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Performance of Mangalore Melon Selections in Farmer's Field

Ratnakar M. Shet[1*], Shivanand Hongal[1] and Raghavendra Gunnaiah[2]

[1]College of Horticulture Sirsi, University of Horticultural Sciences, Bagalkot, Karnataka (581 401), India
[2]College of Horticulture Bagalkot,University of Horticultural Sciences, Bagalkot, Karnataka (587 104), India

Corresponding Author

Ratnakar M. Shet
e-mail: ratnakar.shet@uhsbagalkot.edu.in

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Abstract

Mangalore melon (*Cucumis melo* var. *acidulus*) is a kind of non-dessert culinary melon belongs to family Cucurbitaceace. It is widely cultivated in Southern parts of Indian subcontinent. It is mainly utilized for culinary purpose especially preparation of lentil soup, sambar, dosa, palya and chutney. It is locally referred as Mangalore Southe, Sambar southe, Mogem etc. A total of 80 accessions were collected from six southern Indian states namely, Karnataka, Kerala, Andhra Pradesh, Tamil Nadu, Telangana and Goa. The germplasm accessions were evaluated and characterized for quantitative and qualitative traits during *Kharif* 2018 and Summer season of 2019 at College of Horticulture farm, Sirsi, Karnataka. The top performing 14 selected accessions of South Indian Mangalore melon during two season evaluation were subjected for their yield performance assessment under progressive farmer's field during summer season 2020 in Uttara Kannada district of Karnataka. All the selected accessions performed better compare to station trail. The accessions namely MS-28, MS-30, MS- 74, MS-78 and MS-79 found to be superior for yield performance. Generally, fruits of Mangalore melons are variable in size, shape, color and shelf life. However, local consumers preferred fruits with green color, high shelf life and the fruit color which does not change on maturity. Present study helps to know the local required Mangalore melon type for consumers as well as for farmer's income generation.

Keywords: Culinary, farmers field, Mangalore melon, performance, selections

1. Introduction

Mangalore melon (*Cucumis melo* var *acidulus*) is a kind of non-dessert culinary melon, locally referred as Mangalore Southe is one of the popular vegetables of Uttara Kannada district of Karnataka. It is commonly cultivated during summer in the fallow paddy fields. Mangalore melon can be seen in almost every household of Uttara Kannada district, used in preparation of sambar (lentil soup), dosa, curries, Idly, chutney and its seeds are used for preparation of juice against dyspepsia (Munshi and Alvarez, 2005; Shruti et al., 2016; Suzanne, 2016). It's being known by various local names in Uttara Kannada viz., Sambar Southe, Moggekayi, and Mogem. Culinary or Mangalore melon fruits are known for long shelf life and usually stored for one year without losing freshness (Vidya, 2012; Manohar and Murthy, 2012; Swamy, 2017). It is the reach out vegetable during rainy season when there is scarcity of vegetables in the market due to heavy down pour. Mangalore melon scarcely grown as commercially vegetable due to lower yields and returns; hence the cultivation is restricted to household usage. Further, area of cultivation is decreasing in the traditional belt due to introduction of new vegetables, also changes in the food habits and incidence of pests and diseases (Ratnakar et al., 2019). Consequently, many traditionally grown landraces have been lost. With the intention of restoring the germplasm pool, exploration, collection and conservation of Mangalore melon landraces has been taken up in the conventional Mangalore melon cultivation areas, especially costal and malnad districts of Karnataka, Kerala, Tamil Nadu, Andhra Pradesh and Telangana. Additionally, few elite accessions with good agronomic performance and higher yields will be reintroduced for cultivations. In this study, large scale demonstration of 14 selected accessions of Mangalore melon was taken up in the farmer's field and evaluated along with the local check varieties.

