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Morphological and Yield Trait Variability in Eight Cultivars of Gboma Eggplant (*Solanum macrocarpon* L.) in Burkina Faso

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Authors' contributions

This work was carried out in collaboration among all authors. Author PS contributed to conceptualisation, validation, visualisation, and methodology. Author BK contributed to formal analysis, software, drafting, revision, and proofreading. Author ZD contributed to validation, drafting, revision, and proofreading. Author AKT contributed to formal analysis, drafting, revision, and proofreading. Author YY contributed to drafting the initial version and revision. Author ASSI contributed to supervision, drafting, revision, and formatting. All authors read and approved the final manuscript.

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Abstract

Gboma eggplant (*Solanum macrocarpon* L.) is an important leafy and fruit vegetable in Africa, but information on cultivar-level morphological and yield variation under Burkina Faso conditions remains limited. This study assessed eight cultivars in the North-Sudanian zone of Burkina Faso between July and October 2024. A randomized Fisher block design with four replicates was used, and six qualitative and 17 quantitative traits were recorded. Qualitative observations showed variation in stem, flower, and fruit colour, whereas all cultivars had an upright growth habit, wavy leaf margins, and round fruits. The quantitative traits also varied among cultivars. Days to 50% flowering ranged from 53.50 days for Gb7 to 63.00 days for Gb5. Cultivar Gb5 recorded the greatest leaf blade length (31.14 cm), the largest fruit diameter (8.19 cm), and the highest leaf yield (6,437.50 kg/ha). Cultivar Gb2 produced the highest fruit yield (10,458.33 kg/ha), whereas Gb8 recorded the lowest fruit yield (5,958.33 kg/ha). Positive associations were observed between collar diameter and average fruit weight, fruit diameter and plant height, and fruit yield and the number of fruits per plant. The observed variability indicates that the evaluated cultivars contain useful morphological and agronomic differences. Gb5 may be considered for combined leaf and fruit production, whereas Gb2 is promising for fruit yield. Multi-season and multi-location evaluations are required before breeding or production recommendations are made.

Keywords: Solanum macrocarpon L.; morphological variability; agronomic performance; cultivars; Burkina Faso.

1. Introduction

Market gardening is a major source of income for rural and peri-urban communities and is practised in all regions of Burkina Faso. Cultivated vegetables include African eggplants, such as Gboma (*Solanum macrocarpon* L.). *Solanum macrocarpon* L., a member of the Solanaceae family, is native to Africa and is consumed in several parts of the world for its medicinal and culinary properties (Abdulkareem et al., 2024). African eggplant is an important indigenous vegetable. It is grown in West and Central Africa and South-East Asia for its edible fruits and leaves, which are used as vegetables in soups and sauces and are known for their characteristic bitter taste. The phytochemical compounds are thought to play a protective role and reduce the risks associated with several types of chronic disease (Zhang et al., 2015). This vegetable is widely used in traditional medicine as a vermifuge and laxative and to treat stomach, throat, and heart ailments (Komlaga et al., 2014; Oseni & Babatunde, 2015).

The importance of *Solanum macrocarpon* as a vegetable lies mainly in the high nutritional and dietary value of its leaves and fruits, which make it a highly valued condiment. The fresh leaves and young stems of *Solanum macrocarpon* are widely consumed in West and Central Africa. The leaves can be harvested over several seasons, sometimes for more than a year, when the production cycle is not interrupted by the dry season. The medicinal properties of this vegetable are used to treat numerous human and animal ailments in Africa and Asia. In Kenya, decoctions prepared from the roots are used to treat hookworm infections. Furthermore, the root of *Solanum macrocarpon* forms part of a herbal mixture used to treat bronchitis, aching muscles, and asthma and to accelerate wound healing.

African eggplants have significant nutritional value and contribute to food security and good health (Nyadanu & Lowor, 2015). They also make an important contribution to the food and nutritional security of millions of Africans in rural, peri-urban, and urban areas (Kwarteng et al., 2018). African eggplants are rich in iron, calcium, phosphate, potassium, and vitamin B (Coulibaly et al., 2021). Despite its nutritional and medicinal importance, the production of this vegetable is insufficient to meet demand throughout the year. This limitation is attributed to its slow growth and regeneration, resulting from the limited formation of axillary buds.

Although this indigenous vegetable plays a vital role in nutrition, medicine, and livelihood resilience, it has been neglected by scientific research, and its value chain remains underdeveloped (Kwarteng et al., 2018). Climate change and limited knowledge of this species pose serious threats to its production. As with other traditional vegetables, African eggplant cultivation is declining because of pest pressure and the widespread introduction of higher-yielding varieties (Dansi et al., 2008; Kwarteng et al., 2018). Indeed, little research effort has been devoted to African eggplant breeding, resulting in a lack of high-performing cultivars in terms of both yield and quality. Despite their considerable value, research on the diversity of eggplant species and their evolutionary relationships remains limited (Abdulkareem et al., 2024).

Agro-morphological evaluation of 51 local Gboma cultivars in Benin demonstrated substantial diversity and identified cultivar groups with useful biomass and leaf attributes, illustrating the value of systematic characterisation for selecting breeding material (Saka et al., 2017). Complementary evidence from cultivated brinjal shows that molecular markers can differentiate genotypes, while broader analyses of Solanum indicate that vegetative and reproductive traits are evolutionarily variable; together, these findings suggest the potential value of integrating field descriptors with genetic information in diversity assessment (Hilgenhof et al., 2023; Kumar et al., 2025). Recent work has examined bacterial wilt breeding and water-stress responses in Gboma eggplant (Kégbé et al., 2025; Sossou et al., 2024), but comparative field evidence on morphological and yield variation among locally available cultivars under Burkina Faso conditions remains limited.

