Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 4653-4655
Received: 25-03-2019
Accepted: 27-04-2019

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Evaluation of growth and yield characters in bottle gourd (*Lagenaria siceraria* (Mol.) Standl.)

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Abstract
Investigations were carried out at Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar. Twenty genotypes of bottle gourd collected from different districts of Tamil Nadu were evaluated during the year 2016-2017. These genotypes were used to assess the variability, heritability, genetic advance, relationship of yield components with yield and their interdependence, direct and indirect effects of yield attributes on yield per plant and genetic diversity. For this programme, morphological characters like vine length, days to first male flowering, days to first female flowering, node number of first male flower, node number of first female flower, days to first fruit harvest, fruit length, fruit girth, average fruit weight, number of fruits per vine, 100 seed weight and yield per vine were studied. Analysis of variance revealed that there were significant differences among the genotypes studied for all the characters except node number of first male flower. On the basis of mean performance, among 20 genotypes LS12 was identified as the best genotypes as it has recorded higher mean values for six out of twelve characters studied.

Keywords: Growth, yield, evaluation, bottle gourd

Introduction

Bottle gourd (*Lagenaria siceraria* (Mol) Standl) is one of the most important cucurbitaceous vegetable crop in India grown in both rainy and summer seasons. It belongs to the family cucurbitaceae having chromosome number 2n = 22. It is highly cross pollinated crop due to its monoecious and and romonoecious nature (Swiander *et al.*, 1999). It has been found in wild form in India and Southern Africa. Bottle gourd is a white flowered, monoecious, diploid self compatible, annual climbing or prostrate species in the cucurbitaceae. It is widely cultivated in tropics and subtropical region in India. The fruits are used as a vegetable, container, bowl, decoration, musical instrument or fishing floats. Seeds, tendrils, leave and immature fruits of the bottle gourds are also utilized for different purposes especially for some medicinal treatments. Bottle gourd is known to lower cholesterol, triglyceride, low density lipoproteins, pain and inflammation (Ghule *et al.*, 2006). Improvement in bottle gourd is being made by exploiting the available source of variability. In any crop improvement programme, germplasm serve as a valuable source of base population, which offers much scope for further improvement. The primary aim of the breeder is to evolve superior varieties from the available genotypes. Evolving superior genotypes would be effective, only when the existing variability in the chosen material is wide. Keeping in view the desire facts, the present investigation undertaken in bottle gourd to evaluate the growth and yield characters.

Materials and methods

The basic material for the study included 20 accessions of various genotypes of bottle gourd. They were grown in the experimental field of Vegetable Unit, Department of Horticulture, Faculty of Agriculture, Annamalai University. The experiment was laid out in Randomised Block Design with three replications. Pits of 60 cm diameter and 30 cm depth were taken at a spacing of 2 x 1.5 m. In each pit, four seeds were sown. Sowing was done in such a way that in each replication there was a single row of four plants per accession. The cultural and management practices were adopted according to the package of practices recommended by Tamilnadu Agricultural University. The observation were recorded on five randomly selected plants with respect to characters viz., vine length (cm), days to first male flowering, days to first female flowering, node number of first male flower, node number of first female flower, days to first fruit harvest, fruit length (cm), fruit girth (cm), average fruit weight (kg), number of fruits per vine, 100 seed weight (g) and yield per vine (kg). The mean value of five plants in each genotype and in each replication was subjected to statistical analysis of variance (Panse and Sukhatme, 1961) [8].

Results and discussion

The efficiency of any breeding programme mainly depends upon the choice of parents. While choosing the parents, high mean value was considered as the main criteria among the breeders for a long time. In that context, the mean performance of the 20 genotypes revealed that certain genotypes showed their superiority over others for different traits. The total of 10 genotypes showed that they were significantly less to the grand mean for the character days to first male flowering, similarly 12 genotypes for days to first female flowering, 13 genotypes for days to first fruit harvest, 9 genotypes were found to be significantly superior to the grand mean of vine length, likewise, 11 genotypes for node number of first male flower, 10 genotypes for node number of first female flower, 8 genotypes for fruit length, 8 genotypes for fruit girth, 7 genotypes for average fruit weight, 12 genotypes for number of fruits per vine, 10 genotypes for 100 seed weight and 12 genotypes recorded significantly higher values than the grand mean of fruit yield per vine (Table.1).

