-8 during 2013 while 37.53 cm in Amrutha to 57.33 cm in Jhargram-1 during 2014, respectively. The results also indicated that during both the years of study, significantly higher tree trunk girth were observed in cashew varieties such as BPP-8, Chintamani-1, Jhargram-1, Dhana and Kanaka and were statistically at par with the highest value for respective years of observations.

The results on canopy spread in both North-South and East-West directions as well as canopy spread cover also showed significant variations among the varieties. These parameters are very important for canopy management and to evaluate the variety (s) suitable for high density planting system in cashew. The canopy spread in East-West direction ranges from 3.0 cm (Amrutha) to 5.32 cm (BPP-8 and Chintamani-1) during 2014 as well as 3.53 cm (Amrutha) to 6.55 cm (Vengurla-7) during 2014, respectively. Similarly, the canopy spread in North-South direction ranges from 3.24 cm (Amrutha) to 5.44 cm (Dhana) during 2013 while 2.4 cm (BPP-4) to 6.75 cm (Vengurla-7) during 2014, respectively.

Table 1: Details of sources of cashew varieties used in the study

Sl. no.	Name of cashew types	Source
1.	BPP-4, BPP-6, BPP-8	Bapatla, Andhra Pradesh
2.	Bhubaneswar-1	CRS, Bhubaneswar
3.	Chintamani-1, Ullal-1, Ullal-3, Ullal-4	Hogalagare, Karnataka
4.	Jhargram-1	CRS, Jhargram, West Bengal
5.	Madakkathara-1, Madakkathara-2, K-22-1, Dhana, Kanaka, Priyanka, Amrutha, UN-50	CRS, Madakkathara, Kerala
6.	Vengurla-1, Vengurla-4, Vengurla-6, Vengurla-7	RFRS, Vengurla, Maharashtra
7.	VRI-3	RRS, Vridhachalam, Tamil Nadu
8.	Bhaskara, NRCC Sel-2	DCR, Puttur, Karnataka
9.	Goa-1	CRS, Goa



Table 2: Vegetative growth attributing parameters of different cashew varieties under Odisha condition

Cashew types	Tree height (m)		Trunk girth (cm)		Canopy spread (m)				Canopy spread area (m ²)	
					East-West		North -South			
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
BPP-4	3.24	3.32	35.33	45.25	4.03	4.56	2.41	3.26	11.57	16.67
BPP-6	3.68	3.83	36.42	46.70	4.59	4.77	4.50	5.13	16.19	19.22
BPP-8	3.77	4.43	46.58	51.25	5.32	6.41	5.32	6.28	22.19	31.72
Bhubaneswar-1	3.11	3.97	37.08	48.05	3.82	4.83	3.89	4.92	11.69	18.62
Chintamani-1	3.80	4.13	45.83	51.08	5.32	5.68	5.42	6.13	22.63	27.37
Jhargram-1	3.90	4.13	45.58	57.33	5.18	6.14	5.24	6.37	21.52	30.85
Madakkathara-1	3.69	3.72	41.27	50.35	3.94	4.60	3.72	4.81	11.54	17.38
Madakkathara-2	3.39	3.47	39.40	40.50	3.23	3.75	3.54	4.03	9.22	11.88
K-22-1	3.11	3.28	37.80	41.60	3.88	4.14	3.94	4.64	12.17	15.10
Dhana	3.72	4.04	45.02	54.50	5.02	5.96	5.44	6.51	21.47	30.56
Kanaka	4.08	4.25	42.30	53.25	4.39	5.04	4.54	4.90	15.67	19.38
Priyanka	3.15	3.70	34.83	45.82	4.26	5.19	4.39	5.74	14.68	23.43
Amrutha	2.67	3.44	28.40	37.53	3.01	3.53	3.24	3.87	7.87	10.87
Vengurla-1	3.36	3.60	41.63	45.88	5.19	5.26	4.89	5.60	19.93	23.15
Vengurla-4	3.20	3.79	34.13	48.33	3.88	5.34	3.88	4.83	11.92	20.45
Vengurla-6	3.07	4.09	34.75	44.30	3.35	5.01	3.43	5.50	9.06	21.70
Vengurla-7	3.28	4.18	38.08	54.40	3.88	6.55	3.94	6.75	12.06	34.73
VRI-3	2.74	3.09	35.10	40.00	3.65	4.54	4.00	4.45	11.48	15.87
NRCC Sel-2	3.58	3.93	39.75	47.17	4.55	5.72	4.04	5.06	14.50	22.82
Ullal-1	3.82	3.92	42.10	50.00	4.85	5.40	5.21	5.82	19.87	24.74
Ullal-3	3.63	3.84	34.73	40.67	4.52	5.34	4.34	4.96	15.51	20.84
Ullal-4	2.58	3.98	24.17	45.38	3.05	4.16	3.15	4.20	7.78	14.24
UN-50	3.84	4.05	40.40	41.67	3.74	4.12	3.89	4.13	11.40	13.47
Goa-1	3.05	3.27	36.63	39.35	3.53	4.10	3.55	4.38	10.01	14.16
Bhaskara	3.59	4.09	42.83	51.54	4.35	5.80	4.34	5.49	15.01	25.02
SEm±	0.18	0.11	2.88	2.35	0.33	0.29	0.34	0.59	2.03	2.12
CD (<i>p</i> =0.05)	0.53	0.31	8.41	6.87	0.98	0.85	1.01	1.72	5.95	6.18

