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Evaluation of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) genotypes grown under protected condition for growth and yield parameters

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Abstract
In the academic year 2022–2023, an experiment was carried out at the University of Agricultural Sciences, Dharwad's ICAR–Krishi Vigyan Kendra, Saidapur farm, to assess the genotypes of cherry tomatoes (*Solanum lycopersicum* var. *cerasiforme*) grown under protected conditions. The current study used a randomised block design with fifteen treatments and three replications. The Kaziranga Red Cherry Tomato maximum plant height was measured at 30 days after transplanting (DAT). In Zirconyta, the significantly higher plant height was noted at 60, 90 and 120 DAT. The genotype Dharwad Local produced a significantly higher number of branches per plant. Leaf area and leaf area index were recorded highest in the Red Cherry Tomato genotype. The genotype Kaziranga Red Cherry Tomato took a significantly the minimum number of days for first flower initiation. The minimum number of days taken from flowering to harvest was recorded in check genotype Pusa Cherry Tomato-1. More number of flower clusters per plant was noticed in Phule Jayshree. Genotype Pusa Golden Cherry Tomato-2 showed the highest number of flowers per cluster. The fruit set was maximum in BRCT-1. Check genotype Pusa Cherry Tomato-1 showed the highest number of fruits per cluster and the maximum number of fruits per plant. Truss length was found the maximum in Namdhari-096. The fruit yield per plant, fruit yield per plot and fruit yield. per hectare were recorded the maximum in Kaziranga Red Cherry Tomato, respectively.

Keywords: cherry tomato, genotypes, growth, yield

Introduction
The cherry tomato (*Solanum lycopersicum* var. *cerasiforme)* is known as a botanical variety of the cultivated tomato which belongs to family Solanaceae. Following its first discovery in Tropical and Subtropical America, the wild cherry tomato later migrated into the Tropics of Asia and Africa. According to Renuka *et al.* (2014) [16], cherry tomatoes are produced in enormous quantities throughout Central America and sold to Korea, Mexico and Florida. The first tomatoes to be grown in Europe were yellow cherry tomatoes. In India, Kashmir, Hyderabad, Gujarat, Andhra Pradesh, Rajasthan, Karnataka, Bihar, etc. are the main regions where cherry tomatoes are grown. 'Salad tomato' is a common name for cherry tomatoes. Its fruits are more frequently consumed as fruits than as vegetables. Horticultural crops are commonly covered in netting to protect them from excessive sun radiation, enhance the thermal temperature (Kittas *et al*., 2009) [7], provide shelter from wind and hail and keep out illnesses spread by birds and insects. Shade net may influence various environmental parameters in addition to reducing the amount of light available. In recent years, advancements in breeding techniques and genetic technologies have allowed for the development of a wide range of cherry tomato genotypes with improved traits. These advancements have opened up new possibilities for the selection and improvement of genotypes that are well-suited for protected cultivation. However, to maximize the potential benefits of cultivating cherry tomatoes under protected conditions, it is crucial to select suitable genotypes that exhibit desirable traits such as high yield and adaptability to the specific growing environment. Evaluating different cherry tomato genotypes under protected conditions plays a vital role in identifying superior cultivars that can meet the demands of both producers and consumers. The findings of this research will contribute to the development of improved genotypes and provide growers with valuable information to make informed decisions regarding genotype selection for protected cherry tomato production.

By conducting the evaluations, growers can make informed decisions regarding genotype selection, ultimately leading to increased productivity, profitability and sustainability in cherry tomato production.

Hence it is necessary to evaluate the performance of cherry tomato genotypes in terms of growth and yield under shade house condition. The current inquiry was proposed to assess the performance of a fifteen cherry tomato genotypes under protected growing conditions, specifically shade net conditions, in the Dharwad district of Karnataka.

Materials and Methods

The experiment was conducted during 2022-23 at ICAR-Krishi Vigyan Kendra, Saidapur Farm, University of Agricultural Sciences, Dharwad, Karnataka. Fifteen genotypes were collected from various institutes and companies *viz*., two genotypes from Indian Agricultural Research Institute (IARI) (New-Delhi), seven genotypes from All India Coordinated Research Project on Tuber crops (AICRP) (Dharwad), three genotypes from Desi seed company (Mysore), one genotype from Namdhari seed company (Bangalore), one genotype from Seminis company (Bangalore) and one genotype from (Dharwad), KVK. The experiment was taken out in a randomized block design and was replicated thrice. Using sterilised and enriched coco-peat as growing media, the seeds were sown in the portrays. The main field was prepared to a fine tilth and FYM at 25 t ha^{-1} was applied at the time of ploughing. The cherry tomato seedlings were planted on beds in a paired row system under shade net house condition. All the other cultural practices as recommended were followed as in tomato. Growth and yield characters were recorded from five plants in each replicated entry selected randomly and were tagged.

