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Evaluation of Onion Genotypes (*Allium cepa* L.) for Yield and Quality Parameters during *Kharif* Season in Eastern Dry Zone of Karnataka

Suhas, Y. H.[1*], Amarananjundeswara, H.[2], Tejaswini, H. R.[3], Jagannath, H. R.[4] and Lakshmipathi, N.[5]

[1]M.Sc. (Hort.), College of Horticulture, Kolar-563101

[2]Head, Potato Research and Extension Centre, Hassan-573201

[3]M.Sc. (Hort.), College of Horticulture, Bengaluru-560065

[4]M.Sc. (Hort.), College of Horticulture, Bengaluru-560065

[5]M.Sc. (Hort.), College of Horticulture, Kolar-563101

Department of Vegetable Science, College of Horticulture, Kolar, UHS, Bagalkot (Karnataka), India-563101

*Corresponding Author E-mail: suhasyh.93@gmail.com

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ABSTRACT

In the experiment twenty five genotypes of onion were evaluated for their growth, yield and quality attributes during Kharif season at College of Horticulture, Kolar, Karnataka by adopting RBD with two replications. The growth characters appeared significant differences among the genotypes evaluated. The genotype Super Flare exhibited maximum plant height (68.45cm), number of leaves (13.60) leaf length (59.15cm) and leaf width (1.39cm). While, minimum bulb neck and collar thickness was registered in Rampur Local (0.40cm) and Arka Bindu (1.10cm), respectively. However, the genotype Super Flare registered maximum number of rings (10.34) and the genotype Arka Kirthiman revealed minimum number of centers (1.20). The quality parameters like TSS, pungency and dry matter content was observed maximum in genotype Arka Bindu (17.33°brix, 6.36µmole./g FW and 19.40%, respectively). With respect to yield parameters, the genotype Super Flare noticed maximum average bulb weight (135.00 g) and ten bulb weight (1380.00 g). However, Maximum bulb yield was documented in Super Flare (38.16 t/ha). On the basis of yield and quality parameters Super Flare, S-780, Arka Bindu and Rampur Local were found best suited for Kharif season cultivation in Eastern Dry Zone of Karnataka.

Key words: *Onion, Genotypes, Kharif, Bulb yield, Pungency.*

INTRODUCTION

Onion (*Allium cepa* L.) is one of the most important vegetable crop whose leafy portion as a vegetable, bulbs as salad and spice are used daily. In Karnataka, onion is produced throughout the year and cultivated in an area of 159.60 million hectares with the production of 2395.60 million tonnes and productivity of 15.40 tonnes per hectare[2]. In India, total production of onion is 16,813 metric tonnes, obtained in an area of 1051.50 million hectare.

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While, Maharashtra state stands first with production of 4,660 metric tonnes and Gujarat recorded highest productivity of 24.40 tonnes per hectare. Moreover, onion cultivars reveal wide variation in their yielding ability and potential when grown under varied agro-climatic zones of the country[2].

In India, of total annual onion production about 50 per cent comes from *Rabi* season harvested in April to May, 30 per cent from late *Kharif* season harvested in January to February and remaining 20 per cent from *Kharif* season onion harvested in October to November months. The *Rabi* season crop harvested in April to May is stored all over the country and slowly made available for domestic supply as well as for export up to October to November. There is a critical gap of supply in the country from October to December and as a result the onion price shoot up every year. The good harvest in *Kharif* season tries to bridge the gap of intermediary demand created in the country.

During *Kharif* season, cultivation of onion is undertaken on limited scale in the Karnataka owing to adverse climatic conditions. However, due to more profitability in growing onion during *Kharif* season, it is gaining popularity among the farmers. In addition there are few varieties of onion are suitable for cultivation during *Kharif* season and some genotypes available which are suitable for Kharif season with high yield and good quality. Therefore keeping the above points in view, the present investigation was undertaken to ascertain the yield potential of 25 genotypes and also to study their processing qualities under irrigated situation during *Kharif* seasons in the Eastern Dry Zone of Karnataka.