To increase African eggplant production, it is therefore necessary to strengthen the production chain through the use of high-yielding varieties adapted to local climatic conditions. Morphological diversity is a prerequisite for developing new varieties and identifying higher-yielding cultivars (Adeniji et al., 2018). Accordingly, this study aimed to assess the morphological variability and yield traits of eight Gboma cultivars (*Solanum macrocarpon* L.) in the North-Sudanian zone of Burkina Faso. The results could contribute to the effective management and use of these important genetic resources in breeding programs.

2. Materials and Methods

2.1 Study Site

This study was conducted in the Nakambé Region, in the city of Tenkodogo (Fig. 1). The geographical coordinates of the site are 11°47'22.06'' north latitude and 0°23'3.29'' west longitude, at an altitude of 320 m. The climate is Sudano-Sahelian, with annual rainfall ranging from 600 to 900 mm. Fig. 2 shows the rainfall recorded by the meteorological station of the Boulgou Provincial Directorate of Agriculture, based in Tenkodogo, during the 2024 agricultural season.

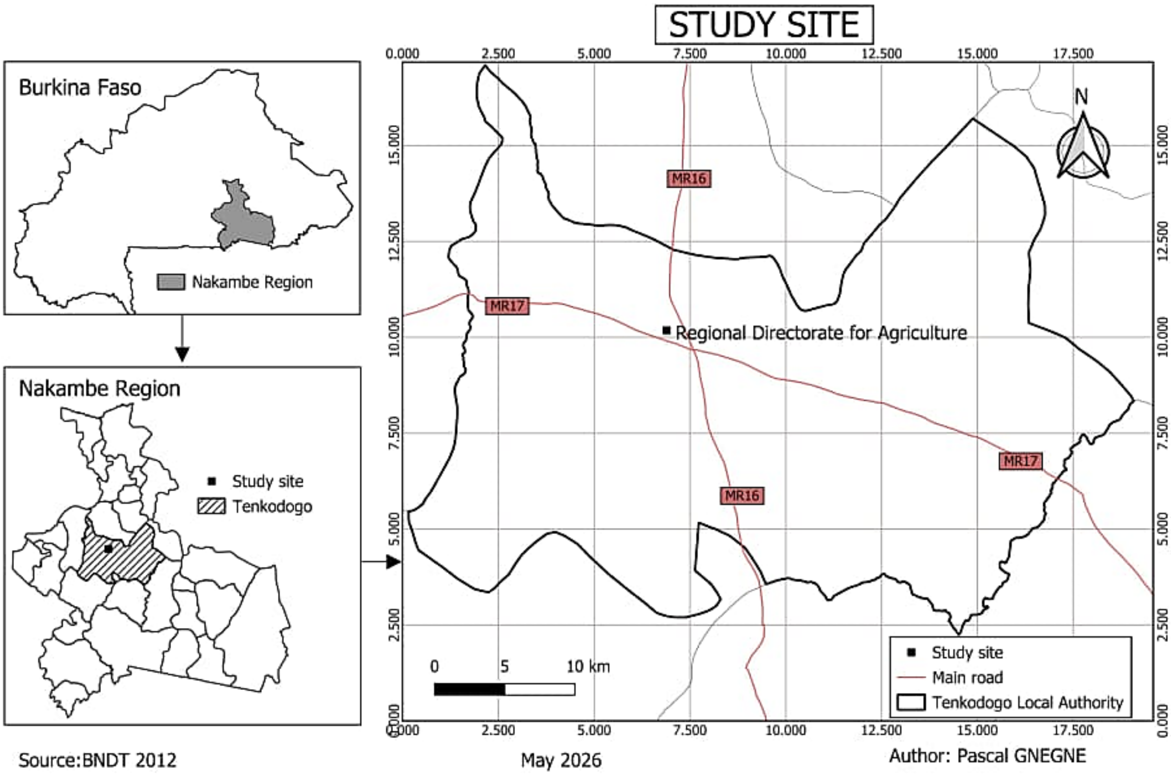

Fig. 1. Map of the study area

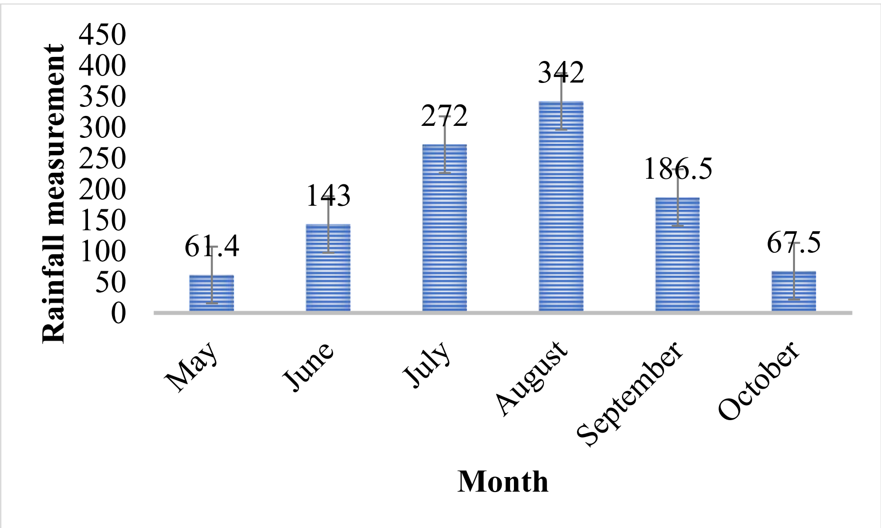

Fig. 2. Rainfall in the years 2024 in the municipality of Tenkodogo

2.2 Plant Material

The plant material tested in this study consisted of eight cultivars of the African eggplant 'Gboma' from Burkina Faso. The cultivars were collected in the Nando and Nazinon regions of Burkina Faso (Table 1).

