

Performance of advanced bottle gourd lines under Bangladesh condition

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Abstract

The study was conducted at the experimental field of Olericulture Division, Horticulture Research Centre, Bangladesh Agricultural Research Institute, Gazipur, Bangladesh, during winter season of 2017-18. Four advanced lines (viz., LS138B4, LS139A1, LS146A1 and LS151C, with two checks; BARI Lau-3 and BARI Lau-4) of bottle gourd were included in the study to select superior lines with higher yield and better quality. The lines varied significantly ($P < 0.05$) for their response to fruit number per plant, average individual fruit weight, fruit yield, fruit length, fruit diameter and fruit yield. The line LS151C showed the earliest fruiting at 89.39 days as well as the maximum number of fruits per plant (12.55). The ranges of fruit length and fruit diameter were 22.23 cm (with LS146A1) - 40.10 cm (with LS151C) and 10.59 cm (with LS138B4) - 17.29 cm (with LS146A1), respectively. The maximum fruit yield was recorded in the line LS151C (47.86 t/ha) which was followed by LS146A1 (36.26 t/ha) and LS138B4 (34.66 t/ha). Considering the earliness, yield potentiality and fruit color, two advanced lines viz., LS 151C, LS146A1 were found promising which may be selected for the regional yield trial.

Introduction

Bottle gourd [*Lagenaria siceraria* (Mol.) Stand.] is a popular winter vegetable in Bangladesh. It belongs to the family Cucurbitaceae. The cultivated species is commonly known as bottle gourd or white flowered gourd. The climatic condition of winter in Bangladesh favors better growth and yield of bottle gourd as hot and humid summer coupled with summer rainy season gives considerable yield. The average day temperature of 20-27°C with lower night temperature of 18-23°C is optimum for growth and fruiting.¹ Although it is commonly grown in winter in Bangladesh, due to advanced research initiatives its cultivation has also been extended in summer and rainy season throughout the country both commercially as well as in the homestead areas for family consumption. Significant variation of plant type, fruit type, fruit shape, fruit color is found among the genotypes.

At present the acreage and annual production of bottle gourd is 7,217 ha and 85,267 tons respectively in Bangladesh with an average yield of 11.81 tons per hectare,² which is very low compared to other countries. Several factors are responsible for this low yield. Presence of variability in a base population is very important for any improvement programme. Collection, conservation and maintenance of germplasm are important to develop new varieties.³ As part of bottle gourd breeding programme, a large number of germplasms were collected and evaluated in last four years. From those four advanced lines were selected which need to be evaluated this year using check(s). Therefore, the present study was undertaken to select superior lines for earliness, higher yields and attractive consumer preferences, fruit shape and colours of bottle gourd.

Materials and Methods

The experiment was conducted at the Olericulture Division of

Horticulture Research Centre, Bangladesh Agricultural Research Institute (BARI) during 2017-18 with four advanced lines of bottle gourd viz., LS138B4, LS139A1, LS146A1 and LS151C with two checks; BARI Lau-3 and BARI Lau-4. The experimental field located at 23.9920° N Latitude and 90.4125° E Longitudes having an elevation of 8.2 m from sea level. The seeds of these germplasms were sown on the seedbed on October 5th, 2017. Twenty days old seedlings were transplanted in the main field on 25th October, 2017. The experiment was laid out in a Randomized Complete Block design with three replications. The unit plot size was 10.0 x 2.0m maintaining 2.0 x 2.5m spacing between two adjacent block and 0.5m drain between two adjacent plots. The land was fertilized with cow dung, N, P, K, S, B and Zn @ 10000, 80, 45, 88, 25, 1.8 and 4.5 kg/ha, respectively (bari.gov.bd). Half of the cow dung and all of S, Zn and B; 30 kg/ha each of P and K @ were applied during final land preparation. Rest of cow dung and 15 kg/ha each of P and K @ was applied as basal in pit. Rest of N and K was applied from 20 days after transplanting in 4 equal installments at 20 days interval. The intercultural operations (weeding and irrigation etc.) were done as and when were necessary. Data on days to first harvest, fruit number/ plant, average fruit weight (kg), fruit yield (kg/plant), fruit length (cm), fruit diameter (cm), fruit yield (t/ha), fruit shape and fruit color were recorded from three randomly selected plants per plot. Means for each quantitative characters were used for the statistical analysis using MSTAT C software.