Generally, cashew produces flowers at the peripheries of the canopy and as such early canopy merger affects cashew nut yield. Therefore, genotypes with large canopy may require larger plant spacing. The results of the years, 2013 and 2014 clearly indicated that significantly cumulative lower canopy spread were recorded in varieties namely BPP-4, Madkathara-2, K-22-1, VRI-3, Ullal-4, UN-50 and Goa-1 (7.78-12.27 m² and 10.87-16.67 m²) at 6th and 7th year of planting. It can be concluded that all these varieties may be evaluated further to study their suitability in high density planting system or for their use in future breeding programmes. On the other hand, the results revealed significantly higher canopy area with the varieties such as Jhargram-1 (21.52 and 30.85 m²) and Dhana (21.47 and 30.56 m²), which were statistically at par with

highest canopy area of Chintamani-1 (22.63 m²) as well as Vengurla- 7 (34.78 cm) during 2013 and 2014, respectively.

3.2. Nut yield attributing parameters

During both the years of observations, the average nut weight, nuts panicle⁻¹ as well as nuts m⁻² area showed significant variations among the tested cashew varieties (Table 3 and 4), indicating the genetic potential of the varieties. The average nut weight varies from 5.60 g and 4.70 g (BPP6) to 10.10 g (Vengurla-7) and 8.75 g (Priyanka) during 2013 and 2014, respectively. Significantly maximum nut weight of 10.10 g (Vengurla-7) and 8.75 g (Priyanka) was recorded than rest of tested varieties during 2013 and 2014, respectively. The varieties such as Priyanka, Ullal-3 and Ullal-4 during 2013



while BPP-8, Madkathara-2, Dhana, Amrutha, Vengurla-1, Vengurla-4, Vengurla-6, Vengurla-7, Ullal-1, Ullal-4 and UN-50 during 2014 recorded significantly higher nut weight than rest of the varieties and were statistically at par with

Table 3: Nut yield attributing parameters of different cashew varieties under Odisha condition

