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PERFORMANCE OF ASH GOURD GENOTYPES FOR EARLINEES AND YIELD UNDER CHHATTISGARH PLAINS, INDIA

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Abstract

An experiment was conducted at Horticulture, Research cum Instructional Farm at Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), India; during *Kharif* season (2014-15) with the objective to find out suitable ash gourd genotype for earliness and yield under Chhattisgarh plains. Among thirty genotypes, the genotype IAG 2 was noted for earliness (82 DAT) for days to 50% flowering and the genotype IAG 15 was noted for early male flowering *i.e.* 28.67. The genotype IAG 7 exhibited early fruit setting (68.67 DAT) and the genotype IAG 29 noted for early harvesting *i.e.* 124.33 DAT. Maximum number of fruits per plant (14) was recorded in IAG 10. Studies revealed that the genotypes IAG 2, IAG 15, IAG 7, IAG 29 and IAG 10 were found to be promising for earliness and fruit yield.

Key words : Ash gourd, earliness, fruit yield, genotypes.

Introduction

Ash gourd [*Benincasa hispida* (Thumb) Cogn.] popularly known as wax gourd, or white pumpkin is important cucurbitaceous vegetable in India grown in rainy season. It belongs to family cucurbitaceous having chromosome number 2n = 24. It is believed to have originates in India. Among the cucurbits, ash gourd/wax gourd is considered a prized vegetable because of its high nutritional value, long storage life and good transport qualities, besides its medicinal properties. The young leaves, flowers and both immature and mature fruits are consumed. The mature fleshy fruit is either eaten raw or cooked as vegetable marrow or 'candied' as sweetmeat popularly known as 'petha'. It is a good source of carbohydrate, vitamin A, vitamin C and minerals like iron and zinc (Randhawa *et al*., 1983 and Sureja *et al*., 2006). An enzyme extracted from ash gourd juice can be used in place of calf rennet for producing cheddar cheese (Gupta and Eskin, 1977). It is also used to treat a variety of ailments in ayurvedic and naturopathy systems of medicine. An understanding of the nature and magnitude of variability or genetic diversity among the genetic stocks is of prime importance to the breeder to overcome these production problems. A good knowledge of genetic diversity helps to yield is a complex character controlled by a large number of contributing characters and their interactions. A study of correlation between different quantitative characters provides an idea of association that could be effectively exploited to formulate selection strategies for improving yield components. For any effective selection programme, it would be desirable to consider the relative magnitude of association of various characters with yield. The path coefficient technique developed by Wright (1921) helps in estimating direct and indirect contribution of various components in building up the total correlation towards yield. On the basis of these studies, the quantum importance of individual character is marked to facilitate the selection programme for better gains.

Materials and Methods

The study was carried out during *Kharif* season (2014-2015) at Horticulture Research cum Instructional farm at Department of Horticulture, I.G.K.V., Raipur (C.G.), India. The experiment comprised of thirty genotypes of ash gourd *viz.,* IAG 1, IAG 2, IAG 3, IAG 4, IAG 5, IAG 6, IAG 7, IAG 8, IAG 9, IAG 10, IAG 11, IAG 12, IAG 13, IAG 14, IAG 15, IAG 16, IAG 17, IAG 18, IAG 19, IAG 20, IAG 21, IAG 22, IAG 23, IAG 24, IAG 25, IAG 26, IAG 27, IAG 28, IAG 29 and IAG 30 .

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Table 1 : Mean performance for fruit yield & its component in ash gourd.

