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Performance of released cashew nut (*Anacardium occidentale* L.) genotypes under Jharkhand condition

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Abstract
The present investigation was carried out at the All India Coordinated Research Project on Cashew, Zonal Research Station, Darisai, Birsa Agricultural University, Ranchi, Jharkhand India during 2017-2018. Twelve cashew genotypes namely NRCC sel-1, NRCC sel-2, M44/3, M15/4, BPP3/33, BPP10/19, BPP30/1, BPP3/28, H303, H255, H367 AND H68 were included for the study. The collected grafted plants were planted at a spacing of 7.5 m x 7.5 m following Randomized Block Design (RBD) having six plants per treatment and replicated twice. Recommended package of practices were adopted uniformly to raise a good crop. Data recorded on various vegetative growth parameters, yield attributing traits and nut yield of different cashew varieties revealed that Among the twelve tested varieties, BPP30/1 recorded maximum for the vegetative parameters like tree height (4.52m) and trunk girth (60.25cm), while canopy spread in North-South direction maximum found in variety M15/4(3.75 m) and canopy spread in East-West direction was recorded maximum in variety, BPP3/33 (3.95 m). Cashew varieties such as H255 (2.44 m) and H367 (2.76m) recorded minimum plant height among the evaluated cashew varieties, indicating their suitability for high density planting. Cashew variety, H367 recorded the minimum trunk girth (41.10 cm) as well as canopy spread in both in East-West (2.15 m) and North-South direction (1.85 m). The number of flowering laterals /m^2 ranged from minimum 8.90 in NRCC sel-1 to maximum 45.60 in H303. Maximum flowering duration was recorded in variety, NRCC sel-2 (10986 days) followed by H303 (106.74 days), H225 (104.85) and M15/4 (101.25). Minimum flowering duration was recorded in variety, BPP3/28 (87.40) means indicating early variety. Average apple weight ranged from minimum 46.20 g in BPP30/1 to maximum 98.70 g in H367. The nut weight varied from minimum 5.10g in H68 to maximum 8.2g in H303.

Keywords: Cashew nut, *Anacardium occidentale* L., genotypes

Introduction
Cashew nut belongs to family Anacardiaceae (2n = 42), and native of North - East Brazil in Latin America. Being an evergreen tree of tropics, this is cultivated in tropical region of either side of the equator for its delightful kernels and apple, besides its by-product like cashew nut shell liquid (CNSL). Cashew as a marketable commodity, has a very important role to play in the liberalized Indian economy. Cashew is originally introduced in India by Portuguese traders during 16th century for aforestation and soil conservation purpose. Since its introduction at certain points in West-Coast cashew has spread all along the West - Coast and also to East - Coast region of the India. Globally, cashew is grown in more than 30 countries and as per the latest statistics (Anon., 2011), India occupies large area (20%) followed by Ivory coast, Brazil, Indonesia, Vietnam, Nigeria, Benin, Guinea Bissau, Mozambique and Philippines. The highest production was from Vietnam followed by Nigeria, India, Ivory Coast, Brazil, Indonesia, Philippines, Guinea Bissau, Benin and Mozambique. In India, Kerala, Karnataka, Goa, and Maharashtra on West- Coast and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal on East Coast are the major cashew growing states. It is also grown to a limited extent in non-traditional area such as Bastar region of Chhattisgarh and Kolar (Plains) region of Karnataka, Gujarat and Jharkhand and in North Eastern Hilly region.

Being a highly cross- pollinated heterozygous polyploid crop, cashew shows enormous variability in different morphological, physiological and anatomical characters. Consideration segregation due to heterozygosity creates lot of variation among the accessions (Rao and Bhat, 1996). Genetic improvement is limited by the lack of knowledge of genetic diversity of the indigenous germplasm of both India and other countries. The total production of cashew in India is 7.28 lakh tonnes from an area of 9.82 lakh hectare during 2012-13 (Saroj *et al*., 2014). Although during last 13 years, there is steady increase in both area and production of cashew in India, but the productivity rate is very low ranging from 600 to 800 kg /ha with an average

of hardly 772 kg/ha as against potential productivity of 2000 kg /ha. The primary reasons of low productivity of Indian cashew are due to existence of large areas under old senile plantation. Therefore, this low productivity of cashew can be addressed effectively by developing cashew genotypes with high yielding potential and adoption of scientific orchard management practices including proper plant protection measures. Keeping this in view, the present investigation was undertaken to evaluate the developed F hybrids for vegetative as well as nut yield 1 under Odisha condition.

Materials and Methods

A multi locational trial –VI was laid out at Zonal Research Station of All India Coordinated Research Project on Cashew operating under Darisai, E. Singhbhum, Birsa Agricultural University, Ranchi, Jharkhand, India. using clonal planting materials of twelve released cashew varieties collected from different co-operating centres of AICRP on Cashew, India. Twelve cashew genotypes namely ' NRCC sel-1, NRCC sel-2, M44/3, M15/4, BPP3/33, BPP10/19, BPP30/1, BPP3/28, H303, H255, H367 AND H68 were included for the study. The collected grafted plants were planted at a spacing of 7.5 m x 7.5 m following Randomized Block Design (RBD) having six plants per treatment replicated twice. Recommended package of practices were adopted uniformly to raise a good crop. The present study was undertaken for the fruiting season 2017-18 (4-7 year old plants) with an objective to study the nut yield performance of cashew varieties for Jharkhand zone. Data were recorded on various vegetative growth parameters, yield attributing traits and nut yield of different cashew varieties adopting standard procedure as described by Swamy *et al*., 1998 [4]. Statistical analysis of all the recorded data were done by adopting standard procedure as suggested by Panse and Sukhatme (1967) [3].

