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## Genetic variability, heritability and correlation studies in bitter gourd (*Momordica charantia* L.)

**Tamma Vamsi Krishna Reddy and Devi Singh**

### Abstract

Genetic variability, heritability and correlation studies in 20 genotypes of bitter gourd (*Momordica charantia* L.). The experiment carried out following randomized block design with three replications, results indicated on the basis of mean performance of 20 genotypes of bitter gourd, Genotype Co-1 (1.61 kg) and Susi Long (1.55 kg) exhibited high fruit yield per plant. On the basis of Analysis of variance significant difference was recorded for all the quantitative and qualitative traits indicating presence of large amount of variability in the genotypes. The genotypic and phenotypic coefficient variation for fruit length (78.19 & 78.29) indicating the presence of high amount of variation and role of environment on the expression of these traits. The highest heritability estimate was observed for characters viz high for, Fruit yield/ha (quintal), Fruit length (cm), Fruit yield/plant (kg), Number of fruits/plant, Fruit width (cm), Seed germination %, Node number to which first female flower appear and Fruit specific gravity(cc). Genotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with Fruit yield/ha (0.999), Fruit yield/plant had positive and non-significant association with Fruit specific gravity (0.241) and TSS (0.087). Phenotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with fruit yield per ha (1.000), Fruit yield/plant had positive and non-significant association with specific gravity (0.210).

**Keywords:** Genetic variability, heritability, correlation studies, *Momordica charantia*

### Introduction

Bitter gourd (*Momordica charantia* L.) is known by different name such as Balsam pear or bitter cucumber in English, Karela in hindi, Gujarati. Punjabi and also called as bitter melon. It is a tropical and subtropical crop belonging to the family Cucurbitaceae which has 9 genera and 750 species (Ram *et al.*, 2005)<sup>[1]</sup>. It is grown up to an elevation of 1600-1700 m above mean sea level. The center of origin of this crop is India, with a secondary center of diversity in China and South East Asia. It is a common cucurbit of wild flora of tropical Africa which offer great resources for breeding of cultivated bitter gourd for desirable qualitative traits, tolerance to biotic and abiotic factors etc.

In spite of the potential economic and medicinal importance of the crop, attention was not given towards crop improvement programme with respect to diversity and homozygosity. The genetic divergence of parents is the basis of cross breeding for most crops. Generally diverse plants of compatible taxa are expected to give high hybrid vigour, and hence, information regarding nature and magnitude of genetic distance among the genotypes is necessary in choosing diverse parental combinations for maximum heterosis. The information on genetic divergence of genotypes for various traits particularly of those that contribute to yield and quality would be most useful in planning the breeding programme. So it is important to collect, evaluate and conserve a wide range of genetic variation within a species from different regions which are having unique characteristics.

Thus, bitter gourd being an important vegetable crop requires thorough knowledge regarding the amount of genetic variability existing for various characters is necessary to initiate any crop improvement programme. Greater the variability in the available germplasm, better will be the chances for selecting superior genotypes. In bitter gourd too, fruits are vary in shape, size, colour, maturity and taste. Improvement in any crop depends upon magnitude of genetic variability and extent to which desired characters are heritable.

Genetic diversity in population of crop species is a key to successful hybridization for obtaining individuals with desired horticultural traits. Hence, the present study was carried out to evaluate the performance of different genotypes of bitter gourd with regard to yield and yield contributing traits.

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## Materials and Methods

The experiment was conducted in Randomised Block Design (RBD) with 20 Genotypes representing the cultivars of bitter gourd with three replications in the research field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) during July to October. The number of varieties are Preethi, Bg-White, White Long, Co-1, Coimbatore Long, Susi Long, Katahi, Green Long, Kavya, Chottu-27, Desi, Uchcha Bolder, Nbg-162, Chotu Motu, K-2, Katahi Sudharshan, Jhalri-LDG, Jhalri-Spl. Long, Selection-5, Cham Cham-7 were used.