Results and Discussion

Analysis of variance (ANOVA) was carried out for fifteen cherry tomato genotypes grown under shade house condition for growth and yield attributes presented in Table 1. The differences among the genotypes were significant for all the characters.

The maximum plant height (87.11 cm) at 30 days after transplanting (DAT) was observed in the Kaziranga Red Cherry Tomato. At 60, 90 and 120 DAT was observed the maximum plant height (223.00, 232.00 and 241.05 cm, respectively) in Zirconyta. The highest plant height was observed due to the active response of plants to diffused sunlight inside the shade net, favourable microclimate and better utilization of the environment inside the growing shade house structure resulting in the increase in growth and also plant height was influenced by the absorption of nutrients, increased cell division which increased vegetative growth. These results are in confirmity with those obtained by Omprasad *et al*. (2018) [10] and Singh *et al*. (2021) [17]. The genotype Dharwad Local produced a significantly higher number of branches per plant (40.20) which was statistically on par with SJCT-01 (36.30). May be influenced by a combination of genetic traits, acclimatization and adaption, light availability, pruning and training. Similar findings confirmed with the results reported by Ramya *et al*. (2016) [14], Yimchunger *et al*. (2018) [19] and Ramesh *et al*. (2022) [13] in cherry tomato. Leaf area (13,139.44 cm^2) and leaf area index (4.39) were recorded the maximum in the Red Cherry Tomato genotype. Due to size of the leaves, number of branches per plant, nutrients absorption and stem lengthening. These results are supported with Ramya *et al*. (2016) [14] and Hossain *et al.* (2017) [5]. The genotype Kaziranga Red Cherry Tomato took a significantly minimum number of days for first flower initiation (25.17 days). It may be due to the ability of the genotype to provide assimilates to the reproductive site during the phase of flower initiation. According to other research that found substantial differences in days to first flower among cherry tomato genotypes reported by Prema *et al*. (2011) [12] and Omprasad *et al*. (2018) [10]. The minimum number of days taken from flowering to harvest (29.03 days) was recorded in (check) Pusa Cherry Tomato-1 genotype which was on par with Kaziranga Red Cherry Tomato (31.43 days) and BRCT-1 (33.34 days). Similar results of significant variation were obtained by Yimchunger *et al*. (2018) [19] and Gawali *et al*. (2023) [4] in cherry tomato. Phule Jayshree recorded the highest (35.06) number of flower clusters per plant which was statistically on par with Kaziranga Red Cherry Tomato (33.80) and Dharwad Local (33.43). Due to potentiality of the genotypes and these results were confirmed by Ramya *et al.* (2016) [14], Malavika *et al.* (2017) [8] and Ullaha *et al.* (2022) [18]. Pusa Golden Cherry Tomato-2 showed the highest number of flowers per cluster (43.67). Due to the inherent genetic capacity of the genotypes to produce flowers under controlled environmental conditions inside a shade house structure. Both Omprasad *et al.* (2018) [10] and Mounica *et al*. (2022) [9] found similar outcomes when evaluating cherry tomato genotypes. The fruit set was maximum in BRCT-1 (90.59%) which is on par with CT-IET (89.61%), Kaziranga Red Cherry Tomato (85.68%) and Punjab Red Cherry (83.43%). Pusa Cherry Tomato-1 (check) showed the highest number of fruits per cluster (18.72). A greater rate of anthers dehiscing, more viable pollen and improved reactivity to shade net conditions could be the causes of the increased fruit set and number of fruits per cluster. These findings were in accordance with Aguirre and Cabrera (2012) [1], Malavika *et al*. (2017) [8] and Omprasad *et al*. (2018) [10]. Number of fruits per plant (394.72) was noticed highest in the check genotypePusa Cherry Tomato-1. It may be due to more number of flowers per plant, more numbe r of branches, fruiting clusters and fruit set. The similar results in cherry tomato are in agreement with Cheena *et al*. (2018) [2], Chouhan *et al*. (2018) [3] and Yimchunger *et al*. (2018) [19]. Truss length was found the maximum in Namdhari-096 statistically on par with BRCT-1 (26.27 cm) and Zirconyta (25.00 cm). Truss length depends on the number of flowers per cluster, fruit set and genetic potentiality of the genotypes. Pathan (2015) [11] noticed similar results on truss length in cherry tomato. Fruit yield per.plant with 3.68 kg, fruit yield perplot with 39.98 kg and fruit yield.per hectare with 67.62 t ha^{-1} were recorded highest in Kaziranga Red Cherry Tomato. It might be due to highest average fruit weight, more number of branches under protected condition and performance of off springs due to genetic makeup. The work done by scientists Prema *et al.* (2011) [12], Islam *et al.* (2012) [6] and Razzak *et al.* (2013) [15] also recorded similar findings in cherry tomato.

