

Studies on the performance of rejuvenated trees of different *ber* varieties

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ABSTRACT

Ten *ber* varieties rejuvenated nine years earlier were used for present studies. In term of tree height and tree volume cv. Thornless was found to be most vigorous. Higher fruit length was recorded in Thornless, whereas fruit breadth and weight was recorded higher in Sanaur-5. Appreciably higher fruit yield was recorded in cv. Sanaur-4. Lowest incidence (8.33%) of powdery mildew was observed in Sanaur-5. Total soluble solids and total sugars were also recorded higher in Sanaur-5. Minimum fruit acidity and maximum vitamin C was estimated from the fruits of Narikeli. Fruit size and quality was observed better in Sanaur-5 after nine years of rejuvenation.

Key words: *Ber*, rejuvenation, performance, biochemical constituents.

INTRODUCTION

Ber is the common fruit of India and cultivated all over the country. It is one of the best nutritious fruit and eaten generally fresh but the fruits can be utilized profitably by the preparation of several delicious products. The cultivation of *ber* has received attention as a commercial crop in the North India particularly in the states of Punjab, Haryana and Rajasthan because of its potential for higher yield and excellent economic return to the growers (Bal, 3). In Punjab *ber* ranks 4th in area and occupies 2673 ha with annual production of 44,170 mt (Anon, 1). The *ber* trees starts giving diminished yield and small fruits after bearing normal crops for two decades. In such trees, old wood goes on accumulating every year. Ultimately, trees become unproductive with weak growth and may get easily infested with diseases like powdery mildew, leaf mould and leaf spot and insect pest like fruit fly, lac and termites. The fruit size reduced and the fruit become misshapen, curved, and corky and fall prematurely. Such old trees can be revived and rejuvenated by severe pruning in May (Bal, 4 & 5). Thus, keeping in view the above facts, studies on the performance of rejuvenated trees of different *ber* varieties was planned.

MATERIALS AND METHODS

Investigation was taken at New Orchard, Punjab Agricultural University, Ludhiana during the year 2007-08 after nine years of rejuvenation. Thirty nine year old plants of different *ber* cultivars raised on katha *ber* rootstock and planted at 7.5 m × 7.5 m were used as experimental material. The plants of *ber* varieties were rejuvenated during May 1999 with retention of 30 cm

length of main limbs. The average height of main limb in different varieties was about one meter from ground level and each tree has 4 or 5 main limbs. During rainy season, numbers of shoots emerged from the stub. The first thinning of shoots was done during fourth week of August by retaining 12-18 shoots depending on the vigour of the plant. The second thinning of shoots was carried out during second fortnight of September and an average 8-12 shoots were retained on each tree. The observations on vegetative characters like tree height, tree spread and tree volume were recorded in month of September. The data on fruit yield, fruit weight, fruit size and biochemical analysis of fruits was done at proper maturity stage. Total soluble solids were estimated in terms of 0°Brix with the help of hand refractometer. Titratable acidity and ascorbic acids were estimated by following the standard procedure (AOAC, 2). The manuring and fertilization of the trees and spray schedule for the control of pests and diseases was followed as per PAU recommendations.

RESULTS AND DISCUSSION

The data pertaining to the vegetative characters and fruit yield of different *ber* varieties are presented in Table 1. The tree height was recorded maximum in cv. Thornless (6.64 m) as compared to other cultivars. The variation in tree height among different cultivars might be due to their genetic difference because all the varieties grow under the same environmental conditions. The maximum tree spread was recorded in Sanaur-4 (8.87 m N-S and 8.07 m E-W). The highest tree volume of 212.43 m³ was observed in Thornless and lowest (116.64 m³) tree volume was recorded in Narikeli. The increase in volume might be ascribed to the fact that in severely pruned trees, most of carbohydrates

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Table 1. Vegetable characters and fruit yield of rejuvenated *ber* varieties.

