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Short communication

Performance of bottle gourd genotypes for earliness and yield under Chhattisgarh conditions

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Abstract
An experiment was carried out to analyze genetic variability analysis for yield and its contributing traits in 69 bottle gourd genotypes during kharif season of 2015. The experiment was conducted using a randomized complete block design with three replications. The genetic parameters between yield and yield contributing characters of different bottle gourd genotypes were studied. Analysis of variance showed significant variation among the genotypes for all tested characters.
The highest fruit yield was recorded in genotype IBG 61 (433.33) which was followed by IBG 67 (351.85 q/ha), IBG 11 (287.11 q/ha number of branches per plant showed the highest genotypic and phenotypic coefficient of variations (38.45 and 39.05), whereas duration of crop showed the lowest ones (2.98 and 3.73). The highest heritability was recorded for the characters days to 50% flowering, node number of first female flower, node number of first male flower, number of branches per plant, days to first female appears, days to fruit set, 100 seed weight, days to first fruit harvest, fruit yield per plot, days to first male flower appears, fruit length, fruit girth.

Keywords: Bottle gourd, genotypes, earliness and fruit yield

Introduction
Bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] belongs to the family Cucurbitaceae having chromosome number 2n = 22, originated in Southern Africa. Bottle gourd or white flowered gourd is commonly known as Lauki, it is one of the important cucurbitaceous vegetable cultivated in India. It is a monoecious, diploid, climbing or prostrate plant, solitary flowers and strictly cross pollinated due to its monoceious nature. Numerous health benefits are reported in bottle gourd including its anti-cancerous, cardio protective, diuretic, aphrodisiac, general tonic, antidote to certain poisons and scorpion stings, alternative purgative and cooling effects (Badmanaban and Patel, 2010). The fruit make delicious supplement to the human diet and 100 g of fruits contain nearly 96g water, 0.2g protein, 0.1g fat, 2.5g carbohydrate, 0.6g fiber, 0.5g minerals, 20mg calcium, 10mg phosphorus, 0.7mg iron, 0.3mg thiamine, 0.01mg riboflavin and 0.2 mg niacin and energy 1.2 cal. Genotypic correlation coefficient provides a measure of genotypic association between the characters and reveals the characters that might be useful as an index of selection. The path analysis facilitates the partitioning of correlation coefficients into the direct and indirect effects of component characters on yield and any other attributes. Keeping in this view, the present investigation was conducted to determine the characters and their direct and indirect effects on yield.
The study was carried out during *kharif* season (2015) at Research cum Instructional farm, IGKV, Raipur. The experiment comprised of sixty nine genotypes of bottle gourd collected from different region of southern Chhattisgarh. The experiment was laid out in a randomized block design with three replication at 3.0 × 0.75 m row to row and plant to plant spacing. All the recommended cultural practices were adopted to raise a healthy crop. Data were recorded on five randomly selected plants with respect to days to first male appears, days to first female flower appears, days to 50% flowering, number of branches per plant, node number of first female flower appears, node number of first female flower appears, days to fruit set, days to first fruit harvest, number of fruits per plant, fruit length (cm), fruit diameter (cm), average fruit weight (g), 100 seed weight, fruit yield per plant, duration of crop (sowing to last harvest). The data were subjected to statistical and biometrical analysis (Singh and Chaudhari, 1985) [8].

The mean value of different growth and yield parameters with respect to genotypes are presented in table 1. Minimum days to first male flowering were recorded in the genotype IBG 66 and IBG-45 (44.20 days) and maximum days to first male flowering were recorded in IBG-55 (73.00 days). The genotype IBG-50 (50.13 days) recorded Minimum days to first female flowering and maximum days to first female flowering was recorded in IBG 23 (76.73 days). Genotype IBG-65 was recorded for maximum fruit length 39.97 cm and lowest fruit length was recorded in IBG-15 (19.50 cm).

