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Evaluation of various Chilli (*Capsicum annuum* L.) genotypes grown under Konkan agroclimatic condition

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Abstract

Thirteen chilli genotypes were evaluated for growth, yield and yield attributing characters under Konkan agro-climatic condition. The study revealed that the highest plant height (107.57 cm) was recorded in genotype T₁₁, the maximum number of leaves (881.67) in genotype T₆. Genotype T₆ and T₁₃ reported minimum days (27.67) for initiation of flowering. Genotypes T₅ and T₈ showed cluster fruiting habit while rest of the genotypes showed solitary fruiting habit. Minimum days required for horticultural maturity from pollination were noticed in T₁₃ (16.67 days). Crop duration was maximum (156 days) in all the genotypes except T₈. The treatment T₁, T₂, T₅, T₇, T₈, T₉, T₁₀, T₁₁, T₁₂ and T₁₃ had elongate fruits while T₃, T₄ and T₆ had triangular fruit. Genotype T₆, T₇, T₁₀, T₁₁ and T₁₂ (60 days) recorded the lowest days to first harvest. Genotype T₁, T₂, T₄, T₅, T₇, T₉, T₁₀ and T₁₃ recorded the highest days to last harvest (114 days). The highest number of pickings (8) per plant was recorded in treatment T₁, T₂, T₄, T₅, T₇, T₉ and T₁₀. Overall yield was highest (23.43 t/ha) in genotype T₁₁. The maximum number of seeds per fruit was observed in the treatment T₁₁ (100.11).

Keywords: Chilli, genotypes, growth, yield

Introduction

Chilli (*Capsicum annuum* L.) belongs to the family Solanaceae having diploid species with mostly $2n = 2x = 24$ chromosomes, but wild species with $2n = 2x = 26$ chromosomes have been reported (Pickersgill, 1991) [7]. In India chilli is grown on an area of 7.43 lakh ha with production of 19.14 lakh tones (Anonymous, 2021) [1]. In Maharashtra, it is grown on an area of 105.50 thousand ha with production of 48.50 MT (Anonymous, 2021) [2]. The major chilli growing states are Andhra Pradesh, Karnataka, Maharashtra, Orissa, Tamil Nadu, Madhya Pradesh, West Bengal and Rajasthan. Andhra Pradesh is leading both in area and production contributing about 25 per cent of the total area and over 40 to 50 per cent of the total production. In Maharashtra Chilli is mainly grown in Dhule, Jalgaon, Pune, Satara, Nagpur, Kolhapur, Yavatmal, Aurangabad and Sangli district. The major share of chilli cultivation in Konkan region goes to Thane district while sizable area also exists in Sindhudurg, Ratnagiri and Raigad district. The chilli fruit varies in size from 1-20 cm in length, from thin, long to conical and thick fleshed blocky shape. The popularity of chilli is due to its wide range of shape, size, sensory attributes and piquancy that make generally insipid bulk nutritive flesh, cereal and vegetable foods more appetizing (Govindarajan *et al.*, 1987) [3]. The mature green chillies are used for value addition especially for preparation of chilli pickle, mixed pickle as well as for preparation of salted and spiced chillies which is locally known as *Bharleli Mirchi* and is popular in Konkan region. Moreover, these genotypes can also be grown under high rainfall areas during *kharif* season. The large variability in respect of fruit size, shape and growth among these chilli genotypes exist in whole Konkan region.

Hence, there is a need to evaluate chilli genotypes under Konkan condition for excellent quality, growth and yield performance. In view of this, present investigation was undertaken for Evaluation of various Chilli (*Capsicum annuum* L.) genotypes grown under Konkan agro-climatic condition.

Materials and Methods

The field experiment was conducted at Educational Research Farm, Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.). Present experiment was undertaken during the 2014-15. Evaluating 13 different chilli (*Capsicum annuum* L.) genotypes including T₁₃ (Konkan Kirti) collected at Department of Horticulture from different locations of konkan region.

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The experiment was laid out in randomized block design with three replications. The soil of experimental plot was lateritic and acidic in reaction.

