

Evaluation of strawberry cultivars in the foothills of Nagaland

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ABSTRACT

Evaluation of strawberry cultivars in the foothills of Nagaland was carried out at Horticultural Experimental Farm, SASRD, Nagaland University. Ten strawberry cultivars viz. Ofra, Fairfox, Elista, Blackmore, Doglas, Sasta, Shimla Delicious, Belrubi, Chandler and Sweet Charlie were planted early October during 2009-10 to study the performance of growth, flowering, fruiting, yield and quality attributes of fruits under shade net (50%) house. The variety Sweet Charlie showed the maximum number of flowers (35.07) and fruit set (33.73) per plant which was followed by Chandler with 34.80 and 32.93 respectively. The maximum fruit weight (7.77g) and yield (262.00g per plant) were recorded with the variety Sweet Charlie followed by Ofra with 6.97g and 207.37g and Chandler with 6.14g and 202.18g per plant respectively. The highest TSS (13.70⁰B) content of fruit was obtained in Sweet Charlie followed by Ofra (13.62⁰B) and Belrubi (13.00⁰B). And the highest total sugar (7.37%), ascorbic acid (97.03mg/100g juice) and the lowest acidity (0.86%) was found in cv. Ofra under standard cultivation practices.

Keywords: Cultivar, flowering, growth, quality, strawberry, yield

The strawberry (*Fragaria × ananassa* Duch) is one of the most delicious and refreshing fruit of the world of family rosaceae being rich source of vitamins, minerals with excellent colour, attractive appearance, pleasant flavor and aroma. Though it is a major fruit of temperate region, with the advent of day neutral cultivars, it grows well in tropical and subtropical regions of the world. The North East state particularly Nagaland provides ample opportunity for successful strawberry cultivation due to its mild climatic conditions. Varietal performance under diverse agro climatic condition also play an important role to quantify the best suited cultivars for the particular agro-climatic condition to reap maximum yield with desirable quality attributes. Therefore, the present study was conducted to test the efficacy of different promising genotypes under sub-humid subtropical part in foot hills of Nagaland.

The experiment was carried out at Horticultural Experimental Farm, SASRD, Nagaland University, Nagaland during 2009-10. The experiment was in Randomized Block Design by three replications with ten strawberry cultivars viz. Ofra, Fairfox, Elista, Blackmore, Doglas, Sasta, Shimla Delicious, Belrubi, Chandler and Sweet charlie collected from ICAR research complex for NEH region, Barapani, Umium, Meghalaya. It was planted during early October, 2009 at a spacing of 30 cm x 60 cm with plot size 1.5m x 1.5 m. The soil pH (4.62), annual rainfall (150 to 200 cm),

temperature (10 to 31°C) and RH (65 to 85%) were recorded during experiment. A well decomposed FYM @ 40 tons ha⁻¹ was incorporated prior to planting. Irrigation at an interval of 1-2 days, weeding, plant protection measures and other cultural practices were carried out as on when required.

Growth, flowering, fruiting, yield and yield attributing characters were observed. Fully ripen fruits were collected for estimation of biochemical constituents of fruits like TSS in °Brix, total sugar, reducing sugar, ascorbic acid, titrable acidity determined by standard procedure of A.O.A.C. (1984).

Flowering and fruit set

Significance difference were noticed on flowering and fruit set from planting to flowering. The cultivar Sweet Charlie produced maximum number of flowers (35.07) followed by Chandler (34.80) and Belrubi (33.17) and least number was recorded in cv. Fairfax (25.90). Accordingly the cultivars Sweet Charlie (33.73), Chandler (32.96), Belrubi (31.63) and Okra (29.77) were found to have set maximum number of fruit per plant as compared to other variety (Table 1). The observations are in close proximity to the findings of Beniwal *et al.* (1989) and Chandel and Badiyala (1996). Days required from planting to flowering and flowering to fruit maturity were observed to have significant variation but there was no considerable

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variation with regard to days required from flowering to fruit set. It was taken 6 to 7.83 days by all the cultivars from flowering to fruit set. Days from fruit set to maturity was lowest in cultivar Blackmore (30.00 days) whereas it was maximum in variety Sasta (46.33 days). This variation may be due to genetic makeup of the cultivars and adaptation to climatic condition. This results are also in conformity with the findings of Dwivedi *et al.* (2004) and Sharma and Sharma (2006). It is evident from the table 1 that much progress for production of runners even up to the final harvest shows by the cultivar Ofra (4.40) followed by Sweet Charlie (4.20) as compare to the cultivar Sasta (1.16).

