*Biological Forum – An International Journal* **15(6): 354-360(2023)**

**ISSN No. (Print): 0975-1130**
**ISSN No. (Online): 2249-3239**

# Studies on different Germplasm of Bael (*Aegle marmelos* L.) based on Chemical Characters of Bael under Sodic Soil condition of Eastern Uttar Pradesh

***Alok Kumar[1*], Bhanu Pratap[2], H.K. Singh[3], Lavkush Pandey[1], Ritesh Singh[1] and Anshuman Singh[4]***

*[1]Research Scholar, Department of Fruit Science,*
*ANDUA&T, Kumarganj, Ayodhya (Uttar Pradesh), India.*
*[2]Professor, Department of Fruit Science,*
*ANDUA&T, Kumarganj, Ayodhya (Uttar Pradesh), India.*
*[3]Associate Professor, Department of Fruit Science,*
*ANDUA&T, Kumarganj, Ayodhya (Uttar Pradesh), India.*
*[4]Assistant Professor, Horticulture, Faculty of Agriculture,*
*KNIPSS, Sultanpur (Uttar Pradesh), India.*

*(Corresponding author: Alok Kumar*)*
*(Received: 21 March 2023; Revised: 28 April 2023; Accepted: 15 May 2023; Published: 20 June 2023)*
*(Published by Research Trend)*

**ABSTRACT: Experiment was conducted in year 2021-22 and 2022-23 at main experimentation college of Horticulture & Forestry Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya (U.P.) to study on different germplasm of bael (*Aegle marmelos* L.) based on chemical characters of bael under sodic soil condition of Uttar Pradesh. The experiment trail comprises of thirteen germplasm N.B.-4, N.B.-5, N.B.-7, N.B.-8, N.B.-9N.B.-10, N.B.-16, N.B.-17, N.B.-22, CIAH B-1, CISH B-2, Pant Aparna, Pant Sujata for the evaluation of TSS, acidity, ascorbic acid, reducing sugar, non-reducing sugar, and total sugars, using principal component analysis and cluster analysis for utilization in crop improvement. The result revealed that the highest T.S.S. is found for the genotype N.B.-17 (40.2 %), highest acidity in Pant Sujata (0.46 %), Ascorbic acid in N.B.-5 (20.5 %), reducing sugar in Pant Aparna (5.2 %), non-reducing sugar N.B.-9 (15.4 %) and total sugar in Pant Aparna N.B.-9(20.5 %), so these genotypes are found best for the both year data set and they are further recommended for the production and breeding programme.**

**Keywords:** Sodic soil, Crop improvement, T.S.S., sugar, Bael germplasm.

## INTRODUCTION

Bael (*Aegle marmelos* L.,) is an indigenous and important fruit to India. It is a tropical fruit native to south- east Asia and belongs to family Rutaceae. According to the Indian Biodiversity Portal, it is also known as stone apple, Indian bael, bael tree, Indian quince, Bengal quince, holy fruit tree, Bel, Bela, Sriphal, Belgeri, Baelpatra, Belva, and find mention in Ramayana, Yajurveda, Buddhist and Jain literature. It belongs to the class of plants known as "fragrant species" and "climate purifiers." The value of bael is found in its therapeutic characteristics, which make it one of the most significant Indian medicinal plants. All of the tree's components, including the stem, bark, leaves, roots, and fruits, have significant uses in a number of patented Ayurvedic and Unani medicines used in India to treat a wide range of illnesses. Bael fruits and roots have antiamoebic and hypoglycaemic properties. According to studies, the bael tree's essential oil is efficient against 21 different varieties of germs. In ayurvedic medicine, the leaves of the bael plant are used to treat and manage diabetes. Every morning, on an empty stomach, the juice is eaten after the leaves have been harvested. According to reports, it regulates blood sugar levels and returns them to normal in about a month. The leaf contains the effective antiaesthetic substance "aegeline", an alkaloid. According to legend, the leaf infusion cures asthma. Constipation and stomach pain can be treated by taking an extract of fresh bael leaves combined with honey. The paste of the leaves is said to relieve joint pain and swelling if used as a poultice. In light of this, it is thought to be a successful treatment for ophthahnia, different inflammations, fever, delirium, and acute bronchitis. The flowers' decoction is applied as eye cream and administered as an antiemetic. The pulp's marmelosin is a laxative and diuretic. In addition to the bark also includes the alkaloids fagarine and skimmianine, as well as the furocoumarins marmelosin and umbelliferon. Malaria patients are given the bark decoction. The bael fruit is exceptionally healthy and contains a wealth of vitamins and minerals. According to Gopalan *et al.* (1971), it has 1.8 g of protein, 0.39 g of fat, 1.7 g of minerals, 31.80 g of carbs, 55 mg of beta-carotene, 0.13 mcg of thiamine, 1.19 mcg of riboflavin, 1.1 mcg of niacin, and 8 mcg of vitamin C per 100 g of edible amount. No other fruit contains as much riboflavin as apples do (Mukherjee and Ahmed 1957). Additionally, it has marmelosin and generates 88 calories from fruit pulp per 100 g. The majority of well-known fruits, such as apple, guava, and mango, have calorific values of only 64, 59, and 36, respectively, making them richer than most of them (Jauhari and