Cashew types	Flowering laterals m ⁻²		Nuts panicle ⁻¹		Apple weight (g)		Shelling %	
	2013	2014	2013	2014	2013	2014	2013	2014
BPP-4	12.83	18	2.8	5.5	43	33	25.09	25.75
BPP-6	9.53	15.25	2.7	6.5	33	34	26.6	26.8
BPP-8	14.66	19	4	5.5	62	69.5	29.43	28.9
Bhuba neswar-1	14.92	18.88	4	6.5	45	34.5	30.77	30.68
Chintamani-1	16.2	19.13	3.4	3.5	31	34	30.22	30.15
Jhargram-1	20.16	23.5	1	1.5	50	59.5	28.69	28.4
Madakathara-1	15.67	18.25	3.3	5.5	50	36	27	28.6
Madakathara-2	15.25	15.63	4.55	4.5	52.5	43	27.82	28.25
K-22-1	14.2	15.5	2.97	5.5	53	47.5	26.57	29.5
Dhana	14.2	16.88	2	5	74	68	30.56	29.85
Kanaka	14.37	18.13	3.05	2.5	59	51.5	30.31	29.9
Priyanka	11	19.75	2.35	2.5	75.75	76.5	27.13	27.95
Amrutha	12.48	20.25	3	4.5	38.75	52.5	30.31	30.8
Vengurla-1	14.83	18.25	3.15	4.5	34.65	49.5	29.71	29.85
Vengurla-4	16.95	14.13	3.15	5.5	53	41.5	30.28	29.69
Vengurla-6	11.9	17.75	3	4	58	49	27.98	29.5
Vengurla-7	11.58	19.25	3.35	5.5	58	33	30.35	30.2
VRI-3	16.85	23.8	2.9	4.5	34	24	29.79	29.4
NRCC Sel-2	16.74	20.63	2.5	5.5	51	33	29.65	30.7
Ullal-1	12.3	18.63	3.1	3.5	45	39.5	29.73	29.8
Ullal-3	10.26	16.75	3.1	2	53	63	29.4	29.65
Ullal-4	8.88	13.13	2.5	3.5	49	56	30.22	30.85
UN-50	13.81	18.5	1.35	3.5	66.25	52.5	31.09	29.87
Goa-1	13.31	19.25	4	5.5	61.5	49.5	31.60	30.55
Bhaskara	15.62	18.13	3.15	6.5	63	46	30.45	29.85
SEm±	0.82	1.72	0.31	0.47	4.22	3.13	0.72	0.53
CD (p=0.05)	2.04	5.01	0.91	1.38	12.33	9.13	2.11	1.54

respective highest values in each year. In cashew, it has been established that the nut weight is highly influenced genetically and environmentally. Manoj et al. (1993); Abdul Salam (1998) reported the variations in nut weight of among cashew types. According to Dorajeerao (1998), cashew the nut weight is a varietal character and was negatively associated with number of nuts panicle⁻¹.

Flowering laterals m⁻² area is another important character contribute towards the nut yield in cashew (Parameswaran et al., 1984). The present study indicated significant variations among the varieties ranging from 8.88 and 13.13 (Ullal-4) to 20.16 (Jhargram-1) and 23.80 (VRI-3) during 2013 and 2014, respectively. Although no statistically parity was observed during 2013 for flowering laterals m⁻², but the varieties such as BPP-8, Bhubaneswar-1, Chintamani-1, Jhargram-1, Priyanka, NRCC Sel-2 and Goa-1 were statistically at par with VRI-3

Table 4: Effect of nut weight and nut yield in different cashew varieties under Odisha condition

Cashew types	Nut weight (g)		nut yield plant ⁻¹		Cumulative nut yield (kg tree ⁻¹) at 4 th harvest		Cumulative nut yield (kg ha ⁻¹) at 4 th harvest
	2013	2014	2013	2014	2013	2014	
BPP-4	8.3	6.2	1	3.33	1.9	5.23	1067.35
BPP-6	5.6	4.7	0.8	2.76	1.27	4.03	822.45
BPP-8	8.7	7.7	4.03	6	5.86	11.86	2420.41
Bhuba neswar-1	6.8	6	1.68	3.97	3.15	7.12	1453.06
Chintamani-1	7.8	6.8	1.48	2.6	2.07	4.67	953.06
Jhargram-1	6.3	6.4	0.73	1.96	1.29	3.25	663.27
Madakathara-1	7.1	5.7	1.37	4.1	2.38	6.48	1322.45
Madakathara-2	7.25	7.8	1.11	1.46	1.57	3.03	618.37
K-22-1	7.4	6.7	0.95	2.27	1.73	4	816.33
Dhana	8.9	7.8	1.67	4.6	2.68	7.28	1485.71
Kanaka	6.3	6.15	1.79	3.8	3.36	7.16	1461.22
Priyanka	10	8.75	1.55	1.51	2.64	4.15	846.94
Amrutha	6.65	8	0.92	1.3	1.77	3.07	626.53
Vengurla-1	7.6	8.3	1.33	1.71	2.25	3.96	808.16
Vengurla-4	8.7	7.65	1.68	4.3	3.38	7.68	1567.35