Maximum fruit girth was recorded for Genotype IBG-56 (14.00 cm) and lowest fruit girth was recorded in IBG-66 (6.15 cm). Earliest days to 50% flowering were recorded in the genotypes IBG-69 (47.00 days) and delayed flowering were recorded in IBG-55 (77.00 days). Earliest male node was found in IBG-46 (9.67 and higher male node was recorded in IBG-65 (34.25). Earliest male node was found in IBG-57 (9.67) followed by IBG-62 (10.67), IBG-6 (11.93) while higher female node number was recorded in the genotype IBG-61 (41).

Earliest fruit setting was recorded in the genotype IBG-62 (50.47 days) followed by IBG-66 (51.87 days), IBG-44 (53.27 days) whereas, maximum days of fruit set was noted in the genotype IBG-55 (77 days). Early harvesting was recorded in the genotype IBG-63 (61.16) whereas, maximum days to first fruit harvest was recorded in the genotype IBG-23 (88.36 days). Maximum number of fruits per plant was recorded in the genotype IBG-59 (15.80). Genotype IBG-2 (5.14) was noted for minimum number of fruits per plant.

Number of branches per plant ranged from 2.47 (IBG-13) to 10.37 (IBG-7) followed by IBG-43 (2.60), IBG-45 (2.53) with an overall mean of 5.17 and least branching was recorded in the genotype IBG-13 (2.47). Significantly higher Fruit yield per plot recorded in IBG-61 (117 kg) followed by IBG-55 (37.00 kg), IBG-52 (36 kg) Fruit yield quintal per hectare plot recorded in 433.33 (IBG-61) followed by IBG-67 (381.85 q), IBG-11 (287.11 q). Minimum crop duration was recorded in the genotype IBG-59 (146.67 days), whereas, maximum crop duration was recorded in IBG-45 (169.33 days).

A wide range of variation was recorded for node number at which first female flower appears, days to first male and female flower appears, days to 50% flowering, fruit length, fruit weight and yield per plot. The genotype IBG-61 was found highest yield and earliest flowering was noted in IBG-69 which indicated that there is better scope for selection for the improvement of these characters. These findings are in close proximity with the results of Ram *et al.* (2007) [6] who reported variability for flowering, fruit size, number of nodes on main vine, fruit weight and yield/plant. Similar finding were also reported by Rahman *et al.* (1986) [5], Prasad *et al.* (1993) [4], Mathew *et al.* (2000) [2], Sharma *et al.* (2010) [7] and Narayan, (2013) [3].

