

CASHEW BREEDING

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Cashew (*Anacardium occidentale* L) is an important commercial crop of Kerala, which earns over 100 crores of rupees from the export of cashew kernels and cashew shell liquid. The cashew processing industry gives direct employment to about $1\frac{1}{2}$ lakh persons. The internal production of rawnuts meets only about 35 per cent of the total requirements of the processing industry. Import of rawnuts is becoming more and more difficult and to sustain this industry, there is urgent need to increase the production of rawnuts substantially. The productivity of the existing cashew plantations in the state is extremely low and one of the main reasons for this is the poor genetic stock. Selection of better varieties from existing population and evolution of superior varieties by hybridization offer great scope for improvement of the genetic stock. Since cashew can be multiplied by vegetative methods, selection can be made in the F₁ population itself and multiplied vegetatively. The breeding work was undertaken in the Cashew Research Station, Anakkayam in Malappuram District and the results are presented in this paper.

Materials and Methods

Breeding work in cashew was started in 1963 at the Cashew Research Station, Kottarakara and continued at the Cashew Research Station, Anakkayam in Malappuram District. The first series of crosses were made between three prolific bearing types and three other types producing large sized nuts. Fifty progenies, involving 4 parental combinations were planted and these are being evaluated for their economic characters. More crosses were made in subsequent years, involving 28 parental combinations and the hybrid nuts obtained were sown in polythene bags for raising seedlings. When the seedlings were about 2 months old, they were planted in the mainfield giving a spacing of 7.5 x 7.5 metres. A total number of 191 hybrid progenies were thus planted at the Anakkayam Station and 114 progenies at the Vellanikkara Campus of the Kerala Agricultural University. The particulars of the parents, the character for which they were selected, the cross combinations involved and the number of F₁ progenies planted are given in Table I.

Results and Discussion

Growth:

The growth measurements such as girth, height and spread of 3 year old hybrid plants indicated that most of them were more vigorous in growth

Table 1

Details of parental trees, cross combinations and F₁ progenies produced during 1963-1973

Hybrid No.	Year of crossing & Planting	Female parent Type No.	Character for which chosen	Male parent Type No.	Character for which chosen	No of F ₁ progenies now available
H-1	1953	12 A	Prolific bearing	Tree No. 27	Large nut size	12
H-2	"	12 A	"	Tree No. 8A	"	8
H-3	"	30	"	Brazil 18	"	19
H-4	"	30 A	"	"	"	11
H-5	1966	51	Medium nut size	22	Good fruit set	1
H-6	1966	56	"	22	"	2
H-7	1969 to 1972	H-4-7	High yield	K-30-1	Largest nut size	24
H-8	"	Tree No. 20	"	"	"	19
H-9	1969 to 1971	Tree No. 20	"	Brazil 18	"	8
H-10	1971	H-4-7	"	"	"	5
H-11	1972	K-10-2	Large nut	Tree 20	High yield	22
H-12	"	K-10-2	"	H-4-7	"	10
H-13	"	K-4-7	High nut	Tree 20	"	14
H-14	"	Tree 20	"	H-4-11	High sex ratio	26
H-15	"	"	"	K-10-2	Large nut size	9
H-16	"	K-30-1	Largest nut size	H-4-7	High yield	1
H-17	1973	PTR-1-1	High setting	K-27-2	Dwarf tree	—
H-18	"	K-27-2	"	PTR-1-1	"	"
H-19	1973	ALGD-H	Large No High setting	K-30-1	Large nut size	10
H-20	"	H-3-13	High sex ratio	"	"	14
H-21	"	BLA-139-1	Early and short flowering phase	"	"	4
H-22	"	HRZ-9-1	High shelling percentage	"	"	3
H-23	"	AGLD-1-1	High setting	H-3-13	High sex ratio	26
H-24	"	"	"	BLA-139-1	Early short flowering phase	12
H-25	"	"	"	BRZ-9-1	High shelling percentage	19
H-26	"	BLA-139-1	Early, short flowering phase	H-3-13	High sex ratio	8
H-27	1973	BRZ-9-1	High shelling percentage	BLA-139-1	Early and short flowering phase	12
H-28	"	BRZ-9-1	"	H-3-13	High sex ratio	6

than open pollinated seedlings of same age. The progenies exhibited variations in growth characters. These variations were noticed even among the progenies of the same parental combination.

Flowering and fruiting:

Stray flowering was noticed in a few hybrids planted in 1963, when they were only 18 months old. Among the 45 F_1 progenies planted in 1963 ten flowered in 1964—65, twenty during 1965—66 and fifteen during 1966—67. This early flowering of the hybrid plants was an indication of heterosis.