Table 1. List and origin of the cultivars tested

Order No.	Cultivars	Origin	Regions
1	Gb3	Léo	Nando
2	Gb8	Léo	Nando
3	Gb5	Léo	Nando
4	Gb1	Bieha	Nando
5	Gb7	Léo	Nando
6	Gb2	Bieha	Nando
7	Gb4	Réo	Nando
8	Gb6	Tiebéllé	Nazinon

2.3 Methods

2.3.1 Experimental Setup

A randomised Fisher block design with four replicates was used. The spacing was 1 m between elementary plots and 1.5 m between blocks. Rows were spaced 0.8 m apart, with 0.5 m between planting holes. Each plot consisted of two rows, each 4.5 m long and 0.8 m wide. One seedling was transplanted per hole. Each row comprised 10 seedlings, giving a total of 20 seedlings per plot. The total trial area was 301.5 m².

2.3.2 Setting up the Nursery

The nursery was established on 5 July 2024. A bed was prepared by levelling and loosening the soil. The seeds were sown in marked furrows and covered with a thin layer of soil. Burkina phosphate was applied in the nursery to fertilise the seedlings. The nursery bed was covered with straw. Emergence was observed 5 days after sowing. The straw was raised to form a cover approximately 50 cm above the ground to protect the young shoots. NPK fertiliser (14-23-14) was applied at a rate of 100 kg/ha to support healthy seedling development.

2.3.3 Soil Preparation and Transplanting

Soil preparation consisted of flat ploughing, followed by levelling and raking. Transplanting took place 15 days after the nursery was established. Seedlings at the 3–4-leaf stage were selected for transplanting. The seedlings were transplanted at a rate of one seedling per hole, with 0.5 m between holes and 0.8 m between rows.

2.3.4 Maintenance and Pest Control

NPK mineral fertiliser (14-23-14) was applied at 14 and 28 days after transplanting (DAT). A third fertiliser application was made at the flowering stage and consisted of a mixture of NPK and urea applied at a rate of 100 kg/ha. The first weeding was carried out at 14 DAT and the second at 28 DAT.

The first crop-protection treatment was applied at 18 DAT using THALIS 56 EC (emamectin benzoate + acetamiprid). The second pesticide treatment was applied 40 days after sowing using IDEFIX (copper hydroxide). A third treatment was applied 52 days after sowing using BENJI (acetamiprid, 250 g/L).

2.3.5 Data Collection

Data were collected for 23 characteristics, comprising six qualitative and 17 quantitative traits.

2.3.5.1 Qualitative Characters

A total of six qualitative traits were recorded. Plant growth habit (SPP) was determined by visually observing the plants' growth habits at 30 days after transplanting (DAT). Stem colour (CS) was determined by visual observation of the plants in each subplot at 60 DAT. Flower colour (CFlo) was determined by visual observation of the plants in each trial plot when the flowers were fully open, at 30 DAT. Fruit colour (CFr) was determined by visual observation of the plants in each trial plot at harvest.

2.3.5.2 Quantitative Characters

Quantitative data were recorded for seven plants per basic plot, selected at random, comprising three plants in the first row and four plants in the second row. A total of 17 quantitative traits were measured. Collar diameter (CoD) was measured at the plant collar using a vernier calliper. Leaf blade length (LL) was measured using a graduated ruler. Leaf blade diameter (LD) was measured using a graduated ruler. The number of branches per plant (NBr) was determined by counting the branches on each plant. Leaf weight per plant (LW) was obtained by weighing the leaves using an electronic balance. The number of leaves per plant at 60 days after sowing (NL60) was determined by counting the leaves on each plant. Plant height at 60 days after sowing (HP60) was measured from the collar to the top of the plant (the uppermost leaf) using a graduated ruler. The number of days to first flowering (DFFlo) was determined upon the appearance of the first flower in each plot. Flower length (LFlo) was measured using a graduated ruler. Flower diameter (DFlo) was measured using a graduated ruler. The date of 50% flowering (D50Flo) was determined by counting the number of days after sowing at which 50% of the plants in the plot had flowered. The number of fruits per plant (NFrP) was obtained by counting the fruits on each plant. Fruit diameter (DFr) was measured using a vernier calliper. Fruit height (HFr) was measured using a vernier calliper. The date of the first fruit harvest (DFrH) was determined by counting the number of days after sowing until the first fruit harvest in each experimental plot. Fruit yield (FrYield) and leaf yield (LYield) were expressed in kg/ha.

2.4 Data Analysis

The collected data were entered into Excel 2019. The qualitative traits were classified according to the observed variability and analysed to determine their frequencies. The quantitative traits were subjected to descriptive analysis and analysis of variance (ANOVA) at the 5% significance level to determine variation among cultivars for the recorded traits and the mean performance of the cultivars. Associations among the quantitative traits were estimated using Pearson's correlation test. Tukey's HSD test was used to distinguish among cultivars. R software version 4.5.2 was used for all quantitative data analyses.

3. Results and Discussion

3.1 Results

3.1.1 Variation in Qualitative Characters

The observations showed variability among the qualitative traits. Stem colour, flower colour, and fruit colour exhibited high variability. Plant growth habit, leaf blade shape, and fruit shape each exhibited a single form. All cultivars had an upright growth habit (100%), leaves with wavy margins (100%), and round fruits (100%) (Fig. 3).