In a collection of genotypes, if certain types have superior performance than other for different traits, it is better to choose such of those superior genotypes for further breeding work. The top five ranking genotypes for each of twelve characters are summarised in Table.17. The genotypes LS12 registered longest vine length (720.82 cm) followed by LS6 (702.18 cm) and similarly the genotype LS 11 (47.54) recorded minimum value for days to first male flowering followed by LS3 (48.20). Hence, these genotypes may serve as ideal donors for the characters concerned. The genotype LS3 registered early days to first female flowering (54.38). The other genotype LS17, LS11, LS5 and LS12 also recorded minimum days to first female flowering. The genotype LS3 produced lowest node number of first male flowering (10.24) followed by LS10 (11.84). The genotype LS3 produced lowest node number of first female flower (14.72). The other genotypes are LS7, LS6, LS10 and LS2 also recorded lowest node number of first female flower indicating their fitness for selection of parents for improving this trait. Similarly for days to first fruit harvest, the genotype LS12, LS10, LS3, LS17 and LS13; for fruit length LS4, LS8, LS1, LS15 and LS9; for fruit girth LS15, LS16, LS8, LS4 and LS20; for average fruit weight LS4, LS8, LS15, LS16, LS7; for number of fruits per vine LS18, LS12, LS19, LS10, LS2 and LS20; for 100 seed weight LS15, LS8, LS16, LS4 and LS7; for yield per vine LS12, LS5, LS17, LS15 and LS8 are better parents in breeding programme. The genotype LS12 collected from Thiruvaiyaru significantly superior for *per se* performance for yield per vine. There was considerable variation in their morphological characters among the genotypes studied. Variation was due to fruit length and fruit girth (Table.2).

On comparing the statistics genotypes LS12 (6), LS15 (6), LS16 (5), LS3 (5), LS10 (5) and LS8 (5) recorded higher value for different traits (indicated in bracket).

Hence, these six genotypes can be utilized for evolving superior varieties and also possible to get desirable recombinants for yield and yield contributing traits, if these are used in hybridization programme. Similar differential performance in yield and yield attributes in ridge gourd was reported by Shivanand *et al*. (2016), yield and quality traits in bottle gourd by Damor *et al*. (2016) [1] and Deepthi *et al*. (2016) [3].

Table 1: Mean performance of bottle gourd genotypes for growth and yield characters

Genotypes	Vine length (cm)	Days to first male flowering	Days to first female flowering	Node number of first male flower	Node number of first female flower	Days to first fruit harvest
LS 1	582.56	52.36	60.36	12.42	21.96	77.80
LS 2	465.90	57.22	63.84	14.86	19.78	74.62
LS 3	663.82	48.20	54.38	10.24	14.72	68.92
LS 4	569.76	56.34	69.72	16.92	27.62	90.62
LS 5	575.64	49.16	55.14	12.04	21.08	70.28
LS 6	702.18	53.78	60.37	14.72	19.42	74.06
LS 7	519.20	51.74	59.68	12.96	16.50	78.14
LS 8	609.14	56.96	69.90	15.34	23.66	89.58
LS 9	636.37	52.72	59.72	12.98	24.02	74.36
LS 10	685.92	50.68	59.50	11.84	19.58	68.12
LS 11	541.15	47.54	54.96	17.79	28.90	72.74
LS 12	720.82	49.79	55.38	13.43	19.96	66.50
LS 13	596.08	54.06	60.74	14.76	21.72	70.26
LS 14	632.75	52.96	58.52	12.90	20.18	74.92
LS 15	682.68	57.60	68.06	18.32	30.20	92.84
LS 16	675.44	59.12	69.94	19.68	29.56	97.74
LS 17	561.62	49.64	54.86	16.12	24.76	69.96
LS 18	576.94	56.36	61.50	19.50	27.18	72.70
LS 19	592.86	59.10	64.72	17.96	25.74	77.08
LS 20	632.60	55.78	62.24	16.14	28.92	61.62
General mean	611.17	53.56	61.18	15.05	23.27	76.64
S.Ed.	3.75	1.99	1.89	1.55	1.18	2.04
CD (p=0.05)	7.53	4.00	3.79	3.11	2.38	4.10
CD (p=0.01)	10.04	5.33	5.05	4.15	3.17	5.47

Table 2: Mean performance of bottle gourd genotypes for growth and yield characters