MATERIAL AND METHODS

The present investigation was conducted at College of Horticulture, Kolar (Eastern Dry Zone of Karnataka) during *Kharif* season under irrigated situation using twenty five genotypes (13 varieties, 10 hybrids and 2 synthetics) as genotypes collected from various sources. *viz.*, Arka Pragathi, Arka Kalyan, Arka Bindu, Arka Niketan, Nasik Red, Rampur Local, Bellary Red, Sataragarvha, Poona Furusungi, Agrifound Light Red, S-780, Light Red, Prema-178, Arka Kirthiman, Arka Lalima, Super Flare, Lucifer, BSS-827, Suvarna, Samruddhi, Sudharshan, Super Red, Flare, Arka Bheem and Marshall. For studies total 25 genotypes were used in the present investigation to evaluate for various growth, yield and quality parameters. The experiment was laid out in Randomized Block Design with two replications during *Kharif* 2015. The seeds of different onion genotypes were sown in plastic pro-trays filled with coir pith as a rooting media during third week of June 2015 in low cost polyhouse and transplanted in the first week of September 2015. In each experimental plot consisted of 10 rows for every treatment. The plot size was 2.0 mx 1.5m. The plants were transplanted at a row to row spacing of 15 cm and plant to plant spacing of 10 cm. The recommended dosage of fertilizers were applied with following the production practices during the cropping period. Observations were recorded on five randomly selected plants in each treatment. The measurements on vegetative parameters were recorded on plant height (cm), number of leaves, leaf length (cm), leaf width (cm), collar thickness (cm), neck thickness (cm), number of rings, number of centers. The quality parameters like TSS, pungency, dry mater content, yield characters like average bulb weight (g) ten bulb weight, bulb yield (t/ha), marketable bulb yield and unmarketable bulb yield (t/ha).

RESULTS AND DISCUSSION

The results of growth parameters of onion genotypes are presented in Table 1. A significant variations were observed among the genotypes and variety with respect to vegetative growth, yield and quality. The maximum plant height and leaf length was recorded in Super Flare (68.45 cm and 59.15 cm, respectively) and the minimum was recorded in Arka Bindu (48.90cm and 43.75 cm, respectively). The significantly highest number of leaves produced in Super Flare

(13.60). Whereas, Arka Bindu produced lowest number of leaves (8.50). Among the genotypes, Poona Furusungi, Agrifound light red, S-780, Light Red, Suvarna, Super Red and Arka Bheem recorded no bolting per cent (0.00%). While, Prema- 178 registered the maximum bolting per cent (3.65 %).

Table 1: Growth attributes in different onion genotypes

Sl. No.	Genotypes	Plant height (cm)	Number of leaves	Leaf length (cm)	Bolting (%)	CT (cm)	NT (cm)
1	**Arka Pragathi**	56.60	9.90	53.32	0.75	1.12	0.43
2	**Arka Kalyan**	55.25	10.80	52.75	1.35	1.24	0.53
3	**Arka Bindu**	48.90	8.50	43.75	2.75	1.10	0.42
4	**Arka Niketan**	57.25	11.70	53.66	1.25	1.22	0.50
5	**Nasik Red**	54.65	11.10	50.25	1.65	1.24	0.56
6	**Rampur Local**	56.75	10.80	51.45	2.35	1.16	0.40
7	**Bellary Red**	53.05	10.10	48.45	2.25	1.18	0.48
8	**Sataragarvha**	58.15	10.50	53.75	1.45	1.29	0.60
9	**Poona Furusungi**	57.45	11.30	54.55	0.00	1.17	0.42
10	**Agrifound Light Red**	52.55	10.20	48.15	0.00	1.25	0.56
11	**S-780**	57.65	12.30	54.35	0.00	1.23	0.53
12	**Light Red**	52.52	11.70	47.22	0.00	1.17	0.48
13	**Prema-178**	54.95	11.30	49.35	3.65	1.27	0.58
14	**Arka Kirthiman**	58.15	11.80	55.22	1.35	1.35	0.68
15	**Arka Lalima**	59.35	12.10	55.55	1.25	1.32	0.63
16	**Super Flare**	68.45	13.60	59.15	0.65	1.38	0.70
17	**Lucifer**	55.40	11.90	51.42	1.45	1.23	0.52
18	**BSS-827**	56.90	12.10	53.65	1.55	1.27	0.55
19	**Suvarna**	54.75	10.10	51.55	0.00	1.15	0.47
20	**Samruddhi**	57.50	11.90	53.95	2.33	1.31	0.61
21	**Sudharshan**	51.90	10.70	48.54	1.25	1.16	0.43
22	**Super Red**	64.45	11.50	58.45	0.00	1.25	0.56
23	**Flare**	58.85	11.80	56.55	1.40	1.33	0.62
24	**Arka Bheem**	62.25	12.60	58.35	0.00	1.18	0.45
25	**Marshall**	60.15	12.30	57.65	1.75	1.15	0.43
SEm±		**2.12**	**0.65**	**2.15**	**0.17**	**0.05**	**0.05**
CD at 5%		**6.20**	**1.90**	**6.27**	**0.49**	**0.14**	**0.14**

Arka Bindu recorded the lowest bulb collar thickness of 1.10 cm. While, maximum collar thickness was observed in Super Flare (1.38 cm). With respect to neck thickness genotype Rampur Local recorded minimum neck thickness after curing (0.34 cm) followed by Cheluru Local (0.40 cm). Whereas, maximum neck thickness after curing was noticed in

Super Flare (0.70 cm). However, minimum collar and neck thickness were desirable trait for extending storage life.

