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Rutika Arvind Ingle
Department of Vegetable Science, College of Horticulture, Dapoli, Maharashtra, India

PC Haldavnekar
Department of Vegetable Science, College of Horticulture, Dapoli, Maharashtra, India

YR Parulekar
Department of Vegetable Science, College of Horticulture, Dapoli, Maharashtra, India

NV Dalvi
Department of Floriculture and Landscaping, College of Horticulture, Dapoli, Maharashtra, India

MG Palshetkar
Department of Botany, College of Agriculture, Dapoli, Maharashtra, India

Corresponding Author:
Rutika Arvind Ingle
Department of Vegetable Science, College of Horticulture, Dapoli, Maharashtra, India

Evaluation of Muskmelon (*Cucumis melo L.*) genotypes for growth and yield under Konkan agroclimatic conditions

Rutika Arvind Ingle, PC Haldavnekar, YR Parulekar, NV Dalvi and MG Palshetkar

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Abstract
Muskmelon is one of the most demanding cucurbits. The present study was carried out to evaluate the performance of muskmelon genotypes for different traits attributing for growth and yield at College of Horticulture, Dapoli. The experiment was carried out in randomized block design having 8 treatments and three replications in pits of 60 cm diameter and 30 cm depth were taken at a spacing of 1m × 0.5 m. Among the 8 genotypes used for research, the highest vine length (90.26 cm) was recorded in Arka Siri, highest number of leaves (38.47), leaf length (11.07 cm) and leaf width (13.09 cm) was recorded in RM-50. Petiole length was highest in IC 373327 (10.82cm). The highest fruit per vine was recorded in IC 373327 (8.78) and highest yield per vine was recorded in RM-50 (7.7kg) followed by IC 373327 (7.6 kg). Based on their performance RM-50 was recommended for cultivation in Konkan agroclimatic conditions in rabi season.

Keywords: Muskmelon, growth, yield, Fruit, Genotype

Introduction
Muskmelon (*Cucumis melo* L., 2n=24) is an important vegetable crop with global consumption and economic importance (Kirkbride, 1993) [4]. This species is frequently known as melon, sweet melon, muskmelon, casaba, cantaloupe (Nayar and Singh, 1998) [5]. Muskmelon is a popular summer fruit due to its refreshing, sweet flesh and nice aroma. It ranks second after watermelon in terms area and production. India is a major producer of muskmelon, contributing significantly to global muskmelon production. In the year, 2022-23, India's muskmelon cultivation area was 70,000 hectares, with a production of 15.10 lakh metric tons, according to National Horticulture Board (2022-23). The leading muskmelon-producing states include Punjab, Madhya Pradesh, Rajasthan, Haryana, and Uttar Pradesh. The cultivation of muskmelon is favored in warm and semi-arid conditions, as the plant thrives in well-drained sandy loam soils with a pH range of 6.0 to 7.5. Growing muskmelon in the Konkan region offers several advantages due to its favorable agro-climatic conditions and fertile soil. The region's warm and humid tropical climate, combined with moderate winters and ample sunshine, creates an ideal environment for muskmelon cultivation, particularly during the summer and post-monsoon seasons. To address the increasing demand, it is essential to focus on improving its growth and yield. This study aims to evaluate different muskmelon genotypes to identify those best suited for cultivation under the Konkan agroclimatic conditions, with the ultimate goal of enhancing muskmelon productivity in the region.

Material and Method
Study site and Experimental details
The experiment was carried out in the year 2024-25 at College of Horticulture, Dapoli during rabi season (November- March). A total of 8 genotypes were taken from various universities, among that 4 were released varieties and 4 were germplasm lines. The experiment was laid out in Randomised Block Design with three replications in pits of 60 cm diameter and 30 cm depth

were taken at a spacing of 1m × 0.5 m. Each genotype was planted in a single row having 19 plants per row in each replication. In total there were 24 beds, 8 treatments and 3 replications. The cultural and management practices were adopted according to the package of practices recommended by Dr. Babasaheb Sawant Konkan Krushi Vidyapeeth, Dapoli.

