POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

Volume 2, Issue 4, 2024

Received: 16 November 2024
Accepted: 16 December 2024
Published: 23 December 2024

GERMPLASM EVALUATION OF BOTTLE GOURD (LAGENARIA SICERARIA L.) ON BASE OF YIELD AND YIELD RELATED TRAITS

Muhammad Iqbal[1], Muhammad Azam Khan[*2], Atif Ali[3], Kashif Nadeem[4], Khalil Ahmad[5], Umar Sabtain[6], Razia Sultana[7], Babar Islam[8], Muhammad Rizwan Bashir[9], Zulkaif Maqsood[10], Zeenat Javed[11], Abu Talha Nusrat[12]

[1,3,4,5,6]*Vegetable Research Institute, AARI, Faisalabad*
[2]*Department of Plant Breeding and & Genetics, University of Agriculture, Faisalabad*
[7]*Wheat Research Institute, Faisalabad*
[8]*Department of Plant Breeding and Genetics, Bahauddin Zakria University, Multan, Pakistan*
[9]*Oilseed Research Institute, AARI, Faisalabad*
[10]*Pulses Research Institute, AARI, Faisalabad*
[11]*Soil & Water testing Laboratory for research, Bahawalpur*
[12]*Department of Plant Breeding and Genetics, The Islamia University of Bahawalpur*

[*2]azam.khan@uaf.edu.pk

ABSTRACT

The analysis of variance revealed significant genetic variation among 22 bottle gourd genotypes. Genotypes such as AAB Gourd 2021, AA Bottle GR-1, Anmol F1, GGAS BoG-10, HBO-373 D, and Bulb F1 demonstrated high germination rates, making them reliable choices for cultivation. The number of fruits per plant is directly linked to yield and productivity. Genotypes Jambo F1, Jalal F1, BG-02, and GGAS BoG-12 showed the highest fruit counts per plant, making them ideal for maximizing yield. Other genotypes, such as AAB Gourd 2021, Anmol F1, Bulb F1, and others, displayed good to moderate productivity. GGAS BoG-12, Diamond 3030, Faisalabad Round, and CBS-402 offered a mix of round and pear shapes, while genotypes like AAB Gourd 2021, AA Bottle GR-1, Jambo F1, and MV-630 F1 produced long fruits. Most other genotypes had round-shaped fruits. In terms of color, genotypes ranged from light green to dark green, with specific preferences varying by market. Fruit weight significantly impacts overall yield and market value. GGAS BoG-12 had the heaviest fruit weight at 450.5 g, indicating high yield potential and market preference for larger fruits. BG-02, HBO-373 D, Anmol F1, and others showed good fruit weights. Lower fruit weights were noted in genotypes like Norvin F1, Faisalabad Round, Nelwin F1, and others, which might cater to niche markets preferring smaller fruits.

INTRODUCTION

Bottle gourd [Lagenaria siceraria (Mol.) Standl.] belongs to the Cucurbitaceae family, subfamily Cucurbitoideae, and tribe Benincaseae. It has a diploid somatic chromosome number of 2n=2x=22 and originates from Africa. The Cucurbitaceae family includes 118 genera and 825 species, widely distributed across warmer regions of the world. The names "lagenaria" and "siceraria" are derived from Latin words meaning bottle and drinking vessel, respectively. Bottle gourd plants are annual vines that grow on the ground, similar to other members of the pumpkin family, and die at the end of each growing season. The stem is deeply grooved, angular, and about 1 cm thick with 5-6 branches. The leaves are prostrate or branching with two tendrils at the base of the leaf stalk. The plant has a wide and spreading root system, colored from white to pale cream, with a taproot penetrating 60-80 cm deep. Flowers are monoecious, with white solitary male and female flowers found on different axes of the same plant, favoring cross-pollination. The large white flowers open at night, and the female flowers are short-stalked. The fruit varies greatly in form, shape, and size, producing different shaped and sized fruits from round to large elongated with narrow necks.

