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## Comparative Studies on the Performance of Some Grape Fruit Varieties under Soil and Climatic Conditions of Dera Ghazi Khan

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**Abstract:** Present research studies were carried out to compare four varieties of grape fruit i.e., Shamber, Marsh seedless, Foster and red Maxican for their vegetative and reproductive characters. It has been found that all the varieties behaved similarly in both the years for height and spread of plant and for TSS contents. With regard to yield, juice contents and juice percentage, Marsh seedless was found superior variety. Stem girth was nearly similar in all cultivars except red Maxican which produced least stem girth. Red maxican was better for giving more fruit size and average weight of single fruit. Generally, all the four cultivars behaved similarly for various vegetative and reproductive characters in both the years.

**Key words:** Grape fruit, shamber, marsh seedless, foster, red maxican, performance, vegetative and reproductive characters

### Introduction

Grape fruit (*Citrus paradisi* Macf) is an important member of citrus family. Out of total citrus area of Pakistan 196.1 thousand hectares, grape fruit is cultivated on an area of 35.3 thousand hectares (Anonymous, 1997). The shape of tree is much beautiful and attractive and can be used in the house lawns during land scaping which can enhance the aesthetic value of the lawns. The fruit is much liked by the people for its nutritional values especially its richness in vitamin-C. Grape fruit is a best natural treatment for diabetics and doctors usually recommend it for diabetic patients. The fruit contains a large amount of juice and mostly used by the people for its juice contents. Some varieties are more juicy and give higher production than others. Soil and climatic conditions also affect the performance of various cultivars and by changing the location, the performance may also be changed. While studying growth characteristics of grape fruit varieties, it was found that marsh seedless produced more yield than shamber, although, height, spread and total soluble solids of both the cultivars did not vary greatly (Noulmer and Sinthy, 1991). Fruit size and fruit weight of different grape fruit varieties was found variable. The comparison of red maxican and foster grape fruit varieties showed that red maxican produced heavier and bigger fruits, the quality of both the varieties did not show any variation (Baulker and Kornas, 1992). Size of fruit and texture of juice vesicles was found almost equal in shamber and marsh seedless cultivars of grape fruit, but more juice contents and juice percentage was observed in the fruits of march seedless (Elmans and Jokera, 1992). Keeping in view the above mentioned facts, this project was envisaged to compare four varieties of grape fruit.

### Materials and Methods

The research studies were carried out at Horticultural Research Station, Dera Ghazi Khan during 1997-99. Four plants from each of four cultivars of grape fruit viz. Shamber, marsh seedless, foster and red maxican were selected for the experiment. All the plants were uniform in size and of 10-12 years age. They were growing under similar groclimatic conditions. A constant dose of fertilizers and farmyard manure was applied to all the plants on the following rates:

- i) Farm yard manure = 40 kg/plant (during December)
- ii) Urea = 1 kg/plant (half dose before flowering and the 2<sup>nd</sup> half after fruit setting)
- iii) SSP = 3 kg/plant full dose before flowering along with first dose of urea
- iv) SOP = 1 kg/plant full dose before flowering alongwith first dose of urea

The four varieties of grape fruit were considered as treatments:

- T<sub>1</sub> = Shamber
- T<sub>2</sub> = Marsh seedless
- T<sub>3</sub> = Foster
- T<sub>4</sub> = Red Maxican

Various parameters observed for these varieties were as under:

1. Stem girth, height and spread of plant was measured in April
2. Yield in the form of number of fruits was calculated on 30<sup>th</sup> June because fruit stealing was a great limitation to take the yield data afterwards
3. Fruit size, weight, TSS, juice contents and juice percentage was observed in the mid of January because after that no fruit was left on the trees

The experiment was laid out according to the randomized complete block design and difference among treatment means was calculated using DMR test (Steel and Torrie, 1980).

### Results and Discussion

The results procured on various parameters for both the years are given in Table 1 and 2 and discussed as under.

**Stem girth (cm):** Table 1 depicts highly significant results for the year 1997-98. T<sub>3</sub> produced the maximum stem girth (59.7 cm). This was followed by T<sub>2</sub> and T<sub>1</sub> and both of them were statistically at par. T<sub>4</sub> produced the lowest stem girth. During 1998-99 T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> behaved similarly with minor differences by producing 52.1, 54.2 and 53.1 cm stem girth, respectively (Table 2). T<sub>4</sub> behaved similarly as in the first year and produced lowest stem girth.

