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COLLECTING JACKFRUIT GERMPLASM IN WESTERN GHATS

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A joint crop specific exploration and collection trip for jackfruit was conducted in parts of Western Ghats lying in states of Kerala, Karnataka and Tamil Nadu and a total of 95 accessions comprising 'koozha' (18), 'navarikka' (3), 'varikka' (59) 'rudraksha varikka' (2), 'rudraksha koozha' (2), wild (2) others (7) were amassed. Evaluation of these genotypes were undertaken and data presented. Distribution pattern of the species has also been enumerated.

Key words : Jackfruit, germplasm, variability, diversity, wild, cultivated, Collection

Jackfruit (*Artocarpus heterophyllus* L.) of the family Moraceae is distributed in the Indo-Malayan region. It is one of the most important fruit trees of South Asia, especially India. Immature and mature fruits are used as vegetable and are pickled. Flakes of mature fruits are used for making chips, 'papad' and ripe fruits for table purpose. In Kerala, it is used for sweet meat preparation known as 'chakkavaratti'. Fruits can be preserved as jam, jelly, etc. Flakes, seeds, sterile flowers, skin and core are used as important source of pectin. Seeds from mature fruits are also used as vegetable. Sometimes it is roasted and eaten as a delicacy. Jackfruit leaves, fruit rinds, bracts, etc. are used as cattle feed. It also yields good timber and is of great demand in Kerala.

Jackfruit has a very wide distribution in tropical semi and evergreen forest areas in Western Ghats. Its cultivation is continuous in western coast with high rainfall upto Konkan and sporadic in other areas with low rainfall. In western ghats, it is cultivated upto 1500m and has tremendous diversity. Two wild species with edible fruits, viz., *A. lackoocha* and *A.hirsutus* also occur there. It is highly heterozygous and is generally propagated through seed in the region. The planted seedlings, therefore, very rarely exhibit similar qualities of the mother plant and hence there is a strong belief among the locals that

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quality in planted jackfruit depends greatly on the man who planted it. High rate of natural crossing has resulted in rich variability in fruit morphology, quality and other characters. Deforestation in western ghats and indiscriminate felling of cultivated trees for timber has resulted in considerable loss of genetic variability in the crop. An attempt has been made in the past only to assemble the germplasm of commercial 'Varikka' variety of Jackfruit by the KAU under an ICAR ad-hoc scheme (Anon, 1983). Hence, an attempt was made to survey and collect entire variability of both cultivated and wild jackfruit in parts of Western Ghats lying in Kerala, Tamil Nadu and Karnataka in 1987. The results of the exploration trip and the variability collected are presented in this paper.

MATERIALS AND METHODS

An exploration tour was undertaken in May-June 1987 in parts of north Kerala and adjoining areas of Karnataka and Tamil Nadu (Fig. 1). Collection sites included commercial farms, forest areas, backyards of houses and government farms. Trekking in forest areas was done for wild forms. A single fruit was collected from each genotype encountered in the mission. Observations were made on morphological characters of fruits and seeds and data are presented in comparison to that available for 175 'Varikka' types (Anon, 1983).

RESULTS AND DISCUSSION

Jackfruit occurs in Western Ghats upto an elevation of 1500 m. The trees are planted in coffee, tea and cardamom plantations for shade. In most of these plantations, natural populations of jackfruit are also left out in selective felling of forest trees prior to establishment of crops. In most of the areas, the cultivation of jackfruit is very widespread and each homestead had one to a few trees depending upon the available area.

A wide variability in cultivated forms were observed. At the Horticultural Research Station, Burliar, a plantation of selected jackfruit from different states was established in 1948. 'Velipala' a type collected from the forest is regarded as possible ancestor to the jackfruit. Wild trees with fruits at four locations in Kerala were medium to very large in size, bearing relatively smaller fruits with numerous small, pointed spines on thicker rinds. Flake density was low and seed to flesh ratio was also low. The peduncles are easily separated from the fruits. The wild forms collected seem to be apparently more primitive than 'Velipala'. Broadly speaking, in the case of cultivated types, there are 'koozha' and 'varikka' forms, the former having soft, musky and slimy flakes and latter with hard and firm flakes. Fruit stalks are easily detachable in koozha and



Fig. 1. Route map showing exploration sites for collection of jackfruit germplasm from western ghat