Singh 1971). A few biochemical components, including steroids, coumarins, and alkaloids, have been extracted and identified from various tree parts. Compared to other species, the seed oil content of bael is significantly higher (40.25%). The pulp of ripe fruits makes a delightful beverage called "Sharbat," which is very well-liked in the Indian subcontinent. Bael fruits are also used to make bael cider. The study used principal component analysis to study correlations among variables, establish relationships among bael germplasm, and serve as a tool for germplasm description. The objectives of the work here reported were to characterise and quantify the genetic variability of bael germplasm using fruit traits, namely fruit weight, fruit length, fruit width, skin weight, number of seeds, seed weight, pulp weight, skin per cent, seed per cent, pulp per cent, skin thickness, fruit volume, TSS, acidity, reducing sugar, and total sugars, using principal component analysis and cluster analysis for utilization in crop improvement.

A sodic soil is defined as a soil with exchangeable sodium of greater than 6% of the caution exchangeable capacity. In the presence of fresh water, non-saline sodic soil typically disperses. Saline sodic clays have higher infiltration rates and are less easily dispersed than non-saline sodic soil. In many cases with sodic clay, where salt levels in the soil solution are higher than the critical flocculation concentration but are not harmful to plants, wheat yields may still be produced at or near their rainfall-limited yield potential. Because of the bael fruit's increased potential, research organizations and scientists have been drawn to it, leading to the development of cultivars, agro-techniques, and orchard management practices.

## MATERIAL AND METHODS

The present investigation **Studies on different germplasm of Bael (*Aegle marmelos* L.) under sodic soil condition of Uttar Pradesh**. was carried out at Main Experiment Station, Department of Fruit Science, College of Horticulture and Forestry, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh during year 2021-22 and 2022- 23. The experimental site is located at the Acharya Narendra Deva University of Agriculture & Technology, Kumarganj Ayodhya 46 km away from Ayodhya headquarter on Ayodhya-Raebareli Road. The soil of experimental site is sodic having poor soil structure, texture and fertility. The University situated at 26.47˚North latitude, 82.12˚East longitude and altitude of 113 meter above from sea level. The region enjoys sub-humid and subtropical climate receiving a mean annual rainfall of about 1215 mm out of which about 85% is concentrated from mid-June to end of September with an average annual rainfall of 764.01mm and relative humidity of 66.76 per cent. In January, a record-low 17.9 °C was reached, and there were also sporadic winter rains and frosty conditions. The season of summer lasts from April to June. having a temperature range of 39.2 to 41.4 °C. The months of mid-May and June were similarly characterized by dry and warm wind waves. The site is located in typical sodic soil belt of indo-gangetic plain of eastern Uttar Pradesh.

The fruits of uniform size free from injury, disease or bruising were harvested randomly from tagged branches of each germplasm for fruits characteristics. The pulp was scooped from selected fruits, thereafter, pulp as well as shell weighed separately for weight and their ratio. The thickness of pulp weight and higher pulp (%) evaluated for future usage in bael improvement (Pandey *et al*., 2005).

**T.S.S (°Brix).** Fruits were randomly selected from each treatment and macerated in pestle and mortar for juice extraction. The juice's total soluble solids (TSS) were determined using a hand Refractometer (Erma) of 0-32 and 28-62 per cent range. The values were corrected at 20˚Cand expressed as per cent total soluble solids of bael fruit pulp in ˚Brix (Ranganna, 1986).