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Cashew types	Nut weight (g)		nut yield plant ⁻¹		Cumulative nut yield (kg tree ⁻¹) at 4 th harvest		Cumulative nut yield (kg ha ⁻¹) at 4 th harvest
	2013	2014	2013	2014	2013	2014	
Vengurla-6	9.1	7.9	1.35	2.68	2.52	5.2	1061.22
Vengurla-7	10.1	8.5	3.47	6.05	4.27	10.32	2106.12
VRI-3	7.1	6.6	1.32	4.6	3.2	7.8	1591.84
NRCC Sel-2	8.7	7.9	2.095	5.15	3.66	8.81	1797.96
Ullal-1	7	8.1	1.13	2.44	1.78	4.22	861.22
Ullal-3	9.4	7.3	3.165	4	4.04	8.04	1640.82
Ullal-4	9.3	7.8	0.7	2.13	1.6	3.73	761.22
UN-50	8.75	8.2	1.095	2.18	1.85	4.03	822.45
Goa-1	7.6	6.5	1.375	2.43	2.82	5.25	1071.43
Bhaskara	7.45	6.9	2.425	5.25	4.6	9.85	2010.20
SEM±	0.27	0.4	0.42	0.32	-	-	-
CD (p=0.05)	0.8	1.17	1.25	0.94	-	-	-

during 2014. Similarly higher flowering laterals m⁻² was also reported by Dorajeerao et al. (2002).

In cashew nuts panicle⁻¹ has +ve correlation with nut yield (Anitha et al., 1991; Manoj et al., 1994). The result of present study indicated that wide variations with nuts panicle⁻¹ ranging from minimum of 1.00 and 1.50 in variety Jharagram-1 to maximum of 4.55 in variety Madakkathara-2 and 6.50 in BPP-6, Bhubaneswar-1, Bhaskara during 2013 and 2014 respectively. During both the two years of study, the cashew varieties such as BPP-8, Bhubaneswar-1 and Goa-1 recorded significantly higher nuts panicle⁻¹ and were statistically at par with the highest value of 4.55 in Madakkathara-2 while BPP-6, Bhubaneswar-1 and Bhaskara during 2014 respectively. Hence these varieties should be used in further breeding programme.

The average weight of cashew apple recorded in the present study also indicates significant variations among the genotypes. The average apple weight varies from 31.00 g in variety, Chintamani-1 to 75.75 g in variety, Priyanka during 2013 while that of 24.00 g in VRI-3 to maximum of 76.50 g in Priyanka during 2014. Considering the heavier apple weight of both the years both Priyanka and Dhana were identified as better varieties may be useful for processing industries, which need further studies in this aspect in future. Sena et al. (1995) also reported the variation in cashew apple weight.

3.3. Shelling %

The result observed from two years data showed significant difference among the released cashew varieties (Table 3). This ranged from 25.09% (BPP-4) to 31.60% (Bhaskara) during 2013 while 25.75% (BPP-4) to 30.85% (Ullal-4) during 2014. The observed difference could be exploited for further breeding programmes. Further, the results for the both the years showed that most of the varieties approached 30 shelling % except the varieties like BPP-4, BPP-6, Madakkathara-1 and Priyanka (25.42% to 27.80%), which produced low % shelling. In cashew, the clones which produce more than 30% shelling could be used as potential breeding parent to improve upon shelling % of some high yielding clones with low shelling % through hybridization programme of cashew.

