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Study on Sex-Ratio, Apple and Nut Parameters in Young Cashewnut Hybrids

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ABSTRACT

Studies on the flowering parameters, fruit set, apple weight, nut weight, and kernel weight were carried out in cashewnut. Total number of flowers varied from 470.95 (H 303) to 650.84 (H 313). The fruit set percentage under natural conditions was found to be 12.06 to 22.42. sex ratio varied from 0.11 to 0.17and apple weight, nut weight, kernel weight and nut yield per tree were maximum in H 313.

Key words: *Cashewnut, Kernel, Apple, Tree*

INTRODUCTION

Cashewnut (*Anacardium occidentale*L. family: Anacardiaceae, 2n = 42) is one of the important dollar earning plantations crops of India. Is native of North East Brazil. In India, the crop is cultivated in an area of 9.79 lakh ha with an annual production of 7.25 lakh tons[1]. The highest productivity is observed in Maharashtra and Kerala with a value more than one ton per ha. Among several factors which are responsible for low yield in cashewnut, the presence of large number of staminate flowers and wide sex ratio are of practical importance.

Cashew Research Station (CRS), Bapatla is one among the AICRP centers 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 as against the standard check BPP 8.

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MATERIALS AND METHODS

The studies were carried out during the flowering and fruiting season of 2012-13 with four trees per genotype. These F_1 hybrids planted in Randomised Block Design (year of planting–1998). They are of seven years age. Observations on sex ratio, fruit set, apple, nut and kernel parameters were recorded and the results obtained are discussed hereunder.

RESULTS AND DISCUSSION

Flowering and fruiting characters

Maximum number of male flowers per panicle (570.67)was recorded in H 313 whereas, the minimum values were recorded by H 303 (401.87) in set III. The number of hermaphrodite flowers per panicle varied from 50.08 (H 328) to 58.75 (H 306). Maximum sex ratio (0.17) was recorded by H 303 and H 338 whereas, the minimum values were recorded by H 328 (0.11). The number of fruits set per panicle varied from 7.49 (H 292) to 11.45 (H 313). Per cent fruit set ranged from 12.06 (H 292) to 22.42 (H 328). Maximum per cent fruit retention (34.18) was recorded by H 298 whereas the minimum values were recorded by H 292 (16.53).

It is evident from the data presented in Table 1 that an examination of data on number of hermaphrodite flowers in comparison with sex ratio (Table 1), it is the sex ratio closely in association with hermaphrodite flowers, in all hybrids. The variations in the panicle and flower parameters can be attributed to varietal character. Significant differences among the panicle and flower parameters were also reported by[2-5].

Observations on the number of fruits set and their percentage did not closely associate with the number of fruits retained till maturity implying that those hybrids that set more fruits could not retain them till the end. But the number of fruits retained has a large bearing on the ultimate nut yield per tree. Since some of the hybrids started with a higher initial number of fruits set per panicles they could stand in a higher order also in respect of nut yield even though their fruit retention was not excellent. Similar observation was noticed in all the hybrids under study. At various cashewnut growing centers of India, significant differences among the accessions in the above characters were also reported by[6-10]. They attributed the variation due to the genetic constitution of the varieties.

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 25.93 g (H 319) to 37.72 g (H 313). Nut weight ranged from 3.96 g (H 292) to 7.08 g (H 313). Maximum nut yield 5.22 kg per tree was recorded in H 313 whereas, the minimum values (1.87 kg per tree) were recorded by (H 292). Kernel weight ranged from 1.14 g (H 338) to 2.18 g (H 313).

The mean apple weightvaried from 25.93 g to 37.72 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, 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, ‘low’ class apples found in H 292, H 303 and H 338, ‘intermediate’ apples found in H 298 and ‘high’ class apples found in H 306, H 313 and H 328. Significant variations in apple weight were also reported by[7,8,11-16]. 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. 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[6, 7,17-21].

As regards to nut yield per tree, highest nut yield in kg per tree was recorded by H 313 followed by H 306. 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. Similar observation of significant differences among the values of nut yield per tree was also reported by[8,22]. 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 313 which was good yielding genotype. The least values of these characters were recorded by poor yielders (H 292 and H 298) among all the hybrids. Significant differences among the values of kernel weight were also reported by[18, 9].

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.

Table 1: Flowering and fruiting characters

Name of the hybrid	Number of male flowers per panicle	Number of hermaphrodite flowers per panicle	Total number of flowers per panicle	Sex ratio	Number of fruits set per panicle	Per cent fruit set	Fruits retained till maturity	Per cent fruit retention
H 292	446.60	62.17	508.77	0.14	7.49	12.06	1.23	16.53
H 298	476.37	75.00	551.37	0.16	9.33	12.44	3.22	34.18
H 303	401.87	69.08	470.95	0.17	10.66	15.44	2.33	21.37
H 306	484.60	58.75	543.35	0.12	9.16	15.60	2.6	27.82
H 313	570.67	80.17	650.84	0.14	11.45	14.29	3.74	31.78
H 319	496.80	74.18	570.98	0.14	11.42	15.39	2.55	22.59
H 328	458.37	50.08	508.45	0.11	11.23	22.42	2.61	23.42
H 338	432.77	75.08	507.85	0.17	10.33	13.77	2.88	26.98
BPP-8	458.00	71.00	529.00	0.15	10.75	15.14	3.56	33.11
SEm	**21.99**	**3.74**	**22.54**	**0.007**	**0.364**	**0.868**	**0.140**	**1.084**
CD at 5%	**67.34**	**11.45**	**69.04**	**0.021**	**1.116**	**2.657**	**0.430**	**3.321**

Table 2: Apple and Nut parameters of cashewnut hybrids

Name of the hybrid	Apple weight (g)	Nut weight (g)	Nut yield (Kg per tree)	Kernel weight (g)	Kernel grade
H 292	28.24	3.96	1.87	1.47	Medium
H 298	38.39	4.18	2.70	1.51	Medium
H 303	35.40	4.69	3.03	1.47	Medium
H 306	58.48	5.93	3.40	1.74	Medium
H 313	67.72	7.08	5.22	2.18	Medium
H 319	25.93	4.78	3.02	1.58	Medium
H 328	43.83	4.29	2.85	1.17	Medium
H 338	26.26	4.95	3.22	1.14	Medium
BPP-8	61.00	5.90	3.00	1.50	Medium
SEm	**3.456**	**0.560**	**0.207**	**0.055**	
CD at 5%	**10.583**	**1.714**	**0.635**	**0.170**	

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