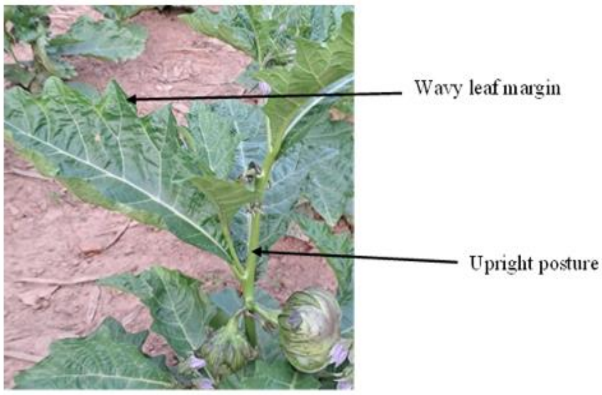

Fig. 3. Port and starboard sides of the blade

- Colour of the stem

Two stem-colour variants were observed: green (75 %) and purple (25 %) (Fig. 4).

Fig. 4. Stem colour *((a): green stem, (b): purple stem)*

- Flower colour

Four flower-colour variants were observed: violet with bluish streaks (37.5 per cent), bluish violet (37.5 per cent), pale violet (12.5 per cent), and white (12.5 per cent) (Fig. 5).

Fig. 5. Flower colour ((a): *purple flower with bluish stripes*, (b): *bluish-purple flower,* (c): *pale purple flower,* (d): *white flower*)

- Colour of the fruit

Four fruit-colour categories were observed: dark green (12.5%), green (50%), purple (12.5%), and white (25%) (Fig. 6).

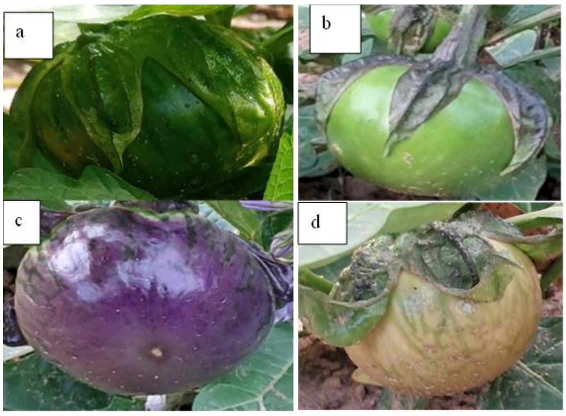

Fig. 6. Fruit colour ((a): *dark green fruit,* (b): *green fruit,* (c): *purple fruit,* (d): *white fruit*)

3.1.2 Variation in Quantitative Characters

The descriptive analysis revealed high coefficients of variation (>20%) for nine traits. Plant height at 60 days after transplanting ranged from 21.93 to 53.29 cm, with a mean of 38 cm. Collar diameter ranged from 0.35 to 1.1 cm, with a mean of 0.82 cm (Table 2). The number of days to 50% flowering ranged from 50 to 64 days after transplanting, with a mean of 56.34 days. The number of fruits per plant ranged from 1.29 to 5.43, with a mean of 2.67. Leaf yield ranged from 583.33 to 9,500.00 kg/ha, with a mean of 3,965.28 kg/ha. Fruit yield ranged from 2,416.67 to 14,027.78 kg/ha, with a mean of 8,355.03 kg/ha.

Table 2. Average performance of cultivars

Variables	Minimum	Maximum	Mean	CV (%)	P-value
HP60	21.93	53.29	38.00	19.63	0.0296 *
CoD	0.35	1.11	0.82	23.76	0.416
LL	12.36	34.39	21.71	24.06	4.6e-06 ***
LD	8.50	22.90	13.98	22.92	7.31e-05 ***
NL60	4.92	68.71	37.88	36.60	0.439
NBr	5.29	14.43	8.17	26.77	0.199
LW	0.21	3.42	1.43	54.36	0.0235 *
DFFlo	42.00	50.00	44.50	5.71	<2e-16 ***
D50Flo	50.00	64.00	56.34	7.09	0.00593 **

Variables	Minimum	Maximum	Mean	CV (%)	P-value
LFlo	3.21	4.78	3.79	10.27	0.119
DFlo	2.14	3.43	2.77	12.14	0.181
NFrP	1.29	5.43	2.67	38.93	0.9343
HFr	2.82	7.18	4.86	18.14	0.000214 ***
DFr	4.19	8.63	6.00	18.03	1.16e-07 ***
DFrH	70.00	89.00	76.88	6.59	5.9e-09 ***
LYield	583.33	9500.00	3965.28	54.36	0.0235 *
FrYield	2416.67	14027.78	8355.03	38.11	0.342

Legend : HP60: plant height, CoD: collar diameter, LL: lamina length, NL60: number of leaves, LFlo: flower length, DFlo: flower diameter, NBr : Number of branches, LW: leaf weight, LYield: leaf yield, NFrP: number of fruits, WFrP: fruit weight, FrYield: fruit yield, HFr : fruit height, DFr: fruit diameter; DFFlo : Day of first flower, D50Flo : Day of 50% flowering, DFrH: Day of first fruit harvest, CV: Coefficient of Variation

3.1.3 Association between Quantitative Characters

The correlation analysis revealed several strong and significant associations among the quantitative traits studied (Fig. 7). Stem-base diameter was strongly and positively correlated (r = 0.61) with average fruit weight. Fruit diameter was strongly and positively correlated (r = 0.65) with plant height at 60 days after transplanting. Fruit yield was strongly and positively correlated (r = 0.67) with the number of fruits per plant. The number of days to 50% flowering was significantly and negatively correlated (r = −0.43) with the number of fruits per plant. The number of days to 50% flowering was also significantly and negatively correlated (r = −0.46) with the number of inflorescences.