Statistical analysis of the nut yield plant⁻¹ (kg) of the twenty five tested cashew varieties over a period of two years indicated significant difference in nut yield (Table 4). Comparatively low nut yields of the present study was primarily due to the early bearing stage of the crop, which of course showing increasing trend when compared the nut yield of 2013 with 2014. During 2013, the average nut yield plant⁻¹ (kg) varies from 0.7 (Ullal-4) to 4.03 (BPP-8) while 1.30 (Amrutha) to 6.05 (Vengurla-7) during 2014. However, during both the years, the variety BPP-8 and Vengurla-7 recorded significantly maximum nut yield plant⁻¹ than rest of the varieties. The study also showed that the varieties such as BPP-8, Vengurla-7, Ullal-3 recorded average nut yield of more than 3 kg plant⁻¹ year⁻¹ during 2013 while BPP-8, Vengurla-7, NRCC Sel.-2 and Bhaskara recorded more than 5 kg yield plant⁻¹. Hence these varieties have the potential for producing higher nut yield than rest of the varieties. The overall yield performance of the varieties also indicated that the varieties such as BPP-8, Vengurla-7, NRCC Sel.-2, Ullal-3 and Bhaskara were consistently high compared to other varieties. Significant variations in nut yield tree⁻¹ among the different types were also reported by Gowda et al. (1989); Dasmohapatra et al. (2012); Dadzie et al. (2014).

The result on cumulative nut yield (kg plant⁻¹) over 4th harvest ranges from 1.27 (BPP-6) to 5.86 (BPP-8) during 2013 while 3.09 (Amrutha) to 11.86 (BPP-8) during 2014. The varieties recorded the cumulative nut yield of above 3 kg plant⁻¹ during 3rd harvest are BPP-8, Bhubaneswar-1, Kanaka, Vengurla-4, Vengurla-7, VRI-3, NRCC Sel.-2, Ullal-3 and Bhaskara ranging from 3.15 to 5.86. Similarly, the varieties producing cumulative nut yield of more than 6 kg plant⁻¹ in 4th harvest were BPP-8, Bhubaneswar-1, Madakkathara-1, Dhana, Kanaka, Vengurla-4, Vengurla-7, VRI-3, NRCC Sel.-2, Ullal-3 and Bhaskara (6.48 to 11.86).

Regarding cumulative nut yield (kg ha⁻¹) at 4th harvest, the



results indicated wide variations among the varieties under agro-climatic conditions of Odisha. The cumulative nut yield varies from minimum of 618.37 kg ha⁻¹ in Madakkathara-2 to maximum of 2420.41 kg ha⁻¹ in BPP-8. The top ten nut yielding varieties (kg ha⁻¹) at 4th harvest stage identified in the present study were BPP-8 (2420.41), Vengurla-7 (2106.12), Bhaskara (2010.20), NRCC Sel.-2 (1797.96), Ullal-3 (1640.82), VRI-3 (1591.84), Vengurla-4 (1567.35), Dhana (1485.71), Kanaka (1461.22) and Bhubaneswar-1 (1453.06). The results of present investigation corroborate the findings of by Samal et al. (2006) under Odisha condition.

4. Conclusion

Potential promising clones or varieties such as BPP-8, Vengurla-7, Bhaskara, NRCC Sel.-2 and Ullal-3 which produce consistent nut yield over the period may be recommended for cultivation under agro-climatic condition of Odisha, the East coast regions of India. Furthermore, shelling % demonstrated by majority of the clones or varieties is within the acceptable International Standard.

5. Future Research

It is suggested that further studies should be undertaken on hybridization among the best different cashew varieties in order to transfer all the relevant traits into a single hybrid in order to develop suitable cashew type (s) for nut yield, processing or suitability to high density planting system as per the breeding objectives.

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