Plant Archives Vol. 16 No. 1, 2016 pp. 437-440 *ISSN 0972-5210*

A STUDY ON MORPHOLOGICAL, NUT AND KERNEL PARAMETERS AMONG CERTAIN F_1 HYBRIDS IN CASHEWNUT

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Abstract

The present investigation was carried out at Cashew Research Station, Bapatla during 2012-13. There were significant differences among hybrids for plant height, stem girth, mean canopy spread, apple weight, nut weight, kernel weight and nut yield. Maximum stem girth was observed in H 85. Canopy spread was highest in H 94. All the hybrids showed intensive type of branching. Apple weight was maximum in H 116 and nut weight, kernel weight and nut yield was highest in H 94. Highest nut yield (12.33 kg per tree) was recorded in H 94 followed by H 85 (7.02 kg per tree).

Key words **:** Cashewnut, kernel, nut and stem girth.

Introduction

Cashew (*Anacardium occidentale* L.) an Anacardiaceae family member is native of North East Brazil. It is an important horticulture crop contributing substantially to the national income through export. It is becoming one of the important commercial plantation crops, which today is deemed as the source of dollar earning crop for the country. In India, the crop is cultivated in an area of 9.79 lakh ha with an annual production of 7.25 lakh tons (NHB, 2012). The highest productivity is observed in Maharashtra and Kerala with a value more than one ton per ha.

Cashew Research Station (CRS), Bapatla is one among the AICRP centres working on the crop, maintaining and evaluating several cross combinations. A few of the F_1s performing consistently well over years were selected for the present study with an objective of evaluating their morphological, nut and kernel parameters under Bapatla conditions. In the present study, eight new F_1 hybrids have been evaluated in comparison with the standard check BPP 8, which is a promising hybrid under cultivation in the state.

Materials and Methods

The present investigation was carried out at Cashew Research Station, Bapatla. These F_1 hybrids were planted in Randomised Block Design during the year 1998 and at present (2012-13) reached fourteen years age. The trial was conducted in three replications taking four trees per hybrid. Observations on morphological parameters like tree height, stem girth, mean canopy spread were recorded. Observations on nut yield per tree, nut weight, apple weight and kernel weight was also recorded.

Results and Discussion

Growth parameters

There were significant differences among the genotypes with respect to growth parameters like tree height, stem girth and mean canopy spread (table 1). Among the hybrids the tree height varied from 5 m (H 112) to 6.74 m (H 85). Stem girth ranged from 67 cm (H 112) to 101 cm (H 94). Maximum canopy spread (8.70 m) was recorded by H 94, whereas, the minimum values were recorded by H 104 (4.40 m). Intensive branching habit was observed in all the hybrids.

The results obtained from the evaluation of F_1 hybrids

Table 1 : Morphological parameters of F_1 hybrids in cashewnut.

Name of the hybrid	Tree height (m)	Stem girth (cm)	Canopy spread (m)	Branching type
H 77	6.54	84.86	5.94	Intensive
H 85	6.74	77.67	7.72	Intensive
H 94	5.85	101.00	8.70	Intensive
H 95	6.00	100.45	7.61	Intensive
H 104	6.50	80.00	4.40	Intensive
H 112	5.00	67.00	6.50	Intensive
H 116	6.50	85.00	5.90	Intensive
H 117	6.60	85.73	4.65	Intensive
BPP-8	6.57	85.38	7.48	Intensive
SEm	0.248	4.866	0.035	
CD at 5%	0.759	14.902	0.108	

Table 2: Apple and nut parameters of F_1 hybrids in cashewnut.

Name of the hybrid	Apple weight (g)	Nut weight (g)	Nut yield (Kg per tree)	Kernel weight (g)	Kernel grade
H 77	68.05	5.01	5.18	1.90	Medium
H 85	62.93	5.66	7.02	2.03	Medium
H 94	34.88	5.76	12.33	2.13	Medium
H 95	47.00	5.36	4.93	1.37	Medium
H 104	39.21	5.21	4.80	1.76	Medium
H 112	27.02	5.61	4.10	1.89	Medium
H 116	69.03	5.25	5.55	1.52	Medium
H 117	54.05	4.03	2.00	1.57	Medium
BPP-8	60.00	6.00	7.00	1.80	Medium
SEm	1.165	0.242	0.321	0.090	
CD at 5%	3.569	0.741	0.982	0.275	