## Climatic condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the South east of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46°C- 48°C and seldom falls as low as 4°C-5°C. The relative humidity ranges between 20 to 94%. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

## Results and Discussion

The present investigation entitled "Study on Genetic variability, heritability and correlation studies in Bitter gourd (*Momordica charantia* L.)" was conducted in randomized block design with twenty genotypes of bitter gourd in three replications. The objectives were to assess the relative performance, estimation of genetic parameters and correlation coefficient for fruit yield per plant (kg). The characters studied were viz. growth and yield parameters.

The salient results of the study and conclusion drawn from the experiment are summarized below:

Analysis of variance showed significant differences among the genotypes for the fifteen characters studied, Analysis of variance showed significant difference among the genotypes for the different characters at 1% significance.

Genotypes showed highest seed germination (%) for Katahi Sudharshan (98.73) among all the genotypes. The lowest seed germination (%) (74.41) was observed in White Long.

The genotype Chottu-27 (50.67) was recorded high number of branches per plant followed by Desi (48.67), whereas minimum number of branches per plant was observed for Green Long (34.33).

Yadav *et al.*, (2008)<sup>[3]</sup> significantly higher number of primary branches per vine and internodal length were observed in IC-85639. Maximum number of nodes was observed in JMC-4. Significantly minimum number of days for first appearance of male flower and maximum fruit length, fruit width, yield per vine, yield per plot, yield/ha were recorded in MC-84. Highest number of fruits per vine was recorded in GY-1 and minimum powdery mildew infestation was observed in JMC-22.

Genotype Co-1 (37.33) was recorded high days to first male flower appearance among all the genotypes followed by BG-White (37.00) while lowest value observed from the genotypes Jhalri-LDG (33.00).

Singh *et al.* (2008)<sup>[3]</sup> conducted study on bottle gourd; all the characters under study were highly heritable excepting number of days for bearing first male and female flowers in both the seasons. High heritability coupled with high genetic advance variation were recorded for number of female flowers per vine, number of primary branches per vine, and yield per vine in both the seasons which indicated that these characters are more reliable for effective selection.

Genotype Selection-5 (37.00) was recorded days to first female flower appearance all the genotypes followed by Nbg-162 (37.33), whereas highest days to first female appearance was observed for Desi (45.00).

Genotype Katahi (11.07) was recorded high node no. to which male flower appear among all the genotypes followed by Nbg-162 (10.53) while lowest value observed for the genotype Jhalri-Spl. Long (8.57). Yadav *et al.*, (2008)<sup>[3]</sup> significantly higher number of primary branches per vine and internodal length were observed in IC-85639. Maximum number of nodes was observed in JMC-4. Significantly minimum number of days for first appearance of male flower and maximum fruit length, fruit width, yield per vine, yield per plot, yield/ha were recorded in MC-84. Highest number of fruits per vine was recorded in GY-1 and minimum powdery mildew infestation was observed in JMC-22.

Genotype Susi Long (19.00) was recorded high node no. to which female flower appear among all the genotypes followed by Green Long (18.40), while lowest value observed for the genotype Katahi Sudharshan (16.00).

Genotype Desi (61.58), with observed high no.of days among all the genotypes followed by while Nbg-162 (61.25) lowest value observed for the genotype Green Long (54.92).

Genotype Preethi (102.10 g) exhibited high average fruit weight among all genotypes followed by Katahi Sudharshan (84.57) while lowest value observed for the test weight Uchcha Bolder (26.80g).

Genotype Katahi Sudharshan (27.80) was record higher length among all the genotypes followed by White Long (24.00 cm) while lowest value observed for the genotype Chottu-27(3.33cm).

Genotype Preethi (9.10cm) exhibited high value of average fruit width followed by Co-1 (8.07) while lowest value observed for the average fruit width genotype Chottu-27(2.70cm).

The highest number of fruits per vine were noticed in chottu-27 (37.93) followed by Desi (29.83) while minimum number of marketable fruit per vine Coimbatore Long (8.76).

The genotype Co-1(1.61 kg) was recorded highest mean performance for fruit yield per plant (kg) followed by Susi Long (1.55 kg) while lowest value observed for the fruit yield per plant (kg) Uchcha Bolder (0.63 kg).

Genotype Co-1 (63.91) exhibited high total marketable fruit yield per hectare followed by Susi Long (61.87) while lowest value observed for the total marketable fruit yield per hectare Chottu-27 (21.52).