Characters	Days to 50% flowe-ring	No. of branches per plant	Node no at which 1st female flower appears	Node no at which 1st male flower appears	Days to fruit set	Days to 1st fruit harvest	Fruit length (cm)	Fruit girth (cm)	Average fruit weight (kg.)	No. of fruits per plant	T.S.S.	100 seed weight	Fruit yield per (kg)	Fruit yield per ha (q/ha)	Duration of crop (sowing to last harvest)
IAG-1	85.67	11.00	47.33	31.00	76.67	126.67	22.33	52.33	2.37	8.33	2.07	4.67	19.53	65.11	135.00
IAG-2	82.00	12.00	37.00	30.00	70.67	127.00	21.67	51.00	3.00	8.33	2.47	4.17	25.17	83.89	136.33
IAG-3	85.67	11.33	47.00	31.33	74.33	129.00	24.00	52.00	2.85	9.00	2.13	4.33	25.50	85.00	137.67
IAG-4	83.67	12.33	37.00	32.00	74.67	133.33	23.00	49.00	2.60	9.00	2.33	4.57	23.27	77.55	145.00
IAG-5	92.33	11.33	44.00	31.67	81.33	125.33	22.33	51.67	2.27	10.00	2.40	5.16	22.77	75.89	135.67
IAG -6	89.00	10.00	45.00	30.00	80.67	131.67	21.33	50.67	2.24	8.00	2.13	3.33	17.93	59.78	140.00
IAG-7	89.67	10.00	44.67	32.00	68.67	128.33	23.67	51.67	2.87	8.67	2.13	4.30	24.00	79.99	144.00
IAG-8	90.67	11.67	30.00	29.33	81.00	132.00	22.33	52.33	3.17	9.33	2.27	4.33	29.67	98.89	137.67
IAG-9	90.33	13.67	32.67	32.00	78.67	133.33	23.33	50.67	3.10	9.67	2.53	3.83	29.93	99.77	137.67
IAG-10	93.33	14.00	48.67	30.67	82.33	133.33	24.33	62.33	3.35	14.00	2.67	6.10	47.23	157.44	143.67
IAG-11	98.67	11.33	34.00	33.67	87.67	132.00	24.00	53.67	2.80	9.67	2.53	4.14	27.47	91.55	134.33
IAG-12	110.00	11.33	47.33	32.00	93.33	125.33	20.67	50.33	3.23	8.00	2.27	3.80	25.77	85.89	134.00
IAG-13	95.33	10.67	43.00	31.67	75.67	127.00	24.67	49.67	2.85	9.67	2.60	4.83	27.43	91.44	137.33
IAG-14	96.67	10.33	45.33	30.33	84.00	129.67	22.67	48.67	2.53	9.00	2.40	3.33	22.75	75.83	139.67
IAG-15	91.33	10.33	35.33	28.67	82.00	132.67	25.00	48.33	2.33	8.33	2.40	4.50	19.33	64.44	133.00
IAG-16	96.33	10.00	45.00	32.67	77.67	127.33	26.00	49.00	2.70	8.00	2.33	5.17	21.47	71.55	140.00
IAG-17	83.67	10.00	30.00	31.00	71.33	130.67	22.33	50.67	3.14	8.67	2.53	4.33	27.37	91.22	143.33
IAG-18	95.00	10.00	32.00	30.00	85.00	130.67	24.00	53.67	3.03	11.00	2.40	4.50	33.30	111.00	136.67
IAG-19	99.67	10.67	47.67	30.00	86.67	127.67	22.67	58.00	2.55	9.00	2.47	4.39	19.20	64.01	136.00
IAG-20	86.33	10.33	40.00	33.67	79.67	128.67	23.00	53.00	3.27	9.67	2.33	3.33	29.50	98.33	141.33
IAG-21	108.00	10.00	39.00	30.00	85.33	127.67	24.00	57.00	2.77	11.00	2.47	4.33	28.53	94.44	143.00
IAG-22	99.67	11.00	40.67	32.00	88.67	132.33	24.33	52.00	2.39	8.67	2.47	3.50	23.15	77.18	140.00
IAG-23	103.33	10.33	46.67	33.33	88.00	131.67	23.67	55.67	3.20	7.67	2.67	4.00	26.67	88.89	146.33
IAG-24	102.33	11.33	43.00	31.67	95.00	129.33	21.00	55.67	3.00	8.67	2.20	3.33	24.45	81.50	143.67
IAG-25	108.67	10.67	41.00	31.33	83.67	134.33	24.33	51.67	2.93	9.67	2.40	4.50	27.00	90.00	137.33
IAG-26	97.00	10.33	40.00	34.00	85.33	129.00	24.33	53.00	2.82	8.33	2.53	4.30	23.53	78.44	141.33
IAG-27	105.67	10.33	39.33	32.67	92.00	131.67	22.33	55.00	2.90	9.67	2.53	4.33	28.07	93.55	142.00
IAG-28	106.00	10.00	38.00	30.33	93.00	131.67	24.00	50.33	2.62	10.00	2.47	4.30	26.10	87.00	141.00
IAG-29	109.00	10.00	36.00	32.00	97.00	124.33	22.00	49.67	2.58	8.67	2.40	3.50	22.42	74.72	134.67
IAG-30	107.33	9.67	40.00	32.00	93.00	132.33	23.33	55.67	2.85	9.33	2.07	4.33	26.60	88.66	136.67
Mean (x)	96.08	10.87	40.56	31.43	83.10	129.87	23.22	52.48	2.81	9.23	2.39	4.25	25.84	86.10	**139.14**
SEm±	5.352	0.721	1.320	0.999	4.359	1.735	0.929	1.577	0.150	0.734	0.129	0.310	2.607	8.693	2.502
CD (p=0.05)	15.153	2.042	3.736	2.828	12.341	4.913	2.631	4.465	0.425	2.077	0.365	0.877	7.382	24.610	7.083
CV (%)	9.650	11.497	5.637	5.506	9.087	2.314	6.932	5.206	9.262	13.768	9.366	12.629	17.481	17.489	3.114