Bottle gourd is significant in the plant kingdom due to the diversity of its fruit shapes, colors, sizes, and uses, and is extensively grown in the tropics and subtropics for its edible fruits. Tender fruits are used as vegetables and for making sweets and pickles, particularly in hilly areas. The fruit has a moderately hard rind, thick edible flesh, and a central cavity containing numerous seeds. Seeds are typically plump, tan or soft white, covered with a testa or seed coat, flat, and rectangular to narrow trapezoidal in shape, ranging in color from whitish to dark brown (Arvind *et al*., 2012). The fruit is rich in proteins, minerals, amino acids, and fixed oils. Bottle gourd fruits are known to help cure various diseases, such as asthma, pain, ulcer, constipation, and bronchial disorders. They are an excellent source of essential fatty acids, antioxidants, vitamins E, A, and C, and sterols. Known locally as Ghia Kaddu, bottle gourd is widely cultivated in Pakistan for its versatility and nutritional benefits, with cultivation occurring in both the rainy and summer seasons and fruits available year-round in markets. Despite its nutritional benefits and widespread cultivation, several challenges hinder the productivity and quality of bottle gourd. Low-yielding cultivars are one of the primary issues, as farmers often rely on traditional varieties that do not produce high yields. Climate change poses a significant threat to cultivation in Pakistan, with rising temperatures, erratic rainfall patterns, and increased frequency of extreme weather events adversely affecting crop growth and yield. Farmers need to adopt climate-resilient farming practices, such as drought-tolerant varieties, mulching, and rainwater harvesting, to mitigate the impact of climate change.

Genetic variability within plant populations is essential for selection programs in plant breeding. A higher degree of variability provides breeders with greater opportunities to select desirable traits (Bakhsh *et al*., 2003). Genetic diversity is crucial in plant breeding because hybrids derived from lines of diverse origins typically exhibit greater heterosis (hybrid vigor) than those from closely related strains. These methods are vital for assessing genetic diversity and identifying genotypes within species.

Bottle gourd cultivation in Pakistan faces multiple challenges, including low-yielding cultivars, pest and disease management, soil and water management, climate change, market access, and a lack of research and development (Gorasiya *et al*., 2012). Addressing these issues requires a multi-faceted approach involving the adoption of improved varieties, integrated pest management, efficient resource management, climate-resilient practices, and increased research efforts. Considering these problems, an experiment was planned to evaluate the germplasm of bottle gourd to identify promising genotypes.

Materials and Methods

The study was conducted at Vegetable Research Institute, Faisalabad during kharif season of 2023. The soil of the experimental plot was clay loam in texture. The experiment was laid out in randomized complete block design having 22 genotypes Table 1 and three replications. The field was plowed to a fine tilth and plotting was made according to the experimental treatments. Field was irrigated before dibbling the seeds and thereafter once a week. The soaked seeds were sown in well prepared seed bed at a depth of 1 cm. Row to row and plant to plant distance was kept as 2 m and 50cm, respectively. Recommended doses of farm yard manure (20 t ha^{-1}) and NPK (200:100:100 kg NPK/ha) fertilizers were also applied. FYM (N = 12.23 g kg^{-1}, P = 7.24 g kg^{-1}, and K = 86. mg kg^{-1}), phosphorus, and potash were applied at sowing while nitrogen was given in three equal splits that is at sowing, one month after sowing, and at flower initiation stage. Irrigation source was canal water. Uniform irrigation at a depth of 7.5 cm was given to all the experimental plots. First irrigation was given immediately after sowing while subsequent irrigations were given with two weeks interval. Last irrigation was given two days before first picking. First picking was done after 80 days of sowing, while second and third pickings were done on weekly basis. Weeds were controlled manually. Red pumpkin beetles, fruit flies, and caterpillars were controlled by spraying Malathion 50 EC (1 ml/lit) before one month of harvesting. Data were recorded Germination (%): Germination %age was calculated by counting the total number of plants emerged in each treatment and % germination was calculated with the formula.

$$Germination\ \%age = \frac{\text{Number of seeds germinated}}{\text{Number of seeds planted}} \times 100$$

Fruits per plant was recorded by selecting three plants randomly from each treatment at every picking (Harika *et al*., 2012). The total number of fruits picked were counted and then averaged to number of fruits plant^{-1}. Fruit shape was visionary observed and recorded .

