



Morphological Characterization of Traditional Mango Variety Karpooram (*Mangifera indica*) in Southern Kerala

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ABSTRACT

Karpooram is a traditional mango variety found mainly in the homesteads of southern Kerala viz., Kollam, Pathanamthitta, Thiruvananthapuram, districts. The fruit of this variety has a characteristic flavor of Karpooram or camphor. This is a table variety with medium to large fruit size, high pulp content, less fibrous flesh compared to other traditional mango varieties. The study was conducted at the Farming Systems Research Station, Sadanandapuram, Kerala Agricultural University during 2018 – 2020 to evaluate the various accessions of traditional mango variety Karpooram in Southern Kerala. During the survey, a good number of Karpooram mango trees were located in Kollam district. Fruit weight varied between 250g to 675g. The tree is moderately vigorous with spreading habit. The values for other characteristics like inflorescence (12.6 cm - 38.6 cm), inflorescence width (7.4 cm - 31.2 cm), inflorescence shape from pyramidal to broadly pyramidal, inflorescence colour from cream and pink flowers, inflorescence position is mostly terminal, petiole length (1.7 cm - 6.5 cm), leaf length (13.5 cm - 27.9 cm), leaf width (3.2 cm - 7.2 cm), tree height varies from tall to medium (6.2 m - 12.4 m) were observed. Fruit bearing type was solitary. Highest TSS (20° brix) was reported from accession KLM 35 and KLM 36, lowest acidity of 0.32 per cent was reported from KLM 21, KLM 22, KLM 32, KLM 33 and PTA 2. Highest carotenoid content of 4.89 mg/100g was reported from KLM 26, highest ascorbic acid content of 30 mg/ 100g was reported from KLM 32. Highest total sugar content of 18.6 per cent was reported from KLM-21. Reducing sugar content (3.6%) was highest in KLM 33. Highest fruit number of 800 was reported from accession KLM 21.

Key Words: Karpooram, characterisation, traditional mango, yield, quality.

INTRODUCTION

Mango is the most important commercially grown fruit of our country (Bhalekar *et al*, 2016). The major mango producing countries include India, China, Thailand, Indonesia, Philippines, Pakistan, Brazil, Bangladesh, USA, Africa and Mexico (Adikshita *et al*, 2018). Karpooram is a native or indigenous mango variety found in the homesteads of south and central Kerala. This is a table variety with medium to large fruit size, high pulp, low peel and stone percent, high TSS and reducing sugar, low acidity and fibre content with characteristic flavor of Karpooram (camphor) and high overall consumer acceptability. The tree is moderately vigorous with spreading habit and

regular bearer. It normally flowers during January-February (mid-season flowering) and rarely off-season flowering (secondary flowering) is also reported by Borel *et al* (2017). Fruits are medium to large (280-750g) in size, high pulp to stone ratio and high rind thickness. The skin colour is dark green with red shade and brown spots. Oil glands are present in the rind. Ripened fruit has high TSS, reducing sugar and carotenoid content, low fibre and acidity. Fruit has the distinct flavor of camphor and also has high keeping quality. High variability is observed with respect to colour, size, shape and quality of fruit and fruit yield. Poly embryonic character is also seen in this variety. The variety is becoming extinct from our homesteads as in

Table 1. Fruit characters of different accessions of traditional mango Karpooram.

Acc no.	Fruit Weight(g)	Fruit Length (cm)	Fruit width (cm)	Fruit diameter (cm)	Fruit volume(cc)	Pulp weight(g)	Peel weight (g)
KLM 4	486.0	11.0	10.0	29.3	520.0	350.00	69.00
KLM 9	419.0	13.0	8.8	25.5	350.0	256.33	38.07
KLM 14	399.0	11.0	7.8	25.0	322.0	260.0	30.0
KLM 16	484.7	13.5	9.0	26.0	420.0	330.0	40.0
KLM 20	393.3	11.0	9.0	27.0	309.0	218.0	27.0
KLM 21	284.0	10.5	8.6	25.6	400.00	307.0	46.0
KLM 22	410.0	12.0	10.0	26.8	375.0	284.0	44.0
KLM 26	638.0	14.2	11.0	30.0	610.0	553.3	37.6
KLM 32	336.0	10.3	9.3	23.0	435.0	363.0	50.0
KLM 33	484.7	12.0	12.0	29.5	500.0	393.0	53.0
KLM 35	387.0	11.5	8.0	33.0	345.0	242.0	51.0
KLM 36	320.0	11.0	9.2	26.3	385.3	291.6	46.0
KLM 41	325.6	10.3	9.1	25.6	351.0	271.0	44.0
TVM-1	317.0	10.50	9.5	28.1	420.0	289.0	51.0
TVM-6	336.0	11.0	7.0	24.0	318.0	197.0	55.0
TVM 8	433.0	13.0	9.5	27.0	400.0	208.0	29.0
TVM 9	430.0	12.0	8.0	24.0	385.0	210.0	37.0
TVM 11	317.3	10.0	10.0	25.0	310.0	186.00	30.00
TVM13	480.0	12.0	10.5	28.0	432.0	340.00	61.00
PTA2	303.0	9.0	8.0	24.0	300.0	205.00	35.00
CD	27.85	1.44	1.75	2.18	20.81	15.23	5.76