**Acidity (%)-**Known quantity of fruit pulp (10 g) was macerated and diluted in small amount of distilled water and filtered through muslin cloth. The volume was made up to 100 ml five ml aliquot was taken for titration against 0.1 N sodium hydroxide solution using phenolphthalein indicator. The appearance of light pink colour was marked as the end point. The results were calculated with the help of following formula and expressed as per cent of acidity per 100 g of fruit pulp by Kaur and Kalia (2017).

$$\text{Acidity (\%)} = \frac{\text{Titrate value} \times \text{Normality of alkali} \times 64 \times \text{volume madeup}}{\text{Aliquot taken} \times \text{weight to sample} \times 1000} \times 100$$

**Ascorbic Acid (mg).** Ascorbic acid content was estimated by grinding 5g fruit pulp with 3.0 per cent Metaphosphoric acid as buffer. The extract was filtered with muslin cloth, and the volume was up to 50 ml. A suitable 5 ml aliquot was taken for a titration against, 2, 6-dichlorophenol indophenol dye solution the appearance of light pink colour persisting at least for 15 second and procedure was fallowed as described by Rangana (2010) dry factor expressed the mg of ascorbic acid per ml of dry solution. The results were calculated with the help of formula and expressed as mg ascorbic acid per100g of fruit pulp.

$$\text{Dye Factor} = \frac{0.5}{\text{Titrate volume of standard ascorbic acid}}$$

$$\text{Ascorbic Acid} = \frac{\text{Titer value} \times \text{Dye factor} \times \text{Volume madeup}}{\text{Aliquot of extract taken} \times \text{Weight of sample}}$$

**Non-reducing sugars (%)-**non-reducing sugar was calculated by deducting the quantity of reducing sugar from total invert sugars and multiplied by factor 0.95. The result was expressed as per cent of non-reducing sugar.

Non-Reducing Sugar (%) = [Total Invent Sugars (%)– Reducing Sugars(%)] × 0.95

**Reducing sugar (%)**-Aliquot of 5 ml diluted fruit juice was taken from 100 ml as above for titration and mixed 10 ml solution of Fehling 'A' and 'B'. This was titrated against 1.0 percent glucose in boiling solution using methyl blue as indicator. A blank with 10ml of Fehling 'A' and 'B' was also run. The result was expressed as percent of reducing sugar. This was titrated in Boling condition against dextrose solution (1ml = 205 mg dextrose) using methyl blue as indicator. A blank with 5 ml of each felling 'A' and 'B' solution was also titrated under boiling condition against same dextrose solution to standardize the feeling's solution. The end point is indicated by the decolorization of the methyl blue indicator and appearance of brick colour precipitates of cuprous oxide. The result was calculated as per following formula and expressed as per cent of reducing sugars.

**Total Sugars (%)**-Sugars were estimated by Fehlings 'A' and'B' solution method given by Lane and Eynon (1943). 10 g fruit pulp was macerated in pestle morter with small amount of distilled water and filtered through muslin cloth and volume was madeup to 100 ml.

The summations of percentage of reducing and non-reducing sugar were expressed as total sugar:

Total Sugar (%) = Reducing sugar (%) = non-reducing sugar (%)

## RESULT AND DISCUSSION

**T.S.S °(Brix)**–Data displayed in the Table 1 and illustrated in Fig. 1 showed the total soluble solid of bael fruit was found highly significant. The data has been evaluated for the year 2021-22 and found that the maximum value for the T.S.S is in the genotype N.B.-17 (40.2) is found highly significant at 5% significance level, and at par with N.B.-4 (38.2), N.B.-5 (39.8), N.B.-7 (38.6), N.B.-10 (39), N.B.-16 (38.7), N.B.-22 (37.5), N.B.-8 (37.9) Pant Aparna (39.7). However, the lowest T.S.S. has been observed for the genotype Pant Sujata (31.2) is found highly significant at 5% significance level, and at par with N.B.-9 (34.8), CIAH-B-1(34.5) and CISH-B-2 (32.8).

