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PERFORMANCE OF RED ONION VARIETIES IN *KHARIF* SEASON UNDER AKOLA CONDITIONS

P. S. Hirave *et al.*,

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P. S. HIRAVE, A. P. WAGH*, A. N. ALEKAR AND R. P. KHARDE
Department of Horticulture,
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola - 444 104 (M.S.)
e-mail: adiraj5588@gmail.com

ABSTRACT

Research experiment was carried out during 2012-13 at Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, in order to evaluate the Performance of red onion varieties in *kharif* season under Akola conditions. The experiment was laid out in Randomized Block Design with eight red onion varieties viz. V₁(Agrifound Dark Red), V₂(Phule Samarth), V₃(Baswant-780), V₄(N-53), V₅(Pune Red), V₆(Bhima Super), V₇(Bhima Raj) and V₈(Bhima Red) which were replicated three times. Results obtained showed that red onion varieties were significantly different when it comes to the plant and bulb morphological characteristics. The variety N-53 produced the maximum height of plant (66.87cm), bulb diameter (6.61 and 6.36cm), fresh bulb weight (110.95 and 106.28gm), cured bulb weight (99.53 and 95.30gm). Regarding neck thickness, the variety Pune Red recorded minimum (0.87cm) neck thickness. The cultivar Bhima Red recorded maximum marketable yield per hectare (328.57 quintal/ha) which was at par with Bhima Raj (298.41 quintal/ha) and Bhima Super (269.83 quintal/ha) respectively. Agrifound Dark Red recorded the maximum TSS (11.47 °Brix) content. Bhima Red variety recorded the zero bolting percentage and minimum splitting percentage (0.33%). The cultivar Bhima Red and Bhima Raj were performed well for the Akola region in *kharif* season.

*Corresponding author

INTRODUCTION

Onion (*Allium cepa* L.) belongs to the *Alliaceae* family and has origin in central Asia. It is commercially by far the most important crop as compared to other spice bulb crops. The annual average world production of onion is estimated at around 72 million metric tonnes. Maharashtra is leading onion growing state accounting 415 thousands hectare area with 4904 thousands million tones production and 16.1 tonnes per hectare productivity (Anon. 2015). Successful onion production depends on the selection of varieties that are adapted to different conditions imposed by specific environment. *Kharif* onion is an off-season cultivation of the crop for which standardization of varieties is of immense utility. Since little information is available about rainy season onions, it was felt imperative to find out suitable varieties for its successful cultivation under Akola condition as a basic step towards its popularization. For increasing area, production and productivity of onion in Vidharbha region, it is very essential to identify the suitable red onion variety in Akola conditions under study. There are numerous varieties of onion, each having different characteristics and yield (Bolanos, 1989, Shimeles, 1998, Costa *et al.*, 2000, Kanwar *et al* 2013). It is expected that the individual variety may perform different on various planting methods. This necessitated the evaluation of various method of planting in combination of genotypes. The hypothesis of the research are different varieties of onion which are grown in *kharif* and late *kharif* season but only few varieties are performed well. According to environmental conditions identify the suitable variety of onion. Hence, the experiment was conducted to study the performance of red onion varieties in *kharif* season and to find out suitable red onion variety for *kharif* season under Akola conditions.

MATERIALS AND METHODS

The investigation was carried out at Main garden, Department of Horticulture, Dr. PDKV, Akola, during the *kharif* season of 2012-13. The experiment was laid out in Randomized Block Design with eight red onion varieties viz. V₁(Agrifound Dark Red), V₂(Phule Samarth), V₃(Baswant-780), V₄(N-53), V₅(Pune Red), V₆(Bhima Super), V₇(Bhima Raj) and V₈(Bhima Red) which were replicated three times.. Eight weeks old healthy seedlings of each variety were transplanted on flat beds at a spacing of 15 x 10 cm in a plot of 2.40 X 1.30 m. Recommended cultural practices were followed to raise the crops successfully. Five plants were selected at random in each plot to record the observations on height of plant (cm), leaves per plant, days required for maturity, bolting percentage (%), neck thickness of bulb (cm), weight of fresh bulb and cured bulb (gm), diameter of bulb (cm), number of marketable bulbs, marketable bulb yield per plot (kg), marketable bulb yield per hectare (q), total yield per plot (kg), total yield per hectare (q), total soluble solids (°Brix) and splitting percentage (%). The mean data were subjected to statistically analyzed as per the methods suggested by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The present investigation revealed that the significant variation among the eight red