Table 1: Mean performance for fruit yield and its components in bottle gourd

Genotype	Days to 1st Male flower appears	Days to 1st female flower appears	Fruit length (cm)	Fruit diameter (cm)	Days to 50% flowering	Node number of first male flower appears	Node number of first female flower appears	Days to fruit set	Days to 1st fruit harvest	No of fruits per plant	100 seed weight (gm)	No. of branches Per plant	Average fruit weight (g)	Fruit yield (kg/ ha)	Fruit yield (q / ha)	Duration of crop (sowing to last harvest)
IBG-1	65.80	66.33	21.00	10.91	70.67	17.67	27.20	79.53	76.65	7.49	21.07	3.33	955.67	50.12	185.63	153.33
IBG-2	66.43	57.53	25.00	7.81	72.67	24.93	38.67	78.40	77.68	5.14	12.83	5.20	1330.00	33.40	123.70	158.49
IBG-3	45.37	56.00	30.20	8.83	51.67	18.87	21.20	58.60	62.84	8.25	14.86	4.23	1326.33	61.00	225.93	148.67
IBG-4	53.37	59.33	33.80	10.29	61.33	11.87	21.07	64.87	67.20	8.88	14.79	4.63	866.67	46.25	171.30	162.33
IBG-5	59.00	64.97	21.50	10.30	65.67	20.13	30.73	71.13	66.27	9.91	14.43	7.07	1166.67	55.00	203.70	151.33
IBG-6	60.47	64.13	24.40	12.22	63.67	21.00	11.93	67.93	72.26	8.76	13.78	7.10	916.67	55.94	207.19	156.67
IBG-7	58.60	59.63	20.20	12.55	59.33	18.43	24.93	63.20	66.86	9.45	17.33	10.37	857.50	53.90	199.63	166.33
IBG-8	52.00	62.93	22.20	11.86	57.33	13.00	22.40	64.27	65.42	10.40	14.67	6.67	900.00	45.92	170.07	158.87
IBG-9	49.53	59.97	21.80	12.54	55.33	12.73	26.73	64.80	69.01	10.33	17.86	3.47	1013.33	43.38	160.67	151.33
IBG-10	49.77	60.40	30.20	9.53	60.33	11.83	25.60	65.33	67.74	8.56	20.74	4.67	1265.33	46.08	170.67	154.33
IBG-11	56.80	65.50	26.00	9.41	63.67	13.33	21.33	75.20	69.71	9.35	19.94	4.17	1450.00	77.52	287.11	158.67
IBG-12	60.60	66.33	21.10	8.62	65.67	16.53	19.93	71.93	71.35	8.85	14.25	4.20	821.50	58.84	217.93	151.45
IBG-13	57.00	70.33	31.60	9.53	72.67	21.87	23.93	73.53	75.77	9.14	10.07	2.47	940.00	46.88	173.63	155.83
IBG-14	56.50	63.60	30.00	7.18	62.33	16.30	24.42	68.73	72.98	8.56	14.31	4.27	759.67	51.96	192.44	160.43
IBG-15	50.70	68.97	19.50	11.21	63.67	19.27	24.93	74.87	73.86	10.47	13.76	4.17	1200.00	39.70	147.04	157.38
IBG-16	58.33	63.47	23.60	11.20	61.33	20.47	26.13	71.67	70.56	11.60	14.12	4.17	1365.00	38.50	142.59	150.55
IBG-17	56.47	57.73	30.20	12.54	62.33	20.80	30.00	71.20	75.28	9.40	15.90	3.43	877.33	50.70	187.78	152.00
IBG-18	57.00	63.70	22.83	9.89	61.67	21.10	25.93	64.20	73.09	9.23	13.03	4.40	966.67	49.00	181.48	154.00
IBG-19	52.00	59.57	26.27	10.02	60.33	11.73	20.67	65.40	72.41	10.70	17.98	3.30	485.67	56.16	208.00	157.00
IBG-20	50.00	64.33	25.40	9.59	63.67	15.00	26.20	72.27	75.60	8.82	11.36	4.37	1057.33	44.64	165.33	156.37
IBG-21	67.23	72.63	31.30	9.82	72.67	16.67	29.67	75.73	84.07	10.84	12.46	4.63	865.67	39.96	148.00	159.33
IBG-22	65.00	69.63	20.30	12.09	68.00	16.63	27.87	75.80	74.99	10.16	12.24	7.27	1166.67	59.72	221.19	159.00
IBG-23	59.30	76.73	30.40	11.16	64.00	12.47	23.40	65.67	88.36	8.98	16.04	4.57	576.00	54.84	203.11	159.00
IBG-24	64.33	69.00	25.40	9.83	74.33	17.83	31.07	78.33	77.82	10.55	20.91	3.37	1049.67	44.08	163.26	149.67
IBG-25	60.20	63.33	25.10	10.15	73.00	18.73	30.73	75.93	75.59	9.13	15.95	3.23	1390.13	43.56	161.33	151.00
IBG-26	56.80	68.23	24.07	7.75	62.00	18.60	29.00	64.00	74.97	8.59	12.73	2.80	533.33	63.80	236.30	150.00
IBG-27	60.20	68.40	31.30	12.07	66.33	20.93	29.73	74.73	73.06	10.39	11.89	3.43	816.00	40.88	151.41	160.50
IBG-28	56.67	67.71	27.95	10.63	52.67	17.53	32.20	63.20	72.32	10.03	14.31	3.76	1390.14	38.68	151.56	160.41
IBG-29	56.80	70.07	28.00	8.91	67.33	15.87	31.93	72.80	78.32	8.03	13.30	4.27	1530.00	35.12	130.07	161.00
IBG-30	59.77	66.60	24.37	10.09	63.33	14.13	28.83	70.87	78.10	9.19	18.42	5.37	400.00	58.92	218.22	151.00
IBG-31	67.80	71.33	26.33	9.86	71.67	15.13	33.73	74.93	75.60	10.02	23.09	5.37	790.50	58.87	218.04	153.00
IBG-32	63.00	68.20	36.23	11.53	68.67	18.07	23.00	73.67	76.69	10.40	13.39	4.83	1133.33	41.52	153.78	160.67
IBG -33	59.80	65.00	30.33	10.13	66.33	17.00	13.60	68.87	73.91	10.05	16.69	4.37	1016.67	46.00	170.37	152.00

