Evaluation of Ber Varieties

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Key Words: Evaluation, Ber, Zizyphus

A large number of ber varieties are available in India, out of which a few have been classified as early, mid and late varieties. Many workers (Chadha *et al.* 1972; Bal and Jawanda, 1981; Bal and Uppal, 1992; Aulakh, 1994) have determined the physico-chemical characters of ber varieties under different agro-climatic conditions. There are many grafted varieties in the country which are reputed for the specific traits. In the present studies, 42 ber varieties have been screened and evaluated for their yield and fruit quality attributes.

Investigations on evaluation of ber (*Zizyphus mauritiana* Lamk) varieties were carried out at Punjab Agriculture University, Ludhiana and RFRS, Bahadurgarh (Patiala) for several years on 42 ber varieties. These varieties are raised by buddling *in situ* on katha ber seedlings. The observations on fruit yield, fruit size, fruit weight and pulp per cent were recorded. Total soluble solids were determined with the help of hand refractometer and values were corrected at 20°C. The acidity was estimated by titrating a known volume of the pulp against N/10 NaOH using phenolphthalein as indicator and expressed in terms of citric acid. Vitamin C was determined by using 2,6–dichlorophena indophenol dye titration method.

The physico-chemical characters of different varieties are presented in Table 1. Different varieties yielded 50 to 200 kg fruits/tree. The average yield of fruits/tree was the highest (200 kg) in Umran. The other high yielding varieties were Kala Gola (170 kg), Sanaur-2 (160 kg) and Sanaur–5 and Desi Alwar (150 kg). The lowest fruit yield/tree was recorded in Rashmi (70 kg) and ZG-4 (50 kg). Aulakh (1994) reported little variation in fruit yield in different ber cultivars perhaps due to seasonal variation.

The fruit size and weight varies greatly among the different ber varieties. The average fruit size was noted largest in Umran followed by Sanaur-2, Glory, Thornless and Kaithli and the smallest in Safeda and Illaichi. Dhingra *et al.* (1973); Bal and Jawanda (1981); Bal and Uppal (1992) and Aulakh (1994) also reported large sized fruits of Umran cultivar. The differences in fruit size and weight as compared to the reports of other workers may be due to different cultural practices adopted and age of the plants. The varieties like Katha Bombay, Rashmi, Umran and Nalagarh produced higher percentage of pulp, whereas Safeda, Chinese, Katha Phul and Mirchia were considered as less pulpy varieties. Soft and thin skin of Kaithli, Banarsi, Illaichi and Nazuk were preferred over thick skin of Golar, Gorva and Katha Bombay. It is the general opinion that pulp should be reasonably hard in texture so that fruits can stand transport action very well. Umran being a hard textured variety, it can transport to longer distance without much deterioration.

The total soluble solids' contents of different varieties varies between 11.3% in Katha Phul and 19.4% in Sanaur-2. Nalagarh, Laddu, Bahadurgarhi, Rashmi, Safeda, selected Safeda, Pathani and Desi Alwar also contain higher total soluble solids. However, Chadha *et al.* (1972) reported higher TSS in ber varieties as compared to the present studies. These differences may be due to the different cultural practices and crop-load on the trees. Acidity was found to be the highest (0.61%) in Chinese cultivar, closely followed by in Surti, Sanaur-3 and Katha Phul and the lowest in ZG-3, Laddu, Banarasi and Umran (Dhingra *et al.* 1973) have also reported variation in acid content in different ber varieties.

All the ber varieties contain good amount of vitamin C ranging between 63 to 148 mg/1000 g of pulp. Vitamin C estimated highest in Kala Gola, Pathani, Narikeli and Illaichi and the lowest in Rohtaki Gola, Safeda, Chinese and Dandan. However, Dhingra *et al.* (1973) reported relatively lower values of Vitamin C in different ber varieties when compared with the values of present study.

Table 1. Physico-chemical characteristics of ber

Varieties	Fruit yield (kg/tree)	Fruit size		Fruit weight (g)	Pulp (%)	TSS (%)	Acidity (%)	Vitamin C (mg/100 g)
		Length (cm)	Breadth (cm)					
Bahadurgarhi	100	3.7	2.7	14.0	90	18.0	0.47	115
Banarsi	100	4.2	2.6	16.8	93	12.5	0.20	99
Banarsi Pawandi	110	4.2	2.8	14.5	93	13.8	0.26	127
Chhuhara	75	3.4	2.4	9.5	92	14.8	0.28	117
Chinese	110	3.4	2.8	12.8	87	13.6	0.61	86
Dandan	137	3.9	2.6	11.4	93	14.8	0.25	89
Desi Alwar	150	4.4	2.8	20.9	92	17.2	0.24	118
Glory	120	4.8	2.7	16.7	92	15.5	0.32	105
Golar	110	4.0	3.0	20.0	90	14.7	0.33	123
Gorva	90	3.3	2.7	13.1	88	16.0	0.42	105
Illaichi	125	2.2	1.9	5.6	93	15.8	0.25	135
Kaithli	120	4.5	2.8	17.5	93	14.2	0.24	17
Kala Gola	170	3.5	3.0	19.8	92	15.8	0.29	148
Katha Bombay	120	3.8	2.6	14.1	94	14.1	0.33	112
Katha Gurgaon	125	3.1	2.5	11.0	93	13.9	0.29	117
Katha Phul	120	2.8	2.3	8.5	86	11.3	0.50	95
Laddu	80	3.7	2.1	10.9	83	16.4	0.29	91
Mirchia	75	4.4	2.3	10.1	83	16.4	0.29	91
Nalagarh	120	3.6	3.0	17.4	94	18.9	0.23	123
Narikeli	125	4.3	2.8	17.2	93	13.2	0.24	138
Nazuk	85	3.7	2.1	7.8	90	16.9	0.32	95
Noki	140	4.5	2.3	11.5	93	14.4	0.36	107
Pathani	100	3.1	2.5	9.4	92	17.2	0.49	146
Rashmi	70	3.4	2.4	11.0	94	17.8	0.24	127
Rohtaki Gola	90	3.6	2.6	13.8	90	14.7	0.32	63
Safeda	110	2.7	2.1	6.9	87	17.8	0.43	85
Sanaur-1	125	4.3	2.3	12.8	90	14.3	0.28	104
Sanaur-2	160	4.5	3.1	23.2	92	19.4	0.44	118
Sanaur-3	140	3.9	3.1	15.2	88	16.0	0.56	108
Sanaur-4	140	4.2	2.9	18.0	92	15.6	0.38	92
Sanaur-5	150	4.0	2.8	18.1	91	14.5	0.25	114
Sanaur-6	95	4.6	2.4	18.5	91	16.8	0.38	112
Sandhura Narnaul	100	4.4	2.6	14.0	91	15.2	0.23	100
Selected Safeda	120	3.2	2.9	13.8	90	17.5	0.32	95
Seo	110	3.5	2.9	16.2	90	14.6	0.30	126
Surti	100	3.7	3.2	18.1	91	14.5	0.58	105
Thornless	140	4.6	2.8	23.4	93	13.3	0.26	105
Umran	200	5.1	3.6	32.1	94	14.0	0.20	120
Wallaiti	125	4.1	2.6	16.5	93	13.7	0.32	93
ZG-2	140	3.8	2.9	15.4	92	14.4	0.25	103
ZG-3	130	3.3	2.4	15.2	91	13.5	0.16	116
ZG-4	50	3.8	3.0	16.5	91	13.8	0.49	115

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