

Studies of Correlation Co-Efficient for Different Physical and Chemical Fruit Parameters of Ber (*Ziziphus mauritiana* Lamk)

Pradeep Kumar, A. K. Srivastava*, Om Prakash, Nidhika Thakur and Pradeep Singh

Department of Fruit Science, Banda University of Agriculture and Technology Banda, 210001 U.P. India

*Corresponding Author E-mail: srivastavahort@yahoo.com

Received: 5.10.2020 | Revised: 14.12.2020 | Accepted: 19.12.2020

ABSTRACT

The present investigation was carried out at Department of Fruit Science, college of Horticulture, Banda University of Agriculture & Technology, Banda (UP) during 2019-20. Phenotypic correlations were worked out among twenty-four characters of ber to know the nature of association existing among the characters. Correlation among the quantitative characters were worked out. Fruit length showed significant and positive correlation with fruit width (0.444*) and significantly negative correlation noted with TSS (-0.448*). Fruit weight showed significant and positive correlation with specific gravity (0.985**) and non-significant positive correlation with stone width, stone weight and TSS, ascorbic acid, protein, sugar non-significant negative correlation. Stone length exhibited significant and positive correlation with stone width (0.533**) and stone weight (0.918**). Stone width showed significant and positive correlation with stone weight (0.815**). Association obtained during the study can be used while making selection, a method of crop improvement in ber or breeding programmes.

Keywords: Ber (*Ziziphus mauritiana* L.), Variability, Correlation, Co-efficient.

INTRODUCTION

Genetic variability of *ber* and Chinese *jujube* is high in India and china respectively. Several other countries to which *Ziziphus* has now spread also have secondary diversity. Several horticultural varieties are in cultivation in both India and China. These varieties developed as a result of selection in different eco regions from progeny emanating from cross pollination between different *Ziziphus* species. In India, over 180 cultivars have been reported across the country however, there are at least 400 cultivars of Chinese *jujube* are reported

(Hayes, 1945 & Pareek, 2001). These can be divided in to two groups: the sour type, mainly used as root stocks, medicines or animal fodder, another cultivated type (*Ciminata*, 1996).

The ability of *Ziziphus* species and the different varieties / types within ber to cross freely has allowed the buildup of a rich gene pool. Vegetative growth (tree form, leaf shape, apex, base and pubescence, petiole length, colour etc.), flowering and fruit characters (shape, size, style end, skin color, stone and pulp content, pulp colour and sweetness etc).

Cite this article: Kumar, P., Srivastava, A. K., Prakash, Om, Thakur, N., & Singh, P. (2021). Studies of Correlation Co-Efficient for Different Physical and Chemical Fruit Parameters of Ber (*Ziziphus mauritiana* Lamk), *Ind. J. Pure App. Biosci.* 9(1), 88-91. doi: <http://dx.doi.org/10.18782/2582-2845.8586>

Vashishtha (1983) has described morphological characteristics of a large number of *ber* cultivars at Jodhpur in North West India.

Rich variability in *ber* exists in respective regions of diversity. So far, systematic efforts to collect, characterize and conserve this variability has not been made. A large number of varieties at several research stations exist in collections particular in India and China. Some outstanding varieties have been identified and are in commercial cultivation in scattered pockets. There is also a need for varietal improvement with the objective of inducing resistance against disease (Powdery mildew), pest (fruit fly) and low and high temperature viz. limit successful cultivation. Efforts to identify and develop cultivars with suitable quality attributes for desert as well as processing uses are required. The Bundelkhand area of Uttar Pradesh (Banda, Chitrakut, Mahoba, Lalitpur, Jalaun, Jhansi, and Hamirpur) has rich diversity in *ber* types in terms of fruit shape, size, flowering, fruit quality, fruit ripening or maturity period etc. Therefore, keeping in view survey was carried out in Bundelkhand region of Uttar to find out variability in *ber* for different morphological, bio chemical quality parameters and association among quantitative parameters recorded to work out to correlation coefficient in between.

