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Evaluation of white varieties of onion suitable for *rabi* season in Southern Telangana

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Abstract

An investigation was done at VRS, Rajendranagar (SKLTSHU), Southern Telangana Zone, Telangana State, India during November, 2020 – April, 2021 and evaluated the accomplishment of various white varieties of onion suitable for *rabi* season in Southern Telangana. Five entries W-355, Bhima Shweta, PKV White, Agri Found White and Palampur White were evaluated in the study. The entries were replicated four times and the design used was Randomized Block Design. Bulb shape of Bhima Shweta and Palampur White was oval and of W-355, PKV White and Agri Found White was round. The variety W-355 reported highly uniform sized bulbs (> 80%) and also recorded maximum average bulb weight (86.63 g), maximum marketable yield (44.89 t ha⁻¹) and highest gross yield (45.91 t ha⁻¹) followed by Palampur White. Minimum average bulb weight, lowest marketable and least gross yield was noticed in Agri Found White. Highest TSS was recorded in Palampur White (13.31° Brix) followed by Bhima Shweta and W-355. No double bulbs were noticed in Bhima Shweta and Agri Found White. Zero bolters were seen in W-355, Palampur white and Bhima Shweta. Zero rotten bulbs were seen in W-355, Bhima Shweta and PKV White. Thrips incidence (4.33) was lowest in W-355 followed by Palampur White. Minimum appearance of purple blotch disease (26.50) was noticed in W-355.

Keywords: Bolter bulbs, double bulbs, *rabi*, rotten bulbs, white onion

Introduction

Onion is an essential commodity of commerce; it is utilized as spice and also as condiment daily in kitchen. Owing to a special pungency both are more valuable than any other vegetables (Som Dutt, 2017) [14]. India ranks first in area under onion in the world and second in production, its productivity is low (15.9 t/ha) compared to world's productivity (20.4/ha) (Amar Jeet Gupta *et al.*, 2017) [11]. Onion crop is widely cultivated across the world under wide climatic range but thrive best with cool atmospheric temperature during early growth phase where as warmer and sunny weather as the growth progress towards bulb maturity. The three major onion growing seasons in India are *kharif*, late *kharif* and *rabi*: however, about 60-70% cultivation is mostly carried out in *rabi* season (Pranjali H Ghodke *et al.*, 2017) [6]. Maharashtra, Gujarat, Odisha, Karnataka, Uttar Pradesh, Andhra Pradesh, Tamilnadu, Bihar, Punjab and Rajasthan are the major onion growing states (Kalyani Gorrepati *et al.*, 2017) [4]. Onion is grown in an area of 45,577 ha in Telangana. Red and white onions are grown of which red in most regions of southern Telangana and in northern regions of Telangana white colour onions are grown. Red coloured onions are more pungent than white onions; owing to less pungency the white onions have good demand in dehydration industries. White coloured onions with high TSS (>18 °Brix) and globe shaped bulbs and are needed. The fungal diseases cause 30-50% yield losses in onions (Vanita Salunkhe *et al.*, 2017) [13]. *Thrips tabaci* is one of the most important pests and is widely distributed in all regions of the country where it is grown (Soumia *et al.*, 2017) [8]. To increase white onion production in *rabi*, it is necessary to change the less productive onion varieties with higher productive onion varieties which are prone to least incidence of purple blotch and thrips and with less bolters and rotten bulbs. Hence, an experiment is initiated at Vegetable Research Station, Rajendranagar, Hyderabad in which five white onion varieties received from DOGR, Rajgurunagar, Pune were tested.

Materials and Methods

A research trail was initiated in *rabi* (November, 2020 – April, 2021) with five entries W-355, Bhima Shweta, PKV-White, Agrifound White and Palampur White at VRS, Rajendranagar, Hyderabad, Telangana State, India.

The soil of the investigated field was with clay loam texture, neutral pH, low in available N and P, high in K, shallow to medium depth of the order Alfisol. The trial was conducted with four replications with randomized block design (RBD). Fifty days old onion seedlings raised in the nursery were transplanted in the main field. The main field was with raised beds with a plot size of 4.8 m² (4.0 m X 1.2 m). One square meter area was allotted for screening of thrips and purple blotch. Plant spacing of 15 cm between rows and plant to plant spacing within the row was 10 cm. A fertilizer dose of 100:50:50:40 kg NPKS and 5 kg zinc fertilizers per hectare were applied. Entire phosphorous, potassium and zinc were applied as basal application, 50% N was applied at 30 DAT and 50% N at 45 DAT. Fipronil @ 2ml/litre at 35 DAT and mancozeb @ 2.5g/lite at 55 DAT was sprayed to control thrips and purple blotch respectively.

To estimate the yield components and yield onion crop was harvested at physiological maturity. The gross weight of marketable bulbs was divided by number of marketable bulbs to get the average bulb weight. Bulbs with diameter size shorter than 2.5 cm were taken as under sized, bulbs with diameter larger than 2.5cm is taken for computing marketable

yields. The combined weight of under sized and also marketable bulbs is taken as total yield. Hand refractometer was used for calculating TSS according to AOAC (1975) [2]. The uniformity is considered as high if more than 80% of the bulbs are of same size, 50–80% bulbs are of same size as average and less than 50% are of same size, it is considered as low. The incidence of Thrips was reported with 1-5 scale and the intensity of purple blotch with 0-9 scale.