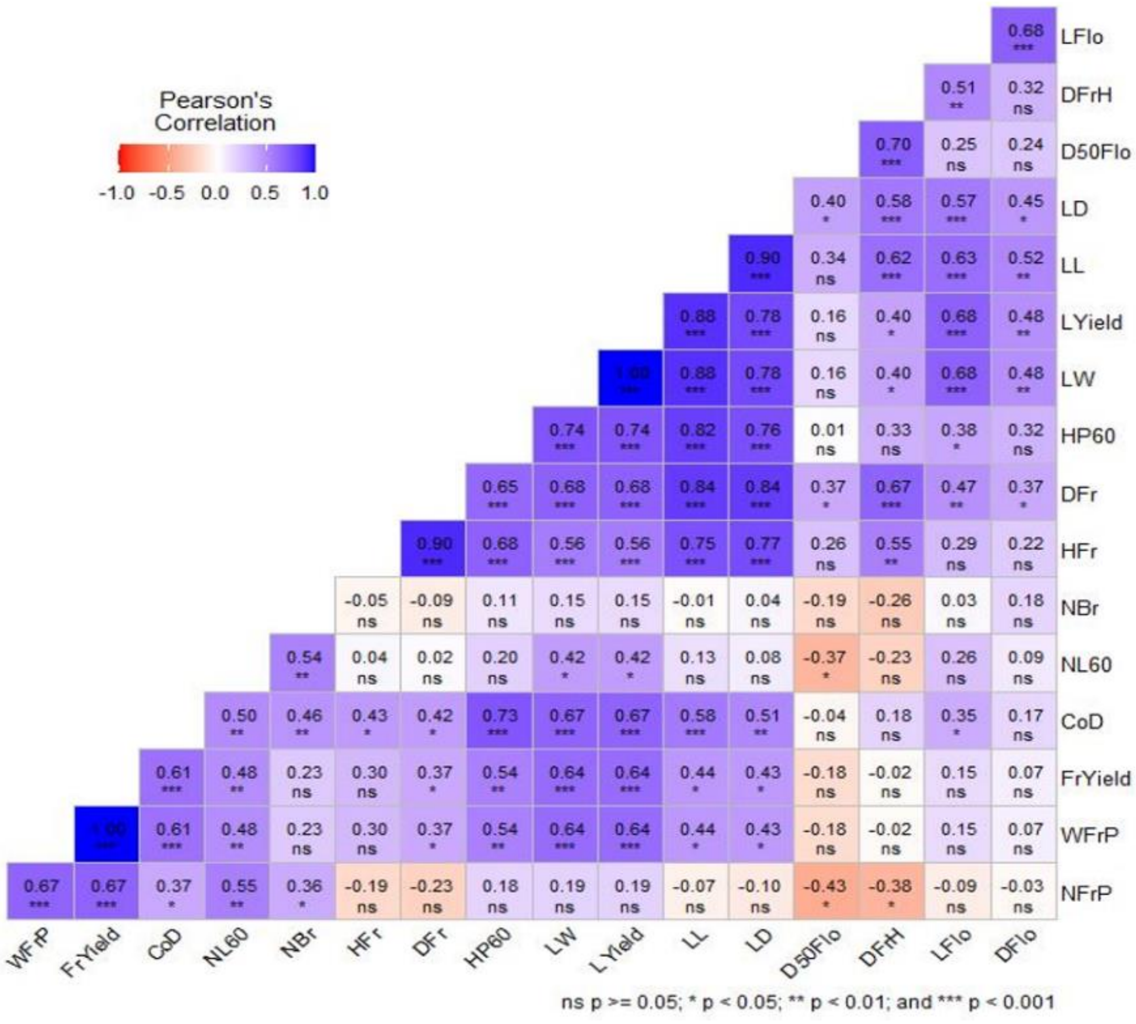

Fig. 7. Associations between quantitative characters

3.1.4 Principal Component Analysis

The first two principal component axes accounted for 80.9% of the total variance (Fig. 8). The F1 axis accounted for 58.9% of the total inertia, and the F2 axis accounted for 22%.

