Madras Agric. J. 89 (10-12) : 598-600 October-December 2002
https://doi.org/10.29321/MAJ.10.A00269

Suitability of pomegranate (*Punica granatum* L.) cultivars to semi arid conditions

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Abstract : Different cultivars of pomegranate were evaluated under semi-arid conditions with respect to vigour, yield and fruit quality at SKN College of Agriculture (Rajasthan Agricultural University), Jobner during 1998-99 and 1999-2000. Results revealed that inter-varietal differences were highly significant for most of the parameters studied. Cultivar 'Jodhpur Red' exhibited maximum plant height (2.40 m) and produced most sour fruits with 0.454 per cent acidity, while maximum stem girth (7.48 cm) was recorded in cultivar 'Bassein Seedless'. The maximum plant spread (3.56 m²) was recorded in cultivar 'Jalore Seedless' which was at par with 'Jodhpur Red' (3.50 m²). The highest yield (16.75 kg plant⁻¹) was produced by cultivar 'Jalore Seedless' with fruits of maximum length (8.04 cm), breadth (7.66 cm) and TSS (14.44° Brix). However, the maximum fruit weight (239.12 g) was obtained in cultivar 'Dholka' that was at par with that of cultivar 'Jalore Seedless' (238.75 g). The cultivar 'Jalore Seedless' is recommended for commercial cultivation in semi-arid conditions.

Key words : Pomegranate, Cultivars, Evaluation, Semi-arid conditions

Introduction

Pomegranate (*Punica granatum* L.) is one of the most important and favourite table fruits of tropical and sub-tropical regions of the world, which is also valued highly for its refreshing juice with nutritional and medicinal properties. Due to its high export potential (Khodade *et al.* 1990), drought hardy nature and suitability to marginal lands, it is gaining popularity among Indian farmers and cultivated all over the country particularly in Maharastra and Rajasthan.

A cultivar which has given better performance in one locality may not necessarily behave the same way under different agro-climatic conditions. Studies on suitability of this crop to different localities are very limited. Considering this in view, nine cultivars of pomegranate which have already given better performance under different localities of the country were studied to find out the potentiality in terms of vigour, yield and fruit quality in this region.

Materials and Methods

With the objective to assess relative performance, nine cultivars viz., Jodhpur Red, Ganesh, Bassein Seedless, Dholka, GKVK-1, G-137, P-26, P-23 and Jalore Seedless we planted during 1993 at Experimental Farm All India Coordinated Research Project on Ar Zone Fruits, SKN College of Agricultur (Rajasthan Agricultural University), Jobner. Th trees came to bearing after 5 years. Th observations were recorded during 1998-99 1999-2000. The cultural practices were give uniformly to all the cultivars.

At the time of harvesting stem girt (measured at 15 cm above ground level), plar height and plant spread were recorded. Thre pickings were done and yield was recorde by cumulating all the pickings. The fruit developed from July to September flowerin (Mrig Bahar) were used for analytical purpos @ five fruits/plant.

For physical parameters, weight of fruit (g), size (cm) and yield (kg plant⁻¹) wer recorded. Similarly, TSS was measured wit the help of 'Zeiss' hand refractometer. Titrabl acidity was determined with the method describe by Ranganna (1977). The experiment was lai out in RBD with four replications. Data collecte in both the years were pooled and statisticall analyzed according to the method suggeste by Panse and Sukhatme (1985) using PC Exce software.

Table 1. Growth, yield and quality parameters of different cultivars of pomegranate.

(Pooled means of two years)

Cultivars	Plant height (m)	Plant spread (m^2)	Stem girth (cm)	Fruit length (cm)	Fruit breadth (cm)	Fruit weight (g)	Yield (kg/tree)	Acidity (%)	TSS (%)
Jodhpur Red	2.40	3.50	6.81	6.11	6.03	166.50	13.75	0.454	12.96
Ganesh	1.76	2.73	6.55	6.90	6.83	215.62	11.25	0.286	12.37
Bassein Seedless	1.97	2.81	7.48	6.22	6.01	151.00	10.75	0.367	12.42
Dholka	2.02	2.12	4.70	5.65	5.51	239.12	12.25	0.380	13.71
GKVK-1	1.64	1.70	5.81	5.36	5.07	152.62	11.00	0.346	11.96
G-137	1.66	1.64	6.26	6.47	6.03	234.12	11.75	0.373	11.98
P-26	1.77	1.83	6.24	7.08	6.79	217.00	10.75	0.397	12.36
P-23	1.39	1.76	5.73	7.24	7.06	209.62	11.00	0.377	11.85
Jalore Seedless	1.38	3.56	5.28	8.04	7.66	238.75	16.75	0.332	14.41
SEm±	0.05	0.07	0.04	0.06	0.05	2.98	0.44	0.006	0.26
CD at 5%	0.14	0.21	0.12	0.17	0.14	8.34	1.22	0.016	0.73

Results and Discussion

Vegetative growth

The inter-varietal differences in respect to vegetative growth were significant (Table-1). It is obvious from the data that maximum plant height (2.40 m) was obtained by the cultivar Jodhpur Red and minimum height was obtained by Jalore Seedless (1.38m). Maximum plant spread (3.56 m^2) was obtained by Jalore Seedless and minimum spread was obtained by G-137 (1.64 m^2). The highest stem girth (7.48 cm) was recorded in Bassein Seedless followed by Jodhpur Red (6.81 cm) and minimum stem girth in Dholka (4.70 cm).

Size and weight of fruits

It is revealed from the results (Table 1) that size and weight of fruits of different cultivars differed significantly. The fruit length and breadth ranged from the lowest of 5.36 cm and 5.07 cm, respectively in cultivar GKVK-1 to the highest of 8.04 cm and 7.66 cm, respectively in cultivar Jalore Seedless. Similarly, the weight of fruits ranged from the lowest of 151.00 g in Bassein Seedless to as high as 239.12 g in Dholka which was at par with that of Jalore Seedless (238.75 g) and G-137 (234.12 g). These results are in agreement with those of Pareek and Nath (1996).

Chemical parameters

Total soluble solids (TSS)

The TSS content in the juice of different cultivars differed significantly and ranged from 11.85 per cent in P-23 to 14.44 per cent in Jalore Seedless which was at par with that of Dholka (13.71 %). These values correspond to those reported by Shulman *et al.*(1984).

Acidity

Total organic acid (as citric acid) differed significantly and ranged from 0.286 per cent in cultivar Ganesh to as high as 0.454 per cent in Jodhpur Red. The inter-varietal differences were highly significant (Table-1). Prevalence of wide variation in acid content of juice of different cultivars as recorded in the study, might probably be the reason to use this character to classify the pomegranate cultivars as sweet, sour or bitter sweet (Caius, 1940 and Cheema *et al.* 1949).

Yield

It is apparent from the data presented in Table-1 that the inter-varietal differences in respect of yield were significant. The highest yield (16.75 kg $plant^{-1}$) was recorded in cultivar Jalore Seedless as compared to lowest (10.75 kg $plant^{-1}$) in Bassein Seedless and P-26.

These variations in vegetative growth, physico-chemical characteristics of fruits and yield were mainly due to genotypic variation of the cultivars (Mahajan and Dhillon, 2000), though the agro-climatic conditions could not be overlooked. Mali and Prasad (1999) also recorded wide variation in different cultivars of pomegranate.

Thus, on the basis of vegetative growth, physico-chemical characteristics of fruits and yield of different cultivars, it is concluded that cultivar 'Jalore Seedless' is recommended for commercial cultivation in semi-arid conditions.

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(Received : March 2002 ; Revised : September 2002)