Table 2 : Analysis of variance for fruit yield and its component characters in ash gourd.

S. no.	Character (df)	Mean sums of square		
		Replication	Treatment	Error
		(2)	(30)	(60)
01.	Days to 50% flowering	78.478	219.441**	85.961
02.	No. of branches per plant	1.733	3.324**	1.561
03.	N0de no. of 1st female flower appears	11.078	90.651**	5.227
04.	Node no. 1st male flower appears	4.133	5.314**	2.995
05.	Days to fruit set	307.033	169.682**	57.022
06.	Days to 1st fruit harvest	22.933	22.703**	9.037
07.	Fruit length (cm)	2.178	4.651**	2.592
08.	Fruit girth (cm)	0.144	29.349**	7.466
09.	Average fruit weight (kg)	0.017	0.291**	0.068
10.	No. of fruits per plant	0.133	4.486**	1.616
11.	T.S.S.	0.004	0.084**	0.050
12.	100 seed weight	0.674	1.128**	0.288
13.	Fruit yield/plot (kg)	2.614	87.320**	20.401
14.	Fruit yield (q/ha)	27.862	968.997**	226.736
15.	Duration of crop (sowing to last harvest)	28.211	39.970*	18.786

The experiment was laid out in a Randomized Block Design with three replications at 3.0 × 1.0 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 characters *viz.,* days to 50% flowering, number of branches per plant, node number at which first male and female flower, days to fruit set, days to first fruit harvest, fruit length (cm), fruit girth (cm), average fruit weight (g), number of fruits per plant, total soluble solid (%), 100 seed weight (g), fruit yield per kg, fruit yield per hectare (q/ha) and crop duration. The data were subjected to statistical and biometrical analysis (Singh and Chaudhary, 1985).