Fruit Color was recorded through observation of fruits harvested from selected plants. Fruit weight (g): The weight of 10 fruits selected randomly from each treatment and weighed in grams with a digital balance and their mean was determined. Fruit yield (tons ha^{-1}): Total weight of all the harvested fruits from each picking was weighed and fruit yield per hectare was calculated.

Results and Discussion

The analysis of variance confirmed the existence of genetic variation among 22 genotypes. Germination percentage is an important measure of seed viability and vigor, indicating the potential success of crop establishment. The germination percentage observed in bottle gourd genotypes was significant. Genotypes AAB Gourd 2021, AA Bottle GR-1, Anmol F1, GGAS BoG-10, HBO-373 D, Bulb F1 – These genotypes exhibit high germination rates, making them reliable choices for cultivation. HBO-245 E, Diamond 3030, Norvin F1, Faisalabad Round, Nelwin F1, Maloki F1, Super Anmol F1, Round Ball – These genotypes show good germination rates but are slightly lower than the top performers. Jalal F1, VRIBG-02 – These genotypes have significantly lower germination rates, indicating poor seed quality or other viability issues (Hegazy *et al*., 2011). High germination rates are essential for successful crop establishment, ensuring that a larger proportion of seeds will develop into healthy plants. By selecting genotypes with higher germination percentages, farmers can improve their chances of achieving a robust crop stand (Hidayatullah *et al*., 2012). The number of fruits per plant for the different bottle gourd genotypes presented in the Table 2. This measure is crucial as it directly impacts the yield and productivity of the crop. Genotype Jambo F1 (11.4 fruits/plant), Jalal F1 (11.3 fruits/plant), BG-02 (10.3 fruits/plant), GGAS BoG-12 (10.2 fruits/plant). These genotypes demonstrate the highest number of fruits per plant, making them ideal choices for maximizing yield. AAB Gourd 2021, Anmol F1, Bulb F1, HBO-245 E, Norvin F1, Nelwin F1, Maloki F1, Super Anmol F1, Round Ball, MV-630 F1, Nawab No. 85 these genotypes show good to moderate productivity, suitable for stable and reliable yield. HBO-373 D, GGAS BoG-10, Faisalabad Round, CBS-402 genotypes exhibit lower fruit counts, indicating room for improvement in terms of productivity (Husna *et al*., 2011). GGAS BoG-12, Diamond 3030, Faisalabad Round, CBS-402 genotypes offer a mix of round and pear shapes, providing variety in the market and appealing to diverse consumer preferences. AAB Gourd 2021, AA Bottle GR-1, Jambo F1, MV-630 F1had log fruits. Long fruits are generally preferred for their uniform shape and ease of slicing, making them versatile in culinary applications. BG-02, HBO-373 D, Anmol F1, Bulb F1, GGAS BoG-10, HBO-245 E, Norvin F1, Nelwin F1, Maloki F1, Super Anmol F1, Round Ball, Jalal F1, Nawab No. 85, VRIBG-02 were of round shape. Understanding the fruit shape preferences helps farmers choose the right genotype to meet market demands and optimize their crop's commercial value (Ilyas *et al*., 2017). By selecting genotypes that produce the desired fruit shapes, they can better cater to consumer preferences and enhance the profitability of their produce (Jan *et al*., 2000). The fruit colors of various bottle gourd genotypes listed in the Table