**Table 1: Estimates of T.S.S. acidity, ascorbic acid of fruit in bael germplasm.**

| Treatments | Parameters | | | | | |
|---|---|---|---|---|---|---|
| | T.S.S $^0$(Brix) | | Acidity (%) | | Ascorbic Acid (mg) | |
| | 2021-22 | 2022-23 | 2021-22 | 2022-23 | 2021-22 | 2022-23 |
| N.B.-4 | 38.2 | 38.2 | 0.34 | 0.33 | 19.1 | 19.0 |
| N.B.-5 | 39.8 | 39.7 | 0.32 | 0.33 | 20.5 | 20.6 |
| N.B.-7 | 38.6 | 38.5 | 0.35 | 0.36 | 19.8 | 19.85 |
| N.B.-8 | 37.9 | 38.0 | 0.38 | 0.37 | 19.9 | 20.0 |
| N.B.-9 | 34.8 | 34.9 | 0.32 | 0.34 | 19.2 | 19.25 |
| N.B.-10 | 39.0 | 39.1 | 0.37 | 0.39 | 18.7 | 18.8 |
| N.B.-16 | 38.7 | 38.6 | 0.44 | 0.45 | 18.2 | 18.25 |
| N.B-17 | 40.2 | 40.1 | 0.31 | 0.32 | 18.3 | 10.35 |
| N.B.-22 | 37.5 | 37.4 | 0.35 | 0.34 | 19.0 | 19.1 |
| CIAH-B-1 | 34.5 | 34.4 | 0.33 | 0.34 | 19.8 | 19.9 |
| CISH-B-2 | 32.8 | 32.9 | 0.41 | 0.42 | 17.4 | 17.45 |
| Pant Aparna | 39.7 | 40.0 | 0.34 | 0.35 | 17.2 | 17.35 |
| Pant Sujata | 31.2 | 31.3 | 0.46 | 0.45 | 17.1 | 17.2 |
| **SEm±** | **1.60** | **0.95** | **0.01** | **0.01** | **0.51** | **0.53** |
| **CD at 5%** | **4.69** | **2.79** | **0.03** | **0.04** | **1.50** | **1.56** |

Data displayed in the Table 1 and illustrated in Fig. 1 showed the total soluble solid of bael fruit was found highly significant. However, the data evaluation of the year 2022-23 shows the same genotype as the highest T.S.S. value N.B.-17 (40.1) and found highly significant at 5% significance level, and at par withN.B.-4 (34.9), N.B.-5 (39.7), N.B.-7 (38.5), N.B.-10 (39.1), N.B.-16 (38.6), N.B.-22 (37.4), N.B.-8 (38) Pant Aparna (40). However, the lowest T.S.S. has been observed for the genotype Pant Sujata (31.2) is found highly significant at 5% significance level, and at par with N.B.-9 (34.9), CIAH-B-1(34.4) and CISH-B-2 (32.9).

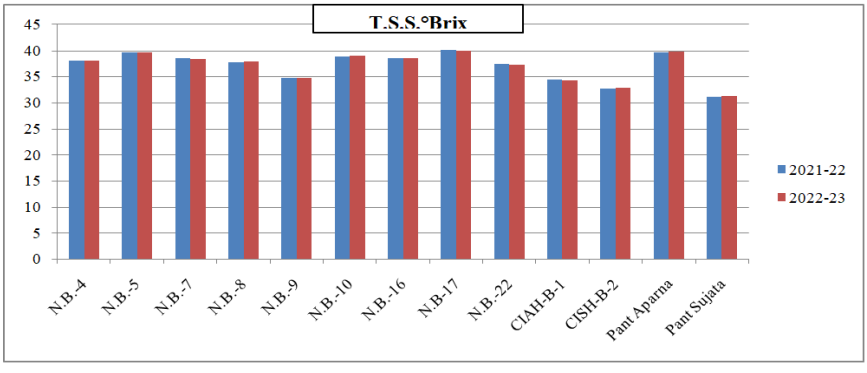


**Fig. 1.** T.S.S. of different bael germplasm.

For the both the year N.B.-17 is found to be best with the T.S.S. of (40.2) and (40.1) respectively however the genotype having the least T.S.S. is Pant Sujata having the T.S.S. of (31.2) and (31.3) respectively.

**Acidity (%)-**It is evident from the data arranged in Table 1 and depicted in Fig. 2 that the acidity of bael fruit was found significant**.** The data has been evaluated for the year 2021-22 and found that the maximum value for the acidity (%) is in the genotype Pant Sujata (0.46) is found highly significant at 5% significance level, and at par with N.B.-16 (0.44). However, the lowest T.S.S. has been observed for the genotypeN.B.-17 (0.31) is found highly significant at 5% significance level, and at par with N.B.-5 (0.32), N.B.-9 (0.32), CIAH-B-1(0.33) and Pant Aparna (0.34).

