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Evaluation of different strawberry (*Fragaria* x *ananassa* Duch.) cultivars for growth, flowering, fruiting and fruit maturity parameters under protected condition

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Abstract
Strawberry (*Fragaria* x *ananassa* Duch.) is one of the most important temperate fruit crops belongs to the family Rosaceae but now it can also be grown in tropical and sub-tropical climatic region. A research trial was conducted at Research Farm of Centre of Excellence on Protected Cultivation and Precision Farming under net tunnel, College of Agriculture, IGKV, Raipur (C.G.) to evaluate different strawberry cultivars for growth parameters, flowering, fruiting and fruit maturity under net tunnel condition in the plain region of Chhattisgarh. The experiment was conducted with twelve strawberry cultivars replicated three times in Randomized Completely Block Design. Result regarding growth parameters revealed that cv. Nabila recorded maximum vegetative growth *i.e.* Plant height, number of leaves, plant spread and number of runners per plant, while the minimum was recorded in Gili. Earliest flowering, fruiting and fruit maturity was exhibited by Sabrina, whereas E1-1333 had too late flowering, fruiting and maturity of the fruits.

Keywords: Strawberry, evaluation, growth parameters, flowering, fruiting, fruit maturity etc.

Introduction
The cultivated strawberry (*Fragaria* x *ananassa* Duch.) is a natural hybrid of *Fragaria chiloensis* and *Fragaria virginiana*. It belongs to the family Rosaceae and is an octaploid in nature. Botanically, strawberry fruit is an aggregate fruit and its edible part is succulent thalamus. It is multiplied mainly through vegetative propagation but now a day tissue culture has become popular. It is being grown in temperate regions worldwide for delicious fruit which is rich source of vitamin C, Iron and other active compounds (Oszmianski and Wojdylo 2009) [12].

This soft fruit is having a distinct tantalizing aroma (Sharma and Yamdagni, 2000) [18]. It is highly nutritious with abundant source of vitamins A, B, C and niacin, minerals like phosphorus, potassium, calcium and iron (Karkara and Dwivedi, 2002) [7]. Strawberry has vast scope in processing industries and kitchen gardens. It is utilized for the production of purees, juice concentrate, jams, preserves and rose red wine. Medicinally, strawberries have been known for its anti-viral properties against polio, these may block the formation of nitosamines, which can cause cancer, furthermore these contain relatively high quantities of ellagic acid, which has a wide range of biological activities (Rieger, 2006) [15].

Commercially it is being grown in Europe, Asia and America. In India, it is being cultivated in Himachal Pradesh, Uttrakhand, Maharashtra, West Bengal, Delhi, Punjab, Haryana Rajsthan and Nilggiri hills (Chadha 2001) [3]. In our country the total area of strawberry is 1000 ha with production of 5000 MT (Anonymous, 2016). In Chhattisgarh strawberry cultivation is not popular due to lack of knowledge. It is grown in Ambikapur and Surajpur district in very small areas with production 12.50 MT and 12.00 MT respectively under open field condition (ADH office balrampur, 2016).

There are reports on higher early production when market prices are high, higher quality fruit, better insect-pest, disease and weed control with reduced use of chemicals, decreased labour costs and more efficient water usage under plasticulture/greenhouse (Dinar 2003; Garwood 1998 and Poling 1993) [4, 5]. However, strawberries grown using the plasticulture system, must be intensively managed (Dinar 2003) [4]. With a plasticulture system, there is considerably less margin for error with regard to soil treatment, timing, pest management, frost and freeze strategies and marketing (Poling *et al.* 2005) [14]. In Japan and Korea, about 90% of the total strawberry production is obtained from protected structures (Takeda 1999) [21]. Similarly, in

Netherlands and Belgium, the strawberry is extensively cultivated under greenhouses or tunnels (Lieten 1993) [10].

