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Analyzing Yield Attributes of Different Onion (*Allium cepa* L.) Varieties for Green Leaf Purpose

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ABSTRACT

The present investigation entitled "Analyzing Yield Attributes of Different Onion (*Allium cepa* L.) Varieties for Green Leaf Purpose" was conducted during *Rabi*- 2017-18 at Scheme for Research on Onion Storage, Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri with a view to evaluate the green leaves yield of different onion varieties for leafy vegetable. The present investigation was carried out in Randomized Block Design. The overall evaluation of 18 genotypes for green leaves yield was conducted. The results obtained for polar diameter and equatorial diameter both at 30, 45 and 60 DAT showed non significant results. For average weight of leaves and bulb, results recorded were significantly different and maximum was in Baswant-780 at 30, 45 and 60 DAT. Similarly, significant difference was observed in yield kg/plot and yield q/ha with maximum yield in Baswant-780 at all 30, 45 and 60 DAT. From the above result it can be concluded that better leaf quality can be obtained at 45 DAT. Also T_3 i.e., Baswant-780 followed by T_{18} i.e., N-2-4-1 showed better result for green leaf yield.

Key words : *Allium cepa, Leaf vegetables, Yield of onion leaves*

Introduction

Vegetables play an important role in balanced nutrition. Among this Onion (*Allium cepa* L.) is one of the most important bulbous vegetable crop belongs to the family *Amaryllidaceae* (Alliaceae), chromosome number 2n=16 and locally known as *Pyaj* and in Maharashtra locally it is known as *Kanda*. It was domesticated in Iran and Pakistan i.e. Central Asia. It is very valuable crop for earning foreign exchange by exporting to abroad. It accounts for 70 per cent of India's total foreign exchange earnings from the export of fresh vegetables. India is the second largest producer of onion next to China in the world. Maharashtra is leading onion producing state in India and share 32% in production. In India, total production of onion is 22071.24 metric tons, obtained in an area of 1315.24 million hectares. Moreover, onion cultivars reveal wide variation in their yielding ability and potential when grown under varied agro-climatic zones of the country (Suhas *et al.*, 2018). Nutritive value of onion varies from variety to variety, small size onion is more nutritive then big size. Onion ranks medium in calories, low in protein and very low in vitamins. Successful onion production depends on the selection of varieties that are

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adapted to different conditions imposed by specific environment. Looking to its importance for domestic consumption as well as export, greater attention is needed for its improvement. Fresh, green onions are gaining popularity with consumers and have become the fastest growing segment in the onion market. Keeping this in view studies are carried out on the green onion. Green onions are harvested while the leaves are still fresh & green and the bulb is either undeveloped or very small in diameter.

Materials and Methods

The experiment was carried out at the Department of Horticulture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar during *Rabi* season 2017 – 18 in Randomized Block Design with 18 genotypes *viz,* T_1 - Phule Samarth, T_2- Phule Suvarna, T_3 - Baswant -780, T_4- Phule Safed, T_5- Bhima Raj, T_6 - Bhima Super, T_7 –Bhima Shubra, T_8 -Bhima Shakti, T_9 - Bhima Kiran, T_{10} - Bhima Shweta, T_{11} - Bhima Dark Red, T_{12} -Bhima Safed, T_{13} - Bhima Red, T_{14} - RO-1, T_{15} -RO-2, T_{16} - RO-59, T_{17} - RO- 252 and T_{18} as N-2-4-1. Geographically, Central campus of MPKV lies between $19^0$47′ N to $19^0$57′ N latitude and $74^0$19′ to $74^0$42′ E longitudes with elevation of 525 m above mean sea level. The soil of experimental plot is grouped under the order vertisol and texture of soil was medium deep black. The treatments were replicated three times. Main field was prepared to fine tilth through tillage operation and flat beds of size 3 x 2 m were made. Fertilizers were applied as FYM (20 t/ha) and chemical fertilizer (50 kg N, 50 kg P_2O_5, 50 kg K_2O) per hectare at the time of transplanting on the experimental site. On January 19, 2018, transplantation was carried out with a 15 x 10 cm spacing. Irrigation started right after transplanting. Weeding and watering schedules as well as other timely intercultural operations, were adhered as advised for the crop.