Table 1: Yield attributing characters of different strawberry cultivars

Genotypes	Planting to flowering (Days)	Flowers plant ⁻¹ (No.)	Flowering to fruit set (Days)	Fruit set to maturity (Days)	Fruit plant ⁻¹ (No.)	Runners plant ⁻¹ (No.)	Yield plant ⁻¹ (g)
Ofra	132.00	31.45	6.97	31.67	29.77	4.40	207.37
Fairfox	108.33	25.90	7.47	31.67	24.27	1.60	106.16
Elista	114.00	27.03	7.00	33.00	25.57	1.53	95.40
Blackmore	109.67	28.50	6.73	30.00	26.83	1.47	93.74
Doglas	115.33	27.03	6.00	37.00	23.97	1.47	87.22
Sasta	112.67	29.23	7.83	46.33	27.17	1.16	91.55
Shimla Delicious	112.00	26.93	7.03	43.33	25.00	1.67	92.52
Belrubi	108.00	33.17	7.53	32.00	31.63	1.53	116.38
Chandler	109.00	34.80	7.77	32.00	32.93	2.33	202.18
Sweet Charlie	107.67	35.07	6.63	40.67	33.73	4.20	262.00
SEm (±)	1.56	0.53	0.16	0.97	0.96	0.27	4.66
LSD (0.05)	4.06	1.48	0.47	2.06	2.06	0.58	13.54

Table 2: Physico-chemical composition of different strawberry cultivars

Genotypes	Fruit weight (g)	TSS (⁰ Brix)	Total sugar (% fresh weight)	Reducing sugar (% fresh weight)	Titration acidity (%)	Ascorbic acid (mg 100 ⁻¹ g fruit juice)
Ofra	6.97	13.63	7.37	1.03	0.86	97.03
Fairfox	4.38	8.10	5.87	3.12	1.10	63.90
Elista	3.73	12.47	5.20	1.14	1.10	50.87
Blackmore	3.49	7.67	4.83	1.13	1.06	52.50
Doglas	3.64	12.97	6.27	3.11	1.32	54.80
Sasta	3.37	9.13	5.47	2.18	1.12	75.57
Shimla Delicious	3.70	9.93	4.90	1.09	1.05	56.18
Belrubi	3.68	13.00	6.27	1.06	1.14	62.37
Chandler	6.14	12.87	6.53	1.14	0.97	77.77
Sweet Charlie	7.77	13.70	6.17	1.14	1.02	94.77
SEm (±)	0.16	0.19	0.20	0.02	0.14	0.95
LSD (0.05)	0.49	0.59	0.63	0.05	0.43	2.89

Physical characters of fruit and yield

The different cultivars studied in the present experiment showed significant variation in their fruit weight which has positive effect on total yield. The variety Sweet Charlie produced maximum fruit weight (7.77g) followed by Ofra (6.97g) and Chandler (6.14 g) whereas minimum fruit weight was exhibited by Sasta (3.37g), Blackmore (3.49g) and Doglas (3.64g) (Table 2). Among the different cultivars, high performance per plant in respect of yield was recorded by Sweet Charlie (262.00g), Ofra (207.37g), Chandler (202.18g) and

Belrubi (116.38g) which had a close proximity with the findings of Singh *et al.* (2008).

Bio-chemical composition of fruits

Fruits under the experiment showed (Table 2) considerable variation with respect to TSS ranging between 7.67 to 13.70⁰B. The highest TSS was found in Sweet Charlie (13.70⁰B) followed by Ofra (13.63⁰B) and Belrubi (13.00⁰B) and lowest in Blackmore (7.67⁰B). High TSS content was observed by the cultivars which may be due to favourable temperature and humidity

specially in night during fruit growth and ripening period. These findings in strawberry are in conformity with Sharma (2002). The soluble solids content was more dependent on environmental condition during growth and development than genetic inheritance in strawberry (Shaw, 1990). Cultivars Ofra (7.37%), Chandler (6.53%), Douglas (6.27%), Belrubi (6.27%), and Sweet Charlie (6.17%) showed higher total sugar content in fruit and it was recorded minimum by the cultivar Blackmore (4.83%) and Elista (5.20%). Reducing sugar content varied among the cultivars which was recorded highest in Fairfax (3.12%) followed by Douglas (3.11%) and minimum in Belrubi (1.06%). Lower titrable acid content in fruit was determined with cv. Ofra (0.86%) and Chandler (0.97%) while maximum titrable acidity was noticed in Douglas (1.32%). Variability in acid content in different strawberry fruit was also reported by Chandel and Badiyala (1996). The possible explanation for lower acidity in strawberry may be due to difference between day and night temperature which are very narrow, whereas cooler nights and warmer days are helpful in synthesizing more acidity noticed by Wani *et al.*, (2007). Significantly the highest value of ascorbic acid content to the tune of 97.03 mg 100⁻¹ g juice was obtained by the variety Ofra followed by Sweet Charlie (94.77 mg) and minimum in Elista (50.87 mg 100⁻¹ g juice), Blackmore (52.50 mg 100⁻¹ g juice) and Douglas (54.80 mg 100⁻¹ g juice). The findings are in agreement with the results of Singh *et al.* (2008) in strawberry. On the basis of observations and performance during experiment under foot hill condition of Nagaland, it may be concluded that the cultivars Chandler, Sweet Charlie and Ofra may be suitable for commercial cultivation to obtained maximum yield with better quality fruits with high TSS and ascorbic acid content and lower level of titrable

acidity.

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