

Performance of Pomegranate (*Punica granatum*) in Temperate Region

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Abstract: Study was conducted at Indian Agricultural Research Institute, Regional Station, Shimla to assess the performance of pomegranate genotypes in temperate region. For this purpose performance of eight pomegranate varieties viz., Ichakdana, Ganesh, Kandhari Hansi, Jodhpur Red, Kandhari Kabuli, P-23, P-26, Nabha, was studied for fruit characters and quality traits. Fruit weight was recorded maximum in Ichakdana (380.5g) and minimum fruit weight observed in P-26 (101.3g). Fruit length was maximum in Ichakdana (91.3mm) and minimum was recorded in Kandhari Hansi (51.1mm). Fruit breadth was varied from 57.4mm-84.3mm with maximum in Ichakdana (84.3mm). The highest TSS was recorded in P-23 (14.6%) minimum was found in Kandhari Hansi (11.5%). Acidity was varied from Ichakdana 1.01-3.38. The highest aril content was recorded in Ichakdana (85.2%) and minimum observed in P-26 (67.8%).

Key words: Pomegranate, fruit characters, temperate region, genotypes.

INTRODUCTION

Pomegranate (*Punica granatum*) belongs to family Punicaceae, is native to Iran (Persia) and is one of the oldest fruit known to mankind. It has been traditionally cultivated since ancient times under diverse agro-climatic conditions. Pomegranate is a favorite fruit of tropical, subtropical and arid regions (Pareek, 1981). In India, pomegranate is commercially grown in about 1.3lakh hectare and production 13.45 lakh tone with average productivity of 10.3tonne/ha (NHB, 2014). Major pomegranate growing areas are Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Tamil Nadu and Rajasthan. Maharashtra is the major pomegranate growing state. It grows wild in Western Himalayan regions that include states like Himachal Pradesh, Jammu and Kashmir and Uttarakhand (Pandey *et al.*, 2008). Some wild types pomegranate also found in foot hills of Himachal Pradesh which can be exploited for anardana purpose (Singh and Singh, 2006). It is deciduous in temperate ecosystem and an evergreen or partially

deciduous in tropical and subtropical conditions. Orchards can be established at higher altitude including mid hills and foothills. Pomegranate can be grown on a wide range of soils but is found to do well on light and medium type of soil. The soil should be well drained. Fruit quality and colour development in light soils is good but poor in heavy soils. Pomegranate has versatile adaptability, drought resistance; low maintenance cost, steady and high yields of the crop. The pomegranate fruit has therapeutic value, good keeping quality and high export potential and is mainly grown for table purpose. The juicy pulp in the arils (seeds) varies from almost colorless to blood red. The seeds in some pomegranate varieties are very soft, while in others they are large and hard. Pomegranate fruits consist of about 60-67 per cent seeds and 33-40 per cent peel (Jagtap *et al.*, 1992). Whole pomegranate fruits contain 45-61 per cent juice, while arils yield 76-85 per cent juice (Patil and Sanghavi, 1980). Pomegranate fruits are the good sources of carbohydrates and minerals such as Ca, Fe and S

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and a moderate source of pectin. Glucose and fructose are the main sugars in pomegranate. These beneficial effects may be related to its high antioxidant activity resulting from the presence of a variety of biologically active compounds (Aviram, 2002; Halvorsen *et al.*, 2002). The edible part of the fruit contains considerable amount of acids, sugar, vitamins, polysaccharides, polyphenols and minerals (Gil *et al.*, 2001 and Kulkarni *et al.*, 2004). In spite of various pomegranate cultivars grown in different regions of India, there is no known cultivar for mid to high temperate conditions. Traditionally, pome and stone fruits are the major fruit crops of temperate ecosystem. With the changing scenario of climatic conditions pomegranate is becoming an alternative fruit crop for temperate region.