Equatorial diameter of bulb is the diameter when it is kept upright in natural position. It is measured by Vernier Caliper from the randomly selected twenty bulbs at harvesting time. The mean equatorial diameter was noted. While polar diameter of bulb was measured by using Vernier Caliper in cm from the base of root plate to the neck of the bulb from the same twenty bulbs, which were used for recording equatorial diameter and the mean polar diameter of bulb was calculated. Total weight of selected twenty bulbs of the same plants were recorded and then mean weight of bulb was calculated for each replication of all treatments and expressed in gram. Similarly, weight of leaves of randomly selected same twenty bulbs after harvesting was recorded on electronic weighing balance with 0.001g of accuracy and then mean weight of leaves was noted and expressed in gram. Total leaf yield obtained in kg per plot was taken then same is used to calculate the yield in quintal per hectare using formula:

$$\text{Total leaf yield (q/ha)} = \frac{[\text{area of 1 ha x total leaf yield (kg/plot)}]}{\text{Plot size (m}^2\text{) x 100}}$$

Results and Discussion

The data presented in the Table 1 showed that treatment were non significant with respect to the equatorial and polar diameter at 30, 45 and 60 DAT. According to this investigation maximum equatorial diameter is recorded in Baswant-780 at different days of transplanting showing better result for Baswant-780. Similar findings were found for equatorial diameter by Sharma (2009), Yadav *et al.* (2009), Hosamani *et al.* (2010), Tripathy *et al.* (2016) and Shrivastav *et al.* (2017). Polar diameter in onion is an important character, because it indicates bulb storage ability. Above results showed that Baswant-780 recorded the maximum polar diameter which is in accordance with equatorial diameter and other growth parameters. These results are similar with the results of Sharma (2009), Tarai *et al.* (2015), Tripathy *et al.* (2016) and Das *et al.* (2017).

The information presented in Table 2 revealed the significant differences among the different treatments for average weight of leaves and bulb at 30, 45 and 60 DAT. The maximum average weight of bulb was recorded in T_3 i.e., cv. Baswant-780 at all different transplanting period i.e., 30, 45 and 60 DAT. The average weight of bulb increases gradually up to 45 DAT but after that there is sudden increase at 60 DAT. This is may be due to more bulb development after 45 DAT in comparison to vegetative growth. Similarly, the maximum weight of leaves is showed by Baswant-780. Further, it is observed that weight of bulb is more than weight of leaves after 45 DAT and 60 DAT. Similar findings were observed by Lortsuun (1989), that in onion the relative leaf growth rate is more in the initial stages thus showing positive leaf growth but towards maturity there is a decrease in relative leaf growth rate

due to decrease in leaf dry weight as number of leaves decreases.

The data in the Table 3 revealed that the treatment differed significantly at 30, 45 and 60 DAT. The treatment T_3 i.e., cv. Baswant-780 gave the highest yield and was statistically at par with T_{18}i.e., cv.

Table 1. Assessment of different onion genotypes for equatorial diameter and polar diameter of bulb (cm)