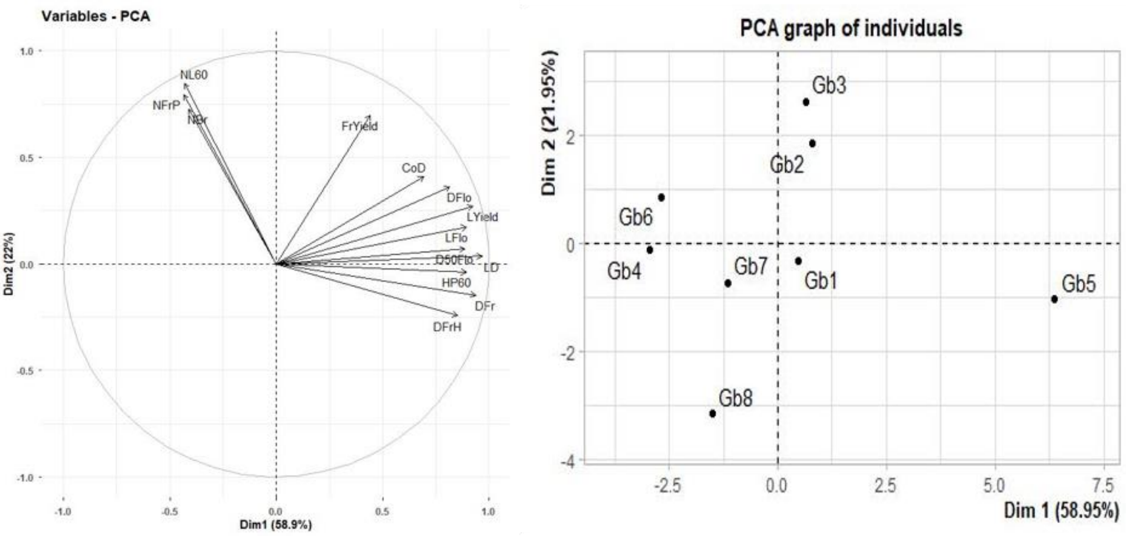

Fig. 8. Results of the principal component analysis of quantitative variables

3.1.5 Average Performance of the Cultivars Studied for Morphological Traits

The comparison of means shown in Table 3 illustrates cultivar performance for the morphological traits. Performance varied among cultivars. Three of the six morphological traits distinguished the cultivars: leaf blade diameter, plant height at 60 days after sowing, and leaf blade length. For plant height at 60 days after sowing, cultivar Gb6 recorded the lowest value (31.16 cm), whereas cultivar Gb5 recorded the highest value (46.94 cm). For leaf blade length, the lowest value (16.47 cm) was recorded for cultivar Gb4, and the highest value (31.14 cm) was recorded for cultivar Gb5.

Table 3. Comparison of cultivar performance for morphological characters

Cultivars	CoD	LD	HP60	LL	NL60	NBr
Gb3	0.83	14.51bc	37.85ab	23.40b	44.43	9.75
Gb5	0.94	19.76a	46.94a	31.14a	28.33	7.10
Gb2	0.89	15.31b	40.83ab	22.36bc	40.93	7.75
Gb1	0.82	14.57bc	39.28ab	23.54b	40.11	7.53
Gb8	0.66	12.54bcd	34.94b	18.45cd	26.81	6.50
Gb7	0.86	11.82cd	41.08ab	21.68bc	36.69	7.57
Gb4	0.67	12.44bcd	31.91b	16.47d	39.61	9.21
Gb6	0.83	10.83d	31.16b	16.56d	46.11	9.92

Legend : HP60: plant height, CoD: collar diameter, LL: lamina length, NL60: number of leaves, NBr : Number of branches, LD: lamina diameter

Table 4. Performance of cultivars for yield-related variables

Cultivars	**D50Flo**	**DFFlo**	**LYield**	**HFr**	**DFr**	**DFrH**	**LW**	**NFrP**	**WFrP**	**FrYield**
Gb3	55.50b	44c	5291.6ab	5.04bc	6.13bc	74.5b	1.90ab	3.17	3.71	10312.50
Gb5	63.00a	50a	6437.50a	6.34a	8.19a	89.0a	2.31a	1.78	3.14	8736.11
Gb2	58.50ab	43d	4534.72abc	4.77bcd	5.84bcd	74.5b	1.63abc	3.60	3.76	10458.33
Gb1	55.50b	47b	4743.05abc	5.38b	6.56b	76.0b	1.70abc	2.10	3.35	9312.50
Gb8	54.50b	44c	2590.27bc	4.66bcd	5.72cd	74.5b	0.93bc	2.07	2.14	5958.33
Gb7	53.50b	43d	3555.55abc	4.40cd	5.20de	76.0b	1.28abc	2.67	2.58	7187.50
Gb4	54.50b	42e	2138.88c	4.42cd	5.52cde	74.5b	0.77c	2.92	3.05	8493.05
Gb6	55.75b	43d	2430.55bc	3.86d	4.83e	76.0b	0.87bc	3.03	2.29	6381.94

Legend: DFlo: flower diameter, LW: leaf weight, LYield: leaf yield, NFrP: number of fruits, WFrP: fruit weight, FrYield: fruit yield, HFr: fruit height, DFr: fruit diameter; DFFlo: Day of first flower, D50Flo: Day of 50% flowering, DFrH: Day of first fruit harvest

3.1.6 Comparison of Cultivars Based on Yield Performance

The test of differences among cultivar means for yield-related traits revealed differences in performance for the date of first flower appearance, number of days to 50% flowering, leaf yield, fruit height, fruit diameter, date of first harvest, and average leaf weight per plant (Table 4). Cultivar Gb7 reached 50% flowering earlier (53.50 days after sowing) than the other cultivars, whereas cultivar Gb5 reached this stage later (63.00 days). For fruit diameter, cultivar Gb6 had the smallest fruits (4.83 cm), whereas cultivar Gb5 recorded the largest fruit diameter (8.19 cm). Cultivar Gb8 had the lowest fruit yield (5,958.33 kg/ha), whereas cultivar Gb2 had the highest fruit yield (10,458.33 kg/ha).

4. Discussion

The assessment of morphological and agronomic characteristics revealed variability among the cultivars for both qualitative and quantitative traits. Plant growth habit and leaf blade shape each exhibited a single modality. This homogeneity in these two traits suggests that the cultivars belong to the same morphotype. These results differ from those of Osei et al. (2010) and Chinedu et al. (2011), who found diversity in fruit and leaf blade shape. This difference may be explained by the number of cultivars studied, as those authors examined a larger number of *Solanum macrocarpon* cultivars. The observed morphological diversity may also be explained by agroclimatic conditions and farmers' practices for managing and conserving this plant genetic resource. High variability was observed among the cultivars in flower, fruit, and stem colour. This diversity may be attributable to genotypic differences among the cultivars.

These findings corroborate those of Nyadanu et al. (2014) in Ghana and N'Gbesso et al. (2016) in Côte d'Ivoire. Nyadanu et al. (2014) reported that adaptation to local climatic conditions and farmers' selection of traits of interest over time appeared to have led to differentiation among eggplant cultivars, resulting in substantial morphological variability among plants.