MATERIALS AND METHODS

The study was conducted at Horticultural Research Farm of Indian Agricultural Research Institute, Regional Station, Shimla-4. The experimental trees of eight cultivars viz., Ichakdana, Ganesh, Kandhari Hansi, Kandhari Kabuli, Jodhpur Red, P-23, P-26, Nabha with uniform age were selected. The uniform management practices with respect to nutrition and irrigation were adopted for all the cultivars. The plants multiplied through vegetative propagation of pomegranate genotypes were transplanted in the field at 3m x 3m apart under square system of planting. Yield attributing traits like fruit length, breadth, fruit weight and quality parameters viz; aril weight, acidity, TSS, were recorded during 2014 and 2015 and presented based on pool data. At the time of fruit harvest five fruits from each plant collected randomly for physico-chemical analysis. Size of fruit was recorded with the help of vernier calliper. TSS was determined with the help of hand refractometer. Titrable acidity was estimated by titrating the known volume of juice with 0.1 N NaOH, using phenolphthalein as indicator (A.O.A.C, 1998).

The soil of experimental site is sandy loam with gravel having low fertility status and poor water holding capacity. Meteorological parameters like temperature, rainfall and relative humidity were also recorded during fruiting period for interpretation of experimental results. Single tree

of each cultivar constituted an experimental unit and each cultivar was replicated four times. For statistical analysis RBD design was followed.

RESULTS AND DISCUSSION

Fruit characters-Observation on fruit characters were depicted in fig.1 elucidates that highest fruit weight was recorded in Ichakdana (380.5g) followed by Ganesh (229.3g), P-23 (211.2g), Kandhari Kabuli (208.7g) however, minimum fruit weight observed in P-26 (101.3g) rest were in between. Fruit length was maximum in Ichakdana (91.3mm) followed by Ganesh (72.3mm), P-23 (70.2mm) and minimum was recorded in Kandhari Hansi (51.1mm). fruit breadth was observed to the maximum in Ichakdana (84.3mm) followed by P-23 (72.1mm), Ganesh (71.5mm) and minimum recorded in Nabha (57.4mm). Wani (2012) recorded variation in fruit character in pomegranate genotypes.

Quality parameters- Performance of pomegranate was assessed for quality parameters in eight varieties/genotypes and results depicted in fig.2. The highest TSS was recorded in P-23 (14.6%) closely followed by Ganesh and P-26 (1.8%), Jodhpur Red (12.8%) and minimum was found in Kandhari Hansi (11.5%) rest were in between. Maximum acidity was recorded in Ichakdana (3.38%) minimum found in Ganesh (1.01%) rest were in between these two genotypes. The highest aril content was recorded in Ichakdana (85.2%) followed by Kandhari kabuli (78.5%), P-23 (75.5%) and minimum observed in P-26 (67.8%). Variation in quality traits was also reported by Singh and Singh (2006) in wild germplasm of pomegranate.

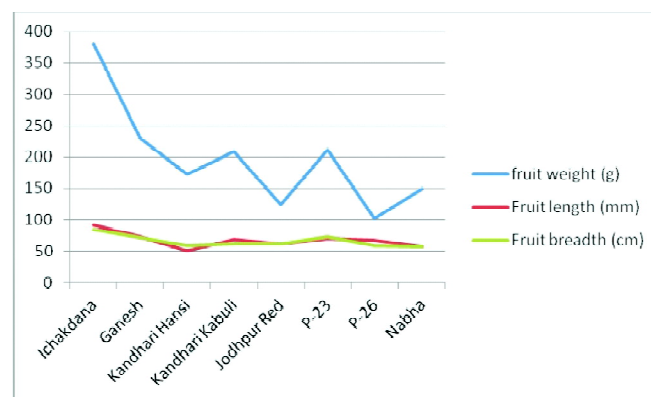


Figure 1: Performance of Pomegranate for fruit characters

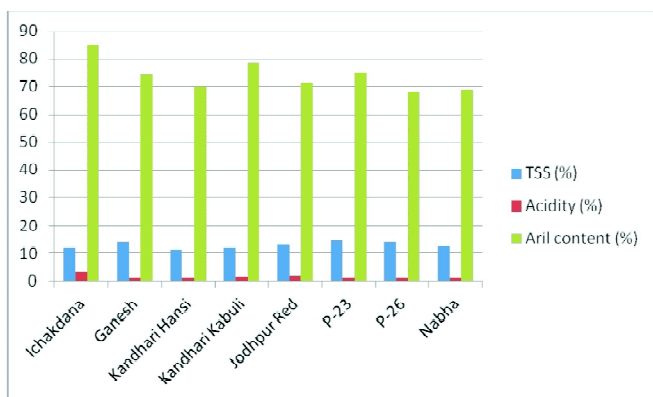


Figure 2: Performance of Pomegranate for quality traits

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