International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Response of *Kharif* Onion Varieties to Time of Set Planting

S. M. More[1], V. S. Kale[2], Anjali Wanare[3], S. D. Deshmukh[4]

[1, 3] M.Sc. Student, Department of Horticulture, Dr. P.D.K.V., Akola, Maharashtra, India

[2]Associate Professor, Department of Horticulture, Dr. P.D.K.V., Akola, Maharashtra, India

[4]Ph. D. Scholar, Department of Horticulture, Dr. P.D.K.V., Akola, Maharashtra, India

Abstract: ***The present experiment conducted in kharif season of 2017 in respect of bulb production was undertaken under two parts basically for standardization of protocol for onion bulb production through sets at Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.). The experiments was laid out in factorial randomized block design with three replications and sixteen treatment combination with two factors viz., factor A i.e. Four Varieties., 1st variety Bhima Super(V1), 2nd variety Bhima Raj(V2), 3rd variety Agri Found Dark Red(V3) and 4th variety Phule Samarth(V4) and Factor B i.e. Four dates of set planting 1st date of set planting 15th June (D1), 2nd date of planting 30th June (D2), 3rd date of planting 15th July (D3) and 4th date of planting1st August (D4). Effect of variety Agri Found Dark Red (V3) and 2nd date of set planting (D2) at 30th June was found significantly superior over other treatment combinations in respect of growth, yield and quality parameters. Plant height (53.83 cm), number of leaves per plant (7.80), Leaf length (51.93 cm) at 90 DAT, weight of fresh bulb (87.7 g), Average weight of bulb (80.6 g), Bulb diameter (6.36 cm), marketable bulb yield per plot (7.17 kg), total bulb yield per hectare (222.60 q) neck thickness (1.43 cm), bolting (0.00%), splitting (3.00 %) and Total Soluble Solids (11.61°Brix) at the time of harvesting than any other treatment combinations. Considering net profit and economics, the variety V3 Agri Found Dark Red and second date of set planting D2 (30th June) was found to be more remunerative and profitable as per B:C ratio (2.48:1).***

1. Introduction

Onion (*Allium cepa* L.) originated from central Asia is one of the most important commercial vegetable crop grown throughout the world. Onion is being extensively cultivated all over the world, especially in China, India, Netherlands, Pakistan, Bangladesh and Australia. India is the second largest producer of onion with an area of 1293 thousand ha and production 21718 thousand MT. In India, Maharashtra is the largest producer of onion in the country with about 471.66 thousands ha area and 6773.08 thousand MT of production with a tune of 22.05 tonnes per hectare productivity. Production is mainly concentrated in Nashik, Pune, Jalgaon, Dhule, Ahmednagar, Solapur and Satara districts (Anon, 2017) of Western Maharashtra.

In Maharashtra, onion bulb-crop is cultivated in three regular seasons, i.e., in *kharif* season 10-15 per cent, in late K*harif* 20-40 per cent and in *Rabi* season 50-60 per cent cultivation. *Kharif* onion cultivation is monopoly of Maharashtra state due to availability of extreme short-day cultivars (viz., N-53, B-780, Phule Samarth, Agri Found Dark Red and local strains) and favorable climatic conditions. However, nursery production of K*harif* onion crop often affected severely by cloudy atmosphere, late rains and incidence of various pests and diseases. Therefore, at present K*harif* onion cultivation is restricted to certain area with low yield potential and poor keeping quality.

Successful raising of nursery during summer season is the main problem for growing of K*harif* season crop. However, it is possible to raise K*harif* onion crop very successfully through onion sets. Seed rate and set planting time are the most important factors which may influence the growth and yield of onion sets in nursery.

2. Material and Methods

The present study entitled "Response of *Kharif* Onion Varieties to Time of Set Planting" was carried out at Main garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during the *Kharif* season of 2017. The experiment consists with four different dates of set planting and four different varieties. The effect of these combinations on the growth, yield and quality of onion was recorded.

3. Results and Discussions

A) Growth observations

The data presented in Table 1 indicated that, the difference in plant height, number of leaves and leaf lenght was significantly affected due to interaction effect of dates of set planting and varieties at all stages of crop growth i.e. 30, 60 and 90 DAT.