**Shakir *et al.*: Grape fruit, shamber, marsh seedless, foster**

**Table 1: Comparative studies on the performance of some grape fruit varieties under soil and climatic conditions of Dera Ghazi Khan (1997-98)**

Treatment	Stem girth (cm)	Height of plant (m)	Spread of plant (m <sup>2</sup> )	No. of fruits/ plant upto 30-06-98	Fruit size (cm <sup>2</sup> )	Average wt. of single fruit (g)	T.S.S. (ml)	Juice contents	Juice %age
T <sub>1</sub>	50.6b	3.38a	15.33a	63.2d	174.1c	370.8c	5.8a	205.6b	55.4a
T <sub>2</sub>	52.1b	3.49a	16.54a	133.0a	151.0d	348.4d	4.4a	242.2a	59.4a
T <sub>3</sub>	59.7a	3.46a	14.96a	114.1b	189.6b	428.6b	5.7a	187.1c	43.7b
T <sub>4</sub>	45.0c	3.12a	13.99a	78.6c	221.0a	448.2a	4.5a	127.9d	28.4c

**Table 2: Comparative studies on the performance of some grape fruit varieties under soil and climatic conditions of Dera Ghazi Khan (1998-99)**

Treatment	Stem girth (cm)	Height of plant (m)	Spread of plant (m <sup>2</sup> )	No. of fruits/ plant upto 30-06-98	Fruit size (cm <sup>2</sup> )	Average wt. of single fruit (g)	T.S.S. (ml)	Juice contents	Juice %age
T <sub>1</sub>	52.1a	3.19a	17.52a	10.71c	178.8c	345.4v	6.4a	22.37b	59.40a
T <sub>2</sub>	54.2a	3.67a	17.70a	78.0d	155.6d	321.6f	4.4a	278.7a	60.50a
T <sub>3</sub>	53.1a	3.53a	18.05a	117.2b	194.0b	376.4n	4.2a	198.7c	52.29b
T <sub>4</sub>	46.6b	3.17a	18.50a	120.0a	206.9a	422.1s	4.9a	177.1d	45.34c

**Number of fruits per plant upto 20<sup>th</sup> June:** During 1997-98 T<sub>2</sub> got the highest position by producing 133 fruits. The remaining cultivars appeared in descending order of T<sub>3</sub>, T<sub>4</sub> and T<sub>1</sub> by producing 114.4, 78.6 and 63.20 fruits per plant, respectively (Table 1). During second year T<sub>4</sub> (120 fruits) got the supreme position (Table 2) followed by T<sub>3</sub>, T<sub>1</sub> and T<sub>2</sub> from which 117.2, 107.01 and 78 fruits per plant were counted.

**Fruit size (cm<sup>2</sup>):** Maximum sized fruits were obtained from T<sub>4</sub> in both the years (Table 1, 2). During first year the maximum fruit size was 221.00 cm<sup>2</sup> which was 206.9 cm<sup>2</sup> in the following year. The fruit size was found decreasing for T<sub>3</sub>, T<sub>1</sub> and T<sub>2</sub> with 189.6, 174.1 and 151 cm<sup>2</sup>, respectively for the first year. For the next year this sequence was 194, 178.8 and 155.6 cm<sup>2</sup> for these treatments.

**Average weight of single fruit (gm):** Depending on the fruit size, the same trend was observed for weight of fruit (Table 1, 2). Maximum average weight per fruit was observed in T<sub>4</sub> in both the years by producing 448.2 and 422.1 gm weight per fruit during first and second year. The remaining treatments were noted in descending order for T<sub>3</sub>, T<sub>1</sub> and T<sub>2</sub> with 428.6, 370.8 and 348.4 gm weight per fruit in the first year which were 376.4, 345.4 and 321.6 gm during the following year.

**Juice contents (ml):** Table 1 and 2 advocates highly significant results. Same pattern was observed for both the years. During 1997-98 maximum juice contents (242.2 ml) were calculated in T<sub>2</sub>. This was followed by T<sub>1</sub>, T<sub>3</sub> and T<sub>4</sub> by producing 205.6, 187.1 and 127.9 ml juice, respectively. In the second year, T<sub>2</sub> produced maximum juice contents. Other treatments were found in descending order for T<sub>1</sub>, T<sub>3</sub> and T<sub>4</sub> with 223.7, 198.7 and 177.10 ml juice contents respectively.

**Juice percentage (%):** All these cultivars depicted similar results in both the years. During first year T<sub>2</sub> occupied the top position which was statistically similar to T<sub>1</sub>. Next position was obtained by T<sub>3</sub> with 43.7% juice.

The lowest juice percentage was observed in T<sub>4</sub>. During second year T<sub>2</sub> and T<sub>1</sub> were found at par statistically by producing 60.05 and 59.40% juice. Then came T<sub>3</sub> with 52.29% juice. T<sub>4</sub> was observed at the bottom having 45.34% juice in its fruits.

**Height and spread of plant and TSS:** All the three parameters were found statistically similar for both the years as is evident from Table 1 and 2. Hence no need of discussion of these factors.

**Discussion**

Some parameters regarding vegetative or reproductive growth of various cultivars of the grape fruit were found similar while others were observed different. These results reflect the genetic potential of each cultivar, because no treatment was given to any plant except a constant dose of farm yard manure and fertilizer to all the plants. Our results are in accordance with the findings of Baulker and Kornas (1992) and Elmans and Jokera (1992).

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