The experimental area was demarcated into 39 plots of 2.70 cm X 2.25 cm dimension. The seedlings were transplanted at 45x45 cm spacing accommodating 30 plants per plot. Well rotten FYM @ 20 t/ha was applied at the time of field preparation. Recommended dose of fertilizers 150: 50: 50 kg/ha NPK were used for all treatments. The full dose of phosphorus, potash and half dose of nitrogen were applied as a basal dose. Remaining dose of nitrogen was applied in two split doses *i.e.* one month and two months after transplanting as top dressing. Ten plants from each plot were randomly selected and tagged for assessing the parameters of each treatment. The observations regarding various parameters were recorded at 30 days interval. The projected yield per hectare was calculated on the basis of yield per plot, occupied by chilli in the present experiment. Data recorded on different parameters of chilli was analyzed statistically (Panse and Sukhatme, 1985) [6] to express the results.

Table 1: Treatment Details

Treatment	Progenies	Treatment	Progenies
T ₁	DPL CA- 1.1	T ₈	DPL CA- 11.1
T ₂	DPL CA- 2.1	T ₉	DPL CA- 13.1
T ₃	DPL CA- 3.1	T ₁₀	DPL CA- 14.1
T ₄	DPL CA- 4.1	T ₁₁	DPL CA- 15.1
T ₅	DPL CA- 5.1	T ₁₂	DPL CA- 7.1
T ₆	DPL CA- 6.1	T ₁₃	Konkan Kirti
T ₇	DPL CA- 10.1		

Results and Discussion

The data pertaining growth, flowering, quality, yield and yield contributing characters are summarized in Table 2. Highest plant height at 120 DAT was recorded in T₁₁ (107.57 cm) whereas, the treatment T₁₃ recorded the lowest plant height (48.90 cm). The variation in height might be due to specific genetic makeup, inherent properties, environment factor, hormonal factor and vigour of the crop. The variation in plant height of different chilli genotypes were recorded by Sreelathakumary and Rajamony (2004) [11]. Highest number of leaves were recorded in the treatment T₆ (881.67) whereas the lowest number of leaves were recorded in the treatment T₄ (467.54). Similar type of variations was also reported by Hiraguli and Allollo (2011) [4].

Evaluation of various 13 genotypes of chilli also showed significant variations among flowering and fruit characters.

Among the flowering characters genotype T₆ and T₁₃ recorded minimum days (27.67) to initiation of flowering. These findings regarding the variation in days to initiation of flowering in different chilli genotypes are in conformity with Smitha and Basavaraja (2006) [10]. Solitary and cluster fruiting habit among the different chilli genotypes under study were observed. The genotypes T₁, T₂, T₃, T₄, T₆, T₇, T₉, T₁₀, T₁₁, T₁₂ and T₁₃ showed solitary fruiting habit while the genotypes T₅ and T₈ showed cluster fruiting habit. Similar type of variations related to fruiting habit was also reported in chilli by Mahmood *et al.* (2002) [5]. Days required for horticultural maturity from pollination among 13 chilli genotypes varied non-significantly and minimum days required for horticultural maturity from pollination were noticed in T₁₃ (16.67 days) whereas the maximum days required were in genotypes T₂, T₄, T₅, T₁₀ and T₁₂ (18.33 days). Crop duration varied significantly between 13 chilli genotypes and it was maximum (156 days) in T₁, T₂, T₄, T₅, T₇, T₉, T₁₀ and T₁₃ while it was minimum (137 days) in T₈. Such variation in chilli genotypes for crop duration was also noticed by Pramila *et al.* (2009) [8].

Among the various fruit characters, the fruits were categorized as elongate and triangular. The treatment T₁, T₂, T₅, T₇, T₈, T₉, T₁₀, T₁₁, T₁₂ and T₁₃ had elongate fruits while T₃, T₄ and T₆ had triangular fruit. Thus, 10 chilli genotypes noticed elongate fruits, while 3 chilli genotypes noticed triangular fruits. The variation in fruit shape and size was also reported by Sreelathakumary and Rajamony (2004) [11].