Treatment	Genotypes	Equatorial diameter			Polar diameter		
		30 DAT	45 DAT	60 DAT	30 DAT	45 DAT	60 DAT
T_1	Phule Samarth	0.82	1.11	2.74	3.91	4.22	4.29
T_2	PhuleSuvarna	0.95	1.09	2.66	4.40	4.58	4.69
T_3	Baswant-780	1.06	1.26	3.12	4.53	4.65	4.73
T_4	Phule Safed	0.94	0.96	2.60	3.84	4.21	4.31
T_5	Bhima Raj	0.85	1.00	2.63	3.63	4.33	4.49
T_6	Bhima Super	0.84	1.09	2.72	3.55	3.95	4.16
T_7	Bhima Shubra	0.97	0.98	2.78	3.83	3.92	4.12
T_8	Bhima Shakti	0.74	0.93	2.99	3.55	4.22	4.32
T_9	Bhima Kiran	0.98	1.05	2.94	3.60	3.68	3.84
T_{10}	Bhima Shweta	0.74	0.84	2.96	3.59	4.17	4.43
T_{11}	BhimaDark red	0.72	1.02	2.61	3.57	4.25	4.28
T_{12}	Bhima Safed	0.91	0.93	2.77	3.20	3.91	4.17
T_{13}	Bhima Red	0.86	1.00	2.97	3.30	4.22	4.35
T_{14}	RO-1	0.74	0.94	2.91	3.83	4.05	4.15
T_{15}	RO-2	0.92	1.04	2.94	4.12	4.34	4.45
T_{16}	RO-59	0.76	1.05	2.92	4.12	4.23	4.27
T_{17}	RO-252	0.88	0.93	2.99	4.13	4.43	4.55
T_{18}	N-2-4-1	1.02	1.04	3.00	4.18	4.31	4.33
	S.E.±	0.08	0.09	0.13	0.27	0.32	0.32
	CD @ 5%	NS	NS	NS	NS	NS	NS
	CV %	**16.41**	**14.59**	**7.99**	**12.00**	**13.31**	**12.63**

Table 2. Assessment of different onion genotypes for average weight of leaves and average weight of bulb (g)

Treatment	Genotypes	Average weight of leaves			Average weight of bulb		
		30 DAT	45 DAT	60 DAT	30 DAT	45 DAT	60 DAT
T_1	Phule Samarth	4.41	9.06	19.01	4.04	9.85	25.20
T_2	PhuleSuvarna	4.41	7.24	19.51	4.51	9.03	22.05
T_3	Baswant-780	11.54	14.21	28.58	7.78	13.64	30.62
T_4	Phule Safed	4.48	10.16	25.04	3.97	10.70	27.08
T_5	Bhima Raj	6.77	9.97	19.16	6.13	9.56	26.12
T_6	Bhima Super	10.71	12.81	14.14	4.83	6.65	28.01
T_7	Bhima Shubra	8.54	10.16	18.12	5.68	8.09	24.55
T_8	Bhima Shakti	10.79	14.02	21.34	4.02	9.50	28.42
T_9	Bhima Kiran	8.72	11.70	24.51	3.69	8.72	26.95
T_{10}	Bhima Shweta	10.43	12.29	17.54	5.06	10.45	22.78
T_{11}	Bhima Dark red	10.70	13.29	17.14	5.47	11.03	27.34
T_{12}	Bhima Safed	5.61	11.02	19.15	6.19	9.32	28.11
T_{13}	Bhima Red	10.57	12.05	15.90	5.10	12.55	22.46
T_{14}	RO-1	10.73	13.10	16.01	5.16	6.82	27.46
T_{15}	RO-2	10.60	13.66	24.59	5.32	12.27	26.89
T_{16}	RO-59	9.41	12.17	22.50	4.68	7.88	24.33
T_{17}	RO-252	10.15	12.82	24.25	4.63	11.73	28.22
T_{18}	N-2-4-1	10.80	14.03	25.07	6.46	12.74	29.40
	S.E.±	0.65	0.78	1.41	0.51	0.98	1.06
	CD @ 5%	1.87	2.25	4.05	1.45	2.80	3.05
	CV %	**12.73**	**11.44**	**11.81**	**16.99**	**16.84**	**6.94**

Table 3. Assessment of different onion genotypes for leaf yield per hectare (q/ha).

Treatment	Genotypes	30 DAT	45 DAT	60 DAT
T_1	Phule Samarth	29.39	60.42	126.73
T_2	Phule Suvarna	29.42	48.25	130.04
T_3	Baswant-780	76.91	94.74	190.52
T_4	Phule Safed	29.88	67.75	166.91
T_5	Bhima Raj	45.13	66.46	127.73
T_6	Bhima Super	71.40	85.39	94.26
T_7	Bhima Shubra	56.95	67.76	120.79
T_8	Bhima Shakti	71.91	93.48	142.27
T_9	Bhima Kiran	58.16	78.00	163.40
T_{10}	Bhima Shweta	69.53	81.92	116.92
T_{11}	Bhima Dark Red	71.33	88.61	114.27
T_{12}	Bhima Safed	37.43	73.46	127.68
T_{13}	Bhima Red	70.46	80.34	105.98
T_{14}	RO-1	71.54	87.33	106.74
T_{15}	RO-2	70.65	91.06	163.92
T_{16}	RO-59	62.71	81.10	149.98
T_{17}	RO-252	67.64	85.44	161.66
T_{18}	N-2-4-1	72.01	93.51	167.14
	S.E.±	4.34	5.23	9.38
	CD @ 5%	12.47	15.03	26.97
	CV %	**12.73**	**11.44**	**11.81**

