

Study on performance of different elite clones of jamun in top working under Hisar condition

Satpal Baloda^{1*}, ¹Jeet Ram Sharma, ¹S.K. Sehrawat, ¹Arvind Malik,
¹Savita Rani, ²Jayanti Tokas and ³Akshay Mehta

¹Department of Horticulture, CCS Haryana Agricultural University, Hisar, Haryana, India

²Department of Biochemistry, CCS Haryana Agricultural University, Hisar, Haryana, India

³Department of Horticulture, Maharana Pratap Horticultural University, Karnal, Haryana.

*Email: satpalbaloda74@gmail.com

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ABSTRACT

A study was carried out to study on performance of different elite clones of jamun in top working under Hisar condition. Scions of elite plants were collected from 18-different locations and budded on 25 years old jamun trees by top working during the year 2016. The results of two consecutive years of study revealed significant increase in growth, yield and quality of jamun. The maximum plant height was recorded from the plant, raised from the scion collected from Khera-1 Yamunanagar (7.6 m), whereas, the maximum stem girth was recorded from the collection taken from Dhani Chanderpal, Rohtak (26.4 cm). The maximum yield was recorded under collection from Milakpur, Hisar (18.4 kg/plant), maximum fruit weight was recorded from Milakpur, Hisar collection (9.2 g), whereas, minimum stone weight was recorded under collection from Chilkana-2 Saharanpur (1.0 g), maximum TSS was found in collection from Chhachrouli fruit nursery (14.0°Brix) and minimum acidity was recorded under collection from Dhani Chanderpal, Rohtak (1.00 %). Thus, it can be concluded that different scions collected from different sites showed variability in growth, yield and fruit quality of jamun.

Keywords : Fruit quality, fruit yield, scion, top working

INTRODUCTION

Jamun (*Syzygium cumini*) is an indigenous tropical fruit tree of India belonging to family myrtaceae. It is also known by other common names like black plum, java plum, Indian blackberry etc. (Sartaj Ali *et al.*, 2013). It is liked both by poor and rich but much liked by those who cannot afford to buy costly fruits. The tree bear fruits once in a year and the berries are sweetish sour in taste (Ghosh *et al.*, 2016). Jamun is also appreciated as windbreaks in fields (Ud din *et al.*, 2020). Jamun has gained commercial importance as a minor fruit in tropical and subtropical conditions. It is one of the most hardy fruit crops and can easily be grown even in marshy areas where other fruits fail to establish (Singh *et al.*, 2007). Jamun has been attributed in the Indian folklore medicine system to possess several medicinal properties (Inamdar, 2000). Apart from consumption of its fruit pulp, its seeds are used in Ayurvedic medicine against diabetes, heart and liver trouble. The jamun fruits are abundant source of

anthocyanins, phenols, pectin, protein and also rich in antioxidant properties. They are rich in anthocyanin pigments and are good source of natural food colourants (Chaudhary and Mukhyopadhyay, 2012). The seed contains jambosin and jambolin, which reduces diastatic conversion of starch into sugars. Besides its use as dessert fruit, jamun is used for preparation of delicious beverages, jellies, jam, squash, wine, vinegar etc.

Jamun is highly cross pollinated crop; hence wide variability is common in the species (Swamy *et al.*, 2017). In nature, lot of variation with respect to fruit shape and size, TSS, acidity and earliness in bearing of this crop is evident. Advantages of these variations can be taken to evolve selections of superior types. Survey and selection are the best procedures to evolve suitable genotypes for a particular area of its natural existence (Swamy *et al.*, 2017). Keeping in view, this experiment has been planned for “Study on performance of different elite clones of jamun in Top working under

Hisar condition” with the objective to evaluate the elite types for recommending under Hissar condition.

MATERIALS AND METHODS

The present investigation was conducted at Experimental orchard of Department of Horticulture, CCS Haryana Agricultural University, Hisar during the year 2018-22. Hisar falls within a typical semi-arid climatic region characterized by scorching, arid summers and extremely frigid winters. This area experiences substantial fluctuations in temperatures, both in terms of monthly maximum and minimum readings, during the summer and winter months. In the summer, from May to June, temperatures soar to a peak of approximately 48°C, while winter brings frigid conditions with temperatures occasionally dropping to freezing points in December and January. Rainfall exhibits significant variability in both its total quantity and distribution. Of the overall annual rainfall, which amounts to about 450 mm, a substantial 80% occurs during the monsoon season from July to September. There are sporadic, light showers from December to February due to western disturbances. The rainfall in this region is notably unreliable, with annual fluctuations ranging between 20-30%, and seasonal variations spanning 30-50%.