The mean performance various chilli genotypes for yield and yield contributing characters have been presented in Table 2. Genotype T₆, T₇, T₁₀, T₁₁ and T₁₂ (60 days) recorded the lowest days to first harvest. Treatment T₁, T₂, T₄, T₅, T₇, T₉, T₁₀ and T₁₃ recorded the highest days to last harvest (114 days). The variation in chilli genotypes for days to first and last harvest was noticed by Sharma *et al.* (2010). The highest number of pickings (8) per plant was recorded in treatment T₁, T₂, T₄, T₅, T₇, T₉ and T₁₀ while the lowest number of pickings per plant (6) was recorded in treatment T₈. Such variation was also noticed by Sreelathakumary and Rajamony (2004) [11]. Yield per hectare (23.43 t) was highest in treatment T₁₁. Variation in fruit yield per hectare of chilli genotypes was also noticed by Smitha and Basavaraja (2006) [10]. The maximum number of seeds per fruit was observed in the treatment T₁₁ (100.11). The variation in number of seeds per fruit of chilli was also noticed by Smitha and Basavaraja (2006) [10]. Treatment T₁, T₆, T₇, T₉, T₁₀ and T₁₂ had noticed more yield per plant than the general mean under Konkan agro climatic conditions.

Table 2: Mean performance of various chilli genotypes for different growth, flowering, quality, yield and yield contributing grown under Konkan agro climatic condition

Treatment	Plant height (cm) 120 DAT	No. of leaves at 120 DAT	Days to initiation of Flowering	Fruiting habit	Days required for horticultural maturity from pollination	Crops duration (days)	Fruit shape	Days to first harvest	Days to last harvest	No. of pickings per plant	Yield per hectare (t)	Number of seeds /fruit
T ₁	92.52	577.33	44.33	Solitary	16.67	156.00	Elongate	63.67	114.00	8.00	17.25	99.22
T ₂	91.94	577.33	38.00	Solitary	18.33	156.00	Elongate	63.67	114.00	8.00	11.92	88.89
T ₃	102.34	592.09	32.00	Solitary	18.00	150.67	Triangular	63.67	108.67	7.33	13.85	95.78
T ₄	98.77	467.54	31.00	Solitary	18.33	156.00	Triangular	63.67	114.00	8.00	15.72	91.45
T ₅	94.91	593.14	32.00	Cluster	18.33	156.00	Elongate	67.33	114.00	8.00	14.31	74.78
T ₆	106.39	881.67	27.67	Solitary	17.33	153.33	Triangular	60.00	111.33	7.67	18.92	58.89
T ₇	106.52	744.49	35.33	Solitary	17.67	156.00	Elongate	60.00	114.00	8.00	22.33	96.11
T ₈	89.44	572.42	38.67	Cluster	17.67	137.00	Elongate	67.33	95.00	6.00	8.37	78.44
T ₉	101.07	727.14	29.33	Solitary	17.00	156.00	Elongate	63.67	114.00	8.00	19.51	95.11
T ₁₀	97.10	604.53	31.33	Solitary	18.33	156.00	Elongate	60.00	114.00	8.00	18.16	87.33

T ₁₁	107.57	724.93	30.67	Solitary	17.67	153.33	Elongate	60.00	111.33	7.67	23.43	100.11
T ₁₂	76.28	767.11	34.00	Solitary	18.33	153.33	Elongate	60.00	111.33	7.67	18.45	79.67
T ₁₃ (Konkan Kirti)	48.90	490.27	36.67	Solitary	16.67	156.00	Elongate	71.00	114.00	8.00	15.44	97.11
Range	48.9 - 107.57	467.54-881.67	27.67 - 44.33		16.67 - 18.33	137 - 156		60 - 71	95 - 114	6 - 8	8.37 - 23.43	58.89 - 100.11
Mean	93.56	630.42	33.92		17.72	153.51		63.38	111.51	7.72	16.74	87.92
Result	Sig	Sig	Sig		NS	Sig		NS	Sig	Sig	Sig	Sig
S.Em±	1.33	14.44	0.47		0.16	0.42		0.76	0.42	0.05	0.39	0.40
CD (0.05)	3.90	42.17	1.37		-	1.23		-	1.23	0.15	1.14	1.19

Conclusion

The present investigation on various 13 chilli genotypes recorded significant variations in relation to growth and yield attributes. Based on plant architecture, fruit parameters, yield and yield contributing characters, genotypes T₁₁, T₇, T₉, T₆, T₁₂ and T₁₀ were found promising.

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