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

2. Fruit color is an important characteristic that can influence consumer preference and marketability. Light Green to Green Spectrum: GGAS BoG-12, AAB Gourd 2021, Jambo F1, Anmol F1, Bulb F1, GGAS BoG-10, Diamond 3030, Faisalabad Round, Round Ball, MV-630 F1, Nawab No. 85, CBS-402, VRIBG-02 (Janaranjani *et al*., 2015). These genotypes offer a visually attractive color gradient that ranges from light green to green, making them popular in fresh produce markets.
Green to Dark Green Spectrum: BG-02, Nelwin F1, Super Anmol F1, Norvin F1. Fruits that transition from green to dark green indicate maturity and are often associated with richer flavors and higher nutrient content (Singh *et al*., 2014). Consistently Light Green: AA Bottle GR-1, HBO-373 D. These genotypes produce consistently light green fruits, which are commonly preferred for their fresh and tender characteristics. Consistently Dark Green: HBO-245 E, Maloki F1, Jalal F1 Dark green fruits are seen as mature and flavorful, which might cater to specific consumer preferences (Munir *et al*., 2013). Understanding the color preferences in the market helps to select the right genotypes that can meet consumer demands and enhance the marketability of produce. By choosing genotypes with the desired color characteristics, farmers can ensure better acceptance and profitability of their crops.
Fruit weight is an important factor as it impacts overall yield and market value (Pandit *et al*., 2009). The genotype GGAS BoG-12 indicated the heaviest fruit weight 450.5 g indicating a high potential for overall yield and market preference due to larger individual fruits (Sivaraj *et al*., 2005). Slightly lower than GGAS BoG-12 but BG-02 still among the top performers in terms of fruit weight, had fruit weight 425.4 g making it a valuable genotype for farmers. HBO-373 D, Anmol F1, Bulb F1, GGAS BoG-10, HBO-245 E, Diamond genotypes show good fruit weights that can contribute to substantial yield and market value (Rahman *et al*., 1990). Norvin F1, Faisalabad Round, Nelwin F1, Maloki F1, Super Anmol F1, Round Ball, MV-630 F1, Jalal F1, Nawab No. 85, CBS-402, VRIBG-02 genotypes had lower fruit weights, which might suit specific markets that prefer smaller fruits. Higher fruit weights directly contribute to higher overall yield per plant, making the top performers desirable for commercial cultivation (Rami *et al*., 2017). Different markets have varying preferences for fruit size. High fruit weight genotypes are ideal for markets that prefer larger fruits, while lower weight genotypes might cater to niche markets seeking smaller, tender fruits (Samadia , 2002).
The overall assessment of the genotypes revealed that some exotic varieties outperformed the local check variety in both fruit yield and quality attributes. This suggests that the local variety has lost its viability and yield potential and should be replaced with a more suitable genotype (Vaniya *et al*., 2008). Among the exotic varieties, GGAS BoG-12 emerged as the most promising alternative due to its superior performance across all evaluated genotypes. GGAS BoG-12 exhibited a high germination percentage and a quicker germination period, likely due to its genetic makeup and seed vigor (Shermila *et al*., 2016). The earlier germination of this genotype likely aligned better with the existing environmental conditions such as light and temperature, and its robust seed vigor and viability contributed to faster seed germination compared to genotypes that took longer to germinate (Husna *et al*., 2011; Mangala *et al*., 2016). The higher germination percentage, earlier maturity, and higher fruit yield observed in certain genotypes are notable. Jan *et al*. (2000) and Tamilselvi *et al*. (2017) attributed the higher germination percentages in bottle gourd to greater seed viability and vigor of certain genotypes. Research by Harika *et al*. (2012), Shaikh *et al*. (2012), Kappal *et al*. (2015), and Priyanka *et al*. (2017) found that darker-colored genotypes are commercially more attractive than light green ones.GGAS BoG-12 stands out for both its quality and higher fruit yield. The significant fruit yield recorded for this genotype indicates its substantial yield potential and suitability to the agro-climatic conditions of the study site. Differences in fruit yield among various genotypes can be attributed to their genetic makeup and their responses to soil macro- and micro-climates.The higher yield observed in GGAS BoG-12 is likely due to its greater fruit weight, as fruit yield is correlated with yield components. This correlation has been supported by research from Vaniya *et al*. (2008), Singh and Singh (2014), and Janaranjani and

Kanthaswamy (2015). Bakhsh *et al*. (2003) suggested that bottle gourd production in the country could be enhanced by expanding the cultivation area is challenging due to already saturated agricultural land. Continuously improving resource management and utilization by growers. Screening for new genotypes with higher yield potential and better quality attributes.