The University of Florida released Sweet Charlie strawberry in 1992. Douglas, another promising short-day strawberry cultivar having a large plant size and leaves with berry size of 22.0 g was released for California in 1980 (Royce and Victor 1980) [16]. The cultivar Chandler was the most frequently planted in South-East US due to its phenotypic stability; long harvest period, adequate cold tolerance, early maturity, flavour, color and high yield. Camarosa recently introduced California cultivar, was becoming increasingly popular due to its firmer flesh, which allows transit of berries to more distant market places whereas, Sweet Charlie, an early ripening cultivar from Florida, enabled growers to find a production niche early in the season when crop value is at its highest (Poling 1993) [12]. Garwood (1998) [5] concluded that although plasticulture systems were expensive to implement but the increased productivity and reduced labour costs allowed for higher returns.

The work on varietal evaluation was not done earlier in Chhattisgarh plain region under protected conditions, therefore, the present study was conducted to evaluate strawberry cultivars under ordinary tunnel type polyhouse condition for their growth, flowering and fruiting.

Methods and Materials

The research trial was carried out during the year 2017-18 at Research Farm of Centre of Excellence on Protected Cultivation and Precision farming under net tunnel condition, College of Agriculture, IGKV, Raipur (C.G.). The soil of experimental field was clay-loam having pH 7.7. The experiment was laid out in Randomized Completely Block Design (RCBD) with twelve strawberry cultivars replicated thrice. In the experiment selected 12 strawberry cultivars *viz.* Hadar, Tamir, Sweet Charlie, Winter-dawn, Yashmin, E1-1333, Line-359, Nabila, Camarosa, Gili, Sabrina and Shani were used as treatments. Healthy Tissue cultured plants procured from KF Bio-Plants Private Limited Pune (Maharashtra). The vigorous, healthy, free from diseases, insect-pest and well rooted saplings of all 12 varieties of Strawberry were planted in field at 30cm x 30cm distance with fertigation of recommended dose of fertilizers and maintained uniform cultural practices under net tunnel condition.

All the experimental plants were provided same cultural practices were provided *i.e.* fertilization, irrigation and plant protection measures during whole period of investigation. Irrigation and fertilizers have been provided to the plants through the drip system of irrigation.

Under growth parameters, the observations *i.e.* plant height (cm), leaves per plant, plant spread (cm) (N-S & E-W directions), runners per plant, days to first flowering, days to first fruiting and days to maturity were recorded.

Results and Discussion

The results of trial pertaining to various aspects of growth parameters, flowering, fruiting and fruit maturity is summarized as follows:

Plant Height (cm)

Different strawberry cultivars showed significant differences in respect to plant height observed at 30, 60, 90 and 120 days after planting (DAP).

At 30 DAP, the maximum plant height (10.47 cm) was observed in cv. Nabila followed by Camarosa and Sabrina with plant heights 9.43 and 8.67cm respectively. The minimum plant height (7.00 cm) was observed in cv. Gili, which was found non-significant with Line-359, Shani, Winter-dawn, Sweet Charlie, Yashmin, E1-1333 and Tamir having plant heights 7.17, 7.27, 7.33, 7.37, 7.40, 7.43 and 7.43 cm respectively.

At 60 DAP, the maximum plant height (16.47 cm) was observed in cv. Nabila followed by Camarosa and Sabrina with plant heights 15.43 and 14.00cm respectively. Cvs. Hadar, Tamir and Sweet Charlie were found at par with Sabrina having plant heights 13.67, 13.43 and 13.37 respectively. The minimum plant height (12.33 cm) was observed in cv. Gili, which was found non-significant with cvs. Winter-dawn, Yashmin, E1-1333, Line-359 and Shani having plant heights 12.60, 12.73, 12.77, 12.83 and 13.03cm respectively.

