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Performance evaluation of new high yielding onion (*Allium cepa* L) varieties for Theni district

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Abstract

The on farm testing (OFT) experiment was conducted at farmer field of Palarpatti village of Theni District during Kharif 2018-2019. The experiment trail was conducted to assess the performance of new high yielding Onion varieties for Theni district. The experiment was laid out in a randomized block design and replicated thrice with following three treatments; T₁ - Farmers practice (Local variety), T₂ - Co 5, T₃-Arka ujjwal. There are two onion varieties namely, Co 5 and Arka ujjwal was used in this experiment trail. The recommended doses of fertilizer were applied at the time of field preparation as a basal dose. Each trail plot was conducted in 0.25 ha. The primary data collected from the farmers with help of the interview schedule and direct field measurement. The growth and yield parameters such as plant height (cm), number of leaves per plant, average weight of cluster (g), no of bulbs per cluster, Bulb weight (gm), yield (t/ha) with value of 37.9, 15.9, 98.4, 7, 64.9 and 19.8 were higher with the Arka ujjwal Onion variety (T₃) followed by, Co 7 Onion variety (T₄). In economics aspects highest B: C ratio (2.51) was recorded in Arka ujjwal Onion variety. The above study reveals that, Arka ujjwal could be considered as a better option for achieving higher productivity and profitability of high yielding onion variety for Theni district.

Keywords: New high yielding onion, *Allium cepa* L, OFT

Introduction

The onion (*Allium cepa* L) is the most widely cultivated species of the genus *Allium*. It is one of the most important commercial vegetable crops grown in India. Onion has a steady demand worldwide. With a production of 20.93 million metric tons of onion in 2015-16, India is the second largest onion producer in the World after China. In India, the share of Maharashtra in the total onion production is around 31.19 % in contrast to West Bengal contributing only 2.6% (Department of Agriculture, Cooperation & Farmers Welfare, 2017) [5]. It is used both in raw and mature bulb stage as vegetable and spice. In addition, onion, native of middle Asia or Mediterranean region, is one of the basic and most widely consumed bulb vegetables. Onion is especially a seasonal crop (kharif and rabi) belonging to the domestic market and is being commonly used for its pungency and flavour (Selvaraj 1976) [8]. The pungency in onion is due to the presence of volatile oil known as ally propyl disulphide (Mohanty and Prusti, 2001) [7]. The bulb of onion consists of swollen bases of green foliage leaves and fleshy scales. Onion is one among the world famous spice commodities used for flavoring the dishes (Bhonde *et al.*, 1992) [2]. Besides culinary purposes, it is considered as valuable medicinal plants (Booer, 1946) [4]. Dehydrated powder and flakes and paste prepared out of onion provide rich agro-industrial base for these commodities. The variety performance and date of planting play an important role in the selection of genotypes for yield improvement and adaptation to particular environmental conditions. Onion is highly sensitive to temperature and photoperiod.

The ICAR introduced on farm testing (OFT) for evaluate the performance of new high yielding Onion varieties for Theni district to enhance the yield and income of the famers. The main objective of the trail is evaluating the performance of new high yielding Onion varieties under the real farming situation. The present study has been undertaken to assess the performance of new high yielding Onion varieties for Theni district.

Materials and Methods

The on farm testing (OFT) experiment was conducted at farmer field of Palarpatti village of Theni District during Kharif 2018-2019. The experiment trail was conducted to assess the performance of new high yielding Onion varieties for Theni district. The soil type of the trail plots is sandy clay loam in texture with low organic carbon (0.31 - 0.37 %), available nitrogen (284 - 298 kg ha⁻¹), available phosphorous (7.67 - 11.56 kg ha⁻¹) and available potassium (161 - 189 kg ha⁻¹).

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The soil pH (1:2 soil water suspension) (Jackson, 1973) and EC (1:2 soil water suspension) (Jackson, 1973) of the trail plot is 7.32 and 0.42 dS m⁻¹. The experiment was laid out in a randomized block design and replicated thrice with following three treatments; T₁ - Farmers practice (Local variety), T₂ - Co 5, T₃ - Arka ujjwal. There are two onion varieties namely, Co 5 and Arka ujjwal was used in this experiment trail. The recommended doses of fertilizer were applied at the time of field preparation as a basal dose. Each trail plot was

conducted in 0.25 ha. The primary data collected from the farmers with help of the interview schedule and direct field measurement.

Under the OFT, the testing new high yielding Onion varieties viz., Co 5 and Arka ujjwal at the rate of 1 kg ha⁻¹ was taken. Appropriate need based plant protection measures were taken up to control the pest and diseases following the recommended package of practices as per the Crop Production Guide (Anonymous, 2012)^[1].

Table 1: Difference between testing new high yielding varieties of onion and farmers practices

S. No	Particulars	Duration	Characters
1	T ₁ – Farmers practice (Local variety)		Cultivation of private variety
2	T ₂ - Co 5	90	It is a high yielding variety developed by mass pedigree method of selection. Bulbs are deep pink rose in colour. Average weight of cluster 90g. Average numbers of bulb lets per cluster 5-6. Mature in 90 days after planting. Recommended for cultivation in Kharif and Rabi in Tamil Nadu. Yield 18 t/ha in 90 days.
3	T ₃ - Arka ujjwal	85	It is a multiplier onion variety with uniform bright dark red bulb color, bulb weight 40-45g, dry matter content 14-16% and bulb yield 20-25t/ha in 85 days.