Parameters recorded

The observations were recorded from five randomly selected plants in each genotype per replication. Vine length (cm), Number of leaves, Leaf length(cm), Leaf width (cm), Petiole length (cm), Number of fruits per vine (Kg), Yield per vine (Kg), Yield per hectare (tons). The data obtained in the present investigation were statistically analysed by the method suggested by Panse and Sukhatme (1995) [6]. The standard error (S.E) of means was worked out and a critical difference (CD) at 5% was also worked out wherever the results were significant.

Results and Discussion

Significant differences among genotypes were observed for all characters. Vine length is one of the important growth characteristics and it is strongly associated with the plant architecture, life span, maturity and yield of the genotype. It decides the overall structure of the plant and shows the extent of growth of plant vigor. The highest vine length was observed in Arka Siri (90.26 cm) which was at par with IC 373327 (76.67 cm) and Pusa Madhuras (75.56 cm) whereas the lowest plant height was observed in EC1194998 (47.27 cm) at 30 DAS. At last harvest the highest vine length was observed in Arka Siri (203.51 cm) and lowest vine length was observed in EC1194996 (106.37 cm) (Table 1). Similar variation in vine length was also reported in muskmelon by Hegde *et al.* (1994) who observed that the variety Arka Manik exhibited more vine length compared to other cultivars. Additionally, Venkatesan *et al.* (2016) also recorded variation in vine length among muskmelon genotypes contributing to differences in vegetative vigor.

The number of leaves is an important growth parameter as it is related to the overall vegetative yield of plants. The highest number of leaves was observed at RM-50 (90.26) which was at par to Arka Siri (31.60) whereas, the lowest number of leaves per plant was observed in Durgapur Madhu (21.44) at 30 DAS. The highest number of leaves was observed in RM-50 (114.52) and lowest number of leaves observed in IC373327 (73.56) at last harvest (Table 1). It might be due to higher vegetative growth potential. A similar variation pattern was observed with the findings of Rizzo *et al.* (2001) [9] in muskmelon, who reported that genetic makeup significantly affects vine vigor and leaf proliferation.

The highest leaf length was observed at RM -50 (11.07 cm) which was at par with Arka Siri (10.67 cm) and Pusa Maduras (9.77 cm) and lowest leaf length was observed in IC 373327 (7.13 cm) at 30 DAS (Table 1). The genotypes also differed significantly in leaf length and width. RM-50 recorded the maximum leaf dimensions, it might be due to indicating better photosynthetic area, possibly leading to higher yield potential. Above finding regarding variation in leaf length was recorded by Sharma and Lal, (2004) [10] reported significant variation in leaf morphology among muskmelon varieties, which was associated with differences in fruit development.

The leaf width is a crucial factor in a plant's survival and growth, influencing photosynthesis, water regulation, and overall plant architecture. At 30 DAS the highest width was observed in RM-50 (13.09 cm) which was par to Arka siri (12.83 cm), EC 1194985 (12.43 cm), Pusa Madhuras (12.01 cm) and lowest leaf width was observed in EC1194996 (10.57 cm) (Table 1). This variation might be attributed to differences in genotype genetic makeup. The Similar results in relation to significant variation in number of leaves per plant were also reported by Sharma and Lal (2004) [10].

The length of petiole significantly impacts its light-capturing ability, nutrient transport and overall growth. The longest petiole length was observed in Pusa Madhuras (11.89 cm) which was at par to IC 373327 (10.82 cm), Arka Siri (10.00 cm) and EC 1194985 (9.86 cm) and shortest petiole length was observed in EC1194996 (7.33 cm) (Table 1). Variation in petiole length from 7.33 to 11.89 cm was observed, with longer petioles possibly enhancing light interception. Similar variability was also reported in muskmelon by Akhter *et al.* (2023) [1] who observed significant differences in vegetative traits among genotypes.