Data displayed in the arranged in Table 1 and depicted in Fig. 2 that the acidity of bael fruit was found significant**.** However, the data evaluation of the year 2022-23 shows the same genotype as the highest acidity (%) is in the genotype Pant Sujata (0.45) and N.B.-16 (0.45) is found highly significant at 5% significance level, and at par with CISH-B-2 (0.42). However, the lowest T.S.S. has been observed for the genotype N.B.-17 (0.32) is found highly significant at 5% significance level, and at par with N.B.-4 (0.33), N.B.-5 (0.33), N.B.-7 (0.36), N.B.-8 (0.37), N.B.-9 (0.34), N.B.-22 (0.34), CIAH-B-1(0.34) and Pant Aparna (0.35).

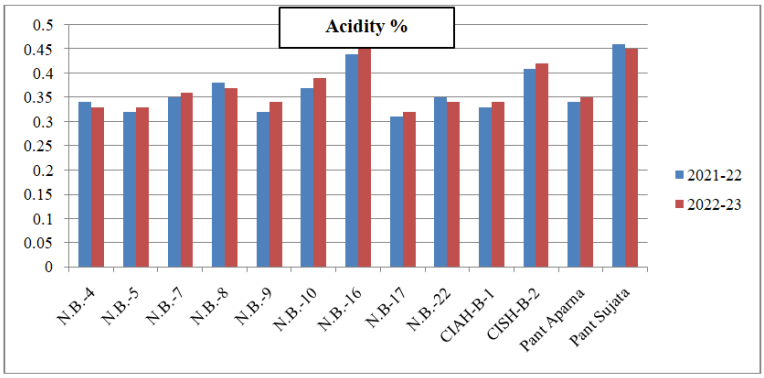


**Fig. 2.** Acidity of different bael germplasm.

For the both the year Pant Sujata is found to be best with the acidity (%) of (0.46) and (0.45) respectively but N.B.-16 is also bound the best in the year 2022-23 having the acidity % of (0.45) however the genotype having the least T.S.S. is N.B.-17 having the acidity (%) of (0.31) and (0.32) respectively.

**Ascorbic Acid (mg).** It is obvious from the data presented in Table 1 and graphical represented in Fig. 3 that the ascorbic acid of bael fruit was found significant. The evaluated data for the year 2021-2022 represent that the highest value for the ascorbic acid found for the genotype is N.B.-5 (20.55) is significant at 5% significance level, and at par with N.B.-4 (19.1), N.B.-7 (19.8), N.B.-8 (19.9), N.B.-9 (19.2), N.B.-22 (19), CIAH-B-1(19.8).

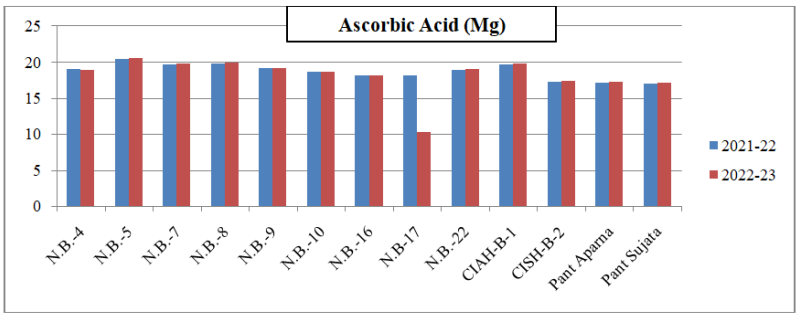


**Fig. 3.** Ascorbic acid of different bael germplasm.

It is obvious from the data presented in Table 1 and graphical represented in Fig. 3 that the ascorbic acid of bael fruit was found significant. However, the least ascorbic acid content is recorded for the genotype is Pant Sujata (17.1). In the year 2022-23 the highest value for the ascorbic acid found for the genotype is N.B.-5 (20.6) is highly significant at 5% significance level, and at par with N.B.-4 (19), N.B.-7 (19.85), N.B.-8 (20), N.B.-9 (19.25), N.B.-22 (19.1), CIAH-B-1(19.9). However, the least ascorbic acid content is recorded for the genotype is N.B.-17 (10.35).