Results and Discussion

Yield attributes

The findings of this study revealed that the yield attributes, yield and economics were significantly influenced by different new high yielding varieties of onion (Table. 1)

The growth and yield parameters such as plant height (cm), number of leaves per plant, average weight of cluster (g), no of bulbs per cluster, Bulb weight (gm), yield (t/ha) with value of 37.9, 15.9, 98.4, 7, 64.9 and 19.8 were higher with the Arka ujjwal Onion variety (T₃) followed by, Co 7 Onion variety (T₄) with plant height (36.5 cm), number of leaves per plant (14.6), average weight of cluster (92.6 gm), no of bulbs

per cluster (4), Bulb weight (62.4 gm), yield (17.6 t ha⁻¹) (Table. 2) and (Fig. 1). The lowest plant height (32.6 cm), number of leaves per plant (12.4), average weight of cluster (83.2 gm), no of bulbs per cluster (4), Bulb weight (57.6 gm), yield (13.5 t/ha) was recorded in local variety (T₁). This might be due to; it has been developed as a multiplier onion variety with uniform bright dark red bulb color and compound bulb with flat shape. The bulb size is 4-5 cm and it gives 40-45 g bulb weight. Therefore a genotype exhibiting relative yield for all the plant attributes may be ideal one. Similar results were also obtained from the works of Bindu and Bindu Podikunju (2014).

Table 2: Performance of different new high yielding varieties of onion

Treatments	Plant height (cm)	No. of leaves per plant	Average weight of cluster (g)	No of bulbs per cluster	Bulb weight (gm)	Yield (t/ha)
T ₁ - Farmers practice (Local variety)	32.6	12.4	83.2	4	57.6	13.5
T ₂ - Co 5	36.5	14.6	92.6	6	62.4	17.6
T ₃ - Arka ujjwal	37.9	15.9	98.4	7	64.9	19.8
S Ed	1.5	0.5	1.7	0.4	0.7	1.1
CD (0.05 %)	3.2	1.2	3.6	0.9	1.5	2.4

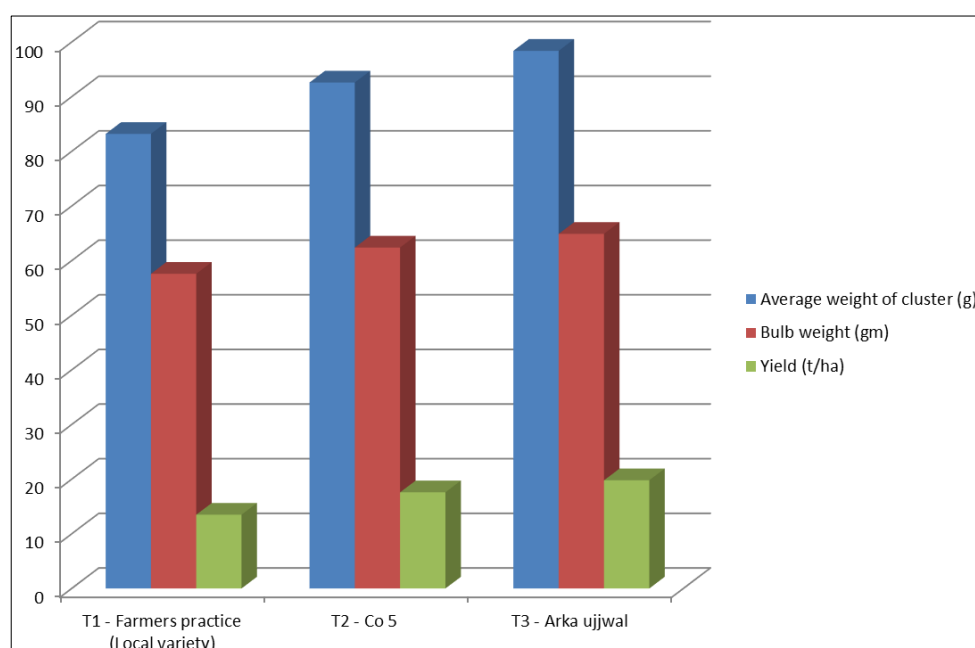


Fig 1: Yield and yield parameters of different new high yielding varieties of onion

Economics

Economics of raising a particular crop plays a vital role in making recommendations for adoption of a technology to the farmers (Table. 3).

The data pertaining to gross returns, net returns and B: C ratios as influenced by performance of different varieties are presented in Table 3. The highest gross return (Rs. 396000 ha⁻¹)

and net return (Rs. 238000 ha⁻¹) were recorded in Arka ujjwal Onion variety. The highest B: C ratio (2.51) was recorded in Arka ujjwal Onion variety. The higher gross, net returns and B: C ratio was due to more bulb yield (cultivation of high yielding variety onion with Integrated Crop Management Practices).

Table 3: Economic parameters of different new high yielding variety of onion

Treatments	Cost of cultivation (Rs ha ⁻¹)	Gross returns (Rs ha ⁻¹)	Net returns (Rs ha ⁻¹)	B:C ratio
T ₁ - Farmers practice (Local variety)	174000	270000	96000	1.55
T ₂ - Co 5	158000	352000	194000	2.23
T ₃ - Arka ujjwal	158000	396000	238000	2.51

Data statistically not analysed

Conclusion

Over all, from the experimental results, it could be concluded that Arka ujjwal onion variety along with adoption of integrated good agricultural practices in onion leads to higher yield. It could be considered as a better option for achieving higher productivity and profitability of high yielding onion hybrid for Theni district.

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