The fruit per plant varies according to the various varieties of muskmelon, which significantly, the highest number of fruits was observed IC 373327 (8.78) which was statistically at par to RM-50 (8.16) and EC 1194996 (7.41), and the lowest number of fruits were on Durgapur Madhu (4.31) (Table 2).These similar results regarding fruit per plant were recorded by Venkatesan *et al.* (2016) [11] in muskmelon, who observed a similar trend between fruit count and total yield.

The yield of various muskmelon genotypes varies according to variety, and it was observed that the highest number of yields was shown by IC 373327(7.6 kg) which was statistically at par to EC 1194996 (6 kg). The lowest yield was obtained by EC 1194998 (3.1 kg) (Table 2). This confirms the reports of Dantas *et al.* (2011) [3] in muskmelon, who found that genotype had a major effect on yield per plant and per hectare.

Yield per hectare was recorded and highest yield/hectare was observed in IC 373327 (15.3 tons) and lowest yield^{-1} was in Pusa Madhuras (7.15 tons) (Table 2). These results are in conformity with the findings of Hedge *et al*. (1994) in watermelon, Nandpuri *et al*. (1985), Paiva *et al.* (2000), and Rad *et al*. (2010) [7] in muskmelon, Mohan *et al. (*2004) and Ram *et al.* (2006) [8] in ridge gourd.

Table 1: Evaluation of muskmelon genotypes for growth

Treatment	Vine length (cm)	Number of leaves	Leaf length (cm)	Leaf width(cm)	Petiole length (cm)
Pusa Madhuras	75.56	24.19	9.77	12.10	11.89
Arka Siri	90.26	31.60	10.67	12.83	10.00
RM-50	69.67	38.47	11.07	13.09	9.63
Durgapur Madhu	47.83	28.42	8.97	10.33	9.58
EC 1194996	58.13	21.44	9.13	10.57	7.33
EC 1194998	47.27	24.49	8.25	10.80	8.83
IC 373327	76.67	29.30	7.13	11.13	10.82
EC 1194985	56.87	28.51	9.37	12.43	9.86
Range	47.27-90.26	21.44-38.47	7.13-11.07	10.33-13.09	7.33-11.89
Result	SIG	SIG	SIG	SIG	SIG
Mean	65.28	28.30	9.29	11.66	9.74
S.E m	5.45	2.38	0.52	0.54	0.71
CD at 5%	16.54	7.23	1.58	1.64	2.14

Table 2: Evaluation of muskmelon genotypes for yield attributing character

Treatment	Number of fruits per plant	Yield-1 (Kg)	Yield-1 (tons)
Pusa Madhuras	5.68	1.7	7.15
Arka Siri	5.69	3.8	7.5
RM-50	8.16	7.7	15.4
Durgapur Madhu	4.31	4.4	8.72
EC 1194996	7.41	6.0	12.0
EC 1194998	6.94	3.3	6.6
IC 373327	8.78	7.6	15.3
EC 1194985	6.19	5.0	10.0
Range	4.31-8.78	1.7-5.0	15.4-6.6
Result	SIG	SIG	SIG
Mean	6.09	4.44	8.87
S.E m	0.53	0.42	0.8
CD at 5%	1.60	1.27	2.5

Conclusion

In the present study it is concluded that the highest vine length and number of leaves was observed in Arka Siri, and the highest leaf length and leaf width was observed in RM-50. The highest petiole length was observed in Pusa Madhuras. The genotype IC 373327 was recorded as the highest fruit per vine. RM-50 was superior in yield characters showing highest yield per plot and yield per hectare. Considering the performance in respect of various, growth, reproductive, yield attributing character for muskmelon genotypes, it was observed that the genotypes RM-50 and Durgapur Madhu had shown better performance during rabi season of Konkan region. However, its present findings are based on the season experiment. It requires further confirmation by conducting the same investigation for the next 1-2 seasons under the Konkan region of Maharashtra.

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