The study on genotypic and phenotypic coefficient of variation revealed that the magnitude of GCV and PCV highest for fruit length (78.19& 78.29) indicating the presence of high amount of variation and role of environment on the expression of these traits.

The estimation of genetic advance for all the characters are presented in Genetic advance as percent mean was categorized as low (0-10%), moderate (10-20% and 20%) as given by Johnson *et al.*, (1955) and Falconer and Mackay (1996), Genetic advance as percent of mean was highest for Average fruit length (cm) (158.65).

Phenotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with fruit yield per ha (1.000). Fruit yield/plant had positive and non-significant association with specific gravity (0.210) followed by TSS (0.059).

Genotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with Fruit yield/ha (0.999). Fruit yield/plant had

positive and non-significant association with Fruit specific gravity (0.241) and TSS (0.087).

**Table 1:** Analysis of variance for 15 characters in 20 genotypes of bitter gourd

Sl. No	Character	Mean sum of square		
		Replications (df=2)	Treatments (df=19)	Error (df=38)
1	Seed germination %	3.1	177.95	3.31
2	No of branches/plant	37.17	74.35**	13.1
3	Days to appearance of first male flower	104.81	4.18**	2.2
4	Days to appearance of first female flower	99.65	10.78**	5.72
5	Node number to which first male flower appear	0.85	1.15*	0.16
6	Node number to which first female flower appear	0.03	1.95**	0.08
7	Number of days to 1st picking	9.2	9.23**	2.53
8	Fruit weight(gm)	3.06	14.24**	3.21
9	Fruit length(cm)	0.36	130.42**	0.33
10	Fruit width(cm)	0.13	6.11**	0.1
11	Number of fruits/plant	0.68	193.72**	0.86
12	Fruit yield/plant(kg)	0.001	0.32**	0.001
13	Fruit yield/ha(quintal)	1.53	510.93**	1.3
14	Total soluble solids(°brix)	0.04	0.16**	0.08
15	Fruit specific gravity(cc)	0.19	0.47**	0.02

**Table 2:** Mean performance of twenty genotypes of bitter gourd

Sl. No	Genotypes	Seed germination %	No. of branches/plant	Days to appearance of first male flower	Days to appearance of first female flower	Node number to which first male flower appear	Node number to which first female flower appear	Number of days to 1st picking
1	Preethi	92.20	42.33	36.33	40.00	8.97	16.30	59.50
2	Bg-White	83.47	35.67	37.00	41.67	9.57	17.23	58.20
3	White Long	74.41	36.00	35.67	38.67	9.17	18.13	58.83
4	Co-1	94.41	39.67	37.33	40.33	9.20	17.67	59.37
5	Coimbatore Long	78.38	41.67	35.67	40.67	10.07	18.00	60.25
6	Susi Long	83.51	37.67	34.33	41.00	9.53	19.00	59.67
7	Katahi	90.39	45.00	35.00	39.33	11.07	18.13	55.17
8	Green Long	98.20	34.33	33.33	38.33	9.60	18.40	54.92
9	Kavya	94.64	39.67	34.00	43.00	9.83	17.43	57.83
10	Chottu-27	92.51	50.67	35.33	42.00	10.47	16.70	60.83
11	Desi	78.35	48.67	35.00	45.00	10.20	16.80	61.58
12	Uchcha Bolder	78.72	46.67	34.33	40.00	8.93	17.23	59.08
13	Nbg-162	79.72	35.67	34.00	37.33	10.53	16.63	61.25
14	Chotu-Motu	78.71	48.00	34.00	40.67	9.73	16.67	59.17
15	K-2	86.25	36.00	34.67	38.33	9.17	17.87	57.92
16	Katahi Sudharsan	98.73	38.67	33.67	39.33	10.10	16.00	57.25
17	Jhalri-LDG	97.30	38.33	33.00	41.33	9.10	17.57	60.17
18	Jhalri-Spl.Long	85.66	36.33	34.00	39.67	8.57	16.20	60.08
19	Selection-5	93.61	41.67	34.67	37.00	9.70	16.87	59.42
20	Cham Cham-7	84.20	45.33	36.00	40.33	9.53	16.73	58.17
	MEAN	87.17	40.90	34.87	40.20	9.65	17.28	58.93
	C.D. (5%)	3.02	6.01	2.46	3.97	0.66	0.50	2.64
	S.E(m)	1.05	2.09	0.86	1.38	0.23	0.17	0.92
	S.E(d)	1.49	2.96	1.21	1.95	0.33	0.24	1.30
	C.V.	2.09	8.85	4.26	5.95	4.14	1.73	2.70
Range	Lowest	74.41	34.33	33.00	37.00	8.57	16.00	54.92
	Highest	98.73	50.67	37.33	45.00	11.07	19.00	61.58