With respect to quality parameters (Table 2) maximum number of rings per bulb was recorded in case of Super Flare (10.34). Whereas, Arka Nikethan noiced the minimum number of rings per bulb (6.60). The number of centres was found to be minimum in Arka Kirthiman (1.20) which was on par with Arka Kalyan (1.30). Whereas, Samruddhi revealed the highest number of centres per bulb (3.30). The quality parameters like TSS, pungency and dry matter content was observed maximum in genotype Arka Bindu (17.33 ◦brix, 6.36µmole./g FW and 19.40%, respectively).

Table 2: Quality attributes in different onion genotypes

Sl. No.	Genotypes	Rings /bulb	Centers /bulb	TSS (° brix)	Pungency (Pyruvic acid µmoles/g FW)	Dry matter (%)
1	**Arka Pragathi**	8.50	2.20	12.87	5.46	12.60
2	**Arka Kalyan**	7.50	1.30	13.21	5.83	12.90
3	**Arka Bindu**	9.20	2.70	17.33	6.36	19.40
4	**Arka Niketan**	6.60	2.50	13.65	5.55	10.30
5	**Nasik Red**	8.50	2.35	12.51	6.12	12.40
6	**Rampur Local**	8.20	1.50	13.16	5.93	11.30
7	**Bellary Red**	9.40	2.80	11.42	5.62	13.90
8	**Sataragarvha**	8.50	3.20	12.61	4.79	12.80
9	**Poona Furusungi**	9.30	1.40	11.47	5.73	13.30
10	**Agrifound Light Red**	8.60	2.75	12.43	5.23	9.60
11	**S-780**	9.40	2.65	11.32	4.83	14.10
12	**Light Red**	8.20	2.50	12.22	4.16	11.10
13	**Prema-178**	8.40	2.40	12.17	5.67	16.30
14	**Arka Kirthiman**	7.50	1.20	13.54	5.81	12.10
15	**Arka Lalima**	8.40	2.30	13.67	5.87	13.80
16	**Super Flare**	10.34	3.20	11.27	4.04	13.10
17	**Lucifer**	9.27	2.10	12.35	5.32	14.60
18	**BSS-827**	8.48	2.50	11.28	4.59	12.80
19	**Suvarna**	9.72	1.50	11.76	4.78	14.20
20	**Samruddhi**	8.25	3.30	12.31	5.12	12.30
21	**Sudharshan**	9.12	2.10	12.36	5.32	15.80
22	**Super Red**	7.63	2.60	12.83	5.91	11.80
23	**Flare**	8.30	2.50	13.17	6.13	11.30
24	**Arka Bheem**	9.32	1.50	13.45	5.75	16.60
25	**Marshall**	7.62	1.40	13.12	5.45	10.60
	SEm±	**0.46**	**0.19**	**0.57**	**0.42**	**0.56**
	CD at 5%	**1.35**	**0.57**	**1.67**	**1.23**	**1.65**

Regarding yield attributes (Table3), highest bulb width was noticed in Super Flare (7.40 cm). Whereas, Arka Bindu recorded the least (4.45 cm) bulb width The maximum length of bulb was registered in Arka Bheem (6.40 cm). While, minimum bulb length was recorded in genotype Arka Bindu (4.10 cm). The maximum average and ten bulb weight was recorded in genotype Super Flare (135.00g and 1380.00 g, respectively). However, Arka Bindu registered the minimum average (37.50 g) and ten bulb weight (380.00 g). The highest

bulb yield was obtained in Super Flare (38.16 t/ha) followed by S-780 (36.50 t/ha). However, lowest bulb yield was registered in Arka Bindu (17.33 t/ha).