Results and Discussion

The mean values of different growth and yield parameters with respect to genotypes are presented in table 1. The genotypes significantly differed for days to 50% flowering, number of branches per plant, node number at which first male and female flower appear, days to fruit set, days to first fruit harvest, fruit length (cm), fruit girth (cm), average fruit weight (g), number of fruits per plant, fruit yield (q/ha), crop duration. Significant early flowering for days to 50% flowering was noticed in IAG 2 (82 DAT) while IAG12 (110 DAT) was found to be late in this respect. Male flower was produced at lower nodes (28.67) in IAG 15 whereas, IAG 8 produced female flower on the lower node (30). The genotype IAG 7 exhibited early fruit setting (68.67 DAT) followed by IAG 2(70.67 DAT) and IAG 4 (74.67 DAT) and the genotype IAG 29 recorded early harvesting (124.33 DAT). The results are in agreement with that of Pandey and Singh (2007) in sponge gourd, Kumar *et al.* (1999) and Sirohi *et al.* (1988) in bottle gourd. Higher number of branches was recorded in IAG 10 (14) followed by IAG 9 (13.67). The length of fruit ranged from 20.67 cm in IAG 12 to 26 cm in IAG 16. The fruit of IAG 10 was marked for the maximum fruit girth (62.33 cm) while fruit of IAG 15 recorded the least girth (48.33 cm). The genotype IAG 10 recorded highest fruit weight (3.35 kg) and the fruit weight was lowest in IAG 6 (2.24 kg). Number of fruits per plant was highest in IAG 10 (16) and lowest in IAG 16 (8). The results obtained are in accordance with those of Mahto *et al*. (2010) for fruit length and Sharma and Sengupta (2013) for fruit length, fruit girth and fruit weight.

Significantly higher fruit yield per hectare was recorded in IAG 10 (157.44 q/ha) followed by IAG 13 (64.44q/ha). Minimum crop duration (133 days) was recorded in IAG 15 and the maximum crop duration (146.33 DAT) was observed in IAG 23. Similar results obtained are in lines with those of Mahto *et al*. (2010), Husna *et al*. (2011), Yadav and Kumar (2012), Harika *et al*. (2012) and Sharma and Sengupta (2013) for fruit yield.

Performance studies revealed that the genotypes IAG 2, IAG 15, IAG 7, IAG 29 and IAG 10 were found to be promising for earliness and fruit yield. In order to improve the fruit yield per plant and other important attributes

genotypes falling in distant characters may be utilized in future breeding programme.

References

Harika , M., V. D. Gasti, T. Shantappa, R. Mulge, A. M. Shirol, A. B. Mastiholi and M. S. Kolkarni (2012). Evaluation of bottle gourd genotypes [*Lagenaria siceraria* (Mol.) Standl.] for various horticultural characters. *Karnataka J. Agric. Sci.*, **25(2)** : 241-244.

Husna, A., F. Mahmud, M. R. Islam, M. A. A. Mahmud and M. Ratna (2011). Genetic variability, correlation and path co-efficient analysis in Bottle gourd [*Lagenaria siceraria* (Mol.) Standl.]. *Adv. Bio. Res*., **5(6)** : 323-327.

Kumar, S., S. P. Singh and R. C. Jaiswal (1999). Heterosis over mid and top parent under the Line × Tester fashion in bottle gourd [*Lagenaria siceraria* (Mol.) Standl.]. *Veg. Sci*., **26(1)** : 30-32.

Mahato, B., M. K. Pandit and A. Sarkar (2010). Evaluation of some indigenous bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] genotypes in the new alluvial zone of West Bengal. *J. Interacademicia*, **14(4)** : 440-443.

Pandey, R. and D. K. Singh (2007). Seasonal effect on fruit yield and study of genetic variability on indigenous germplasm lines of sponge gourd (*Luffa cylindrica* Roem.). *Ann. Agric. Res. New Series*, **28(2)** : 184-191.

Sharma, A. and S. K. Sengupta (2013). Genetic Diversity, Heritability and Morphological Characterization in Bottle Gourd [*Lagenaria siceraria* (Mol.) Standl.]. *The Bioscan*, **8(4)** : 1461-1465.

Singh, R. K. and B. D. Chaudhury (1985). Biometrical method of quantitative genetic analysis. *Haryana J. Hort. Sci*., **12(2)** : 151-156.

Sirohi, P. S., N. Sivakami and B. Choudhury (1988). Genetic studies in bottle gourd. *Ann. Agric. Res*., **9(1)** : 1-5.

Yadav, Y. C. and S. Kumar (2012). Studies on genetic variability, correlation coefficient and path analysis in bottle gourd [*Lagenaria siceraria* (Mol) Standl.]. *Ann. Hort.*, **5(1)** : 80-89.