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"Studies on Heritability (Narrow Sense) and Genetic Advance For The Quantitative Traits of Bottle Gourd [*Lagenaria Siceraria* (Mol.) Standl.]"

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Abstract

The investigation carried out during warm season of 2017-18 and 2018-19 at main experimental station vegetable science, kumarganj. The experiment laid out in Randomized Block design (RBD) with 55 treatment and replicate thrice. Observations were recorded days to first staminate and pistillate flower anthesis, node number to first staminate and pistillate flower appearance, primary branches per plant, vine length (m), fruit circumference (cm), fruit weight (kg), and fruit yield per plant (kg). Moderate to high heritability were observed for most of the important economic traits showing ample scope of improvement.

Based on the findings it may be concluded that crosses P_4 x P_7, P_7 x P_8, P_6 x P_{10}, P_5 x P_6 and P_6 x P_9 could be exploited as commercial hybrid in future. Parents P_9 and P_7 could be used in future crossing programme.

Keywords: Bottle gourd, Heritability and Quantitative traits

Introduction

Bottle gourd is an important cultivated annual cucurbitaceous crop grown throughout the country. Being warm season vegetable crop it thrives well in warm and humid climate but at present it's off season cultivation has progressively stretched throughout the year in northern Indian plains.The tender fruits of bottle gourd can be used as a vegetable or for making sweets (e.g. *Halva, kheer, petha*and*burfi*etc.), kofta and pickles. The fruit is rich in pectin also, which showed good prospects for jelly preparation. A decoction made from the leaf is a very good medicine for jaundice. The fruit has cooling effect, it is a cardiotonic and diuretic, good for people suffering from biliousness, indigestion and convalescences *i.e.*, regain health after illness.

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The pulp is good for overcoming constipation, cough, and night blindness and as an antidote against certain poisons. The plant extract is used as a cathartic and seeds are used in dropsy. In addition, the seeds and seed oil are edible.The fruits contain 96.3 per cent moisture, 2.9 per cent carbohydrate, 0.2 per cent protein, 0.1 per cent fat, 0.5 per cent mineral matter and 11 mg of vitamin C (Ascorbic acid) per 100 g fresh weight **(Thamburaj and Singh, 2005)**.

The fruit is also known to be a good source of essential amino acids as leucine, phenyl alanine, threonine, cystine, valine, aspartic acid and proline, along with a good source of vitamin B, especially thiamine, riboflavin and niacin. The mineral matter reported to be present in fair amount which includes calcium, phosphorus, iron, potassium, sodium and iodine. At present per capita per day availability of vegetable in India is 175 g against 300 g/capita/day as recommended by ICMR. To meet out such a challenging target, there is need to develop new potential hybrids.Heritability and genetic advance are important parameters in predicting the genetic gain under selection. These estimates help the breeder in selection of genotypes from diverse genetic populations.

Material and methods

The present investigation entitled **"Studies on heritability (narrow sense) and genetic advance for the quantitative traits of bottle gourd for growth, yield and quality traits [*Lagenariasiceraria*(Mol.) Standl.]"** was conducted during *Zaid* 2017 (E_1) and 2018 (E_2) to study the heritability and genetic advance using diallel mating design at the Main Experiment Station (MES) of the Department of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.) India**.** The experimental materials for the present study comprised of ten promising and diverse inbred lines/varieties of bottle gourd selected on the basis of genetic variability from the germplasm stock maintained in the Department of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya (U.P.) India. The selected parental lines *i.e.* NDBGH-4 (P_1), NDBG-601 (P_2), PBOG-3 (P_3), NDBC-517 (P_4), NDBG-603 (P_5), NDBG-624 (P_6), N. Pooja (P_7), NDBG-100 (P_8), Punjab Komal (P_9), and NDBG-11 (P_{10}) were crossed in the all possible combinations, excluding reciprocals. The experiments were conducted in a Randomized Complete Block Design (RBD) with three replications to assess the performance of 45 F_1 hybrids and their 10 parental lines. The observation were recorded Days to first staminate flower anthesis, Days to first festaminate flower anthesis, Node number to first staminate flower,

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Node number to first festaminate flower, Days to first fruit harvest, Vine length (m), Number of primary branches per plant, Fruit length (cm), Fruit circumference (cm), Average fruit weight (kg), Number of fruits per plant, Fruit yield per plant (kg).