Variety	Tree height (m)	Tree spread (m ²)		Tree volume (m ³)	Fruit yield (kg/tree)	Powdery mildew incidence (%)	Status of variety
		NS	WE				
Chhuhara	5.28	7.17	8.10	166.58	98.13	31.67	Susceptible
Dandan	4.76	8.09	8.23	166.09	93.67	25.67	Moderate
Golar	4.26	7.10	7.67	127.19	75.20	9.00	Tolerant
Kaithali	5.63	7.17	7.03	168.18	111.30	34.00	Susceptible
Nalagargh	4.53	7.77	8.03	153.78	115.97	34.67	Susceptible
Narikeli	4.90	6.57	6.87	116.64	94.27	35.67	Susceptible
Sanaur-4	4.76	8.87	8.07	170.74	133.30	9.00	Tolerant
Sanaur-5	3.85	8.40	7.93	138.15	130.73	8.33	Tolerant
Thornless	6.64	7.20	7.86	212.43	87.90	22.67	Moderate
Wallaiti	4.43	8.06	8.30	155.31	68.73	32.67	Susceptible
CD at 5%	1.61	0.95	0.95	11.75	10.95	7.25	

Table 2. Physio-chemical characters of fruits of rejuvenated *ber* varieties.

Variety	Fruit length (cm)	Fruit breadth (cm)	Fruit weight (g)	TSS (%)	Acidity (%)	Vitamin C (mg/100g of pulp)	Total sugars (%)
Chhuhara	3.00	2.17	9.00	13.60	0.28	122.57	9.05
Dandan	3.66	2.56	11.23	13.88	0.31	108.90	9.49
Golar	3.92	2.86	19.40	13.39	0.36	114.90	9.02
Kaithali	4.23	2.80	20.50	13.85	0.26	128.57	8.92
Nalagargh	3.73	2.81	16.83	14.26	0.32	128.37	11.49
Narikeli	4.24	2.82	23.46	12.84	0.25	134.57	9.30
Sanaur-4	4.30	2.96	24.06	14.49	0.42	102.87	12.22
Sanaur-5	4.19	2.96	22.57	14.94	0.36	124.73	12.67
Thornless	4.54	2.69	15.97	12.62	0.27	105.27	9.00
Wallaiti	4.13	2.60	1.17	13.67	0.32	108.57	9.55
CD at 5%	0.35	0.15	1.45	0.25	0.04	2.14	1.05

and nitrogen were utilized for stimulated growth and production of leader and laterals shoots leading to increased tree canopy volume (Dhaliwal and Singh, 6). Sanaur-4 recorded appreciably higher yield (133.30 kg/tree) than other cultivars. This difference in yield may be due to individual growth pattern of the tree (Singh and Bal, 8). Before rejuvenation process the fruit yield in all the varieties was reduced to minimum. The yield is now remarkably improve and maintained even after nine years of rejuvenation. A significant difference in incidence of powdery mildew was observed among different *ber* cultivars. Lowest incidence of powdery mildew was found in Sanaur-5 (8.33%).

The results related to fruit size and biochemical constituents are presented in Table 2. The fruits of

Thornless had significant highest fruit length (4.54 cm). The fruits of Sanaur-5 and Sanaur-4 (2.96 cm) had highest fruit breadth. The cv. Sanaur-5 had highest fruit weight (24.06 g). The cultivar Chhuhara had lowest fruit size and fruit weight among all the varieties. The present results are in line with the findings of Bal *et al.* (5) who reported highest fruit weight in *ber* cultivar Sanaur-5 and lowest in Chhuhara rejuvenated trees. Highest total soluble solids content of 14.94 per cent was noted in cv. Sanaur-5. The acid content was noted higher in cv. Sanaur-4 (0.42%). The cvs. like Narikeli, Kaithli, Thornless and Chhuhara had the lowest acidity value. The maximum content of total sugars in fruit was obtained in Sanaur-5 (12.67%). The results are in accordance with the findings of Lal and Prasad (7)

who reported highest total sugars in cvs. Pewandi and Banarsi Karaka pruned at 120 cm shoot length. The maximum vitamin C content (134.57 mg /100 g of pulp) was estimated in fruits of Narikeli. It was closely followed by Kaithli (128.57 mg/100 g of pulp) and Nalagarh (128.37 mg/100 g of pulp). A significant increase in vitamin C content in severely pruned trees of *ber* cv. Banarsi Karaka as compared to other varieties was observed by Syamal and Rajput (9). It was concluded that after nine years of rejuvenation in different *ber* varieties the fruit size, yield and fruit quality were observed better in the Sanaur-5 cultivar.

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