Season of bearing:

Most of the hybrids were harvested in the mid season i.e. March—April, while some were harvested only by middle of May. The harvest periods were also comparatively shorter.

Flowering and maturing of cashewnuts in early or mid season is a desirable character as the nuts produced by such trees are of good quality. Nuts harvested from late season crops after the onset of the south-west monsoon rains are inferior in quality and do not usually fetch good price in the market.

Apple and nut characters:

The colour size and shape of apples of the hybrids showed considerable variation even among the progenies of the same parental combination. The nuts produced by the hybrids were either medium or small in size. The selected hybrids produced large sized nuts as compared to the nuts produced by the maternal parent.

Yield:

Wide variations in respect of yield was noticed in the different hybrids. The mean yield of nuts for 5 years from the hybrids planted during 1963 and 1964 ranged from 0.260 kg. to 13.426 kg.

Hybrid selections:

Among the hybrid progenies derived from the first 4 parental combinations, planted in 1963 and 1964, the hybrid number H-3-17 (derived from the tree No:30 x Brazil 18) and hybrid number H-4-7 (obtained from the cross tree No:30 A x Brazil 18) have been assessed as promising on the basis of flowering season, short harvest period, medium nut size and high yield. Detailed description of the trees and apple and nut characters of these two hybrids are furnished in Table 2.

Table 2

Description of two promising hybrids of cashew

	H-3-17*	H-4-7**
1. Year of planting	August, 1963	August, 1963
2. <i>Tree size of 25-6-75</i>		
Height	7.25 m.	7.5 m.
Stem girth	102 cm.	120 cm.
Mean spread	9.1 m	11.2 m.
3. Habit	Erect	Erect
4. Branching	Moderate	Moderate
5. Girth of shoot terminals	2.7 cm.	2.5 cm.
6. Length of internode	1.8 cm.	1.02 cm.
7. Colour of new shoot	Light green	Light green
8. Colour of emerging leaf	Pinkish green	Pinkish green
9. Armoa of tender leaf	Mild mango	Mild mango
10. Shape of leaf	Obovate	Obovate
11. <i>Size of leaf lamina:</i>		
Length	11.6 cm.	8.3 cm.
Breadth	7.0 cm.	5.9 cm.
12. Texture of leaf	Leathery	Leathery
13. Colour of mature leaf	Dark green	Dark green
14. Venation	Prominent	Prominent
15. Flowering season	Mid season	Mid season
16. <i>Inflorescence:</i>		
Shape	Slightly Pyiamidal	pyramidal
Length	20.9 cm	25.9 cm.
Basal spread	9.3 cm.	19.7 cm.
Compactness	Open	Open
17. Per cent of perfect flowers	13.3	13.3
18. <i>Apple characters:</i>		
Colour of ripe fruit	Yellowish pink	Yellowish pink

1	2	3
Shape	Long conical	Conical
Weight	62.6 g.	70 g.
19. <i>Nut characters:</i>		
Length	3.3 cm.	3.24 cm.
Breadth	1.8 cm.	1.9 cm.
Weight of 100 nuts	655 g.	620 g.
Shelling percentage	26.19	25.25
20. Mean yield for last 5 years (1973—77)	14.3 kg tree	10.1 kg tree
21. Reaction to major pests	No resistance to major pests	No resistance to major pests
22. Agronomic features	A regular bearer, consistently giving good yields.	This is a type having fairly high% of perfect flowers & good fruit setting.

* This is the progeny of the cross between tree No. 30 of Regional Cashew Research Station, Kottarakkara (A Mangalore type) and Brazil-18.

** This is the progeny of the cross between tree No. 30A and type No. Brazil—18.

Summary

Breeding of cashew was undertaken at the Cashew Research Station at Kottarakara and Anakayam in Kerala during the period 1963 to 1973 and 216 hybrid progenies from 28 parental combinations were produced. From studies conducted so far on the hybrids planted during 1963 and 1964, two hybrid H-3-17 and H-4-7 were selected as promising for large scale cultivation under Kerala conditions.

സംഗ്രഹം

ആനക്കയം കശുമാവ് ഗവേഷണകേന്ദ്രത്തിൽ 1963 മുതൽ 1973 വരെ നടത്തിയ പരീക്ഷണങ്ങളിൽ എച്ച്. 3-17, എച്ച്. 4-7 നമ്പർ സങ്കരവർഗ്ഗങ്ങൾ കേരളത്തിൽ വ്യാപകമായ തോതിൽ പ്രചരിപ്പിക്കാൻ പറ്റിയതായി കണ്ടു.

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