Statistical analysis of data was done using *F*-test as suggested by Gomez and Gomez (1984) [3]. For determining the significant difference among the treatment means LSD values at *P*=0.05 were used.

Table 1: Phonological characteristics of white coloured onion varieties at VRS, during *rabi* season.

Entry	Bulb Colour	Bulb Shape	Uniformity in bulb size
W-355	White	Round	High
Bhima Shweta	White	Oval	Average
PKV white	White	Round	Average
Agrifound white	White	Round	Average
Palampur white	White	Oval	Average

Table 2: Execution of white coloured onion varieties at VRS, in *rabi* season.

Variety	Avg. bulb weight (g)	Gross yield (t ha ⁻¹)	Marketable Yield (t ha ⁻¹)	TSS (°Brix)	Percentage of Double bulbs	Percentage of Bolters	Percentage of Rot bulbs	Thrips incidence*	PDI (%) Purple Blotch**
W-355	86.63	45.91	44.89	12.26	3.12	0.00	0.00	4.33 (2.29)	26.50 (30.95)
Bhima Shweta	63.05	33.42	31.92	12.51	0.00	0.00	0.00	8.66 (3.10)	33.00 (35.02)
PKV White	67.98	36.03	34.84	11.30	0.90	2.35	0.00	7.33 (2.88)	32.50 (34.73)
Agrifound White	56.51	29.95	28.26	10.49	0.00	4.68	1.00	13.00 (3.74)	32.00 (34.36)
Palampur White	73.20	38.80	37.63	13.31	1.30	0.00	1.00	6.33 (2.70)	28.25 (31.92)
S.Em +	1.04	0.55	0.49	0.20				0.08	0.51
CD (<i>p</i> =0.05)	3.24	1.72	1.55	0.63				0.23	1.54

* Square root transformed values
** Angular transformation values

Results and Discussion

The colour of the bulb of all the varieties evaluated is white. In Bhima Shweta and Palampur White the bulb shape was oval and was round in W-355, PKV White and Agri Found White. W-355 reported uniformity of more than 80 percent in bulb size, and average uniformity by rest of the varieties (Table-1). From the data in table-2 it is clear that W-355 has reported significantly superior average bulb weight (86.63 g) compared to others, and was followed by Palampur White (73.20 g) and PKV White (67.98 g). The least mean bulb weight was reported by Agri Found White (56.51 g). W-355 recorded a marketable yield (44.89 t ha⁻¹) and gross yield (45.91 t ha⁻¹) which was significantly superior over other entries. Palampur White (37.63 and 38.80 t ha⁻¹) and PKV White (34.84 and 36.03 t ha⁻¹) followed W-355. Minimum average bulb weight (56.51 g), lowest marketable yield (28.26 t ha⁻¹) and least gross yield (29.95 t ha⁻¹) was recorded by Agri Found White. Maximum TSS was noticed in Palampur white (13.31° Brix) followed by Bhima Shweta (12.51 ° Brix) and W-355(12.26 ° Brix). Double bulbs weren't noticed in Bhima Shweta and Agri Found White. Double bulbs to the extent of 0.90%, 1.30% and 3.12% were noticed in PKV white, Palampur white and W-355. Zero bolter bulbs were recorded in W-355, Bhima Shweta and Palampur White. Bolters to the extent of 2.35% and 4.68% were noticed in PKV white and Agri Found White respectively. Zero rotten bulbs were seen in W-355, Bhima Shweta and PKV White. To the extent of 1% rotten bulbs were reported in Agri Found White and Palampur White. Lowest incidence of thrips (4.33)

was reported in W-355 followed by Palampur White. Minimum PDI of purple blotch (26.50) was recorded in W-355 and Palampur White.

The variations in phonological characters, quality parameters, yield contributing factors and yield might be because of variations in genetic makeup and adoptability to various agro-climatic and soil conditions. Variations in yield contributing factors and yield among the entries were previously noticed in onion by Umamaheswarappa *et al.* (2015) [11] during late *kharif* 2011-12 in Karnataka, Utagi *et al.* (2015) [12], by Tripathy *et al.* (2016) [9] in Odisha during *rabi* 2009-10.

The findings of the above experiment are in tune with the findings of Mohanty (2001) [5] in Orissa during *rabi* 1996-97 and 1997-98, Tripathy *et al.* (2013) [10] in Orissa to thrips and purple blotch tolerance and Sarkar *et al.* (2015) [7] in West Bengal to yield and quality of onion.

Conclusion

W-355 had reported high bulb size uniformity, highest mean bulb weight and maximum total and marketable yield. Zero bolters, zero rotten bulbs, lowest thrips incidence and minimum incidence of purple blotch was also reported in W-355. Further study can be continued and W-355 may be recommended for Southern Telangana region of Telangana during *rabi* season followed by Palampur White and PKV White.

Conflict of Interest

The authors declare that they have no known competing

financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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