Evaluation of ber cultivars for growth, yield and quality in red laterite zone of West Bengal

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ABSTRACT

Six different local as well as commercial cultivars of ber were evaluated for their growth, yield and quality at RRSS, Sekhampur, BCKV, Birbhum during the years 2007-2008 and 2008-09 on three (3) year old trees of uniform vigour. Among the evaluated culivars maximum plant height was recorded in Kazi (2.88 m) (local name) while *Apple Colour* (local name) showed maximum plant spread in both East-West and North-South directions (211.25 and 193.50 cm respectively) and total number of branches (14.75) compared to all the other cultivars. Significantly maximum number of flowers/cluster (31.25) was recorded with the cultivar *Apple Colour* but the yield/plant was maximum with Madhav Kool (7.10 kg). Total Soluble Solids (TSS) and sugar content were highest in *Apple Colour* (10.5^{o}B and 9.30% respectively) as compared to the cultivar Narkeli (8.10^{o}B and 5.20% respectively). Among the six cultivars *Apple Colour* performed better in respect to both yield and quality in the red laterite region of West Bengal..

Key Words: Cultivars, evaluation, growth, quality and yield.

Ber (*Zyzyphus mauritiana* Lank) is a drought hardy fruit crop, which can be grown successfully in adverse soil and climatic conditions. It is called as a poor man's fruit which not only provides nutritious diet to the poor farmers of the problematic region but also provide assured income to the poor farmers (Vashishtha, 1989). In dry regions crop failure is frequent; no other crop except ber can give sustainable income to the farmers. Among the fruit crops grown in dry region, ber requires least input, care and management but gives good return without any crop failure. Various local as well as commercial cultivars are grown sporadically in different parts ofWest Bengal. However, the information on varietal adaptability of ber cultivars under red and laterite region of West Bengal is very meagre. A comprehensive study on various external and physico-chemical parameters associated with fruit quality of different local as well commercial ber cultivars is of much value for selecting suitability of ber cultivars. So, the present investigation was undertaken regarding the suitability of ber cultivars for growth, yield and quality in the red and laterite region of West Bengal.

MATERIALS AND METHODS

The field experiment were conducted during the years 2007-08 and 2008-2009 at the Regional Research Substation at Sekhampur, BCKV, Birbhum on 3 years old ber plants. The experiment was laid out in a randomized block design with 6 (six) treatments and 4 (four) replications. Each cultivar was treated as individual treatment and two plants were maintained per treatment per replication. Fertilizer application was done as per the recommendation in red and laterite zone of West Bengal. The physico-chemical characteristics were recorded from ten randomly selected mature fruits from each replication. Total soluble solids (TSS) was measured using hand refractometer. The other fruit quality parameters were determined according to the methods described in A.O.A.C (1984). The two years data were pooled and statistically analyzed according to the methods suggested by Panse and Sukhatme (1985).

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RESULTS AND DISCUSSION

Wide ranges of variability were observed in plant morphology, fruit bearing and fruit characters. There was a significant variation in the plant morphological characters among the different cultivars of ber. The plant height was recorded maximum in the cultivar *Kazi* (2.88 m) followed by *Apple Colour* (2.26 m) as against the minimum in Gola (1.70 m). The highest plant girth was observed in Madhav Kool (2.90 cm) followed by *Apple Colour* and lowest plant girth was observed in Gola (2.10 cm). The results are in conformity with the findings of Gupta *et al*. (2003). Plant spread was recorded maximum in East-West direction (211.25 cm) in *Apple Colour* but it was minimum in North-South direction (193.50 cm) (Table-1). It was due to more exposure of plant to sunlight in E-W direction than N-S direction. Number of branches was noted maximum in *Apple Colour* (14.75) followed by Narkeli (13.25) and Banarasi Karka (13.00) as compared to the minimum in Gola (10.50). There was a significant difference in flowering behaviour among the cultivars. More number of flowers/cluster was found in *Apple Colour* (31.25) followed by Banarasi Karka (24.00) and lowest in Madhav Kool (12.50). The maximum fruit weight was recorded in *Kazi* (38.30 g) whereas the lowest fruit weight was noted in *Apple Colour* (12.52 g). The number of fruits/plant was recorded maximum in *Apple Colour* (412.50)

followed by Madhav Kool (374.70) and the minimum in Banarasi Karka (132.00). Fruit yield was recorded maximum in Madhav Kool (7.10 kg/ plant) and minimum in Banarasi Karka (1.50 kg/plant) (Table-2).