Results and Discussion

The result of yield and yield contributing characters of bottle gourd lines are presented in Table 1 and Figure 1. The tested lines varied significantly ($P < 0.05$) for days to 1st harvest, number of fruit/plant, average fruit wt. (kg), fruit length (cm), fruit diameter (cm) and fruit yield (t/ha) showing significant differences for all the parameters. The

line LS151C produced fruits at the earliest with 89.39 days followed by LS146A1 (95.17 days) and LS139A1 (91.89 days); while the late harvestable line was BARI Lau-3 (102.67 days). The maximum number of fruit/plant was harvested from the line LS151C (12.55) which was followed by the line LS146A1 (10.05) with minimum from the line BARI Lau-3 (7.14). In case of the average fruit weight, statistically identical but significantly heavier fruits were obtained by

the line/check BARI Lau-4 (2.11 kg), LS138B (2.10 kg), LS139A1 (2.10 kg) and BARI Lau-3 (2.10 kg) than from LS146A1 which produced the lightest fruits (1.81 kg). The fruit length was 22.23 cm with LS146A1 and 40.10 cm with LS151C). The line LS146A1 had the thickest fruit having 17.29 cm diameter while others had identical fruit diameter ranging from 10.59 to 12.01 cm (Table 1).

Table 1 Yield and yield contributing characters of six bottle gourd lines/ varieties

Treatment	Days to 1 st Harvest	Fruits number/ plant	Average fruit weight. (kg)	Fruit yield (kg/plant)	Fruit length (cm)	Fruit Diameter (cm)
LS138B4	101.17 ab	8.27 bc	2.10 a	17.33 b	35.30 b	10.59 b
LS139A1	91.89 cd	8.04 c	2.10 a	16.93 bc	26.26 c	12.01 b
LS146A1	95.17 b-d	10.05 b	1.81 b	18.13 b	22.23 d	17.29 a
LS151C	89.39 d	12.55 a	1.95 ab	23.93 a	40.10 a	10.67 b
BARI Lau-3	102.67 a	7.14 c	2.10 a	14.96 c	34.10 b	11.89 b
BARI Lau-4	97.14 a-c	8.09 c	2.11 a	17.00 bc	39.05 a	10.82 b
Level of significance	*	*	*	*	*	*
CV (%)	3.51	11.12	6.80	6.97	6.07	9.81

Table 2 Fruit shape and fruit color of 6 bottle gourd lines/ varieties

Lines/ variety	Fruit shape	Fruit color
LS138B4	Cylindrical	Deep green + white spot
LS139A1	Bottle	Light green
LS146A1	Balloon	Deep green + white spot
LS151C	Bottle	Deep green + white spot
BARI Lau-3	Bottle	Deep green + white spot
BARI Lau-4	Bottle	Deep green + white spot

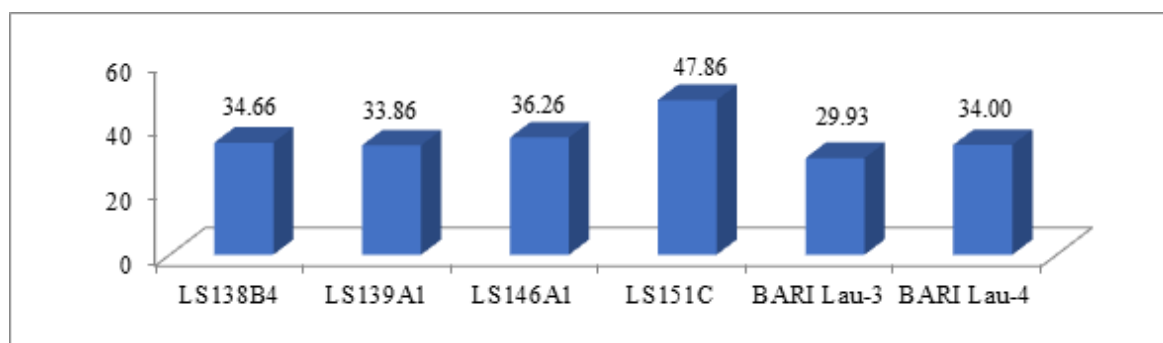


Figure 1 Fruit yield (t/ha) of 6 bottle gourd lines/ variety

The maximum fruit yield (t/ha) was recorded in the line LS151C (47.86 t/ha) which was followed by LS146A1 (36.26 t/ha) and LS138B4 (34.66 t/ha); while the minimum was in BARI Lau-3 (29.93 t/ha) (Figure 1).

Fruit shape and fruit color of bottle gourd are very important characters to the consumer and that is much diversified in our country. That is why these characters were considered during the study. Table 2 shows that there were three types of fruit shape viz., LS138B4 had cylindrical shape; LS139A1, LS151C, BARI Lau-3 and BARI Lau-4 had bottle shape and LS146A1 had balloon shaped. Two colors were visible among the lines or checks such as LS138B4 had light green color and others were deep green with white spots.

Conclusion

Considering earliness, yield potentiality, fruit color, acceptable fruit shape (bottle) two advanced lines viz., LS 151C, LS146A1 were found promising which may be selected for the regional yield trials.

References

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