N-2-4-1 at 30, 45 and 60 DAT, respectively. According to present investigation the leaf weight is increasing gradually with the number of days hence, yield q/ha also increases. Maximum leaf yield is recorded in Baswant-780 followed by N-2-4-1. Although Baswant-780 is *kharif* season onion but it showed the maximum leaf yield as compare to other cultivars. This may be due to the physiology of the crop. Similar findings were recorded by Lortsuun (1989) in 3 different onion cultivar.

Conclusion

Equatorial diameter, polar diameter, average weight of bulb, average weight of leaves and leaf yield (q/ha) of 18 different onion cultivar were measured at 30, 45 and 60 days after transplanting. The treatment T_3 i.e., cv. Baswant-780 had significantly more Equatorial diameter, polar diameter, average weight of bulb, average weight of leaves and leaf yield (q/ha) followed by T_{18} i.e., cv. N-2-4-1 at 30, 45 and 60 DAT. So, the following data represents that Baswant-780 showed better results for green leaf yield of onion at 45 and 60 DAT, even though it is a *kharif* season variety.

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Conflict of interest statement

The author declares that there is no conflict of interest.

References

Ratan, D., Gowda, R.V. and Pandey, H. 2017. Evaluation of Different Onion (*Allium cepa* L.) Genotypes for Yield and Quality Parameters in Kharif Season under Bengaluru Condition. *Int. J. Curr. Microbiol. App. Sci.* 6(11): 2393-2398.

Hosamani, R.M., Patil, B. C. and Ajjappalavara, P. S. 2010. Genetic variability and character association studies in Onion (*Allium cepa* L.). *Karnataka J. Agric. Sci*. 23: 302-305.

Lortsuun, D.N. and Khan, A.A. 1989. The Pattern of Dry Matter Distribution during Development in Onion. *Journal of Agronomy and Crop Science.* 162(2): 127-134.

Sharma, A. K. 2009. Evaluation of onion varieties in *kharif* season under sub mountain low hill conditions of Himachal Pradesh. *Annals Hort*. 2: 191-193.

Srivastav, G., Balaji, V. and Prasad, V. M. 2017. Studies on multiple correlation between bulb yield, growth and yield attributes in different genotypes of onion (*Allium cepa* L.) under Allahabad agro-climactic condition. *Journal of Pharmacognosy and Phytochemistry*. 6(6): 793-798.

Suhas, Y. H., Amarananjundeswara, H., Tejaswini, H.R., Jagannath, H.R. and Lakshmipathi, N. 2018. Evaluation of Onion Genotypes (*Allium cepa* L.) for Yield and Quality Parameters during *Kharif* Season in Eastern Dry Zone of Karnataka. *Int. J. Pure App. Biosci* . 6 (6): 552-557.

Tarai, R.K., Panda, P.K., Behera, S. K., Beura, J. K., Mohapatra, K. C. and Sahoo, T. R. 2015. Varietal performance of onion in the western undulating zone of Odisha. *International Journal of Scientific Research and Engineering Studies.* 2(1): 1-4.

Tripathy, P., Sahoo, B. B. and Dash, D. K. 2016. Evaluation of Rabi onion (*Allium cepa* L.) genotypes under Western Table Land Zone of Odisha. *International Journal of Farm Sciences.* 6(3): 216-222.

Yadav, S.S., Haldavanekar, P.C., Bhave, S.G., Khandekar, R.G. and Haldankar, P. M. 2009. Growth and yield performances of onion varieties under Kokan agro climatic conditions of Maharashtra. *J Asian Hort*. 5(2): 85-86.