Table 1: Performance of cherry tomato genotypes grown under protected condition for growth and yield parameters

Sl. No.	Genotypes	Plant height (cm)				Number of branches per plant	Leaf area (cm^2)	Leaf area index	Days taken for first flowering	Days taken from flowering to harvest	Number of flower clusters $plant^{-1}$
		30 DAT	60 DAT	90 DAT	120 DAT						
1	Punjab Red Cherry	58.77	153.95	163.20	163.70	22.40	4528.20	2.39	41.83	36.37	12.60
2	SJCT-01	61.87	156.53	162.60	169.93	36.30	10137.00	3.16	27.30	37.43	23.59
3	BRCT-1	68.37	150.06	157.33	158.63	30.10	10902.00	3.75	30.47	33.34	13.71
4	Dharwad Local	55.17	143.73	167.27	172.03	40.40	4057.40	1.08	28.00	36.72	33.43
5	Pusa Golden Cherry Tomato - 2	75.67	177.47	191.40	201.72	26.22	9820.00	3.57	32.33	32.87	16.98
6	Phule Jayshree	59.80	148.53	181.63	171.33	31.87	10550.00	2.85	30.50	37.39	35.06
7	Red Cherry Tomato	79.03	212.88	223.00	229.10	35.17	13139.00	4.39	26.28	35.68	30.73
8	CT-IET	63.50	180.20	185.20	190.23	28.69	8719.30	3.96	30.50	35.40	27.08
9	Swarna Ratna	64.90	131.23	144.77	149.80	33.52	8918.40	2.79	28.70	38.07	30.80
10	Namdhari-096	57.57	163.82	180.17	186.20	26.10	5639.70	2.10	29.82	36.08	15.70
11	Zirconyta	73.53	223.00	232.00	241.05	28.85	4380.30	1.74	28.40	42.57	24.37
12	Kaziranga Red Cherry Tomato	87.11	212.50	225.40	230.47	28.07	12561.00	3.75	25.17	31.43	33.80
13	Black Cherry Tomato	68.27	199.80	207.07	221.87	24.80	9942.30	2.65	27.00	38.73	27.39
14	Swarna Ratan	65.17	130.13	133.36	143.57	35.20	8347.60	3.51	32.25	44.60	32.95
15	Pusa Cherry Tomato - 1 (Check)	73.83	183.19	202.00	227.80	32.80	10951.00	4.05	34.10	29.03	21.39

Table 1: Continued…

Sl. No.	Genotypes	Number of flowers $cluster^{-1}$	Fruit Set (%)	Number of fruits per cluster	Number of fruits per plant	Truss length (cm)	Fruit yield per plant (kg)	Fruit yield per plot (kg)	Fruit yield per ha (t/ha)
1	Punjab Red Cherry	13.37	83.43	11.15	160.99	21.67	1.64	20.25	33.76
2	SJCT-01	10.03	74.82	7.50	185.83	12.15	1.25	15.56	25.93
3	BRCT-1	16.11	90.59	14.57	220.00	26.27	2.36	26.72	44.54
4	Dharwad Local	7.87	50.90	6.33	211.78	5.17	0.72	13.65	24.41
5	Pusa Golden Cherry Tomato - 2	43.67	36.60	16.00	295.04	11.00	3.57	36.37	60.62
6	Phule Jayshree	8.53	78.21	6.84	233.70	12.35	1.52	22.76	37.94
7	Red Cherry Tomato	11.82	77.25	9.03	329.54	13.22	2.97	34.84	58.07
8	CT-IET	12.00	89.61	10.75	291.01	14.00	2.45	31.54	52.57
9	Swarna Ratna	8.93	74.48	6.49	209.50	11.54	1.49	18.68	31.13
10	Namdhari-096	20.33	80.31	16.30	277.79	28.00	3.33	35.72	59.53
11	Zirconyta	18.90	53.67	10.20	248.16	25.00	2.58	29.20	48.66
12	Kaziranga Red Cherry Tomato	12.64	85.68	8.08	298.15	10.22	3.68	39.98	67.62
13	Black Cherry Tomato	9.50	57.87	7.58	229.42	15.00	2.94	35.21	58.68
14	Swarna Ratan	13.09	68.86	5.65	201.93	12.11	1.58	18.03	30.04
15	Pusa Cherry Tomato - 1 (Check)	37.50	48.23	18.72	394.72	17.45	1.39	16.06	26.76

Conclusion

Among the fifteen genotypes studied Kaziranga Red Cherry Tomato and Pusa Golden Cherry Tomato showed best results in terms of yield (67.62 t/ha and 60.62 t/ha, respectively) under shade house condition. Hence, cultivation of Kaziranga Red Cherry Tomato and Pusa Golden Cherry Tomato can be grown in Dharwad region under shade house condition was found to be suitable for getting good yield.