REFERENCES

Anonymous. 2023. Production guide line for bottle guord.Department of Agriculture, Forestary and Fisheries of Rebulic of South Africa. P. 1-10

Arvind, K., B. Singh, M. Kumar and R.K. Naresh. 2012. Genetic variability, heritability and genetic advance study for yield and its components in bottle gourd (*Lagenaria siceraria* Mol.). Prog. Hortic. 43: 267-270.

Bakhsh, K., B. Ahmad, S. Hassan and Z.A. Gill. 2003. An analysis of technical efficiency of growing Bitter gourd in Pakistani Punjab. Pak.J. Agri. Sci. 44(2): 350-355.

Gorasiya, S.J., A. Paranjape and K. Murti. 2012. Pharmacognostic and pharmacological profile of *Lagenaria siceraria* (Molina) Standley. Pharm. Newsl. 3: 317-324.

Harika, M., V.D. Gasti, T. Shantappa. R. Mulge. A.M. Shirol. A.B. Mastiholi and M.S. Kulkarni. 2012. Evaluation of bottle gourd genotypes (*Lagenaria siceraria* Mol.) Standl. for various horticultural characters. Karnataka J. Agric. Sci. 25: 241-244.

Hegazy, E.M. and O.S. El-Kinawy, 2011. Characteristics, of pumpkin and bottle gourd in Egypt and potentially their contamination by mycotoxins and mycotoxigenic fungi. J. Am. Sci. 7(9): 615-622.

Hidayatullah., T. Mahmood, M. Farooq, M.A. Khokhar and S.I. Hussain. 2012. Plant growth regulators effecting sex expression of bottle gourd (*Lagenarria siceraria* Molina) plants. Pak. J. Agric. Res. 25: 50-54.

Husna, A., F. Mahmud, M.R. Islam, M.A. Mahmud and M. Ratna. 2011. Genetic variability, correlation and path co-efficient analysis in bottle gourd (*Lagenaria siceraria* L.). Adv. Biol. Res. 5: 323-327.

Ilyas, M., G. Nabi, S. Ali, M.M. Anjum, N. Ali, W. Zaman, S. Jan, I. Samar, M. Sadiq and S. Akbar. 2017. Evaluation of bottle gourd genotypes (*Lagenaria siceraria* Mol.) varieties in Agro climatic conditions of Peshawar Valley. Int. J. Envioron. Sci. Nat. Res. 3(1): 1-3.

Jan, D.J., M. Iqbal, A. Ghafoor, K. Waseem and M.S. Jilani. 2000. Effect of NPK fertilizers and spacing on the yield of bottle gourd (*Lagenaria siceraria* M.). Pak. J. Biol. Sci. 3: 448-449. https://doi.org/10.3923/pjbs.2000.448.449

Janaranjani, K.G. and V. Kanthaswamy. 2015. Correlation studies and path analysis in bottle gourd. J. Hortic. 2(1): 1-4.

Kappal, S.B., B. Chawan, R.H. Rathod and T. Shantappa. 2015. Variability and characters, association studies in ridge gourd (*Luffa acutangula* Robx) reference to yield attributes. J. Glob. Biosci. 4(5): 2332-2342.

Managala, T., J. Mandal and V.K. Dhangrah. 2016. Variation in flowering characters of bottle gourd. Hort. Flora. Res. Spectr. 5 (1): 39-42.