2. Materials and Methods

Fourteen accessions of Mangalore melon that had outperformed in productivity during the research station trials were are given to the farmer Sri Ramachandra Hedge of Koppa village Near Sirsi (longitude 74.85°E; latitude 14.62°N) for cultivation during summer 2020.The salient features of selected accessions are presented in Table 1.

2.1. Plant production and protection

Raised beds 30 cm height × 80 cm width were prepared in

Table 1: Salient features of selected accession of Mangalore melon

Accessions	Place of collection	Silent features
MS-2	Chevvoor, Trissur, Kerala	Elongated shape, yellow color on maturity, no stripes, fruit weighs average 800 g. flesh thickness of 2.0-2.5 cm. first harvest can be done 50 days after sowing. Moderately resistance to downey mildew and anthracnose. Fruits on full ripening produces sweet aroma. Yields 10.71 tonnes acre^{-1}
MS-15	Muttippalam, Kerala	Round shaped yellow fruits matures 60 DAS, yields 12.31 tonnes acre^{-1}
MS-21	Bapnalli, Sirsi, Karnataka	Green colored no stripes, Medium size fruits with good flesh thickness (3.50 cm) and shelf life, suitable for dishes like dosa and kadbu, preferred type in Malnad taluks of Uttara Kannada district. Yields 17.82 tonnes acre^{-1}
MS-25	Manchikere, Yellapur, Karnataka	Green color fruits turn yellow after one month, good flesh content, yields 19.02 tonnes acre^{-1}
MS-28	Kadabala, Sirsi, Karnataka	Dark green color, ovate fruits having average fruit weight of 2.5 kg and having prominent smooth ribs on the surface. Fruits having high flesh thickness (4.5 cm) and good shelf life. Fruits can be stored for more than six months in normal room condition. Medium duration, Yields 23.11 tonnes acre^{-1}
MS-30	Vajralli, Yellapur, Karnataka	Good shelf life (> 9 months) fruits are ovate in shape with prominent stripe. Immature fruits are having bitter taste, tolerant to fruit borer. Mature fruits turn orange color with prominent stripes and are good in flesh thickness and early type (50-60 days), Yields 24.04 tonnes acre^{-1}
MS-36	Kimnajji, Belthangadi, Karnataka	Medium sized oblate shaped, striped, 6-8 fruits vine^{-1} each weighs 600 g, good for small family consumption. First harvest at 50 days after sowing, early type (45-60 days) yields 16.48 tonnes acre^{-1}
MS-39	Medanaadu, Kodagu, Karnataka	Oblate shaped, average fruit weighs one kg, light green and white stripes surface, good storage capacity (> 9 months), moderate yielding capacity (5 kg vine^{-1}), high flesh thickness (4-4.5 cm), short duration (50- 60 days). Yields 11.47 tonnes acre^{-1}
MS-74	Krishnagiri, Tamil Nadu	Big size oblong fruits with patchy green stripes weighs 2.0 kg Good shelf life (> 6 month) bearing average four marketable fruits vine^{-1}. High yielding capacity (10 kg vine^{-1}). Early type 50-60 days, Yields 28.31 tonnes acre^{-1}
MS-78	Madgoa Market,Goa	Green and white striped patches oblong shaped fruits turns yellowish orange on maturity, long duration type yields 11.82 tonnes acre^{-1}
MS-79	Salkani, Sirsi, Karnataka	Elongated to oblong green color fruits with good flesh content. Good quality flesh preferred fruit type by local people for culinary purpose. It's having long shelf life (> 8 months).
MS-62	Koppa, Karnataka	Ovate green with white to yellow stripes on maturity. Resistance to downey mildew and anthracnose diseases, Yields 11.02 tonnes acre^{-1}
MS-81	Manbhagi, Sirsi, Karnataka	Stripes oblong shaped medium to large fruits, good flesh content resistant to downey mildew yields 18.93 tonnes acre^{-1}
MS-69	Prakasaraopalem, Andhra Pradesh	Scattered green patches round small fruits having average weight of 500 g. Vine grows to length of 2 mt and bears 8-10 small fruits. Long duration type (65-75 days) yields 8.58 tonnes acre^{-1}