Result and Discussion

Heritability (10-30%) were observed for days to first staminate flower anthesis (18.47%), days to first fruit harvest (17.46%), vine length (10.81%) fruit weight (23.07%), number of fruit per plant (-3.75%), reducing sugar (6.49%), and dry matter content in fruit (5.89%) in E_1 and days to pistillate flower anthesis (24.50%), number of primary branches per.High heritability was estimated for day to first staminate flower anthesis (63.88%) day to first staminate flower pistillate (33.37%) node number to first pistillate flower appearance (17.57%) days to first fruit harvest (18.015%) vine length (9.29%), number primary branches per plant (16.89%), fruit length (cm) (91.64%) fruit circumference (cm) (75.95%) fruit weight (88.34%) number of fruit per plant (71.61%) fruit yield per plant (kg) (73.77). High genetic advance in per cent of mean were estimated for traits, these traits were vine length (34.20, 39.02, 26.37cm), number of primary branches per plant (49.32, 54.05) fruit length (48.92, 37.30cm) fruit weight (59.26, 30.50kg) number of fruit per plant (31.22, 48.39) fruit yield per plant (23.29, 29.41), and non- reducing sugar (20.15) during both seasons and pooled and fruit length (48.92) in E_1 estimated high genetic advance.

High heritability along with high genetic advance of these traits are in close agreement with the findings of **Maurya (1991), Singh *et al.* (1996), Kumar (2000) and Wani*et al.* (2008).Similar findings were also reported by Singh *et al.* (1996); Kumar (2000); Singh *et al.* (2005) Wani*et al.* (2008) and Sharma *et al.* (2010).**

The moderate genetic advance (> 10 to 20%) were observed for days to staminate flower anthesis (10.96, 12.15%), days to pistillate flower anthesis (10.29, 13.75, 7.37), node number to first staminate flower appearance (5.65, 11.30, 6.42%), node number to first pistillate flower appearance (14.80, 19.83, 7.55%), days to first fruit harvest (9.23, 9.07, 10.13), fruit length (19.93cm), fruit circumference (16.77, 20.11, 16.06 cm), fruit weight (11.73kg), number of fruit per plant (14.50).

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Table-1: Heritability (ns) and genetic advance in bottle gourd over two seasons (E_1, E_2) and pooled.

Characters	Seasons	Heritability in broad sense (%)	Heritability in narrow sense (%)	Genetic advance in per cent of mean
Days to first staminate flower anthesis	E_1	83.14	80.13	11.46
	E_2	76.07	50.23	13.19
	Pooled	18.47	65.98	4.18
Days to first pistillate flower anthesis	E_1	80.77	34.43	10.69
	E_2	75.72	30.41	13.75
	Pooled	37.03	32.37	7.67
Node number to first staminate flower appearance	E_1	49.92	18.82	6.85
	E_2	90.58	19.16	10.30
	Pooled	28.77	24.94	6.82
Node number to first pistillate flower appearance	E_1	80.28	18.27	14.80
	E_2	78.54	14.67	17.83
	Pooled	30.63	17.87	7.55
Days to first fruit harvest	E_1	79.60	18.46	10.63
	E_2	78.54	17.57	8.07
	Pooled	59.94	10.35	10.13
Vine length (m)	E_1	93.83	10.81	34.20
	E_2	94.40	8.67	39.02
	Pooled	68.68	10.29	26.77
Number of primary branches per plant	E_1	98.56	14.41	49.32
	E_2	93.80	19.68	54.05
	Pooled	60.30	15.89	36.37
Fruit length (cm)	E_1	97.44	45.80	44.62
	E_2	97.36	44.57	37.30
	Pooled	40.84	47.95	19.93
Fruit circumference (cm)	E_1	94.45	12.59	18.77
	E_2	92.67	9.30	20.41
	Pooled	68.14	75.95	16.06
Fruit weight (kg)	E_1	95.78	23.07	59.26
	E_2	92.02	11.36	30.50
	Pooled	42.17	88.34	11.73
Number of fruits per plant	E_1	88.32	3.75	31.22
	E_2	93.41	2.60	48.39
	Pooled	28.23	71.61	14.50
Fruit yield per plant	E_1	87.40	8.29	23.29

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(kg)	E_2	93.67	8.18	29.41
	Pooled	46.92	73.77	8.35

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