of cashewnut with respect to morphological parameters revealed that the differences exhibited by them were significant. It is interesting to note from the data that most of the taller hybrids did not record maximum values in respect of stem girth or canopy spread; but relatively shorter hybrids in each set had greater values of stem girth and canopy spread, thus giving an indication that shorter hybrids compensated their growth by putting up more stouter stems and wide spread canopies. The similar results in respect of significant differences in tree height, stem girth and canopy spread among cashewnut accessions were reported by Desai (2009), Uthaiah *et al*. (1989), Samal *et al*. (2006), Reddy *et al*. (2002a), Naik *et al*. (1997) and Narayanareddy *et al*. (1986).

Apple, nut and kernel characters

There were significant differences among the genotypes with respect to these parameters (table 2). Among the hybrids, the apple weight varied from 27.02 g (H 112) to 69.03 g (H 116). Nut weight ranged from 4.03 g (H 117) to 5.76 g (H 94). Maximum nut yield (12.33 kg per tree) was recorded by H 94, whereas the minimum values were recorded by H 117 (2.00 kg per tree). Kernel weight ranged from 1.37 g (H 95) to 2.13 g (H 94).

The mean apple weight varied from 27.02 g to 69.03 g among the total hybrids under study. The variation in the apple weight could be due to genetic variability and varietal character. The descriptor list for cashew of IBPGR (1986), suggested that the apple weights, from 36 to 43 g were to be considered as 'intermediate', while the weights lower than 36 g as 'low' and higher weights above 43 g as 'high' class. Based on this, H 94 and H 112 are 'low' in class, H 95 and H 104 comes under intermediate type, H 77, H 85, H 116 and H 117 are of high class. Similar studies also reported by Pereira *et al*. (2011), Desai (2009), Lenka *et al*. (2003), Raquel *et al*. (2003), Reddy *et al*. (2002b), Reddy *et al*. (2001) and Narayanareddy *et al*. (1986).

A comparison of apple size parameters with morphology of tree and nut yield indicated that even though there was no exact coincidence of maximum and

minimum values of these characters, the association between apple weight and tree girth as well as canopy spread was highly appealing thus indicated a bearing on nut yield per tree. However, the association of apple weight with nut yield was found to be at lower magnitude as compared to that between tree girth and canopy spread.

An analysis of the data on nut parameters revealed that nut weight has not followed the trend in apple weight, thus indicating that it is not important to have larger apples for producing heavier nuts. Smaller apples also were found to bear larger nuts in some of the hybrids (for example H 94). Heavier apples did not necessarily bear heavier nuts which in turn did not necessarily produce heavier kernels. Most of the weight in nut might have been contributed from shell part and therefore nut weight could not in close harmony with kernel weight in some of the hybrids. Similar results of significant differences among the nut parameters were also reported by Desai (2011), Desai (2009), Mahesha *et al*. (2005), Haldankar *et al*. (2004), Vishnuvardhana *et al*. (2003), Reddy *et al*. (2002a) and Manoj *et al*. (1993).

As regards to nut yield per tree, highest nut yield in kg per tree was recorded by H 94 followed by H 85. When we profoundly study other observations recorded by these hybrids, it is inferred that these superior hybrids were shorter in stature, but stouter in girth values and had wide spread canopies. These hybrids were having either medium or small sized apples but produced bold sized nuts thus indicating that they could deposit maximum amount of photosynthetic assimilates into nut and thus maintaining an individual nut weight at higher order. Similar observation of significant differences among the values of nut yield per tree was also reported by Reddy *et al*. (2001) and Lakshamana *et al*. (2001).

The kernel of cashewnut is edible, economical and processed part. The observations presented in table 2 indicated that kernel weight had significant differences among the hybrids under study. Kernels weighing more than 2 g were observed in the hybrids H 94 and H 85 which were good yielding genotypes. The least values of these characters were recorded by poor yielders (H 95 and H 116) among all the hybrids. Significant differences among the values of kernel weight were also reported by Desai (2011), Desai (2009) and Dorajeerao (1999).

As per IBPGR descriptors, the kernel weight was categorized as low (less than 1.2 g), medium (1.2-2.5 g) and high (more than 2.5 g). None of the hybrids in the present study had high kernel weight. However, the hybrids were found to produce medium kernels.

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