the case of other traditional or native varieties of Kerala. Considering the high-quality attributes and export potential of this variety, there is an urgent need to conserve the available genetic resources in situ which are on the verge of extinction.

Urbanization and industrialization paved way to large scale destruction of native varieties of mango. Moreover, the introduction of new varieties from other states and changed preference of people towards these varieties and use of grafts instead of seedlings led to the extinction of native cultivars. This also led to the irreversible genetic erosion leading to extinction of many of our traditional varieties. However, a few varieties are still existing in some homesteads and as avenue plants. So, it

was necessary to conserve the available traditional genetic resources, which are on the verge of extinction.

Traditional mango varieties are poorly investigated and promoted. Evaluation of these varieties will be useful for developing high yielding varieties with desirable characters through breeding approaches. However, the efforts taken to conserve the traditional mango germplasm of southern Kerala and its utilization in genetic improvement programmes is not much appreciable. Hence this work was envisaged with an objective of identification, conservation and maintenance of superior lines of the traditional mango variety Karpooram in

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Table 2. Yield characters of different accessions of traditional mango Karpooram.

Acc no.	Number of fruits	Yield per tree (kg)	Shelf life (days)
KLM 4	500	242.35	7.00
KLM 9	350	146.65	6.00
KLM 14	620	247.38	6.66
KLM 16	370	151.55	7.00
KLM 20	550	166.65	7.33
KLM 21	600	307.20	7.33
KLM 22	525	275.25	7.00
KLM 26	850	542.30	7.33
KLM 32	600	275.40	6.66
KLM 33	730	353.00	7.00
KLM 35	500	170.00	7.33
KLM 36	550	209.00	7.00
KLM 41	500	180.50	7.00
TVM-1	480	152.16	5.00
TVM-6	550	165.00	6.33
TVM 8	700	188.30	7.33
TVM 9	550	221.60	7.66
TVM 11	490	155.33	6.33
TVM13	500	221.00	6.60
PTA2	500	135.50	7.00
CD	30.23	24.62	1.05

Southern Kerala from existing germplasm at the farmer's field.

MATERIALS AND METHODS

Random survey was conducted to locate the indigenous/native mango variety Karpooram in different parts of central and south Kerala. The elite mango trees of this variety which were superior with respect to the important economic characters like yield, fruit size, organoleptic qualities, regularity in bearing and offseason bearing was selected and germplasm was established at FSRs, Sadanandapuram using grafts. The grafts will be prepared by pre-curing of scions in the mother plants identified. Pre-cured scions will be separated from the mother tree and grafts will be prepared. The grafts

was maintained at the farm and established grafts were planted and maintained in the orchard. For the study descriptive characters of leaf, inflorescence, fruit and stone were recorded as per IPGRI descriptor. Quantitative characters like leaf length, leaf width, petiole length, inflorescence length, inflorescence width, fruit length, fruit width, fruit weight, fruit volume was noted. Quality characters like acidity, ascorbic acid content, total carotenoids, total soluble solids, total sugar and reducing sugar and crude fibre content were studied.

RESULTS AND DISCUSSION

The study revealed that (Table1.) fruit weight ranges from 284g (KLM21) to 638g(KLM 26) also reported by Asif *et al* (2002), fruit length varied from 10.0 cm(TVM 11) to 14.2 cm (KLM 26) ,

Table3.Fruit quality characters of different accessions of traditional mango Karpooram.