**Reducing sugar-**Data presented in Table 2 and illustrated in Fig. 4 showed that the reducing sugar of bael fruit was found is highly significant. After the data evaluation for the year 2021-22 is found that the highest value for the reducing sugar is for the genotype Pant Aparna (5.2) is highly significant at 5% significance level, and at par with N.B.-5 (5.1). However lowest value for the reducing sugar is found for the genotype CISH-B-2 (4) is highly significant at 5% significance level, and at par with N.B.-7 (4.2), N.B.-8 (4.1), CISH B-1 (4.2) and Pant Sujata (4.1).

Data presented in Table 2 and illustrated in Fig. 4 showed that the reducing sugar of bael fruit was found is highly significant. In the year 2022-23 the highest value for the reducing sugar is found for the genotype in Pant Aparna (5.31) is highly significant at 5% significance level, and at par with N.B.-5 (5.08). However lowest value for the reducing sugar is found for the genotype CISH-B-2 (4.07) is highly significant at 5% significance level, and at par withN.B.-7 (4.25), N.B.-8 (4.13), and Pant Sujata (4.2).

**Table 2: Estimates of reducing sugar, non-reducing sugar, total sugar of fruit in bael germplasm.**

| Treatments | Parameters | | | | | |
|---|---|---|---|---|---|---|
| | Reducing sugar (%) | | Non-reducing sugars (%) | | Total Sugars (%) | |
| | 2021-22 | 2022-23 | 2021-22 | 2022-23 | 2021-22 | 2022-23 |
| N.B.-4 | **4.7** | **4.75** | **12.9** | **13.01** | **17.6** | **17.76** |
| N.B.-5 | 5.1 | 5.08 | 13.4 | 13.69 | 18.5 | 18.77 |
| N.B.-7 | 4.2 | 4.25 | 12.0 | 12.19 | 16.2 | 16.44 |
| N.B.-8 | 4.1 | 4.13 | 11.8 | 12.02 | 15.9 | 16.15 |
| N.B.-9 | 4.6 | 4.7 | 15.4 | 15.6 | 20.0 | 20.30 |
| N.B.-10 | 4.8 | 4.88 | 13.3 | 13.52 | 18.1 | 18.40 |
| N.B.-16 | 4.9 | 4.96 | 13.1 | 13.34 | 18.0 | 18.3 |
| N.B-17 | 4.4 | 4.44 | 13.3 | 13.51 | 17.7 | 17.95 |
| N.B.-22 | 4.5 | 4.6 | 13.8 | 13.95 | 18.3 | 18.55 |
| CIAH-B-1 | 4.2 | 4.23 | 13.8 | 14.02 | 18.0 | 18.25 |
| CISH-B-2 | 4.0 | 4.07 | 13.4 | 13.58 | 17.4 | 17.65 |
| Pant Aparna | 5.2 | 5.31 | 14.8 | 14.99 | 20.0 | 20.30 |
| Pant Sujata | 4.1 | 4.2 | 13.9 | 14.1 | 18.0 | 18.3 |
| **SEm±** | **0.095** | **0.095** | **0.290** | **0.283** | **0.351** | **0.354** |
| **CD at 5%** | **0.278** | **0.277** | **0.847** | **0.827** | **1.023** | **1.032** |

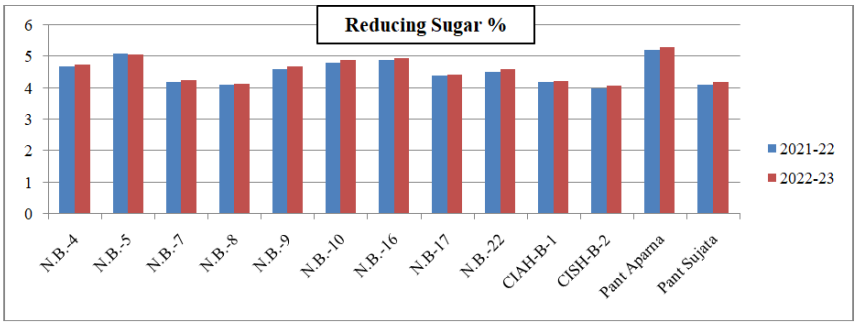


**Fig. 4.** Reducing sugar of different bael germplasm.

For both the years genotype Pant Aparna has the highest amount of the reducing sugar (5.2) and (5.31) respectively and lowest amount of reducing sugar is found for the genotype CISH-B-2 having the value (4) and (4.07) respectively.

