International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2018; 6(5): 1568-1570

Received: 15-07-2018
Accepted: 20-08-2018

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Studies on variability in fruit characters and yield of jamun (*Syzygium cuminii* Skeels) collection in Kerala

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Abstract
Fruit morphological variation in 17 collections was undertaken at KAU main campus for identifying the superior types. All the observation with respect to qualitative fruit characters were done following NBPGR descriptors. As majority of jamun trees are of seedling origin, they showed tremendous variation in their physicochemical attributes. Based on clustural analysis on quantitative and qualitative data, KJ-45 has higher yield (54 kg plant^{-1}), 12 fruits per cluster, fruit volume (11.4 cc), fruit length (3.10 cm), fruit width (1.24 cm), single fruit weight of 12.28 g, pulp (90.39 %), seed (9.6 %) and pulp: seed (9.41). Hence, KJ- 45 is considered as superior collection followed by KJ- 48, 47 and 7.

Keywords: evaluation, selection, variability, fruit characters and yield

Introduction
Jamun possesses commercial importance as a minor fruit tree of best food and medicinal value in tropical and subtropical conditions. Because of its nutritive value its demand is increasing day by day and that will require selected plants of superior quality with high yield potential. For superior genotypes major emphasis in selection should be given for higher pulp weight, fruit volume, fruit size and pulp: seed ratio and high TSS along with less seed size. As majority of jamun trees are of seedling origin, they show tremendous variation in their morphology and physicochemical attributes. Lack of improved varieties with dwarf stature, high yielding with good keeping quality are the major bottlenecks for the commercial cultivation of jamun.

Materials and Methods
The investigation envisages was conducted on 17 collections at Kerala Agricultural university to evaluate the fruit morphological characters of jamun collections. The qualitative fruit characters were recorded by following NBPGR descriptors. The data pertaining to the quantitative fruit characters were compared with Jaccard's similarity coefficients and was clustered by the Unweighed Pair Group Average Method (UPGAM) devised by using NTsys pc 2.02 software. Similarity matrix was computed and the dendrogram was constructed accordingly.

Result and Discussion
The collections showed wide variation for the fruit characters. At the similarity coefficient status of 40 per cent, grouping of accessions was done which resulted in 5 non-overlapping clusters (Fig.1). Cluster wise listing of collections according to quality characters are listed in Table 1. Cluster I had maximum number of collections (8) and Cluster II and V had the minimum number of collection (1).

Variation was observed with respect to fruiting season (March-April and April-May), days from flowering to fruit maturity (62 days to 68 days), fruit set to maturity (58 days to 64 days), fruit clustering habit (solitary and cluster), fruit weight (5.91 g to 12.28 g), fruit volume (5.32 cc to 11.40 cc), number of fruits per cluster (3 to 12), specific gravity (0.91 to 1.23), fruit length (1.61 cm to 3.10 cm), fruit width (1.24 cm to 2.41 cm), fruit shape (oblong), fruit colour (blackish purple), firmness/softness (4.09 kg cm^{-2} to 9.94 kg cm^{-2}), juice content (14 per cent to 44 per cent), pulp content (77.50 per cent to 90.39 per cent), seed weight (9.60 per cent to 22.49 per cent), pulp/seed ratio (3.24 to 9.41) and yield tree^{-1} (10 kg plant^{-1} to 54 kg plant^{-1})

Table 2. Wide variation in yield with different collections is due to the genetic makeup of plant and environmental factors such as location, maximum and minimum temperature, frequency of rainfall, and relative humidity (Singh and Singh, 2012) [5]. These findings are in agreement with findings of Kundu *et al.* (2001) [3], Devi *et al*. (2002) [1] and Prabhuraj *et al.* (2002) [4] in jamun.