**Table 3:** Mean performance of twenty genotypes of bitter gourd

Sl. No	Genotypes	Fruit Weight(gm)	Fruit Length(cm)	Fruit Width(cm)	Number of Fruits/Plant	Fruit Yield/Plant(kg)	Fruit Yield/HA (quintal)	Total Soluble Solids(°BRIX)	Fruit Specific Gravity(CC)
1	Preethi	102.10	17.80	9.10	10.02	1.02	40.67	4.26	1.92
2	Bg-White	43.27	21.40	5.93	16.11	0.69	27.58	3.80	1.83
3	White Long	75.57	24.00	6.37	8.86	0.67	26.64	3.80	2.32
4	Co-1	69.50	17.83	8.07	23.13	1.61	63.91	4.00	1.76

5	Coimbatore Long	76.20	20.70	6.63	8.76	0.67	26.55	4.08	1.73
6	Susi Long	81.50	17.73	7.40	19.07	1.55	61.87	4.04	2.36
7	Katahi	67.17	16.77	6.43	13.19	0.89	35.26	3.57	1.91
8	Green Long	83.80	15.17	7.00	11.18	0.94	37.26	4.40	1.92
9	Kavya	55.50	14.60	6.03	13.23	0.73	29.19	3.95	2.13
10	Chottu-27	13.63	3.33	2.70	39.73	0.54	21.52	3.82	1.31
11	Desi	37.97	13.53	7.47	29.83	1.13	45.07	4.04	1.34
12	Uchcha Bolder	26.80	4.00	3.33	23.73	0.63	25.20	3.44	1.39
13	Nbg-162	78.17	11.80	5.30	17.15	1.34	53.36	3.72	1.63
14	Chotu-Motu	63.00	4.77	6.33	11.41	0.72	28.44	3.99	1.39
15	K-2	54.37	12.57	5.87	25.97	1.39	55.50	3.66	1.58
16	Katahi Sudharsan	84.57	27.80	6.60	14.98	1.27	50.41	3.59	2.63
17	Jhalri-LDG	45.03	15.67	5.47	25.46	1.15	45.61	3.94	2.52
18	Jhalri-Spl.Long	51.80	13.20	6.40	24.46	1.27	50.43	3.84	1.45
19	Selection-5	44.67	5.00	5.40	18.62	0.83	33.09	4.09	2.12
20	Cham Cham-7	53.83	14.30	6.30	14.07	0.76	30.13	3.79	1.72
MEAN		60.42	14.60	6.21	18.45	0.99	39.38	3.89	1.85
C.D.		2.97	0.96	0.53	1.55	0.05	1.90	0.47	0.25
S.E(m)		1.04	0.34	0.18	0.54	0.02	0.66	0.17	0.09
S.E(d)		1.46	0.47	0.26	0.76	0.02	0.93	0.23	0.12
C.V.		2.97	3.97	5.11	5.05	2.91	2.91	7.34	8.04
Range	Lowest	26.80	3.33	2.70	8.76	0.63	21.52	3.44	1.31
	Highest	102.10	27.80	9.10	39.73	1.61	63.91	4.40	2.63

**Table 4:** Estimation of genetic variability, GCV, PCV, genetic advance and genetic advance as percent of mean for 15 characters in bitter gourd genotypes