one acre of fallow paddy field. The bed was mixed with 6 tonnes of farm yard manure along with recommended dose of N, P_2O_5, K_2O (100:75:50 kg ha^{-1}) in the form of urea, single super phosphate and muriate of potash, respectively as a basal dose. Drip irrigation system was lined at center of bed and covered with 120 cm width and 30-micron thickness Mulching sheet. The plot was divided into two halves, each representing a replication. The single seeds of 14 selected accessions sown directly in the 2 mt distance beds with a spacing of 45 cm between seeds. For each accession, 150 plants were maintained in each replication. The fertigation was done at three stages: first at five leaf stage of the crop 500 g (12N:61P:0K) and 1 kg (19N:19P:19K), second at flower initiation stage calcium nitrate (1 kg acre^{-1}) and third at fruiting stage 500 g (13N:0P:45K) and one kg (19N:19P:19K) twice at interval of 6 days through drip irrigation. Neem oil was sprayed

at four leaf stage and full fruit set stage as a precautionary measure to prevent pests and disease infestation. Pesticide hemaedochropid (1 ml^{-1}) was sprayed at vegetative as well as reproductive stages to manage the fruit fly and pumkin beetle infestation. In addition, light traps were placed all over the field to minimize fruit fly incidence.

The observations for quantitative traits like vine length (cm), number of branches, fruit length and breadth (cm), number of fruits $vine^{-1}$, average fruit weight (g) yield $vine^{-1}$ was recorded on randomly selected 10 plants in each replication and mean data was subjected for statistical analysis. Yield $vine^{-1}$ was converted to total yield $acre^{-1}$ for each accession to compare the *per se* yield performance of the selected accessions.

3. Results and Discussion

3.1. Yield performance

The mean performance of selected accessions is presented in Table 2. The Coefficient of variation values indicates less environmental influence on the growth of accessions. The estimates genetic variability parameters for seven yield contributing traits indicated significant genetic variation present among the yield traits (Table 3). All the seven traits studied were noted high PCV, GCV, Heritability accompanied by genetic advance. This indicates yield traits with high heritability and genetic advance had significant role in the enhancing or stable yield performance of selected accessions for next generation (Silpa et al., 2020). The maximum yield was observed for MS- 28 (52.40 t $acre^{-1}$) followed by MS-30 (50.82 t $acre^{-1}$), MS-74 (50.24 t $acre^{-1}$) and MS -79 (49.58 t $acre^{-1}$). These four accessions performed better with respect to yield and yield components. The average fruit weight of these accessions was more than 2800 g and suitable for mass gathering meals such as marriage functions, community kitchens of temples and nuclear families. The accessions namely MS 36 (919 g), MS 62 (863 g) MS 21 (1530 g), MS 25 (1285 g) are medium size fruit with good flesh content are more preferred to small families for culinary use. The MS-69 that produces maximum number of fruits $vine^{-1}$ (8) with average weight of 533 g is highly preferred in the market for daily consumption. All the accessions performed better in the farmer's field as compared to station trails. Yield of most of the accessions was doubled in the farmers' field due to optimum agronomic management. The paddy fallow land is rich in nutrients, especially organic carbon due to residual nutrients of previous crop and the paddy stubbles.