Table 1: Growth, yield and yield contributing and quality characters as Influenced by the different red onion varieties in *khari*f season under Akola conditions

Varieties	Plant height (cm) 90 DAT	Number of leaves/plant 90 DAT	Days required for maturity	Bolting (%)	Neck thickness of bulb (cm)	Fresh weight of bulb (gm)	Cured weight of bulb (gm)
V ₁ - Agrifound Dark Red	61.27	13.07	103.00	1.00 (0.8)	1.23	82.78	71.93
V ₂ - Phule Samarth	60.17	14.20	113.00	1.33 (1.1)	1.10	106.28	95.30
V ₃ - Baswant-780	65.67	12.73	100.33	2.00 (1.4)	1.03	81.63	71.10
V ₄ - N-53	66.87	13.40	104.67	2.33 (1.5)	0.93	91.05	80.30
V ₅ - Pune Red	61.87	12.33	116.00	1.67 (1.3)	0.87	80.79	70.10
V ₆ - Bhima Super	65.27	13.67	115.33	0.33 (0.3)	0.97	96.10	85.07
V ₇ - Bhima Raj	57.87	13.20	120.67	0.67 (0.7)	1.07	100.76	89.40
V ₈ - Bhima Red	62.67	14.33	116.67	0.00 (0.0)	1.17	110.95	99.53
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m) ±	1.82	0.38	3.22	0.40	0.05	2.71	2.65
C.D. at 5%	5.52	1.17	9.79	1.21	0.17	8.23	8.04

Table 1: Cont.....

Varieties	Diameter of bulb (cm)	Number of marketable bulbs per plot	Marketable yield per plot (kg)	Marketable yield per plot (kg)	Marketable yield per hectare (q)	Total soluble solids (°Brix)	Splitting (%)
V ₁ - Agrifound Dark Red	5.31	89.04	4.97	4.97	236.50	11.47	1.00 (0.8)
V ₂ - Phule Samarth	6.36	64.76	4.27	4.27	203.17	10.50	2.67 (1.6)
V ₃ - Baswant-780	5.74	93.13	5.20	5.20	247.61	9.87	1.67 (1.0)
V ₄ - N-53	5.98	80.19	4.83	4.83	230.15	10.30	2.00 (1.4)
V ₅ - Pune Red	5.41	81.81	4.33	4.33	206.35	8.87	2.33 (1.5)
V ₆ - Bhima Super	5.71	86.60	5.67	5.67	269.83	10.17	1.33 (1.1)
V ₇ - Bhima Raj	6.15	90.24	6.27	6.27	298.41	10.20	0.67 (0.7)
V ₈ - Bhima Red	6.61	103.80	6.90	6.90	328.57	10.43	0.33 (0.3)
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m) ±	0.19	6.77	0.54	0.54	25.99	0.32	0.44
C.D. at 5%	0.58	20.56	1.65	1.65	78.84	0.97	1.34

onion varieties in *khari*f season under Akola conditions, which indicated the presence of significant genetic variability for all the traits and are shown in Table 1. The plant height was finally recorded at 90 DAT (Days after transplanting), showed maximum plant height (66.87cm) in the variety N-53 which was at par with Baswant-780 (65.67cm), Bhima Super (65.27cm), Bhima Red (62.67cm) and Pune Red (61.87cm), whereas the minimum plant height was recorded by Bhima Raj (57.87cm). Similarly at 90 DAT Bhima Red recorded maximum (14.33) number of leaves which was at par with Phule Samarth (14.20), Bhima Super (13.67), N-53 (13.40), and Bhima Raj (13.20). Whereas, variety Pune Red recorded minimum (12.33) number of leaves per plant. Similar results were reported by Mohanty *et al.* (2002), Sarada *et al.* (2009), Dwivedi *et al.* and Kanwar *et al.* (2013) under different climatic conditions with different varieties.