Twenty five years old 60 nos. unproductive trees were taken for top working study. There were 18-treatments (scion of 18-sites) with three replications of each (three top-worked trees from each site taking one plant as a unit) following randomized block design. The scions from 18-locations were collected and budded on old jamun trees by top working for evaluation of elite planting material of jamun. The criteria used for selection of scions from the trees of 18-sites was on the basis of yield, fruit size and quality of fruits. During the previous year of collection of scions i.e. July-August 2015, the trees were ear marked and then in the following year, the scions were collected.

The top working was done in July, 2016, taking scions from 18 locations of Hissar district. The 18-sites were i. Chhachrouli fruit nursery, ii. Khera-1 Yamunanagar, iii. Khera-2 Yamunanagar, iv. Chilkana-1 Saharanpur, v. Chilkana-2 Saharanpur, vi. Parkash Farm-1 (Chilkana, Saharanpur), vii. Parkash Farm-2 (Chilkana, Saharanpur), viii.

Karam Sain Farm-1 (Chilkana, Saharanpur), ix. Rakesh Mehta Farm house (Yamunanagar), x. R.R.S Buria (Yamunanagar), xi. Khijarpura (Kurukshetra), xii. Hansala (Kurukshetra), xiii. Udarsi (Kurukshetra), xiv. Dhera Bhath Majra (Kurukshetra), xv. Dadlu (Kurukshetra), xvi. Dangli (Kurukshetra), xviii. Milakpur (Hisar) and xviii. Dhani Chanderpal (Rohtak). Success of top working 4-months after operation has been presented in the table.

The observations included plant height (m), stem girth (cm), yield (kg/plant), fruit weight (g), stone weight (g), TSS (°Brix) and Acidity (%). The height of the trees were measured with the help of measuring pole, up to maximum point of height. For measuring the stem girth a marking place using a black circular one-centimeter-wide band, the tree trunk was marked 10 cm above the graft union on scion part and girth was measured in centimeter with the help of measuring tape. Plant height and stem girth were recorded on first fortnight of February 2020, February 2021 and February 2022 and pooled data is presented in the paper.

To calculate total fruit yield, the total number of fruits per tree was multiplied with average fruit weight and the value was expressed in kilograms (kg/tree). For recording fruit weight five randomly selected fruits from the tagged branch of the tree were picked and weighed on top pan electric balance. To calculate the average fruit weight, the total fruit weight was divided by total number of fruits taken and expressed in grams (g). The total soluble solids (TSS) was measured by hand refractometer and fruit acidity was estimated by using the method given in A.O.A.C. (1990). The yield and fruit quality parameters were recorded in July-August of 2020, 2021 and 2022 and pooled data is presented in the Tables.

RESULTS AND DISCUSSION

Variation was observed in the success of top working and growth of scion of jamun germplasm collected from different sites (Table 1). Budding success, recorded 4-months after operation varied from 50 % to 68 % among the collection sites. The plant height ranged from 5.6 m to 7.6 m. The maximum plant height was recorded by the collection from Khera-1 Yamunanagar (7.6 m) and the minimum plant height was recorded by the collection from Parkash Farm-2, Chilkana,

Table 1: Growth of scion of jamun germplasm collected from different sites (Pooled data of 2020, 2021 and 2022)

Treatment (Site of collection)	Plant height (m)	Stem girth (cm)	Budding Success (%)
1. Chhachrouli fruit nursery	7.0	24.0	58 %
2. Khera-1 Yamunanagar	7.6	21.0	60 %
3. Khera-2 Yamunanagar	6.2	22.5	56 %
4. Chilkana-1 Saharanpur	5.8	23.0	50 %
5. Chilkana-2 Saharanpur	6.5	23.5	54 %
6. Parkash Farm-1, Chilkana, Saharanpur	6.8	21.2	51 %
7. Parkash Farm-2, Chilkana, Saharanpur	5.6	22.5	68 %
8. Karam Sain Farm-1, Chilkana, Saharanpur	7.4	24.6	66 %
9. Rakesh Mehta Farm house, Yamunanagar	6.8	22.8	60 %
10. R.R.S Buria, Yamunagar	6.5	23.4	54 %
11. Khijarpura, Kurukshetra	6.7	23.0	57 %
12. Hansala, Kurukshetra	6.6	23.4	50 %
13. Udarsi, Kurukshetra	6.5	22.5	55 %
14. Dhera Bhath Majra, Kurukshetra	6.0	24.6	62 %
15. Dadlu, Kurukshetra	6.8	22.5	64 %
16. Dangli, Kurukshetra	6.2	24.5	56 %
17. Milakpur, Hisar	6.7	24.6	59 %
18. Dhani Chanderpall, Rohtak	6.6	26.4	63 %
CD (p=0.05)	0.3	1.0	