Results and Discussion

Vegetative Growth Parameters

Statistical analysis of various vegetative growth parameters indicated significant variations among the varieties. Among the twelve tested varieties, BPP30/1 recorded maximum for the vegetative parameters like tree height (4.52m) and trunk girth (60.25cm), while canopy spread in North-South direction maximum found in variety M15/4(3.75 m) and canopy spread in East-West direction was recorded maximum in variety, BPP3/33 (3.95 m). Cashew varieties such as H255 (2.44 m) and H367 (2.76m) recorded minimum plant height among the evaluated cashew varieties, indicating their suitability for high density planting. Cashew variety, H367 recorded the minimum trunk girth (41.10 cm) as well as canopy spread in both in East-West (2.15 m) and North-South direction (1.85 m). The number of flowering laterals /m^2 ranged from minimum 8.90 in NRCC sel-1 to maximum 45.60 in H303. Hanumanthappa *et al*., (2014) [2] and Tripathy *et al*., (2015) [5] reported similar variation in vegetative growth parameters among cashew types.

Yield and Yield Attributes

The results on flowering duration (days), apple weight, nut weight (g), mean nut yield 3rd year (kg/tree) and cumulative nut yield (kg/plant) of three harvest revealed significant variations among the varieties .Maximum flowering duration was recorded in variety, NRCC sel-2 (10986 days) followed by H303 (106.74 days), H225 (104.85) and M15/4 (101.25). Minimum flowering duration was recorded in variety, BPP3/28 (87.40) means indicating early variety. Average apple weight ranged from minimum 46.20 g in BPP30/1 to maximum 98.70 g in H367. The nut weight varied from minimum 5.10g in H68 to maximum 8.2g in H303. Tripathy *et al*., (2015) [5] and Gajbhiye *et al*., (2015) [1] reported variations in nut weight of different cashew types. The tested varieties also revealed significant variations for mean annual nut yield (kg/ plant) as well as cumulative nut yield / plant during the period of investigation. Significantly highest nut yield was recorded in variety, M15/4 (4.30 kg /plant) followed by H68 (4.10 kg /plant), while that of lowest in variety BPP30/1(2.25 kg / plant) at the3rd year harvest. Cumulative nut yield (kg/plant) of three harvest highest nut yield was recorded in variety, M15/4 (9.20 kg /plant) followed by H68 (9.00 kg /plant), while that of lowest in variety BPP30/1(5.15 kg / plant). Hence, these varieties have the potential of producing higher nut yield than rest of the tested varieties. Tripathy *et al*., (2015) [5] reported similar variations in nut yield of different cashew types under Odisha condition.

Table 1: Vegetative parameters of cashew genotypes in MLT-VI at ZRS, Darisai, E. Singhbhum, BAU, Darisai Centre during the year 2017-18

Accession	Year of planting	Mean tree ht. (m)	Mean stem girth (cm)	Mean canopy spread (m)		Mean Flowering laterals/m^2
				E-W	N-S	
NRCC sel-1	2010	3.80	48.50	3.25	3.76	8.90
NRCC sel-2	2010	3.45	57.60	2.95	2.35	26.30
M44/3	2010	4.15	49.85	2.45	2.85	23.60
M15/4	2010	3.58	47.65	3.45	3.75	25.80
BPP3/33	2012	3.86	42.70	3.95	3.60	33.90
BPP10/19	2012	3.45	51.60	2.75	2.65	31.60
BPP30/1	2012	4.52	60.25	3.70	3.45	19.90
BPPP3/28	2012	3.96	53.70	2.45	2.65	27.60
H303	2012	4.12	48.20	3.30	3.45	45.60
H255	2013	2.44	46.30	3.45	3.65	18.60
H367	2013	2.76	41.10	2.15	1.85	28.25
H68	2013	3.76	49.20	2.65	2.70	37.60
SEm ±	-	0.31	2.05	0.33	0.27	5.21
CD (5%)	-	0.92	6.14	0.98	0.86	15.76
CV (%)		15.35	12.75	13.36	13.71	14.62

Table 2: Yield parameters of cashew genotypes in MLT-VI at ZRS, Darisai, E. Singhbhum, BAU, Darisai Centre during the year 2017-18

Accession	Year of planting	Mean flowering duration (Days)	Mean apple wt. (gm)	Mean nut wt (g)	Mean nut yield 3rd Year (kg/tree)	Cumulative Nut Yield (kg/plant) of three Harvest
NRCC sel-1	2010	98.65	68.85	6.40	2.90	7.40
NRCC sel-2	2010	109.86	63.70	7.10	3.65	8.95
M44/3	2010	94.65	39.65	5.90	4.08	8.58
M15/4	2010	101.25	78.60	7.30	4.30	9.20
BPP3/33	2012	98.60	58.40	6.60	3.50	7.90
BPP10/19	2012	94.30	52.80	6.20	2.90	7.20
BPP30/1	2012	91.20	46.20	6.60	2.25	5.15
BPPP3/28	2012	87.40	69.40	7.50	3.60	6.90
H303	2012	106.74	65.20	8.20	3.60	8.20
H255	2013	104.85	68.60	5.70	3.75	9.15
H367	2013	95.20	98.70	6.70	3.40	8.60
H68	2013	96.40	67.60	5.10	4.10	9.00
SEm±		2.61	3.78	0.33	0.12	0.23
CD (5%)		7.96	11.24	0.98	0.34	0.62
CV (%)		14.62	16.76	13.86	12.38	12.56

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