

## Varietal Evaluation of Pomegranate under Arid Conditions

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**Abstract:** Among the nine cultivars of pomegranate evaluated, cv. Jodhpur Red, P-23 and Basin Seedless were more vigorous than other cultivars. Jalore Seedless showed its superiority with respect to fruit size, juice content, softness of seeds and other characters. The cracking percentage of fruits was maximum (63.4%) in cv. Jodhpur Red and minimum in cv. Jalore Seedless (21.2%).

**Key words:** Pomegranate, varieties, growth, yield, quality, cracking, arid conditions.

Pomegranate (*Punica granatum* L.) is one of the important fruit crops gaining popularity in arid and semi-arid regions of India. The area under this fruit crop is increasing in the country due to its hardy nature, high yield, low maintenance cost and good keeping quality (Khodade *et al.*, 1990). Lately, the farmers of Rajasthan have taken up the cultivation of this fruit crop because of its drought-hardy nature and suitability to the marginal lands. Pomegranate is also tolerant to salinity. In western Rajasthan the crop has shown immense potential for commercial cultivation in large areas. Unfortunately, information on its varietal evaluation is scanty. The present investigation was undertaken to evaluate the improved pomegranate cultivars.

### Materials and Methods

During 1986, cuttings of nine pomegranate cultivars, viz., Jodhpur Red, Ganesh, Basin Seedless, Dholka, GKVK-1, G-137, P-26 and Jalore Seedless, were raised and planted at the Central Research Farm of Central Arid Zone Research Institute, Jodhpur. For this, a Randomized Block Design was used, with four replications, and plant to plant spacing was maintained at

5 x 5 m. Four plants under each variety or replication were used for recording the observations. The plants were grown with uniform cultural practices. The fruiting of Mrig Bahar flowering was retained. Between 1994-95 and 1997-98, observations were made on vegetative growth of trees, yield and quality characters of the fruit. Physico-chemical characteristics were recorded from five randomly selected mature fruits from each replication. The total soluble solids (TSS) were estimated using a hand refractometer. Titrable acidity of the juice was determined by titration method (A.O.A.C., 1990).

### Results and Discussion

#### *Growth characteristics*

Most vegetative characters of pomegranate showed significant differences between varieties (Table 1). Cultivar Dholka had the maximum height (3.12 m), followed by P-23 (3.06 m) and Basin Seedless (2.95 m). The stem diameter recorded in P-26 (3.46 cm) was significantly larger than that in G-137, Ganesh and other cultivars. The spread of plant in east-west and north-south directions varied significantly in different

Table 1. Mean growth characteristics of different cultivars of pomegranate (1994-95 to 1997-98)

Cultivars	Plant height (m)	Diameter of stem (cm)	Spread of plant (m)	
			E-W	N-S
Jodhpur Red	2.94	3.29	3.18	3.20
Ganesh	2.31	2.80	2.58	2.64
Basin Seedless	2.95	3.24	3.14	3.05
Dholka	3.12	3.26	3.02	3.03
GKVK-1	2.64	3.17	2.78	2.82
G-137	2.74	3.00	2.81	2.79
P-23	3.06	2.95	2.91	2.86
P-26	2.74	3.46	3.20	3.31
Jalore Seedless	2.65	3.26	2.88	2.71
CD at 5%	0.17	0.23	0.13	0.15

cultivars. Jodhpur Red, Dholka and P-26 were the more spreading types. Pareek (1978) reported that pomegranate cultivars contained vigorous, semi-vigorous and dwarf types in their vegetative growth characters.

#### Yield

The yield data of the fruit for 4 years (Table 2) reveal significant difference between the years. Fruit yield, in general, was higher compared to that reported by Banker and Prasad (1992). This was because of the increase in plant height and canopy

cover during the period. The highest mean fruit yield per plant was observed in Jalore Seedless (24.37 kg), followed by G-137 (22.40 kg). Similar trend was also obtained for all the years and these were statistically at par.

#### Quality characters of fruit

Significant increase was observed in average weight of the fruits of improved cultivars over Jodhpur Red (local variety). Cultivar G-137 recorded the maximum fruit weight, followed by Jalore Seedless (Table

Table 2. Performance of different pomegranate cultivars with respect to fruit yield

Cultivars	Fruit yield (kg plant <sup>-1</sup> )				Mean
	1994-95	1995-96	1996-97	1997-98	
Jodhpur Red	12.00	14.45	14.23	15.84	14.13
Ganesh	15.20	17.67	16.47	16.89	16.56
Basin Seedless	13.50	15.20	15.50	14.98	14.80
Dholka	16.40	18.24	20.31	19.82	18.70
GKVK-1	18.82	20.23	21.62	22.58	20.81
G-137	22.55	21.80	23.00	22.21	22.40
P-23	20.90	22.96	19.17	21.92	21.24
P-26	18.50	20.23	22.18	21.36	20.57
Jalore Seedless	23.36	24.25	25.47	24.40	24.37
CD at 5%	3.62	5.20	4.83	4.27	-

Table 3. Cumulative physico-chemical parameters of different pomegranate cultivars (1994-95 to 1997-98)

Cultivars	Fruit weight (g)	Juice (%)	Seed (%)	TSS (°Brix)	Acidity (%)	Cracking (%)
Jodhpur Red	177.2	38.6	26.4	16.8	0.1789	63.4
Ganesh	191.2	46.3	12.7	17.6	0.4101	33.9
Basin Seedless	185.2	38.8	14.3	18.0	1.6872	38.2
Dholka	200.3	48.7	14.7	17.6	0.4021	26.4
GKVK-1	205.2	45.2	13.7	17.7	0.3502	37.5
G-137	230.6	49.5	14.0	18.0	0.4117	24.7
P-23	203.4	50.3	13.2	17.8	0.3542	29.5
P-26	207.5	49.7	12.2	17.8	0.4213	30.3
Jalore Seedless	226.8	52.8	10.1	18.1	0.4067	21.2
CD at 5%	14.7	5.3	2.1	1.2	0.0600	7.9

3). Siddappa (1943) reported similar difference in juice content due to genetic variation. The seed percentage in Jodhpur Red was significantly higher than that in other varieties, possibly because it is hard-seeded. Jalore Seedless, Ganesh, P-23 and other cultivars had seeds of light weight that contributed to softness in their quality. This further confirms the findings of Mali and Prasad (1999).

The T.S.S. in the juice ranged from 16.8 in Jodhpur Red to 18.1 in Jalore Seedless. The intervarietal differences were statistically comparable and were at par. These values correspond to those reported by Shulman *et al.* (1984).

The acidity (as citric acid) ranged from as low as 0.1789% in Jodhpur Red to as high as 1.6872% in Jalore Seedless. Because of such high variation in acid content this character can be used to classify the pomegranate cultivars into sweet, sour and bitter-sweet (Cains, 1940). The cracking per cent was minimum (21.2%) in Jalore Seedless, and maximum (63.4%) in Jodhpur Red, and it depended on the genetical

characters of different cultivars, sudden change in climate, and variation in soil moisture at the time of fruit maturity (Bankar and Prasad, 1992).

Thus, cv. Jalore Seedless performs very well under arid conditions, and may be recommended for commercial cultivation in the region.

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