At the stage of 30, 60 and 90 DAT, the maximum plant height (47.60 cm, 53.21 cm and 53.83cm respectively) was recorded in treatment combination (V3D2), whereas minimum plant height at 30, 60 and 90 DAT i.e. 22.53 cm, 41.63 cm and 50.40 cm was recorded in treatment combination (V1D4) and (V1D3) respectively. This may be due to genetical makeup of the varieties and early planting provides lower temperature with long photoperiod which ultimately improving the plant height. Similar results have been reported by Srivastava *et al.* (1996) and Mohanty and Prusti (2001).

Table 1: Responce of *kharif* onion varieties to time of set planting on Growth observations

Treatment combination	Plant height (cm)			No of leaves			Leaf length (cm)		
	30 Days	60 Days	90 Days	30 Days	60 Days	90 Days	30 Days	60 Days	90 Days
V1D1	22.67	49.80	50.80	4.93	6.47	6.47	19.40	48.00	50.27
V1D2	25.13	49.13	51.07	6.03	6.27	7.40	20.20	45.73	50.07
V1D3	24.17	41.63	50.40	4.40	5.67	7.40	14.87	40.93	48.20
V1D4	22.53	46.60	50.27	4.00	6.47	7.53	14.93	40.60	47.47
V2D1	33.20	44.93	51.13	5.50	6.20	7.33	31.47	46.20	48.93
V2D2	43.30	53.30	51.90	4.70	6.33	7.33	35.13	50.00	50.07
V2D3	42.50	47.00	51.40	5.40	5.93	7.47	41.73	44.47	49.20
V2D4	42.27	51.93	51.33	5.00	6.40	7.27	39.87	48.40	48.60
V3D1	45.93	53.20	52.13	6.43	6.67	7.73	44.00	49.67	50.20
V3D2	47.60	53.21	53.83	6.47	7.23	7.80	46.87	50.13	51.93
V3D3	45.87	53.10	52.90	6.00	7.00	7.40	45.53	49.27	50.13
V3D4	47.20	49.13	52.93	5.40	6.80	7.73	45.67	47.00	50.60
V4D1	36.80	49.13	51.53	5.63	7.14	6.80	33.80	46.87	49.80
V4D2	38.40	49.87	52.33	5.67	7.23	7.20	35.87	47.33	47.53
V4D3	39.47	50.00	51.00	5.33	6.20	7.20	35.60	47.53	47.67
V4D4	40.93	50.73	53.80	5.73	6.57	6.77	37.33	48.40	48.93
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE (m) ±	0.78	1.31	0.44	0.31	0.09	0.17	1.28	1.41	0.62
CD at 5%	2.27	3.8	1.27	0.91	0.28	0.49	3.7	4.08	1.79

Treatment combination (V3D2) recorded maximum number of leaves per plant 6.47, 7.23 and 7.80 at the stage of 30, 60 and 90 DAT, whereas minimum 4.00, 5.67, 6.47 number of leaves per plant was recorded in (V1D4), (V1D3), (V1D1) respectively. Probable reasons for enhanced more number of leaves, due to early planting provides lower temperature with short photoperiod which ultimately improving the vegetative growth of plant. These findings are in agreement with the findings of Sarada *et al*. (2009), Dewangan *et al*. (2012) and Dwivedi *et al*. (2012).

Maximum leaf length at the stage of 30, 60 and 90 DAT was recorded in 46.87 cm, 50.13 cm, 51.93 cm treatment combination (V3D2), whereas minimum leaf length 14.87 cm, 40.60 cm, 47.53 cm was recorded in treatment combination (V1D3), (V1D4), (V4D2) respectively. Probable reasons for increase in leaf length is the maximum photosynthesis and moisture availability in early dates of planting and some extent of varietal characteristics.

B) Yield parameters

The data presented in Table 2 indicated that, the difference in yield and quality parameters was significantly affected due to interaction effect of different dates of set planting and varieties.