Data on fruit quality parameters presented in table - 3 revealed that maximum T.S.S. recorded in *Apple Colour* (10. 50 °B) was statistically at par with cv. Gola (10.00 °B) and Madhav Kool (9.80 °B). The fruits of cultivar Madhav Kool exhibited highest acidity (0.46%) as against the lowest in *Kazi* (0.13%). The total sugar content was recorded maximum in *Apple Colour* (9.30%) and minimum in Narkeli (5.20%). The cultivar *Apple Colour* showed highest reducing sugar (4.30%)content and as compared to the lowest in *Kazi* (3.15%).

It appears from the result that the cultivar *Apple Colour* could be recommended for cultivation in the red and laterite region of West Bengal for better growth, yield and quality of ber.

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Table 1 : Morphological characteristics of ber cultivars

Cultivar	Height (m)	Girth (cm)	Plantspread EW(cm)	Plant spread N-S(cm)	No. of branches	Leaf Area (cm^2)
Kazi	2.88	2.20	170.50	162.30	12.5	48.0
Apple colour	2.26	2.80	211.25	193.50	14.75	19.0
Narkeli	2.12	2.35	167.50	177.25	13.25	25.90
Banarasi karka	2.11	2.40	162.50	150.00	13.00	21.75
Gola	1.70	2.10	148.30	160.25	10.50	20.41
Madhav Kool	2.20	2.90	181.75	175.75	13.50	30.50
SEm (±)	**4.900**	**0.197**	**5.034**	**4.800**	**0.988**	**0.850**
LSD (P = 0.05)	**1.440**	**0.420**	**10.730**	**10.200**	**2.083**	**1.825**

Table-2 : Flowering and fruit physiological characteristics of ber cultivars

Variety	Flowers/ Cluster	Cluster/ Branch	Fruit wt. (g)	Fruit wt/ plant (kg)	Fruit / plant	Fruit length (cm)	Fruit Breadth (cm)
Kazi	14.25	7.75	38.30	5.68	148.80	4.20	3.70
Apple colour	31.25	10.25	12.52	5.14	412.50	3.00	2.50
Narkeli	21.25	8.50	13.95	4.07	295.50	4.30	2.40
Banarasi karka	24.00	7.50	11.27	1.50	132.00	3.25	2.45
Gola	21.75	8.00	17.25	3.00	170.30	3.10	3.20
Madhav Kool	12.50	10.00	19.32	7.10	374.70	2.87	3.40
SEm(±)	**1.413**	**1.515**	**0.992**	**0.282**	**7.726**	**0.131**	**0.091**
LSD(P=0.05)	**3.005**	**0.711**	**2.114**	**0.602**	**16.46**	**0.28**	**0.194**

Table-3 : Fruit qualitative characteristics of ber cultivars

Variety	TSS °B	Acidity (%)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)
Kazi	8.60	0.13	5.90	3.15	2.75
Apple colour	10.50	0.19	9.30	4.30	5.00
Narkeli	8.10	0.17	5.20	3.30	1.90
Banarasi karka	9.30	0.16	7.80	3.50	4.30
Gola	10.00	0.29	6.60	3.85	2.80
Madhav Kool	9.80	0.46	5.70	3.70	2.00
SEm(±)	**0.206**	**0.01**	**0.304**	**0.117**	**0.161**
LSD(P=0.05)	**0.439**	**0.024**	**0.649**	**0.251**	**0.343**