Acc no.	TSS (°brix)	Acidity (%)	Carotenoid (mg/100g)	Ascorbic Acid (mg/100 g)	Total Sugar (%)	Reducing Sugar(%)	Non Reducing Sugar(%)
KLM 4	15.00	0.640	4.20	15.00	9.22	3.00	6.22
KLM 9	16.80	0.640	3.15	17.01	8.29	3.00	5.29
KLM 14	14.00	0.320	2.23	15.00	9.06	1.66	7.40
KLM 16	16.00	1.900	2.89	17.05	8.43	2.63	5.80
KLM 20	15.50	1.280	2.02	30.27	11.62	2.38	9.24
KLM 21	14.00	0.320	3.62	15.00	12.60	2.08	10.52
KLM 22	14.60	0.320	2.18	13.30	8.60	2.92	5.68
KLM 26	22.00	0.317	5.22	28.50	15.00	5.00	10.00
KLM 32	15.00	0.820	2.05	20.00	7.52	1.99	5.53
KLM 33	20.00	0.320	4.82	30.27	15.64	4.20	11.44
KLM 35	16.00	0.320	4.49	17.23	8.90	3.27	5.63
KLM 36	15.00	0.953	3.38	13.33	13.31	4.20	9.11
KLM 41	18.00	0.323	2.50	12.00	8.33	2.03	6.30
TVM-1	16.00	0.937	2.40	20.67	8.91	1.62	7.29
TVM-6	20.00	0.319	5.25	20.00	14.00	4.16	9.84
TVM 8	18.00	0.633	3.00	15.00	7.22	2.40	4.82
TVM 9	19.00	0.960	4.00	20.33	13.12	2.60	10.52
TVM 11	16.00	0.923	5.78	14.93	10.40	2.50	7.90
TVM13	18.00	0.630	4.48	18.00	13.12	2.93	10.19
PTA2	19.00	0.320	2.65	13.32	12.91	3.57	9.34
CD	1.114	0.189	0.242	2.340	0.471	0.294	0.593

fruit width varied from 7cm(TVM 6) to 12cm(KLM 33), fruit diameter varied from 23 cm(KLM 32) to 33cm (KLM 35), fruit volume varied from 300 cc (PTA 2) to 610 cc KLM 26), pulp weight varied from 186 g (TVM 11) to 553.33g (KLM 26), peel weight varied from 27g (KLM 20) to 69.0 g(KLM 4).

Results of the experiment showed that (Table.2) number of fruits from different accessions of Karpooram varied between 350 (KLM 9) to 800(KLM 26), yield per tree varies from 146.6 Kg (KLM 9) to 542.3kg (KLM 26). Prakashkumar and Suresh (2018) observed similar results in mango, shelf life at ambient conditions varies from 5 days (TVM 1) to 7.66 days(TVM9).

Fruit quality characters showed significant difference among different accessions studied (Table .3). TSS value varied from 14 °Brix (KLM-21) to (KLM -26)22° Brix, acidity varied from 0.317 % (KLM 26) to 1.9 percent (KLM 16). Das *et al* (2020) showed similar result. Carotenoid content varied from 2.02 mg/100 g (KLM-20) to 5.78 mg/100 g (TVM 11), ascorbic acid varied from 12.0 mg/100g (KLM 41) to 30.27 mg/100g (KLM 33), total sugar content varied from 7.22 per cent (TVM 8) to 15.64 per cent (KLM 33), reducing sugar content varied from 1.62 per cent (TVM 1) to 5.0 per cent (KLM 26), non reducing sugar content varied from 4.82 per cent (TVM 8) to 11.44 per cent (KLM 33), crude fibre content content varied from 2.80 per cent (KLM 26) to 16.5 per cent (KLM 41).

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CONCLUSION

Karpooram is a native or indigenous mango variety found in the homesteads of south and central Kerala. Evaluation of various accessions of traditional mango variety Karpooram in Southern Kerala revealed that a good number of Karpooram mango trees were located in Kollam district of Kerala. Fruit weight varies from 250g to 675g. The tree is moderately vigorous with spreading habit. Fruit bearing type is solitary. Highest TSS (20^o brix) was reported from accession KLM 35 and KLM 36, lowest acidity of 0.32 per cent was reported from KLM 21, KLM 22, KLM 32, KLM 33 and PTA 2. Highest carotenoid content of 4.89 mg/100g was reported from KLM 26, highest ascorbic acid content of 30 mg/100g was reported from KLM 32. The work revealed that Karpooram mango accessions KLM 26 and KLM 33 were promising ones with respect to the morphological characters studied .

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