Munir, M., A.K. Baloch, W.A. Baloch, F. Ahmad and M. Jamil. 2013. Development of iodometeric redox method for routine test of ascorbic acid from fresh fruits and vegetables. J. Chem. Soc. Pak. 35 (3): 784-792.

Pandit, M.K., B. Mahato and A. Sarkar. 2009. Genetic variability, heritability and genetic advance for some fruit characters and yield in bottle gourd (*Lagenaria siceraria* Molina Standl.) genotypes. Acta. Hort. 809: 221-226. https://doi.org/10.17660/ActaHortic.2009.809.22

Privanka, V., S.K. Maurya, A. Panchibhaiya and S. Dhyani. 2017. Studies on variability, heritability and genetic advance for yield and yield contributing characters in pointed gourd (*Trichosanthus diocia*-Roxb). J. Pharm. Phytochem. 6(3): 734-738.

Rahman, M.M., S.K. Dey and M. Wazuddin. 1990. Yield components and plant

characters of several bitter gourd, ribbed gourd, bottle gourd and sweet gourd genotypes. Proc. workshop Bangladesh Agric. Univ. Res. Prog. Mymensingh (Bangladesh) Vol. 4: 117-127.
Rami, U.K. and E.N. Reddy. 2017. Variability and correlation studies of bottle gourd. Int. J. Pure Appl. BioSci. 5(2): 723-731.
Samadia D.K. 2002. Performance of bottle gourd Genotypes under hot arid environment. India.
J. Hort. 59 (2): 167-170.
Samadia, D.K. and R.C. Khandelwal. 2002. Combining ability in bottle gourd. India. J. Hort. 59(4): 402-405.
Shaikh, J.A., K.B. Kathiria and R.R. Acharya. 2012. Heterosis and combining ability for fruit yield and its component traits in bottle gourd (*Lagenaria siceraria* Mol.). Veg. Sci. 38(2): 169- 175.
Shermila, V.S., M.N. Supe, M.N. Bhalekar and S.S. Gaikwad. 2016. Combining ability studies in bottle gourd in summer season. Asian. J. Sci. Tech. 7(5): 2842-2845.
Sherma, A. and S.A Sengupta. 2012. Evaluation of genetic variability in bottle gourd genotypes. Veg. Sci. 39 (1): 83-85.
Shiviannad, B.K., L. Mukesh, R.C. Jagdeesha, R.C. Vijaykumar, J.J. Ayappa and S. Koulgi. 2015. Genetic variability and correlation among the physiological growth attributing characters in ridge gourd genotypes. Int. J. Adv. Res. 3 (4): 961-971.
Sarvanyadev, G., V. Lakshmanan and N. Robin. 2016. Performance evaluation and correlation analysis in mithipagal genotype (Momordica charantia var mucata). Elect. J. Plan. Bree. 8(2): 652-659.
Singh, A.K., U.B. Pandey and S. Mamta. 2006. Studies on heterosis in bitter gourd (*Momordica charantia* L). J. Veg. Sci. 27(2): 158-161.
Singh. B and S.K. Singh. 2014. Evaluation trial of bottle gourd (*Lagenaria siceraria* Mol.). Asia. J. Hort. 9(1): 116-119.
Sivaraj, N. and S.R. Pandravada. 2005. Morphological diversity for fruit characters in bottle gourd germplasm from tribal pockets of telangang region of Andhra Pradesh, India. Asian Agric. History. 9: 305-310.
Soil Survey Staff. 2009. Keys to soil of NWFP, FATA and northern areas. Nat. Instit. Res. Soils Geomatics, Lahore, Pakistan. p. 76.
Steel, R.G.D., J.H. Torrie and D.A. Dickey. 1997. Principles and practices of statistics, a biometric approach, *3rd ed.* McGraw Hill, Int. book co., Inc. Singapore. Prof. Russell Freed MSTAT Office freed@msu.edu 384C. Plant Soil Sci. Mich. State Univ. East Lansing, MI48824 Fax: 517 353-5174.
Tamilselvi, N.A. and P. Janisravi. 2017. Evaluation of pumpkin (*Cucerbita mosqata*.L*)* genotypes for earliness, yield and quality. Int. Curr. Micrbiol. APP. Sci. 6(3): 1554-1559.
Vaniya, B.D., L.K. Dhaduk and J.H. Vachhani. 2008. Heterosis studies in bottle gourd (*Lagenaria siceraria* Mol.) in relation to diallel crossing system. Int. J. Biosci. 6(1): 131-134.