At 90 DAP, the maximum plant height (20.80 cm) was observed in cv. Nabila followed by Camarosa and Sabrina with plant heights 19.77 and 18.33cm respectively. The minimum plant height (16.67cm) was observed in cv. Gili, which was found at par with Hadar, Tamir, Sweet Charlie, Winter-dawn, Yashmin, E1-1333, Line-359 and Shani having plant heights 18.00, 17.77, 17.70, 17.27, 17.07, 17.10, 17.17 and 17.37cm respectively.

At 120 DAP, the maximum plant height (25.80 cm) was observed in cv. Nabila followed by Camarosa which is found at par with Sabrina having plant heights 23.77 and 22.33cm respectively. The minimum plant height (20.43cm) was observed in cv. Gili, which was found at par with Hadar, Tamir, Sweet Charlie, Winter-dawn, Yashmin, E1-1333, Line-359 and Shani having plant heights 21.37, 21.10, 20.60, 21.33, 20.73, 21.03, 21.17 and 20.67cm respectively.

Variation in the plant height of different cultivars of Strawberry might be due to the genes responsible for the plant height were not expressed with the same degree as it expresses at other places because of different agro-climatic conditions. Varietal differences in plant height were also noted by Singh *et al.*, (2008) [19] in Meghalaya and by Neetu and Sharma (2018) [11] in Chhattisgarh which support the present observation.

Plant Spread (cm) East-West (E-W) direction

Different strawberry cultivars showed significant differences in respect to plant spread (E-W direction) observed at 30, 60, 90 and 120 days after planting (DAP).

As per data observed on E-W direction at 30 DAP, the maximum plant spread (12.47 cm) was observed in cv. Nabila which was at par with Camarosa having plant spread 12.10 cm. Similarly, Hadar, Sweet Charlie, E1-1333, Line-359 and Sabrina were found at par with Camarosa having plant spreads 11.67, 11.37, 11.77, 11.50 and 11.73 cm respectively. The minimum plant spread (9.27 cm) was observed in cv. Gili.

At 60 DAP on E-W direction cv. Nabila recorded maximum plant spread (21.47 cm), followed by Camarosa, Sabrina and Hadar with plant spread 19.43, 17.67 and 16.73 cm respectively. Moreover, E1-1333, Line-359, Winter Dawn, Shani and Yashmin were found at par with Hadar having respective plant spreads 16.43, 16.50, 16.00, 16.33 and 16.37 cm. The minimum plant spread (14.60 cm) was observed in cv. Gili which was at par with Tamir having plant spread 15.10 cm.

At 90 DAP on E-W direction cv. Nabila recorded maximum plant spread (26.50 cm), which was found at par with Camarosa having plant spread 26.10 cm. Moreover, Hadar,

E1-1333, Line-359 and Sabrina were found at par with Camarosa having respective plant spreads 24.60, 24.20, 24.17 and 24.63 respectively. The minimum plant spread (21.73 cm) was observed in cv. Gili which was at par with Tamir, Sweet Charlie, Yashmin, Winter Dawn and Shani having respective plant spreads 23.10,21.83, 23.60, 22.30 and 23.03 cm.

At 120 DAP on E-W direction cv. Nabila recorded maximum plant spread (32.50 cm), which was found at par with Camarosa having plant spread 31.47 cm. Sabrina was at par with Camarosa having plant spread 29.97 cm. Moreover, Hadar, Sweet Charlie, Yashmin, Shani and Line-359 were found at par with Sabrina having plant spreads 29.20, 29.03, 28.77, 29.10 and 28.07 respectively. The minimum plant spread (27.40 cm) was observed in cv. Gili which was found non-significant with all other varieties except Nabila, Sabrina and Camarosa.

Plant Spread (cm) North-South (N-S) direction

Different strawberry cultivars showed significant differences in respect to plant spread (N-S direction) observed at 30, 60, 90 and 120 days after planting (DAP).