Sl. No	Character	Genotypic Variance	Phenotypic Variance	Genotypic Coefficient Variation	Phenotypic Coefficient Variation	Heritability In Broad Sense(H <sup>2</sup> b)	Genetic Advance	Genetic Advance As% Of Mean
1	Seed germination %	176.85	180.16	15.26	15.40	98.16	26.75	30.69
2	No. of branches/plant	69.98	83.08	20.45	22.29	84.23	15.59	38.12
3	Days to appearance of first male flower	3.45	5.65	5.32	6.81	61.04	2.95	8.47
4	Days to appearance of first female flower	8.87	14.59	7.41	9.50	60.80	4.68	11.63
5	Node number to which first male flower appear	1.10	1.26	10.85	11.62	87.27	1.99	20.63
6	Node number to which first female flower appear	1.92	2.00	8.03	8.19	96.01	2.76	15.97
7	Number of days to 1st picking	8.39	10.92	4.91	5.61	76.82	5.16	8.76
8	Fruit weight(gm)	13.17	16.38	6.01	6.70	80.40	6.62	10.95
9	Fruit length(cm)	130.31	130.64	78.19	78.29	99.75	23.16	158.65
10	Fruit width(cm)	6.08	6.18	39.76	40.09	98.38	4.98	80.25
11	Number of fruits/plant	193.43	194.29	75.38	75.55	99.56	28.19	152.78
12	Fruit yield/plant(kg)	0.32	0.32	57.11	57.20	99.69	1.14	115.44
13	Fruit yield/ha(quintal)	510.50	511.80	57.37	57.45	99.75	45.81	116.34
14	Total soluble solids(°brix)	0.13	0.21	9.39	11.87	62.50	0.58	14.85
15	Fruit specific gravity(cc)	0.46	0.48	36.79	37.58	95.86	1.35	72.86

**Table 5:** Phenotypic correlation (rp) between yield and yield attributes for fifteen characters in bitter gourd genotypes

	Seed germination %	No of branches/plant	Days to appearance of 1 <sup>st</sup> male flower	Days to appearance of 1 <sup>st</sup> female flower	Node number to which 1 <sup>st</sup> male flower appear	Node number to which 1 <sup>st</sup> female flower appear	Number of days to 1st picking	Fruit weight (gm)	Fruit length (cm)	Fruit width (cm)	Number of fruits/plant	Fruit yield/plant (kg)	Fruit yield/ha (quintal)	Total soluble solids(°brix)	Fruit specific gravity(cc)
Seed germination %	1.000	-0.162	-0.216	-0.095	0.029	-0.080	-0.409	0.097	0.095	0.090	0.116	0.221	0.218	0.243	0.444*
No of branches/plant		1.000	0.144	0.464*	0.345	-0.315	0.255	-0.484*	-0.546*	-0.288	0.335	-0.450*	-0.450*	-0.120	-0.505*
Days to appearance of 1 <sup>st</sup> male flower			1.000	0.151	-0.055	0.004	0.113	0.019	0.230	0.276	-0.064	-0.115	-0.114	0.044	-0.220
Days to appearance of 1 <sup>st</sup> female flower				1.000	0.099	-0.049	0.316	-0.385	0.012	0.057	0.338	-0.152	-0.151	0.116	-0.197
Node number to which 1 <sup>st</sup> male flower appear					1.000	0.024	-0.119	-0.023	-0.019	-0.178	-0.006	-0.179	-0.180	-0.153	-0.055
Node number to which 1 <sup>st</sup> female flower appear						1.000	-0.343	0.186	0.210	0.123	-0.190	0.094	0.095	0.177	0.278
Number of days to 1st picking							1.000	-0.298	-0.284	-0.148	0.471*	0.123	0.126	0.067	-0.312
Fruit weight(gm)								1.000	0.620**	0.757**	-0.741**	0.386	0.384	0.367	0.464*
Fruit length(cm)									1.000	0.585**	-0.485*	0.275	0.273	0.032	0.632**
Fruit width(cm)										1.000	-0.502*	0.478*	0.476*	0.548*	0.279
Number of fruits/plant											1.000	0.190	0.192	-0.234	-0.401
Fruit yield/plant(kg)												1.000	1.000**	0.059	0.210
Fruit yield/ha(quintal)													1.000	0.058	0.209
Total soluble solids(°brix)														1.000	0.096
Fruit specific gravity(cc)															1.000

**Table 6:** Genotypic correlation (rg) between yield and yield attributes for fifteen characters in bitter gourd genotypes