**Non-reducing sugar-**It is obvious from the data presented in Table 2 and graphical represented in Fig. 5 that the non-reducing sugar of bael fruit was found significant. The evaluated data for the both year 2021-22 it is found that the highest value for the non-reducing sugar is for the genotype N.B.-9 (15.4) is highly significant at 5% significance level, and at par with Pant Aparna (14.8). However lowest value for the non-reducing sugar is found for genotype N.B.-8 (11.8) and at par with N.B. 7 (12).

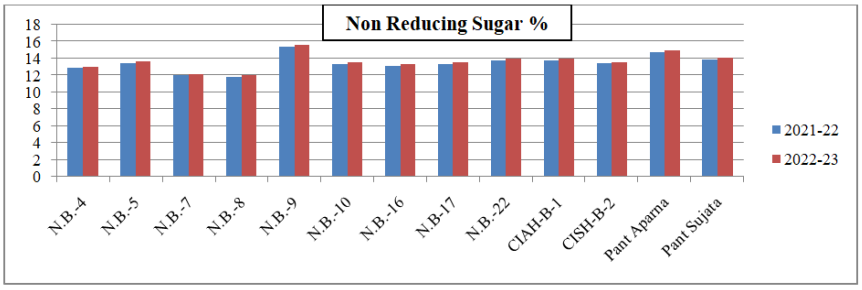


**Fig. 5.** Non-Reducing sugar of different bael germplasm.

It is obvious from the data presented in Table 2 and graphical represented in Fig. 5 that the non-reducing sugar of bael fruit was found significant. In the year 2022-23 the highest value for the non-reducing sugar is found for the genotype in N.B.-9 (15.6) is highly significant at 5% significance level, and at par with Pant Aparna (14.99). However lowest value for the

non- reducing sugar is found for the genotype N.B.-8 (12.02) and at par with N.B.-7 (12.19).

For both the years the genotype having the maximum value for the non-reducing sugar is N.B.-9 (15.4) and (15.6) respectively, and the lowest value for the non-reducing sugar is found for the genotype N.B.-8 (11.8) and (12.02) respectively.

**Total sugar-** Data displayed in Table 2 and illustrated in Fig. 6 showed that the total sugar of bael fruit was found significant. The evaluated data for the year 2021-22 it is found that the highest value for the total sugar is for the genotype Pant Aparna (20) is highly significant at 5% significance level, however lowest value for the total sugar is found for genotype N.B.-8 (15.9) is highly significant at 5% significance level, and at par with N.B.-7 (16.2).

Data displayed in Table 2 and illustrated in Fig. 6 showed that the total sugar of bael fruit was found significant**.** In the year 2022-23 the highest value for the total sugar is found for the genotype in Pant Aparna (20.3) is highly significant at 5% significance level, however lowest value for the total sugar is found for genotype N.B.-8 (16.15) is highly significant at 5% significance level, and at par with N.B.-7 (16.44).

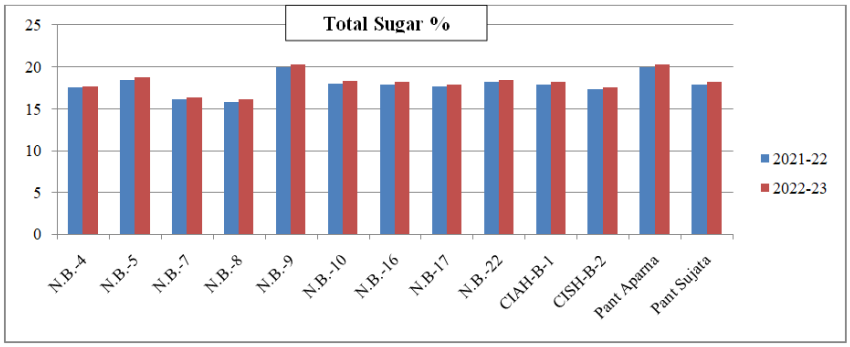


**Fig. 6.** Total sugar of different bael germplasm.

For both the years the genotype having the maximum value for the total sugar is Pant Aparna (20) and (20.3.) respectively, and the lowest value for the total sugar is found for the genotype N.B.-8 (15.9) and (16.15) respectively.