As per data observed on N-S direction at 30 DAP, the maximum plant spread (12.40 cm) was observed in cv. Nabila which was at par with Camarosa and Sabrina having plant spread 11.63 and 10.63 cm respectively. Similarly, Hadar was found at par with Camarosa and Sabrina with plant spread 9.23 cm. The minimum plant spread (6.40 cm) was observed in cv. Gili which was found non-significant with Sweet Charlie, E1-1333, Line-359, Tamir, Yashmin, Shani and Winter Dawn having plant spread 8.26, 7.83, 8.16, 8.10, 7.76 and 8.96 cm respectively.

At 60 DAP on N-S direction cv. Nabila recorded maximum plant spread (18.40 cm), which was at par with Camarosa, Sabrina and Hadar having plant spread 18.30, 17.63 and 16.43 cm respecively. 19.43, 17.67 and 16.73 cm respectively. Moreover, E1-1333 and Line-359 were at par with Hadar having respective plant spreads 15.83 and 15.90 cm. The minimum plant spread (13.73 cm) was observed in cv. Gili which was at par with Tamir, Winter Dawn, Shani, Sweet Charlie, E1-1333, Line-359 and Yashmin having plant spreads 14.43, 14.97, 14.83, 13.93, 15.83, 15.90 and 14.50 cm respectively.

At 90 DAP on N-S direction cv. Nabila recorded maximum plant spread (23.50 cm), which was at par with Camarosa having plant spread 23.10 cm. Moreover, Hadar, Sweet Charlie, E1-1333, Line-359 and Sabrina were found at par with Camarosa having respective plant spreads 21.63, 21.60, 21.20, 21.16 and 21.73 respectively. The minimum plant spread (18.83 cm) was observed in cv. Yashmin which was at par with Tamir, Gili, Winter Dawn and Shani having respective plant spreads 20.10, 20.60, 19.30 and 20.03 cm.

At 120 DAP on N-S direction cv. Nabila recorded maximum plant spread (28.50 cm), which was found at par with Camarosa having plant spread 27.46 cm. Sabrina was at par with Camarosa having plant spread 25.96 cm. Moreover, Hadar, Sweet Charlie, E1-1333, Shani and Line-359 were found at par with Sabrina having plant spreads 24.76, 24.10, 25.20, 25.03 and 24.06 respectively. The minimum plant spread (23.40 cm) was observed in cv. Gili which was found non-significant with all other varieties except Nabila, Sabrina and Camarosa.

The above finding related to plant spread comes in accordance with the findings of Singh *et al.,* (2008) [19], Sharma *et al.,* (2014) [17] and Neetu and Sharma (2018) [11]

Leaves per plant

At 30 DAP, the maximum number of leaves per plant (9.83) was observed in cv. Nabila followed by Camarosa and Sabrina which were at par with each other with number of leaves 9.20 and 8.67 respectively. The minimum number of leaves (6.43) was observed in cv. Gili.

The data pertaining to number of leaves per plant observed at 60 day after planting revealed that the maximum number of leaves per plant (20.50) was recorded in cv. Nabila which was at par with Camarosa having number of leaves 19.03 per plant. The minimum number of leaves per plant (15.47) was recorded in cv. Gili, which was found non-significant different with Shani and E1-1333 with respective number of leaves 15.53 and 15.73 per plant.

At 90 DAP, the maximum number of leaves per plant (29.50) was recorded in cv. Nabila followed by Camarosa then Sabrina having number of leaves 26.03 and 24.77 per plant respectively. The minimum number of leaves per plant (20.47) was recorded in E1-1333.

Similarly at 120 DAP, the maximum number of leaves per plant (36.50) was observed in cv. Nabila which was followed by Camarosa then Sabrina having number of leaves 35.37 and 33.77 per plant respectively. The minimum number of leaves per plant (26.40) was recorded in cv. Gili.

