

## **VARIATION I GROWTH FLOWEING AND YIELD CHARACTERS IN SOME APPLE (*Malus x domestica* Borkh) CULTIVARS UNDER MID-HILL CONDITIONS OF HIMANCHAL PRADESH**

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### **ABSTRACT**

An evaluation of variation in growth, flowering, fruiting and yield parameters in 25 apple cultivation was carried out at D. Y. S. Parmar University of Horticulture and Forestry, Solan, H.P. Cultivar Tropical Beauty was found to be superior for the characters stem firth, leaf area, tree volume, yield per plant, mean fruit weight and mean fruit breath among all the cultivars. Cultivars Parlin's Beauty was found to be next highest yielder, Idared, Skyline Supreme and Mollie's Delicious gave very poor performance with respect to yield contributing characters. The cultivars Tropical Beauty and Parlin's Beauty are adjusted best in respect of productivity and fruit quality and are accordingly recommended for cultivation under the mid-hill condition Himanchal Pradesh.

### **INTRODUCTION**

Himanchal Pradesh is hilly state and is situated in the top of Himalayan range with elevation ranging between 460 to 6400 meters (m.s.l.). apple is one of the main commercial temperate fruit crop of Himanchal Pradesh with a production of 3,93,653 tones from an area of 85,631 ha during the year 1998-1999. so far apple cultivation is limited to the areas suitable for high chilling apple cultivars. There are some varieties, which can grow in mid-hill condition and requires low chilling temperature. Which are needed to be popularization among the farmers of such areas. Moreover, the existing genetic variability among the cultivars which can be used for future breeding programme in a successful manner, to the benefit of the farmers. Keeping in view a trial was laid out to evaluation some of the apple cultivation at Dr. Y.S.Parmar University of Horticulture and Forestry, Solan, Himanchal Pradsesh.

### **MATERIALS AND METHODS**

Twenty-five apple cultivars from various chilling requirement group wee taken from the present study. The experimental site was located at around 1250 m (m.s.L.) and situated at 310 N latitude and 770E longitude. The stem girth was measured at a height of 15 cm. from graft union. Tree volume and fruit set percentage 20 & 40 days after full bloom was recorded as per the method given by Westwood (1978). Days to full bloom was estimated by calculating the days from fist bud break and full bloom. Full bloom was recorded when > 75 % flowers had opened. To record the number of flowers per unit shoot length and number of fruit per unit shoot length, 30 cm. length wa taken as a fruit and same shoots were used to record both the data. For analysis of data randomized block design was adopted with 3 replication. The statistical analysis for each character was carried out on mean value. The data subjected to the analysis of variance as described by Panse and Sukhatme (1961).

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## RESULTS AND DISCUSSION

The analysis of variance for all characters studied differed significantly. This implies that the entries evaluation were genetically different. Nakayama and Saito (1970) observed significant differences among the apple varieties for fruit and leaf characters. Earlier many yield (Longley, 1960), girth height and mean tree spread (Chadha and Sharma, 1975), date of flowering, date of full bloom, date of harvest, yield per plant, fruit weight, length and diameter (Rathore, 1986), trunk girth, yield, fruit length and breadth (Gautam and Chauhan, 1986) and fruit shape, size, ripening and flowering characters (Bernkoff, 1990).

Tropical Beauty and Parlin's Beauty were the best genotype for yield per plant. In 1984, Gautam and Chauhan found tropical Beauty showed to be highest yielder under the mid-hill conditions. Whereas, Tropical Beauty showed the highest value for yield per unit shoot length, stem girth, leaf area, tree volume, mean fruit weight and breadth. Gautam and Chauhan in 1984 also found highest value for stem girth and tree volume in Tropical Beauty under the mid-hill conditions of Himanchal Pradesh. Sweet Semi Red was found to be promising for fruit set 20 days after full bloom, fruit set 40 days after full bloom and final fruit before harvesting. For the character number of flowers per unit shoot length, Parlin's Beauty and Early McIntosh were at par with each other. Aziza was found to be highest genotype for the characters mean tree spread, total duration of flowering days after full bloom, days between date of petal fall and date of commencement of June drop and number of fruit per unit shoot length. Genotype Nemared Delicious, Maayan, Stark Summer Gold and Red Royal were found to be promising for the characters plant height, days to full bloom, days between date of commencement of June drop and date of harvesting and mean fruit length respectively. The range of growth, flowering, fruit and yield characters are given in table 1-3.

On the basis of growth, flowering and yield characters, cultivars Tropical Beauty and Parlin's Beauty were found to be best suited for mid-hill condition among all the twenty-five cultivars studied. Further biometrical studies reveal the transmissibility of desired trait to the progenies, so that more suitable cultivars can be developed through breeding works.

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**Table 1. Range of growth characters in apple**

Character	Grand mean	Range	SE ( $\pm$ )	CD (5 %)
Stem girth (cm.)	47.04	31.00 - 72.33	8.34	16.78
Plant height (m)	5.28	2.10 - 8.00	0.87	1.75
Mean tree spread (m)	4.51	2.18 - 6.63	0.55	1.12
Leaf area (cm <sup>2</sup> )	180.78	95.36 - 264.77	16.89	34.01
Tree volume (m <sup>3</sup> )	62.18	12.76 - 132.73	19.48	39.20

**Table 2. Range of fruiting characters in apple.**

Character	Grand mean	Range	SE ( $\pm$ )	CD (5 %)
Number of fruit/unit shoot length (30 cm)	6.21	3.17 - 9.69	0.59	1.19
Fruit set 20 days after bloom (%)	26.52	11.31 - 46.27	6.64	13.37
Fruit set 40 days after Full bloom (%)	17.13	6.46 - 28.75	2.92	5.88
Final fruit before Harvesting (%)	14.47	6.73 - 25.57	2.43	4.89

**Table 3. Range of fruit and yield characters in apple.**

Character	Grand mean	Range	SE ( $\pm$ )	CD (5 %)
Yield/Plant (kg.)	7.17	1.67 - 25.00	1.21	2.43
Fruit weight (g)	114.71	54.89 - 188.33	5.82	11.73
Fruit length (cm.)	5.53	3.95 - 6.56	0.42	0.84
Fruit breadth (cm.)	6.61	3.26 - 7.92	0.41	0.82
Fruit yield / unit shoot length (g)	845.95	495.0 - 1783.3	98.60	198.45