Table 2: Mean values of yield attributes of selected accessions of Mangalore melon under farmer's field

Accessions	Vine length (cm)	No. of Branches	Fruit length (cm)	Fruit breadth (cm)	Avg fruit weight (g)	No. of fruits $vine^{-1}$	Yield $vine^{-1}$ (kg)	Yield $Acre^{-1}$ (tones)
MS-2	198.00	4.00	20.90	8.57	825.94	5.50	4.91	19.64
MS-15	212.50	3.50	8.34	8.35	638.84	4.00	3.39	13.54
MS-21	204.00	3.90	18.82	15.00	1530.00	4.50	6.51	26.02
MS-25	171.50	3.50	16.93	14.01	1285.00	4.00	4.29	17.16
MS-28	230.50	3.50	31.00	28.11	3350.00	4.00	13.10	52.40
MS-30	192.50	4.90	29.23	17.50	2875.00	4.00	12.71	50.82
MS-36	158.00	4.10	16.18	10.50	919.00	5.50	6.36	25.42
MS-39	166.00	3.55	19.15	11.27	1270.00	4.00	7.04	28.16
MS-74	175.00	5.10	28.77	15.00	3090.00	4.50	12.56	50.24
MS-78	182.00	3.80	29.45	18.05	2185.00	4.50	11.26	45.02
MS-79	188.50	4.00	28.35	15.72	3052.50	4.50	12.40	49.58
MS-62	168.00	4.50	18.30	10.52	863.50	3.50	3.49	13.96
MS-69	201.00	3.30	15.63	9.65	533.00	8.00	3.97	15.86
MS-81	191.00	4.10	26.35	13.63	1890.00	4.00	11.05	44.18
Local check	160.30	3.80	20.62	14.30	1132.00	3.70	3.58	14.62
Minimum	158.00	3.30	8.34	8.35	533.00	3.50	3.49	13.54
Maximum	230.50	5.10	31.00	28.11	3350.00	8.00	13.10	52.40
SEM±	1.32	0.28	0.79	0.70	65.84	0.35	0.45	
CV (%)	0.99	9.99	5.12	7.09	5.30	11.06	7.67	
CD (*p*=0.05)	4.00	0.85	2.40	2.12	199.69	1.07	1.37	

Table 3: Estimates of variability parameters for seven traits in selected accessions of Mangalore melon

Traits	Mean±SE	Range		PCV (%)	GCV (%)	h_{bs}^2 (%)	GAM (%)
		Min	Max				
Vine length (cm)	186.53±1.32	158.0	230.50	25.13	23.92	69.71	35.81
No. of branches	3.71±0.28	3.30	5.10	35.14	29.97	72.73	52.73
Fruit length (cm)	21.87±0.79	8.34	31.00	29.19	27.06	89.14	49.00
Fruit breadth (cm)	14.01±0.70	8.35	28.11	34.23	33.54	94.19	57.58
Avg fruit weight (g)	1696±65.84	533	3350	55.03	51.79	92.29	59.37
No. fruits $vine^{-1}$	4.54±0.35	3.50	8.00	32.82	26.80	66.67	45.08
Fruit yield $vine^{-1}$ (kg)	7.77±0.45	3.49	13.10	55.18	45.36	63.22	64.58

PCV: Phenotypic coefficient of variation, GCV: Genotypic coefficient of variation, h_{bs}^2: Heritability (Broad sense), GAM: Genetic advance as % mean

3.2. Farmers opinion on selected accessions performance

Progressive farmer Shri Ramachandra Hegde conducted field demonstration of selected accessions of Mangalore melon from our experiments adopting Israel cultivation technology of drip irrigation, raised beds and mulching.

All the 14 selected accessions had 100% germination and good vegetative growth. Three accessions MS-15, MS- 62 and MS-69 flowered at ninety days after sowing. The honeybee hives placed in and around the field helped in effective pollination and fruit set. There was no incidence of diseases; fruits were infested with fruit fly, resulted in reduction in quality fruit yield. The accessions namely MS 28, MS 30, MS 74, MS 78, MS 79 and MS 81 had good size fruits and each fruit weighs on an average more than two kg. He harvested fruits ranged from 300 g to 5 kg weight (Sandya, 2020). Each accession can produce minimum of 3-4 good size marketable fruits. The accession MS-2 fruits had elongated shape looks like cucumber, turn yellow color on maturity and have bitter taste. Hence, MS 2 is not preferred by local consumers. The late accessions namely MS 15, MS 62 and MS 69 produced small to medium sized fruits most of them are infested by fruit fly. Local people's preferred green color, ovate to oblong shaped, medium to large sized with or without stripes fruits. Out of 14 accessions, MS-28, MS 21, MS 79 (green color), MS 74, MS 78, MS 36 and MS 39 produced good quality fruits as preferred by local consumers and fetched better price in the market. More than 60 quintals of marketable fruit were harvested and was able to market 55quintal of fruits under COVID-19 situations and earned net profit of INR 50,000 in a three month duration.