POLICY RESEARCH JOURNAL
ISSN (E): 3006-7030 (P) 3006-7022

Table 1: List of Genotypes Selected for experiment

Sr.NO	Genotypes	SR.NO	Genotypes
1	GGAS BoG-12	**12**	Norvin F1
2	BG-02	**13**	Faisalabad Round
3	AAB Gourd 2021	**14**	Nelwin F1
4	AA Bottle GR-1	**15**	Maloki F1
5	Jambo F1	**16**	Super Anmol F1
6	HBO-373 D	**17**	Round Ball
7	Anmol F1	**18**	MV-630 F1
8	Bulb F1	**19**	Jalal F1
9	GGAS BoG-10	**20**	Nawab No. 85
10	HBO-245 E	**21**	CBS-402
11	Diamond 3030	**22**	VRIBG-02

TABLE 2: MEAN VALUES OF BOTTLE GOURD GENOTYPES FOR YIELD AND YIELD RELATED TRAITS

Sr.NO	Genotypes	Germination (%)	No. of fruits/plant	Fruit shape	Fruit color	Fruit weight (g)	Fruit yield (t/ha)
1	GGAS BoG-12	86.4	10.2	Round-Pear shape	Green to dark Green	450.5	32.3
2	BG-02	72.2	10.3	Round type	Green- to Dark green	425.4	31.3
3	AAB Gourd 2021	100.0	9.3	Long type	Light green-Green	410.2	30.3
4	AA Bottle GR-1	93.0	7.8	Long type	Light green	395.3	29.6
5	Jambo F1	84.7	11.4	Long type	Light green to Green	390.4	29.4
6	HBO-373 D	88.9	7.3	Round type	Light green	380.6	26.8
7	Anmol F1	90.3	8.6	Round type	Light green to Green	378.2	29.4
8	Bulb F1	88.9	7.8	Round type	Light green to Green	350.5	27.4
9	GGAS BoG-10	90.3	7.2	Round type	Light green to Green	345.2	27.1
10	HBO-245 E	73.6	8.7	Round type	Dark green	300.2	26.4
11	Diamond 3030	81.9	7.9	Round-Pear shape	Light green to Green	295.6	26.3
12	Norvin F1	79.2	8.0	Round	Light green-to Dark green	260.1	25.5
13	Faisalabad Round	87.5	7.1	Round-Pear shape	Light green to Green	240.1	24.8
14	Nelwin F1	84.7	8.3	Round	Green- to Dark green	238.2	24.7
15	Maloki F1	81.1	9.0	Round	Dark green	238.1	24.6
16	Super Anmol F1	82.2	8.2	Round	Green- to Dark green	235.5	24.3
17	Round Ball	80.6	7.7	Round type	Light green-Green	230.8	23.8
18	MV-630 F1	75.0	7.7	Long type	Light green-Green	220.1	23.0
19	Jalal F1	55.6	11.3	Round	Dark green	215.2	20.5
20	Nawab No. 85	72.2	8.1	Round	Light green-Green	205.1	20.0
21	CBS-402	81.9	7.0	Round-Pear shape	Light green-Green	195.6	19.5
22	VRIBG-02	51.4	8.4	Round	Light green-Green	175.2	16.0

ISSN (E): 3006-7030 (P) 3006-7022

Fig 1. COMPARISON OF FRUIT WEIGHT PER PLANT OF DIFFERENT GENOTYPES