1) Fresh bulb weight (gm)

The highest fresh bulb weight (87.70 gm) was recorded in treatment combination (V3D2), whereas lowest (68.13gm) fresh bulb weight was recorded in treatment combination (V2D2).

2) Average Bulb Weight (gm)

Treatment combination (V3D2) recorded the highest average bulb weight i.e. 80.60 gm whereas, lowest i.e. (70.80gm) average bulb weight was recorded in treatment combination (V2D3).

3) Bulb Diameter (cm)

The difference in Bulb diameter was significantly affected due to interaction effect of different dates of set planting and varieties were found significant and the highest (6.36 cm) bulb diameter was recorded in treatment combination (V3D2) whereas, lowest (5.30 cm) bulb diameter was recorded in treatment combination (V4D1) and (V4D4).

4) Marketable bulb yield per plot (kg)

Highest (7.17 kg) marketable bulb yield was recorded in treatment combination (V3D2), whereas lowest (3.69kg) marketable bulb yield was recorded in treatment combination (V4D2).

5) Total bulb yield per hector (kg)

The total bulb yield per hector were found significant and the highest (222.60 q) yield was recorded in treatment combination (V3D2) which was at par with treatment combination (V3D3) , (V2D2) , (V3D1). Whereas lowest (188q) total bulb yield per hectare was recorded in treatment combination (V2D3).

Yield parameter has shown maximum values in early date because of weather parameters like rainfall, humidity, temperature and photoperiod were in optimum range. Similar results have been reported by Mohanty and Prusti (2001), Singh and Bhonde (2011). The different varietal characters of onion and avability of 11-12 hours sunlight which stimulate bulb formation, Mohanty *et al*. (2002), Sarada *et al*. (2009), Sharma A.K. (2007) and Yadav *et al*. (2010).

C) Quality parameters

1) Neck thickness (cm)

The neck thickness found significant and the minimum (1.20 cm) was recorded in treatment combination (V4D1), whereas maximum (1.43 cm) neck thickness was recorded in treatment combination (V3D2). Variation in neck thickness was due to the inherent genetic makeup of the varieties, which is some way influenced by the photoperiod at the growth leads to increased neck thickness of the bulb but minimum neck thickness is desirable character of variety. It also help to increase the shelf life of the bulb. Present findings are supported with that of Naik and Hosamani (2003) and Ansari *et al.*, (2005).

2) Splitting (%)

The data presented in Table 2 indicated that, Interaction effect between different dates of set planting and varieties on splitting percentage was found statistically non significant.

Table 2: Responce of *Kharif* onion varieties to time of set planting on Yield and Quality parameter

Treatment combination	Weight of fresh bulb (gm)	Average bulb weight (gm)	Bulb Diameter (cm)	Marketable bulb yield per plot (kg)	Total bulb yield per hectare (q)	Neck thickness (cm)	Splitting (%)	Bolting (%)	TSS °Brix
V1D1	73.40	73.40	5.71	5.42	208.00	1.25	3.60	0.48	10.15
V1D2	79.47	79.13	5.71	5.30	214.90	1.26	3.12	0.00	10.17
V1D3	76.47	75.40	5.72	5.47	213.10	1.28	3.62	0.68	10.12
V1D4	72.87	71.53	5.65	5.65	209.30	1.27	3.53	0.48	10.10
V2D1	74.60	76.27	6.14	5.00	204.00	1.33	3.44	0.68	10.16
V2D2	68.13	73.40	6.15	5.10	218.90	1.29	2.89	2.50	10.28
V2D3	69.63	70.80	6.11	5.37	188.00	1.26	3.22	1.36	10.13
V2D4	71.67	72.67	6.13	5.27	208.70	1.34	3.44	0.00	10.25
V3D1	78.00	75.33	6.34	6.20	216.70	1.41	3.11	0.00	11.42
V3D2	87.70	80.60	6.36	7.17	222.60	1.43	3.00	0.00	11.61
V3D3	87.07	78.00	6.31	6.87	218.90	1.33	3.11	0.00	11.43
V3D4	82.53	77.60	6.32	6.30	215.20	1.35	3.23	0.00	11.46
V4D1	72.73	72.73	5.30	6.25	214.30	1.20	4.15	0.00	10.16
V4D2	75.73	73.27	5.37	3.69	192.00	1.27	3.99	2.08	10.14
V4D3	73.40	73.60	5.30	4.70	209.60	1.27	4.08	0.00	10.20
V4D4	76.93	74.93	5.30	6.17	214.70	1.25	4.61	1.44	10.28
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Ns	Sig.	Sig.
SE (m) ±	0.97	1.06	0.012	0.25	6.32	0.014	--	0.37	0.034
CD at 5%	2.82	3.07	0.035	0.73	18.24	0.042	--	1.07	0.098