MATERIALS AND METHODS

The present investigation was carried out at Department of Fruit Science, college of Horticulture, Banda University of Agriculture

& Technology, Banda (UP) during 2019-20. Thirty genotypes were collected from Bundelkhand region of Uttar Pradesh. Twenty-four fruits of *ber* were randomly selected from all the direction of farmer's field and selected genotypes, and the bulk of sample of all the selected trees from each site collected then kept into bags and tagged by the number and subjected to physico-chemical analysis in laboratory. Morphological characters of fruit and leaf were described on the basis of Minimal Descriptors of Agri-Horticultural Crops as prepared by Mahajan et al. (2002).

Physical parameters like fruit weight measure by electronic weighting machine and fruits length, fruits width shell thickness seed size spine length, and seed size were estimated with the help of digital Vernier Calipers. Ascorbic acid was determined by using 2, 6-Dichlorophenol- indophenols visual titration method (Johnson, 1948). Sugars content were estimated using Fehling's solutions (Lane & Eynon, 1923) and the method as described by (Rangana, 2010), Reducing sugars (Nelson, 1944).

The percentage of non-reducing sugars was obtained by subtracting the values of reducing sugar from total sugars and multiplying by 0.95 (Somogyi, 1952). The data obtained during experimentation was statistically analyzed as per method given by Panse and Sukhatme (1985) and results were evaluated at 5% level of significance. The correlation coefficients among the different physico-chemical parameters were calculated as per method described by Fisher (1954).

Table 1: Correlation coefficient for 11 characters of *ber* (*Ziziphus mauritiana* Lamk) genotypes

Variable	Fruit length (cm)	Fruit width (cm)	Fruit weight (g)	Specific gravity (gm/cc)	Stone length (cm)	Stone width (cm)	Stone weight (g)	TSS (Brix)	Ascorbic Acid (mg/100g)	Protein (%)	Sugar (%)
Fruit length (cm)	1	0.444*	0.048	0.186	-0.237	-0.251	-0.299	-0.448*	0.024	-0.218	0.107
Fruit width (cm)		1	0.052	0.208	0.035	0.175	0.137	-0.388	-0.089	0.129	-0.0691
Fruit weight (g)			1	0.985**	-0.041	0.368	0.151	-0.029	-0.247	-0.094	-0.018
Specific gravity (gm/cc)				1	-0.064	0.358	0.138	-0.113	-0.249	-0.095	-0.016
Stone length (cm)					1	0.533**	0.918**	-0.65	0.183	0.178	0.137
Stone width (cm)						1	0.815**	0.170	-0.230	0.313	-0.169
Stone weight (g)							1	0.014	0.013	0.286	0.020
TSS(Brix)								1	0.251	-0.024	-0.135
Ascorbic acid (Mg/100g)									1	-0.320	0.216
Protein (%)										1	-0.077
Sugar (%)											1

** Correlation is significant at the 0.01 level

* correlation is significant at the 0.05 level

RESULT AND DISCUSSION

Correlation co-efficient for different characters phenotypic correlations were worked out among eleven characters of ber to know the nature of association existing among the characters. The results regarding correlation studies are presented in Table -1. Correlation coefficient among different bio-chemical parameters showed significant and positive correlation in between fruit length with fruit width; Fruit weight and specific gravity; stone length and stone width; stone width and stone weight. Non-significant positive correlation in between fruit width and fruit weight; fruit width and specific gravity; stone length and stone width; stone width and protein.

Fruits width showed significant and positive correlation with fruits length (0.444*) and significant negative correlation with TSS (-0.448*). Non-significant but positive correlation was noted with fruit weight, specific gravity, ascorbic acid and total sugar. Non-significant negative correlation was recorded with stone length, stone width, stone weight, TSS and protein.