Table 3: Yield attributes in different onion genotypes

Sl. No.	Genotypes	Bulb width (cm)	Bulb height (cm)	Avg. Bulb weight (g)	Ten bulb weight (g)	Total bulb yield (t/ha)	Marketable yield (t/ha)
1	**Arka Pragathi**	5.60	4.95	86.30	865.00	28.82	27.12
2	**Arka Kalyan**	6.10	4.75	94.50	932.00	35.16	33.66
3	**Arka Bindu**	4.45	4.10	37.50	380.00	17.33	14.50
4	**Arka Niketan**	6.10	4.60	91.20	908.00	27.16	25.53
5	**Nasik Red**	5.90	4.20	87.60	867.00	31.50	30.03
6	**Rampur Local**	6.50	5.10	101.30	1030.00	29.16	27.43
7	**Bellary Red**	5.85	5.20	88.40	892.00	30.05	27.85
8	**Sataragarvha**	6.05	4.90	93.40	947.00	33.82	32.58
9	**Poona Furusungi**	6.25	5.35	106.00	1082.00	30.16	28.99
10	**Agrifound Light Red**	6.00	5.10	83.50	828.00	24.83	22.98
11	**S-780**	6.60	5.20	103.50	1056.00	36.50	35.52
12	**Light Red**	5.40	4.60	78.30	762.00	22.50	20.53
13	**Prema-178**	6.30	4.80	87.90	865.00	24.66	22.56
14	**Arka Kirthiman**	5.90	5.25	88.20	890.00	29.33	27.76
15	**Arka Lalima**	5.90	5.50	89.10	895.00	33.33	31.90
16	**Super Flare**	7.40	5.35	135.00	1380.00	38.16	37.23
17	**Lucifer**	5.90	5.20	96.70	982.00	30.28	28.60
18	**BSS-827**	6.40	5.20	89.20	895.00	34.33	32.99
19	**Suvarna**	5.80	4.65	86.30	867.00	26.26	24.51
20	**Samruddhi**	6.50	5.25	110.00	1125.00	35.56	34.31
21	**Sudharshan**	5.70	4.60	77.90	783.00	29.73	28.07
22	**Super Red**	6.60	4.85	88.70	890.00	32.66	31.29
23	**Flare**	6.30	4.85	89.40	896.00	35.66	34.18
24	**Arka Bheem**	5.90	6.40	107.00	1087.00	36.33	34.81
25	**Marshall**	7.00	5.10	103.50	1060.00	35.83	34.36
	SEm±	**0.27**	**0.27**	**5.15**	**61.60**	**2.93**	**3.27**
	CD at 5%	**0.80**	**0.78**	**15.04**	**179.79**	**8.55**	**9.53**

The variation in genetic constitution may be attributed to varied growth parameters which in turn resulted in different synthesis and utilization efficiency of photosynthetic product thereby differences in yield characters of varieties, Mohanty and Prusti[5] have also reported the variation in growth and yield traits of different varieties. The genotype Super Flare recorded the maximum marketable bulb yield (37.23 t/ha) While, Arka Bindu recorded the minimum marketable bulb yield per hectare (14.50 t/ha) during *Kharif* season. Similarly, variations in bulb yield of different varieties due to genetic constitution have been reported by Aghora and Pathak[1], Patil *et al*.[7], Deka *et al*.[4], Yadav *et al*.[8].

CONCLUSION

The results showed that Super Flare recorded significantly highest bulb yield along with maximum plant height, number of leaves/plant, weight of bulb, yield with moderate dry matter content, TSS and pungency. The variety S-780 produced

comparable bulb yield and stand next to it with all other characters. The variety Arka Bindu showed significant results for quality parameters. On the basis of yield and quality parameters Super Flare, S-780, Arka Bindu and Rampur Local were found best suited for *Kharif* season cultivation in Eastern Dry Zone of Karnataka.

REFERENCES

1. Aghora, T. S. and Pathak, C. S., Heterosis and combining ability in a line x tester cross of onions. *Veg. Sci*. **18(1):** 53-58 (1991).
2. Anonymous, Final estimates for 2014-15. National Horticulture Board, Gurgoan, pp-4 (2013).
3. Bhonde, S. R., Shrivastava, K. J. and Pandey, U. B., Evaluation of varieties for growing "Rangda" crop of onion (Allium cepa L.) in Nasik area of Maharshtra. *Maharshtra J. Hort*. **6(2):** 39 (1992).
4. Deka, B. C., Bora, G. C., Baruah, S. N. and Shadeque, A., Yield and quality performance of some onion varieties. *J. Agric. Sci. Soc. North-East India.* **7(2):** 162-164 (1994).
5. Mohanty, B. K. and Prusti, A. M., Assessment of onion cultivars for horticultural traits in Orissa during Kharif season. *JNKVV, Res. J.* **34(1&2):** 20-24 (2000).
6. Sharma, S., Bal, S. S. and Bajaj, K. L., Chemical composition of some important varieties of onion. *Veg. Sci.* **23(1):** 45-51 (1996).
7. Patil, D. R., Hebbara, M. and Naganagoud, A., Performance of onion varieties on black soils. *Karnataka J. Agril. Sci*. **4(1-2):** 54-56 (1991).
8. Yadav, V. S., Yadav S. S. and Sharma, Y. K., Evaluation of onion varieties for bulb yield and yield attributes. In: Souvenir & Abstract "National Symposium on Alliums: current scenarion and emerging trends" Organised from 12-14 March, by Indian Soci. Alliums at DOGR, Rajgurunagar, Pune p135 (2011).