The analysis of quantitative variables showed significant differences among cultivars. The ranges between minimum and maximum values, together with the high coefficients of variation for most traits, indicated substantial morphological variability among cultivars. Plant height and leaf blade diameter and length are important distinguishing agro-morphological traits that enable local eggplant cultivars to be differentiated. These results are similar to those of Nyadanu et al. (2014), Bationo-Kando et al. (2015), and Sawadogo et al. (2016), who reported agro-morphological variability within African eggplant accessions.

The strong and significant positive correlations observed between stem-collar diameter and average fruit weight, between fruit diameter and plant height at 60 days after transplanting, and between fruit yield and the number of fruits per plant show that these traits vary in the same direction; that is, an increase in one is associated with an increase in the other. This finding suggests that cultivars exhibiting high vigour in terms of plant size, stem diameter, and leaf blade dimensions produce large fruits. These results corroborate those of Bationo-Kando et al. (2015) and Sawadogo et al. (2016) for *Solanum aethiopicum* L. of the Kumba group in Burkina Faso. Furthermore, the number of days to 50% flowering was significantly and negatively correlated with the number of fruits per plant and the number of inflorescences. These correlations indicate that the traits vary in opposite directions. The study enabled the identification of cultivars suitable for leaf and fruit production. For leaf blade length, the highest value (31.14 cm) was recorded for cultivar Gb5.

For the growth cycle, cultivar Gb7 reached 50% flowering earliest, at 53.50 days after sowing. In terms of fruit size, cultivar Gb5 produced the largest fruits (8.19 cm in diameter). Cultivar Gb5 also showed good leaf-yield potential, at 6,437.50 kg/ha. Cultivar Gb2 achieved the highest fruit yield (10,458.33 kg/ha). Overall, cultivar Gb5 showed relatively high productivity for both leaves (6,437.50 kg/ha) and fruits (8,736.11 kg/ha) and could therefore be considered a dual-purpose cultivar.

5. Conclusion

The evaluation of eight Gboma eggplant cultivars revealed appreciable variation in qualitative and quantitative traits under the North-Sudanian conditions of Burkina Faso. Stem, flower, and fruit colour differentiated the cultivars, whereas growth habit, leaf margin, and fruit shape were comparatively uniform. Cultivar Gb7 reached 50% flowering earliest, at 53.50 days after sowing. Cultivar Gb5 recorded the greatest leaf blade length, the largest fruit diameter, and the highest leaf yield, while cultivar Gb2 achieved the highest fruit yield. The positive associations between fruit yield and the number of fruits per plant, fruit diameter and plant height, and collar diameter and average fruit weight indicate potentially useful relationships among the evaluated traits. These results identify Gb5 as a possible dual-purpose cultivar for leaf and fruit production and Gb2 as a promising cultivar for fruit yield. However, these findings are specific to the conditions and season evaluated. Further assessment across sites and growing seasons is necessary to establish performance stability and support their use in breeding or production programs.

6. Limitations

The study was conducted during a single growing season at one site, with four replicates. Consequently, the consistency of cultivar performance across environments could not be assessed. Evaluations over several growing seasons and at multiple sites are therefore required before the cultivars are incorporated into a breeding programme.

Declaration of AI Use

This manuscript was prepared through the combined contributions of all author(s), including contributions to the study design, data, content development, results, interpretation, and related scholarly work. The author(s) acknowledge the use of Grammarly and

ChatGPT to assist with grammar checking, language refinement, and reference formatting. These AI-assisted tools were not used as authors and did not replace the intellectual contributions or scholarly judgement of the author(s). All AI-assisted outputs, including content, references, and interpretations, were carefully reviewed, revised, verified, and approved by the author(s). The author(s) accept full responsibility for the accuracy, integrity, and final content of the manuscript.

Competing Interests

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Abdulkareem, K. A., Bello, A., Abdul, N., Sidiq, K. O., Olayinka, B. U., Kareem, I., Danzaki, M. M., & Mustapha, O. T. (2024). Phylogenetic analysis of *Solanum macrocarpon*: The evolutionary relationships and species diversification. *Journal of Plant Molecular Breeding, 12*(1), 28–36. https://doi.org/10.22058/JPMB.2024.2031457.1301

Adeniji, O. T., Kusolwa, P. M., & Reuben, S. W. O. M. (2018). Genetic diversity based on agronomic and fruit quality traits in gboma eggplant (*Solanum macrocarpon* L.). *Bangladesh Journal of Agricultural Research, 43*(1), 25–38. https://doi.org/10.3329/bjar.v43i1.36156

Bationo-Kando, P., Sawadogo, B., Nanéma, K. R., Kiébré, Z., Sawadogo, N., Kiébré, M., Traoré, R. E., Sawadogo, M., & Zongo, J. D. (2015). Characterization of *Solanum aethiopicum* (Kumba group) in Burkina Faso. *International Journal of Science and Nature, 6*(2), 169–176. https://progres.ujkz.gov.bf/publications/2501/details

Chinedu, S. N., Olasumbo, A. C., Eboji, O. K., Emiloju, O. C., Arinola, O. K., & Dania, D. I. (2011). Proximate and phytochemical analyses of *Solanum aethiopicum* L. and *Solanum macrocarpon* L. fruits. *Research Journal of Chemical Sciences, 1*(3), 63–71. https://www.isca.me/rjcs/Archives/v1/i3/09.php

Coulibaly, N. D., Fondio, L., & N'Gbesso, M. F. D. P. (2021). Évaluation des performances agromorphologiques de neuf cultivars d'aubergine en station au Centre de la Côte d'Ivoire. *Afrique Science, 18*(1), 1–11. https://www.afriquescience.net/article.php?code=Vol.18%2C+N%C2%B01+%282021%29&id=1&nid=539