## DISCUSSION

Similar result were also reported by Srivastava *at al.* (2004) started the maximum T.S.S. in recorded in the genotypes N.B.-5 (40.2 %) and minimum T.S.S recorded in the genotypes pant Sujata (33. %).

Similar result were also reported by Nagar *at al*. (2017) started the maximum Acidity (%) in recorded in the genotypes N.B.-5 (0.34 %) and minimum T.S.S. recorded in the genotypes N.B.-17 (0.30 %).

Similar results were also reported Pandey *et al.* (2008) maximum total sugar in Narendra Bael-5. Similar results were also reported Mandal *et al.* (2014) chemical properties revealed that average Total tritable acidity (%) 0.42, ascorbic acid (mg/100g)-14.32.

## CONCLUSIONS

As per the data evaluated in the result revealed that the best genotype having the highest T.S.S. is N.B.-17 (40.2 %) and the genotype having the highest acidity percentage is Pant Sujata and N.B.-16, best genotype for the highest amount of the ascorbic acid found in N.B.-5 (20.55 %) mg. the reducing sugar is found highest in the genotype Pant Aparna (0.44 %) and highest amount of non-reducing sugar and total sugar found in the genotype N.B.-9.

## FUTURE SCOPE

The genotypes which are concluded i.e. Pant Sujata for acidity, Pant Aparna for non-reducing and total sugar and N.B.-17 for the T.S.S. perform well in the sodic soil of Uttar Pradesh and these genotypes are further recommended for the orchard planning and production units also for the future crop improvement programme, and development of the new genotypes.

## REFERENCES


Gopalan, C.B.N., Rama Sastri and Balasubramaniam (1971). Nutritive value of Indian foods. National Institute of Nutrition, Indian Council of Medical Research. New Delhi, India.

Jauhari, O. S. and Singh, R. D. (1971). Bael - a valuable fruit. *Indian Horticulture, 16*, 1, 9- 10.

Kaur, A. and Kalia, M. (2017). Physic-chemical analysis of bael (*Aegle marmelos* L.) fruit and pulp, seed and pericarp. *Chem. Sci Review and Letters*, *6*(22), 1213-1218.

Pandey, D., Shukla, S. K., & Kumar, A. (2008). Variability in bael accessions from Bihar and Jharkhand. *Indian J. Hort*., *65*, 226-229.

Mukherjee, B. and Ahmad, K. (1957). Riboflavin. *Pakistan Journal of Biological and Agricultural Sciences, 1*, 47-51.

Nagar, S., Kumar, M., Kumatkar, R. B., Sharma, J. R., & Singh, S. (2017). Evaluation of bael (*Aegle marmelos* Corr.) germplasms for seed and qualitative characters under semi-arid conditions of Haryana. *Int. J. Pure App. Biosci*., *5*(3), 436-442.

Mandal, P., & Sahoo, B. B. (2014). Studies on processing and storage stability of bael (*Aegle marmelos correa*) squash for nutritional security. *Journal of Progressive Agriculture*, *5*(1), 62-64.

Pandey, D., Shukla, S. K. and Nath, V. (2005). Diversity of bael (*Aegle marmelos* Correa) in Bihar and Uttar Pradesh. *Prog. Hort.*, 31, 359-62.

Pathak, R. K., Pandey, D .and Pramanik, P. K. (2002). Diversity in bael (*Aegle marmelos* Correa)-An underutilized fruit of India. *The International Board for Plant Genetic Resources, News l. 37*, 22 & 37.

Srivastava, K. K., & Singh, H. K. (2004). Physico-chemical quality of bael (Aegle marmelos Correa) cultivars. *Agricultural Science Digest*, *24*(1), 65-66.

Ranganna, S. (1986). Manual of Analysis of fruits and vegetable products, Tata Mc Graw-Hill Publishing Company Ltd; New Delhi, pp.1-30.

**How to cite this article:** Alok Kumar, Bhanu Pratap, H.K Singh, Lavkush Pandey, Ritesh Singh and Anshuman Singh (2023). Studies on different Germplasm of Bael (*Aegle marmelos* L.) based on Chemical Characters of Bael under Sodic Soil condition of Eastern Uttar Pradesh. *Biological Forum – An International Journal*, *15*(6): 354-360.