Original Research Article

Field evaluation of strawberry cultivars under greenhouse conditions in Nilgiris

Abstract

Among the nine strawberry varieties assessed for the performance under greenhouse growing environment, in Nilgiris condition, the variety Rania showed better for plant height (33.81 cm), plant spread(E-W) [45.38 cm], (N-S) [43.96 cm] during 120 days after planting. Flavia recorded more number of leaves (24.80). Rania recorded a fruit length (4.05 cm), fruit width (11.29 cm), fruit weight (27.62 g). The variety Capri recorded number of fruits per plant (68.86) which is on par with Flavia (68.80). The fruit quality parameters Total Soluble Solids (TSS) is high with 12.43^{o} brix in Nabila and acidity (0.98 %) in Flaminia. The highest yield per plant (1190.20 g) is recorded in Flavia and with lowest yield in Capri (563.46 g). The variety Flavia recorded maximum in fruit parameters like fruit length, fruit width fruit weight and highest yield recorded whereas fruit quality parameters of TSS and acidity is highest in Nabila and Flaminia respectively.

Keywords: Evaluation, strawberry, yield, greenhouse

Introduction

Strawberry is native of France and belongs to the family Rosaceae. It is grown in temperate regions and in India, it is grown in Mizoram, Meghalaya, Kerala, Himachal Pradesh and Jammu and Kashmir. Strawberries are grown as perennial herbs with shallow root system in temperate regions and in sub tropics it behaves as annuals (Finn and Strike, 2008). Strawberries fruit has a sweet-sour taste and mostly eaten fresh, the ripe strawberries attain attractive red colour on maturity and have soft, melting pulp of a characteristic flavor. The red colour of the fruit is mainly due to the presence of an anthocyanin, i.e., pelargonidin 3- monoglucoside and traces of cyanidin (Singh and Sharma, 1970; Mitra, 1991) Strawberry is a low volume and a high value crop which is amenable for cultivation by the farmers and is having a huge requirements among the people particularly young children. The varieties Tioga, Camarosa, Sweet Charlie, Winter

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Dawn, Chandler *etc.*, are commercially grown in India.According to response of varieties to photoperiod, two types of strawberry are now grown commercially i.e., day neutral and short day plant. Long day (ever bearing) varieties are also available but they are rarely grown outside the home garden. Short day types are actually facultative. The temperature and day-length (photo-periodism) have considerable effects on growth and yield of strawberry probably through the control of the production of plant hormones. The research on evaluation of strawberry varieties/genotypes/cultivars in India is meagre. The Nilgiris district in Tamil Nadu is having potential for cultivation of the crop under open field and greenhouse conditions. The area under strawberry crop is close to 20 acres under greenhouses [Source: Department of Horticulture, The Nilgiris]. The continued introduction of strawberry cultivars to the market increases the need for reliable methods of identification and genetic diversity assessment (Degani *et al.,* 2001).

The research project was taken up with the objective of collection and evaluation of different varieties and testing the suitability based on the performance of plant characters, yield and quality of fruits suitable for Nilgiris. Extremes of weather conditions prevailing in recent days in the Nilgiris district and interference by animals have necessitated cultivation of strawberry under protected conditions to produce quality strawberry fruit crop.

Materials and methods

A field experiment was conducted to evaluate the performance of strawberry cultivars at Horticultural Research Station, Ooty Nilgiris district during the year 2018 - 2020. A total of nine genotypes of strawberry cultivars*viz.,* Camarosa, Winter Dawn, Nabila, Akihime, Flavia, Rania, Flaminia, Capri, Sweet Charlie were collected and 80 plants of each variety were planted in greenhouse during the month of December, 2018. The experiment was laid out in a randomized block design with three replications.

The planting of uniform sized runners of nine varieties of strawberry was taken up with a spacing of 25 x 25 cm between the rows and in between the plants in cross pattern. Mulching system was practiced with the bed width of 0.75 m. The performance of the collected nine cultivars was assessed for its important growth and yield characters for the crop growing period from January, 2019 to September, 2020.

Data on the morphological and yield parameters were collected from mean of randomly selected five plants from each cultivar in each replication. The vegetative and yield parameters

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viz.,Plant height (cm), plant spread (cm) (E – W), (N – S), leaves per plant, (numbers), individual fruit weight (g), fruit length (cm), fruit width (cm), number of fruits per plant, TSS (^{o} brix), acidity (%), yield per plant (g), TSS/Acid ratio were recorded. The crop cultivation was done by following the standard package of practices recommended in crop production guide. The data collected were statistically analyzed by following the procedure of Panse and Sukhatme (1967).

Results and Discussion

Significant variationexists among the various strawberry cultivars with respect to most of the vegetative and fruit quality parameters.The variety Rania showed better for plant height (33.81 cm), plant spread (E-W) [45.38 cm], (N-S) [43.96 cm] during 120 days after planting. Flavia recorded more number of leaves (24.80). The variety Capri recorded lower value for plant height (18.51 cm), plant spread (23.40 cm) (E - W), and Nabila registered a lower value for number of leaves among the varieties grown.

In strawberry cultivation, fruit quality in terms of morphology and chemical composition is of prime importance and is greatly influenced by the weather conditions. The quality of strawberry is determined by its taste, flavour, texture, size, shape, gloss and skin colour, storage and transportability (Mochizuki, 1991).

Rania recorded a fruit length (4.05 cm), fruit width (11.29 cm), fruit weight (27.62 g). The variety Capri recorded number of fruits per plant (68.86) which is on par with Flavia (68.80). The importantfruit quality parameterTotal Soluble Solids (TSS) is high with 12.43^{o} brix in Nabila and acidity (0.98 %) in Flaminia. The highest yield per plant (1190.20 g) is recorded in Flavia and with lowest yield in Capri (563.46 g).