References

1. Aguirre NC, Cabrera FAV. Evaluating the fruit production and quality of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*). Revista Facultad National de Agronomia Medellin. 2012;65(2):6593-6604.
2. Cheena J, Saidaiah P, Geetha A, Tejaswini N. Effect of sowing dates on yield and growth of indeterminate tomato varieties under poly house conditions. Journal of Pharmacognosy and Phytochemistry. 2018;7(2):880-882.
3. Chouhan D, Singh M, Tripathi PN, Sharma A. Effect of green shade net on yield and quality of tomato. International Journal Current Microbiology Applied Science. 2018;7(9):2148-2150.
4. Gawali SS, Patil RA, Gaikwad SB. Standardization of different plant growth regulators on growth parameters of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) under protected condition. The Pharma Innovation. 2023;12(1):506-510.
5. Hossain SAAM, Lixue W, Taotao C, Zhenhua L. Leaf area index assessment for tomato and cucumber growing period under different water treatments. Plant, Soil and Environment. 2017;63(10):461-467.
6. Islam MS, Mohanta HC, Ismail MR, Rafiim Y, Malek MA. Genetic variability and trait relationship in cherry tomato (*Solanum lycopersicum* L. var. *cerasiforme* (dunnal) a. Gray). Bangladesh Journal Botany. 2012;41(2):163-167.
7. Kittas C, Rigakis N, Katsoulas N, Bartzanas T. Influence of shading screens on microclimate, growth and productivity of tomato. Acta Horticulture. 2009;807:97-102.
8. Malavika O, Indira P, Sheela KB. Performance evaluation of cherry tomato genotypes under rain shelter. Journal of Tropical Agriculture. 2017;55(2):180-183.
9. Mounica N, Padma E, Madhavi M, Suneetha S.

Evaluation of tomato (*Solanum lycopersicum* L.) hybrids for growth and yield attributes under coastal conditions of Andhra Pradesh. The Pharma Innovation Journal. 2022;4:1403-1408.
10. Omprasad J, Reddy PSS, Madhumathi C, Balakrishna M. Evaluation of cherry tomatoes for quality characters under shade net. Journal of Pharmacognosy and Phytochemistry. 2018, 2126-2128.
11. Pathan AK. Influence of planting geometry and training methods on growth, yield and quality of cherry tomato grown under shade house, M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad, Karnataka, India, 2015.
12. Prema G, Indiresh KM, Santhosha HM. Evaluation of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) genotypes for growth, yield and quality traits. Asian Journal of Horticulture. 2011;6(1):181-184.
13. Ramesh G, Maheshwara Babu B, Ajithkumar K, Mallika K, Savitha AS. Significance of protected structures on growth and yield of tomato (*Solanum lycopersicum*) in semi-arid region and its influence on blight of tomato. The Pharma Innovation Journal. 2022;11(2):800-805.
14. Ramya R, Ananthan M, Krishnamoorthy V. Evaluation of cherry tomato [*Solanum lycopersicum* L. var. *cerasiforme*] genotypes for yield and quality traits. Asian Journal of Horticulture. 2016;16(2):329-334.
15. Razzak H, Ibrahim A, Wahb-Allah M, Alsadon A. Response of cherry tomato (*Solanum lycopersicum* var. *cerasiforme)* to pruning systems and irrigation rates under greenhouse conditions. Asian Journal of Crop Science. 2013;5:275-285.
16. Renuka DM, Sadashiva AT, Kavita BT, Vijendrakumar RC, Hanumanthiah MR. Evaluation of cherry tomato lines (*Solanum lycopersicum* var. *cerasiforme)* for growth, yield and quality traits. Plant Archives. 2014;14(1):151-154.
17. Singh AK, Sabir N, Jat GS, Singh J, Singh V, Singh A, *et al*. Effect of spacing and pruning on growth, yield and economics of long melon (*Cucumis melo* var. *utilissimus*) under naturally ventilated polyhouse. The Indian Journal of Agricultural Sciences. 2021;91(6):885-89.
18. Ullaha MZ, Samsuzzaman BM, Alamb MS, Baruac JL, Parvinc E. Evaluation of cherry tomato *(Solanum lycopersicum* var. *cerasiforme)* genotypes for growth and yield attributes. Tropical Agro biodiversity. 2022;3(2):36-42.
19. Yimchunger TL, Sarkar A, Kanaujia SP. Evaluation of different genotypes of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) under foothill condition of Nagaland. Annals of Plant and Soil Research. 2018;20(3):228-232.