Variation with respect to number of leaves could be attributed to the fact that different cultivars may react differently to photoperiod, light, temperature, nutrient status of soil, available metabolites and their allocation to the above ground plant parts (Tanaka and Muzuta, 1974; Strik, 1988) [22, 20]. Similar results were also obtained by Neetu and Sharma (2018) [11] in strawberry in the plain region of Chhattisgarh.

Runners produced per plant

The maximum number of runners per plant (5.76) was produced by cv. Nabila followed by Camarosa (4.13) which was at par with Sabrina with number of runners per plant (3.70). Moreover, E1-1333, Tamir, Yashmin, Winter Dawn and Line-359 were found at par with Sabrina having number of runners per plant 3.30, 3.66, 3.05, 2.99 and 3.33 respectively. The minimum number of runners per plant (2.68 cm) was observed in Gili which was at par with Winter Dawn, Shani, Sweet Charlie, E1-1333, Line-359 and Yashmin having respective number of runners per plant 2.99, 2.69, 2.75, 3.30, 3.33 and 3.05. Because of confined and short favorable agro-climatic conditions, reduced number of runners was produced by the plants. This result is at par with that of Kumar *et al.,* (2011) [8] in Sikkim condition, Baumann *et al.,* (1993) [2] in British Columbian condition and Neetu and Sharma (2018) [11] in Chhattisgarh condition.

Days to first flowering

Days to first flowering varied significantly among the varieties. Amongst the different cultivars Sabrina recorded minimum days to first flowering (51.43 days) which was at par with Camarosa having 51.94 days to first flowering while E1-1333 recorded the maximum days to first flowering (56.93 days). Variability in days to first flowering in different varieties might be due to differences in their chilling requirement as opined by Badiyala and Joolka (1983) [6] or due to differences in their genetic makeup as suggested by Li *et al.* (1993) [9]. The present findings are in close agreement with the finding of Neetu and Sharma (2018) [11] in Chhattisgarh condition.

Days to first fruiting

Days to first fruiting varied significantly among the varieties. Amongst the different cultivars Sabrina recorded minimum days to first fruiting (59.29 days) which was at par with Camarosa having 61.58 days to first fruiting while E1-1333 recorded the maximum days to first fruiting (68.40 days). Variability in days to first fruiting in different varieties might be due to differences in their days taken to become in flowering stage or due to different agro-climatic conditions where they are grown. The present findings are in close agreement with the finding of Neetu and Sharma (2018) [11] in Chhattisgarh condition.

Days to fruit maturity

The minimum days to fruit maturity (69.39) was observed in cv. Sabrina, which was followed by cv. Camarosa having days to fruit maturity 71.57. The Maximum days to fruit maturity (78.13) was recorded in cv. E1-1333, which was at par with Winter Dawn and Gili having 77.71 and 76.59 days to fruit maturity respectively. The present results are in conformity with the findings of those reported by Neetu and Sharma (2018) [11] in Chhattisgarh condition.

Considering the above results, it can be concluded that cv. Nabila gave maximum vegetative growth (Plant height, plant spread, leaves and runners per plant) and Sabrina takes minimum time to come to flowering, fruiting and fruit maturity under the plain region of Chhattisgarh.

Table 1: Plant height (in cm) of different strawberry cultivars under protected condition.

Treatments	30 DAP	60 DAP	90 DAP	120 DAP
Hadar	7.70^{b}	13.67^{c}	18.00^{ab}	21.37^{ab}
Sweet Charlie	7.37^{ab}	13.37^{bc}	17.70^{ab}	20.60^{a}
E1-1333	7.43^{ab}	12.77^{ab}	17.10^{ab}	21.03 ^{ab}
Tamir	7.43^{ab}	13.43^{c}	17.77^{ab}	21.10^{ab}
Yashmin	7.40^{ab}	12.73^{ab}	17.07^{ab}	20.73^{a}
Camarosa	9.43^{d}	15.43^{d}	19.77^{c}	23.77^{c}
Gili	7.00^{a}	12.33^{a}	16.67^{ab}	20.43^{a}
Shani	7.27^{ab}	13.03^{a}	17.37^{ab}	20.67^{a}
Winter-dawn	7.33^{ab}	12.60^{a}	17.27 ^{ab}	21.33^{ab}
Line-359	7.17^{ab}	12.83^{ab}	17.17^{ab}	21.17^{ab}
Sabrina	8.67^{c}	14.00^{c}	18.33^{b}	22.33^{bc}
Nabila	10.47^{e}	16.47^{e}	20.80^{d}	25.80^{d}
SE(m)±	0.15	0.25	0.45	0.50
C.D.	0.45	0.74	1.33	1.48