The variety Capri registered a lowest fruit length of 1.22 cm, fruit weight (7.98 g), Sweet Charlie for fruit width (2.48 cm). Rania recorded minimum number of fruits per plant with 41.60, lowest Total Soluble Solids in Camarosa with 6.47, Akihime (0.38%), Capri registered a lowest yield potential of 563.46 grams per plant. Different cultivars studied showed significant variation for weight and size which have a positive relationship with total yield. These variations may be due to genetic make up of these genotypes (Sharma and Sharma 2006) and growing (Dwiwedi*et al.*, 2004).

Differences in number of fruits per plant, fruit weight, yield per plant, TSS, total soluble sugar, acidity of various strawberry genotypes may be attributed to adaptability potential under Nilgiris climatic conditions and may also be due to their genotypic differences. Similar results

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were obtained by Das *et al.*, (2007), Sharma and Thakur (2008), Singh *et al.*, (2012), Sharma *et al.*, (2012). Rao and Lal (2010), E. Al Ramamneh*et al*., (2013) and Ankita and Chandel (2014).

The variety Flavia recorded maximum in fruit parameters like fruit length, fruit width fruit weight and highest yield recorded whereas fruit quality parameters of TSS and acidity is highest in Nabila and Flaminia respectively.

Table 1: Performance of Strawberry varieties for phenological parameters

S. No.	Varieties	Plant height (cm)*	Plant spread (cm)* (E – W)	Number of leaves*
1.	Camarosa	23.68	36.41	22.06
2.	Nabila	22.60	33.67	15.46
3.	Flavia	28.16	41.70	24.80
4.	Rania	33.81	45.38	16.73
5.	Winter Dawn	16.50	26.97	15.13
6.	Akihime	29.20	41.16	14.60
7.	Flaminia	24.23	32.43	17.00
8.	Capri	18.51	23.40	12.66
9.	Sweet Charlie	26.00	41.86	21.26
	Mean	24.74	35.88	17.74
	SE(d)	0.25	0.34	0.15
	CD (0.05)	0.48	0.67	0.36

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Table 2: Physio chemical characteristics of fruits of different strawberry varieties

S. No.	Varieties	Fruit length (cm)	Fruit width (cm)	Average fruit weight (g)	Number of fruits per plant	TSS ^{o} brix	Acidity (%)	TSS/ Acidity ratio	Yield per plant (g)
1.	Camarosa	3.68	7.90	11.29	61.66	6.47	0.68	9.51	644.73
2.	Nabila	3.92	8.93	16.70	64.60	12.43	0.74	16.80	1075.66
3.	Flavia	3.78	10.44	16.63	68.80	8.49	0.64	13.27	1190.20
4.	Rania	4.05	11.29	27.62	41.60	8.44	0.65	12.98	1141.66
5.	Winter Dawn	2.32	8.81	17.50	52.40	11.43	0.90	12.70	922.26
6.	Akihime	1.89	6.84	19.56	46.20	8.92	0.38	23.47	906.13
7.	Flaminia	1.61	3.66	14.88	60.13	9.06	0.98	9.24	873.20
8.	Capri	1.22	3.69	7.98	68.86	8.66	0.64	13.53	563.46
9.	Sweet Charlie	3.04	2.48	14.21	61.93	6.76	0.97	6.97	861.53
	Mean	2.83	7.11	16.26	58.46	8.96	0.73	13.16	908.76
	SE(d)	0.04	0.16	0.22	0.42	0.11	0.06	0.21	10.72
	CD (0.05)	0.10	0.29	0.47	0.88	0.17	0.12	0.44	19.26

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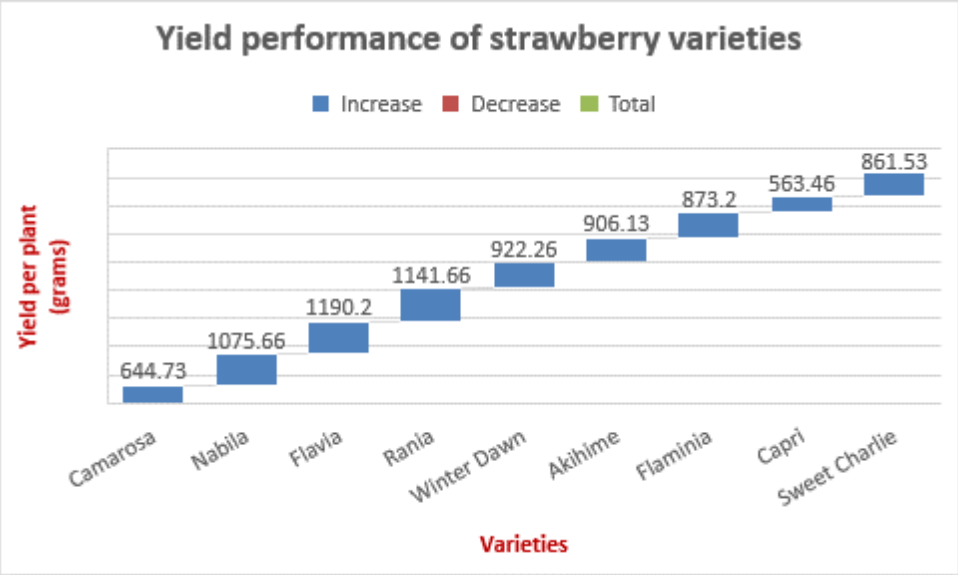

Fig.1

Conclusion

Nine varieties of strawberry were evaluated for the performance of the crop under greenhouse environment condition in Nilgiris. The overall performance of Flavia recorded maximum in fruit parameters for yield followed by Capri. The fruit quality parameters of TSS and acidity are highest in Nabila and Flaminia respectively.

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