Genotypes	Fruit length (cm)	Fruit girth (cm)	Average fruit weight (kg)	Number of fruits per vine	100 seed weight (g)	Yield per vine (kg)
LS 1	35.62	33.56	1.37	10.20	13.92	13.83
LS 2	21.70	25.12	0.51	16.40	11.32	8.51
LS 3	26.56	37.87	0.98	15.53	16.28	15.19
LS 4	49.28	51.64	2.92	5.13	20.02	14.80
LS 5	31.24	38.75	1.34	12.60	18.36	17.33
LS 6	27.80	37.96	0.91	14.20	16.24	13.35
LS 7	29.52	41.77	1.38	9.83	19.81	14.02
LS 8	37.26	51.83	2.44	6.33	21.26	15.95
LS 9	33.73	37.24	1.23	12.06	19.77	15.02
LS 10	22.10	27.16	0.54	16.47	10.96	9.06
LS 11	24.27	39.82	1.09	13.67	19.08	15.05
LS 12	26.82	34.20	1.12	16.67	13.36	18.80
LS 13	26.56	31.56	0.76	14.27	12.65	10.88
LS 14	19.20	37.32	0.80	15.27	14.78	12.23
LS 15	34.68	65.55	2.31	7.06	21.95	16.48
LS 16	29.72	53.56	1.91	8.27	20.06	15.73
LS 17	28.39	40.24	1.22	14.06	18.10	17.21
LS 18	20.52	29.66	0.53	16.86	12.65	9.02
LS 19	26.76	30.72	0.87	16.47	13.79	14.45
LS 20	26.12	45.18	1.02	15.87	19.54	16.30
General mean	28.89	39.54	1.25	12.86	16.70	14.16
S.Ed.	1.96	2.13	0.63	1.91	2.00	2.17
CD (p=0.05)	3.94	4.28	1.27	3.84	4.03	4.36
CD (p=0.01)	5.25	5.70	1.69	5.11	5.38	5.81

References

1. Damor AS, Patel JN, Parmar HK, Vyas ND. Studies on genetic variability, heritability and genetic advance for yield and quality traits in bottle gourd (*Lagenaria siceraria* (Mol.) Standl.) genotypes. International J Sci. Environ. Tech. 2016; 5(4):2301-2307.
2. Deepa Devi N, Mariyappan S. Genetic variability, heritability and genetic advance for yield and its components in snake gourd (*Trichosanthes anguina* L.). African J Agri. Res. 2013; 8(28):3852.
3. Deepthi B, Syam Sundar Reddy P, Satyaraj Kumar A, Ramanjanaya Reddy A. Studies on PCV, GCV, heritability and genetic advance in bottle gourd genotypes for yield and yield components. Plant Archives. 2016; 16(2):597-601.
4. Ghule BV, Ghante MH, Saoji AN, Yeole PG. Hypolipidermic and antihyperlipidermic effects of *Lagenaria siceraria* (Mol.) fruit extracts. Indian J Experimental Biol. 2006, 44(11): 905-909.
5. Johnson HW, Robinson HF, Comstock RE. Estimates of genetic and environmental variability in soybean. Agron. J. 1955; 47:314-318.
6. Kumar SA, Yadav JP, Srivastava JR, Yadav JN, ShuklaMishra G, Parihar NS. Correlation and path coefficient analysis in bottle gourd (*Lagenaria siceraria* (Molina) Standl.). Prog. Res. 2007; 2(1-2):165-166.
7. Munshi R, Acharyya P. Varietal evaluation in bottle gourd genotypes. Ind. Agric. 2005; 49(3/4):213-221.
8. Muralidharan B, Kanthaswamy V, Sivakumar B. Correlation and path analysis studies in bottle gourd (*Lagenaria siceraria* (Mol.) Standl.). Published in Proc. of National Symposium on Abiotic and Biotic stress management in Vegetable crops. Ind. Soc. Veg. Sci. 2013, 69.
9. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. ICAR, New Delhi, 1961.
10. Rana NP, Pandit MK. Studies on genetic variability, character association and path analysis in snake gourd (*Trichosanthes anguina* L.) genotypes. J Crop and Weeds. 2011; 7(2): 91-96.
11. Sharma A, Sengupta SK. Genetic diversity, heritability and morphological characterization in bottle gourd (*Lagenaria siceraria* L.). The Bioscan. 2013; 8(4):1461-1465.
12. Shivanand BK, Mukesh Charan L, Jyoti Patil. Character association studies in ridge gourd (*Luffa acutangula* L.) with reference to yield attributes. Indian J Ecology., 2016, 43(1):176-183
13. Sultana S, Kawachar MA, Naznin S, Sadhik A, Mahmmud F. Variability, correlation and path analysis in pumpkin (*Cucurbita moschata* L.). Bangladesh J Agri. Res. 2015; 42(3):479-489.
14. Swiander JM, Ware GW, Maccollum JP. Vegetable crops. Interstate Publishers, 1999, 323-340.