DAP – Days after planting

The superscript letter indicates that the treatment means with same letters are at par at 5% level of significance, while the means with different letters are significantly different at 5% level of significance. These letters have been affixed based on CD-value comparison of treatment means.

Table 2: Plant spread (in cm) in E-W direction of different strawberry cultivars under protected condition.

Treatments	30 DAP	60 DAP	90 DAP	120 DAP
Hadar	11.67^{cd}	16.73^{d}	24.60^{bc}	29.20^{ab}
Sweet Charlie	11.37^{cd}	15.70^{bc}	21.83^{ab}	29.03^{ab}
E1-1333	11.77^{cd}	16.43^{cd}	24.20^{bc}	27.80^{a}
Tamir	10.43^{b}	15.10^{ab}	23.10^{ab}	27.77^{a}
Yashmin	11.03^{bc}	16.37^{cd}	23.60^{ab}	28.77^{ab}
Camarosa	12.10^{de}	19.43^{f}	26.10^{cd}	31.47^{cd}
Gili	9.27^{a}	14.60^{a}	21.73^{a}	27.40^{a}
Shani	11.33^{c}	16.33^{cd}	23.03^{ab}	29.10^{ab}
Winter-dawn	11.00^{bc}	16.00^{cd}	22.30^{ab}	27.70^{a}
Line-359	11.50^{cd}	16.50^{cd}	24.17^{bc}	28.07^{ab}
Sabrina	11.73^{cd}	17.67^{e}	24.63^{bc}	29.97^{bc}
Nabila	12.47^{e}	21.47^{g}	26.50^{d}	32.50^{d}
SE(m)±	0.29	0.30	0.67	0.69
C.D.	0.85	0.89	1.96	2.04

DAP – Days after planting

E-W – East-West

The superscript letter indicates that the treatment means with same letters are at par at 5% level of significance, while the means with different letters are significantly different at 5% level of significance. These letters have been affixed based on CD-value comparison of treatment means.

Table 3: Plant spread (in cm) in N-S direction of different strawberry cultivars under protected condition

Treatments	30 DAP	60 DAP	90 DAP	120 DAP
Hadar	9.23^{bcd}	16.43^{bcd}	21.63^{bc}	24.76^{ab}
Sweet Charlie	8.26^{abc}	13.93^{a}	21.60^{bc}	24.10^{ab}
E1-1333	7.83^{ab}	15.83^{abc}	21.20^{bc}	25.20^{ab}
Tamir	8.10^{abc}	14.43^{ab}	20.10^{ab}	23.76^{a}
Yashmin	7.76^{ab}	14.50^{ab}	18.83^{a}	23.80^{a}
Camarosa	11.63^{de}	18.30^{d}	23.10^{cd}	27.46^{cd}
Gili	6.40^{a}	13.73^{a}	20.60^{ab}	23.40^{a}
Shani	7.50^{ab}	14.83^{ab}	20.03^{ab}	25.03^{ab}
Winter-dawn	8.96^{abc}	14.97^{ab}	19.30^{ab}	23.70^{a}
Line-359	8.16^{abc}	15.90^{abc}	21.16^{bc}	24.06^{ab}
Sabrina	10.63^{cde}	17.63^{cd}	21.73^{bc}	25.96^{bc}
Nabila	12.40^{e}	18.40^{d}	23.50^{d}	28.50^{d}
SE(m)±	0.88	0.77	0.66	0.68
C.D.	2.59	2.28	1.95	2.03

DAP – Days after planting

N-S – North-South

The superscript letter indicates that the treatment means with same letters are at par at 5% level of significance, while the means with different letters are significantly different at 5% level of significance. These letters have been affixed based on CD-value comparison of treatment means.

