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RESEARCH ARTICLE

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Performance of Bottle Gourd Lines in Bangladesh Condition

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ABSTRACT

Eleven advanced lines of bottle gourd were evaluated at the Olericulture Division, Bangladesh Research Center, Gazipur, Bangladesh during 2015-2016 for selecting the superior lines in terms of higher yield and better quality. The lines varied significantly (P<0.05) for fruit number per plant, average fruit weight, fruit yield per plant ,plant, fruit length ,length, fruit diameter and diameter and fruit yield (t/ha). The line LS151C produced the earliest fruiting (71.67 days) and maximum number of fruits per plant (12.25). The range of fruit length was 23.00 cm (LS146A1) to 43.67 cm (BARI Lau 4), while fruit diameter ranged from 10.87 cm (LS148-5) to 15.00 cm (LS139A5). The maximum fruit yield (t/ha) was recorded in the line LS151C (48.00 t/ha) which was statistically similar with LS146A1 (46.34 t/ha), LS139A1 (46.00 t/ha), LS137A5 (45.08 t/ha), LS133A4 (41.72 t/ha). Considering earliness, high yield, fruit color and acceptable fruit size and shape, out of 11, the four advanced lines, i.e., LS151C, LS146A1, LS139A1, LS137A5 were found promising.

Keywords: Dimorphic fungus, Emerging mycosis, Narayan stain, Public health, Sporotrichosis, Zoonotic potential

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 favours better growth and yield of bottle gourd. The average day temperature of 20-27°C with lower night temperature of 18-23°C is optimum for its growth and fruiting. Bottle gourd is widely cultivated throughout the country. Its cultivation and uses are wide in winter season. It is found to cultivate in commercial way in the field as well as homestead in rural Bangladesh. Significant variation of plant type, fruit type, fruit shape, fruit colour was found among the genotypes (Please give reference).

The national average yield of bottle gourd is only 9.38 tons/hectare [1] which is very low as compared to other bottle gourd producing countries (like India). Several factors are responsible for this low yield; those are lack of high yielding OP and hybrid variety, disease free variety, proper cultural management etc. Availability of the advanced lines in the country is missing, thus to develop a high yielding variety the germplasm collection programme should be strengthen. 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 as mentioned by Kallo [2]. As part of bottle gourd breeding programme, a large number of germplasm were collected and evaluated in last three years. From those findings 11 advanced lines were developed and need to be evaluated this year. So, the present study was undertaken to select superior lines with higher yield, better quality, and increase of seeds of the selected lines of bottle gourd.

MATERIALS AND METHODS

The experiment was conducted at the Olericulture Division of Horticulture Research Centre, Bangladesh Agricultural Research Institute (BARI) during the winter season of 2015-2016 with eleven advanced lines of bottle gourd and BARI Lau 3 and BARI Lau 4 as check. The seeds of these germplasm were sown on the polybag on 10 September 2015. Twenty days old seedlings were transplanted in to the field on 30 September 2015. The experiment was laid out

in a Randomized Complete Block design with 3 replications. The unit plot size was 10.0 × 2.0 m maintaining 2.0 × 2.5 m spacing and 0.5 m drain. 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. Half of cow dung, full doses of S, Zn and B, and P and K @ 30 kg/ha each was applied during final land preparation, however, the rest of cow dung and P and K @ 15 kg/ha was applied as basal in pit. Rest of N and K was applied after 20 days of transplanting in 4 equal installments at 20 days interval. Other operations (weeding and irrigation, etc.) were done as and when 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 colour were recorded from three randomly selected plants per plot. Plot means for 7 quantitative characters were used for the statistical analysis using MSTAT C software [3].

RESULTS AND DISCUSSION

Mean performances of growth parameters, yield and yield contributing characters of bottle gourd lines are presented in Table 1 and Figure 1.

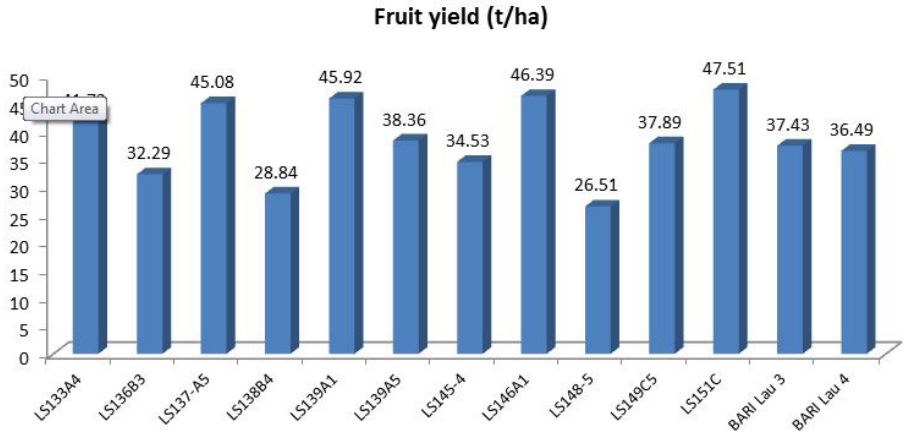

Figure 1: Fruit yield (t/ha) of 13 bottle gourd lines/varieties

The lines varied significantly (P<0.05) for fruit number per plant, average fruit weight (kg), fruit yield (kg/plant), fruit length (cm), fruit diameter (cm) and fruit yield (t/ha). The performance of 11 advanced lines with two check varieties of bottle gourd is presented in Table 1 and Figure 1. The lines showed significant differences for all the parameters. The line LS151C produced the earliest fruiting with 71.67 days followed by LS137A5 (81.67 days), LS137A5 (81.67 days), BARI Lau 3 (81.33 days), LS136B3 (83.00 days), LS138B4 (84.33 days), LS148-5 (84.67 days), while the delay harvested line was recorded for LS139A5 (92.67 days).