3) Bolting (%)

Bolting percentage found significant and no bolting recorded in treatment combination (V3D1), (V4D1), (V1D2), (V3D2) (V3D3), (V4D3), (V2D4) and (V3D4), whereas maximum (2.50%) was recorded in treatment combination (V2D2). It may be due to higher temperature prevalence throughout the crop period, smallest bulb size, varietal character and late transplanting resulted in bolting.

4) Total Soluble Solids

TSS found significant and the highest (11.61 °Brix) in treatment combination (V3D2), whereas lowest (10.10 °Brix) was recorded in treatment combination (V1D4).

4. Conclusion

From the present investigation it can be concluded that, different date of set planting and varieties recorded statistically positive effect on growth, yield and quality of onion. These results, however, need to be further confirmed on multi location large scale trials before passing as recommendations to the onion growers of Maharashtra.

References

[1] Anonymous, 2017. Indian Horticulture Database, www.nhb.gov.in. pp 2-5

[2] Ansari N. A., Jaime A. Teixeira Da Silva. and N.Yazdani 2007. Effect of onion sets and cultivar on production of green bunch onions (Allium cepa) . Asian J. of Plant Sci., 6 - 7.

[3] Dewangan, S. R., G. D. Sahu and Kumar Ajay (2012). Evaluation of different *kharif* onion genotypes in Chhatisgarh plains. Indian Horti. J. **2**(1&2): 43-45.

[4] Dwivedi, Y. C., S. S. Kushwah and S.K. Sengupta (2012). Evaluation of onion varieties for growth, yield and quality traits under agroclimatic condition of Kymore plateau region of Madhya Pradesh. *Agric. Sci. Digest-A Res. J*., **32**(4):326-328.

[5] Mohanty, B. K., M. M. Hossain and A.M. Prusti (2000). Varietal assessment on common onion for horticultural fruits during *kharif* season. *The Orissa J. Hort.*, **28**(2):8-11.

[6] Mohanty, B. K., M. M. Hossain and A. M. Prusti (2002). Performance of onion cultivars in *kharif* season. *Advances in Plant Sci.* **15**(2):603- 606.

[7] Naik,B. H. and R. M. Hosamani, (2003) Effect of spacing and nitrogen levels on growth and yield of kharif onion. Karnataka J. of Agric. Sci., 27(2):38-41.

[8] Sarada,C., Kalidasu Giridhar and N. H. Rao (2009). Varietal performance of onion (*Allium cepa L*.) in black soils. *Annals of Plant Physiology*.,**23**(2):266-267.

[9] Sharma, A. K. (2007). Evaluation of onion varieties in *kharif* season under submontan low hill conditions of Himachal Pradesh. Annals of Hort., **2**(2):191-193.

[10] Shrivastava, R. K., B. K. Verma, S. K. Dwivedi and Y.C. Dwivedi (1996). Response of onion varieties to plant spacing in relation to yield attributes and bulb productivity. *Veg. Sci*., **23**(1):26-29.

[11] Singh, R. K., B. K. Dubey, S.K. Singh and S. R. Bhonde (2011). Selection of high yielding and good keeping quality genotypes in onion. *Progressive Horti*. **43**(2):243-247.

[12] Yadav, S. S., B. H. Khan and Nishu Yadav (2010). Studies of onion varieties in *kharif* season. *Bhartiya Krishi Anusandhan Patrika*., **24**(3&4):38-40.