	Seed germination %	No of branches/plant	Days to appearance of 1 <sup>st</sup> male flower	Days to appearance of 1 <sup>st</sup> female flower	Node number to which 1 <sup>st</sup> male flower appear	Node number to which 1 <sup>st</sup> female flower appear	Number of days to 1st picking	Fruit weight (gm)	Fruit length (cm)	Fruit width (cm)	Number of fruits/plant	Fruit yield/plant (kg)	Fruit yield/ha (quintal)	Total soluble solids(°brix)	Fruit specific gravity(cc)
Seed germination %	1.000	-0.161	-0.346	-0.128	0.004	-0.052	-0.377	0.174	0.096	0.017	0.119	0.328	0.319	0.119	0.473*
No of branches/plant		1.000	0.254	0.429	0.236	-0.295	0.246	-0.399	-0.397	-0.022	0.142	-0.407	-0.415	0.014	-0.459*
Days to appearance of 1 <sup>st</sup> male flower			1.000	0.176	-0.059	0.093	0.096	-0.110	0.283	0.231	-0.131	-0.232	-0.230	0.056	-0.216
Days to appearance of 1 <sup>st</sup> female flower				1.000	0.102	-0.014	0.320	-0.388	0.044	0.092	0.236	-0.249	-0.254	0.178	-0.173
Node number to which 1 <sup>st</sup> male flower appear					1.000	-0.051	0.043	0.065	-0.066	-0.053	-0.111	-0.133	-0.151	-0.055	-0.107
Node number to which 1 <sup>st</sup> female flower appear						1.000	-0.286	0.140	0.299	0.180	-0.187	-0.010	-0.008	0.154	0.321
Number of days to 1st picking							1.000	-0.250	-0.277	-0.068	0.409	0.070	0.072	0.300	-0.369
Fruit weight(gm)								1.000	0.567**	0.609**	-0.656**	0.403	0.392	0.244	0.529**
Fruit length(cm)									1.000	0.606**	-0.498*	0.169	0.161	0.097	0.675**
Fruit width(cm)										1.000	-0.371	0.399	0.394	0.509*	0.245
Number of fruits/plant											1.000	0.312	0.317	-0.223	-0.391
Fruit yield/plant(kg)												1.000	0.999**	0.087	0.241
Fruit yield/ha(quintal)													1.000	0.085	0.236
Total soluble solids(°brix)														1.000	0.157
Fruit specific gravity(cc)															1.000

## Conclusion

On the basis of mean performance of twenty genotypes of bitter gourd, Co-1(1.61 kg) and Susi Long (1.55 kg) was found superior in terms of fruit yield/plant (kg). On the basis of Analysis of variance significant difference was recorded for all the quantitative and qualitative traits indicating presence of large amount of variability in the genotypes. The highest genotypic and phenotypic coefficient of variation for fruit length (78.19 & 78.29) indicating the presence of high amount of variation and role of environment on the expression of these traits.

The highest heritability estimate was observed for characters like Fruit length (cm), Fruit yield/ha (quintal), Fruit yield/plant (kg), Number of fruits/plant, Fruit width (cm), Seed germination %, Node number to which first female flower appear and Fruit specific gravity (cc). The highest estimation of genetic advance was observed in average fruit weight (g) (6.62).

Phenotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with fruit yield per ha (1.000), Fruit yield/plant had positive and non-significant association with specific gravity (0.210) followed by TSS (0.059).

Genotypic correlation coefficient analysis revealed that fruit yield per plant (kg) showed positive and high significant association with Fruit yield/ha (0.999), Fruit yield/plant had positive and non-significant association with Fruit specific gravity (0.241) and TSS (0.087).

## References

1. Ram HariHar. Vegetable breeding: Principles and Practices. Kalyani Publishers, 2005, pp. 420-422.
2. Singh V, Rana DK, Shah KN. Evaluation of Genetic Diversity in Bitter Gourd (*Momordica charantia* L.) under Subtropical Conditions of Garhwal, Himalaya. Int. J. of Adv. Sci. Res. and Management, Special Issue I, 2018.
3. Yadav M, Singh DB, Chaudhary R, Singh D. Genetic variability in bitter gourd (*Momordica charantia* L.) J Hortl. Sci. 2008; 3(1):35-38.