Table 1: Yield and yield contributing characters of 13 bottle gourd lines/varieties

Lines/variety	Days to first harvest	Fruit number/plant	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (kg)	Fruit yield (kg/ plant)
LS133A4	89.00 ab	10.73 ab	40.67 a-c	12.03 c-f	1.98 b	20.86 a-c
LS136B3	83.00 b	10.27 a-c	40.67 a-c	12.13 c-f	1.57 b	16.15 cde
LS137A5	81.67 b	11.20 a	40.33 a-c	12.93 b-e	2.03 ab	22.54 ab
LS138B4	84.33 ab	9.33 a-c	40.33 a-c	13.17 a-d	1.56 b	14.42 de
LS139A1	87.33 ab	12.10 a	41.67 ab	13.57 a-d	1.90 b	23.00 ab
LS139A5	92.67 a	9.80 a-c	27.33 e	15.00 a	1.98 b	19.18 a-d
LS145-4	87.67 ab	9.33 abc	38.33 b-d	11.83 d-f	1.92 b	17.27 c-e
LS146A1	88.33 ab	12.13 a	23.00 e	14.33 ab	1.91 b	23.17 ab
LS148-5	84.67 ab	7.00 c	36.67 cd	10.87 f	1.92 b	13.25 e
LS149C5	85.00 ab	7.47 bc	40.00 a-c	11.87 d-f	2.54 a	18.95 a-d
LS151C	71.67 c	12.25 a	38.00 b-d	11.13 ef	1.96 b	24.00 a
BARI Lau 3	81.33 b	10.73 ab	34.00 d	13.90 a-c	1.75 b	18.71 b-d
BARI Lau 4	85.33 ab	8.87 abc	43.67 a	13.80 a-c	2.06 ab	18.25 b-e
Sig. level	*	**	**	**	**	**
CV (%)	6.68	15.6	5.63	6.57	12.33	11.39

The fruit number per plant and average fruit weight are among the most important characters to choose a good line. Maximum fruit was harvested from the line LS151C (12.25) which was statistically similar to the lines LS146A1 (12.13), LS139A1 (12.10) and LS137A5 (11.20) and the minimum was from the line LS148-5 (7.00). In case of the average fruit weight, the heaviest fruits were obtained by LS149C5 (2.54 kg) which was statistically similar to the BARI Lau 4 (2.06 kg), LS137A5 (2.03 kg) followed by LS133A4 (1.98 kg), LS139A5 (1.98 kg). Similarly, the lightest fruits were harvested from LS138B4 (1.56 kg). The maximum fruit yield per plant was obtained by the line LS151C (24.00 kg) which was statistically similar and at per with the LS146A1 (23.17 kg), LS139A1 (23.00 kg), LS137A5 (22.54 kg) and minimum was from the line LS148-5 (13.25 kg).

Islam and Uddin [1] found that the fruits per plant was varied from 7.20-14.20. Kumar et al. [3] reported yield per plant of 20 bottle gourd genotypes was 1.77-9.61 kg. In the present study, the yield per plant ranged from 13.25-24.00 kg which was higher than the yield per plant of Islam and Uddin [1] and Kumar et al. [3], respectively. This higher yield might be due to either differences in genotypes or to the favourable climatic condition and better management of the experiment or both.

The range of fruit length was 23.00 cm (LS146A1) to 43.67 cm (BARI Lau 4). Among the lines, several lines had long fruit size (>40 cm) which including LS136B3 (40.67 cm), LS133A4 (40.67 cm), LS149C5 (40.00 cm), LS137A5 (40.33 cm), LS138B4 (40.33 cm) and LS139A1 (41.67 cm). In case of fruit diameter, there was a narrow variation among the lines and ranged from 10.87 cm (LS148-5) to 15.00 cm (LS139A5).

The maximum fruit yield (t/ha) was recorded in the line LS151C (48.00 t/ha) which was statistically similar with LS146A1 (46.34 t/ha), LS139A1 (46.00 t/ha), LS137A5 (45.08 t/ha), LS133A4 (41.72 t/ha), while the minimum in LS148-5 (26.51 t/ha).

Fruit shape and fruit colour of bottle gourd are very important characters from consumer point of view, and is quite diversified. That is why these characters were considered during the study. Four types of fruit shape were observed viz., cylindrical (3 lines), bottle (7 lines/varieties), bottle shaped with wider neck (2 lines) and balloon (1 line) while three types of colour viz., Light green (3 lines), green+white spot (I line) and deep green+white spot (9 lines/varieties) were observed.

CONCLUSION

Collection and evaluation is a part of conventional breeding programme. Continuing this programme several lines performed well among the eleven advance lines. Considering earliness, high yield, fruit color and acceptable fruit size, shape, 4 advanced lines (LS151C, LS146A1, LS139A1, LS137A5) were found promising and may selected for further advance trial prior to release a OP variety.

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