Table 2: Yield and fruit quality of jamun germplasm collected from different sites (Pooled data of 2020, 2021 and 2022)

Site of Collection	Yield (kg/plant)	Fruit weight (g)	Stone weight (g)	TSS (°Brix)	Acidity (%)
1. Chhachrouli fruit nursery	15.5	8.7	2.1	14.0	1.05
2. Khera-1 Yamunanagar	6.6	5.8	1.5	12.0	1.12
3. Khera-2 Yamunanagar	6.4	6.5	1.8	11.8	1.20
4. Chilkana-1 Saharanpur	5.8	5.6	1.4	12.2	1.15
5. Chilkana-2 Saharanpur	3.5	5.0	1.0	10.6	1.25
6. Parkash Farm-1, Chilkana, Saharanpur	3.6	5.2	1.1	11.4	1.22
7. Parkash Farm-2, Chilkana, Saharanpur	5.5	5.8	1.5	11.8	1.18
8. Karam Sain Farm-1, Chilkana, Saharanpur	6.0	6.0	1.6	12.0	1.20
9. Rakesh Mehta Farm house, Yamunanagar	8.5	8.1	2.0	13.2	1.10
10. R.R.S Buria, Yamunagar	3.0	5.2	1.1	10.0	1.22
11. Khijarpura, Kurukshetra	5.0	5.0	1.0	11.4	1.16
12. Hansala, Kurukshetra	9.2	8.5	2.0	12.6	1.12
13. Udarsi, Kurukshetra	8.6	8.6	2.0	13.0	1.08
14. Dhera Bhath Majra, Kurukshetra	10.7	9.0	2.2	12.5	1.10
15. Dadlu, Kurukshetra	9.0	8.2	2.1	13.2	1.12
16. Dangli, Kurukshetra	16.8	8.8	2.2	14.0	1.02
17. Milakpur, Hisar	18.4	9.2	2.5	13.8	1.04
18. Dhani Chanderpall, Rohtak	13.5	8.0	2.0	13.6	1.00
CD (p=0.05)	0.4	0.3	0.07	0.6	0.06

Saharanpur (5.6 m). Whereas, stem girth of scions varied from 21.0 cm to 26.4 cm. The maximum stem girth was recorded by the collection from Dhani Chanderpall, Rohtak (26.4 cm) and minimum stem girth was recorded by the collection from Khera-1 Yamunanagar (21.0 cm).

Similarly, variation was also observed in fruit yield and fruit quality of jamun germplasm collected from different sites. Table 2 shows that the yield ranged from 3.0 to 18.4 kg/plant. The maximum yield was recorded under collection from Milakpur, Hisar (18.4 kg/plant) and minimum yield was recorded under collection from R.R.S Buria, Yamunagar (3.0 kg/plant). On the other hand, fruit weight varied from 5.0 to 9.2 g. The maximum fruit weight was recorded from Milakpur, Hisar collection (9.2 g) and the minimum fruit weight was recorded from Chilkana-2 Saharanpur collection (5.0 g). Whereas, stone weight ranged from 1.0 to 2.5 g. The minimum stone weight was recorded under collection from Chilkana-2 Saharanpur (1.0 g) and the maximum stone weight was recorded under collection from Milakpur, Hisar (2.5 g). The TSS ranged from (10.0 - 14.0°Brix) and acidity varied from 1.25 to 1.00 %. The maximum TSS was found in collection from Chhachrouli fruit nursery (14.0°Brix) and minimum TSS was found in collection from R.R.S Buria, Yamunagar (10.0°Brix). Whereas, minimum acidity was recorded under collection from Dhani Chanderpall, Rohtak (1.00 %) and maximum acidity was recorded under collection from Chilkana-2 Saharanpur (1.25 %). Similar findings were reported by Jai Prakash *et al.* (2010) and Shahnawaz and Sheikh (2011).

CONCLUSION

The performance of different elite clones of Jamun in top working under Hisar conditions showed variability in growth, yield and fruit quality. However, the top worked plants raised from the scions of Milakpur, Hisar resulted in higher fruit yield, maximum sizeable fruits along with better fruit quality and these plants can be used as mother plants for further multiplication for cultivation in this region.

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