Characters		Wild	Koozha	Navrikka	Varikka	Rudraksha koozha	Rudrakha varikka	ICAR project
No. of collections		2	18	3	59	2	2	175
Fruit length	R	32.0-37.0	28.0-68.0	32.0-58.0	23.0-72.0	28.0-30.0	21.0-28.0	22.0-84.0
	М	34.5	45.0	46.0	46.0	29.0	24.5	38.0
Fruit weight	R	2.2-3.5	2.0-25.4	4.0-9.0	1.5-39.0	2.0-4.1	2.5-3.9	1.6-25.1
	М	2.9	8.4	7.5	10.4	3.6	3.2	9.7
Fruit circumference	R	40.0-50.0	30.0-120.0	60.0-75.0	62.0- 96.0	54.0-66.0	35.0-44.0	13.0-102.6
	М	45.0	52.0	68.0	73.0	60.0	40.0	41.5
Rind thickness	R	2.4-1.8	1.0-3.0	1.3-2.0	1.5-3.0	0.8-1.0	0.8-1.0	0.4-3.1
	М	2.1	2.0	1.8	1.9	0.9	0.9	1.5
Core length	R	23.0-24.0	13.0-15.0	16.0-38.0	12.0-56.0	13.0- 14.0	0	11.0-61.0
	М	23.5	27.0	29.0	29.0	13.5	20.0	31.0
Core width	R	4.5-5.0	4.5-12.0	6.0-9.0	3.5-12.0	5.0-6.5	-	3.2-14.0
	М	4.8	6.4	7.3	6.8	5.7	4.5	6.8
Flake length	R	3.7-5.0	4.2-8.5	5.0-5.7	3.5-10.5	5.0-7.0	4.5-5.0	3.2-12.5
	М	4.4	6.1	5.4	6.7	6.0	4.7	6.2
Flake circumference	R	6.0-6.1	6.0-13.0	8.0-9.2	4.0-13.0	9.0-13.0	8.0-10.0	-
	М	6.1	9.0	8.7	9.2	11.0	9.0	-
Weight of flake	R	4.6-7.0	7.0-34.0	7.6-14.0	6.4-41.6	1.4- 1.9	-	10.5-55.0
	М	5.8	17.0	10.8	19.0	17.0	23.0	27.8
Weight of a seed	R	4.6-5.0	5.0-15.4	7.0-11.0	3.4-13.4	6.2-7.0	3.0-8.4	1.2-14.2
	М	4.8	7.6	8.6	7.6	6.6	7.3	6.8
Seed length	R		2.7-4.5	2.3-4.0	2.0-5.0	2.4-3.5	3.5-4.3	2.4-11.0
	М	3.0	3.5	3.8	3.2	2.9	3.9	3.6
Seed width	R	-	1.2-3.0	2.0-2.3	1.2-3.0	1.4-2.0	2.0-2.2	1.3-9.0
	м	2.1	21	2.2	19	17	2.1	5.4

Table 1. Fruit and seed characters of jackfruit collections

the reverse is true in varikka. A third group known as 'navarikka' or 'pazhamvarikka' as reported by a farmer has soft and musky fruits but with persistent peduncles. This form has probably a hybrid origin from 'koozha' and 'varikka' types. This types is also known as 'vellaran'. The most strikingly different type is known as 'rudraksha' or 'thamara' in which fruits are nearly

spherical with thin rinds and spreading spines. In this, based on the firmness, of flesh both 'koozha' and 'varikka' forms exist. Very rarely an extremely sweet and tasty type known as 'thenvarikka' form also occur. In the present trop only two such collections were obtained. Due to the fine texture and sweetness of the flesh, mostly 'varikka' types are preferred. Colour of fruits is light yellow in wild forms, 'rudraksha' and 'navarikka' types. It varies from white to deep yellow and reddish in Koozha, light yellow to brownish yellow in 'Varikka' and whitish yellow in 'rudraksha varikka'. Density of flakes per unit volume was low in wild, high in 'koozha' and 'varikka', medium to high in 'rudraksha koozha' and low to medium in 'rudraksha varikka'.

A total of 95 samples were collected comprising wild (2), 'koozha' (18), 'navarikka' (3), 'varikka' (59), 'rudraksha koozha' (2), 'rudraksha varikka' (2) and others (7). The results of detailed observations on 12 quantitative characters of fruits and seeds of the above collections in comparison with range and mean of various characters in the case of 175 accessions collected by the ICAR project on varikka jackfruit at KAU, Thrissur are presented in Table 1. Generally heaviest fruits are noticed in 'Varikka' and the smallest in wild and in 'Rudraksha' types. 'Navarikka' and 'Rudraksha' have large and heavier seeds. Colour and quality of the flakes also changes within major varieties.

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