The Baswant-780 (100.33) required minimum days for maturity which was at par with Agrifound Dark Red (103.00) and N-53 (104.67), While Bhima Raj (120.67) recorded maximum days. These difference in maturity period of bulb was observed due to the different genetic constitution of onion varieties. Patil *et al.* (2003) and Ijoyah *et al.* (2008) also reported the influence of onion varieties on days required for maturity.

The variety Bhima Red recorded minimum (00%) bolting of bulb which was found to be at par with variety Bhima Super (0.33%), Bhima Raj (0.67%) and Agrifound Dark Red (1.00%), whereas maximum (2.33%) bolting of bulb was recorded in

the variety N-53. It may be due high temperature prevalence throughout the crop period and varietal character. These results are in conformity with the findings of Warade *et al.* (1996) and Khar Anil *et al.* (2007).

The variety Pune Red recorded minimum (0.87cm) neck thickness which was at par with N-53 (0.93cm), Bhima Super (0.97cm) and Baswant-780 (1.03cm). However, Agrifound Dark Red recorded the maximum neck thickness (1.23cm) which was at par with Bhima Red (1.17cm). The neck thickness of the bulb correlated with diameter, number of leaves, thus increase in size exerts similar increase in neck thickness. These differences in the neck thickness are due to the different varietal characters of onion. These results are in close agreement with the findings of Mohanty *et al.* (2002) and Dewangan *et al.* (2012).

The maximum average fresh weight of bulb (110.95gm) and cured weight of bulb (99.53gm) were recorded with variety Bhima Red (V8), while the variety Phule Samarth at par for fresh bulb (106.28gm) and for cured bulb (95.30gm) whereas, variety Pune Red recorded minimum fresh weight of bulb (80.79gm) and cured weight of bulb (70.10gm). Similar result were reported by Singh Yadwinder and Brar (2002) and Sarada *et al.* (2009). They observed similar trend in different varieties at different locations.

The Variety Bhima Red (V8) recorded significantly maximum diameter of bulb (6.61cm), number of marketable bulbs (103.8), marketable yield per plot (6.9 kg) and marketable yield

per hectare (328.57 quintal/ha) while the variety at par for diameter of bulb Phule Samarth (6.36cm) and Bhima Raj (6.15cm), for number of marketable bulbs Baswant-780 (93.13), Bhima Raj (90.24), Agrifound Dark Red (89.04) and Bhima Super (86.6), for marketable yield per plot Bhima Raj (6.27 kg) and Bhima Super (5.67 kg) and for marketable yield per hectare Bhima Raj (298.41 quintal/ha) and Bhima Super (269.83 quintal/ha) Whereas, minimum diameter of bulb recorded by Agrifound Dark Red (5.31cm), while Phule Samarth recorded less number of marketable bulbs (64.76), marketable yield per plot (4.27 kg) and marketable yield per hectare (203.17 quintal/ha). The increase in yield could also be due to plant height, leaf number, chlorophyll content, bulb diameter, weight of bulb ultimately enhanced the yield. Similar results were reported by Mohanty *et al.* (2002), Khar Anil *et al.* (2007), Sarada *et al.* (2009), Yadav *et al.* (2010), Dwivedi *et al.* (2012) and Sangeeta *et al.* (2014) under different climatic conditions with different varieties.

Data presented in Table 1 revealed that, total soluble solids of onion bulb was significantly influenced due to different onion varieties. Significantly maximum TSS (11.47 °Brix) was recorded in variety Agrifound Dark which was at par with variety Phule Samarth (10.5 °Brix). Whereas, the minimum TSS (8.87 °Brix) was observed in the variety Pune Red. The increased total soluble solids was due to enhanced physiological activity and availability of nutrients and development of strong source and sink relationship. These results are in conformity with findings of Saimbhi and Bal (1996), Yadav *et al.* (2010) and Dewangan *et al.* (2012).

In respect to splitting percentage, variety Bhima Red recorded minimum (0.33%) splitting of bulb which was found to be at par with variety Bhima Raj (0.67%), Agrifound Dark Red (1.00%), Bhima Super (1.33%) and Baswant-780 (1.67%). Whereas, maximum (2.67%) splitting percentage of bulb was recorded in the variety Phule Samarth. These results are in conformity with the findings of Jadhav *et al.* (1990) and Soni *et al.* (1993).

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