Width of fruit (cm) showed positive correlations with Specific gravity (g/cm³) (0.208), Stone length (0.035), Stone weight, and protein. However, non-significant but negative correlation was recorded with TSS (⁰Brix), total sugar and ascorbic acid. Fruit weight showed significant positive correlations with specific gravity (0.985**). Non-significant but positive correlation was noted with stone width and stone weight. Non-significant negative correlation was also recorded with stone length, TSS, ascorbic acid, protein and sugar. Specific gravity showed non-significant positive correlations with stone width, stone weight and non-significant negative correlation recorded with stone length, TSS, ascorbic acid, protein and sugar. Stone length showed significant positive correlations with stone width (0.533**) and stone weight (0.918**). Non-significant but positive correlation was found with ascorbic acid, protein and sugar. However, it was observed that non-significant negative correlations exist with stone length and TSS. Stone width showed significant positive

correlations with stone weight (0.815**). Non-significant but positive correlation recorded with TSS, and protein. However, non-significant but negative correlation found with ascorbic acid and sugar. Stone weight has showed non-significant positive correlations with vitamin C, TSS, protein and sugar.

Total sugar showed non-significant and positive correlation with ascorbic acid and non-significant negative correlation with protein and sugar. Correlations among the quantitative characters were worked out. Fruit length Showed significant and positive correlation with fruit width (0.444*) and significantly negative correlation noted with TSS (-0.448*). Fruit weight showed significant and positive correlation with specific gravity (0.985**) and non-significant positive correlation with stone width, stone weight and TSS, ascorbic acid, protein, sugar non-significant negative correlation. Stone length exhibited significant and positive correlation with stone width (0.533**) and stone weight (0.918**). Stone width showed significant and positive correlation with stone weight (0.815**). Results are in accordance with Jindal and Rana (1986); Gupta and Mehta (2000) and Srivastava (2002).

CONCLUSION

Biochemical characters *viz.* total soluble solid, total sugars, protein, acidity, specific gravity, ratio of TSS and acidity. Non-significant variation was noted for acidity content among the available genotypes. Significant and positive correlation in between fruit length with fruit width; fruit weight and specific gravity; stone length and stone width; stone width and stone weight. Significantly negative correlation was noted between with fruit length and TSS of fruits. Association obtained during the study can be used in breeding programmes or while making selection, a method of crop improvement in ber.

REFERENCES

- Ciminata, P. (1996). The Chinese jujube, *Ziziphus jujube*. *WANATCA year Book*, 20, 34-36.

- Kumar et al.** *Ind. J. Pure App. Biosci.* (2021) 9(1), 88-91 ISSN: 2582 – 2845
- Gupta, N. K., & Mehta, A. K. (2000). Genetic variability and association of component characters for fruit yield in ber (*Ziziphus mauritiana* Lamk). *Adv, in Plant sci.* 13(1), 75-78.
- Hayes, W. B. (1945). Fruit growing in India. Kitabistan, Allahabad, India.
- Jindal, K. K., & Rana, S. S. (1986). Stomata number, Pore size and their correlation with growth of apple root stock (in) *Advacne in research on temperate fruit proceeding of the National symposium on temperate fruit held during 15-18 march, 1984 at Himanchal Pradesh Agricultural university of Horticulture and Forestry*, PP. 127-132.
- Maharajan, R. K., Gangopadhyay, K. K., Dophal, V. K., Srivastava, Gupta, P. N., & Pareek, S.K. (2002). Minimal Descriptors of Agri-Horticulture crops. *Parat-III fruit crops.* 3, 41-48.
- Pareek, O. P. (2001). Fruit of the Future Ber. International centre for Underutilization crops, University of Southampton, Southampton UK.
- Srivastava, A. K. (2002). Suitable root stock for commercial rising of ber (*Ziziphus mauritiana* Lamk) under eastern up condition, Department of horticulture, Institution of Agriculture, Ph. D thesis, BHU. U. P.
- Vashishtha, B. B. (1983). Biosystematics of ber cultivars. Ph.D. Thesis, University of Jodhpur, Jodhpur, India.