IBG-34	59.60	65.13	27.33	10.61	69.33	20.17	32.80	70.87	74.09	8.71	13.46	4.40	1203.33	42.00	155.56	154.67
IBG-35	68.00	75.67	25.59	11.87	74.33	20.00	21.53	80.73	84.42	10.63	13.61	3.80	1340.33	40.00	148.15	152.00
IBG-36	46.53	58.13	28.67	10.25	54.67	12.27	17.73	63.07	72.14	9.22	12.92	3.73	823.33	65.00	240.74	164.67
IBG-37	53.93	59.00	24.33	7.96	56.00	13.20	18.47	63.40	71.10	8.59	21.07	4.83	1172.67	43.00	159.26	150.00
IBG-38	47.60	61.00	25.03	10.78	55.00	14.00	11.93	65.47	70.26	11.73	10.52	3.70	971.67	44.00	162.96	156.00
IBG-39	55.00	64.13	31.30	10.46	62.33	12.67	21.87	65.80	74.22	9.84	14.40	4.83	816.67	50.00	185.19	161.00
IBG-40	55.00	70.80	24.17	12.73	60.00	12.40	19.80	66.20	79.70	10.34	14.50	5.73	936.00	42.00	155.56	161.33
IBG-41	57.67	54.07	24.83	11.21	67.67	17.53	32.20	75.27	63.49	9.61	13.84	3.53	1066.67	68.00	251.85	152.67
IBG-42	49.60	56.33	27.67	8.44	53.33	11.07	17.67	61.40	63.36	8.32	13.26	4.63	1168.00	39.00	144.44	154.00
IBG-43	49.13	51.27	27.10	7.69	54.33	13.20	16.50	60.93	63.85	10.49	28.64	2.60	1363.00	48.00	177.78	156.00
IBG-44	48.40	53.20	31.67	12.07	55.00	11.73	20.92	53.27	67.92	10.52	18.36	4.73	945.17	73.00	270.37	159.67
IBG-45	44.20	52.90	24.27	7.39	52.67	13.53	17.50	55.40	66.65	7.97	18.20	2.53	1000.00	53.00	196.30	169.33
IBG-46	47.80	54.67	25.67	6.96	54.33	9.67	15.78	55.53	71.44	7.88	10.86	4.37	673.67	70.00	259.26	168.67
IBG-47	66.20	71.40	33.00	12.86	72.00	17.67	31.67	73.47	84.31	10.73	18.82	4.47	1140.00	38.00	140.74	152.33
IBG-48	54.80	66.30	25.60	9.51	67.33	16.53	27.53	75.60	77.20	9.67	16.01	4.33	1235.00	42.00	155.56	153.00
IBG-49	54.60	64.83	34.47	10.20	66.67	14.60	27.33	69.80	73.90	8.41	13.88	3.83	933.33	48.00	177.78	152.00
IBG-50	45.80	50.13	23.50	12.30	52.67	13.83	16.58	53.47	62.72	11.04	18.95	2.83	971.67	51.00	188.89	154.00
IBG-51	51.60	58.00	30.10	9.04	61.67	16.20	22.55	64.07	67.99	8.65	13.06	9.42	547.67	39.00	144.44	150.33
IBG-52	52.20	58.07	32.00	9.96	60.00	19.87	31.89	64.47	70.43	9.33	11.98	7.70	1016.67	36.00	133.33	150.33
IBG-53	57.00	62.77	25.57	8.87	65.00	15.55	30.47	73.47	71.09	8.52	22.52	6.80	767.67	47.00	174.07	158.67