Dansi, A., Adjatin, A., Adoukonou-Sagbadja, H., Faladé, V., Yedomonhan, H., Odou, D., & Dossou, B. (2008). Traditional leafy vegetables and their use in the Benin Republic. *Genetic Resources and Crop Evolution, 55*, 1239–1256. https://doi.org/10.1007/s10722-008-9324-z

Hilgenhof, R., Gagnon, E., Knapp, S., Aubriot, X., Tepe, E. J., Bohs, L., Giacomin, L. L., Gouvêa, Y. F., Martine, C. T., Orejuela, A., Orozco, C. I., Peralta, I. E., & Särkinen, T. (2023). Morphological trait evolution in *Solanum* (Solanaceae): Evolutionary lability of key taxonomic characters. *Taxon, 72*(4), 811–847. https://doi.org/10.1002/tax.12990

Kégbé, A. M., Salako, K. V., Enagnon Lokonon, B., Mensah, S., Noba, K., & Assogbadjo, A. E. (2025). A comparative study of morpho-physiological responses of wild and cultivated *Solanum* species to water stress: The case of *S. sisymbriifolium* and *S. macrocarpon*. *Genetic Resources and Crop Evolution, 72*(2), 2249–2263. https://doi.org/10.1007/s10722-024-02095-z

Komlaga, G., Sam, G. H., Dickson, R. A., Mensah, M. L. K., & Fleischer, T. C. (2014). Pharmacognostic studies and antioxidant properties of the leaves of *Solanum macrocarpon*. *Journal of Pharmaceutical Sciences and Research, 6*(1), 1–4.

Kumar, T., Quaiyum, Z., Ranjan, T., Singh, R. S., Pal, A. K., Kumar, B., Akhtar, S., Rajani, K., Krishna, B., & Kumar, R. R. (2025). SSR markers mediated diversity analysis of brinjal (*Solanum melongena* L.). *Plant Cell Biotechnology and Molecular Biology, 26*(7–8), 255–265. https://doi.org/10.56557/pcbmb/2025/v26i7-89461

Kwarteng, A. O., Amoah, R. A., Nyadanu, D., Nyam, C. K., Ziyaaba, J. Z., Abogoom, J., Aziz, A., Anokye, K. D., Dufie, M., Boakye, M. O., & Danso, E. O. (2018). Core collection of two important indigenous vegetables; gboma eggplant (*Solanum macrocarpon* L.) and jute mallow (*Corchorus olitorius* L.) in Africa: An important step for exploitation of existing germplasm and development of improved cultivars. *Australian Journal of Crop Science, 12*(9), 1398–1409. https://doi.org/10.21475/ajcs.18.12.09.PNE993

N'Gbesso, M. F. D. P., Kouassi, A., Fondio, L., & Djidji, A. H. (2016). Étude de la diversité intra et interspécifique des caractères phénotypiques chez deux espèces d'aubergines africaines: *Solanum macrocarpon* (L.) et *Solanum dasyphyllum* (L.). *International Journal of Biological and Chemical Sciences, 10*(4), 1793–1804. https://doi.org/10.4314/ijbcs.v10i4.28

Nyadanu, D., & Lowor, S. T. (2015). Promoting competitiveness of neglected and underutilized crop species: Comparative analysis of nutritional composition of indigenous and exotic leafy and fruit vegetables in Ghana. *Genetic Resources and Crop Evolution, 62*(1), 131–140. https://doi.org/10.1007/s10722-014-0162-x

Nyadanu, D., Aboagye, L. M., Akromah, R., Osei, M. K., & Dordoe, M. B. (2014). Agromorphological characterisation of gboma eggplant, an indigenous fruit and leafy vegetable in Ghana. *African Crop Science Journal, 22*(4), 281–289. https://www.ajol.info/index.php/acsj/article/view/110423

Osei, M. K., Banful, B., Osei, C. K., & Oluoch, M. O. (2010). Characterization of African eggplant for morphological characteristics. *Journal of Agricultural Science and Technology, 4*(3), 33–37. https://worldveg.tind.io/record/2379

Oseni, K., & Babatunde, O. (2015). Underutilized indigenous vegetable (UIV) in Nigeria: A rich source of nutrient and antioxidants—A review. *Annals. Food Science and Technology, 16*(2), 236–247. https://afst.valahia.ro/wp-content/uploads/2022/09/s01_w01_full_2015-1.pdf

Saka, M., Ahoton, L. E., Ezin, V., Quenum, F., & Ayena, M. (2017). Agro-morphological assessment of local cultivars of nightshade (*Solanum macrocarpon* L.) in Benin. *Journal of Experimental Agriculture International, 15*(3), 1–14. https://doi.org/10.9734/JEAI/2017/30415

Sawadogo, B., Bationo-Kando, P., Sawadogo, N., Kiébré, Z., Kiébré, M., Nanéma, K. R., Traoré, R. E., Sawadogo, M., & Zongo, J. D. (2016). Variation, correlation and heritability of interest characters for selection of African eggplant. *African Crop Science Journal, 24*(2), 213–221. https://doi.org/10.4314/acsj.v24i2.9

Sossou, B. E., Ayenan, M. A. T., Schafleitner, R., Sikirou, R., & Achigan-Dako, E. G. (2024). Breeding for resistance to bacterial wilt in Solanaceae crops: Lessons learned and ways forward for gboma eggplant (*Solanum macrocarpon* L.), a traditional African vegetable. *Euphytica, 220*, Article 153. https://doi.org/10.1007/s10681-024-03393-4

Zhang, Y. J., Gan, R. Y., Li, S., Zhou, Y., Li, A. N., Xu, D. P., & Li, H. B. (2015). Antioxidant phytochemicals for the prevention and treatment of chronic diseases. *Molecules, 20*(12), 21138–21156. https://doi.org/10.3390/molecules201219753

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