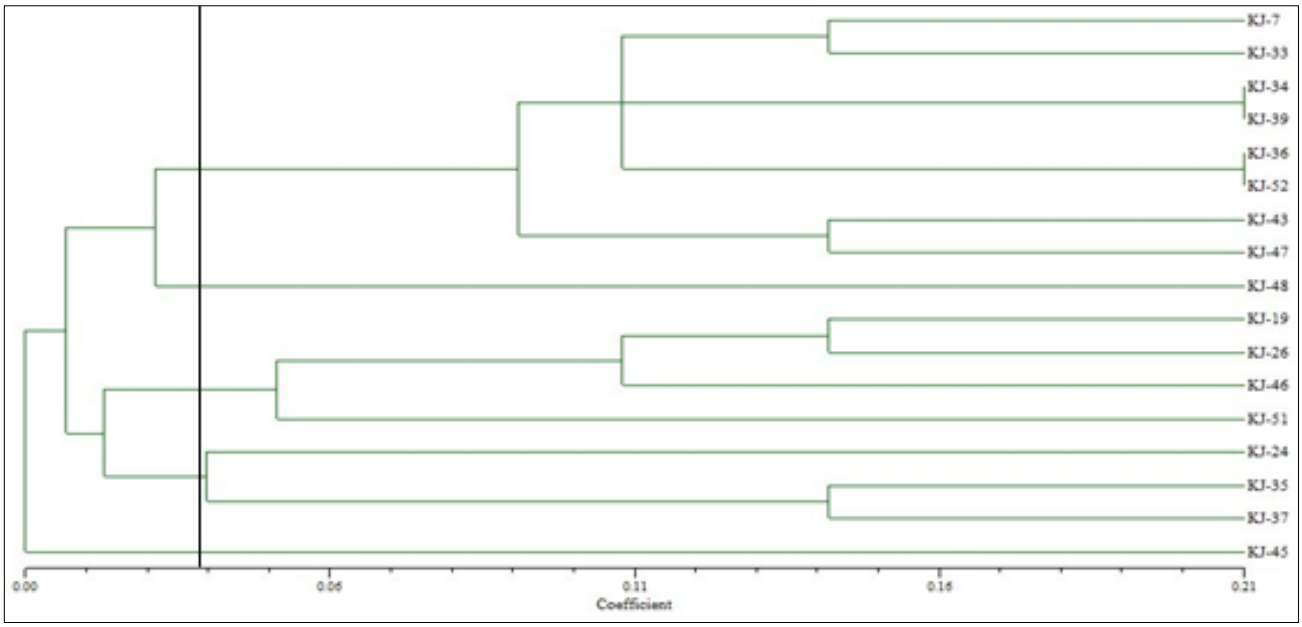

Fig 1: Dendrogram of fruit characters

Table 1: Cluster wise listing of collection according to fruit characters

Clusters	List of collection
I	KJ- 7, KJ- 33, KJ- 34, KJ- 36, KJ- 39, KJ- 43, KJ- 47, KJ- 52
II	KJ- 48
III	KJ- 19, KJ- 26, KJ- 46, KJ- 51
IV	KJ- 24, KJ- 35, KJ- 37
V	KJ- 45

Table 2: Cluster wise summary statistics of fruit characters

Characters	Clusters				
	I	II	III	IV	V
Fruiting season	Mar-Apr, Apr-May	Mar-Apr	Mar-Apr, Apr-May	Mar-Apr, Apr-May	Mar-Apr
Days from flowering to fruit maturity	64	63	67	66.33 ± 1.52	62
Days from fruit set to Maturity	60	59	62.75 ± 0.5	62 ± 1.73	58
Fruit clustering habit	Cluster	Cluster	Solitary	Cluster, Solitary	Cluster
Fruit weight (g)	9.24 ± 1.33	10.31	6.63 ± 0.52	8.19 ± 0.77	12.28
Fruit volume (cc)	8.42 ± 1.79	9.5	6.53 ± 1.09	8.23 ± 0.68	11.4
Number of fruits per cluster	7.25 ± 1.16	10	4.5 ± 1.91	4.33 ± 0.57	12
Specific gravity	1.09 ± 0.03	1.08	1.02 ± 0.14	0.99 ± 0.08	1.07
Overall length of fruits (cm)	2.35 ± 0.23	2.96	1.88 ± 0.20	2.24 ± 0.20	3.1
Maximum width (cm)	2.10 ± 0.04	2.1	1.78 ± 0.36	2.04 ± 0.07	2.41
Fruit shape	Oblong	Oblong	Oblong	Oblong	Oblong
Firmness/Softness(kg cm-2)	7.34 ± 0.84	7.02	4.82 ± 0.55	5.26 ± 0.77	9.94
Colour	Blackish purple	Blackish purple	Blackish purple	Blackish purple	Blackish purple
Pulp (%)	83.86 ± 3.58	87.87	81.10 ± 1.74	81.05 ± 2.55	90.39
Seed (%)	16.13 ±3.58	12.12	18.88 ± 1.74	18.94 ± 2.55	9.6
Pulp/seed ratio	5.64 ± 1.09	7.25	4.20 ± 0.70	4.34 ± 0.76	9.41
Juice content (%)	25.75 ±4.71	38	16.5 ± 1.91	20 ± 4	44
Yield / tree (kg)	36.5 ± 5.68	48	11.75 ± 1.70	24.33 ± 9.01	54

Conclusion

Bases on the fruit characteristics could be inferred that the yield of the plant KJ- 45 depends on number of fruits/cluster (12 fruit/cluster), fruit length (3.10 cm), fruit width (1.24 cm), fruit volume (11.4 cc), pulp (90.39 %), seed (9.6 %) and pulp: seed (9.41) and fruit weight (12.28 g). Based on clustural analysis on quantitative and qualitative data, KJ- 45 is considering as superior collection followed by KJ- 48, 47 and 7.

Acknowledgment

The authors gratefully acknowledge Kerala Agricultural University, Thrissur, Kerala, 680656, India and Government of India for providing funds and facilities to carry out the research works.

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