IBG-54	58.33	62.67	25.23	11.97	65.67	20.00	27.67	64.73	77.87	10.56	17.22	10.32	1213.33	72.00	266.67	159.00
IBG-55	73.00	51.80	52.93	9.09	77.67	32.78	32.78	84.93	63.31	9.19	16.81	3.40	600.00	37.00	137.04	161.67
IBG-56	62.60	69.73	25.93	14.00	70.67	29.13	40.78	76.33	70.12	10.92	21.78	3.47	1183.67	49.00	181.48	150.00
IBG-57	45.80	50.20	24.43	6.46	51.33	10.00	9.67	57.87	62.76	11.42	12.99	3.83	1283.20	75.00	277.78	157.33
IBG-58	68.40	75.33	35.17	11.02	76.33	26.55	38.44	66.40	86.32	10.27	18.86	6.30	560.00	67.00	248.15	151.33
IBG-59	57.80	74.63	24.57	11.58	74.00	26.89	32.11	80.20	84.68	15.80	22.99	5.73	850.00	65.00	240.74	146.67
IBG-60	48.40	52.50	24.40	6.97	50.67	17.33	22.22	57.93	64.79	9.26	11.29	9.50	1303.33	49.00	181.48	158.67
IBG-61	64.00	69.67	20.50	11.80	69.00	31.11	41.00	82.80	75.64	10.59	18.96	6.73	416.00	117.0	433.33	166.67
IBG-62	45.00	54.60	39.97	6.28	51.00	9.89	10.67	50.47	65.66	8.72	12.80	6.67	850.00	64.00	237.04	150.33
IBG-63	59.60	50.40	31.53	10.61	68.67	19.00	26.44	76.00	61.16	9.14	12.58	8.73	1088.00	69.00	255.56	153.67
IBG-64	63.80	69.50	26.97	13.40	69.00	20.78	27.55	78.20	72.02	10.68	15.79	9.24	1057.33	48.00	177.78	150.00
IBG-65	66.00	67.73	19.97	13.05	69.33	34.25	33.00	76.13	67.05	10.27	17.87	6.93	865.67	53.00	196.30	154.67
IBG-66	44.20	50.43	36.13	6.15	50.33	10.00	12.67	51.87	64.54	8.47	30.39	6.83	1166.67	76.00	281.48	160.67
IBG-67	64.00	70.70	30.47	9.26	74.33	27.89	32.07	77.47	83.86	10.35	14.93	5.67	576.00	95.00	351.85	160.33
IBG-68	56.60	62.33	34.97	12.97	67.00	27.55	32.67	68.73	78.65	11.27	20.85	8.63	1049.67	75.00	277.78	152.00
IBG-69	71.93	59.00	28.93	7.71	47.00	21.83	19.07	79.80	87.65	12.14	13.45	9.20	1390.13	72.00	266.67	152.67
Mean(x)	56.91	63.05	27.56	10.34	62.60	17.78	25.37	69.03	72.79	9.69	16.04	5.17	996.01	53.50	198.29	155.92
S Em	1.7345	2.6678	1.430	0.7339	0.4065	0.5527	0.6831	0.9283	1.332	0.6888	0.6411	0.2040	47.6201	2.929	10.860	2.0170
CD	4.8508	7.4610	3.999	2.0526	1.1368	1.5456	1.9103	2.5962	3.727	1.9263	1.7930	0.5705	133.178	8.194	30.373	5.6408
CV	5.2789	7.3283	8.987	12.293	1.1247	5.3824	4.6642	2.3292	3.171	12.307	6.9215	6.8304	8.2811	9.484	9.4868	2.2406

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