3.2. Consumers opinion

A small survey of consumers who procured selected accessions fruits from progressive farmer was conducted on their preference for choosing the product. The major consumer of Mangalore melon in Uttara Kannada is Hawyaka Brahmins, who use fruits throughout the year for their culinary purposes. The preferred traits of consumer preference are high flesh thickness, crispy flesh, non-bitterness, narrow seed cavity, long shelf life, retention of primary rind color, taste and the shape. They prefer local types (green color) rather than striped one as well as color changing types. The accessions having green fruits with good flesh content (MS 28, MS 21, MS 79) most preferred by the hilly region Malnad consumers. Accessions (MS 30, MS 36, MS 39, MS 74, MS 78) having striped fruits were preferred by coastal region consumers.

4. Conclusion

A farmer participatory in varietal selection provides ideas to breeder for development of desirable variety or hybrids suitable for farmers. Present study helped to know the local requirement Mangalore melon type for consumers as well as for farmer's income generation. The accessions MS 28, MS 74, MS 79, MS 78 and MS 30 performed better in farmer field. These accessions can be taken up for large scale farm demonstration to confirm the yield consistency and adoption of accessions in farmer's field.

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6. References

Manohar, S., Murthy, H., 2012. Estimation of phenotypic divergence in a collection of cucumis melo, including shelf-life of fruit. Scientia horticulturae 148, 74–82.

Munshi, A.D., Alvarez, J.M., 2005. Hybrid melon Development. Journal New Seeds 6(4), 321–360.

Ratnakar, M.S., Shivanand, H., Shantappa, T., 2019. Malenadu raithar besigeya bele mogekayi. Udyana loka 9(1), 6–7.

Sandya, H., 2020. Sirsi/ Sambaru Southe: Lockdownnallu marata- Prajavani. Available from https://www.

prajavani.net/district/uthara-kannada/farmar-sold-sambar-cucumber-successfully-737639.html.

Shruti, G., Ganiger,V.M., Bhuvaneshwari, G., Madalageri, M.B., Kotikal, Y.K., Manjunatha, G., 2016. Evaluation of oriental pickling melon (*Cucumis melo* L. Var. *conomon*) Genotypes for Pest and Disease Reaction under Northern Dry Zone of Karnataka. Journal of Environment and Ecology 7(1), 29−36.

Silpa, R., Sarah, T.G., Anitha, P., Pradeepkumar, T., Sujatha, V.S., Bastian, D., Pathrose, B., Laly, J.C., .2020. Genetic divergence analysis in oriental pickling melon (*Cucumis melo* var. *conomon* Mak.). Research Journal Agriculture Science 11(1), 115−119

Suzanne, F., 2016. Growing field marrow/Madras cucumber / Sambar cucumber in a pot in India. 9 October 2016. Available from http://suespottedterracegarden.blogspot.in/2016/10/growing-field-marrowmadras-cumcumber.html

Swamy, K.R.M., 2017. Origin, distribution and systematics of culinary melon (*Cucumis melo* subsp*. agrestis* var. *conomon*). Journal of Horticultural Science 12(1), 1−22.

Vidya, B., 2012. Madras cucumber: Finding the origins of this South Indian vegetable. The Economic Times, December 9, 2012.