Table 4: Number of leaves per plant of different strawberry cultivars under protected condition.

Treatments	30 DAP	60 DAP	90 DAP	120 DAP
Hadar	8.43^{d}	16.70^{b}	24.70^{d}	32.07^{d}
Sweet Charlie	7.37^{bc}	16.37^{b}	23.37^{c}	31.03^{c}
E1-1333	7.93^{cd}	15.73^{a}	20.47^{a}	30.80^{c}
Tamir	8.43^{d}	16.43^{b}	23.07^{c}	31.77^{cd}
Yashmin	7.40^{bc}	16.47^{b}	23.47^{c}	31.80^{cd}
Camarosa	9.20^{e}	19.03^{d}	26.03^{e}	35.37^{f}
Gili	6.43^{a}	15.47^{a}	21.77^{b}	26.40^{a}
Shani	7.33^{b}	15.53^{a}	23.20^{c}	27.53^{a}
Winter-dawn	7.70^{bc}	16.40^{b}	22.40^{bc}	28.70^{b}
Line-359	7.50^{bc}	16.50^{b}	23.50^{c}	27.50^{a}
Sabrina	8.67^{e}	17.77^{c}	24.77^{d}	33.77^{e}
Nabila	9.83^{f}	20.50^{d}	29.50^{f}	36.50^{g}
SE(m)±	0.19	0.21	0.26	0.39
C.D.	0.56	0.63	0.77	1.15

DAP – Days after planting

The superscript letter indicates that the treatment means with same letters are at par at 5% level of significance, while the means with different letters are significantly different at 5% level of significance. These letters have been affixed based on CD-value comparison of treatment means.

Table 5: Days to 1st flowering, days to 1st fruiting, days to maturity and number of runners per plant of different strawberry cultivars under protected condition

Treatments	No. of runners /plant	Days to 1st flowering	Days to 1st fruiting	Days to maturity
Hadar	3.59^{bce}	53.34^{cd}	62.76^{bc}	74.52^{c}
Sweet Charlie	2.75^{a}	53.45^{cd}	67.89^{fg}	76.48^{e}
E1-1333	3.30^{abcd}	56.93^{h}	68.40^{g}	78.13^{f}
Tamir	3.66^{cde}	54.37^{ef}	68.15^{g}	76.10^{e}
Yashmin	3.05^{abcd}	54.14^{def}	67.05^{f}	74.75^{cd}
Camarosa	4.13^{e}	51.94^{ab}	61.58^{ab}	71.57^{b}
Gili	2.68^{a}	54.67^{f}	67.51^{fg}	76.59^{ef}
Shani	2.69^{a}	53.67^{de}	63.58^{cd}	75.26^{cde}
Winter-dawn	2.99^{abcd}	55.99^{g}	63.45^{cd}	77.71^{f}
Line-359	3.33^{abcd}	53.39^{cd}	64.97^{e}	74.89^{cd}
Sabrina	3.70^{de}	51.43^{a}	59.29^{a}	69.39^{a}
Nabila	5.76^{f}	52.62^{bc}	62.13^{b}	72.22^{b}
SE(m)±	0.27	0.91	0.45	0.529
C.D.	0.78	2.67	1.32	1.562

The superscript letter indicates that the treatment means with same letters are at par at 5% level of significance, while the means with different letters are significantly different at 5% level of significance. These letters have been affixed based on CD-value comparison of treatment means.

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